Ordinary Council Meeting

Agenda

25 November 2025

City of Belmont

Notice of Meeting

An **Ordinary Council Meeting** will be held in the Council Chamber of the **City of Belmont Civic Centre,** 215 Wright Street, Cloverdale, on **Tuesday 25 November 2025,** commencing at 6:30pm.

John Christie
Chief Executive Officer

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CITY OF BELMONT

Ordinary Council Meeting

Agenda

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Alternative Formats

This document is available on the City of Belmont website and can be requested in alternative formats including electronic format by email, in hardcopy both in large and standard print and in other formats as requested. For further information please contact the Community Development team on (08) 9477 7219. For language assistance please contact TIS (Translating and Interpreting Service) on 131 450.

Elected Members are reminded to retain any confidential papers for discussion with the minutes.

1 Official Opening

The Presiding Member will read aloud the Acknowledgement of Country.

Acknowledgement of Country
Before I begin, I would like to acknowledge the Whadjuk Noongar people as the Traditional Owners of this land and pay my respects to Elders past, present and emerging. I further acknowledge their cultural heritage, beliefs, connection and relationship with this land which continues today.

The Presiding Member will cause the Affirmation of Civic Duty and Responsibility to be read aloud by a Councillor.

Affirmation of Civic Duty and Responsibility
I make this affirmation in good faith and declare that I will duly, faithfully, honestly, and with integrity fulfil the duties of my office for all the people in the City of Belmont according to the best of my judgement and ability. I will observe the City's Code of Conduct and Standing Orders to ensure efficient, effective and orderly decision making within this forum.

2 Apologies and leave of absence

3 Declarations of interest that might cause a conflict

Elected Members/Staff are reminded of the requirements of *s5.65* of the *Local Government Act 1995 (WA)*, to disclose any interest during the meeting when the matter is discussed, and also of the requirement to disclose an interest affecting impartiality under the City's Code of Conduct for Council Members, Committee Members and Candidates and the Code of Conduct for Employees.

3.1 Financial Interests

A declaration under this section requires that the nature of the interest must be disclosed. Consequently, a member who has made a declaration must not preside, participate in, or be present during any discussion or decision-making procedure relating to the matter the subject of the declaration.

Other members may allow participation of the declarant if the member further discloses the extent of the interest and the other members decide that the interest is trivial or insignificant or is common to a significant number of electors or ratepayers.

Name	Item No and Title	Nature of Interest (and extent, where appropriate)

3.2 Disclosure of interest that may affect impartiality

Elected Members and staff are required in addition to declaring any financial interest, to declare any interest that might cause a conflict (under the Code of Conduct). The member/employee is also encouraged to disclose the nature of the interest. The member/employee must consider the nature and extent of the interest and whether it will affect their impartiality. If the member/employee declares that their impartiality will not be affected then they may participate in the decision-making process.

Name	Item No and Title	Nature of Interest (and extent, where appropriate)

4 Announcements by the Presiding Member (without discussion) and declarations by Members

4.1 Announcements

4.2 Disclaimer

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4.3 Declarations by Members who have not given due consideration to all matters contained in the business papers presently before the meeting

5 Public question time

5.1 Responses to questions taken on notice

5.1.1 Ms Hollands on behalf of Belmont Residents and Ratepayer Action Group

The following question was taken on notice at the 28 October 2025 Ordinary Council Meeting. Ms Hollands was provided with a response on 13 November 2025. The response from the City is recorded accordingly:

1) At the 23 September 2025 Ordinary Council Meeting I asked if Councillors blocking people from their social media page and whether residents could make a complaint of a breach of the Code of Conduct. The response from the City was that the social media page of a Councillor is the 'private realm of an individual, and it is up to the individual, or in this instance Councillor who they allow to see their social media page content.'

   In the Elected Members Communication Policy, it includes statements relating to social media such as 'increases residents access to Council information', and 'increase the level of trust in Council'. How does either of these happen when people are blocked?

   Additionally, I refer the City and Council to the Elected Member Code of Conduct sections 4.1(b), 5.1(a), 6(d), 8.1(a) and 8.2(b) and (d), and to regulation 18 within the Standards Panel Decision 'Walker vs Treeby', and 'Kepert vs Standards Panel and Attorney General where both breaches related to social media accounts. Now that I have provided this information, would the City and Council be prepared to re-investigate this information and review the responses provided to me at the 23 September 2025 Ordinary Council Meeting?

Response

The City has reviewed the additional material provided by Belmont Residents and Ratepayer Action Group (BRRAG) as well as the Local Government Standards Panel cases quoted by BRRAG.

By the City's reading of the Standards Panel cases referred to by the questioner, these cases do not relate to blocking of access to a Facebook page by an Elected Member.

Should BRRAG believe an Elected Member has breached the Local Government Act by blocking a third party's access to that Elected Member's Facebook site, it is open to BRRAG to lodge a formal complaint with the City or the WAEC (as it occurred in the Municipal Election Period).

5.1.2 Ms L Hollands, Redcliffe

The following question was taken on notice at the 28 October 2025 Ordinary Council Meeting. Ms Hollands was provided with a response on 13 November 2025. The response from the City is recorded accordingly:

4. Is there a policy to stop properties having overgrown grass, particularly in relation to front yards of residential properties?

Response

There is no Council policy that addresses overgrown grass on private properties.

Where the property is grossly overgrown the owner would be required to cut back the vegetation in line with the *Bushfire Act 1954 (WA)*.

5.1.3 Mr Cardozo on behalf of Belmont East Ward Connect

The following questions were taken on notice at the 28 October 2025 Ordinary Council Meeting. Mr Cardozo was provided with a response on 13 November 2025. The response from the City is recorded accordingly:

3. When the public is asked to leave an ABF for confidential matters, is the audio recording paused, as it is during confidential items at OCM's?

Response

The audio recording continues during closed sessions for confidential matters at ABF's.

4. So if the audio does not capture confidential matters, then confidentiality cannot be the reason that the public cannot access the ABF audio?

Response

As above, the audio recording continues during closed sessions for confidential matters at ABF's.

5.1.4 Ms J Gee, Cloverdale

The following questions were taken on notice at the 28 October 2025 Ordinary Council Meeting. Ms Gee was provided with a response on 13 November 2025. The response from the City is recorded accordingly:

1. Can I have a summary of how much has been spent on Councillor meals in the last 12-months?

Response

The City provided meals for Elected Members for November 2024 to October 2025 (12 months) at a cost of $19,874 (ex-GST).

2. How much is the Councillors' Lounge costing us including drinks and snacks over the last 12-months?

Response

The Councillors Lounge cost for Elected Members for November 2024 to October 2025 (12 months) is estimated at $1,534 (ex-GST).

5.1.5 Mr L Rosolin, Belmont

The following question was taken on notice at the 28 October 2025 Ordinary Council Meeting. Mr Rosolin was provided with a response on 13 November 2025. The response from the City is recorded accordingly:

2. In regard to employees and volunteers engaged with the City at multiple locations, what is the checks performed to ensure the safety of children and the community as to the backgrounds of these individuals?

Response

As Mr Rosolin was advised at the 28 October 2025 Ordinary Council Meeting, relevant roles at the City require an employee to have a valid Working With Children Check and satisfactory National Police Clearance prior to their commencement at the City.

5.2 Questions from members of the public

6 Confirmation of Minutes/receipt of Matrix

6.1 Matrix for the Agenda Briefing Forum held 18 November 2025

Officer Recommendation
That the Matrix of the Agenda Briefing Forum held on 18 November 2025, as printed and circulated to all Elected Members, be received and noted.

6.2 Ordinary Council Meeting held 28 October 2025

Officer Recommendation
That the Minutes of the Ordinary Council Meeting held on 28 October 2025, as printed and circulated to all Elected Members, be confirmed as a true and accurate record.

7 Questions by Members on which due notice has been given (without discussion)

8 Questions by members without notice

8.1 Responses to questions taken on notice

8.2 Questions by members without notice

9 New business of an urgent nature approved by the person presiding or by decision

10 Business adjourned from a previous meeting

11 Reports of committees

Nil.

12 Reports of administration

12.1 Amendment No. 23 to Local Planning Scheme No. 15 and modifications to Local Planning Policy No.19

Voting Requirement	:	Simple Majority
Subject Index	:	LPS15/023 LPP15/019
Location/Property Index	:	Various
Application Index	:	N/A
Disclosure of any Interest	:	N/A
Previous Items	:	27 May 2025 Ordinary Council Meeting – Item 12.1 23 July 2024 Ordinary Council Meeting- Item 12.1
Applicant	:	N/A
Owner	:	N/A
Responsible Division	:	Development and Communities

Council role

Legislative	The making and adopting of local laws, local town planning schemes and Council policies.

Purpose of report

For Council to consider final adoption of Amendment No. 23 to Local Planning Scheme No. 15 (LPS 15) and modifications to Local Planning Policy No. 19 (LPP 19) following public advertising.

Summary and key issues

- In late 2024, the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)* (Regulations) were amended to create consistency in the assessment of short-term rental accommodation across local governments.
- The key changes relate to:
  - The inclusion of new definitions and modifications to existing definitions.

  - A State-wide exemption for 'hosted' Short-term Rental Accommodation (STRA).
  - A 90-night (cumulative) exemption within a 12-month period for 'unhosted' STRA in the Perth metropolitan area.
- The City is required to amend LPS 15 to be consistent with the State Regulations by the end of 2025. The required amendments to LPS 15 include the addition, modification and deletion of various definitions, as well as updates to the Zoning Table.
- Local Planning Policy No. 19 – Short-term Rental Accommodation also requires minor updates to reflect the proposed changes to LPS 15. These changes are minor in nature, and do not change the substantive policy objectives or application.
- At the 27 May 2025 Ordinary Council Meeting (OCM), Council endorsed public advertising of Amendment No. 23 to LPS 15 and modified LPP 19. The documents were advertised concurrently from 31 July 2025 to 12 September 2025.
- No submissions were received during the advertising period. It is therefore recommended that Council support Amendment No. 23 to LPS 15 and modified LPP 19 without modification.

Officer Recommendation

That Council:

1. Pursuant to Regulation 50(3) of the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)*, supports Amendment No. 23 to Local Planning Scheme No. 15 contained at Attachment 12.1.1 with a recommendation that the Amendment be approved by the Minister for Planning without modification.
2. Adopts modified Local Planning Policy No. 19 - Short-term Rental Accommodation contained at Attachment 12.1.2 in accordance with Schedule 2, Part 2, Clause 4 of the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)*.

Location

Amendment No. 23 and modified LPP 19 relate to the entire City of Belmont local government area.

Consultation

The Regulations require scheme amendments to be submitted to the Western Australian Planning Commission (WAPC) to obtain consent for public advertising.

On 15 July 2025, the City received consent to advertise from the WAPC, subject to a modification requiring 'Unhosted' STRA to be designated as 'A' instead of 'X' in the Mixed Business zone. This change reflects the guidance that 'Unhosted' STRA should be capable of consideration in zones where dwellings can be contemplated. Dwellings can currently be considered in the zone, with some already existing.

Amendment No. 23 and modified LPP 19 were advertised concurrently from 31 July 2025 until 12 September 2025 (43 days) as follows:

- The Amendment, revised Policy and public notices being displayed on the City's website and Civic Centre.
- A public notice being published in the 31 July 2025 edition of the PerthNow newspaper.

No submissions were received during this period.

Strategic Community Plan implications

In accordance with the 2024–2034 Strategic Community Plan:

Key Performance Area: Place
Outcome: 6. Sustainable population growth with responsible urban planning.

Policy implications

Local Planning Policy No. 19 – Short-term Rental Accommodation

While the intent of the Policy remains unchanged, the updates to LPP 19 will ensure terminology and references align with the Regulations. Should Council ultimately approve the modifications to LPP 19, the amended Policy will guide the assessment of future applications for STRA.

Statutory environment

Planning Bulletin 115/2024 – Short-term Rental Accommodation – Guidance for Local Government

The Bulletin provides guidance for local governments on amending their local planning scheme to address STRA in a manner consistent with the Regulations.

It also clarifies how such amendments should be classified as well as providing guidance on land use permissibility.

The Bulletin states that if a scheme amendment only replaces existing land use terms with new short-term rental accommodation terms without changing permissibility, it will generally be a basic amendment. However, if it introduces new land uses or changes the permissibility of existing ones, it will usually be treated as a standard amendment. The Bulletin also outlines that 'unhosted STRA' should be listed as a 'D' or 'A' use in zones where any type of dwelling is capable of approval.

Local Planning Scheme No. 15

Schedule 1 of LPS 15 includes both general definitions and land use definitions for each use listed in the Zoning Table. The relevant definitions relating to this Amendment are outlined in Attachment 12.1.3.

Table 1 (Zoning Table) of LPS 15 sets out the permissibility of uses using the symbols 'P', 'D', 'A' and 'X'. The meaning of the symbols is listed below:

'P' Means the use is permitted by the Scheme, providing the use complies with the relevant development standards and the requirements of the Scheme.

'D' Means that the use is not permitted unless the local government has exercised its discretion by granting development approval.

'A' Means that the use is not permitted unless the local government has exercised its discretion by granting development approval after giving special notice in accordance with the provisions contained in Clause 64 of the Regulations Schedule 2.

'X' Means a use that is not permitted by the Scheme.

Planning and Development (Local Planning Schemes) Regulations 2015 (WA)

Model Provisions

Schedule 1 of the Regulations contains the Model Provisions for local planning schemes. The Model Provisions provide the form and content for all new local planning schemes and apply when a scheme is revised, prepared or amended by a local government. The Model Provisions, along with any essential local variations approved by the Minister, should be gradually integrated into Local Planning Schemes through the scheme amendment process whenever an opportunity arises. All local governments are required to have their schemes align with the updated Regulations for STRA by the end of 2025.

Local Planning Scheme Amendments

Section 75 of the *Planning and Development Act 2005 (WA)* provides for an amendment to be made to a local planning scheme. The procedures for amending a local planning scheme, including public consultation requirements, are set out within Part 5 of the Regulations.

The Regulations specify three different types of Scheme amendments, being 'basic', 'standard' and 'complex'. The main differences between the amendment classifications are the differing advertising requirements. Clause 35(2) of the Regulations requires a resolution of the local government specifying the type of amendment and the reasons for the classification.

When a local government resolves to amend a scheme, the proposed scheme amendment is required to be referred to the WAPC to obtain consent to advertise. Where an amendment is deemed to have an environmental impact, it is also required to be referred to the Environmental Protection Authority.

Following consent to advertise, the responsible authority shall advertise the amendment in accordance with the Regulations by:

- Displaying the amendment and associated public notice on the local government's website.
- Publishing the notice in a local newspaper and displaying this on the local government's public notice boards.
- Giving a copy of the notice to each public authority that the local government considers is likely to be affected by the amendment.

After the conclusion of the advertising period, Council is required to consider the submissions and pass a resolution to either support the amendment, with or without modification, or not support the amendment. After passing a resolution, the amendment is to be forwarded to the WAPC to review and provide a recommendation to the Minister for Planning.

Local Planning Policy Amendments

Schedule 2, Part 2, Clause 5 of the Regulations outlines the procedure for amending a local planning policy. When a local government resolves to amend a policy, it is required to advertise the document for a period not less than 21 days. Modifications to a local planning policy are required to be advertised by displaying a notice on the local government's website and in a local newspaper, as well as making a copy of the revised policy available for viewing at the local government's office.

After the conclusion of the advertising period, the local government must consider submissions and determine whether to proceed with the policy, with or without modification, or not proceed with the policy. Should the local government proceed with the modified policy, it must publish a notice of its decision.

Background

Council endorsed Amendment No. 23 to LPS 15 and modified LPP 19 for advertising at the 27 May 2025 OCM. The intent of Amendment No. 23 and the modifications to LPP 19 is to bring the City's planning framework relating to STRA into alignment with the Regulations.

The rise of online booking platforms has significantly increased the number of properties originally approved for residential use, being used for STRA. Belmont's proximity to Perth Airport, the Perth CBD, Optus Stadium, and the Swan River has made it a desirable location for both traditional tourist accommodation and STRA land uses.

Recognising the need for local guidance, Council adopted LPP 19 to set standards for operators seeking to establish and operate STRA. Since then, the State has amended the Regulations to modify the STRA land use definitions and include exemptions from the requirement for development approval in certain instances. More specifically:

- The land uses of 'hosted short-term rental accommodation', 'unhosted short-term rental accommodation' and 'tourist and visitor accommodation' have been included.
- The 'bed and breakfast', 'holiday accommodation', 'holiday house', 'motel', 'serviced apartment' and 'tourist development' land uses have been deleted.
- Development approval is not required for 'hosted' STRA. 'Unhosted' STRA also does not require development approval where it is used for no more than 90 nights in a 12-month period.

To align the local planning framework with the State's Regulations, modifications are proposed to LPS 15 and LPP 19. These include updates to definitions, the zoning table, and land use permissibility in LPS 15, as well as concurrent amendments to LPP 19 to ensure consistency. An overview of these modifications is provided in the Report section.

Report

Key changes proposed by Amendment No. 23 relate to:

- The addition, modification and deletion of various definitions;
- Updates to the Zoning Table to incorporate new land use terms with permissibility consistent with Planning Bulletin 115/2024; and
- Consequential changes to remove references to deleted definitions from the parking standards and Additional Uses schedule.

Modifications to LPP 19 include:

- Updating terminology to align with the Regulations;

- Clarifying one of the policy objectives and its associated clause; and
- Providing clearer guidance on how parking should be calculated where developments contain self-contained components on the same site.

Amendment No. 23 and modified LPP 19 were advertised concurrently for 43 days, with no submissions received. It is therefore recommended that Council adopt modified LPP 19 and support Amendment No. 23 without modification, with a recommendation that the Minister for Planning approve the Amendment.

Financial implications

There are no financial implications evident at this time.

Environmental implications

There are no environmental implications associated with this report.

Social implications

The amendments to LPS 15 and LPP 19 aim to ensure that STRA uses are located and managed appropriately to protect the supply and amenity of long-term residential accommodation.

Attachment details

Attachment No and title
1. Amendment No. 23 to Local Planning Scheme No. 15 (LPS 15) [**12.1.1** - 34 pages] 2. Revised Local Planning Policy No. 19 - Short-term Rental Accommodation [**12.1.2** - 10 pages] 3. Definitions [**12.1.3** - 4 pages]

City of Belmont

Scheme Amendment 23

Local Planning Scheme No. 15



Document Set ID: 6012572
Version: 1, Version Date: 14/07/2025

Planning and Development Act 2005

RESOLUTION TO PREPARE AMENDMENT TO LOCAL PLANNING SCHEME

CITY OF BELMONT

LOCAL PLANNING SCHEME NO. 15

SCHEME AMENDMENT NO. 23

Resolved that the local government pursuant to Section 75 of the *Planning and Development Act 2005*, amend the above local planning scheme by:

i. Deleting the existing definition of 'Short-Term Accommodation' in Schedule 1 – General Definitions of the Scheme Text.

ii. Amending the existing definition of Cabin in Schedule 1 – General Definitions of the Scheme Text to:

"means a building that —

(a) is an individual unit other than a chalet; and

(b) forms part of —

(i) tourist and visitor accommodation; or

(ii) a caravan park; and

(c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period."

iii. Amending the existing definition of Chalet in Schedule 1 – General Definitions of the Scheme Text to:

"means a building that —

(a) is a self-contained unit that includes cooking facilities, bathroom facilities and separate living and sleeping areas; and

(b) forms part of —

(i) tourist and visitor accommodation; or

(ii) a caravan park; and

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(c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period."

iv. Insert terms 'Short-term Rental Accommodation' and 'Short-term Rental Arrangement' in Schedule 1 – as follows:

"Short-term rental accommodation —

(a) means a dwelling provided, on a commercial basis, for occupation under a short-term rental arrangement; but does not include a dwelling that is, or is part of, any of the following —

(i) an aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1);

(ii) a caravan park;

(iii) a lodging-house as defined in the Health (Miscellaneous Provisions) Act 1911 section 3(1);

(iv) a park home park;

(v) a retirement village as defined in the Retirement Villages Act 1992 section 3(1);

(vi) workforce accommodation."

"Short-term rental arrangement means an arrangement under which —

(a) a dwelling, or part of a dwelling, is provided for occupation by a person; and

(b) the person occupies the dwelling, or part of the dwelling, for a period or periods not exceeding a total of 3 months in any 12-month period."

v. Deleting the 'Bed and Breakfast', 'Holiday Accommodation', 'Holiday House', 'Motel', 'Serviced Apartment', 'Short Stay Accommodation' and 'Tourist Development' definitions in Schedule 1 – Land Use Definitions of the Scheme Text.

vi. Insert the following definition for Tourist and Visitor Accommodation in Schedule 1 – Land Use Definitions:

"(a) means a building, or a group of buildings forming a complex, that —

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(i) is wholly managed by a single person or body; and

(ii) is used to provide accommodation for guests, on a commercial basis, with no individual guest accommodated for a period or periods exceeding a total of 3 months in any 12-month period; and

(iii) may include on-site services and facilities for use by guests; and

(iv) in the case of a single building — contains more than one separate accommodation unit or is capable of accommodating more than 12 people per night; and

(b) includes a building, or complex of buildings, meeting the criteria in paragraph (a) that is used for self-contained serviced apartments that are regularly serviced or cleaned during the period of a guest's stay by the owner or manager of the apartment or an agent of the owner or manager; but

(c) does not include any of the following —

(i) an aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1);

(ii) a caravan park;

(iii) hosted short-term rental accommodation;

(iv) a lodging-house as defined in the Health (Miscellaneous Provisions) Act 1911 section 3(1);

(v) a park home park;

(vi) a retirement village as defined in the Retirement Villages Act 1992 section 3(1);

(vii) a road house;

(viii) workforce accommodation."

vii. Insert the following definition for Hosted short-term rental accommodation in Schedule 1 – Land Use Definitions:

"means any of the following —

(a) short-term rental accommodation where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the same dwelling during the short-term rental arrangement;

(b) short-term rental accommodation that is an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the other dwelling on the same lot, resides at that other dwelling during the short-term rental arrangement;

(c) short-term rental accommodation that is a dwelling on the same lot as an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the ancillary dwelling during the short-term rental arrangement."

viii. Insert the following definition for Unhosted short-term rental accommodation in Schedule 1 – Land Use Definitions:

"means short-term rental accommodation that —

(a) is not hosted short-term rental accommodation; and

(b) accommodates a maximum of 12 people per night."

ix. Deleting reference to 'Bed and Breakfast', 'Holiday Accommodation', 'Motel' and 'Serviced Apartments' in Table 1 – Zoning Table.

x. Inserting 'Hosted Short-term Rental Accommodation', 'Unhosted Short-term Rental Accommodation' and 'Tourist and Visitor Accommodation' in Table 1 – Zoning Table with the permissibilities outlined below.

ZONES										
USE CLASSES	Residential	Town Centre	Commercial	Mixed Use	Mixed Business	Industrial	Service Station	Places of Public Assembly	Residential and Stables	Special Development Precinct
Hosted Short-term Rental Accommodation	P	P	P	P	P	X	X	X	P	P
Unhosted Short-term Rental Accommodation	A	A	A	A	X	X	X	X	A	A
Tourist and Visitor Accommodation	X	X	X	D	A	X	X	X	X	A

xi. Remove reference to 'Motel' from Table 2 – Car Parking Requirements and Table 3 – Bicycle Parking Requirements.

xii. Remove all references to 'Serviced Apartments' from Schedule No. 2 – Additional Uses.

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Pursuant to Clause 35(2) of the Planning and Development (Local Planning Schemes (Regulations) 2015 (WA), determines that Amendment No. 23 to Local Planning Scheme No. 15 is a 'Standard' amendment, for the following reasons:

i. The amendment would have minimal impact on land in the scheme area that is not the subject of the amendment;

ii. The amendment does not result in any significant environmental, social, economic or governance impacts on land in the scheme area; and

iii. The amendment relates to a zone or reserve that is consistent with the objectives identified in the scheme for that zone or reserve.

Dated this 27th day of May 2025.

Chief Executive Officer

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Planning and Development Act 2005

MODIFIED AMENDMENT TO LOCAL PLANNING SCHEME

CITY OF BELMONT

LOCAL PLANNING SCHEME NO. 15

SCHEME AMENDMENT NO. 23

The local government as directed by the Department of Planning, Lands and Heritage, pursuant to section 83A of the *Planning and Development Act 2005,* amend the above Local Planning Scheme by:

i. Deleting the existing definition of 'Short-Term Accommodation' in Schedule 1 – General Definitions of the Scheme Text.

ii. Amending the existing definition of Cabin in Schedule 1 – General Definitions of the Scheme Text to:

"means a building that —

(a) is an individual unit other than a chalet; and

(b) forms part of —

(i) tourist and visitor accommodation; or

(ii) a caravan park; and

(c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period."

iii. Amending the existing definition of Chalet in Schedule 1 – General Definitions of the Scheme Text to:

"means a building that —

(a) is a self-contained unit that includes cooking facilities, bathroom facilities and separate living and sleeping areas; and

(b) forms part of —

(i) tourist and visitor accommodation; or

(ii) a caravan park; and

(c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period."

iv. Insert terms 'Short-term Rental Accommodation' and 'Short-term Rental Arrangement' in Schedule 1 – as follows:

"Short-term rental accommodation —

(a) means a dwelling provided, on a commercial basis, for occupation under a short-term rental arrangement; but does not include a dwelling that is, or is part of, any of the following —

(i) an aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1);

(ii) a caravan park;

(iii) a lodging-house as defined in the Health (Miscellaneous Provisions) Act 1911 section 3(1);

(iv) a park home park;

(v) a retirement village as defined in the Retirement Villages Act 1992 section 3(1);

(vi) workforce accommodation."

"Short-term rental arrangement means an arrangement under which —

(a) a dwelling, or part of a dwelling, is provided for occupation by a person; and

(b) the person occupies the dwelling, or part of the dwelling, for a period or periods not exceeding a total of 3 months in any 12-month period."

v. Deleting the 'Bed and Breakfast', 'Holiday Accommodation', 'Holiday House', 'Motel', 'Serviced Apartment', 'Short Stay Accommodation' and 'Tourist Development' definitions in Schedule 1 – Land Use Definitions of the Scheme Text.

vi. Insert the following definition for Tourist and Visitor Accommodation in Schedule 1 – Land Use Definitions:

"(a) means a building, or a group of buildings forming a complex, that —

(i) is wholly managed by a single person or body; and

(ii) is used to provide accommodation for guests, on a commercial basis, with no individual guest accommodated for a period or periods exceeding a total of 3 months in any 12-month period; and

(iii) may include on-site services and facilities for use by guests; and

(iv) in the case of a single building — contains more than one separate accommodation unit or is capable of accommodating more than 12 people per night; and

(b) includes a building, or complex of buildings, meeting the criteria in paragraph (a) that is used for self-contained serviced apartments that are regularly serviced or cleaned during the period of a guest's stay by the owner or manager of the apartment or an agent of the owner or manager; but

(c) does not include any of the following —

(i) an aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1);

(ii) a caravan park;

(iii) hosted short-term rental accommodation;

(iv) a lodging-house as defined in the Health (Miscellaneous Provisions) Act 1911 section 3(1);

(v) a park home park;

(vi) a retirement village as defined in the Retirement Villages Act 1992 section 3(1);

(vii) a road house;

(viii) workforce accommodation."

vii. Insert the following definition for Hosted short-term rental accommodation in Schedule 1 – Land Use Definitions:

"means any of the following —

(a) short-term rental accommodation where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the same dwelling during the short-term rental arrangement;

(b) short-term rental accommodation that is an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the other dwelling on the same lot, resides at that other dwelling during the short-term rental arrangement;

(c) short-term rental accommodation that is a dwelling on the same lot as an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the ancillary dwelling during the short-term rental arrangement."

viii. Insert the following definition for Unhosted short-term rental accommodation in Schedule 1 – Land Use Definitions:

"means short-term rental accommodation that —

(a) is not hosted short-term rental accommodation; and

(b) accommodates a maximum of 12 people per night."

ix. Deleting reference to 'Bed and Breakfast', 'Holiday Accommodation', 'Motel' and 'Serviced Apartments' in Table 1 – Zoning Table.

x. Inserting 'Hosted Short-term Rental Accommodation', 'Unhosted Short-term Rental Accommodation' and 'Tourist and Visitor Accommodation' in Table 1 – Zoning Table with the permissibilities outlined below.

	ZONES									
USE CLASSES	Residential	Town Centre	Commercial	Mixed Use	Mixed Business	Industrial	Service Station	Places of Public Assembly	Residential and Stables	Special Development Precinct
Hosted Short-term Rental Accommodation	P	P	P	P	P	X	X	X	P	P
Unhosted Short-term Rental Accommodation	A	A	A	A	A	X	X	X	A	A
Tourist and Visitor Accommodation	X	X	X	D	A	X	X	X	X	A

xi. Remove reference to 'Motel' from Table 2 – Car Parking Requirements and Table 3 – Bicycle Parking Requirements.

xii. Remove all references to 'Serviced Apartments' from Schedule No. 2 – Additional Uses.

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The Amendment endorsed by Council on 27th May 2025 was considered to be standard under the provisions of the *Planning and Development (Local Planning Schemes (Regulations) 2015 (WA)* for the following reasons:

i. The amendment would have minimal impact on land in the scheme area that is not the subject of the amendment;

ii. The amendment does not result in any significant environmental, social, economic or governance impacts on land in the scheme area; and

iii. The amendment relates to a zone or reserve that is consistent with the objectives identified in the scheme for that zone or reserve.

Dated this 4th day of July 2025.

Chief Executive Officer

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Scheme Amendment Details

Item	Description	Details
1.	Local Authority	City of Belmont
2.	Description of Local Planning Scheme	Local Planning Scheme No. 15
3.	Type of Scheme	Local Zoning Scheme
4.	Scheme Amendment No.	Amendment No. 23
5.	Summary of Proposal	1. Updating the General and Land Use definitions within Schedule No. 1 to be consistent with the *Planning and Development (Local Planning Schemes) Regulations 2015.* 2. Modifying Table 1 - Zoning Table to reflect the updated land use classifications. 3. Removing reference to 'Motel' from Table 2 – Car Parking Requirements and Table 3 – Bicycle Parking Requirements. 4. Removing reference to 'Serviced Apartments' from Schedule No. 2 – Additional Uses.
6.	Classification	Standard

Planning Report

Introduction

Amendment No. 23 to Local Planning Scheme No. 15 (LPS 15) proposes to:

1. Update the General and Land Use definitions within Schedule No. 1 to be consistent with the *Planning and Development (Local Planning Schemes) Regulations 2015.*
2. Modify Table 1 - Zoning Table to reflect the updated land use classifications.
3. Remove reference to 'Motel' from Table 2 – Car Parking Requirements and Table 3 – Bicycle Parking Requirements.
4. Remove reference to 'Serviced Apartments' from Schedule No. 2 – Additional Uses.

Background

Location

Amendment No. 23 relates to the entire City of Belmont local government area.

City of Belmont Context

The rise of online booking platforms has significantly increased the number of properties originally approved for residential use, being used for short-term rental accommodation (STRA). Belmont's proximity to Perth Airport, the Perth CBD, Optus Stadium, and the Swan River has made it a desirable location for both traditional tourist accommodation and STRA land uses.

Recognising the need for local guidance, Council adopted Local Planning Policy No. 19 – Short-term Rental Accommodation (LPP 19) to set standards for operators seeking to establish and operate STRA. Since then, the State has amended the Regulations to modify the STRA land use definitions and include exemptions from the requirement for development approval in certain instances. More specifically:

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- The land uses of 'hosted short-term rental accommodation', 'unhosted short-term rental accommodation' and 'tourist and visitor accommodation' have been included.
- The 'bed and breakfast', 'holiday accommodation', 'holiday house', 'motel', 'serviced apartment' and 'tourist development' land uses have been deleted.
- Development approval is not required for 'Hosted' STRA. 'Unhosted' STRA also does not require development approval where it is used for no more than 90 nights in a 12-month period.

To align the local planning framework with the State's Regulations, modifications are proposed to LPS 15 and LPP 19. These include updates to definitions, the zoning table, and land use permissibility in LPS 15, as well as concurrent amendments to LPP 19 to ensure consistency.

Proposed Amendment

The purpose of the Amendment is to align the City of Belmont's Local Planning Scheme with recent changes to the *Planning and Development (Local Planning Schemes) Regulations 2015*, relating to STRA.

Planning Context

Planning Bulletin 115/2024 – Short-term Rental Accommodation – Guidance for Local Government

The Bulletin provides guidance for local governments on amending their local planning scheme to address STRA in a manner consistent with the Regulations. It also clarifies how such amendments should be classified as well as providing guidance on land use permissibility.

The Bulletin states that if a scheme amendment only replaces existing land use terms with new short-term rental accommodation terms without changing permissibility, it will generally be a basic amendment. However, if it introduces new land uses or changes the permissibility of existing ones, it will usually be treated as a standard amendment.

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Local Planning Scheme No. 15

Schedule 1 of LPS 15 includes both general definitions and land use definitions for each use listed in the Zoning Table. The relevant definitions relating to this Amendment are outlined in Table 1 and Table 2 in the Report section below.

Table 1 (Zoning Table) of LPS 15 sets out the permissibility of uses using the symbols 'P', 'D', 'A' and 'X'. The meaning of the symbols is listed below:

'P' Means the use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme.

'D' Means that the use is not permitted unless the local government has exercised its discretion by granting development approval.

'A' Means that the use is not permitted unless the local government has exercised its discretion by granting development approval after giving special notice in accordance with the provisions contained in Clause 64 of the Regulations Schedule 2.

'X' Means a use that is not permitted by the Scheme.

Planning and Development (Local Planning Schemes) Regulations 2015 (WA)

Model Provisions

Schedule 1 of the Regulations contains the Model Provisions for local planning schemes. The Model Provisions provide the form and content for all new local planning schemes and apply when a scheme is revised, prepared or amended by a local government.

The Model Provisions, along with any essential local variations approved by the Minister, should be gradually integrated into Local Planning Schemes through the scheme amendment process whenever an opportunity arises. All local governments are required to have their schemes align with the updated Regulations for STRA by the end of 2025

Local Planning Scheme Amendments

Section 75 of the *Planning and Development Act 2005 (WA)* provides for an amendment to be made to a local planning scheme. The procedures for amending a local planning scheme, including public consultation requirements, are set out within Part 5 of the Regulations.

The Regulations specify three different types of Scheme amendments, being 'basic', 'standard' and 'complex'. The main differences between the amendment classifications are the differing advertising requirements. Clause 35(2) of the Regulations requires a resolution of the local government specifying the type of amendment and the reasons for the classification.

When a local government resolves to amend a scheme, the proposed scheme amendment is required to be referred to the Department of Planning, Lands and Heritage to obtain consent to advertise. Where an amendment is deemed to have an environmental impact, it is also required to be referred to the Environmental Protection Authority.

Following consent to advertise, the responsible authority shall advertise the amendment in accordance with the Regulations by:

- Displaying the amendment and associated public notice on the local government's website.
- Publishing the notice in a local newspaper and displaying this on the local government's public notice boards.
- Giving a copy of the notice to each public authority that the local government considers is likely to be affected by the amendment.

After the conclusion of the advertising period, Council is required to consider the submissions and pass a resolution to either support the amendment, with or without modification, or not support the amendment. After passing a resolution, the amendment is to be forwarded to the Western Australian Planning Commission (WAPC) to review and provide a recommendation to the Minister for Planning.

Report

Definitions

General Definitions

Local Planning Scheme No. 15 currently contains general definitions for 'Cabin', 'Chalet' and 'Short-term Accommodation'. To align with the Model Provisions of the Regulations, Amendment No. 23 proposes the following changes:

- Modifying the definitions of 'Cabin' and 'Chalet'.
- Deleting the definition of 'Short-term Accommodation'.

- Introducing definitions for 'Short-term Rental Accommodation' and 'Short-term Rental Arrangement'.

These amendments will ensure LPS 15 is consistent with the Regulations. The changes to the existing definitions and new definitions are shown in Table 1 below.

Current LPS 15 General Definitions to be deleted	New Definition
Cabin means a dwelling forming part of a tourist development or caravan park that is — (a) an individual unit other than a chalet; and (b) designed to provide short-term accommodation for guests.	**Cabin** means a building that — (a) is an individual unit other than a chalet; and (b) forms part of — (i) tourist and visitor accommodation; or (ii) a caravan park; and (c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period.
Chalet means a dwelling forming part of a tourist development or caravan park that is — (a) a self-contained unit that includes cooking facilities, bathroom facilities and separate living and sleeping areas; and	**Chalet** means a building that — (a) is a self-contained unit that includes cooking facilities, bathroom facilities and separate living and sleeping areas; and (b) forms part of — (i) tourist and visitor accommodation; or

Current LPS 15 General Definitions to be deleted	New Definition
(b) designed to provide short-term accommodation for guests.	(ii) a caravan park; and (c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period.
Short-Term Accommodation means temporary accommodation provided either continuously or from time to time with no guest accommodated for periods totalling more than 3 months in any 12-month period.	**Short-term Rental Accommodation** (a) means a dwelling provided, on a commercial basis, for occupation under a short-term rental arrangement; but (b) does not include a dwelling that is, or is part of, any of the following: (i) an aged care facility as defined in the *Land Tax Assessment Act 2002* section 38A(1); (ii) a caravan park; (iii) a lodging-house as defined in the *Health (Miscellaneous Provisions) Act 1911* section 3(1); (iv) a park home park; (v) a retirement village as defined in the *Retirement Villages Act 1992* section 3(1); (vi) workforce accommodation.

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Current LPS 15 General Definitions to be deleted	New Definition
	Short-term Rental Arrangement means an arrangement under which: (a) a dwelling, or part of a dwelling, is provided for occupation by a person; and (b) the person occupies the dwelling, or part of the dwelling, for a period or periods not exceeding a total of 3 months in any 12-month period.

Table 1 General Definition Changes

Land Use Definitions

Local Planning Scheme No. 15 currently contains various land use definitions relating to forms of STRA. Amendment No. 23 proposes to delete several of these definitions as they are no longer contained within the Model Provisions of the Regulations. Various new definitions are also proposed to be introduced into LPS 15 to align with the Model Provisions of the Regulations.

Table 2 shows the existing LPS 15 definitions that are proposed to be deleted and the definitions they are proposed to be replaced with as part of Amendment No. 23.

Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
Bed and breakfast means a dwelling — (a) used by a resident of the dwelling to provide short-term accommodation, including breakfast, on a commercial basis for not	**Hosted short-term rental accommodation** means any of the following — (a) short-term rental accommodation where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the same

Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
more than 4 adult persons or one family; and (b) containing not more than 2 guest bedrooms.	dwelling during the short-term rental arrangement; (b) short-term rental accommodation that is an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the other dwelling on the same lot, resides at that other dwelling during the short-term rental arrangement; (c) short-term rental accommodation that is a dwelling on the same lot as an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the ancillary dwelling during the short-term rental arrangement.
Holiday accommodation means two or more dwellings on one lot used to provide short-term accommodation for persons other than the owner of the lot.	**Tourist and visitor accommodation** (a) means a building, or a group of buildings forming a complex, that — (i) is wholly managed by a single person or body; and (ii) is used to provide accommodation for guests, on a commercial basis, with no individual guest accommodated for a period or periods exceeding a total of

Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
	3 months in any 12-month period; and (iii) may include on-site services and facilities for use by guests; and (iv) in the case of a single building — contains more than one separate accommodation unit or is capable of accommodating more than 12 people per night; and (b) includes a building, or complex of buildings, meeting the criteria in paragraph (a) that is used for self-contained serviced apartments that are regularly serviced or cleaned during the period of a guest's stay by the owner or manager of the apartment or an agent of the owner or manager; but (c) does not include any of the following — (i) an aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1); (ii) a caravan park; (iii) hosted short-term rental accommodation. or **Unhosted short-term rental accommodation**

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Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
	means short-term rental accommodation that — (a) is not hosted short-term rental accommodation; and (b) accommodates a maximum of 12 people per night; Classification dependent on specific details of the proposal.
Holiday House A single dwelling on one lot used to provide means a single dwelling on one lot used to provide short-term accommodation but does not include a bed and breakfast;	**Unhosted short-term rental accommodation** As above.
Serviced Apartments means a group of units or apartments providing — (a) self-contained short stay accommodation for guests; and (b) any associated reception or recreational facilities.	**Tourist and visitor accommodation** As above.
Motel A premises providing hotel-like accommodation with facilities for guests traveling with motor vehicles, and it may be licensed under the *Liquor Control Act 1988*.	**Tourist and visitor accommodation** As above.
Tourist Development means a building, or a group of buildings forming a complex, other than a bed and breakfast, a caravan park or holiday	**Tourist and visitor accommodation** As above.

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Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
accommodation, used to provide — (a) short-term accommodation for guests; and (b) onsite facilities for the use of guests; and (c) facilities for the management of the development.	
Short Stay Accommodation means the accommodation of short stay guests providing on site facilities for the convenience of guests and, management of the development, where occupation by any person is limited to a maximum of 3 months in any 12-month period, and excludes any other use falling within a use class specifically defined in this scheme.	This land use is proposed to be deleted, as it is a broad term covering accommodation limited to a maximum of three months within a 12-month period. This is now encompassed under the general definition of 'Short-term Rental Accommodation'.

Table 2 Land Use Definition Changes

Zoning Table and Land Use Permissibility Changes

Proposed Changes

The various land use definitions outlined in Table 2 above for deletion will also be removed from the Zoning Table.

The following new land use definitions are required to be included within the Zoning Table as part of the subject amendment:

- Hosted Short-term Rental Accommodation
- Tourist and Visitor Accommodation
- Unhosted Short-term Rental Accommodation.

The permissibility proposed to be assigned to each of these land uses is shown in Table 3.

ZONES										
USE CLASSES	Residential	Town Centre	Commercial	Mixed Use	Mixed Business	Industrial	Service Station	Places of Public Assembly	Residential and Stables	Special Development Precinct
Hosted Short-term Rental Accommodation	P	P	P	P	P	X	X	X	P	P
Unhosted Short-term Rental Accommodation	A	A	A	A	A	X	X	X	A	A
Tourist and Visitor Accommodation	X	X	X	D	A	X	X	X	X	A

Table 3 Proposed land use permissibility for new land uses

The following justification is provided for the proposed permissibilities.

Hosted Short-term Rental Accommodation

Under the Regulations, this use is exempt from requiring development approval. Accordingly, Planning Bulletin 115/2024 recommends a 'P' permissibility be assigned where residential development is capable of approval. It is therefore proposed to apply this permissibility in the 'Residential,' 'Mixed Use,' 'Commercial,' 'Town Centre,' 'Residential and Stables,' and 'Special Development Precinct' zones.

Conversely, 'Hosted Short-term Rental Accommodation' is not considered appropriate in the 'Industrial,' 'Service Station,' or 'Places of Public Assembly' zones and is therefore proposed to be assigned an 'X' permissibility in these areas.

Unhosted Short-term Rental Accommodation

Planning Bulletin 115/2024 outlines that 'Unhosted Short-term Rental Accommodation' should be assigned the following permissibilities:

- 'A' in zones where any type of dwelling is capable of approval

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- 'P' (Permitted) in Tourism zones
- 'X' in all other zones

Consistent with this approach, this use is proposed to be assigned an 'A' designation in the 'Residential', 'Town Centre', 'Commercial', 'Mixed Use', 'Mixed Business', 'Residential and Stables' and 'Special Development Precinct' zones.

This designation would require any proposal to be advertised to surrounding residents and landowners for comment prior to the application being determined.

Tourist and Visitor Accommodation

This use is typically more intensive and operates at a larger scale than both 'hosted' and 'unhosted short-term rental accommodation'. Examples include motel operations and large-scale chalet developments, which generally involve a higher concentration of guests and more commercial-style management.

Given this, it is proposed to restrict the use to the 'Mixed Use', 'Mixed Business' and 'Special Development Precinct' zones, with different permissibility designations to reflect the nature of each area. This approach aligns with the current zones where the previous land uses could be considered.

In the 'Mixed Use' zone, which is predominantly located along Great Eastern Highway and has a stronger commercial focus, a 'D' designation is proposed. Whilst the use could be considered without advertising, this may be required depending on the specific circumstances and location of a proposal. In contrast, the 'Special Development Precinct' zone accommodates a broader mix of land uses. Due to this variability, an 'A' designation is proposed to ensure all proposals undergo public advertising.

An 'A' designation is also proposed for the 'Mixed Business' zone, consistent with the existing ability to consider Motel uses in this zone. This designation also provides the flexibility to assess the appropriateness of this use on a case-by-case basis, recognising that locations closer to Great Eastern Highway are likely to be more suitable due to their higher level of accessibility.

The use is proposed to be assigned an 'X' use in all other zones.

Other Changes

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Parking

Tables 2 and 3 of LPS 15 contain car and bicycle parking requirements for the 'Motel' land use. As this land use is being deleted, reference to 'Motel' in the parking provisions will be removed.

Additional Uses

Local Planning Scheme No. 15 currently identifies 'Serviced Apartments' as an 'Additional Use' which can be considered at the following locations:

- 101, 103, 105, 107, 111 and 113 Orrong Road, Rivervale
- 289, 291A, 293 and 295 Orrong Road, Kewdale
- 2, 347 and 351 Orrong Road, Kewdale.

As this land use is proposed to be deleted, its reference as an 'Additional Use' will also be removed. An alternative form of STRA is not proposed as an 'Additional Use' for these sites. Most have already been developed, with the exception of 347 Orrong Road and 293 Orrong Road. 347 Orrong Road is owned by the State Government, who have not indicated any development intentions for the site. . In addition, there are no existing approvals or operations for 'Serviced Apartments' on any of these sites. This change does not preclude consideration of other forms of STRA at these sites, where permitted under the Scheme.

Scheme Amendment Classification

The Regulations define three types of Scheme amendments: 'basic,' 'standard,' and 'complex.' Clause 35(2) of the Regulations requires the local government to pass a resolution specifying the type of amendment and providing justification for its classification.

A Standard amendment is defined by the Regulations as:

"(a) an amendment relating to a zone or reserve that is consistent with the objectives identified in the scheme for that zone or reserve;

(b) an amendment that is consistent with a local planning strategy for the scheme that has been endorsed by the Commission;

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(c) an amendment to the scheme so that it is consistent with a region planning scheme that applies to the scheme area, other than an amendment that is a basic amendment;

(ca) an amendment to the scheme to — (i) include a provision in the scheme that a specified planning code is to be read as part of the scheme; or (ii) provide for the modification of a planning code that is to be read as part of the scheme;

(d) an amendment to the scheme map that is consistent with a structure plan or local development plan that has been approved under the scheme for the land to which the amendment relates if the scheme does not currently include zones of all the types that are outlined in the plan;

(e) an amendment that would have minimal impact on land in the scheme area that is not the subject of the amendment;

(f) an amendment that does not result in any significant environmental, social, economic or governance impacts on land in the scheme area;

(g) any other amendment that is not a complex or basic amendment."

The proposed amendment is considered to be a 'standard' amendment for the following reasons:

- The Amendment proposes changes to land use definitions and permissibility which align with the scheme's objectives for each zone.
- The Amendment would have minimal impact on land in the scheme area that is not the subject of the amendment, as it does not result in any significant environmental, social, economic, or governance impacts.
- Additionally, the amendment relates to a zone or reserve that is consistent with the objectives identified in the scheme for that zone or reserve.

Additionally, Planning Bulletin 115/2024, provides further guidance on amendment classifications. The bulletin outlines that if an amendment introduces or changes permissibility for STRA uses, it should generally be progressed as a 'Standard' amendment. The scope of Amendment No. 23 is considered to meet these considerations.

Conclusion

The Amendment proposes to update Local Planning Scheme No. 15 to align with the Planning and Development (Local Planning Schemes) Regulations 2015 in relation to short-term rental accommodation. It introduces new land use definitions, modifies existing ones, and updates land use permissibility across various zones, reflecting the guidance set out in Planning Bulletin 115/2024. The Amendment is classified as 'Standard' due to its alignment with strategic planning objectives and minimal impact on the broader scheme area.

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Planning and Development Act 2005

City of Belmont
Local Planning Scheme No. 15

Scheme Amendment No. 23

The Council of the City of Belmont, under and by virtue of the powers conferred upon it in that behalf by the *Planning and Development Act 2005*, hereby amends the above Local Planning Scheme by:

xiii. Deleting the existing definition of 'Short-Term Accommodation' in Schedule 1 – General Definitions of the Scheme Text.

xiv. Amending the existing definition of Cabin in Schedule 1 – General Definitions of the Scheme Text to:

"means a building that —

(d) is an individual unit other than a chalet; and

(e) forms part of —

(i) tourist and visitor accommodation; or

(ii) a caravan park; and

(f) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period."

xv. Amending the existing definition of Chalet in Schedule 1 – General Definitions of the Scheme Text to:

"means a building that —

(a) is a self-contained unit that includes cooking facilities, bathroom facilities and separate living and sleeping areas; and

(b) forms part of —

(i) tourist and visitor accommodation; or

(ii) a caravan park; and

(c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period."

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xvi. Insert terms 'Short-term Rental Accommodation' and 'Short-term Rental Arrangement' in Schedule 1 – as follows:

"Short-term rental accommodation —

(a) means a dwelling provided, on a commercial basis, for occupation under a short-term rental arrangement; but does not include a dwelling that is, or is part of, any of the following —

(i) an aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1);

(ii) a caravan park;

(iii) a lodging-house as defined in the Health (Miscellaneous Provisions) Act 1911 section 3(1);

(iv) a park home park;

(v) a retirement village as defined in the Retirement Villages Act 1992 section 3(1);

(vi) workforce accommodation."

"Short-term rental arrangement means an arrangement under which —

(a) a dwelling, or part of a dwelling, is provided for occupation by a person; and

(b) the person occupies the dwelling, or part of the dwelling, for a period or periods not exceeding a total of 3 months in any 12-month period."

xvii. Deleting the 'Bed and Breakfast', 'Holiday Accommodation', 'Holiday House', 'Motel', 'Serviced Apartment', 'Short Stay Accommodation' and 'Tourist Development' definitions in Schedule 1 – Land Use Definitions of the Scheme Text.

xviii. Insert the following definition for Tourist and Visitor Accommodation in Schedule 1 – Land Use Definitions:

"(a) means a building, or a group of buildings forming a complex, that —

(i) is wholly managed by a single person or body; and

(ii) is used to provide accommodation for guests, on a commercial basis, with no individual guest accommodated for a period or periods exceeding a total of 3 months in any 12-month period; and

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(iii) may include on-site services and facilities for use by guests; and

(iv) in the case of a single building — contains more than one separate accommodation unit or is capable of accommodating more than 12 people per night; and

(b) includes a building, or complex of buildings, meeting the criteria in paragraph (a) that is used for self-contained serviced apartments that are regularly serviced or cleaned during the period of a guest's stay by the owner or manager of the apartment or an agent of the owner or manager; but

(c) does not include any of the following —

(i) an aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1);

(ii) a caravan park;

(iii) hosted short-term rental accommodation;

(iv) a lodging-house as defined in the Health (Miscellaneous Provisions) Act 1911 section 3(1);

(v) a park home park;

(vi) a retirement village as defined in the Retirement Villages Act 1992 section 3(1);

(vii) a road house;

(viii) workforce accommodation."

xix. Insert the following definition for Hosted short-term rental accommodation in Schedule 1 – Land Use Definitions:

"means any of the following —

(a) short-term rental accommodation where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the same dwelling during the short-term rental arrangement;

(b) short-term rental accommodation that is an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the other dwelling on the same lot, resides at that other dwelling during the short-term rental arrangement;

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(c) short-term rental accommodation that is a dwelling on the same lot as an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the ancillary dwelling during the short-term rental arrangement."

xx. Insert the following definition for Unhosted short-term rental accommodation in Schedule 1 – Land Use Definitions:

"means short-term rental accommodation that —

(a) is not hosted short-term rental accommodation; and

(b) accommodates a maximum of 12 people per night."

xxi. Deleting reference to 'Bed and Breakfast', 'Holiday Accommodation', 'Motel' and 'Serviced Apartments' in Table 1 – Zoning Table.

xxii. Inserting 'Hosted Short-term Rental Accommodation', 'Unhosted Short-term Rental Accommodation' and 'Tourist and Visitor Accommodation' in Table 1 – Zoning Table with the permissibilities outlined below.

ZONES										
USE CLASSES	Residential	Town Centre	Commercial	Mixed Use	Mixed Business	Industrial	Service Station	Places of Public Assembly	Residential and Stables	Special Development Precinct
Hosted Short-term Rental Accommodation	P	P	P	P	P	X	X	X	P	P
Unhosted Short-term Rental Accommodation	A	A	A	A	A	X	X	X	A	A
Tourist and Visitor Accommodation	X	X	X	D	A	X	X	X	X	A

xxiii. Remove reference to 'Motel' from Table 2 – Car Parking Requirements and Table 3 – Bicycle Parking Requirements.

xxiv. Remove all references to 'Serviced Apartments' from Schedule No. 2 – Additional Uses.

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Council adoption for advertising

Adopted for advertising by resolution of the Council of the City of Belmont at the Ordinary Meeting of the Council held on this 27th day of May 2025.

CITY OF BELMONT COMMON SEAL

Mayor

Chief Executive Officer

Council recommended/submitted for approval

Supported for submission to the Minister for Planning for approval by resolution of the City of Belmont at the Ordinary Meeting of the Council held on this day of and the Common Seal of the City of Belmont was hereunto affixed by the authority of a resolution of the Council in the presence of:

Mayor

Chief Executive Officer

WAPC recommended/submitted for approval

Delegated under S.16 of the
Planning and Development Act 2005

Date

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Approval granted

Minister for Planning
S.87 of the *Planning and Development Act 2005*

Date

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City of Belmont

Local Planning Policy No. 19

Short-term Rental Accommodation



Publication date: 18/03/24

Local Planning Policy No. 19

Pursuant to Schedule 2, Part 2, Clause 4 (Deemed Provisions) of the Planning and Development (Local Planning Schemes) Regulations 2015.

1. Policy basis

The City of Belmont is an appealing location for short-term rental accommodation (STRA) uses due to its proximity to Perth Airport, the Perth CBD, Optus Stadium and the Swan River. Therefore, there is a need to ensure STRA uses are located and managed appropriately to protect the supply and amenity of long-term residential accommodation.

This Local Planning Policy contains the standards and objectives in which the City will assess applications for STRA.

2. Policy application

This Policy applies to development applications for STRA.

STRA is the collective name given to holiday homes, units or apartments offered for short-term letting, often through an online booking platform or management agent.

STRA is either hosted (where a host is present) or unhosted (where guests have exclusive use of an entire house, unit or apartment). Commonly, they can be:

a) a family holiday home, periodically offered as a short-term rental;

b) a property purchased for the sole intent of operating a short-term rental operation;

c) spare bedrooms and areas within a home, offered to let on a short-term basis; and

d) motels and serviced apartments.

The land use definitions for the various forms of STRA and classification table is outlined in Section 7.

3. Policy exclusions

This Policy is not intended to apply to the following forms of traditional tourist accommodation and other forms of temporary accommodation that are subject to alternative guidance or legislation:

- Hotels;
- Caravan parks (inclusive of chalets and cabins associated with this use);
- Lodging house and Boarding house;
- House swapping and house sitting;
- Personal use of a holiday home or the sharing of a holiday home with the owner's family and friends;
- Student exchange accommodation;
- Workforce accommodation; and
- Residential parks, park home parks, lifestyle villages.

4. Policy objectives

The objectives of this Policy are to:

a) Provide guidance and standards for operators seeking to establish and operate STRA.

b) Ensure STRA is appropriate for its location by being located near other short-term rental accommodation, tourist accommodation uses and hotels along Great Eastern Highway and accessible for visitors by being near a high frequency public transport stop along that road.

c) Ensure STRA does not adversely impact on the character and amenity of the surrounding residential area or nearby residents.

d) Safeguard the primary purpose of residential areas in providing residential dwellings which are affordable and available on a long-term basis.

e) Ensure dwellings located within the flexible density coded areas which have been developed above the base density coding are providing long-term and affordable residential accommodation.

5. Terms used

Guest	A person who is accommodated within a short-term accommodation on a temporary basis for a fee but is not subject to a Residential Tenancy Agreement.
Host / Keeper	Means a person who permanently resides at the dwelling and is responsible for its upkeep and management of the accommodation. The host/keeper cannot reside on a different land parcel or in a different unit.
Anti-Social Behaviour	Means actions and behaviours that threaten the amenity of the locality, and includes but is not limited to swearing, shouting, abusive, threatening behaviour, raised voices, parties and loud music.
Strata Company	A body corporate constituted under section 32 of the Strata Titles Act 1985 whether for a strata scheme or a survey-strata scheme.
Short-term Rental Arrangement	Means an arrangement under which: (a) a dwelling, or part of a dwelling, is provided for occupation by a person; and (b) the person occupies the dwelling, or part of the dwelling, for a period or periods not exceeding a total of 3 months in any 12-month period

6. Accompanying information

Pursuant to Clause 63(1)(d) of the *Planning and Development (Local Planning Schemes) Regulations 2015,* an application for development approval for any STRA use is to include the submission of a detailed Management Plan and Code of Conduct that addresses, but is not limited to, the following matters:

6.1. Management plan

The Management Plan is to address, but is not limited to, the following:

- Control of anti-social behaviour and the potential conflict between guests and permanent residents of the area;
- Minimum and maximum lengths of stay;
- Maximum occupancy limit, six guests or one family to a maximum of two people per bedroom;
- Guest arrival and departure procedures;
- Car parking management;
- Complaints management and after-hours complaints procedure including:
- Nature of complaint
- Date and time of complaint
- Complainant
- Description of how complaint was addressed and whether feedback was provided to complainant.
- The provision of a contact telephone number of the accommodation owner and operator to neighbouring properties for business-hours and after-hours complaints; and
- Explanation of how guests are informed of the Code of Conduct prior to and on arrival.

6.2. Code of conduct

The Code of Conduct is to address, but is not limited to, the following matters:

- The expected behaviour of guests.
- Periods of 'quiet time', including between 10pm to 7am;
- Parties are not permitted;
- Reasonable noise expectations (in compliance with the *Environmental Protection (Noise) Regulations 1997*);
- Details regarding guest check-in and check-out procedures;
- Expected control and maintenance of pets (if permitted at the property);
- Details of any car parking restrictions applicable to the area, and clarification on:
- the maximum number of vehicles that can park on a property; and
- that parking on surrounding properties and within the street and verge area is not permitted;
- Details regarding waste management which specifies the expectations on guests about general rubbish and bin collection;

- Rules and maintenance relating to the use of all common property and common facilities (if applicable);
- Information on relevant strata by-laws (if applicable);
- Emergency contact information;
- Contact details of emergency services, the City's Rangers Department and the Belmont Community Watch; and
- Implications of breaching the code of conduct.

The Code of Conduct shall be provided in the form of an information booklet for guests at the accommodation, and online prior to arrival.

6.3. Complaint register

A complaints register should accompany any application proposing to amend or extend an existing approval.

6.4. Strata approval

For STRA proposals, the signature from all lot owners who own an undivided share of the Common Property in accordance with the Strata Titles Act 1985 is needed.

7. Land use definitions and classification table

The City's Local Planning Scheme No. 15 (LPS 15) contains the following general definition for Short-term Rental Accommodation:

(a) "Means a dwelling provided, on a commercial basis, for occupation under a short-term rental arrangement; but
(b) Does not include a dwelling that is, or is part of, any of the following:
  i. An aged care facility as defined in the Land Tax Assessment Act 2002 section 38A(1);
  ii. A caravan park
  iii. A lodging-house as defined in the Health (Miscellaneous Provisions) Act 1911 section 3(1);
  iv. A park home park;
  v. A retirement village as defined in the Retirement Villages Act 1992 section 3(1);
  vi. A workforce accommodation."

LPS 15 defines various STRA land uses and outlines the associated permissibility as per the Zoning Table. If a defined land use is not contained within the Zoning Table, it will be treated as a 'Use Not Listed' and advertised accordingly.

The types of STRA that are subject to this policy are defined as follows:

Land use	LPS 15 definition
Hosted Short-term Rental Accommodation	means any of the following — (a) short-term rental accommodation where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the same dwelling during the short-term rental arrangement;

	(b) short-term rental accommodation that is an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the other dwelling on the same lot, resides at that other dwelling during the short-term rental arrangement; (c) short-term rental accommodation that is a dwelling on the same lot as an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the ancillary dwelling during the short-term rental arrangement.
Tourist and visitor accommodation	(a) means a building, or a group of buildings forming a complex, that — (i) is wholly managed by a single person or body; and (ii) is used to provide accommodation for guests, on a commercial basis, with no individual guest accommodated for a period or periods exceeding a total of 3 months in any 12-month period; and (iii) may include on-site services and facilities for use by guests; and (iv) in the case of a single building — contains more than 1 separate accommodation unit or is capable of accommodating more than 12 people per night; and (b) includes a building, or complex of buildings, meeting the criteria in paragraph (a) that is used for self-contained serviced apartments that are regularly serviced or cleaned during the period of a guest's stay by the owner or manager of the apartment or an agent of the owner or manager; but (c) does not include any of the following — (i) an aged care facility as defined in the *Land Tax Assessment Act 2002* section 38A(1); (ii) a caravan park;

	(iii) hosted short-term rental accommodation; (iv) a lodging-house as defined in the *Health (Miscellaneous Provisions) Act 1911* section 3(1); (v) a park home park; (vi) a retirement village as defined in the *Retirement Villages Act 1992* section 3(1); (vii) a road house; (viii) workforce accommodation.
Unhosted short-term rental accommodation	means short-term rental accommodation that — (a) is not hosted short-term rental accommodation; and (b) accommodates a maximum of 12 people per night.

8. Assessment criteria

STRA will generally only be supported where the following criteria (Section 8.1 to 8.5) are met:

8.1. Location

- Within 400 metres of a high frequency public transport stop located on Great Eastern Highway and an existing short-term rental accommodation, tourist accommodation use or hotel on Great Eastern Highway.

8.2. Car parking

Car parking must be provided in accordance with the below minimum standards:

Dwelling type/Unit	Location A[1]	Location B[2]
1 bedroom dwelling/unit	1 bay per dwelling/unit	1 bay per dwelling/unit
2+ bedroom dwellings/units	1 bay per dwelling/unit	2 bays per dwelling/unit

[1]Location A: within 800m walkable catchment of a train station and/or 250m of a transit stop of a high-frequency route or within the defined boundaries of an activity centre.

[2]Location B: Not within Location A.

- For the purpose of calculating parking requirements, any dwelling or accommodation unit that either functions or has the ability to function as two separate and independent dwellings, such as having its own entrance, kitchen, or bathroom facilities, will be treated as separate dwellings or accommodation units.
- All car parking associated with the use must be wholly contained on the subject site.
- Strata and community title developments must not rely on the use of visitor car parking bays.
- A Transport Impact Statement or Assessment will be required in support of proposals in the instances outlined in the Department of Planning, Lands and Heritage Transport Impact Assessment Guidelines.

8.3. Amenity

- The City will evaluate the potential amenity impacts of each STRA proposal, considering their individual circumstances and the specific local context.
- STRA proposals that detrimentally impact the surrounding locality's amenity will not be supported.
- The evaluation of a proposal will focus on the inherent suitability of each proposed use, as presented in the application, with specific attention to its details and how it impacts amenity of the locality. Conditions of approval should not be used to support proposals that are inherently unsuitable.
- In reviewing STRA proposals, the City will assess proposed management measures to consider if they are reasonable, enforceable, and effective in maintaining amenity.
- STRA proposals must, at a minimum, demonstrate compliance with the Environmental Protection (Noise) Regulations 1997. However, compliance does not automatically translate

into acceptable noise impacts from a planning amenity perspective. The City will consider factors such as arrival times, use of outdoor areas, proximity to adjoining dwellings, and other relevant aspects.

8.4. Strata developments

- For lots that have 2 or more proposed STRA land uses, there will be the requirement to have appointed on-site personnel, or demonstrate modern technology will be used, for access control and monitoring.

8.5. Instances in which STRA will not be supported

Applications for STRA will not be supported in the following instances:

a) Applications within multiple dwelling complexes proposing ad hoc STRA uses will not be supported. Instead, applications should seek to change the use of entire floors to ensure separation of uses within a building.

b) STRA applications will not be supported where associated with a grouped dwelling which has a lot size of less than 350m^2.

c) STRA will not be supported on flexible residential density coded sites which have been developed above the base density code.

d) In the 'Residential and Stables' zone.

e) Within 400m of a school.

9. Development approval

9.1. Approval period

If approved, the City will issue a time-limited approval of up to 12 months in the first instance. This approval will be of no further effect unless the City resolves to grant approval to a new development application, amends the original approval to delete the condition(s) limiting the time of approval or extends the terms of the approval under Clause 77 of the Deemed Provisions.

Where the Local Government is satisfied the STRA has been appropriately managed, an approval of the renewal application for a period of up to three years may be granted. In determining this, the City would have regard to the performance of the accommodation over the previous period, and if not satisfactory, the application may not be supported.

9.2. Conditions

In approving an application for development approval, the City may impose conditions including, but not limited to the following:

- There shall be no more than six short-stay guests or one family residing at the property at any one time to a maximum of two people per room.
- The whole property is to be rented as one booking only. No bedrooms or other areas of the house are to be rented on an individual basis.
- Prior to commencement of the use, the landowner shall implement the approved Management Plan (as well as any subsequently update and approved versions of the Management Plan) to the satisfaction of the City.

- The STRA operator shall supply the emergency contact details of the management agent or owner to address complaints from surrounding residents that require urgent attention.
- The landowner shall maintain a complaint register and outline the measures taken to address any complaints.
- The minimum length of stay.

9.3. Other approvals

This policy does not exempt STRA from the requirement to obtaining any other necessary approvals, including, but not limited to building or health approvals.

Governance references

Statutory compliance	*Planning and Development Act 2005* *Planning and Development (Local Planning Schemes) Regulations 2015* Local Planning Scheme No. 15
Industry compliance	
Organisational compliance	
Process links	

Local planning policy administration

Directorate	Officer title	Contact
Development and Communities	Manager Planning Services	9477 7222

Document date	Review Cycle	Next due
	Triennial	

Version	Decision to advertise	Decision to adopt	Synopsis

Attachment 12.1.3

General Definitions

The changes to the existing general definitions and proposed new definitions are shown in Table 1 below.

Current LPS 15 General Definitions to be deleted	New Definition
Cabin means a dwelling forming part of a tourist development or caravan park that is — (a) an individual unit other than a chalet; and (b) designed to provide short-term accommodation for guests.	**Cabin** means a building that — (a) is an individual unit other than a chalet; and (b) forms part of — (i) tourist and visitor accommodation; or (ii) a caravan park; and (c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period.
Chalet means a dwelling forming part of a tourist development or caravan park that is — (a) a self-contained unit that includes cooking facilities, bathroom facilities and separate living and sleeping areas; and (b) designed to provide short-term accommodation for guests.	**Chalet** means a building that — (a) is a self-contained unit that includes cooking facilities, bathroom facilities and separate living and sleeping areas; and (b) forms part of — (i) tourist and visitor accommodation; or (ii) a caravan park; and (c) if the unit forms part of a caravan park — is used to provide accommodation for persons, on a commercial basis, with no individual person accommodated for a period or periods exceeding a total of 3 months in any 12-month period.
Short-Term Accommodation means temporary accommodation provided either continuously or from time to time with no guest accommodated for periods totaling more than 3 months in any 12-month period.	**Short-term Rental Accommodation** (a) means a dwelling provided, on a commercial basis, for occupation under a short-term rental arrangement; but (b) does not include a dwelling that is, or is part of, any of the following: (i) an aged care facility as defined in the *Land Tax Assessment Act 2002* section 38A(1); (ii) a caravan park; (iii) a lodging-house as defined in the *Health (Miscellaneous Provisions) Act 1911* section 3(1);

Current LPS 15 General Definitions to be deleted	New Definition
	(iv) a park home park; (v) a retirement village as defined in the *Retirement Villages Act 1992* section 3(1); (vi) workforce accommodation.
	Short-term Rental Arrangement means an arrangement under which: (a) a dwelling, or part of a dwelling, is provided for occupation by a person; and (b) the person occupies the dwelling, or part of the dwelling, for a period or periods not exceeding a total of 3 months in any 12-month period.

Table 1 General Definition Changes

Land Use Definitions

The changes to the existing land use definitions and proposed new definitions are shown in Table 2 below.

Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
Bed and breakfast means a dwelling — (a) used by a resident of the dwelling to provide short-term accommodation, including breakfast, on a commercial basis for not more than 4 adult persons or one family; and (b) containing not more than 2 guest bedrooms.	**Hosted short-term rental accommodation** means any of the following — (a) short-term rental accommodation where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the same dwelling during the short-term rental arrangement; (b) short-term rental accommodation that is an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the other dwelling on the same lot, resides at that other dwelling during the short-term rental arrangement; (c) short-term rental accommodation that is a dwelling on the same lot as an ancillary dwelling where the owner or occupier, or an agent of the owner or occupier who ordinarily resides at the dwelling, resides at the ancillary dwelling during the short-term rental arrangement.
Holiday accommodation	**Tourist and visitor accommodation**

Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
means two or more dwellings on one lot used to provide short-term accommodation for persons other than the owner of the lot.	(a) means a building, or a group of buildings forming a complex, that — (i) is wholly managed by a single person or body; and (ii) is used to provide accommodation for guests, on a commercial basis, with no individual guest accommodated for a period or periods exceeding a total of 3 months in any 12-month period; and (iii) may include on-site services and facilities for use by guests; and (iv) in the case of a single building — contains more than one separate accommodation unit or is capable of accommodating more than 12 people per night; and (b) includes a building, or complex of buildings, meeting the criteria in paragraph (a) that is used for self-contained serviced apartments that are regularly serviced or cleaned during the period of a guest's stay by the owner or manager of the apartment or an agent of the owner or manager; but (c) does not include any of the following — (i) an aged care facility as defined in the *Land Tax Assessment Act 2002* section 38A(1); (ii) a caravan park; (iii) hosted short-term rental accommodation. or **Unhosted short-term rental accommodation** means short-term rental accommodation that — (a) is not hosted short-term rental accommodation; and (b) accommodates a maximum of 12 people per night; Classification dependent on specific details of the proposal.
Holiday House A single dwelling on one lot used to provide means a single dwelling on one lot used to provide short-term accommodation but does not include a bed and breakfast;	**Unhosted short-term rental accommodation** As above.
Serviced Apartments	**Tourist and visitor accommodation** As above.

Current LPS 15 Land Use and Definition to be deleted	New Land Use and Definition
means a group of units or apartments providing — (a) self-contained short stay accommodation for guests; and (b) any associated reception or recreational facilities.	
Motel A premises providing hotel-like accommodation with facilities for guests traveling with motor vehicles, and it may be licensed under the *Liquor Control Act 1988*.	**Tourist and visitor accommodation** As above.
Tourist Development means a building, or a group of buildings forming a complex, other than a bed and breakfast, a caravan park or holiday accommodation, used to provide — (a) short-term accommodation for guests; and (b) onsite facilities for the use of guests; and (c) facilities for the management of the development.	**Tourist and visitor accommodation** As above.
Short Stay Accommodation means the accommodation of short stay guests providing on site facilities for the convenience of guests and, management of the development, where occupation by any person is limited to a maximum of 3 months in any 12-month period, and excludes any other use falling within a use class specifically defined in this scheme.	This land use is proposed to be deleted, as it is a broad term covering accommodation limited to a maximum of three months within a 12-month period. This is now encompassed under the general definition of 'Short-term Rental Accommodation'.

Table 2 Land Use Definition Changes

12.2 Amendment No. 24 to Local Planning Scheme No. 15

Voting Requirement	:	Simple Majority
Subject Index	:	LPS15/024
Location/Property Index	:	Various
Application Index	:	N/A
Disclosure of any Interest	:	Nil
Previous Items	:	Ascot Racecourse Precinct Structure Plan - 15 April 2025 - Item 12.1
Applicant	:	Rowe Group
Owner	:	The Western Australian Turf Club Western Australian Planning Commission
Responsible Division	:	Development and Communities

Council role

Legislative	The making and adopting of local laws, local town planning schemes and Council policies.

Purpose of report

For Council to consider initiating Amendment No. 24 to Local Planning Scheme No. 15 (LPS 15) for public advertising.

Summary and key issues

- Rowe Group on behalf of Perth Racing (the applicant) has prepared the draft Ascot Racecourse Precinct Structure Plan (PSP) to guide the future use and development of the land in and around Ascot Racecourse.
- At the 15 April 2025 Ordinary Council Meeting (OCM), Council resolved to recommend that the draft PSP be approved by the Western Australian Planning Commission (WAPC) subject to modifications.
- The Department of Planning Lands and Heritage (DPLH) is currently considering the draft PSP but prior to a determination being made, a Local Planning Scheme Amendment is required to be progressed.
- Rowe Group has lodged an amendment request on behalf of Perth Racing (Attachment 12.2.1) for Precincts B, C, D, and E of the draft PSP. The applicant has advised that a request to rezone Precinct A will be prepared and submitted to the City of Belmont for consideration in due course.

- Several aspects of the applicant's amendment are not supported generally on the basis that they are inconsistent with Council's resolution on the draft PSP.
- Council has the discretion to either adopt Amendments as submitted, or subject to changes.
- It is recommended that Council adopt a modified version of the applicant's amendment as a 'complex' amendment for advertising as detailed within the Officer Recommendation.

Officer Recommendation

That Council:

i. Pursuant to Section 75 of the *Planning and Development Act 2005 (WA)*, adopts for the purpose of advertising the following amendment to Local Planning Scheme No. 15:

   i. Rezoning a portion of Lot 452 (No. 70) Grandstand Road, Ascot from the 'Place of Public Assembly' zone to the 'Residential' R60 zone.

   ii. Rezoning a portion of Lot 452 (No. 70) Grandstand Road, Ascot from the 'Place of Public Assembly' zone to the 'Mixed Use' zone and including a Restricted Use (R1) designation and R60 density code.

   iii. Rezoning Lot 100 (No. 1) Raconteur Drive, Ascot from the 'Place of Public Assembly' zone to the 'Mixed Use' zone, rezoning Lot 23 (No. 2) Carbine Street from the 'Residential and Stables' zone to the 'Mixed Use' zone, deleting the Additional Use (A18) designation, inserting residential density codes of R10 and R-AC4, and including a Restricted Use (R1) designation.

   iv. Rezoning the redundant residual alignments of Grandstand Road and Matheson Road and part of Lot 1 (No. 88), Lot 3 (No. 96) Grandstand Road, and Lot 51 (No. 2) Raconteur Drive from the 'Mixed Use' zone and 'no zone' to the 'Commercial' zone, inserting a residential density coding of R-AC3 and applying a Restricted Use (R2) designation.

   v. Modifying Schedule No. 2 – Additional Uses as follows:

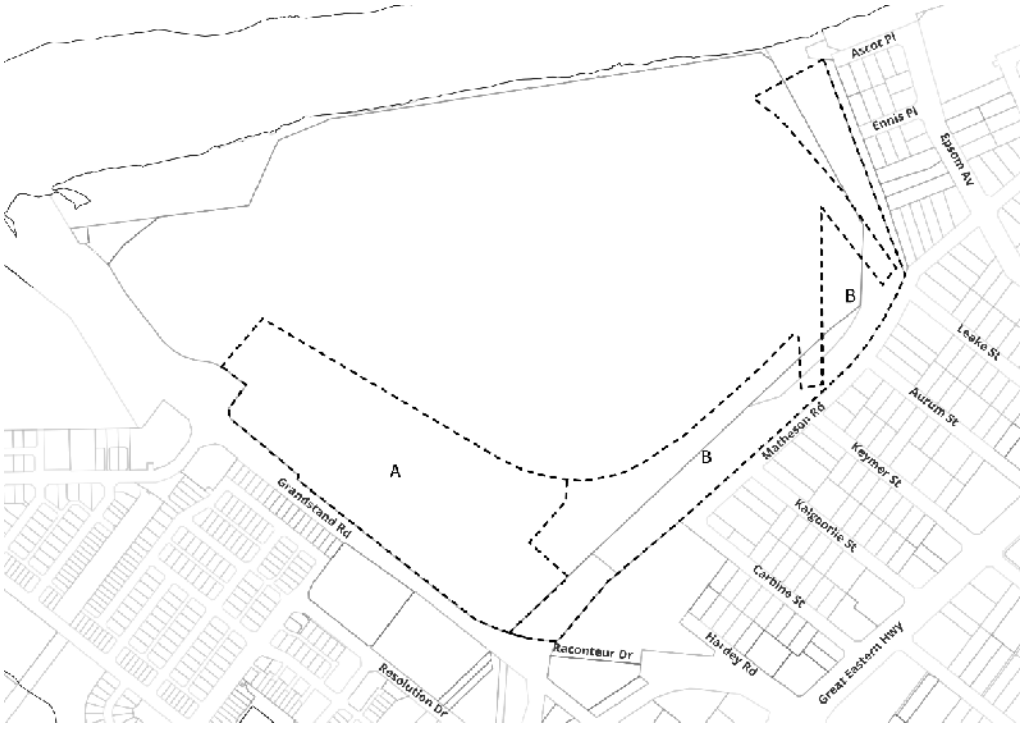
No.	Location and Additional Uses
18	Within Precinct A, the local government may consider the following additional uses: • Office • Hotel

Officer Recommendation

- Reception Centre
- Restaurant
- Tavern.

Within Precinct B, the local government may consider the following additional uses:

- Stables
- Veterinary Centre.



vi. Inserting the following into Schedule No. 3 – Restricted Uses and deleting the text "There are no restricted uses which apply to the Scheme":

No.	Description of Land	Restricted Use	Conditions
1	'Mixed Use' zoned portion of Lot 452 (No. 70) Grandstand Road, Ascot Lot 100 (No.	• Aged or Dependent Persons Dwelling • Ancillary Dwelling • Art Gallery • Betting Agency • Car Park	Nil

Officer Recommendation				
		1) Raconteur Drive, Ascot. Lot 23 (No. 2) Carbine Street, Ascot.	• Caretakers Dwelling • Child Care Premises • Child Family Day Care • Civic Use • Club Premises • Community Home • Consulting Rooms • Convenience Store • Dry Cleaning Premises • Educational Establishment • Exhibition Centre • Grouped Dwelling • Health Centre • Health Studio • Home Business • Home Occupation • Home Store • Hospital • Hosted Short Term Rental Accommodation • Hotel • Laundromat • Liquor Store – Small • Lunch Bar • Massage Parlour • Medical Centre • Mobile Phone Tower	

Officer Recommendation				
			& Associated Facilities • Multiple Dwelling • Nursing Home • Office • Private Recreation • Place of Worship • Public Amusement • Reception Centre • Residential Building • Restaurant/Café • Single House • Small Bar • Studio • Tavern • Telecommunications Infrastructure • Tourist and Visitor Accommodation • Unhosted Short term Rental Accommodation • Veterinary Centre • Vet Consulting Rooms • Video Store.	
	2	Lot 1 (No. 88) and Lot 3 (No. 96) Grandstand Road and Lot 51 (No. 2) Raconteur Drive, Ascot	• Aged or Dependent Persons Dwelling • Amusement Facility • Art Gallery • Betting Agency	Residential dwellings shall not be located on the ground floor. Retail floorspace is restricted to

Officer Recommendation				
			• Car Park • Caretaker's Dwelling • Child Care Premises • Civic Use • Club Premises • Consulting Rooms • Dry Cleaning Premises • Educational Establishment • Exhibition Centre • Fast Food Outlet/Lunch Bar • Health Centre • Health Studio • Home Business • Home Occupation • Hosted Short Term Rental Accommodation • Laundromat • Liquor Store-Small • Liquor Store-Large • Lunch Bar • Massage Parlour • Medical Centre • Mobile Phone Tower & Associated Facilities • Multiple Dwelling • Office	1,200m^2 increasing up to 3,000m^2 where a Net Benefit Test is provided to the satisfaction of the Local Government. 'Fast Food Outlet/Lunch Bar' shall only be permitted where it forms part of and is integrated with the built form of the precinct, and where no drive-through facilities are proposed.

Officer Recommendation

		• Public Amusement • Restaurant/Café • Restricted Premises • Shop • Small Bar • Tavern • Telecommunications Infrastructure • Unhosted Short Term Rental Accommodation • Veterinary Centre • Vet Consulting Rooms • Video Store.	

vii. Amending the Scheme Map accordingly.

2. Is of the view that the proposed amendment to Local Planning Scheme No. 15 is a 'complex' amendment because the intended zones, density codes and land use permissibility for the subject land is not addressed by the City's Local Planning Strategy.

3. Forwards the Amendment to the Environmental Protection Authority for assessment in accordance with Section 82 of the *Planning and Development Act 2005 (WA),* and to the Western Australian Planning Commission in accordance with Part 5, Division 2, Regulation 37 of the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)* for consent to advertise.

4. Subject to the Minister for Planning granting consent to advertise, advertises the amendment for public comment for a period of 60 days or a longer period approved by the Commission in accordance with Part 5, Division 2, Regulation 38 (3) of the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA).*

Location

Amendment No. 24 relates to 61.3 hectares of land bound by the Swan River, Ascot Waters Estate, Grandstand Road, Resolution Drive, the Residential and Stables zone, Hardey Road, Carbine Street and Matheson Road in Ascot (refer to Figure 1 below).

More specifically, the amendment area comprises nine lots, eight of which are owned by Perth Racing. The remaining lot shaded yellow on Figure 1 adjacent to Grandstand Road is owned by the WAPC.



Figure 1: Amendment Area (outlined red)

Consultation

No consultation has been undertaken on the proposed Amendment at this point in time.

The *Planning and Development Act 2005 (WA)* requires scheme amendments to be advertised in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)* (the Regulations). The details of this are outlined in the 'Statutory Environment' section of this report.

Strategic Community Plan implications

In accordance with the 2020 – 2040 Strategic Community Plan:

Key Performance Area: Place
Outcome: 6. Sustainable population growth with responsible urban planning.

Policy implications

There are no policy implications associated with this report.

Statutory environment

Statutory Planning Framework

Local Planning Scheme Amendments

Section 75 of the *Planning and Development Act 2005* provides for an amendment to be made to a local planning scheme. The procedures for amending a local planning scheme, including public consultation requirements are set out within Part 5 of the Regulations.

The Regulations specify three different types of scheme amendments being 'basic', 'standard', and 'complex'. Clause 35(2) of the Regulations requires a resolution of the local government which specifies the amendment type and the reasons for the classification.

When a local government resolves to amend a scheme, the proposed scheme amendment is required to be referred to the Department of Planning Lands and Heritage (DPLH) to obtain consent to advertise. Where an amendment is deemed to have an environmental impact, it is also required to be referred to the Environmental Protection Authority.

Following consent to advertise, the responsible authority shall advertise the amendment in accordance with the Regulations by:

- Displaying the amendment and associated public notice on the local government's website.
- Publishing the notice in a local newspaper and displaying this on the local government's public notice boards.
- Giving a copy of the notice to each public authority that the local government considers is likely to be affected by the amendment.

After the conclusion of the advertising period, Council is required to consider the submissions and pass a resolution to either support the amendment, with or without modification, or not support the amendment. After passing a resolution, the amendment is to be forwarded to the WAPC to review and provide a recommendation to the Minister for Planning.

Metropolitan Region Scheme

The subject land area is primarily zoned 'Private Recreation' under the Metropolitan Region Scheme (MRS), with the balance zoned 'Urban' and land abutting the Swan River reserved 'Parks and Recreation' (refer to Figure 2). The proposed Scheme Amendment is able to be accommodated under the current MRS zoning.



Figure 2: MRS Zones and Reserves (Amendment Area outlined Red)

Local Planning Scheme No. 15

The subject land is predominantly zoned 'Place of Public Assembly – Racecourse' under LPS 15. The southern portion of the subject land abutting Resolution Drive is zoned 'Mixed Use', Lot 23 (No. 2) Carbine Street is zoned 'Residential and Stables', and a separate portion of land adjacent to Grandstand Road is not currently assigned a zone or reserve (refer to Figure 3).

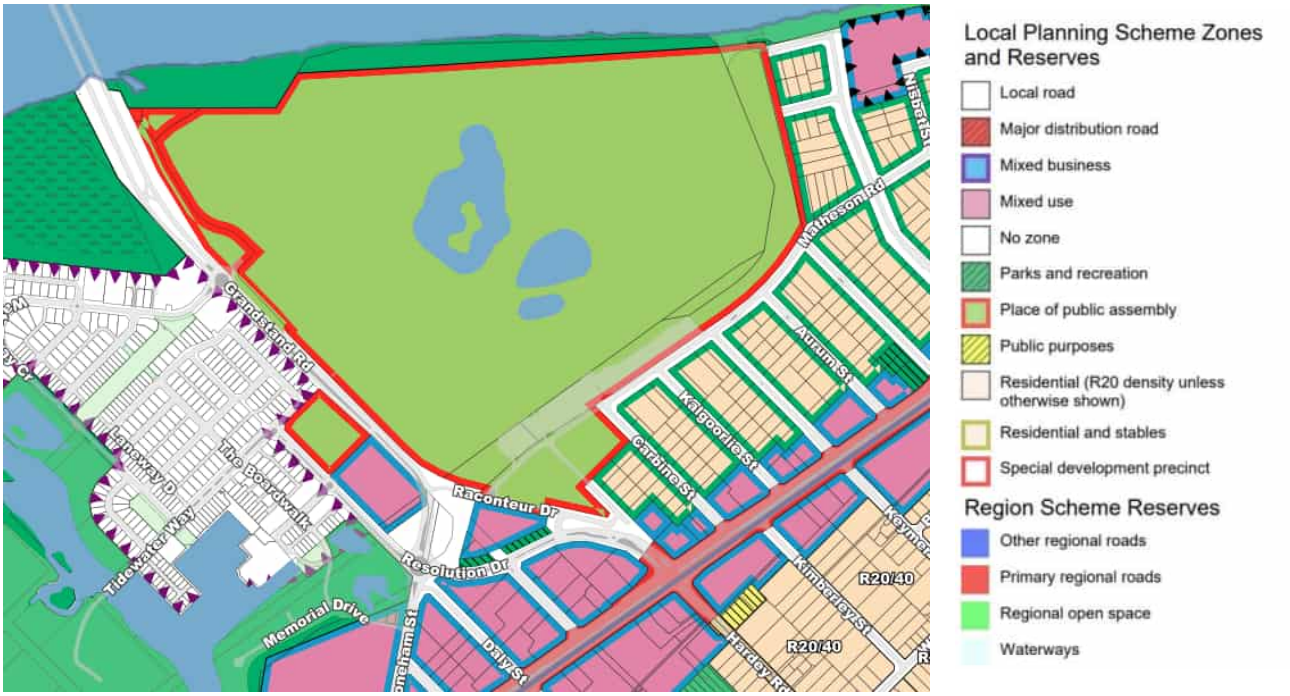


Figure 3: LPS 15 Zones and Reserves

The objectives of the 'Place of Public Assembly', 'Mixed Use' and 'Residential and Stables zones are as follows:

> "The 'Places of Public Assembly' zone is intended to allow for special places of assembly, such as halls, private schools, grounds for athletics, sports grounds with provision for spectators, racecourses, trotting track, stadia and/or showgrounds."
>
> "The Mixed Use Zone is intended to allow for the development of a mix of varied by compatible land uses such as housing, offices, showrooms, amusement centres, eating establishments and appropriate industrial activities which do not generate nuisances detrimental to the amenity of the district or to the health, welfare and safety of its residents. Buildings should be of a high standard of architectural design set in pleasant garden surrounds with limited vehicular access from properties to primary roads.
>
> To provide for a wide variety of active uses on street level which are compatible with residential and other non-active uses on upper levels."

> "The Residential and Stables Zone is intended to provide for compatible and environmentally responsible use of land in proximity to the Ascot Racecourse and the Swan River by residential accommodation and stables and ancillary functions of the horse racing industry."

Table 1 (Zoning Table) of LPS 15 sets out the permissibility of uses using the symbols of 'P', 'D', 'A', and 'X'. The meaning of the symbols is listed below:

'P' means the use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme;

'D' means that the use is not permitted unless the local government has exercised its discretion by granting Development Approval;

'A' means the use is not permitted unless the local government has exercised its discretion by granting Development Approval after giving special notice in accordance with the provisions contained in Clause 64 of the *Planning and Development (Local Planning Schemes) Regulations 2015* Schedule 2;

'X' means a use that is not permitted by the scheme.

Clause 3.5 addresses Additional Uses and outlines that, regardless of the use class designation in the zoning table, land uses for areas specified in Schedule No. 2 can receive approval, subject to the specific conditions being met.

Schedule No. 3 of LPS 15 and Clause 3.6 relate to Restricted Uses. Clause 3.6 sets out the purpose of Restricted Uses as follows:

> "Despite anything contained in the Zoning Table, the land specified in Schedule 3 may only be used for the specific use or uses that are listed and subject to the conditions set out in Schedule 3 with respect to that land."

There are currently no restricted uses under LPS 15.

State Planning Policy 7.3 – Residential Design Codes

The Residential Design Codes (R-Codes) establish built form controls for all residential development within Western Australia and are used in the assessment of residential development and subdivision proposals. Volume 1 of the R-Codes establishes standards for single houses, grouped dwellings, and multiple dwellings up to R60. Volume 2 of the R-Codes specifically relates to multiple dwelling developments at the R80 code and above. Any future residential development will be assessed against the PSP and the R-Codes.

Strategic Planning Framework

Perth and Peel @ 3.5 Million

Perth and Peel @ 3.5 Million provides a strategic framework to guide development across the Perth and Peel regions, in response to a projected population of 3.5 million by 2050. The document divides the Perth metropolitan area into four sub-regions: Central, North-West, North-East, and South. The subject land is located within the Central Sub-region.

The strategy also outlines Urban Consolidation Principles and identifies corresponding precincts. Of particular relevance to this amendment are the 'Green Network', 'Urban Corridor' and 'Activity Centres' principles and precincts.

The racecourse is identified as part of the 'Green Network' that extends along the Swan River. The document highlights the importance of supporting population growth and higher-density living with a connected network of public and private open spaces.

Great Eastern Highway, located south of the subject land, is identified as an 'Urban Corridor', intended to accommodate higher-density residential development that leverages proximity to public transport while minimising impacts on surrounding areas and maintaining the efficiency of the regional transport network. Great Eastern Highway, Grandstand Road, and Resolution Drive are also identified as high-frequency public transit routes.

The document references State Planning Policy 4.2 (SPP 4.2) and the hierarchy of centres based on the future importance of each centre from a network perspective. Additionally, the document identifies the important role that activity centres have in being a focal point for commercial and social activity and the importance of these areas being designed to be walkable and near public transport to support these means of access.

State Planning Policy 4.2

State Planning Policy 4.2 guides the planning and development of activity centres in the Perth and Peel region. The document emphasises the importance of activity centres having a compact urban form with pedestrian-focused streetscapes. The City's Activity Centre Planning Strategy (ACPS) identifies a local centre within the broader Golden Gateway precinct, which includes part of Perth Racing's landholdings subject to the draft PSP. State Planning Policy 4.2 states that neighbourhood and local centres should cater to daily and weekly household shopping needs, provide community facilities, and offer a small range of convenience services. Neighbourhood centres typically include a supermarket, personal services, and convenience shops, supported by small-scale offices. Local centres share these characteristics but operate on a smaller scale.

State Planning Policy 4.2 emphasises that development in activity centres should generally align with the floorspace requirements set out in local planning

strategies or structure plans. Where a proposal exceeds that floorspace need, the proposal is to demonstrate a net benefit to the community. A net benefit test is to be prepared in accordance with Section 7.8 of SPP 4.2 and address matters included in Section 5.3 of the Implementation Guidelines.

The applicant's amendment request includes 'Showrooms' as a use capable of approval within Precinct E of the draft PSP. State Planning Policy 4.2 states that these should be located in an Activity Centre Frame but notes that smaller centres may not have a frame. It also identifies bulky goods showrooms as a desired use within the frame of district centres but not for the frame of local or neighbourhood centres.

City of Belmont Local Planning Strategy

The City of Belmont Local Planning Strategy is the strategic planning document that broadly sets out the long-term planning direction for the City. The Strategy also informed the preparation of LPS 15. The key objectives of the Local Planning Strategy and relevant sub strategies for this precinct are as follows:

- To enhance the north-west entrance to the City.
- To encourage landmark development.
- Acknowledge that Ascot Racecourse and the Swan River are 'strategic tourism sites' of State significance to benefit future tourism development.

This amendment is not considered to be addressed by the Local Planning Strategy.

Activity Centre Planning Strategy

The ACPS was prepared to guide the future planning and coordination of activity centres within the City of Belmont and was adopted by Council at the February 2024 OCM. The ACPS identifies a future local centre within the broader Golden Gateway precinct, which includes a portion of Perth Racing's land and outlines that it is to be 1,200m^2 in the first instance. The ACPS states that following further residential development within the Golden Gateway precinct, it may be appropriate for this figure to be reviewed through a Needs Assessment or Net Benefit Test.

Draft Ascot Racecourse Precinct Structure Plan

The draft PSP (refer to Figure 4) has been prepared to guide the future use and development of land in and around Ascot Racecourse. At the 15 April 2025 OCM, Council resolved to recommend that the WAPC approve the draft PSP and supporting technical appendices subject to modifications.

The amendment request lodged by the applicant seeks to apply zones, density codes and land use permissibility consistent with the draft PSP for Precincts B,

C, D and E. The applicant has advised that a request to rezone Precinct A under LPS 15 will be prepared and submitted for consideration in due course.

The draft Local Structure Plan (LSP) is currently under consideration by officers at the DPLH. To avoid fettering the Minister's decision on this scheme amendment, the WAPC will not make a decision on the draft PSP until the amendment is signed off by the Minister.

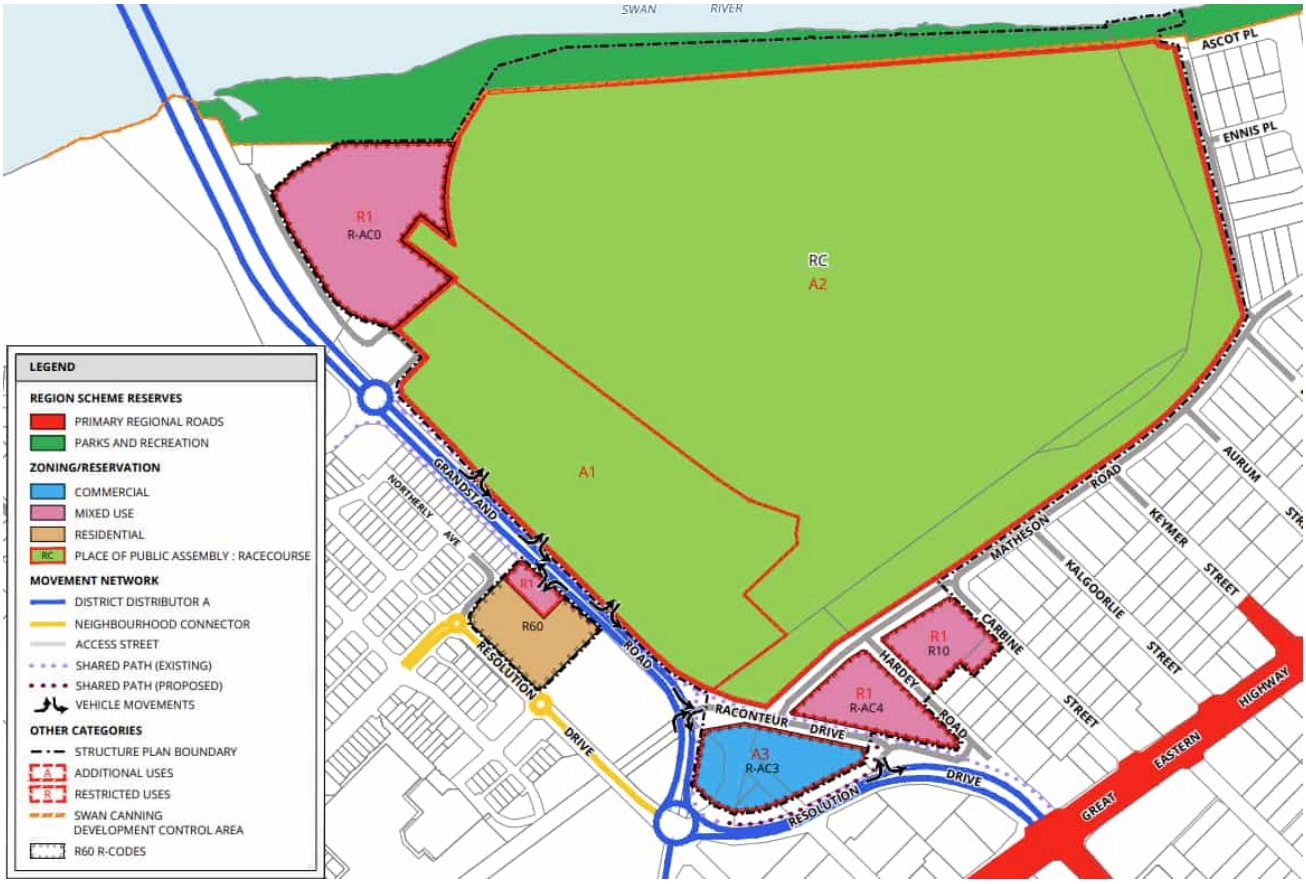


Figure 4: Draft Ascot Racecourse Precinct Structure Plan

Background

Council resolved at its 15 April 2025 OCM to recommend approval of the draft PSP to the WAPC, subject to modifications. The draft PSP and Council's recommendation were subsequently forwarded to DPLH, where the proposal is currently under consideration.

Before the WAPC can determine the draft PSP, a Local Planning Scheme Amendment must be progressed. The applicant has therefore lodged the amendment request provided at Attachment 12.2.1. Officers have reviewed the request but do not support various aspects in light of Council's 15 April 2025 resolution. Further discussion on the applicant's request and the proposed amendment is set out in the following section of this report.

Report

Zoning and Density

The applicant's amendment request proposes zoning and density codes consistent with the draft PSP, as follows:

- Rezoning Lot 452 (No. 70) Grandstand Road, Ascot (refer to Figure 5) from the 'Place of Public Assembly' zone to the 'Residential' and 'Mixed Use' zone and applying a density code of R60.



Figure 5: Lot 452 (No. 70) Grandstand Road

- Rezoning Lot 100 (No. 1) Raconteur Drive, Ascot (refer to Figure 6) from the 'Place of Public Assembly' zone to the 'Mixed Use' zone and applying an R-AC4 code to land west of Hardey Road and an R10 density code east of Hardey Road.

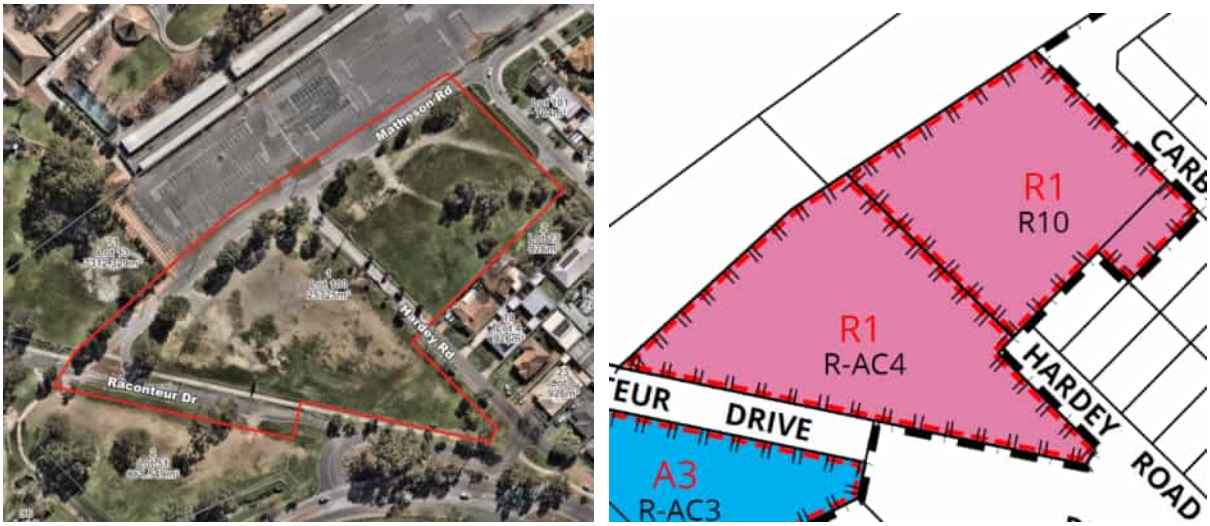


Figure 6: Lot 100 (No.1) Raconteur Drive

- Rezoning Lot 23 (No. 2) Carbine Street (refer to Figure 7) from the 'Residential and Stables' zone to the 'Mixed Use' zone and applying an R10 density code.



Figure 7: Lot 23 (No. 2) Carbine Street

- Rezoning the redundant residual alignments of Grandstand Road and Matheson Road and part Lot 1 (No. 88), Lot 3 (No. 96) Grandstand Road, and Lot 51 (No. 2) Raconteur Drive (refer to Figure 8) from the 'Mixed Use' zone and 'no zone' to the 'Commercial' zone and applying a density code of R-AC3.

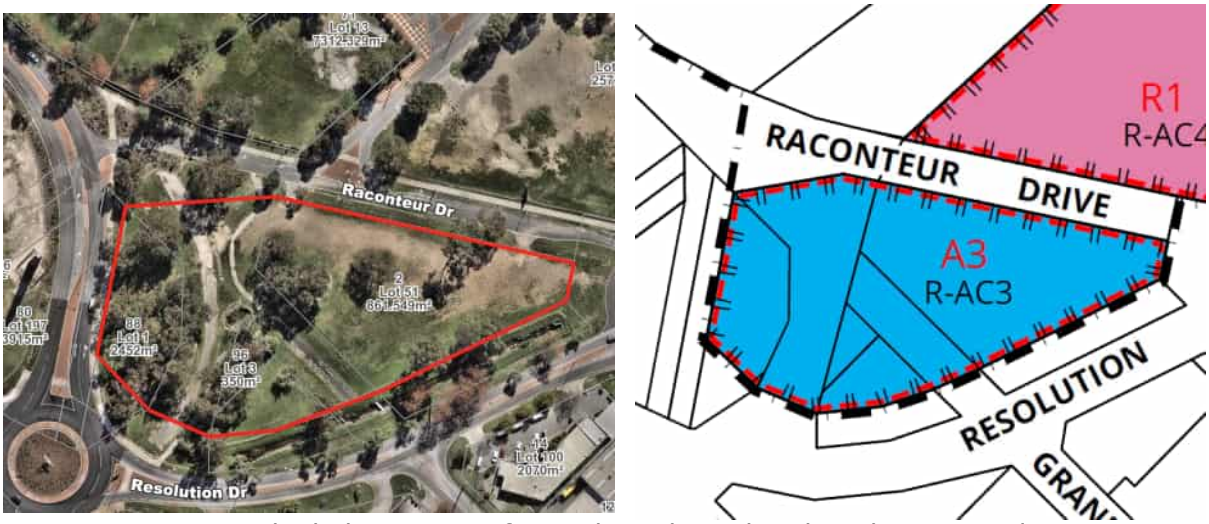


Figure 8: Residual alignments of Grandstand Road and Matheson Road, Part Lot 1 (No. 88),Lot 3 (No. 96) Grandstand Road, and Lot 51 (No. 2) Raconteur Drive

As outlined in the 15 April 2025 OCM report (Attachment 12.2.2), the proposed zones and density codes are considered appropriate, subject to modifications to land use permissibility and development controls. It is noted that development controls will be addressed through the structure plan rather than LPS 15, and therefore are not dealt with in this amendment.

With respect to land use permissibility, further consideration has been given to the application of Additional Uses and Restricted Uses, as well as the appropriate permissibility for land proposed to be zoned 'Commercial'. This will be discussed further in the next section.

Land Use Permissibility

The applicant's amendment request includes several changes to land use permissibility. The land uses proposed are consistent with those defined in the current version of LPS 15. However, in light of Amendment No. 23, it is recommended that the uses 'Bed and Breakfast', 'Serviced Apartment' and 'Motel' be deleted and replaced with 'Hosted Short Term Rental Accommodation', 'Unhosted Short Term Rental Accommodation' and 'Tourist and Visitor Accommodation'. Other proposed changes to land use permissibility are outlined below.

Additional Use 18

Clause 3.5 of LPS 15 addresses Additional Uses and outlines that, regardless of the use class designation in the zoning table, land uses for areas specified in Schedule 2 can receive approval, subject to the specific conditions being met. Portions of the Amendment area are currently subject to Additional Use 18 (A18) which provides for 'Horse Sales' and 'Stables' to be approved on No. 71 Grandstand Road and No. 1 Raconteur Drive (refer to Figure 9).

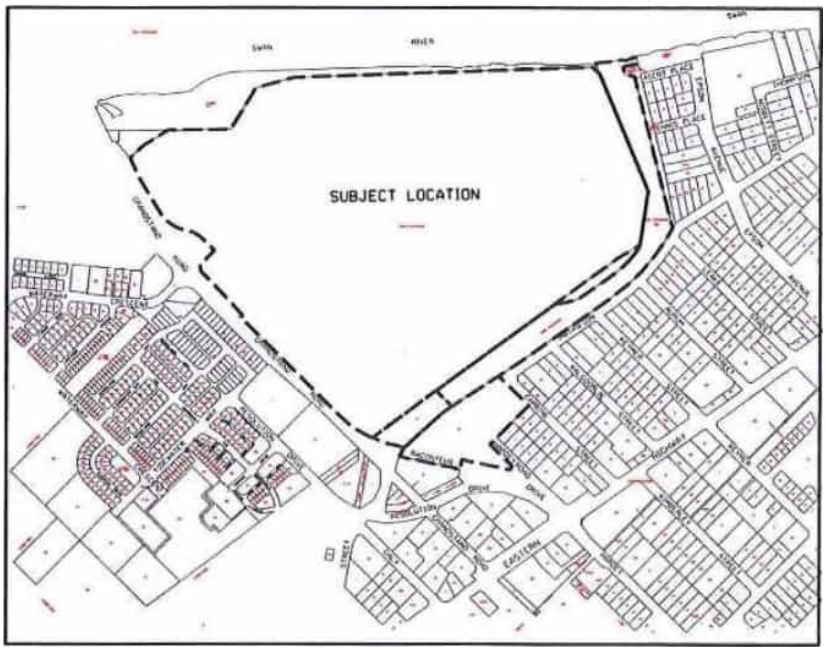


Figure 9: Area currently subject to A18

The applicant's amendment request proposes to modify A18 by:

- Deleting the use 'Horse Sales'.
- Providing for the following land uses to be capable of approval within Precinct B (refer to Figure 10) of the draft Ascot Racecourse PSP:
  - Office;
  - Hotel;
  - Reception Centre;
  - Restaurant; and
  - Tavern.

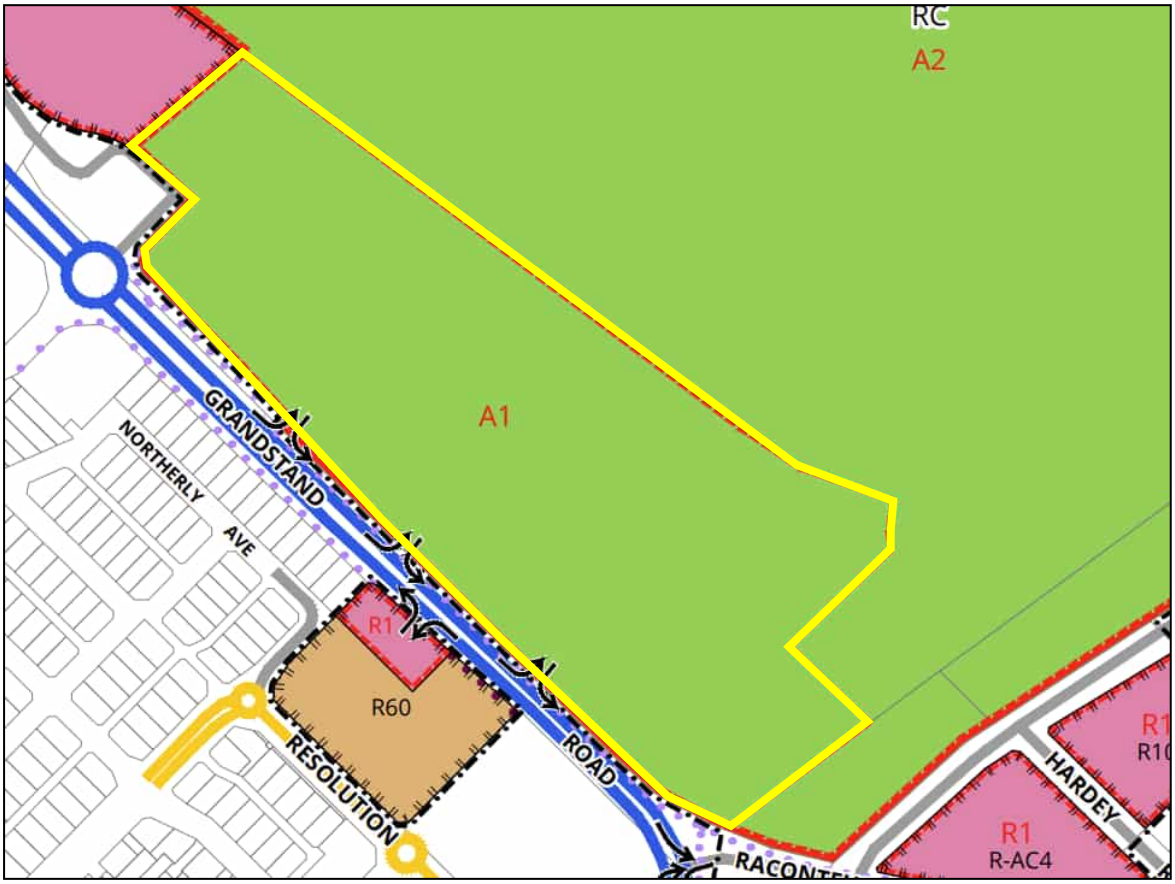


Figure 10: Precinct B of the draft PSP outlined yellow

- Providing for the following land uses to be capable of approval within Precinct C (refer to Figure 11) of the draft Ascot Racecourse PSP:
  - Animal Establishment;
  - Stables; and
  - Veterinary Centre.

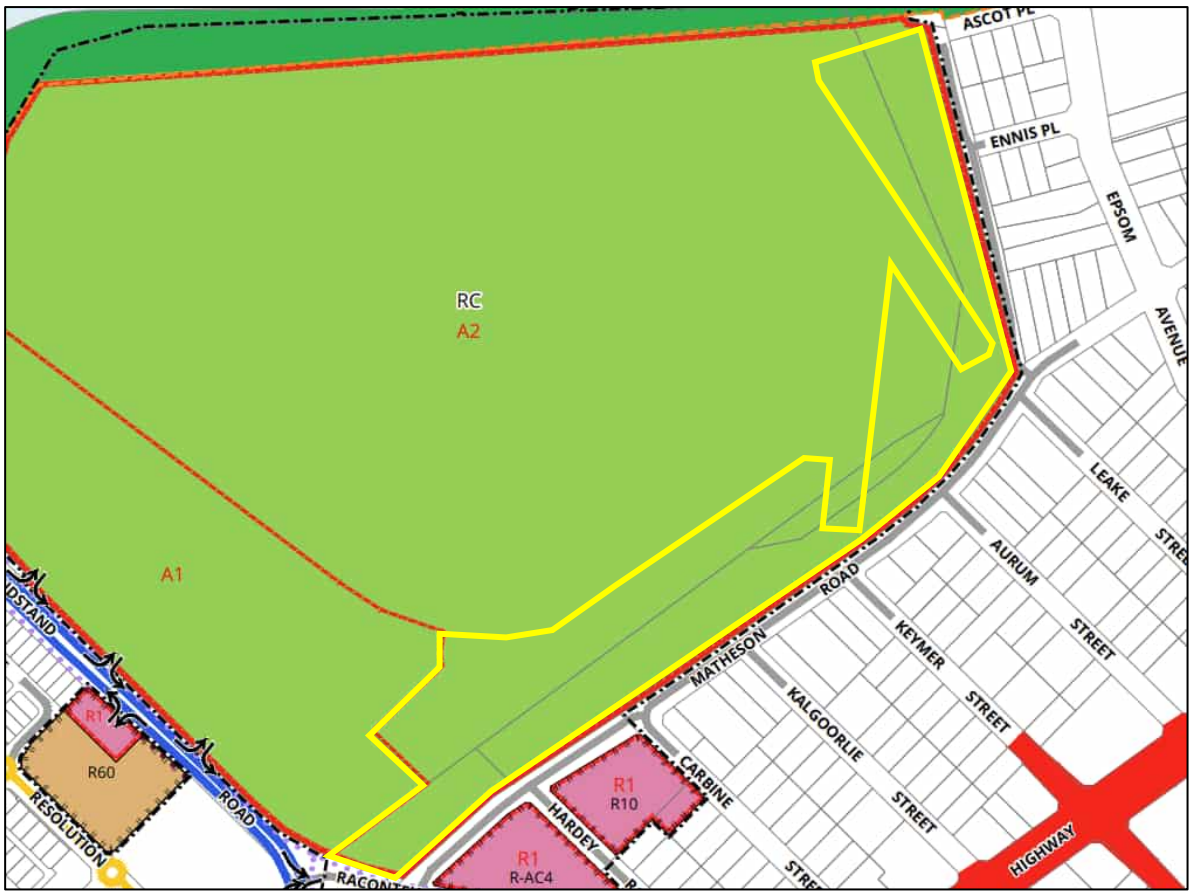


Figure 11: Precinct C of the draft PSP outlined yellow

- Providing for 'Health Centre' to be capable of approval within Precinct E (refer to Figure 12) of the draft Ascot Racecourse PSP.

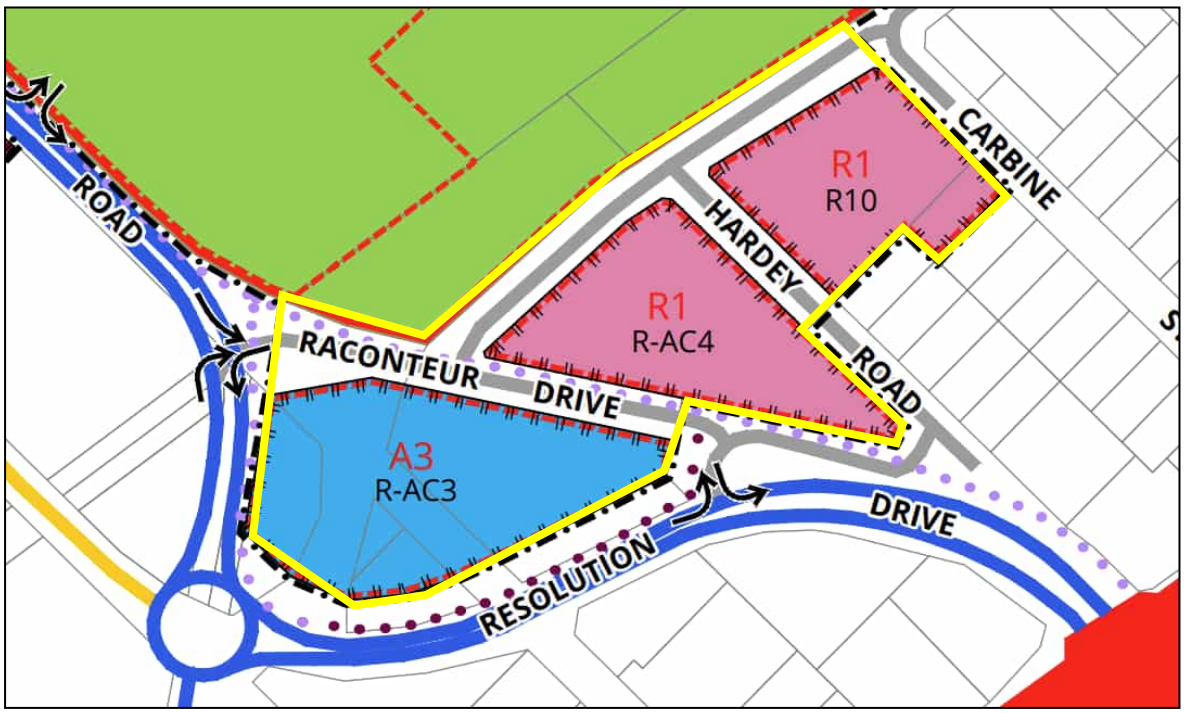


Figure 12: Precinct E of the draft PSP outlined yellow

- Replacing the existing plan included within Schedule 2 of LPS 15 for the A18 area with the plan included as Figure 13 below.

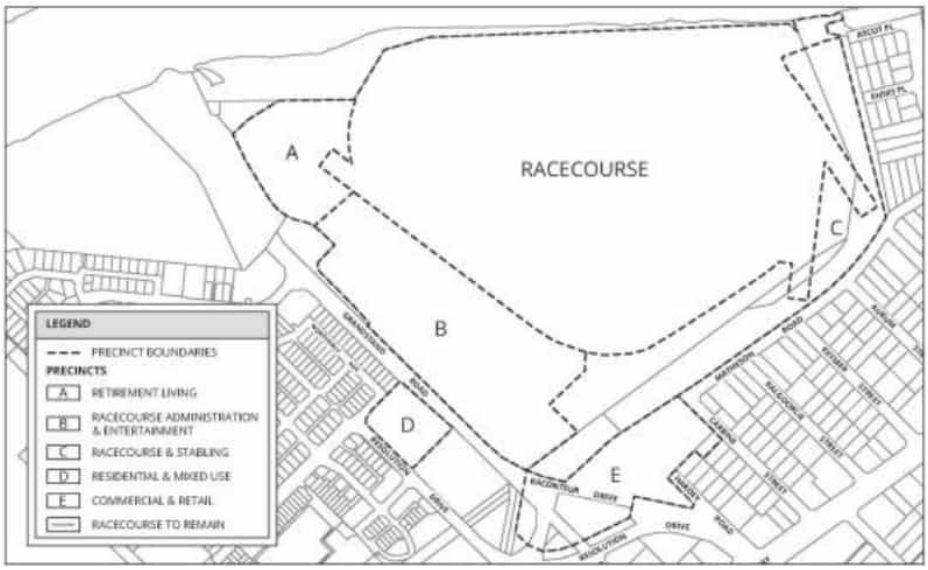


Figure 13: A18 plan requested by the applicant

In considering the applicant's request relating to A18 the following is relevant:

- The Additional Uses proposed to be applied to Precinct B of the draft PSP will support its function as a racecourse and entertainment precinct. Therefore, this aspect of the amendment is supported.
- Applying Additional Uses of 'Stables' and 'Veterinary Centre' to Precinct C of the draft PSP is supported as these uses will support the function of the racecourse and stabling area.

- While 'Animal Establishment' may be an appropriate land use within Precinct C of the draft PSP, this use is not listed in the Zoning Table and so it should not form part of A18. Any application for this use would need to be treated as a 'Use not Listed'.
- The applicant's request to apply an Additional Use of 'Health Centre' to Precinct E, is inconsistent with the draft Ascot Racecourse PSP, which only proposed the Additional Use for the 'Commercial' portion of Precinct E. This is because 'Health Centre' is an 'X' use within the 'Commercial' zone but a 'D' use within the 'Mixed Use' zone. Notwithstanding, this use can be provided for through Restricted Uses instead of Additional Uses. This will be explained further under the 'Restricted Uses' heading.

Having regard to the above, it is recommended that Council initiates an amendment to update A18 to apply the uses of 'Office', 'Hotel', 'Reception Centre', 'Restaurant' and 'Tavern' to Precinct B and 'Stables' and 'Veterinary Centre' to Precinct C. However, it is not considered appropriate for the scheme to make reference to the PSP. Therefore, Precinct B of the draft PSP will be labelled Precinct A on the A18 plan and Precinct C will be labelled Precinct B.

The applicant's amendment request also proposes extending Additional Use 3 (A3) to cover the 'Commercial' zoned land as shown in Figure 14. Additional Use 3 currently provides for 'Shop' to be approved over Lots 713, 237 and 236 Grandstand Road as shown in Figure 15. Given 'Shop' is already a 'D' use within the 'Commercial' zone, it is unclear why the A3 plan is proposed to be extended to the 'Commercial' zoned portion of the subject land. Instead, 'Shop' can become a 'Restricted Use' for the 'Commercial' zoned land as discussed below.

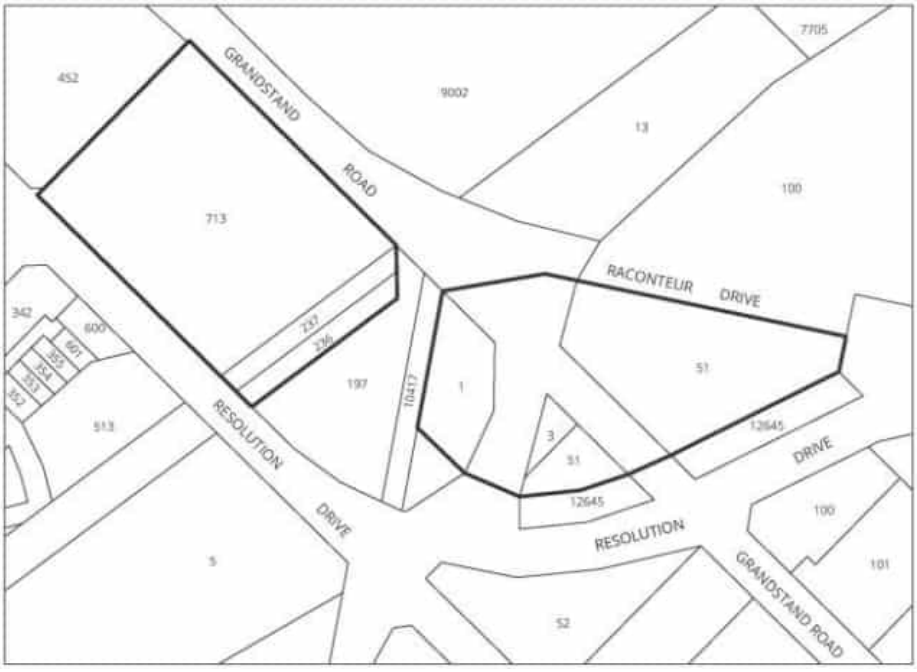


Figure 14: A3 plan requested by the applicant

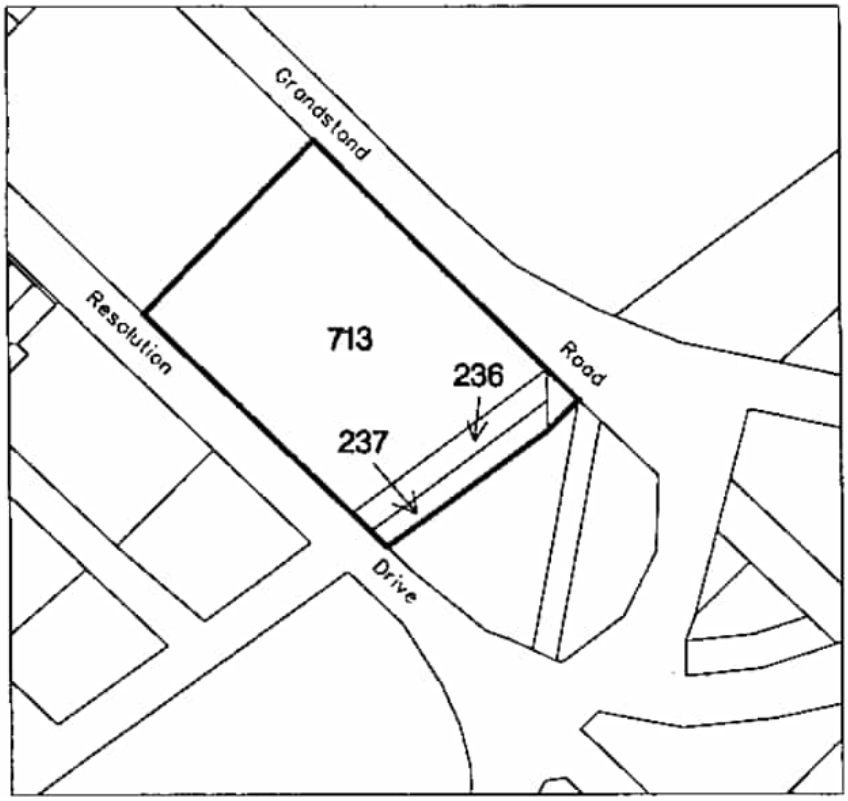


Figure 15: A3 plan currently included within LPS 15

Restricted Uses

Restricted Use areas are a mechanism in local planning schemes that limit land to specific permitted uses. This means that only the designated use(s) are allowed on a particular site, and any other uses that would typically be permissible within the zone are not permitted.

Restricted Use Area 1 (R1)

The applicant's amendment request proposes to restrict the permissible uses within the 'Mixed Use' portions of Precincts D and E (refer to Figure 5 and Figure 6) of the Ascot Racecourse PSP so that the following cannot be considered:

- 'Amusement Facility'
- 'Amusement Parlour'
- 'Auction Mart'
- 'Garden Centre'
- 'Industry-Light'
- 'Industry – Service'
- 'Motor Vehicle Repair'

- ‘Warehouse’.

While this approach is generally supported, the proposed wording in the applicants request states: “uses permissible in the Mixed Use zone, but excluding the following uses”, followed by a list of the abovementioned uses. To better reflect the intent of ‘Restricted Use’ areas, it is considered more appropriate to include a full list of uses capable of approval in Table 2. The modified amendment therefore proposes to explicitly list all permissible uses, ensuring clearer alignment with the purpose of the ‘Restricted Use’ mechanism.

Further, it is considered necessary to expand the list of uses not permissible in the ‘Mixed Use’ areas to include the following:

- ‘Fast Food Outlet/Lunch Bar’
- ‘Funeral Parlour’
- ‘Pet Day Care’
- ‘Night Club’
- ‘Radio or Tv Installation’
- ‘Restricted Premises’
- ‘Service Station’
- ‘Vet Hospital’
- ‘Showroom’.

These uses are not considered appropriate within proximity to residential development as they are likely to have adverse amenity impacts or do not align with the intent of the precinct in the draft PSP. It should be noted that Council in considering the draft PSP resolved to ensure that these uses are not capable of approval. Reasons for this particularly with respect to ‘Showrooms’ is further detailed within the officers report included as Attachment 12.2.2. Having regard to this, R1 does not include the abovementioned uses or those listed by the applicant.

Restricted Use Area 2 (R2)

In considering the draft Ascot Racecourse PSP, Council did not resolve to restrict uses permissible within the portion of Precinct E that is proposed to be zoned ‘Commercial’. However, officers have further considered land use permissibility over this land and consider it appropriate to restrict uses by applying an R2 designation. This will allow all uses capable of approval within the ‘Commercial’ zone, excluding the following:

- ‘Garden Centre’
- ‘Radio or Tv Installation’

- ‘Showroom’
- ‘Single House’
- ‘Grouped Dwelling’.

In addition, the ‘Health Centre’ land use is proposed to be included as a use that can be considered (this captures the applicants request that ‘Health Centre’ be an Additional Use). ‘Fast Food Outlet/Lunch Bar’ is also proposed to be included as a use that may be considered; however, it is proposed to be subject to a condition limiting its development to circumstances where it does not include drive-through facilities. This approach enables the consideration of a use that may complement the local centre while ensuring that a standalone, car-oriented development does not establish within it.

In considering why the abovementioned uses are not appropriate, the following is relevant:

- The intent of the ‘Commercial’ zoned land is to facilitate the development of an activity centre. A ‘Garden Centre’ that includes the propagation, rearing and sale of plants and the storage of produces associated with horticulture and gardens is not considered to be consistent with this intent.
- ‘Radio or TV Installations’ could occur elsewhere within the City of Belmont and are not required within a ‘Mixed Use’ precinct within proximity to the Kilns site, Ascot Racecourse and future development within the Golden Gateway precinct.
- As detailed within the officers report included within Attachment 12.2.2, ‘Showrooms’ are more appropriate in existing planned precincts, such as those along Great Eastern Highway and within the City’s business park.
- Low density dwelling typologies such as ‘Single House’ and ‘Grouped Dwelling’ are not consistent with the intent of this area to facilitate the development of an activity centre. Additionally, Council in its previous resolution have requested development provisions that require activation of all street frontages. It is considered that this should occur through active commercial uses on the ground floor supported by residential development on upper floors.

Having regard to the above, it is recommended that Council initiate the amendment so that the abovementioned uses cannot be considered. Additionally, it is recommended that a condition be applied to ensure multiple dwellings are not located on the ground floor, thereby reserving these areas for activity centre land uses that contribute to street-level activation.

A condition is also recommended to limit retail floorspace to 1,200m² initially, increasing to a maximum of 3,000m² where a Net Benefit Test demonstrates sufficient need to the satisfaction of the City of Belmont. In considering the appropriateness of this condition, officers had regard to the Retail Assessment prepared in support of the Ascot Racecourse PSP and Council’s resolution for modifications to be made to it. At this stage, an updated Retail Assessment has

not been provided and so it is considered necessary to restrict retail floorspace to 1,200m^2 having regard to the following:

- While the Retail Assessment concludes that the proposed 3,400m^2 retail floorspace aligns with the City's strategic framework, this view is not considered to reflect the intent of the City's ACPS. The City's ACPS anticipates incremental expansion over time.
- The Retail Assessment states that the centre will be sustainable by 2026 without broader precinct development and with minimal impact on adjacent centres. This assumption relies on sufficient demand from the immediate trade area. However, as the draft Golden Gateway LSP has not been finalised, development within the precinct is unlikely to progress within this timeframe.
- Population growth projections also indicate that growth may not materialise until 2031–2041. As a result, the local population base in 2026 may be insufficient to support a 3,400m^2 neighbourhood centre without significantly drawing sales from existing centres. The claim that the centre will be sustainable by 2026 is therefore considered overly optimistic and requires further justification.
- Section 2.1 of the Retail Assessment mentions the key considerations outlined in SPP 4.2's Implementation Guidelines for preparation and assessment of retail assessments. However, the report does not provide clear responses to address these matters. The Retail Assessment is therefore not satisfactory in its current form.

Considering the above, in the absence of a modified Retail Assessment, it is appropriate to restrict retail floorspace within the 'Commercial' portion of Precinct E of the draft PSP to 1,200m^2 in the first instance. This figure could be reviewed upon receipt of a Net Benefit Test which provides clear justification for a higher figure and addresses the above points.

Scheme Amendment Classification

The Amendment is considered to be a 'complex' amendment because the intended zones, density codes and land use permissibility for the subject land has not been addressed by the City's Local Planning Strategy.

The Amendment will be required to be advertised for 60 days consistent with the Regulations.

Conclusion

The applicant requested that the City modify LPS 15 consistent with the draft Ascot Racecourse PSP. While various aspects of the applicant's request are supported, a number of changes to land use permissibility are warranted. This reflects Council's resolution at the April 2025 OCM and officers' further

consideration of appropriate land use permissibility for land proposed to be zoned 'Commercial'. It is recommended that the modified version of the amendment as reflected within the officers recommendation be supported by Council for the purpose of advertising. Following Council's resolution, the Amendment will be referred to the Environmental Protection Authority and the WAPC for consent to advertise.

Financial implications

There are no financial implications evident at this time.

Environmental implications

There are no environmental implications associated with this report. The Amendment will need to be provided to the Environmental Protection Authority prior to advertising.

Social implications

The Amendment will facilitate the enhancement of the range of services and facilities in the area.

Attachment details

Attachment No and title
1. Applicant's Amendment Request [**12.2.1** - 989 pages] 2. 15 April 2025 OCM Report - Item 12.1 [**12.2.2** - 1211 pages]

Proposed Amendment to the City of Belmont LPS No. 15

Precincts B, C, D and E / Ascot Racecourse Precinct
Ascot

ROWE GROUP

OUR REF: 9481 28/07/2025

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2. Draft Ascot Racecourse Precinct Structure Plan Map

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1. Cadastral Information
2. Certificate of Title Encumbrances
3. Summary of Proposed Amendment

1. Introduction

Rowe Group acts on behalf Perth Racing in relation to their landholdings at Lots 3, 13, 452 and 9002 Grandstand Road, Lot 7005 Matheson Road, and Lots 51 and 100 Raconteur Drive, Ascot ('site'). A draft Precinct Structure Plan known as the Ascot Racecourse Precinct Structure Plan ('draft PSP') has been prepared in relation to the site and was submitted to the City of Belmont for consideration on 21 August 2024. The draft PSP identifies future zoning, density, and land use controls that will facilitate future development of the site.

To give statutory effect to these elements and provide consistency with the PSP, it is necessary to amend the Metropolitan Region Scheme ('MRS') and the City of Belmont Local Planning Scheme No. 15 ('LPS15'). An MRS Amendment request has been prepared in relation to a portion of Lot 9002 Grandstand Road (Precinct 'A') and was submitted to the Western Australian Planning Commission ('WAPC') on 28 November 2024. A request to rezone Precinct 'A' under LPS15 will be prepared and submitted to the City of Belmont for consideration in due course.

The enclosed documentation requests support from the City of Belmont to initiate an amendment to LPS15 in relation to Precincts 'B', 'C', 'D' and 'E' of the draft PSP ('Amendment Area'). The proposed amendment comprises both textual modifications to LPS15 and modifications to the LPS15 scheme maps.

This report contains all of the necessary information required to support the initiation of the amendment to LPS15. It provides a detailed explanation of the proposed amendment, identifies and describes the Amendment Area and its surroundings, contains an overview of the relevant zoning and reservations, and includes an analysis of relevant planning and environmental considerations.

This report has been prepared following initial engagement with the Department of Planning Lands and Heritage (DPLH) and the City of Belmont in the context of the draft PSP.

2. Description of Site

2.1 Location

Located within the municipal district of the City of Belmont, the Amendment Area forms part of the locality of Ascot and is situated approximately 7.7 km east of the Perth Central Business District.

Refer **Figure 1 – Regional Context**

The Amendment Area is bound by the Swan River to the north, the Ascot Residential and Stables area and Matheson Road to the east and south-east, Resolution Drive to the south and south-west, and Grandstand Road to the west.

Grandstand Road provides access to the regional road network including Tonkin Highway and Graham Farmer Freeway via Garrat Road and Guildford Road to the north, and Great Eastern Highway to the south via Resolution Drive and Stoneham Street. The southern portion of the Amendment Area is bound by Resolution Drive and Matheson Road providing access to local residential streets.

Refer **Figure 2 – Local Context**

2.2 Cadastral Information

The Amendment Area comprises the following land parcels which collectively measure 61.42 ha:

Lot	Street Address	Plan	Volume	Folio	Area	Landowner
1	88 Grandstand Road	55346	1724	276	2,452m^2	State Planning Commission
3	96 Grandstand Road	55346	1742	278	350m^2	The Chairman of the Committee of the WA Turf Club
13	71 Grandstand Road	26760	1883	670	7,312m^2	The Chairman of the Committee of the WA Turf Club
23	2 Carbine Street	2198	321	107	926m^2	The Chairman of the Committee of the WA Turf Club
50	71 Grandstand Road	5729	1041	934	3,516m^2	The Chairman of the Committee of the WA Turf Club
51	2 Raconteur Drive	15104	1883	668	6,939m^2	The Chairman of the Committee of the WA Turf Club
100	1 Raconteur Drive	60341	2723	304	25,725m^2	The Chairman of the Committee of the WA Turf Club
452	70 Grandstand Road	60339	2723	355	11,441m^2	The Chairman of the Committee of the WA Turf Club
7705	71 Matheson Road	209359	1789	567	43,318m^2	The Chairman of the Committee of the WA Turf Club
9002	71 Grandstand Road	60352	2723	303	512,241m^2	The Chairman of the Committee of the WA Turf Club

Table 1: Cadastral Information

The proposed Amendment relates to all of the above landholdings with the exception of the portion of Lot 9002 which comprises the 'Racecourse' Precinct and Precinct 'A', as depicted within the draft PSP.

Refer **Figure 3 – Site Plan**

Copies of the Certificates of Title for the above land parcels are enclosed at **Attachment 1**. A review of the Certificates of Title reveal that the Amendment Area is affected by a number of encumbrances, details of which are set out in the table below.

Document Number	Type	Details	Affected Lots
D367664	Caveat	Diamond Syndicate Pty Ltd	1
K930699	Easement	Water Corporation	7705
H712859	Lease – telecommunications infrastructure	Vodaphone network Pty Ltd	9002
I041460	Lease – telecommunications infrastructure	Optus Mobile Pty Ltd	9002
K929948	Lease – telecommunications infrastructure	Crown Castle Australia Pty Ltd	9002
K944992	Caveat - telecommunications infrastructure	Crown Castle Australia Pty Ltd	9002
N/A	Easement burden	Electricity	9002
L399948	Memorial	Contaminated Sites Act 2003	9002
M813804	Lease – telecommunications infrastructure	Optus Mobile Pty Ltd	9002
L014550	Easement	WA Gas Networks Pty Ltd	100
M230259	Easement	Electricity	100
M230260	Easement	Electricity	100
N/A	Easement	Drainage	452
L014556	Easement	City of Belmont	452

Table 2: Certificate of Title Encumbrances

None of the above encumbrances affect the advancement of the proposed amendment however further consideration will be required at the development stage, particularly in relation to the protection of easements.

Refer **Attachment 1 – Certificates of Title**

2.3 Existing Improvements and Surrounding Land Uses

The Amendment Area abuts the Swan River foreshore to the north, the Ascot Residential and Stables area to the south and east, light/commercial development to the south, and the Ascot Waters residential estate and Bristile Kilns (also known as the 'Ascot Kilns') to the west. The Ascot Residential and Stables area is inherently linked to the horse racing industry and the operation of Ascot Racecourse. The existing zoning applicable to the area permits the keeping of horses within private stable complexes, enabling horse trainers to operate in the area and utilise the Racecourse for training purposes.

Land to the west and south-west of the Amendment Area includes a historical landmark being the Bristile Kilns located on the border of the Ascot Waters residential estate. The light industrial/commercial development to the south comprises of a range of land uses including corporate offices, fast food outlets, and service stations.

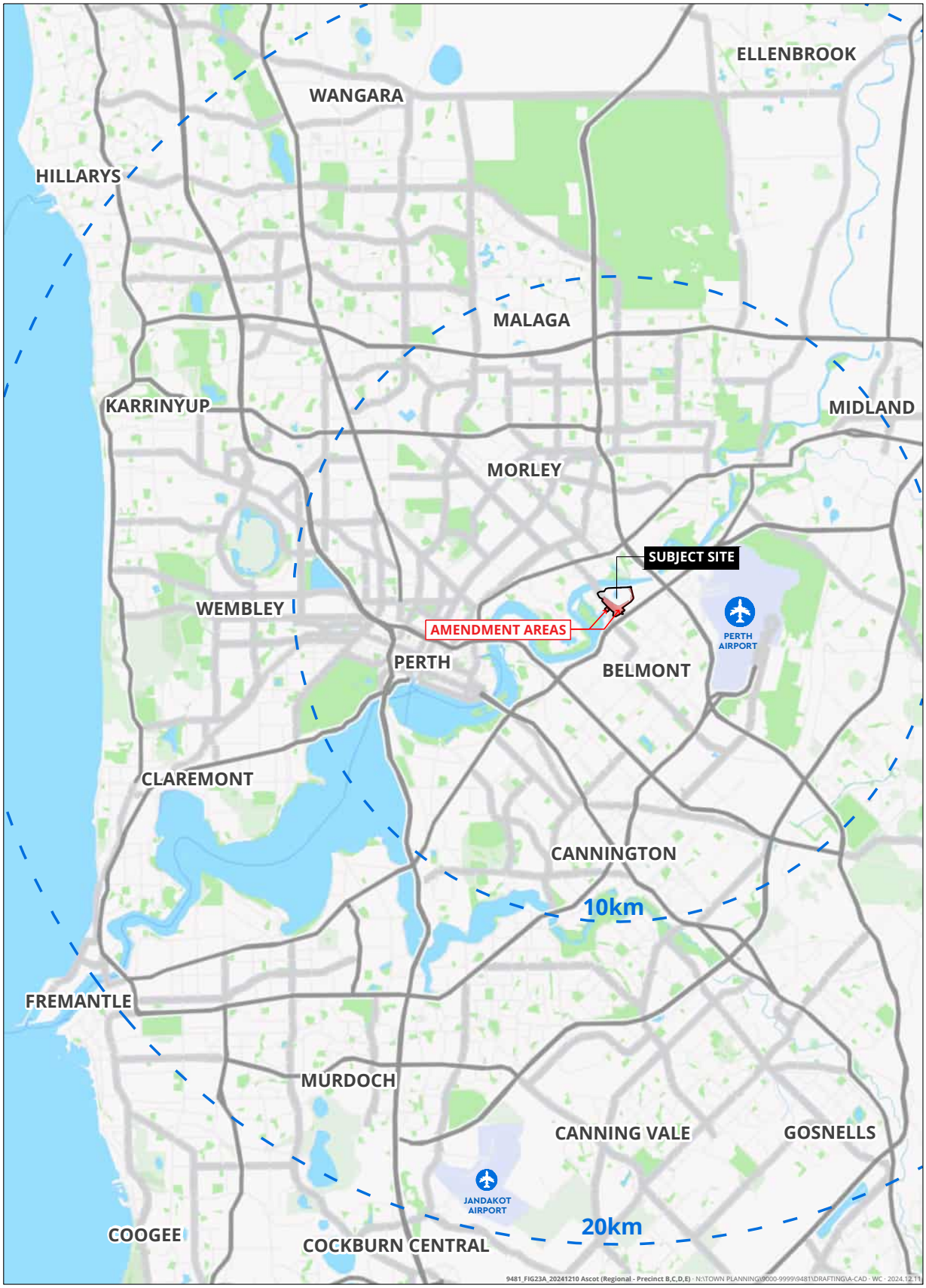


FIGURE 1
REGIONAL LOCATION

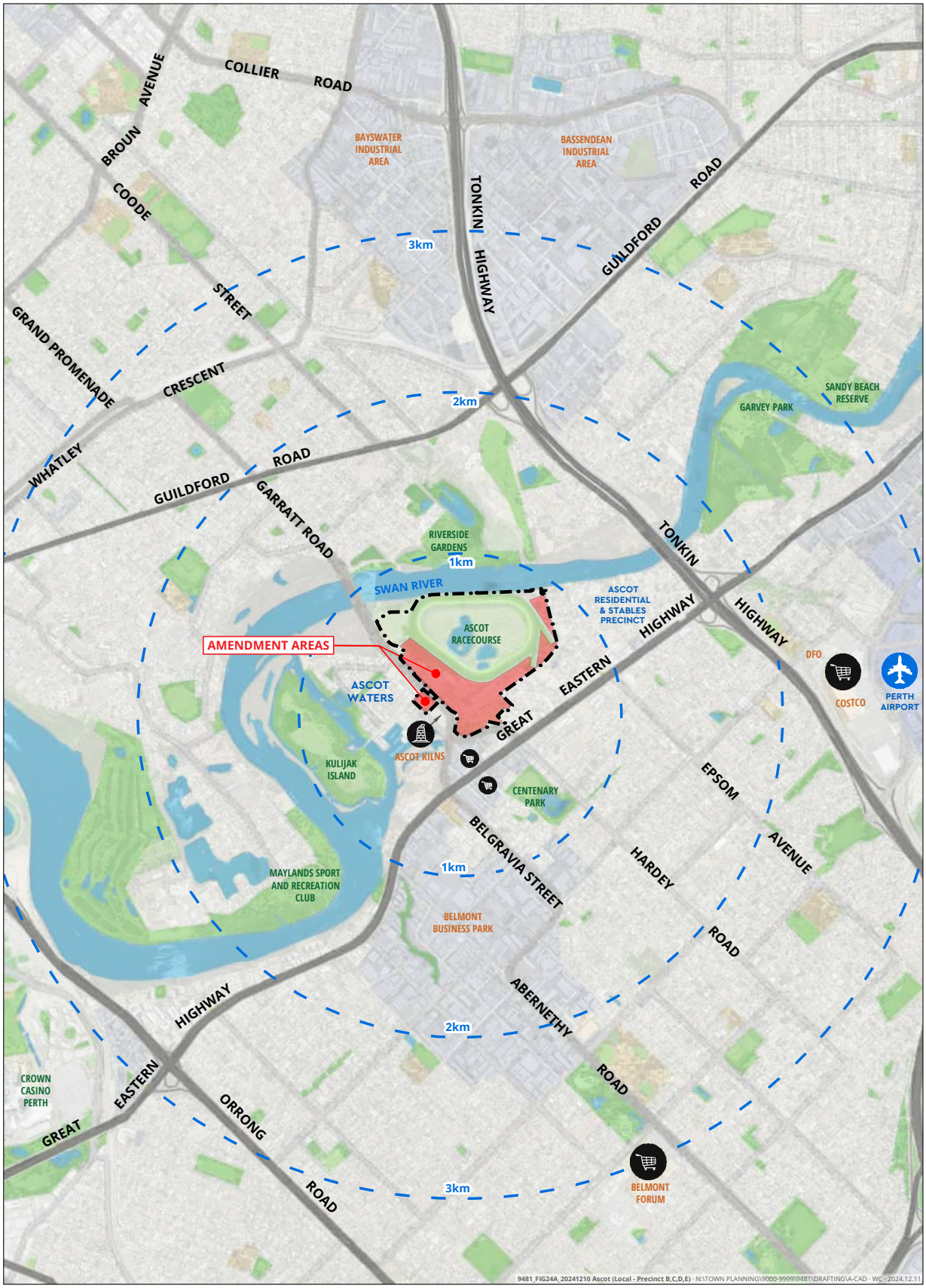


FIGURE 2
LOCAL CONTEXT



FIGURE 3
SITE PLAN

3. Proposed Amendment

It is requested that the City of Belmont, pursuant to Section 75 of the *Planning and Development Act 2005*, resolves to initiate an amendment to LPS15 by:

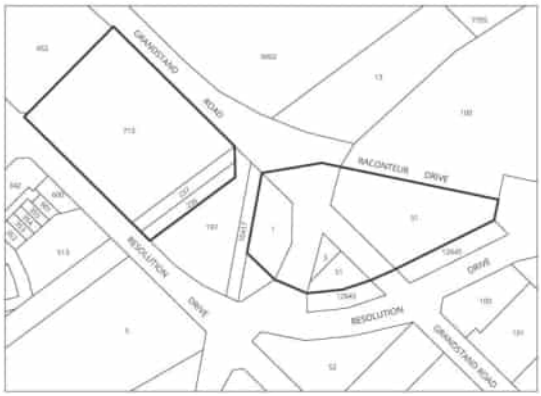
1. Rezoning a portion of Precinct 'D' (comprising Lot 452 (No. 70) Grandstand Road, Ascot) from the 'Place of Public Assembly: Racecourse' Zone to the 'Residential' R60 Zone as shown on the Scheme Amendment Plan.
2. Rezoning a portion of Precinct 'D' (comprising Lot 452 (No. 70) Grandstand Road, Ascot) from the 'Place of Public Assembly: Racecourse' Zone to the 'Mixed Use' Zone and including a Restricted Use (R1) designation as shown on the Scheme Amendment Plan.
3. Rezoning a portion of Precinct 'E' (comprising Lot 100 (No. 1) Raconteur Drive, Ascot) from the 'Place of Public Assembly: Racecourse' Zone and a portion of Precinct 'E' (comprising Lot 23 (No. 2) Carbine Street) from the 'Residential and Stables' Zone to the 'Mixed Use' Zone, deleting the Additional Use (A18) designation, inserting a Restricted Use (R1) designation and inserting a residential density coding of R10 and R-AC4 as shown on the Scheme Amendment Plan.
4. Rezoning portion of Precinct 'E' (comprising Lot 1 (No. 80) and Lot 3 (No. 96) Grandstand Road and Lot 51 (No. 2) Raconteur Drive, Ascot) from the 'Mixed Use' Zone and 'No Zone' to the 'Commercial' Zone, inserting a residential density coding of R-AC3 and inserting an Additional Use (A3) designation as shown on the Scheme Amendment Plan.
5. Including the following new provision in Schedule No. 2 – Additional Uses:

No.	Location and Additional Uses
18	Within Precinct 'B', the local government may consider the following additional uses: • Office • Hotel • Reception Centre • Restaurant • Tavern Within Precinct 'C', the local government may consider the following additional uses: • Animal Establishment • Stables • Veterinary Centre Within Precinct 'E', the local government may consider the following additional uses: • Health Centre 

6. Inserting the following table into Schedule No. 3 of LPS15 - Restricted Uses:

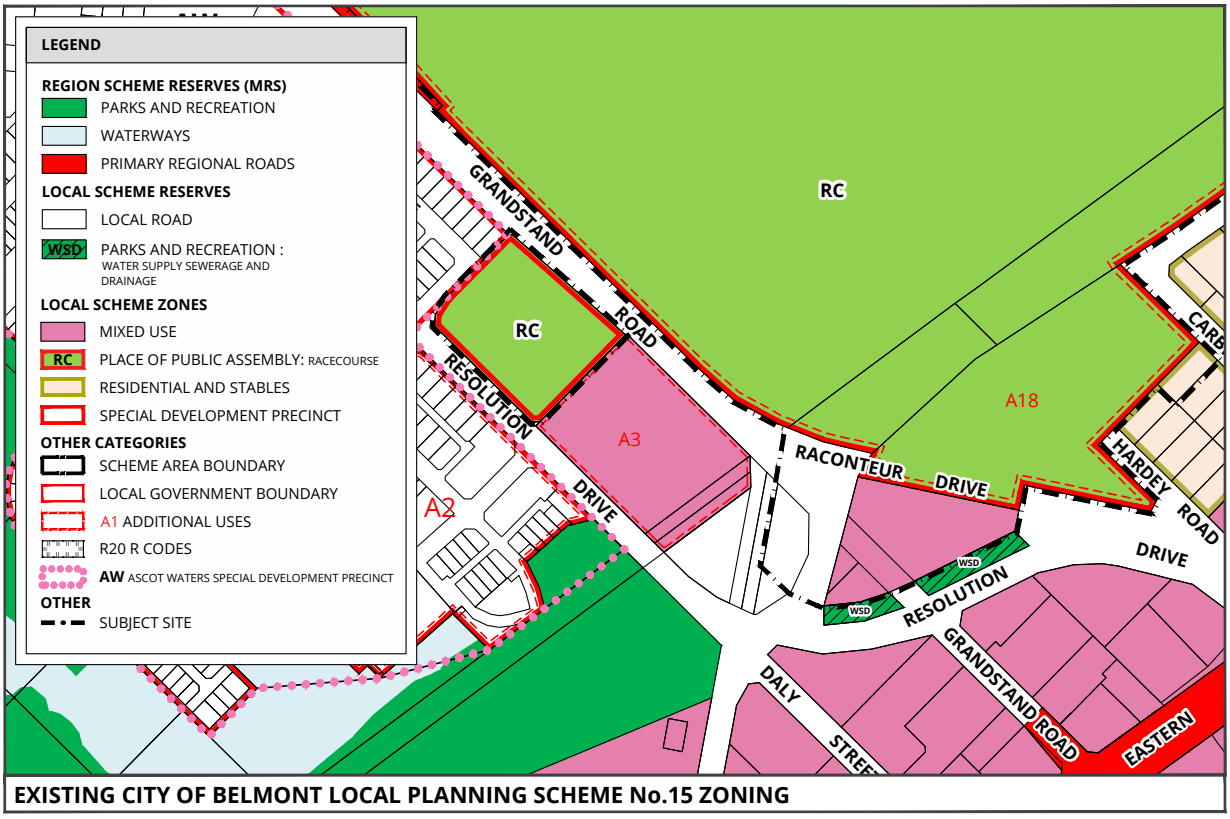
No.	Description of Land	Restricted Use	Conditions
1	All land contained within Precinct D and Precinct E of the Ascot Racecourse Precinct Structure Plan area subject of the 'Mixed Use' zone	Uses permissible in the 'Mixed Use' Zone, but excluding the following uses: Amusement Facility Amusement Parlour Auction Mart Garden Centre Industry – Light Industry – Service Motor Vehicle Repair Warehouse	Nil.

7. Modifying Schedule No. 2 – Additional Uses (A3) by inserting the following replacement plan:

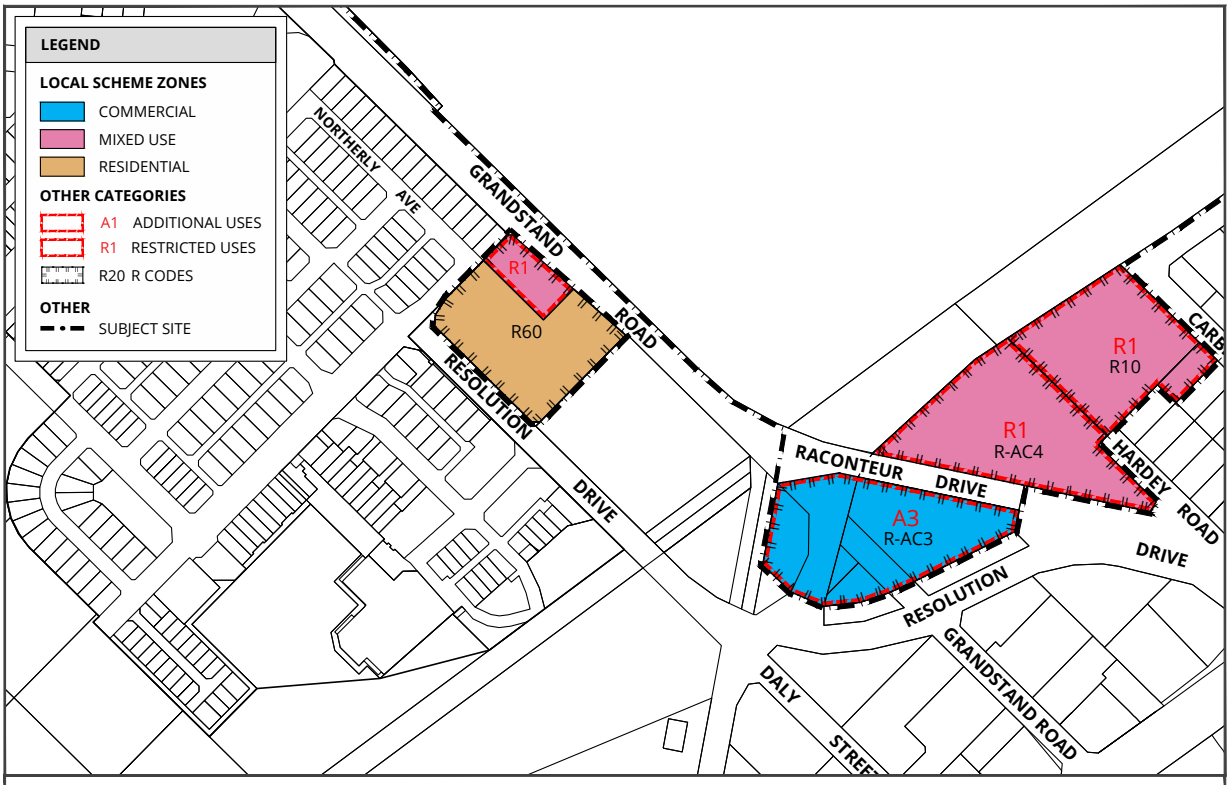
No.	Location and Additional Uses
3	

8. Amending the Scheme Map accordingly.

The proposed Amendment is considered to fall within the category of a 'Complex' Amendment pursuant to Part 5 Regulation 34 of the *Planning and Development (Local Planning Schemes) Regulations 2015*.



EXISTING CITY OF BELMONT LOCAL PLANNING SCHEME No.15 ZONING



PROPOSED CITY OF BELMONT LOCAL PLANNING SCHEME No.15 ZONING

9481_FIG26A_20241210 Ascot (LPS rezoning - Precinct B,C,D,E) · N:\TOWN PLANNING\9000-9999\9481\DRAFTING\A-CAD · WC · 2024.12.12

0 300 m

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FIGURE 4
SCHEME AMENDMENT PLAN

4. Town Planning Considerations

4.1 Zones and Reservations

4.1.1 Metropolitan Region Scheme

The Amendment Area is primarily zoned 'Private Recreation' under the provisions of the MRS. The balance of the Amendment Area is zoned 'Urban'.

Refer **Figure 5 – MRS Zoning**

4.1.2 City of Belmont Local Planning Scheme No. 15

The Amendment Area is predominately zoned 'Place of Public Assembly – Racecourse' under the provisions of LPS15 and is assigned an 'Additional Use' ('A18') designation on the Scheme Map. The balance of the Amendment Area is zoned 'Mixed Use'.

The A18 designation enables a portion of the Amendment Area to be considered for the additional uses of 'Horse Sales' and 'Stables' which are not otherwise permissible under the 'Place of Public Assembly' Zone. The proposed Amendment seeks to modify the scope of additional uses applicable to the 'Place of Public Assembly' Zone but retain the general intent and nature of the uses provided.

Refer **Figure 6 – LPS15 Zoning**

4.2 Regional Planning Strategies

4.2.1 Central Sub-Regional Planning Framework

The Perth and Peel @ 3.5 Million suite of documents provides a framework for the development of the Perth and Peel regions as the population reaches an estimated 3.5 million people by 2050. The suite of documents includes four (4) planning frameworks for the Central, North-West, North-East and South Metropolitan sub-regions. These documents provide the detailed commentary and analysis accompanying the overall 'Spatial Plan for Perth and Peel @ 3.5 million'.

The Amendment Area is located within the parameters of the 'Central' Sub-Regional Planning Framework ('Framework'). The Framework identifies the racecourse as forming part of a 'Green Network' that extends along the Swan River. Great Eastern Highway is identified as an 'Urban Corridor' where focus should be given to investigating increased residential densities, with potential for mixed land uses where appropriate. Both Great Eastern Highway, Grandstand Road and Resolution Drive immediately abutting Perth Racing's landholdings are identified under the Framework as 'high-frequency public transit' routes.

The proposed amendment is broadly consistent with the Framework in that it seeks to provide mixed uses and higher residential densities in and around high frequency public transit routes whilst retaining a network of green space along the river foreshore.

Refer **Figure 7 – Central Sub-Regional Planning Framework Map**

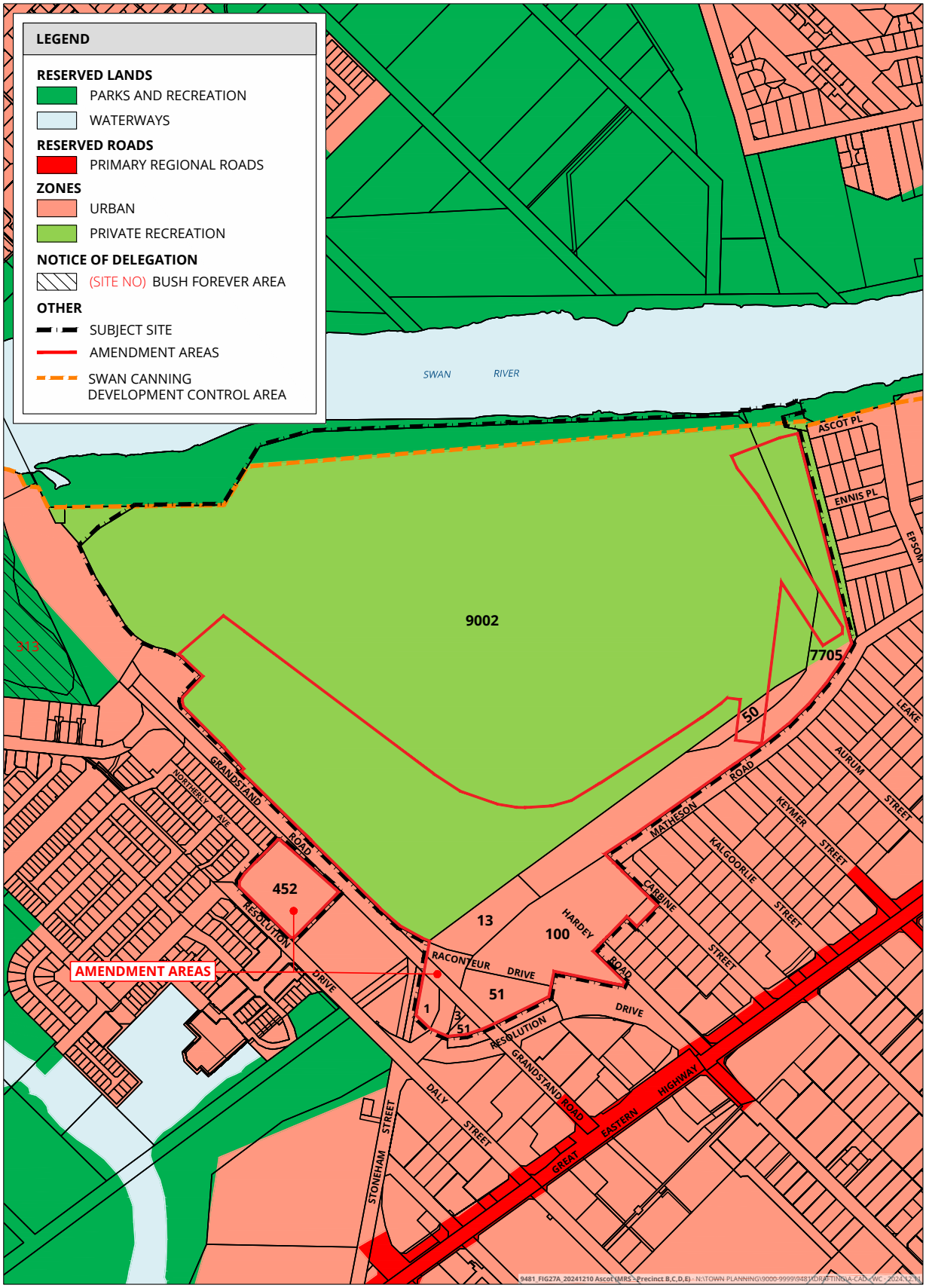
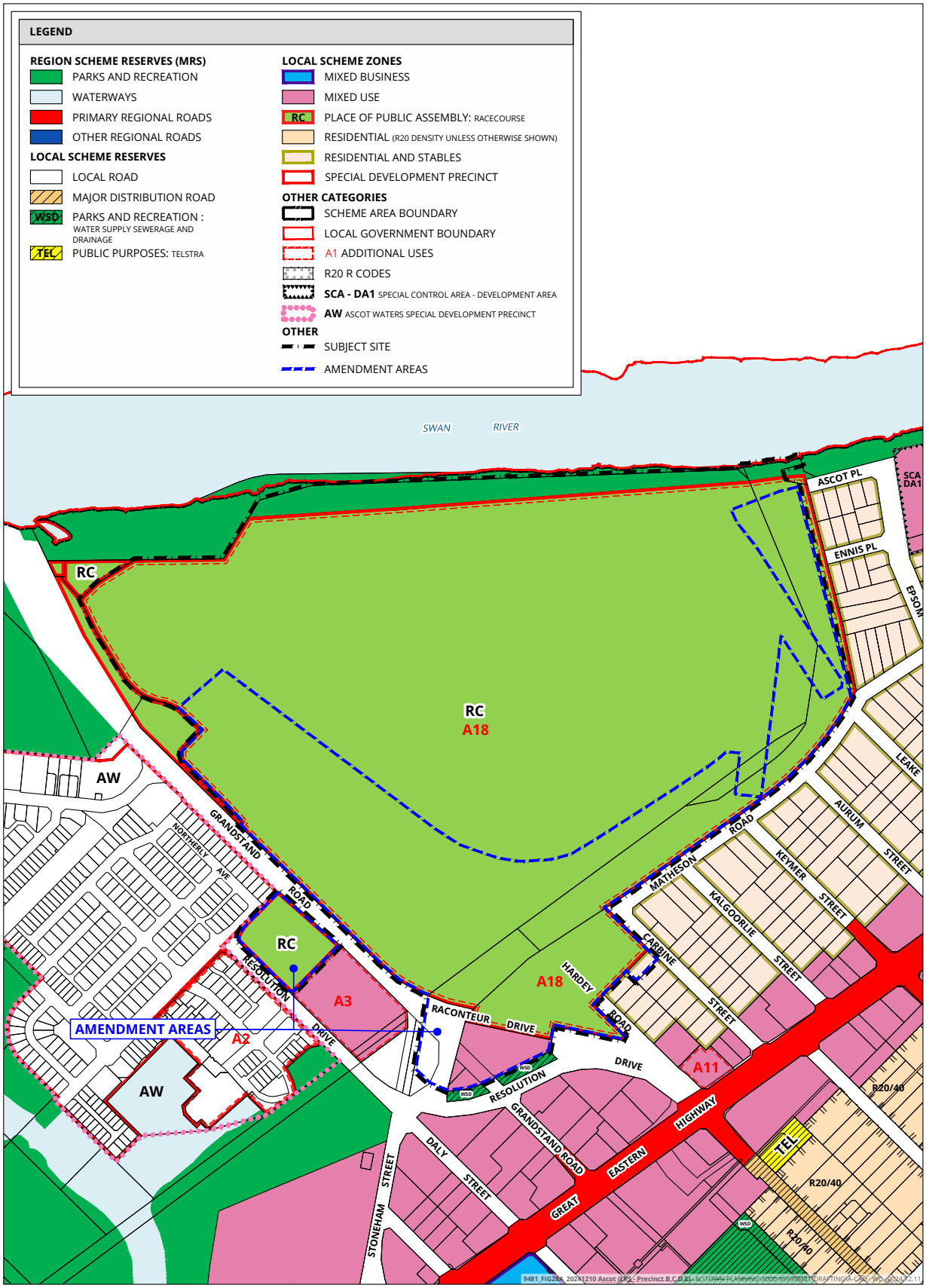


FIGURE 5
METROPOLITAN REGION SCHEME ZONING



0 200 m

SCALE @ A4: 1:7000

FIGURE 6
CITY OF BELMONT LOCAL PLANNING SCHEME No. 15 ZONING

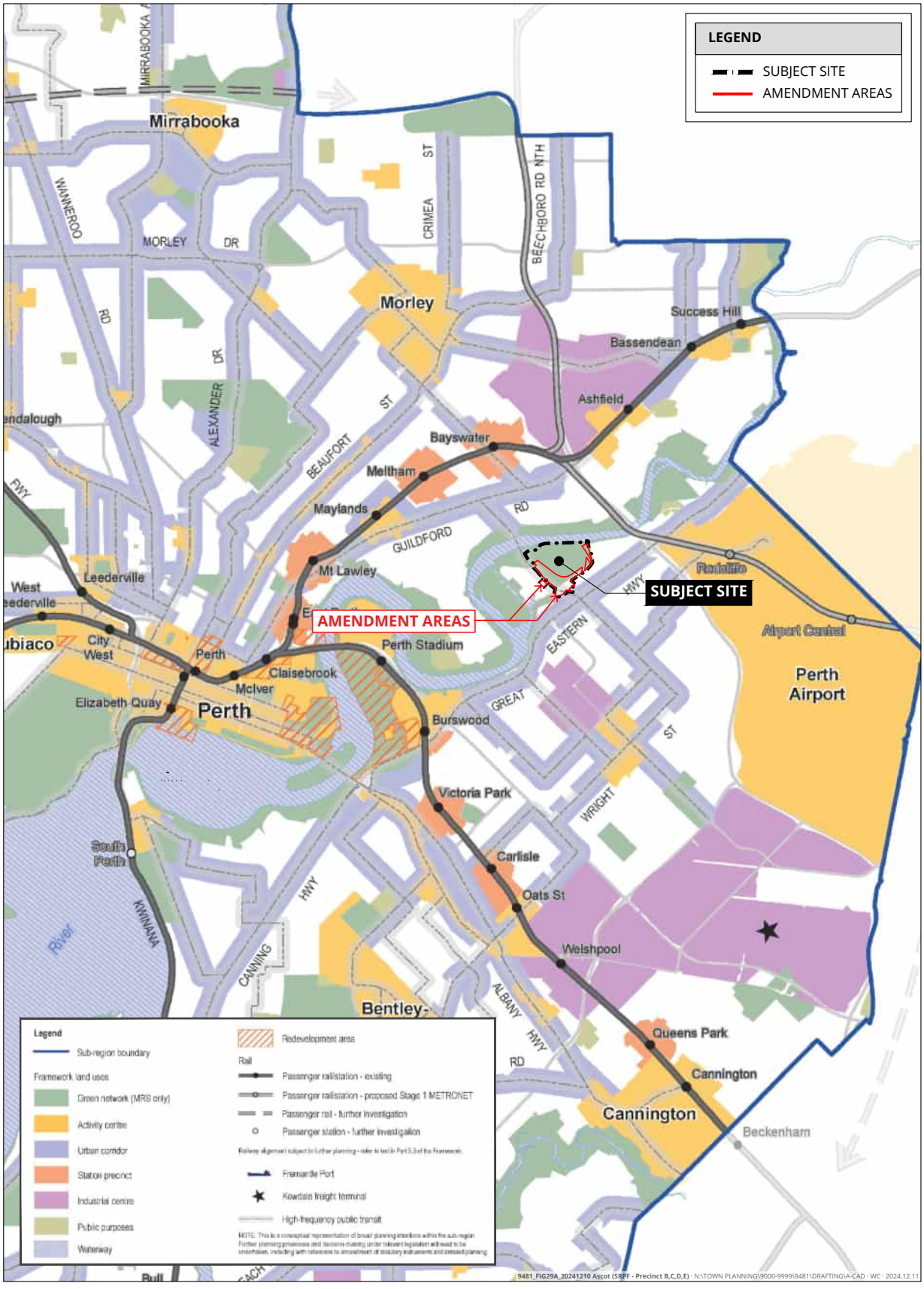


FIGURE 7
CENTRAL SUB-REGIONAL PLANNING FRAMEWORK

4.3 Local Planning Strategies

4.3.1 City of Belmont Local Planning Strategy

The City of Belmont is not currently guided by an adopted Local Planning Strategy however is in the process of preparing a Local Planning Strategy which will be used to inform the preparation of a new Local Planning Scheme to replace LPS15. No indication of timeframes for the preparation and advertising of the draft Local Planning Strategy and draft Local Planning Scheme are currently available.

4.3.2 City of Belmont Activity Centres Planning Strategy

The City of Belmont Activity Centres Planning Strategy ('ACPS') provides a holistic guide for future planning of activity centres within the City, based on the current strategic planning framework, future economic trends and analysis of best practice activity centre planning, as outlined by *State Planning Policy 4.2 – Activity Centres* ('SPP 4.2'). The ACPS identifies a future 'Local Centre' within the Ascot Waters residential estate (500m^2 NLA) to the west of the Amendment Area and the Golden Gateway Activity Centre (1,200m^2 NLA) which includes Precinct 'E'.

Precinct 'E' is identified in the draft PSP for future commercial development, reflective of its position within the Golden Gateway Activity Centre. Accordingly, the proposed Amendment seeks to rezone Precinct 'E' to the 'Commercial' and 'Mixed Use' Zones in order to facilitate a range of commercial uses. Land immediately adjacent to Resolution Drive and Grandstand Road, which is proposed for a 'Commercial' zoning under the proposed Amendment, would be suitable for active land uses such as a supermarket and speciality retail uses, and could form the 'core' of the activity centre, positioned centrally within the activity centre and having suitable access and exposure to passing trade.

To provide an appropriate transition to the adjacent 'Residential and Stables' precinct, transitional commercial and/or equine focussed development, such as bulky goods showroom, offices, a gym, and/or vet consulting rooms, to the north-east of Raconteur Drive is proposed via a 'Mixed Use' zoning. Like Precincts 'A' and 'D', 'Restricted Uses' are proposed to be applied to the 'Mixed Use' zone to ensure compatibility with surrounding development.

4.4 Structure Plans

4.4.1 Draft Ascot Racecourse Precinct Structure Plan

The Amendment Area forms part of the draft Ascot PSP which was lodged with the City of Belmont on 21 August 2024. The purpose of the PSP is to guide future land use, subdivision and development of the racecourse and surrounds. The draft PSP designates five (5) precinct areas ('A', 'B', 'C', 'D' and 'E') subject to different objectives and planning requirements. The proposed Amendment relates to Precincts 'B', 'C', 'D' and 'E' only. The following provides a description of each.

Precinct B (Racecourse Administration & Entertainment)

a) Support the continuation of the Racecourse spectator and entertainment area.

b) Integrate Perth Racing's administration functions within the Ascot Racecourse site.

c) Enhance public and spectator amenity through attractive built form, expansive open spaces, and landscaping.

d) Respect existing heritage values of the site.

Precinct C (Racecourse & Stabling)

a) Facilitate land use and development that supports, and is complementary to, the horse racing industry.

b) Provide for the planned development of on-course horse stabling and ancillary functions to support the ongoing viability of Ascot Racecourse.

c) Mitigate potential land use conflict through appropriate design and management practices.

Precinct D (Residential & Mixed Use)

d) Provide for medium density residential development of a scale that is consistent and/or compatible with surrounding residential area.

e) Support the development of small-scale non-residential uses fronting Grandstand Road, including but not limited to a 'Child Care Premises'.

Precinct E (Commercial)

f) Facilitate the development of an activity centre at the intersection of Grandstand Road and Resolution Drive.

g) Support retail, commercial, and other land uses that are consistent and complementary with the role and function of an activity centre.

h) Support land use and development that is complementary to Racecourse operations.

i) Satisfy existing and future demand for convenience retail and amenities in the local area.

Refer **Attachment 2 - Draft Ascot Precinct Structure Plan Map**

4.5 State Planning Policies

4.5.1 State Planning Policy 2.10 – Swan-Canning River System

The WAPC's *State Planning Policy 2.10 - Swan-Canning River Systems* ('SPP 2.10') provides an overarching framework that sets out guiding principles for decision-making in relation to planning proposals over the Swan and Canning River and its foreshore. SPP 2.10 contains four (4) guiding principles of social benefit, environmental values, cultural and natural heritage, and design and development, and nine (9) precinct areas.

The Amendment Area is located within the 'Lower Swan' precinct under SPP 2.10 which promotes planning decisions that:

- *Establish protection measures for riparian vegetation on foreshores;*
- *Promote an aesthetic environment for new riverside development appropriate to its surrounding, and establish a sense of place by the river;*
- *Recognise the importance of the river for transport, commerce, tourism and leisure as well as its conservation value;*
- *Enhance the appearance and function of existing recreation, tourism and commercial nodes and of proposed nodes identified in an adopted Swan-Canning precinct plan;*
- *Protect places of cultural significance, in particular places on the Register of Heritage Places and the Department of Indigenous Affairs register of significant places; and*
- *Ensure that subdivisions incorporate adequate foreshore reserves and building setbacks.*

The proposed Amendment does not directly affect the Swan-Canning River System on the basis that it does not involve any modifications to the zoning or statutory town planning provisions relating to land immediately adjoining the river foreshore. On this basis, the proposed Amendment is consistent with the objectives of SPP 2.10 and specific provisions in relation to the Lower Swan precinct.

4.5.2 State Planning Policy No. 2.9 – Water Resources

The WAPC's *State Planning Policy 2.9 – Water Resources* ('SPP 2.9') provides guidance for the planning, protection, conservation and management of surface and groundwater catchments. It also includes consideration of the availability of water and waterways management, wetlands, waterways, and estuaries and their buffers, and implementation of total water cycle management principles in the land use planning system.

The proposed Amendment will facilitate implementation of the draft PSP by providing the prerequisite local zoning and statutory town planning controls to support future development. The draft PSP is supported by a Local Water Management Strategy ('LWMS') prepared in accordance with the WAPC's Better Urban Water Management Guidelines and addressing the provisions and objectives set out in SPP 2.9.

Any future development within the Amendment Area will require demonstration by way of an Urban Water Management Plan ('UWMP') or Stormwater Management Plan (as appropriate) that the water management measures contained within the LWMS are suitability implemented.

Refer **Attachment 3 – Local Water Management Strategy**

4.5.3 Draft State Planning Policy 2.9 – Planning for Water

The WAPC has prepared a *draft State Planning Policy 2.9 – Water Resources* ('Draft SPP 2.9') and supporting draft Guidelines which, once gazetted, will consolidate and replace a number of existing State Planning Policies including SPP 2.9 – Water Resources and SPP 2.10 – Swan-Canning River System. Its purpose to is deliver greater clarity and simply the current framework around how water-related provisions are implemented across WA.

Whilst draft SPP 2.9 is yet to be finalised and adopted, its objectives and provisions have been taken into consideration as part of the draft PSP preparation process and are suitably addressed in the LWMS.

4.5.4 State Planning Policy 3.0 – Urban Growth and Settlement

The WAPC's *State Planning Policy 3.0 – Urban Growth and Settlement* ('SPP 3.0') is a broad sector policy that sets out the principles and considerations to facilitate sustainable patterns of urban growth and settlement in Western Australia. The proposed Amendment is consistent with (and promotes) a number of key principles contained within SPP 3.0 including the following:

- Sufficient and suitably serviced land in the right locations for housing, employment, commercial, recreational and other purposes, coordinated with the efficient and economic provision of transport, essential infrastructure and human services.
- Variety and choice in the size, type and affordability of housing to support a range of household sizes, ages and incomes and which is responsive to housing demand and preferences.
- Making the most efficient use of land in existing urban areas through the use of vacant and under-utilised land and buildings, and higher densities where these can be achieved without detriment to neighbourhood character and heritage values; the cost-effective use of urban land and buildings, schools and community services, infrastructure systems and established neighbourhoods; and promoting and encouraging urban development that is consistent with the efficient use of energy.
- Supporting higher residential densities in the most accessible locations, such as, in and around town and neighbourhood centres, high frequency public transport nodes and interchanges, major tertiary institutions and hospitals, and adjacent to high amenity areas such as foreshores and parks.
- Giving priority to infill development in established urban areas, particularly through urban regeneration and intensification of development of under-utilised urban land, whilst respecting neighbourhood character.
- Locating higher residential densities in locations accessible to transport and services, such as in and around the CBD, regional and district centres, activity corridors and higher education campuses, and in selected areas of high amenity on the coast and river foreshores.

The proposed Amendment is consistent with the objectives and principles for future urban growth and will provide for the implementation of a well-planned pattern of development within the existing urban area of the Ascot Racecourse and surrounding area.

4.5.5 State Planning Policy 4.2 – Activity Centres

The WAPC's *State Planning Policy No. 4.2 – Activity Centres* ('SPP 4.2') provides for a hierarchy and network of activity centres to meet the needs of the community, provide economic and environmental benefits, enable the distribution of goods and services, and facilitate retail, commercial and mixed used developments. As the proposed Amendment seeks to rezone land within Precinct 'E' to facilitate commercial development as part of the wider Golden Gateway Activity Centre, the objectives and provisions of SPP 4.2 are applicable.

The size and scale of the Golden Gateway Activity Centre (which includes Precinct 'E') would be akin to a 'Local Centre' or a 'Neighbourhood Centre' under SPP 4.2. The role and characteristics of a 'Local Centre' and 'Neighbourhood Centre' are described under SPP 4.2 as follows:

> ***Local centres*** *provide for the convenience and incidental needs of local communities. These centres provide an important role in providing walkable access to services and facilities for local communities.*
>
> ***Neighbourhood centres*** *are important focal points that provide for daily to weekly household shopping needs, community facilities and a small range of other convenience services. They are also a focus for medium density housing. These centres play an important role in providing walkable access to services and facilities for local communities.*

There are unique considerations in the planning of the Golden Gateway Activity Centre including, but not limited to, the extent of land fragmentation, the type and nature of existing land uses/development, and access constraints. The centre's proximity to Great Eastern Highway makes it attractive for uses reliant upon passing trade, such as bulky goods showrooms. Similarly, its proximity to the Perth Central Business District and Belmont Business Park, coupled with high levels of accessibility afforded by the road network and public transport services, makes it attractive for service industries and offices to locate.

The vision for Precinct 'E' under the draft PSP is to develop active commercial/retail land uses adjacent to Resolution Drive and Grandstand Road and transitioning to less intensive retail (i.e. bulky goods showrooms), commercial, and/or equine focussed development to the north-east of Raconteur Drive, adjacent to the Residential and Stables area. These land uses would be consistent with the intent of an activity centre in this location, whilst also responding to the existing 'equine-focus' of the area.

In accordance with SPP 4.2, a Net Benefit Test was prepared by Taktics4 in support of the draft PSP to assess the economic demand and implications for potential retail development in this area. The Net Benefit Test assesses the potential for 3,400m² net lettable area ('NLA') of 'Shop/Retail' floorspace and 9,600m² NLA of 'Other Retail', representing a 'worst-case' maximum retail floorspace scenario for Precinct 'E'. The findings of the Net Benefit Test indicate the following:

- The proposed development of 'Shop/Retail' and 'Other Retail' within the activity centre will have low/insignificant impacts on the existing and future activity centre network, with any impacts likely offset by potential sales growth generated by additional population and spending over the next 15 years.
- The creation of an activity centre in the area will reduce the number of vehicle kilometres required to be travelled by residents in the immediate trade area, and overall will save up to 700,000 vehicle trips per annum outside of the trade area.
- The development could create up to 205 full-time equivalent jobs.

- The 'Shop/Retail' floorspace will be sustainable from 2026 and satisfy an existing resident trade area, filling an existing demand in the market.
- Any development of 'Other Retail' will complement existing offerings in the vicinity.

Given the investigations undertaken as part of the precinct structure planning process, the proposed Amendment is considered to satisfy the objectives and provisions of SPP 4.2.

Refer **Attachment 4 – Retail Assessment (Net Benefit Test)**

4.5.6 State Planning Policy No. 5.4 – Road and Rail Noise

The WAPC's *State Planning Policy 5.4 – Road and Rail Noise* ('SPP 5.4') applies where a noise sensitive land use is proposed within proximity to major transport and freight corridors. Under SPP 5.4, the proposed 'Mixed Use' zone in Precinct 'E' is partially located within the noise buffer zone of Great Eastern Highway, being a strategic freight and major traffic route.

A Transportation Noise Assessment was prepared by Lloyd George Acoustics in support of the draft PSP and concluded that:

- Due to the screening effect of existing buildings, any ground floor noise sensitive uses would be compliant with the outdoor noise target; and
- Noise sensitive uses above ground floor and within 200m of Great Eastern Highway would be subject to Package A, including a notification on title. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available.

Implementation of the abovementioned requirements will be applied as a condition of subdivision or development approval (as applicable).

Refer **Attachment 5 – Transportation Noise Assessment**

5. Environmental Considerations

The following provides a summary of the environmental site conditions and constraints relating to the Amendment Area and is sourced from the LWMS and Environmental Assessment Report ('EAR') prepared by Emerge Associates for the broader Ascot Racecourse Complex in support of the draft PSP. Copies of the LWMS and EAR are provided at **Attachments 3 and 6** respectively.

5.1 Landform and Soils

The Amendment Area is generally flat, with a slight increase in elevation in its eastern extent. The northern portion, adjacent to the Swan River, is the lowest at 0m Australian Height Datum ('AHD'). The remainder of the Amendment Area is elevated at 2m AHD to the north-west and 7.5m AHD to the east.

The Amendment Area falls within the Swan River Terrace system and contains Guildford formation of Alluvial and leached yellow sands. The soil types present at the subject site include:

- **Ms2** – Sandy Silt: Strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.
- **Ms4** – Sandy Silt: light yellow brown, blocky, mottled with some fine to medium sand, soft when moist, variable clay content.
- **S8** – Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin.

Geotechnical investigations were undertaken specifically for Precinct 'A' (Douglas Partners, 2014), Precinct 'C' (Douglas Partners, 2023) and Precinct 'D' (Galt, 2024). Each investigation confirms the regional geological mapping generally consisting of shallow layers of sand overlying sandy clay of the Guildford formation, which is generally unsuitable for on-site stormwater disposal.

From a site classification perspective, Precinct 'A' would be 'Class P', Precinct 'C' is also 'Class P' but can be re-classified to 'Class S' with appropriate site preparation, and Precinct 'D' is 'Class S'. It is assumed that Precinct 'B' will have ground conditions similar to Precincts 'A' and 'C', however further geotechnical investigations will be required to ensure adequate treatment of ground conditions before future development. For Precinct 'E', it is anticipated that ground conditions would be consistent with the natural material from the geotechnical investigations and geological mapping.

Refer **Attachment 7 - Engineering Servicing Report**

5.2 Acid Sulphate Soils

The Department of Water and Environmental Regulation's ('DWER') Acid Sulphate Soils ('ASS') risk mapping indicates that the majority of the Amendment Area is considered to have a 'high to moderate' risk of ASS occurrence within 3m of the natural surface. A portion of the Amendment Area, including parts of Precinct 'B' and Precinct 'C' are mapped as having 'moderate to low' risk of ASS occurring within 3m of the natural surface.

The existence of ASS within the Amendment Area does not affect the advancement of the proposed Amendment however it is acknowledged that a detailed ASS investigation and management plan will be required prior to any intrusive works being undertaken in the future.

5.3 Site Contamination

A review of the Department of Water and Environmental Regulation's ('DWER') Contaminated Sites Database reveals that the Amendment Area is not located within a registered 'Contaminated Site' under the *Contaminated Sites Act 2003*.

A Basic Summary of Records for Lot 9002 was requested from DWER as part of the draft PSP process which indicated that Precincts 'B' and 'C' are classified as 'possibly contaminated – investigation required'. The possible contamination is associated with the area's historic use for horse-racing and runoff from animal storage and agistment in the surrounding areas.

The contamination classification does not affect the advancement of the proposed Amendment however it is noted that Perth Racing are currently undertaking monitoring and investigation into the potential contamination which will be reviewed by DWER in due course. Any treatment or management requirements arising from these investigations will be implemented at the development stage.

5.4 Groundwater and Surface Water

The Perth Groundwater Map (DWER, 2023) indicates that the regional groundwater level sits at 0.5m AHD across the Amendment Area. The groundwater clearance from south-east to north-west of the Amendment Area therefore ranges from 6.5m to 0.5m.

In terms of future development, it is anticipated that additional fill will be required within the Amendment Area to satisfy a minimum groundwater clearance of 1.2m above maximum groundwater levels. This would be subject to further investigations on final development requirements and land uses. Further detail is outlined within the draft PSP.

5.5 Wetlands

The Geomorphic Wetlands of the Swan Coastal Plain dataset does not indicate the presence of any wetlands within the Amendment Area.

5.6 Biodiversity and Natural Area Assets

A flora and fauna survey of the broader Ascot Racecourse Complex was undertaken as part of the draft PSP process in March 2023 by Emerge Associates. The survey found the majority of the Racecourse Complex is heavily disturbed with limited intact native vegetation and that most of the vegetation was in a 'degraded' and 'completely degraded' state.

The survey found no threatened or priority flora species or suitable habitat for threatened or priority species within the Amendment Area. Whilst a desktop search indicated potential for two (2) threatened and priority flora species within the broader Racecourse Complex, these were not considered likely to occur due to lack of suitable habitat.

The northern portion of the broader Ascot Racecourse Complex (along the Swan River) is identified as an environmentally sensitive area which are prescribed protection under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Any future development within this area will need to ensure clearing permits are obtained prior to clearing works occurring.

5.7 Fauna

A basic fauna and targeted black cockatoo survey of the broader Ascot Racecourse Complex was undertaken by Emerge Associates to inform the draft PSP. The survey found that fauna habitat values within the Amendment Area are limited due to historical disturbance and are primarily suited to widespread fauna species with non-specific habitat requirements.

Although the Amendment Area has historically been predominantly cleared of vegetation to facilitate racecourse activities, several existing trees have been identified. These trees were identified through the fauna survey as potential nesting habitat for Black Cockatoos. Future development within the Amendment Area will need to observe any retention measures deemed appropriate.

5.8 Heritage

5.8.1 Aboriginal Heritage

A search of the Aboriginal Cultural Heritage Inquiry System identified one (1) Aboriginal heritage place located within the Amendment Area, as follows:

- Site ID 3753 – Registered site, Name: Perth, Type: Historical, Mythological, Hunting Place, Named Place, Natural Feature.

Site ID 3753 partially intersects with the western edge of the site and the boundary is a broader area, with the exact area not being defined.

5.8.2 European Heritage

A search of the 'Inherit' database of the Western Australian Heritage Council ('WAHC') and the City of Belmont Local Heritage Survey and Heritage List identifies that the Amendment Area forms part of two (2) heritage sites, being the 'Ascot Racecourse Complex' (Place Number 6123) and 'Lee-Steere House' (Place Number 27274). These heritage sites are identified under the City of Belmont's Local Heritage Survey with a Management Category of '1' and '4', respectively.

6. Infrastructure and Servicing

An Engineering Servicing Report of the broader Ascot Racecourse Complex was prepared by TABEC Civil Engineering Consultants to support the draft PSP. A copy of the Engineering Servicing Report is enclosed at **Attachment 7** and the key findings and recommendations relevant to the Amendment Area are summarised below.

6.1 Water

Investigations indicate that the existing water reticulation network within the area can service the Amendment Area depending on final water usage requirements, specifically:

- Precinct 'B' is currently serviced by an existing 100mm water main, however if additional water is required, this water main may require upgrading.
- Precinct 'C' has access to an existing 100mm water main located along the southern verge of Matheson Road which can service the Precinct area. If greater supply is required above the capacity of the pipework, there may be a need to upgrade the size of the water main to Precinct 'C'.
- Precinct 'D' has access to an existing 150mm water main on the western verge of Resolution Drive and a 100mm water main on Grandstand Road which provide adequate opportunity for connection and water supply.
- Precinct 'E' can be serviced by an existing DN100mm water main located within the existing redundant road reserves dissecting this Precinct area.

6.2 Sewer

Precinct 'B' is currently serviced by an existing sewer connection located at Raconteur Drive, however Water Corporation do not have any record of this connection and therefore wastewater flows from this Precinct have not been included in their planning assumptions. As such, if there is a substantial increase in wastewater flows to this connection, further discussions will be required with Water Corporation.

In the case of Precinct 'C', which will include development of on-course stabling complexes along the outer edge of the Racecourse, multiple sewer connections will be required to service the site. The western portion of the Precinct (between Kalgoorlie Street and Raconteur Drive) is expected to be conveyed to the west to the existing internal sewer.

The central area of the Precinct, along Matheson Road, is proposed to be serviced via an existing connection from Kalgoorlie Street. The eastern portion of the Precinct will require two (2) new connections along the eastern boundary to the existing sewer network.

6.3 Power

Preliminary power investigations have been undertaken as part of the draft PSP process to determine anticipated high voltage infrastructure requirements within the Amendment Area. These investigations indicate that there is sufficient capacity within the network to accommodate future urban development within the Amendment Area.

6.4 Stormwater Drainage

There are two (2) significant drainage systems that convey stormwater from the Amendment Area to the Swan River. The first is the Central Belmont Main Drain which is managed by Water Corporation, and the second is the local drainage network located near Matheson Road which conveys water from the surrounding road reserves into the lake system at the centre of the Racecourse.

In terms of precinct-specific stormwater drainage management, the following is noted:

- Precinct 'B' currently captures and infiltrates water at source, with overland flow being graded towards the existing track.
- Precinct 'C' will require a combination of infiltration at source where levels and soil conditions allow, and discharge to the lake system.
- Precinct 'D' will include stormwater storage and infiltration at the site, with the 1% AEP event discharging into the local drainage network on Resolution Drive.
- Precinct 'E' is anticipated to be treated via bio-retention swale before overflow from the basin discharging into the Water Corporation's drainage system.

Further detail is outlined within the draft PSP with specific requirements for each Precinct to be subject to detailed design at the development stage.

6.5 Traffic and Access

A Traffic Impact Assessment ('TIA') of the broader Ascot Racecourse Complex was undertaken to support the draft PSP. A copy of the TIA is enclosed at **Attachment 8** and the key findings and recommendations relevant to the Amendment Area are summarised below.

6.5.1 Existing Road Network

Vehicular access to and from the Amendment Area will be provided from several locations along Grandstand Road, Resolution Drive, and Matheson Road. Grandstand Road provides access to the regional road network including Tonkin Highway and Graham Farmer Freeway via Garrat Road and Guildford Road to the north, and Great Eastern Highway to the south via Resolution Drive and Stoneham Street. Grandstand Road is classified as a 'Distributor A' road under the Main Roads WA Functional Road Hierarchy and forms a dual carriageway carrying volumes of approximately 16,700 vehicles per day (2018). Intersection arrangements to Grandstand Road will remain the same for the Ascot Racecourse complex.

There is an opportunity for a left-in/left-out access from Precinct 'D' (opposite the racecourse) to Grandstand Road to serve a future commercial/community use. This will need to ensure the access is integrated safely with the operations of the crossover on the opposite side of the road to the racecourse. Detailed assessment of the anticipated impacts associated with a commercial development on this site will occur in later planning stages. Precinct 'D' also accommodates future residential uses, however access to residential lots in this location will be provided from Resolution Drive.

In terms of Precinct 'E', the draft PSP proposes modifications to the existing access arrangement at Grandstand Road/Raconteur Drive to facilitate left-in, left-out and right-in movements only. Access from the existing Resolution Drive intersection is proposed to be restricted to left-in/left out movements only.

Detailed assessment of the anticipated impacts associated with modifications to access arrangements will occur in later planning stages.

6.5.2 Public Transport

The Amendment Area is serviced by existing bus stops along Grandstand Road, which is served by the 998/999 circle route, providing connectivity to the central Perth and Bayswater Train Stations. Additionally, frequent bus services are available along Great Eastern Highway, providing access to the Redcliffe Station, Central Perth and Perth Airport.

Development of the Amendment Area will utilise the existing public transport network, with opportunities to upgrade the infrastructure at the stops along Grandstand Road.

6.5.3 Pedestrian and Cycling Access

There are no on-road cycle lane facilities on Grandstand Road however a single continuous shared use path exists along the north-eastern side of Grandstand Road, with intermittent provision on the south-western side. A high-quality shared path extends from the Grandstand Road/Garratt Road bridge to Ascot Place, adjacent to the Swan River and along the northern boundary of the Racecourse. Additionally, Great Eastern Highway includes on-road cycle laneways with no physical separation and are combined with bus lanes.

The draft PSP proposes the continuation of pedestrian access within the precinct, including along Grandstand Road, adjacent to Precinct 'D' and the extension of the shared path along Resolution Drive, adjacent to Precinct 'E', connecting to the existing shared path network.

6.5.4 Trip Generation

The TIA prepared in support of the draft PSP considered trip generation and road capacity impacts for the broader Racecourse Complex but also examined each Precinct individually. Specific to the Amendment Area, the draft PSP will not impact trip generation for Precinct 'B' as the use of the racecourse will remain as it is currently used, where the morning and afternoon peaks is negligible. Use of this Precinct is at its highest on weekends and big race days where traffic management may be utilised on Grandstand Road.

Future development of Precinct 'C' will result in the development of stables, with the use of stables typically occurring well before the morning peak when horses are trained early in the morning. After this, traffic movements will occur again after the typical morning peak period.

Precinct 'D' is intended to be developed for residential and child care purposes, with trip generation in the order of 32 vehicles per hour (in and out) in both the morning and afternoon peak, with negligible impact on the local road network.

The draft PSP assesses the retail development of Precinct 'E' on the assumption that the Precinct would accommodate bulky goods and supermarket land uses. This development alone is not expected to generate notable trips independently, but traffic would be reciprocal between each use of this Precinct.

A more detailed TIA will be undertaken at the development stage to ensure the safe and efficient movement of vehicles in and around the Amendment Area.

7. Justification for Scheme Amendment

This report requests support from the City of Belmont to initiate an amendment to LPS15 in relation to Precincts 'B', 'C', 'D' and 'E' of the draft PSP. The proposed Amendment comprises both textual modifications to LPS15 and modifications to the LPS15 scheme maps which are broadly summarised as follows:

Precinct Area	Proposed LPS15 Zoning/Text Changes
B	Retain the existing 'Place of Public Assembly: Racecourse' Zone under LPS15, but with modifications to 'Additional Uses' (A18)
C	Retain the existing 'Place of Public Assembly: Racecourse' Zone under LPS15, but with modifications to 'Additional Uses' (A18)
D	Rezone from the 'Place of Public Assembly: Racecourse' Zone to the 'Residential' and 'Mixed Use' under LPS15, with an 'R60' coding and 'Restricted Uses' (R1) to the 'Mixed Use' Zone
E	Rezone from the 'Place of Public Assembly: Racecourse', 'Residential and Stables' Zone and 'Mixed Use' Zones to the 'Commercial' and 'Mixed Use' Zones under LPS15, with 'R-AC3', 'R-AC4', and 'R10' coding and 'Additional Use' (A3) and 'Restricted Uses' (R1)

Table 3: Summary of Proposed Amendment

The proposed Amendment is considered appropriate and justified on the basis that it:

- will facilitate future subdivision and development in accordance with the PSP;
- is consistent with its 'Urban' zoning under the MRS;
- is supported by a LWMS prepared in relation to the PSP which addresses the provisions and objectives of SPP 2.9 and draft SPP 2.9;
- is supported by a TIA prepared in relation to the PSP which demonstrates that the proposed zoning changes can be accommodated within the existing road network;
- has been identified as being suitable for zoning changes through the draft PSP process and satisfies the objectives and provisions of SPP 3.0;
- provides an opportunity for urban expansion to integrate with the surrounding 'Central Corridors' in accordance with the WAPC's *Perth and Peel @ 3.5 Million Central Sub-Regional Planning Framework*;
- is capable of being serviced by all essential utility infrastructure including water, sewer, stormwater, power and telecommunications infrastructure.
- is supported by a Net Benefit Test prepared in relation to the PSP which demonstrates that the proposed development of 'Shop/Retail' and 'Other Retail' within the Golden Gateway activity centre is economically viable having regard to the broader hierarchy of activity centres, consistent with the objectives and provisions of SPP 4.2;
- is supported by a noise assessment which demonstrates that the proposed zoning changes in Precinct 'E' will be capable of satisfying the noise targets under SPP 5.4; and
- does not contain any environmental or heritage constraints that would prohibit future development in the manner proposed.

8. Conclusion

This report has been prepared in support of a request to the City of Belmont to initiate an amendment to LPS15, pursuant to Part 5 Regulation 35 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, in relation to Precincts 'B', 'C', 'D' and 'E' of the Ascot Racecourse PSP.

The PSP is currently under consideration by the City of Belmont and once certified and adopted by the WAPC will guide the future subdivision, use and development within the Amendment Area. The proposed Amendment seeks to give statutory effect to the future zonings, densities and land use controls contained within the PSP and in doing so, facilitate redevelopment of Ascot Racecourse and its surrounds.

The proposed Amendment is considered appropriate and justified on the basis of key town planning, environmental, servicing and traffic considerations and accordingly, support from the City and the WAPC to initiate the Amendment is requested.

ATTACHMENT 1

Certificate of Titles

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
321	**107**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 23 ON PLAN 2198

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	321-107 (23/P2198)
PREVIOUS TITLE:	283-14
PROPERTY STREET ADDRESS:	2 CARBINE ST, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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Landgate
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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1041	**934**

RECORD OF CERTIFICATE OF TITLE

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 50 ON PLAN 5729

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

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SKETCH OF LAND:	P5729
PREVIOUS TITLE:	1041-164
PROPERTY STREET ADDRESS:	71 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1742	**276**

RECORD OF CERTIFICATE OF TITLE

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1 ON DIAGRAM 55346

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

STATE PLANNING COMMISSION OF 22 ST. GEORGE'S TERRACE, PERTH

(T D398174) REGISTERED 15/1/1987

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. D367664 CAVEAT BY DIAMOND SYNDICATE PTY LTD LODGED 24/11/1986.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1742-276 (1/D55346)
PREVIOUS TITLE:	1742-275
PROPERTY STREET ADDRESS:	88 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT
RESPONSIBLE AGENCY:	WESTERN AUSTRALIAN PLANNING COMMISSION

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1742	**278**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 3 ON DIAGRAM 55346

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1742-278 (3/D55346)
PREVIOUS TITLE:	1742-275
PROPERTY STREET ADDRESS:	96 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1789	**567**

RECORD OF CERTIFICATE OF TITLE

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BGRoberts

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 7705 ON DEPOSITED PLAN 209359

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE.
2. CROWN GRANT IN TRUST. SEE CROWN GRANT FOR CONDITIONS.
3. K930699 EASEMENT TO WATER CORPORATION FOR TANK AND PIPELINE PURPOSES - SEE DEPOSITED PLAN 58026 REGISTERED 5/5/2009.

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STATEMENTS:

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SKETCH OF LAND:	1789-567 (7705/DP209359)
PREVIOUS TITLE:	1259-989
PROPERTY STREET ADDRESS:	71 MATHESON RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

NOTE 1: K364458 DEPOSITED PLAN (INTEREST ONLY) 58026 LODGED

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1883	**668**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 51 ON PLAN 15104

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

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STATEMENTS:

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SKETCH OF LAND:	1883-668 (51/P15104)
PREVIOUS TITLE:	1883-666
PROPERTY STREET ADDRESS:	2 RACONTEUR DR, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 13 ON DIAGRAM 26760

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE. VOL 1883 FOL 670.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

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STATEMENTS:

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SKETCH OF LAND:	1883-670 (13/D26760)
PREVIOUS TITLE:	202-100A
PROPERTY STREET ADDRESS:	71 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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BGRoberts

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 9002 ON DEPOSITED PLAN 60342

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. CROWN GRANT IN TRUST. SEE CROWN GRANT FOR CONDITIONS. AS TO THE PORTION OF SWAN LOCATION 823 FORMERLY COMPRISED IN VOLUME 1771 FOLIO 332 ONLY.
2. H712859 LEASE TO VODAFONE NETWORK PTY LTD OF 799 PACIFIC HIGHWAY, CHATSWOOD, NEW SOUTH WALES EXPIRES: SEE LEASE. AS TO PORTION ONLY. REGISTERED 4/4/2001.
   - H970091 TRANSFER OF LEASE H712859, LESSEE NOW CROWN CASTLE AUSTRALIA PTY LTD OF CARE OF LEVEL 1, 754 PACIFIC HIGHWAY, CHATSWOOD, NEW SOUTH WALES REGISTERED 24/12/2001.
   - K929949 EXTENSION OF LEASE H712859. REGISTERED 5/5/2009.
3. I041460 LEASE TO OPTUS MOBILE PTY LTD OF OPTUS CENTRE, 101 MILLER STREET, NORTH SYDNEY, NEW SOUTH WALES AS TO PORTION ONLY. EXPIRES: SEE LEASE. REGISTERED 13/3/2002.
4. K929948 LEASE TO CROWN CASTLE AUSTRALIA PTY LTD OF LEVEL 1, 754 PACIFIC HIGHWAY, CHATSWOOD, NEW SOUTH WALES EXPIRES: SEE LEASE. AS TO PORTION ONLY. REGISTERED 5/5/2009.
5. K944992 CAVEAT BY CROWN CASTLE AUSTRALIA PTY LTD AS TO PORTION ONLY. LODGED 19/5/2009.
6. EASEMENT BURDEN CREATED UNDER SECTION 167 P & D ACT FOR ELECTRICITY PURPOSES TO ELECTRICITY NETWORKS CORPORATION - SEE DEPOSITED PLAN 60342.
7. L399948 MEMORIAL. CONTAMINATED SITES ACT 2003 REGISTERED 13/8/2010.
8. M813804 LEASE TO OPTUS MOBILE PTY LTD OF 1 LYONPARK ROAD, MACQUARIE PARK, NEW SOUTH WALES EXPIRES: SEE LEASE. AS TO PORTION ONLY REGISTERED 31/10/2014.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

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REGISTER NUMBER: 9002/DP60342 VOLUME/FOLIO: 2723-303 PAGE 2

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

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SKETCH OF LAND:	DP60342
PREVIOUS TITLE:	2216-686
PROPERTY STREET ADDRESS:	71 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 100 ON DEPOSITED PLAN 60341

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. EASEMENT BURDEN CREATED UNDER SECTION 27A T.P. & D. ACT FOR GAS PURPOSES TO S.E.C. - SEE SKETCH ON DEPOSITED PLAN 60341 AS CREATED ON PLAN 15104.
2. L014550 EASEMENT TO WA GAS NETWORKS PTY LTD FOR GAS PIPELINE PURPOSES - SEE DEPOSITED PLAN 60341 REGISTERED 21/7/2009.
3. M230259 EASEMENT TO ELECTRICITY NETWORKS CORPORATION FOR TRANSMISSION OF ELECTRICITY PURPOSES - SEE SKETCH ON DEPOSITED PLAN 76199 REGISTERED 4/4/2013.
4. M230260 EASEMENT TO ELECTRICITY NETWORKS CORPORATION FOR TRANSMISSION OF ELECTRICITY PURPOSES - SEE SKETCH ON DEPOSITED PLAN 76199 REGISTERED 4/4/2013.

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STATEMENTS:

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SKETCH OF LAND:	DP60341
PREVIOUS TITLE:	1883-667
PROPERTY STREET ADDRESS:	1 RACONTEUR DR, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 452 ON DEPOSITED PLAN 60339

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. EASEMENT BURDEN CREATED UNDER SECTION 167 P. & D. ACT FOR DRAINAGE PURPOSES TO CITY OF BELMONT - SEE DEPOSITED PLAN 60339.
2. L014556 EASEMENT TO CITY OF BELMONT FOR RIGHT OF FOOTWAY PURPOSES - SEE SKETCH ON DEPOSITED PLAN 60339. REGISTERED 30/7/2009.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

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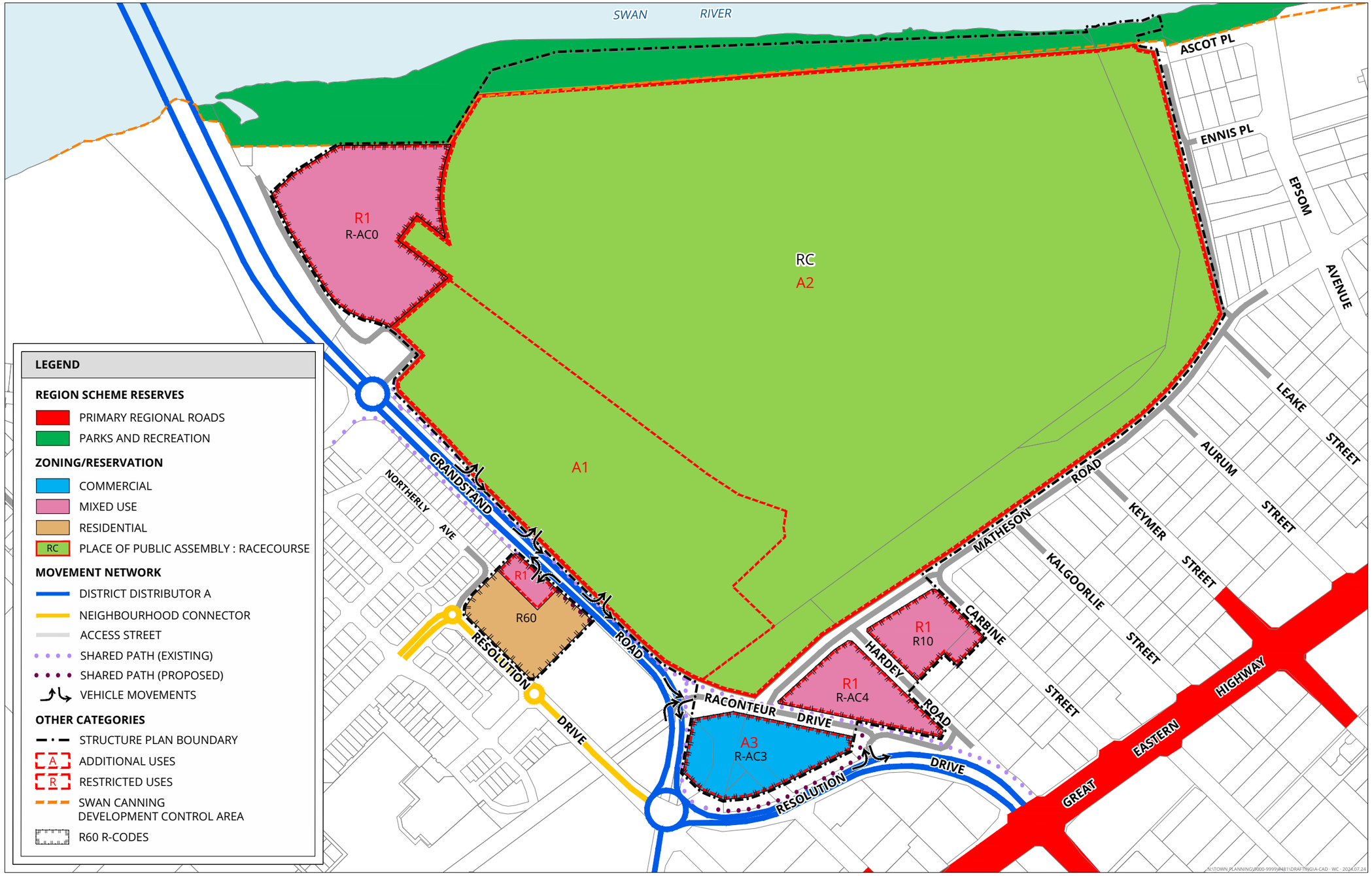
SKETCH OF LAND:	DP60339
PREVIOUS TITLE:	1776-799
PROPERTY STREET ADDRESS:	70 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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ATTACHMENT 2

Draft Ascot Racecourse Precinct Structure Plan Map



PLAN 1 - STRUCTURE PLAN
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

N
0 100 m
SCALE @ A3: 1:4000
9481-STR-01-G

DRAWN: WC
DATE CREATED: 2024.07.24
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
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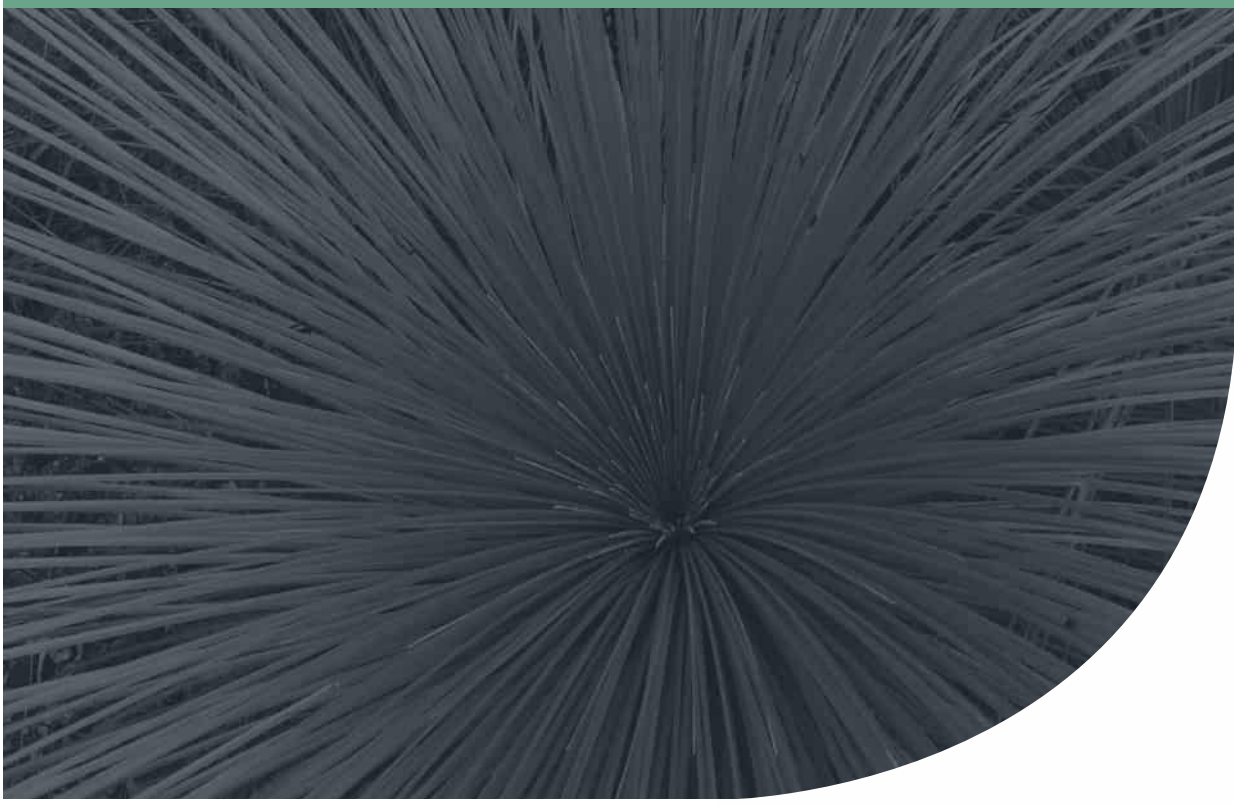
Local Water Management Strategy

Local Water Management Strategy

Ascot Racecourse Local Structure Plan

Project No: EP23-109(03)

Prepared for Perth Racing
July 2024



Document Control

Doc name:	Local Water Management Strategy Ascot Racecourse Local Structure Plan				
Doc no.:	EP23-109(03)--001B JM				
Version	Date	Author		Reviewer	
1	May 2024	Joyti Mabruk	JM	David Coremans	DPC
	For project team review				
A	May 2024	Joyti Mabruk	JM	David Coremans	DPC
	For submission to Agencies				
B	July 2024	Joyti Mabruk	JM	David Coremans	DPC
	For submission to Agencies				

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Executive Summary

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B (largely unchanged form existing), Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**. The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and City of Belmont (CoB). The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
    - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
    - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
    - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).
- The highest groundwater level beneath the site is reported 3.03 mBGL during February 2024 (Galt 2024), located beneath Precinct D.

- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The Central Belmont Main Drain (CBMD), managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Matheson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the racecourse. These are understood to receive runoff from the Grandstand buildings in Precinct B and stables/buildings in Precinct C.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

The design criteria and the manner in which they are proposed to be achieved are presented in **Table E1**.

Table E1: Water management criteria and compliance summary

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Water Conservation	WC1	For residential dwellings consumption target of 60 kL/person/year scheme water.	Provide advice to Precinct A and Precinct D residents on water conservation measures	Proponent	Point of sale
			RWTs can be utilised for non-potable uses	Lot owner	Post-house construction
			Promotion and use of WWG in lots within Precinct D and other open spaces across all precincts	Proponent/Lot owner	Point of sale/Post-house construction
			Promotion and use of water efficient appliances within Precinct A and Precinct D	Proponent/Lot owner	Point of sale/Post-house construction
			Mandate water efficient fittings within Precinct A and Precinct D	CoB	Building approval
	WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in all open spaces and verges	Proponent	Landscape design
			Open spaces designed to use no more than allocated groundwater		
			Minimise water requirements for open spaces and verge maintenance		
			Use of water efficient appliances within Precinct A and Precinct D	Lot owner	Post-house construction
			Use of WWG principles within Precinct A and Precinct D		
	WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the racecourse.	Proponent	Landscape design

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Stormwater Management	SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.	Lot owner/developer	Construction
	SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.	Proponent	Construction
			Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.	Proponent	Construction
	SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.95 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.	Proponent	Construction
	SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the basins.	Proponent	Detailed drainage design
	SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.	Proponent	Detailed drainage design
	SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the nutrient concentrations within surface water meet the regional water quality target.	Proponent	Detailed drainage design
	SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within POS and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use	Landscape/Maintenance Contactor/Proponent	Landscape Implementation/ Point of Sale
	SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.	Proponent	Detailed drainage design

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Groundwater Management	GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, and subsoil drainage will be provided in the POS.	Proponent	Detailed drainage design
	GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.	Proponent	Detailed drainage design

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Central Belmont Main Drain Water Corporation

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
ANZECC	Australian and New Zealand Environment and Conservation Council
BoM	Bureau of Meteorology
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
CoB	City of Belmont
WC	Water Corporation of Western Australia (Water Corp)

Table A2: Abbreviations – General terms

General terms	
AEP	Annual exceedance probability
ASS	Acid sulfate soils
CCW	Conservation category wetland
CEMP	Construction Environmental Management Plan
DCA	Development Control Area
DMP	Drainage management plan
EC	Electrical conductivity
FMP	Foreshore management plan
LWMS	Local Water Management Strategy
MGL	Maximum groundwater level
MRS	Metropolitan Region Scheme
NWQMS	National Water Quality Management Strategy
POS	Public open space
SCWQIP	Swan and Canning Water Quality Improvement Plan
SRA	Swan River Alluvium
TDS	Total dissolved solids
TEC	Threatened ecological community
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids

General terms	
TWL	Top water level
UFI	Unique feature identifier
UWMP	Urban Water Management Plan
WSUD	Water sensitive urban design
WWG	Water wise gardening

Table A3: Abbreviations – units of measurement

Units of measurement	
cm	centimetre
ha	hectare
m	metre
m^2	square metre
m^3	cubic metre
m^3 / s	cubic metres per second
mAHD	metres in relation to the Australian height datum
mBGL	metres below ground level
mm	millimetre
mS / cm	millisiemens per centimetre
µg/L	micrograms per litre
mg / L	milligrams per litre

Table A4: Terminology – design rainfall

Rainfall event	Annual exceedance probability (AEP)	Approximate equivalent average recurrence interval (ARI)
Small	1 exceedance year (EY) event (frequent)	1 in 1 year ARI event
Minor (residential purposes)	20% AEP event	1 in 5 year ARI event
Minor (commercial purposes)	10% AEP event	1 in 10 year ARI event
Major	1% AEP event	1 in 100 year ARI event

1 Introduction

1.1 Background

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse and Perth Racing Administration lot/building on Grandstand Road. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**.

1.2 Town planning context

The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

1.3 Purpose of this report

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and CoB. The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

1.4 Policy Framework

There are a number of State Government legislation and policies of relevance to the site. These policies include:

- *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d)
- *Swan and Canning Rivers Management Act 2006* (Government of WA 2006)
- *Policy 49 – Planning for stormwater management affecting the Swan Canning Development Control Area* (DPaW 2016)
- *Local Planning Scheme No. 15 (City of Belmont)* (WAPC 2023a)
- *State Water Plan* (Government of WA 2007)
- *Draft State Planning Policy 2.9: Planning for Water Guidelines* (DPLH 2021)
- *State Planning Policy 2.10 Swan Canning River System* (WAPC 2006b)
- *Guidance Statement No. 33: Environmental Guidance for Planning and Development* (EPA 2008)
- *Liveable Neighbourhoods* (WAPC 2009a)
- *Planning Bulletin No. 64: Acid Sulfate Soils* (WAPC 2009b)

In addition to the above policies, there are a number of published guidelines and standards available that provide direction regarding the water management characteristics that urban developments should aim to achieve. These are key inputs that relate either directly or indirectly to the site and include:

- *Better Urban Water Management* (WAPC 2008b)
- *Urban Water Management Plans: Guidelines for Preparing Plans and for Complying with Subdivision Conditions* (DoW 2008)
- *National Water Quality Management Strategy (NWQMS)* (ANZECC 2000)
- *Australian Runoff Quality* (Wong et al. 2006)
- *National Water Quality Management Strategy* (ANZECC 2000)
- *Stormwater Management Manual for Western Australia* (DoW 2007)
- *Decision Process for Stormwater Management in Western Australia* (DWER 2017)
- *Australian Rainfall and Runoff* (Ball J et al. 2019)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008)
- *Golden Gateway Structure Plan* (CoB 2019).

1.5 Previous Studies

1.5.1 Golden Gateway Local Water Management Strategy

The draft Golden Gateway LWMS (Essential Environmental 2018b) was prepared to support the Golden Gateway Structure Plan (CoB 2019) by Essential Environmental. The LWMS was prepared in consideration of *Better Urban Water Management* (WAPC 2008b) and *State Planning Policy 2.9: Water Resources* (WAPC 2006a). The key objectives and design criteria of the draft LWMS (Essential Environmental 2018b) included:

Water Conservation:

- Ensure the efficient use of all water resources in the redeveloped urban form and aim to achieve highest value use of fit-for-purpose water.
- Maintain opportunities for future generations by using water more efficiently.

Stormwater management:

- The first 15 mm of rainfall is to be retained within all lots through a combination of raingardens, water tanks and soakwell systems.
- Raingardens and tree-pits are to be installed in all new or upgraded streets to provide infiltration of the first 15 mm of rainfall.
- Minor event runoff from events larger than 15mm total depth are to be managed in accordance with serviceability requirements of the City of Belmont.
- Roads and public open spaces are to be designed to cater for the surface overflow for more severe storm events with habitable floors at least 0.3 m above the 1% AEP flood or storage level at any location.
- Habitable floors are to be constructed at least 0.5m above the 1% AEP flood level in the Swan River adjacent to the development area.

- Water quality treatment systems and stormwater management structures should be designed in accordance with the *Stormwater Management Manual for Western Australia* (DoW 2007) and *Australian Runoff Quality: A guide to water sensitive urban design* (Wong et al. 2006).

Groundwater management:

- Groundwater management systems are to be designed as free discharging under normal operating conditions.
- Flows from groundwater management systems are to be treated prior to discharge.

1.6 LWMS objectives

Whilst the criteria proposed in the Golden Gateway LWMS are relevant to some parts of the Ascot Racecourse structure plan area, it is not representative of all areas and site characteristics and therefore only partially applicable. This LWMS supports the Ascot Racecourse Structure Plan, which proposes an alternate layout (to the Golden Gateway Structure Plan) to some of the land uses surrounding the Ascot Racecourse. The design criteria and objectives proposed in this LWMS are generally based on those proposed in the Golden Gateway LWMS, though with additional consideration for site and Precinct- specific characteristics. This LWMS adopts the following major objectives:

- Protect water quality in the Swan River by providing appropriate water quality treatment at source.
- Mitigate potential flooding within the Structure Plan area and immediate surrounds.
- Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater.
- Provide a broad level stormwater management framework to support future urban development.
- Incorporate appropriate best management practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified.
- Minimise development construction costs, which will result in reduced land costs for future home owners.
- Minimise transport of nutrients/pollutants to groundwater.
- Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area.
- Gain support from DWER, DBCA, CoB and Water Corporation for the proposed method to manage stormwater within the site.

Detailed objectives for water management within the site are further discussed in **Section 4**.

2 Proposed Development

A total of approximately 62.0 ha is proposed to be developed as shown on **Figure 1**. The Ascot Racecourse Structure Plan proposes six precincts with different objectives and character, and these include:

- **Precinct A –** Approximately 3.0 ha for retirement living/village and mixed use purposes
- **Precinct B –** Approximately 9.3 ha for the use of public assembly (i.e. entertainment/office purposes)
- **Precinct C –** Approximately 8.0 ha for the use of public assembly (i.e. racecourse/stabling purposes)
- **Precinct D –** Approximately 1.5 ha for residential/childcare purposes
- **Precinct E –** Approximately 4.2 ha for mixed use (i.e. commercial/retail purposes)
- **The Racecourse –** Approximately 36.0 ha of retained 'Place of Public Assembly: Racecourse' uses.

The proposed land uses surrounding Ascot Racecourse will be integrated into the Racecourse Precinct. Management of surface and groundwater will take a water sensitive urban design (WSUD) approach that will integrate the management of water within the Precincts with the Racecourse and immediately surrounding infrastructure.

The WSUD measures that will be adopted within the Structure Plan area will include:

- Bio-retention areas (BRAs) to meet water quality treatment requirements
- Subsurface infiltration cells that will facilitate at-source infiltration
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse
- Flood storage areas (FSAs) to provide flood detention, retention and infiltration as close to source as possible.

The WSUD approaches are further discussed in **Section 6**.The detailed concept plan and preliminary civil drawings are provided in **Appendix A** and **Appendix C**.

3 Pre-development Environment

3.1 Sources of information

The following sources of information were used to provide a broad regional environmental context for the site:

- *Geological Survey of Western Australia* (Gozzard 2007)
- *Map Viewer Plus* (Landgate 2023)
- *Water Register* (DWER 2024c)
- *Perth Groundwater Map* (DWER 2024a)
- *Weather and Climate Statistics Data* (BoM 2024)
- *Acid Sulfate Soil Mapping* (DWER 2023a)
- *Water Information Reporting* (DWER 2024b).

In addition to the above information, site-specific investigations have been conducted. These have aimed at providing more detail to the existing regional information. These site-specific investigations and information have been available from the following sources:

- *Draft Golden Gateway Structure Plan* (CoB 2019)
- *Draft Golden Gateway LWMS* (Essential Environmental 2018b)
- *Draft Golden Gateway Environmental Report* (Essential Environmental 2018a)
- *Draft Infrastructure Assessment Report : Golden Gateway Precinct* (Cardno 2017)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008).

3.2 Land use context

The site has been used as the Ascot Racecourse since 1892 (Landgate 2023). The northeast portion of the site is being used for horse racing and training purposes and the surrounding area is being used for stabling, training and entertainment venues which support the above purposes. Some portions of the site are predominantly cleared (e.g. Precinct A, Precinct E) and are occasionally used for parking or other temporary uses. The Precinct D area is used for commercial purposes, being the current Perth Racing administration building.

3.3 Climate

The site experiences a dry Mediterranean climate of hot dry summers and cool wet winters and is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August (BoM 2024). The region experiences rainfall for 84.8 days annually (on average).

3.4 Topography

The site is mostly flat with a slight downward slope from east to north and northwest, with a few low points. The variance in topography of the Precincts is described further as:

- The Racecourse slopes from Precinct C towards the Swan River with topography approximately 7 m Australian Height Datum (mAHD) to 1m AHD and from 7 mAHD (east) to 3 mAHD (west). There are a few local depressions (i.e., lakes and swale) observed within the centre of the racecourse.
- Precinct A has a generally flat topography of 2 mAHD with a high point of 3 mAHD to the west adjacent to Grandstand Road.
- Precinct B slopes from south to north (4 mAHD to 2 mAHD) and from west to east (3 mAHD to 2 mAHD). Precinct D and E are generally flat with a topography of 3 mAHD and 2 mAHD respectively.
- Parts of Precinct C (existing stables and buildings) drain towards the Racecourse, however most of Precinct C is currently carpark that drains towards Precinct E and the Southern Main Drain.
- Precinct D is generally flat with a topographic level 3 mAHD.
- Precinct E has a gentle slope from east to west. The topography of the precinct ranges from 4 mAHD to the east to 2 mAHD to the west.

The topographic contours of the site are shown on **Figure 2**.

3.5 Geotechnical conditions

3.5.1 Geology and soils

The Perth Metropolitan Region 1:50,000 Environmental Geology Series (Gozzard 1986) *and Sea to scarp - geology, landscape, and land use planning in the southern Swan Coastal Plain* (Gozzard 2011) describes that the site lies in the Swan River Terraces system, being underlain by the Guildford formation of alluvial and leached yellow sand. The regional geological mapping indicates that the site soils include:

- **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
- **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
- **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin

The regional geological mapping is shown on **Figure 3**.

3.5.2 Precinct A geotechnical investigation

A detailed geological investigation has been carried out in January 2024 (Douglas Partners 2024) for Precinct A (see **Appendix B**). This investigation generally confirms the regional geological mapping, and the ground conditions of Precinct A are described as:

- Uncontrolled Fill
  - Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL
  - Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY
- Overlying natural soils includes
  - Clayey soils including Clayey SAND and CLAY
  - Sandy soils including SAND and Silty SAND

Douglas Partners (2024) concluded that if unmodified, Precinct A is considered unsuitable for on-site stormwater disposal due to the low permeability soils and shallow groundwater depth. To meet geotechnical requirements, stormwater should be managed by connecting to a suitable outflow (Douglas Partners 2024).

3.5.3 Precinct D geotechnical investigation

Galt has undertaken a geotechnical study in March 2024 (Galt 2024) for Precinct D (provided in **Appendix B**) and has described the Precinct D ground conditions as:

- **Surficial Topsoil** (in landscaped areas) up to 0.3 m thick and **Hardstand Fill Layers** (in carparks and access ways); overlying
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Whilst detailed geotechnical investigations have not been undertaken in each Precinct, it is expected that the soils encountered will be generally consistent with regional geological mapping and the investigations undertaken for Precincts A and D and will consist of generally shallow layers of sand overlying sandy clay of the Guildford formation. Such soils are unlikely to be suitable for onsite infiltration of all stormwater and onsite detention unless modified and stormwater management will need to be supplied with an outlet so that flood storage areas have a way to drain between storm events.

3.5.4 Acid sulfate soils

The acid sulfate soil (ASS) risk mapping (DWER 2023b) indicates that most of the site is considered to have a high to moderate risk of ASS occurring within the 3 m of the natural surface. Some portions of Precinct B, Precinct C and the Racecourse are mapped to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.

The ASS risk mapping is shown on **Figure 4**.

3.6 Environmental assets

3.6.1 Environmentally sensitive area

The northern portion of the site (along the Swan River) is identified as an environmentally sensitive area (ESA). ESAs are shown on **Figure 5**.

3.6.2 Sewerage sensitive area

The entirety of the site is classified as a sewage sensitive area (SSA) by the *Government Sewerage Policy* (DPLH 2019). The two classifications of relevance to the site define a SSA as:

- a) Estuary catchments on the Swan and Scott Coastal Plains.
- f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.

3.6.3 Geomorphic wetlands

The *Geomorphic Wetlands of the Swan Coastal Plain* dataset indicates the following wetlands within the site:

- Multiple Use Category Wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
- Resource Enhancement Wetland (REW) area (UFI 8423)

The Swan River, situated immediately adjacent to the northern boundary of the site, is recognised as a "Conservation Category Wetland" (CCW) (UFI 1316 - Estuary waterbody) within the *Geomorphic Wetlands of the Swan Coastal Plain* dataset and has additional significant ecological, cultural and heritage values (DEC 2011).

The location of the geomorphic wetlands is shown on **Figure 5.**

3.7 Hydrology

3.7.1 Surface water

3.7.1.1 Water Resources

The dominant hydrological feature of the site is the Swan River estuary. The estuary is subject to marked seasonality, which controls the salinity of the site, and particularly the foreshore area. This seasonality is a result of the short winter rainfall patterns, a small tidal range and the landform of the estuary (Hodgkin and John 1986).

The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park (shown on **Figure 6**). Any proposed development on land adjacent river within the DCA and/or partly within DCA are subject to assessed and approved by the Department of Biodiversity, Conservation and Attraction (DBCA) under Part 5 of the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007* (CoB 2018).

Water management strategies will be needed to ensure protection (i.e. water quality improvement) of the Swan River. The catchments of the Swan Canning River system are the subject of the Swan Canning Water Quality Improvement Plan (SRT 2009) which contains catchment management measures and control actions.

The major event flood levels in the Swan River have been documented in recent studies undertaken on behalf of DWER (DWER 2023c).These flood levels, along with the extent of floodway/floodplain

are shown in the DWER online floodplain mapping tool. This tool indicates that the anticipated 1% AEP flood level adjacent to the site is 2.8 mAHD – noting that this level includes consideration for future climate change. The extent of floodway/floodplain from the Swan River adjacent to the site is shown on **Figure 6**.

3.7.1.2 Lakes

There are three lakes within the racecourse including:

- **Irrigation lake** – located adjacent to the Production Bore 1 (PB01) and has a volume of 6,000 m^3 to 7,000 m^3. Water is pumped out from PB01 into the lake, and irrigation water is drawn from the Irrigation Lake. During winter the Irrigation Lake overflows into the adjacent Lined Lake. The current irrigation demand for the Racecourse is approximately 3,000 m^3/day, there is no shortage of irrigation water supply as the lake has sufficient storage capacity. The top water level (TWL) of the Irrigation Lake is approximately 3.1 mAHD.
- **Lined Lake** – this Lake is sealed with a natural clay liner and fed via a 225 mm overflow pipe from the Irrigation Lake. The Lined Lake overflows into the Wetland Lake. The elevation of the Lined Lake is approximately 2.1 mAHD.
- **Wetland lake** – is the largest of the three lakes and has approximately 2.6 ha of surface area. The Wetland Lake has a TWL of approximately 0.4 mAHD. Two overflow pipes at the northern end of the Wetland Lake allow excess water within the Lake to flow to the Swan River.

Peak water levels within the Lined Lake and Wetland Lake were predicted for a 10% AEP storm event (Evangelisti & Associates 1997). The peak water level for was 2.68 mAHD in the Lined Lake which then discharged to the Wetland Lake. The Wetland Lake discharged to the Swan River after reaching the peak water level of 0.53 mAHD. The lakes are connected by 450 mm RCP pipes. The outfall into the Swan River is directed via two pipes (450 mm RCP and 375 mm RCP). The pipes are fitted with headwall and tidal control gate to mitigate inundation from the Swan River (Evangelisti & Associates 1997).

The location of the lakes and overflow pipes are shown on **Figure 6**.

3.7.1.3 Drainage network systems

The Central Belmont Main Drain (CBMD) is managed by the Water Corporation and is the regional drainage system and has a catchment area of 189 ha and which discharges into the Swan River. Catchment plans for the CBMD indicate that inflow from the site occurs in the southwestern corner of Precinct E, where an open drain connects to the CBMD at node CAN008 as shown in **Appendix E** and **Figure 6**.

The CoB has a local drainage piped network located beneath Hardey Road adjacent to Precinct C and which discharges to the CBMD within Precinct E. A larger local CoB network extends along Matheson Road to the East. This is currently connected to the 900 mm pipe that discharges northwards to the lined lake within the centre of the racecourse.

CoB local drainage pipes also exist beneath Grandstand Road adjacent to Precinct A however there is no current connection between Precinct A and the local drainage network. The same network also extends past/adjacent to Precinct D along the northern end of Resolution Drive, however there is no

current connection from Precinct D to the local pipe network. The pipe network along Resolution Drive includes a 450 mm and 525 mm pipe which are understood to discharges into the CBMD. Whilst the CoB catchment has not been modelled to determine peak flows under differing storm durations, an estimate can be made based on the capacity of the pipes which discharge to the CBMD. The combined capacity of the two existing pipes is estimated to be 0.62 m^3/s, and therefore the allowable discharge from Precinct C and Precinct E is estimated to be 0.33 m^3/s.

Within the Racecourse an existing swale is being used around the racecourse to convey water from the track into the central Wetland Lake.

The location of the swales within the Racetrack Precinct and outlet to Swan River from the Wetland Lake is shown on **Figure 6**.

3.7.2 Groundwater

3.7.2.1 Groundwater Resource

The groundwater beneath the site is a multi-layered system comprised of the following:

City of Bayswater – Perth Superficial Swan unconfined aquifer. The Superficial Aquifer is approximately 20 m thick under the Ascot Racecourse, with the base of the aquifer under the racecourse at approximately - 20 mAHD (Davidson, 1995). The aquifer is recharged directly by rainfall and from the Swan River.

King Park Aquifer. The Kings Park Aquifer is 155 m thick starting from - 20 mAHD and is recharged laterally from the adjacent northern Mirrabooka Aquifer and Superficial Aquifer. The Kings Park Aquifer comprises 2 members: the Mullaloo Sandstone and Como Sandstone. Only the Mullaloo Sandstone member is present at the Ascot site (Davidson, 1995). The Mullaloo Sandstone member is underlain by the Kardinya Shale confining bed of the Osborne Formation.

The groundwater salinity in the aquifer in 1995 was mapped as 500 mg/L to 1,000 mg/L TDS (Davidson, 1995). However, data in recent years indicates the aquifer salinity levels are increasing due to saltwater intrusion.

Perth South – Perth Leederville confined aquifer is below -160 mAHD and is approximately 370 m thick. In the Ascot area the Leederville Aquifer is confined but further to the south and north of Perth it is hydraulically connected to the Superficial Aquifer. The Leederville Aquifer comprises of four formations under the Ascot Racecourse, namely Henley Sandstone, Pinjar Member, Wanneroo Member and the Mariginiup Member.

Groundwater flow is generally westwards through the Leederville Aquifer. Lateral discharge can occur to the Kings Park Aquifer but depends on levels of abstraction in the Leederville Aquifer adjacent to the discharge area.

Generally, groundwater salinity in the Leederville Aquifer can be divided into an upper and a lower zone. The upper zone is generally fresh with salinity ranging from 250 to 1,000 mg/L. Salinity in the lower zone (below -400 mAHD) ranges from 1,000 mg/L to greater than 3,000 mg/L.

Groundwater is abstracted from an artesian production bore (PB1) assigned to the Leederville Aquifer to meet the irrigation demand of the Racecourse and surrounds. The bore is located adjacent the Irrigation Lake at the south corner of the Ascot Racecourse track. The bore is screen in the upper Leederville Formation which extends between -160 mAHD and -400 mAHD.

The allocation status of aquifers is further discussed in **Section 5.1.2**.

3.7.2.2 Groundwater levels

Perth Groundwater Map indicates (DWER 2023e) that the regional groundwater level sits at 0.5 m AHD across the site. Therefore, the groundwater clearance from southeast to northwest of the site ranges from 6.5 m to 0.5 m.

There are two groundwater level and quality monitoring bores (Bore1 and Bore2) and one production bore (PB1) within the Racecourse (see **Figure 2**) which are monitored by Perth Racing. Groundwater levels in these are monitored monthly.

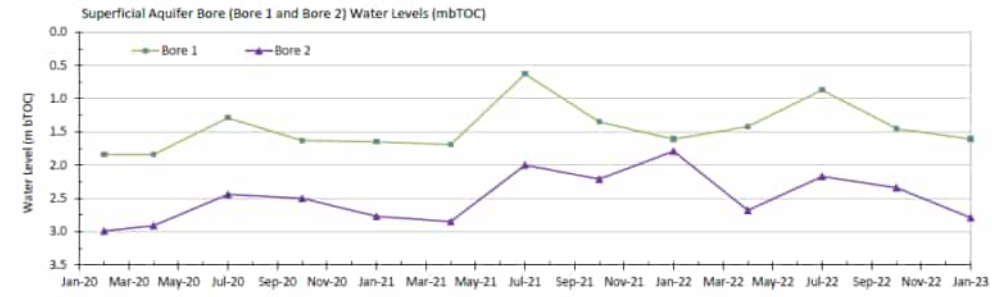


Plate 1: Groundwater levels within the Superficial Aquifer at Bore1 and Bore2 (JDA 2023)

Plate 1 depicts the groundwater levels observed within the Racecourse which clearly indicates the rise and fall of groundwater levels seasonally. The peak groundwater level at Bore 1 and Bore 2 were recorded 1.26 m AHD and 1.70 m AHD respectively, during August 2022.

Monitoring has recently been undertaken within Precinct A. Six monitoring wells were installed for the Precinct A geotechnical investigation. The groundwater depth below the surface of the Precinct A (during January 2024) varied from 1.09 m below ground level (mBGL) to 2.37 mBGL (Douglas Partners 2024).

Monitoring has also recently been undertaken within Precinct D by Galt Geotechnics during the geotechnical investigation. The highest groundwater level beneath Precinct D is reported as 3.03 mBGL during February 2024 (Galt 2024).The various monitoring data/sources have been collated to prepare estimated maximum groundwater contours beneath the site. These have also considered the surface elevation of swales adjacent to the racetrack and the reported TWL of the Wetland Lake. The regional groundwater levels are shown in **Figure 2,** with spot heights recorded at the various locations also provided. It is noted that these do not necessarily represent the annual maximum groundwater levels at all parts of the site given the various timing of measurement of groundwater. Notwithstanding the variability of timing, it is likely that the management of stormwater (and in

particular infiltration) will more likely be influenced by localised soil conditions than seasonal peak groundwater levels in the superficial aquifer.

3.7.2.3 Groundwater quality

Water quality monitoring was conducted monthly at PB1 and quarterly at Bore1 (JDA 2023). Water quality parameters those were analysed during the monitoring period include:

Monitoring Bore (Bore1)

- EC
- pH
- TDS
- Total phosphorus (TP)
- Filterable Reactive Phosphorus or Phosphorus in Orthophosphate (PO_4-P)
- Total Nitrogen (TN)
- Nitrogen in Total Oxidised Nitrogen (NO_x-N)
- Nitrogen in Ammonia (NH_3-N)
- Total Kjeldahl Nitrogen (TKN)

Production Bore (PB1)

- Electrical conductivity (EC)
- pH
- Total Dissolved Solids (TDS)

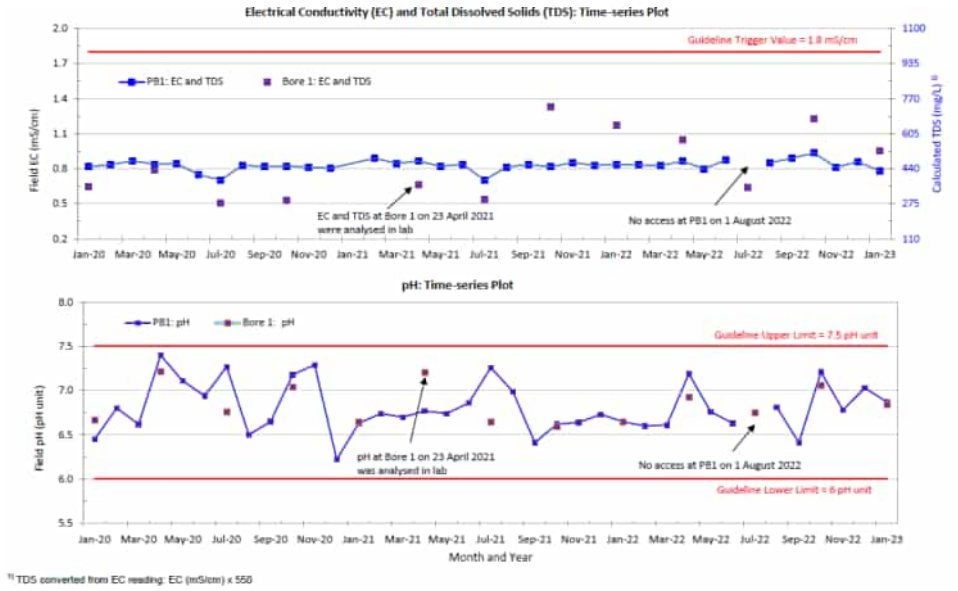


Plate 2: Water Quality (EC, TDS and pH) Monitoring results (JDA 2023)

Plate 2 and **Plate 3** illustrate the water quality of the groundwater within the site is generally consistent over the monitoring periods with typically low variance in parameters tested. EC, TDS and

pH values did not display any exceedances of the trigger values. However, TN and TP regularly exceeded the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L (respectively). It is also noted a large exceedance in TN occurred in August 2022 however this does not appear to be representative of long-term values.



Plate 3: Water Quality (TN and TP) Monitoring results (JDS 2023)

3.8 Summary of existing environment

In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
  - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
  - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
  - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).

- The highest groundwater level beneath Precinct D is reported 3.03 mBGL during February 2024 (Galt 2024).
- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The CBMD, managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Mathieson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the Racecourse. These are understood to receive runoff from the grandstand buildings in Precinct B and stables/buildings in Precinct C.
- Allowable discharge to the CBMD from the local drainage network is 0.95 m^3/s based on Water Corporation modelling.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

4 Design Criteria and Objectives

This section outlines the objectives and design criteria that this LWMS and future management plans must achieve. The water management strategy includes water conservation, groundwater management and stormwater management.

4.1 Integrated water cycle management

Better Urban Water Management (WAPC 2008a) endorses the promotion of integrated water cycle management and application of WSUD principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies.

The key principles of integrated water cycle management include:

- Considering all water sources, including wastewater, stormwater and groundwater
- Integrating water and land use planning
- Allocating and using water sustainably and equitably
- Integrating water use with natural water processes
- Adopting a whole catchment integration of natural resource use and management.

Integrated water cycle management addresses not only physical and environmental aspects of water resource use and planning, but also integrates other social and economic concerns. Water management design objectives should therefore seek to deliver better outcomes in terms of:

- Potable water consumption
- Stormwater quality management
- Groundwater management.

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. The existing environmental context of the site has been discussed in **Section 3** of this document. Guidance regarding environmental values and criteria is provided by a number of national and state policies/guidelines and site-specific studies undertaken in and around the site. These were detailed in **Section 1.4** and **Section 1.5** respectively.

4.2 Water conservation

This LWMS proposes the following water conservation criteria:

Criteria WC1 For residential dwellings, consumption target of 60 kL/person/year.

Criteria WC2 Ensure the efficient use of all water resources

Criteria WC3 Non-potable irrigation water to be sourced from existing groundwater licences held over the area.

The manner in which this objective will be achieved is further detailed in **Section 5**.

4.3 Stormwater management

The principle behind stormwater management at the site is to mimic the pre-development hydrological conditions and utilise existing infrastructure where sensible to do so, as described in **Section 3.7**. This principle and the guidance documents discussed in **Section 1.4** and **Section 1.5** and have guided the stormwater management criteria.

Criteria SW1 Retain and treat the first 15 mm of rainfall as close to source as possible and within site.

Criteria SW2 Detain up to 1% AEP rainfall event on-site.

Criteria SW3 Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.

Criteria SW4 Finished floor levels must have a minimum of 300 mm clearance above the 1 % AEP TWL in the FSA.

Criteria SW5 All lots must have a minimum of 500 mm clearance above the 1 % AEP flood level in the Swan River.

Criteria SW6 Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.

Criteria SW7 Reduce nutrient loads by applying appropriate non-structural measures.

Criteria SW8 Design infiltration areas to avoid creating mosquito habitat.

The manner in which these objectives will be achieved is further detailed in **Section 6**.

4.4 Groundwater management

The principle behind the groundwater management strategy is to maintain the existing groundwater hydrology. The groundwater management criteria for the site include:

Criteria GW1 Surface based infiltration structures should have 300 mm clearance above the MGL.

Criteria GW2 Habitable floor levels should have a clearance to the MGL of at least 1.2 m.

The manner in which the groundwater management objectives will be achieved is further detailed in **Section 7**.

5 Water Conservation Strategy

5.1 Fit for purpose water use

Conservation of water through fit-for-purpose use and best management practices is encouraged so that scheme water is not wasted. Fit-for-purpose describes the use of water that is of a quality suitable for the required use of the water. Fit-for-purpose principles have been utilised in the water conservation strategy for the site and will achieve **Criteria WC1**.

5.1.1 Scheme water supply

Scheme water will be supplied by the Water Corporation Integrated Water Supply System. Scheme water is proposed to be used for all potable uses. Scheme water will also service some external uses, where fit-for-purpose alternatives are not available.

5.1.2 Groundwater

As discussed in **Section 3.7.2.1**, the site is located beneath a multi-layered system comprising of the Superficial Swan, Kings Park Formation, Leederville and Yarragadee aquifers.

The proponent holds a groundwater allocation from the Perth South Leederville confined aquifer for the following:

- GWL 178519 - 347,000 kL

This licence will be used to meet the irrigation requirements for the Racecourse Precinct, Precinct A, Precinct B and part of Precincts C and E.

The above-mentioned measure will achieve **Criteria WC3**.

5.1.3 Rainwater tanks

Rainwater tanks (RWTs) can be used within private lots to harvest roof runoff. This water is considered non-potable but can be used to supplement non-potable water uses.

5.2 Lot scale water conservation measures

This LWMS proposes that the water conservation measures to be adopted would include RWTs, waterwise principles for lot scale gardens and within estate landscaping (WWG) and water efficient fixtures and appliances (WEFA) to ensure that the residential portion of the development minimises the use of water. These are summarised in the following sections.

5.2.1 Rainwater tanks

The use of RWTs will not be mandated, and the stormwater quantity management strategy does not rely on their use. They are therefore only considered to be a water conservation measure. Given that rainwater tanks will not be mandated or supplied by the proponent, it has been assumed that these would be implemented by 7.5% of households within Precinct D. Whilst they may be considered for

Precinct A they are not proposed to be taken up in other Precincts. The assumed uptake rate has been based on data obtained from the Australian Bureau of Statistics (ABS 2013). It is assumed (for the purposes of the water balance analysis) that all rainwater tanks have a capacity of 3 kL.

5.2.2 Water efficient fixtures and appliances

Water conservation strategy for the site proposes the use of WEFA. Water efficient fittings will be mandated through the building licence, while uptake of water efficient appliances can be encouraged by State and Local Government rebates in addition to education from the proponent at point of sale. WEFA are relevant to Precinct A and Precinct D. It is assumed that water efficient appliances will be implemented by 40% of households within Precinct A and Precinct D, which has been based on data obtained from the Australian Bureau of Statistics (ABS 2013, 2014).

5.2.3 Waterwise gardens

Landscape packages will not be provided as a part of the land sale contract. Lot scale waterwise gardening principles (WWG) are only relevant for Precinct D. These will be achieved by promoting Waterwise gardening principles (WWG) (WC 2003) at the time of sale of land within Precinct D. It is assumed that 75% of households in Precinct D will implement WWG principles within lot gardens (ABS 2013). WWG principles include:

- Soil to be improved with soil conditioner certified to Australian Standard (AS) 4454 to a minimum depth of 150 mm where turf is to be planted and a minimum depth of 300 mm for garden beds.
- The irrigation system shall be designed and installed according to best water efficient practices:
  - The controller must be 'hydrozoned'.
  - Emitters must disperse coarse droplets or be subterranean.
- Garden beds to be mulched to 75mm with a product certified to AS4454.
- Increasing community awareness of water conservation by promoting Waterwise practices, fixtures and fittings at the point of sale.

WWG principles will also be considered for Precinct A and Precinct E, however it is anticipated that these areas will have minimal irrigated landscaping to which this would apply. The current approach to irrigation within the Racecourse Precinct, Precinct B and Precinct C adopts a range of water conservation measures (including non-irrigated area and retention of existing trees/vegetation) to ensure that Perth Racing operates within the available groundwater allocation. This approach is not proposed to be significantly modified.

The above measures will assist in achieving **Criteria WC1** and **WC2**.

5.3 Water use analysis

5.3.1 Lot scale water use analysis

A water use analysis has been undertaken for Precinct D to estimate the expected individual residential lot water use to demonstrate the effectiveness of the water conservation strategy. The water use analysis has been based on the rates and calculation methodology presented in the Water

Corporation (2011) spreadsheet *AltWaterSupply_Water_Use_Model.xls*. This spreadsheet has been adapted to model the effects of using the water conservation measures proposed, and key assumptions include:

- Lot area has been based on a conceptual lot layout (see **Appendix A**).
- Average residency of 2.6 people per single lot dwelling. This value has been calculated from data provided by ABS for new housing developments in Perth (ABS 2022).
- Assumed up-take rates include:
  - 100% uptake of water efficient fittings
  - 40% uptake of water efficient appliances
  - 7.5% uptake of RWTs
  - 55% uptake of WWG principles.

The results of the water balance indicate that if households in Precinct A and Precinct D adopt the proposed water conservation measures (e.g. efficient fittings, RWT, WWG principals) at typical uptake rates they will use an average of 33.0 kL/year/person. This achieves the water target of no more than 60 kL/year/person of scheme water and satisfies **Criteria WC1**.

5.4 Wastewater management

The wastewater generated from the site will be managed by connecting the development to the Water Corporation deep sewer network.

5.5 Water conservation management criteria compliance

A summary of the proposed water conservation management criteria and how these are addressed is provided within **Table 1.**

Table 1: Water conservation management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
WC1	Residential consumption target of 60 kL/person/year scheme water.	Provide advice to residents in Precinct A and Precinct D on water conservation measures
		RWTs can be utilised for non-potable uses within Precinct D
		Promotion and use of WWG in lots within Precinct D
		Promotion and use of water efficient appliances to Precinct A and Precinct D
		Mandate water efficient fittings within Precinct A and Precinct D
WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in open spaces
		Open spaces designed to use no more than allocated groundwater
		Minimise water requirements for open space and verge maintenance
		Use of water efficient appliances within Precinct A and Precinct D
		Use of WWG principles in lots in Precinct D

Table 2: Water conservation management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the Racecourse and surrounding Precincts.

6 Stormwater Management

The principle behind the stormwater management strategy for the site is to maintain the existing hydrology by detaining, retaining and treating runoff from the small rainfall event (i.e. first 15 mm) as close to source as possible and detaining/retaining the major event (1% AEP) on site prior to discharge to either the centre of the Racecourse (i.e. self-retained) or to the CBMD the pre-development outflow rates. Due to the existing soil conditions (See **Section 3.5**), the site is not well suited for structural controls utilising infiltration of stormwater unless modified. However, given that fill will be utilised to ensure that habitable floor levels are above the 1% AEP flood elevation of the Swan River, final elevations will be approximately 4 mAHD. Where fill is used to achieve this there will be sufficient clearance to MGL and permeability of soils to adopt WSUD measures which utilise infiltration.

WSUD measures proposed will vary across the Precincts and will include:

- BRAs to achieve water quality treatment (Precincts A, C, D and E)
- FSAs to detain runoff prior to discharge to the adjacent road network system
- Subsurface infiltration cells that will facilitate at-source infiltration (Precinct D)
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse (for Precinct A and C)
- FSAs to provide flood detention and infiltration as close to source as possible (Precinct E).

The overall approach to precinct drainage is shown on **Figure 7**.

The WSUD measures that will be implemented as a part of the development are described in the following sections. Precinct B has been assumed to be self-retained and a portion of Precinct C (already connected to the Lakes in the centre of the track) has been assumed to be the same as it is now. Surface runoff modelling undertaken using XPSWMM has been used to inform the design of stormwater infrastructure as detailed in the following sections. Assumptions used to represent the post-development environment are provided in the modelling assumptions report in **Appendix D**.

6.1 Lot scale drainage measures

Lots within Precinct D and Precinct E will retain the first 15 mm rainfall event runoff within soakwells/soakage which will need a capacity of 150 m^3/ha. Lot storage is the responsibility of the lot owner and will be assessed as part of the building approval process prior to construction.

The use of soakwells/soakage areas will assist in achieving **Criteria SW1**.

6.2 Development drainage measures

6.2.1 Bio-retention areas

Runoff from the first 15 mm of rainfall will be captured and retained within a vegetated BRA located in open spaces. The BRA is assumed to have a depth of 500 mm with 1:3 side slopes. Treatment of

runoff will be provided through interaction with vegetation and adsorption to sand particles through infiltration prior to reaching groundwater.

The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10). This will be finalised prior to detailed design. The location of the BRA will either be in a drainage reserve, an open space or they may be within the centre of the Racecourse as a separate treatment area (separate from the existing Lakes). The sizing and spatial requirements of BRAs will be confirmed in the detailed designs.

The use of BRA will assist in achieving **Criteria SW1, SW6,** and **SW8**.

6.2.2 Flood detention/storage

An FSA will be utilised to detain runoff above the first 15 mm and up to the 1% AEP rainfall event. To achieve this, the invert of the FSA will have sufficient clearance above groundwater 300 mm. FSAs are assumed to be 1.2 m depth with 1:6 side slope and will be integrated into POS or drainage reserve, and will overflow to the Water Corporation drainage network. The sizes and spatial requirements for the FSA will be confirmed in the detailed designs and development stages.

The use of an FSA will assist in achieving **Criteria SW1, SW2, SW4,** and **SW6.**

6.2.3 Subsurface storage

Surface runoff generated by lots, stables and hardstand/carpark areas will be directed into sub-surface storage. Precinct D will have an independent drainage pipe network within individual precincts which convey flows to downstream sub-surface retention structures.

These structures have been sized to accommodate up to the 1% AEP rainfall event and have been designed as a 1 m deep structure. The detailed configurations could be modified to suit site constraints. These will either be location beneath road reserve/verge or beneath an open space and will require an overflow connection to the local (CoB) drainage network to ensure that they can dry out. The sizes and spatial requirements for the subsurface storages are provided in **Table 2** and illustrated in **Figure 7A**: Precinct A Stormwater Management Plan

Figure 7B: Precinct C Stormwater Management Plan

Figure .

The use of the sub-surface storage will assist in achieving **Criteria SW1, SW2,** and **SW6.**

6.2.4 Lake storage

Precinct A and Precinct C (stables) will first direct runoff to a bio-retention areas, however overflow from these will be catered for in the Wetland Lake. In a 1% AEP storm event an additional 78 mm of depth will occur within the Wetland Lake from both Precincts.

As indicated in **Section 3.7.1.2**, the Wetland Lake is connected/discharges to the Swan River via a 375 mm and 450 mm culvert. These are not proposed to be modified. The combined nominal flow capacity of the 375 mm and 450 mm pipes is approximately 0.4 m^3/s. The inlet, length, grade, etc of

these pipes is not proposed to be modified and therefore the current overflow regime from the site to the Swan River will remain unchanged.

The use of the Wetland Lake storage will assist in achieving **Criteria SW1, SW2, SW3,** and **SW6.**

6.3 Precinct based drainage approach

6.3.1 Precinct A

There is no current connection point for drainage to be exported from site to the local CoB network. Runoff will therefore need to be managed within Precinct A and the Racecourse. Precinct A will require a single BRA that will address treatment of water quality; this will be located within Precinct A as close to source as possible. The BRA should have the following characteristics:

- Base will be vegetated with reeds/rushes as per a biofilter
- 1:3 side slopes
- Depth of 300 – 500 mm pending final design
- Volume of the BRA will need to achieve 194 m^3
- Nominal surface area of 450 m^2.

In addition to the volume achieved by the BRA, in a major (1% AEP) storm event a further 1,345m^3 of flood retention storage will be required. The proposed earthwork level of Precinct A (4.0 mAHD) means that it is possible to direct runoff exceeding BRA capacity to the Wetland Lake in the centre of the Racecourse. This approach will add approximately 52 mm to the central 2.6 ha Wetland Lake.

The volumes of storage required and locations of storage across the Precincts is summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7A**.

6.3.2 Precinct B and Racecourse

As indicate previously, there are no substantial changes proposed to Precinct B. Precinct B currently manages surface runoff within the precinct and adjacent Racecourse, largely via at source infiltration, swales around the perimeter of the track surface and the existing lake system Precinct B and the Racecourse are proposed to be retained largely as is.

As indicated in **Section 3**, the Wetland Lake currently has a piped overflow connection to the Swan River. This overflow pipe(s) reportedly rarely overflow and can be controlled via a structure at the outlet (which also prevents tidal influence on the Wetland Lake). The Wetland Lake has a 2.6 ha surface area, and therefore can provide significant volume of stormwater retention in the event of a major storm event. There are no new connections proposed to the Swan River and there are no changes proposed to the management approach currently taken for the Wetland Lake and the current piped outlets.

6.3.3 Precinct C

Precinct C is the existing stables area, adjacent carparks and future stables areas along the south and east of the Structure Plan area. The existing buildings currently either infiltrate runoff at source or

discharge to the Lined Lake in the centre of the Racecourse. This approach is proposed to be retained.

Surface runoff generated by hardstand/carpark areas of Precinct C will be directed and discharged towards Precinct E via the existing connections to the CoB drainage network along Matheson Road or via the existing pipe connection in the southwest of the Structure Planning area to the existing connection to the CBMD (Water Corporation drainage system) within Precinct E.

The drainage requirements for the southern (carpark) portion of Precinct C are therefore detailed with those proposed for Precinct E.

For the two currently undeveloped portions of Precinct C (future stables along the south and east of the Structure Plan area), the post-development drainage system will collect the runoff from these areas and direct them to the centre of the Racecourse. Initial treatment will be provided by a BRA which accommodates 418 m^3, with a nominal surface area of 924 m^2.

Runoff exceeding the capacity of the BRA (which will be 684 m^3) will be directed to the Wetland Lake. The direction of major event stormwater runoff to the Wetland Lake will add 26 mm to the top water level of the Wetland Lake.

The volumes required to be treated and for flood mitigation for Precinct C are summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7B**.

6.3.4 Precinct D

As indicated in **Section 6.1**, private lots and the childcare building within Precinct D are assumed to retain the first 15 mm within the lot boundary, most likely within soakwells, which should be appropriate given that some measure of imported fill will be required to meet clearance above regional flood levels. Based on the density of lots proposed in Precinct and lack of open space, this precinct will need 42 m^3 of subsurface storage to accommodate and detain the 1% AEP storm event to ensure that the post development peak flow rates will mimic the pre -development conditions. This is assumed to be located adjacent to Resolution Drive as shown in **Figure 7C**. The outflow from this Precinct will likely be predominantly overland flow once the first 15 mm of storage has reached capacity, however a low flow to ensure that these can adequately drain between storm events is recommended.

The volumes required to be treated and for flood mitigation for Precinct D are summarised in **Table 2**.

6.3.5 Precinct E

Surface runoff from across Precinct E (inclusive of Precinct C hardstand/carpark) will be conveyed via the drainage network firstly to a BRA for water quality treatment and then this will overflow to an FSA (detention drainage structure) at the south western corner of Precinct E for detention of the 1% AEP storm event. Overflow from Precinct E basin will discharge into the CBMD (Water Corporation drainage system) at existing flow rates. The Water Corporation surface runoff modelling of the CBMD indicates that the local drainage network contributes 0.95 m^3/s at node CNA008. This is understood to be contributed to by existing 450 mm and 525 mm pipes beneath Resolution Drive and therefore it is assumed that 0.62 m^3/s is taken up by the existing pipe network, and approximately 0.33 m^3/s of

capacity is available to convey runoff from Precinct C, Precinct E and upstream contributing catchments.

The volumes required to be treated and for flood mitigation for Precinct E are summarised in **Table 2**. The approach to water management in Precinct E is shown in **Figure 7D**.

6.3.6 Precinct drainage summary

The requirements for water quality treatment within the Precincts is summarised in **Table 2**.

Table 2: Precinct drainage summary

Precinct	First 15 mm requirement (m^3)	Location of first 15 mm	1% AEP flood mitigation requirement (m^3)	Location of 1% AEP flood mitigation requirement	1% AEP outflow from site
Precinct A	194	BRA located within Precinct A	1,345	Wetland Lake, centre of Racecourse	0
Precinct B	No change to existing	Precinct B	No change to existing	Precinct B	Self-retained
Precinct C (Stables)	418	BRA located in the centre of the Racecourse	684	Wetland Lake in centre of Racecourse	0
Precinct C (carpark)	Combined with Precinct E volumes	BRA in Precinct E	Combined with Precinct E volumes	FSA in Precinct E	
Precinct D	28	Subsurface storage cells beneath road reserve/drainage reserve	42	Subsurface storage cells beneath road reserve/drainage reserve	0.402 m^3/s to local drainage network/road pavement
Precinct E	365	Southwest corner of Precinct E, adjacent to FSA	930	South west corner of Precinct E	0.32 m^3/s to CBMD

There will be no new connections to the Swan River or to the CBMD, and the existing flow regimes at these outlet points will be maintained. Specifically with regard to overflow from the Wetland Lake which occurs via gravity, the peak flow rates that the existing 375 mm and 450 mm pipes are capable of achieving (approximately 0.4 m^3/s) will not change given that the inlet, length, grade and outlet of these pipes is not proposed to be modified.

Precinct D will require a connection to the local drainage network, however the outflow rate will be nominal, and has not been accounted for when sizing the subsurface storage cells within Precinct D. The direction of runoff from Precinct A and a portion of Precinct C to the centre of the Racecourse will require a BRA with a surface area of 1,105 m^2 (for Precinct C) and will add a total of 78 mm depth to the top water levels within the Wetland Lake.

The precinct areas and a summary of the approach to surface water management are shown on **Figure 7**.

6.3.7 Non-structural measures

A number of non-structural measures will be implemented to help reduce nutrient loads within stormwater runoff. These measures include:

- Minimising fertiliser use to establish and maintain vegetation within POS and road verges.
- Street sweeping at regular intervals.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- Minimising the use of turf within open spaces.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.
- Education of residents regarding fertiliser use and nutrient absorbing vegetation species within lots.

The above measures will assist in achieving **Criteria SW7**.

6.3.8 Earthwork levels

Finished floor levels of the entire development will be set at minimum of 4.0 mAHD (See **Appendix C**) which will assist in achieving **Criteria SW5**.

6.4 Stormwater criteria compliance

A summary of the proposed stormwater design criteria and how these are addressed is provided in **Table 3**.

Table 3: Stormwater management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.
SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.
		Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.
SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.32 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.
SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the habitable floor levels must have a

		minimum of 300 mm clearance above the 1% AEP TWL in the basins.
SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.
SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the long term nutrient concentrations within surface water meet the regional water quality targets.

Table 4: Stormwater management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within open space and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use
SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.

7 Groundwater Management

7.1 Groundwater management approach

The principle behind groundwater management is to maintain the existing hydrology across the site, provide appropriate protection from groundwater inundation, and maintain or improve existing groundwater quality.

7.2 Groundwater level management

The regional groundwater map (DWER 2023e), localised measurement of groundwater and the surface contours of the site (see **Section 3.4** and **Figure 2**) indicate that there is sufficient clearance to groundwater beneath the site to facilitate infiltration of stormwater runoff, on the basis that fill is being imported to raise finished levels to 4.0 mAHD.

Whilst the underlying parent soils have demonstrated generally low permeability, the earthworks approach will require import of fill to 4.0 mAHD to achieve clearance above the 1% AEP flood level in the Swan River for Precinct A, Precinct D and Precinct E. Therefore, stormwater will be encouraged to infiltrate at source wherever possible to minimise stormwater runoff and to adopt an at-source approach to management of runoff where possible. This will occur within soakwells, permeable portions of lots and BRAs which will have at least 300 mm of clearance above the MGL. The above-mentioned measure will assist in achieving **Criteria GW1**.

For Precinct C (stables) runoff will be directed to the centre of the racetrack. The stables facilities do not require a specific separation from groundwater, and in order to accommodate equine uses the land between buildings/facilities should be as flat as possible. The most appropriate response is therefore to accommodate stormwater quality treatment and flood retention within the centre of the racetrack. Given the low permeability of soils in the centre of the racetrack, the BRA is unlikely to achieve separation from groundwater or the low permeability soil layer. This is however considered acceptable as it is consistent with the presence of the three Lakes currently within the centre of the racetrack.

The control of groundwater by subsoil drainage is not proposed due to requirements to provide adequate clearance above the 1% AEP flood levels and the proximity of the Swan River. Rather, groundwater separation requirements will be achieved by the use of imported fill as described above. The earthworks strategy provided in **Appendix C** shows that all habitable floor levels will be greater than 1.2 m above the MGL. The above-mentioned measure will assist in achieving **Criteria GW2**.

As previously discussed, there are no changes proposed to the form of development within Precinct B or to the Racecourse. These areas are currently managed by the swales aligned with the existing racetrack which control soil moisture conditions in these areas, and which discharge to the Wetland Lake. This approach will be retained in the post-development environment.

7.3 Groundwater quality management

Whilst not specified in a design criterion, the main objective for groundwater quality management is to maintain or improve the existing groundwater quality. This can be achieved by reducing the total nutrient load into the groundwater that originates from the site. Groundwater that originates from the site is surface runoff that has infiltrated into the soil profile. Therefore, improving groundwater quality can be achieved by treatment of the surface runoff prior to infiltrating to groundwater.

The reduction of nutrient load to the groundwater will be achieved by:

- Retention of existing trees within open spaces wherever possible.
- Directing stormwater to a vegetated (with native wetland species) BRA.
- The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10).
- Minimise fertiliser use to establish and maintain vegetation within open space areas and road verges.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- The use of turf will be minimised, however where adopted a drought tolerant turf species that require minimal water, and nutrients will be used.
- Roll-on turf will be used within the open space areas and road verges, to prevent the high nutrient input requirement during establishment of the turf.
- Garden beds should not be immediately adjacent to BRAs to reduce nutrient transportation into these infiltration areas.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.

The above measures will improve the quality of water prior to it infiltrating into the underlying groundwater.

7.4 Groundwater criteria compliance summary

A summary of the proposed groundwater quantity design criteria and how these are addressed within the site is provided in **Table 4**.

Table 4: Groundwater criteria compliance summary

Criteria number	Criteria description	Manner in which compliances will be achieved
GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, the exception being the BRA in the centre of the racetrack.
GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.

8 Subdivision and Urban Water Management Plans

The requirements to undertake preparation of more detailed water management plans to support subdivision is generally imposed as a condition of subdivision. This will be most relevant to Precinct D. Other precincts may be developed under a Development Approval and therefore water management will likely be documented within a Stormwater Management Plan (SMP). The development of future UWMP/SMPs should follow *Urban Water Management Plans: Guidelines for preparing plans and for Complying with Subdivision Conditions* (DoW 2008).

While strategies have been provided within this LWMS that address planning for water management within the site, it is a logical progression that future subdivision designs and the supportive UWMP/SMP will clarify details not provided within the LWMS. The main areas that will require further clarification within future UWMP/SMPs may include (pending which precinct is being addressed):

- Extent of land uses within Precincts
- Connection to local and Main Drainage networks
- Surface runoff modelling
- Implementation of water conservation strategies
- Non-structural water quality improvement measures
- Management and maintenance requirements
- Construction period management strategy.

These are further detailed in the following sections. As stated above, ongoing (post-development) monitoring of groundwater will be detailed in the UWMP/SPM, however in this LWMS is outlined broadly in **Section 9**.

8.1 Extent of land uses within Precincts

It is expected that the layout and extent of land uses within Precincts may evolve over time. Future water planning documents will need to be updated to align with the most up to date spatial plans for each Precinct. Changes to the spatial plans will likely have an implication on the size of stormwater infrastructure and possibly their location, and should be revised and clarified in future UWMP/SMPs.

8.2 Connection to local and Main Drainage networks

This LWMS has made assumptions regarding connectivity to the CoB local drainage network and to the Water Corporation's CBMD. These are assumptions are made based on the information available at the time of preparing this LWMS and may need to be revised pending feedback from these agencies. This could result in updates to surface runoff modelling (see **Section 8.3**).

8.3 Surface runoff modelling

It is acknowledged that the water management strategies documented in this LWMS are based upon broad-scale assumptions and to some extent regional data. These assumptions are considered

adequate for development of this LWMS and are of an appropriate level of detail. However, verification of proposed subdivision drainage designs will be undertaken once the specific basin designs and extent of inclusion of finer scale WSUD elements are confirmed.

It is expected that future UWMP/SMPs will update surface runoff modelling as appropriate, and this may result in evolution of the spatial layout of the structure plan/future subdivisions or detailed civil design approach.

8.4 Implementation of water conservation strategies

The non-potable water needs from the Precincts are to be accommodated from the existing groundwater allocation and therefore, track water usage is a significant consideration. Notwithstanding licensed volumes available, there is minimal new open space areas proposed within the Precincts that would demand significant additional groundwater allocation, and it is therefore anticipated that non-potable water needs can be met by the existing licence held by Perth Racing.

A number of potential measures to conserve water have been presented within this LWMS. These water conservation strategies will be incorporated into design and the on-going maintenance of the Precinct A, B and C open spaces and where relevant. Landscape concept design measures that will be incorporated into the water conservation strategy will be further detailed within the future UWMP/SMPs produced for the development.

The manner in which the developer intends to promote water conservation measures discussed in this LWMS to future lot owners will also be discussed within the future UWMP/SMPs.

8.5 Non-structural water quality improvement measures

Guidance for the development and implementation of non-structural water quality improvement measures is provided within the *Stormwater Management Manual for Western Australia* (DWER 2022). Some measures will be more appropriately implemented by CoB for local roads, such as street sweeping, however many can be implemented relatively easily within the design and maintenance of the subdivision and the open space areas. It is expected that any privately managed development areas (e.g. Precinct A, Precinct B and Precinct C) will be managed by Perth Racing or another appropriate management body, and that the management of areas exposed to equine uses (Precinct C and the Racecourse) will continue to adopt contemporary best practice nutrient management.

Future UWMP/SMPs will provide an implementation plan/timing/responsibility for measures such as street sweeping, public education (through measures such as signage that may be implemented to raise awareness), etc.

8.6 Management and maintenance requirements

The management measures to be implemented to address surface water quality (such as the use of vegetation within WSUD assets) will require ongoing maintenance. It is therefore expected that the future UWMP/SMPs will detail management and maintenance procedures that will set out required maintenance actions (e.g. gross pollutant removal), timing (e.g. how often it will occur), locations (e.g. exactly where it will occur) and responsibilities (e.g. who will be responsible for carrying out the

actions). Given that approval from the CoB will be sought for the proposed measures, it is anticipated that consultation will be undertaken and referral to guiding policies and documents will be made.

8.7 Construction period management strategy

It is anticipated that the construction stage will require some management of various aspects (e.g. soil erosion, sedimentation of downstream water bodies, dust, surface runoff, noise, traffic etc.). The management measures undertaken for construction management will be addressed either in the future UWMP/SMPs or a separate Construction Management Plan (CMP).

9 Monitoring

9.1 Post-development monitoring

The post-development monitoring of water quality should be undertaken within groundwater immediately upstream and downstream of BRAs within Precinct A, Precinct C and Precinct E. It should also be undertaken at the outlet to or adjacent to the subsurface detention system in Precinct D. This should be undertaken via shallow groundwater bores installed immediately upstream and immediately downstream based on local groundwater flow direction, based on information available at the time (or in the case of Precinct D it could be at the outlet from the subsurface storage cells).

The monitoring should also consider and be generally consistent in the approach with the monitoring undertaken to comply with conditions of Groundwater Licence GWL 178519.

The WSUD measures (BRAs) should also be monitored to ensure their continued effectiveness. This should occur at the outlets from BRAs prior to their discharge to the Wetland Lake. It is noted that this may be difficult to achieve as it will require a rainfall event > 15 mm and to be timed to occur when overflow is occurring or alternatively auto samplers could be employed.

Monitoring of the outlet to the Swan River from the Wetland Lake is not proposed to be undertaken given the infrequent nature of overflow from the Lake to the River. Further, the Lake intersects shallow groundwater and any discharge from the pipes to the River is likely to be influenced by local groundwater quality.

9.1.1 Trigger values

The water quality targets from the *National Water Quality Management Strategy* (ANZECC and ARMCANZ 2000) and the trigger criteria are acknowledged as long term targets for the site, being 1.2 mg/L for TN and 0.065 mg/L for TP. However, it is also recognised that recent site monitoring undertaken (and reported in **Section 3**) shows repeated exceedances of the NWQMS default trigger criteria. Therefore, short term trigger values are proposed based on the approximate average nutrient concentrations measured in groundwater, and these are shown in **Table 5**.

Table 5: Post-development trigger values

Analyte	pH	EC (uS/cm)	TN (mg/L)	TP (mg/L)
Value	6-7.5	1800	3.0	0.15

Monitoring should be undertaken on a quarterly basis and should include:

- pH
- Conductivity
- Dissolved oxygen
- Temperature
- Nutrients (TN, TP)
- Nutrient Species (Ammonium, NH_4, Oxides of nitrogen, NO_x ortho-phosphorous (ORP))

9.1.2 Condition monitoring

It is proposed that the overall condition of the Precincts will be monitored on a bi-annual basis. This monitoring will be implemented after the completion of the civil and landscaping works and will continue for a period of two years.

A visual assessment will be undertaken to monitor the overall condition of the Precincts, with the aim to ascertain that the maintenance activities are achieving the overall management objectives for the development. The parameters that will be monitored include:

- Gross pollutants
- Terrestrial weeds
- Irrigation
- Vegetation density
- Paths, benches, walkways and other infrastructure.

The management and maintenance objectives will be detailed within future UWMPs along with details of the corresponding monitoring program.

9.1.3 Contingency Action Plan

If the results from the initial monitoring occasion indicate that nutrient concentrations exceed the nominated (short term) trigger values, a number of contingency measures may be employed.

The first action that should be undertaken if groundwater trigger criteria are exceeded is to repeat the monitoring to remove the potential for sampling error. If the repeat monitoring still shows results which breach the trigger value, the next action will be to compare the upstream (incoming) nutrient concentrations with the outgoing (downstream) nutrient concentrations. If the downstream nutrient concentrations are >50% higher than the upstream nutrient concentrations, the following actions should be undertaken:

- Review open space nutrient application practices to identify source if possible.
- Conduct surveillance of Precincts and drainage infrastructure to determine any other potential and obvious nutrient inputs.
- Remove source if possible (i.e. fertiliser input, etc.).
- Remove sediment–bound nutrients by removing basin sediments.
- Manual removal of plant material from BRAs to facilitate further nutrient uptake.

If the downstream nutrient concentrations are found to be generally consistent with the upstream concentrations the next action will be to conduct a site – specific comparison of long-term background data presented in this LWMS. There is some amount of variability (temporally) in nutrient concentrations experienced across the site, and this is the reason for the proposed short and long term trigger values. The comparison of measured values to trigger values and historical monitoring data should then be used as a management tool to determine if the trigger values should be revised.

Following the implementation of the above contingency measures the groundwater quality will be re – sampled. If the results of the analysis still show water quality characteristics which breach the trigger values an additional set of upstream/downstream monitoring bores may be installed. The

additional bores would be sampled as per the ongoing sampling regime already being undertaken for the first two bores. If the additional locations demonstrate results consistent with the initial monitoring, an assessment will be undertaken as to whether the results are representative of a broader site management concern, and whether any additional contingency actions need to be implemented onsite.

9.2 Reporting

A post-development monitoring report will be prepared on conclusion of the two-year monitoring period and will be provided to CoB on request. This will be undertaken per Precinct once development within the Precinct has occurred. Interim results (spreadsheet) can be provided to either CoB, DWER or DBCA on request during the monitoring program.

10 Implementation

10.1 Roles and responsibility

The LWMS provides a framework that the proponent can utilise to assist in establishing stormwater management methods that have been based upon site-specific investigations, are consistent with relevant State and Local Government policies and have been endorsed by DWER, DBCA and CoB. The responsibility for working within the framework established within the LWMS rests initially with the proponent, although it is anticipated that a future UWMP/SMP will be developed in consideration of other relevant policies and documents. A summary of roles and responsibilities relevant to the current and future planning stages and ongoing management of the site is summarised in **Table 6**.

Table 6: Roles and responsibilities for various planning stages

Stakeholder	Perth Racing	City of Belmont	Water Corporation	DWER	DBCA	WAPC
LWMS preparation	√					
LWMS review and advice		√	√	√	√	
LWMS approval				√		√
UWMP/SMP & civil design preparation	√					
UWMP/SMP review and approval		√				
Precinct implementation	√					
Post development Precinct management	√					
Public roads/open space ongoing management	√	√				

10.2 Funding

The proponent will fund all subdivision, civil and landscape works within the public realm (roads and open spaces) and within Precincts that are being privately managed (Precinct A, Precinct B and Precinct C). Development of individual lots will be the responsibility of the lot owner at the lot-scale development application stage.

10.3 Review

It is not anticipated that this LWMS will be reviewed unless the Ascot Racecourse Structure plan undergoes significant change post-lodgement of the LWMS. If the proposed layout of the

development is substantially modified, the surface runoff modelling undertaken for this LWMS may need to be reviewed and the criteria revised to ensure that all are still appropriate.

The next stage of water management for most of the Precincts is UWMP preparation to support subdivision (relevant to Precinct D) or SMP preparation to support Development Approval (relevant to all other precincts). The UWMP/SMP is largely an extension of the LWMS, as it should provide detail to the designs proposed within this LWMS and will demonstrate compliance with the criteria proposed in **Section 4**. Regardless of whether a UWMP or SMP is prepared, these should be prepared as per *Better Urban Water Management*.

The next stage of development following the UWMP is single lot development. It is recognised that certain elements of the LWMS and the UWMP will not be implemented until this late stage, and that there is little or no statutory control that can be applied to ensure the implementation of any remaining measures. While the remaining measures are unlikely to be enforced at this stage their implementation could be encouraged by the CoB through policy (or modification of these where necessary), building licence or awareness programs (such as the Water Corporation Waterwise program).

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11.1 General references

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11.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 11.1**, with access date information provided in **Table R1**.

Table R1 Access dates for online references

Reference	Date accessed	Website or dataset name
(ABS 2013)	19/4/2024	ABS: Water Use and Conservation Data
(ABS 2014)	19/4/2024	ABS: Energy Use and Conservation Data
(DWER 2023a)	12/04/2024	Acid Sulfate Soil Risk Map
(BoM 2024)	12/04/2024	Climate Data
(Landgate 2023)	31/01/2024	Landgate Map Viewer Plus
(WAPC 2023a)	11/12/2023	Local Planning Scheme No. 15 Map
(DWER 2024a)	12/04/2024	Perth Groundwater Map
(DWER 2024b)	12/04/2024	Water Information Reporting
(DWER 2024c)	12/04/2024	Water Register
(DWER 2023c)	26/04/2024	FPM Floodplain Area (DWER-020)

Figures

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Figure 2: Topographic and Groundwater Contours

Figure 3: Geological Mapping

Figure 4: Acid Sulfate Soil Mapping

Figure 5: Environmental Assets

Figure 6: Hydrological Features

Figure 7: Ascot LSP Precinct Plan surface water management

Figure 7A: Precinct A Stormwater Management Plan

Figure 7B: Precinct C Stormwater Management Plan

Figure 7C: Precinct D Stormwater Management Plan

Figure 7D: Precinct E Stormwater Management Plan



Figure 1: Site Location

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F23

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
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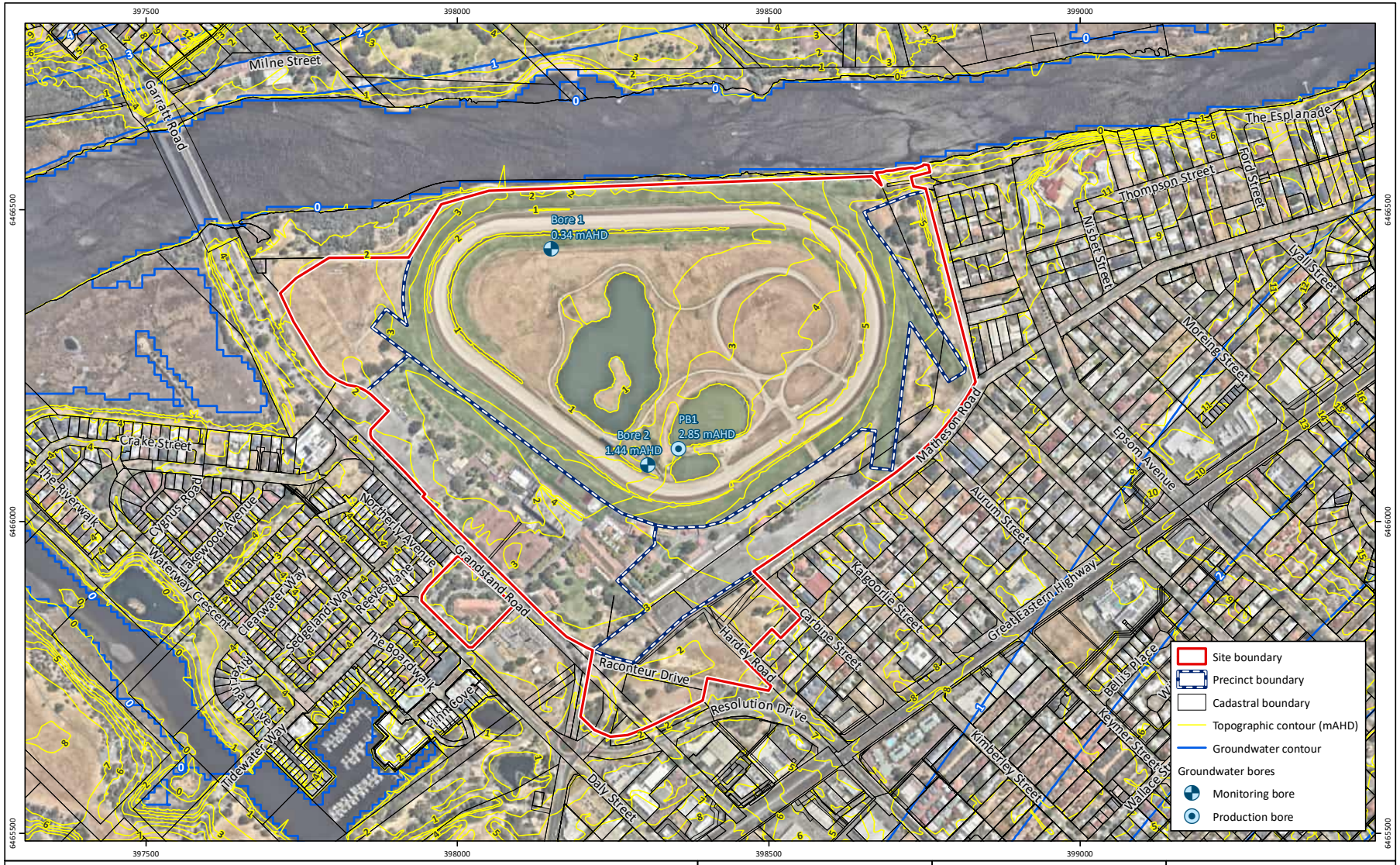


Figure 2: **Topographic and Groundwater Contours**

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number:
EP23-109(03)--F24
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
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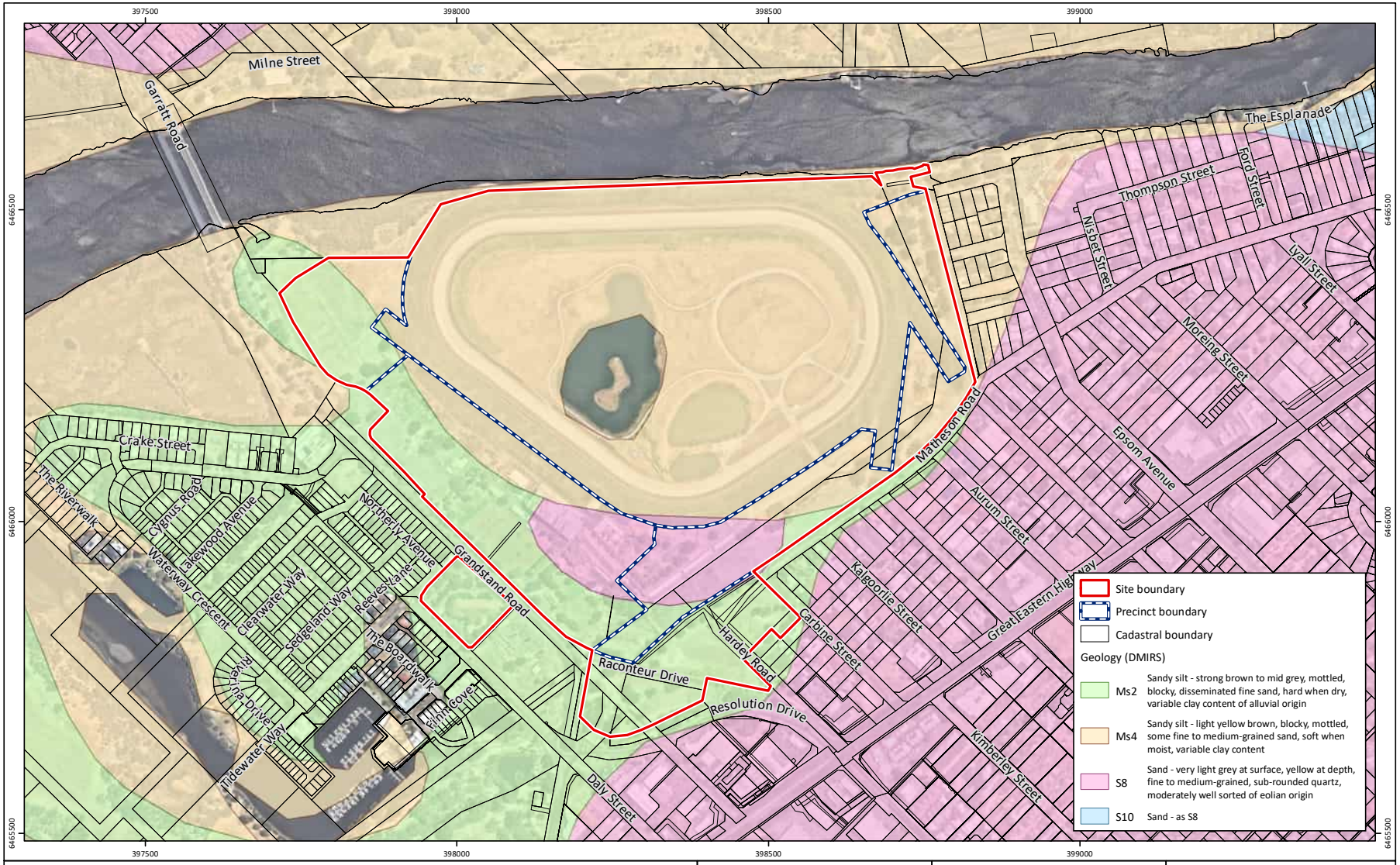


Figure 3: Geological Mapping

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F25

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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Scale: 1:8,000@A4
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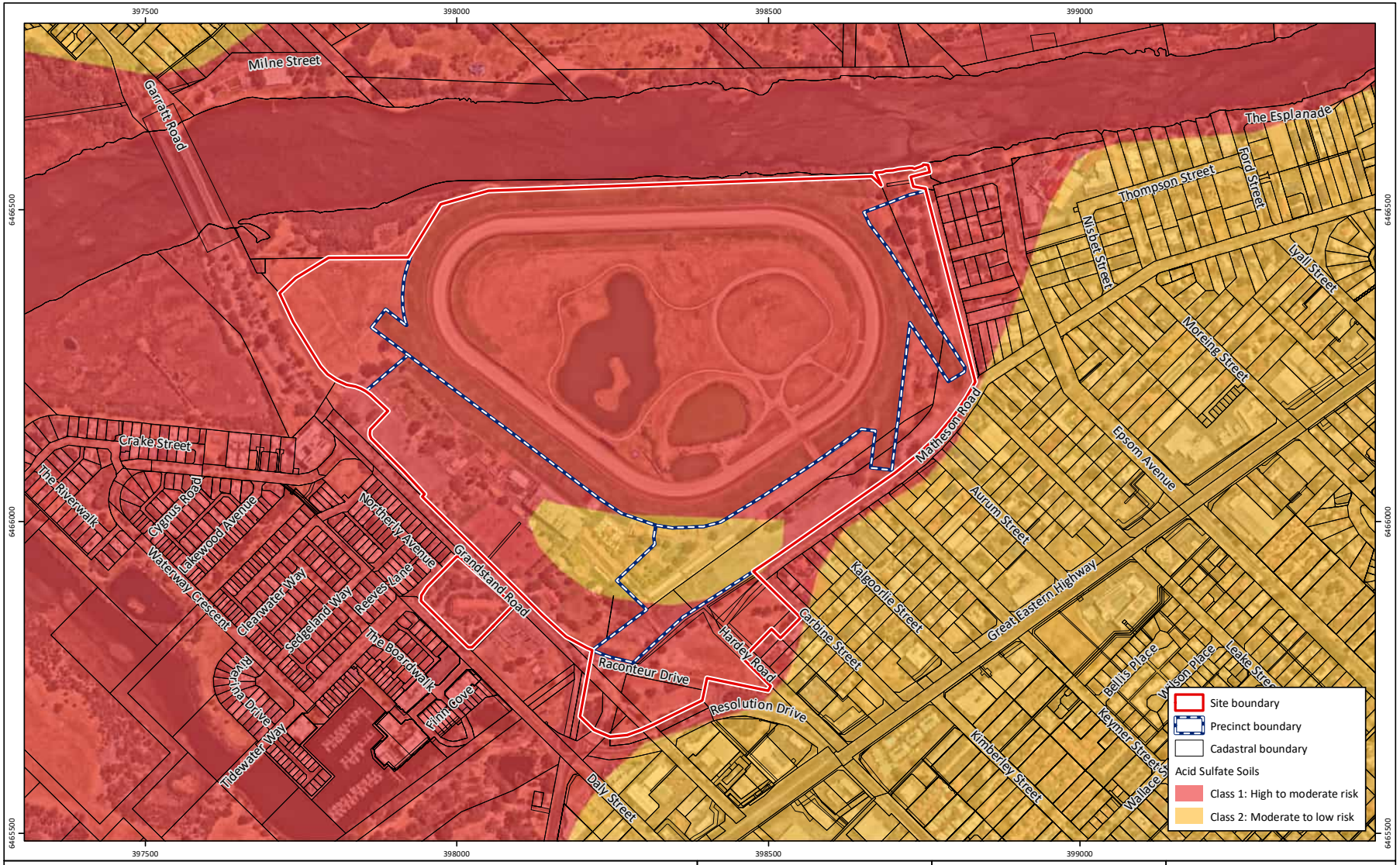


Figure 4: Acid Sulfate Soil Mapping

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number: EP23-109(03)--F26
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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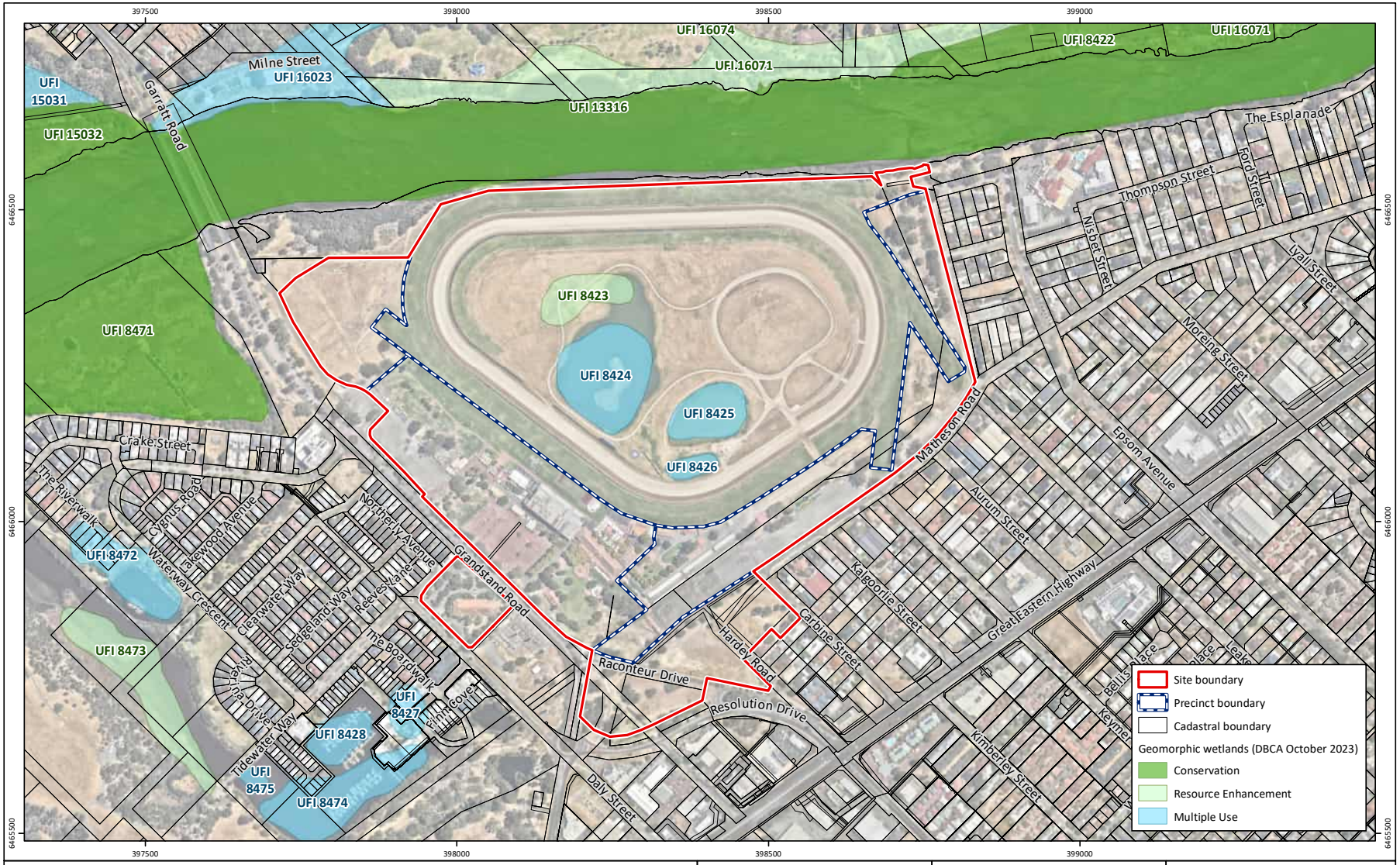


Figure 5: Environmental Assets

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F27
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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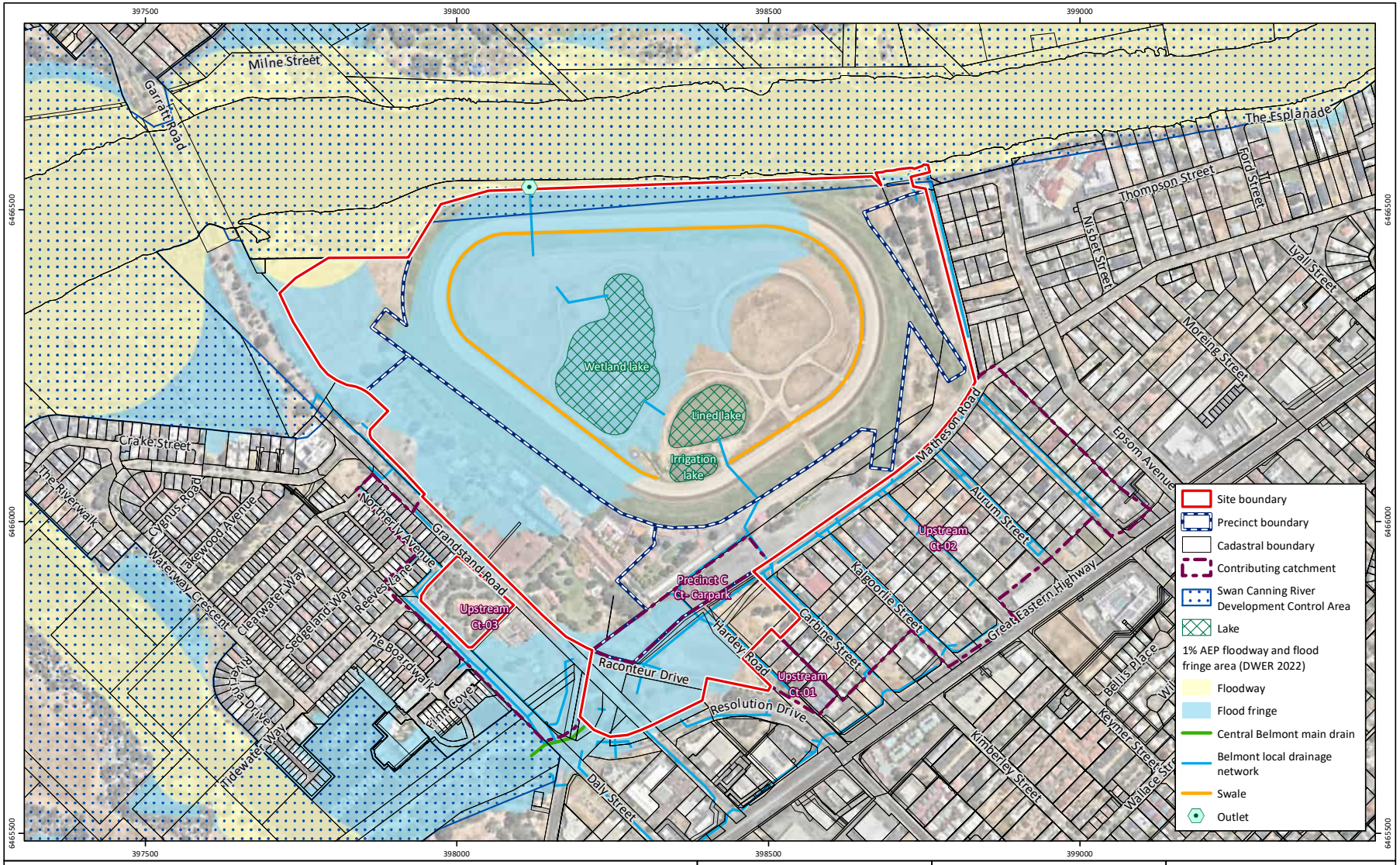


Figure 6: Hydrological Features

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F28

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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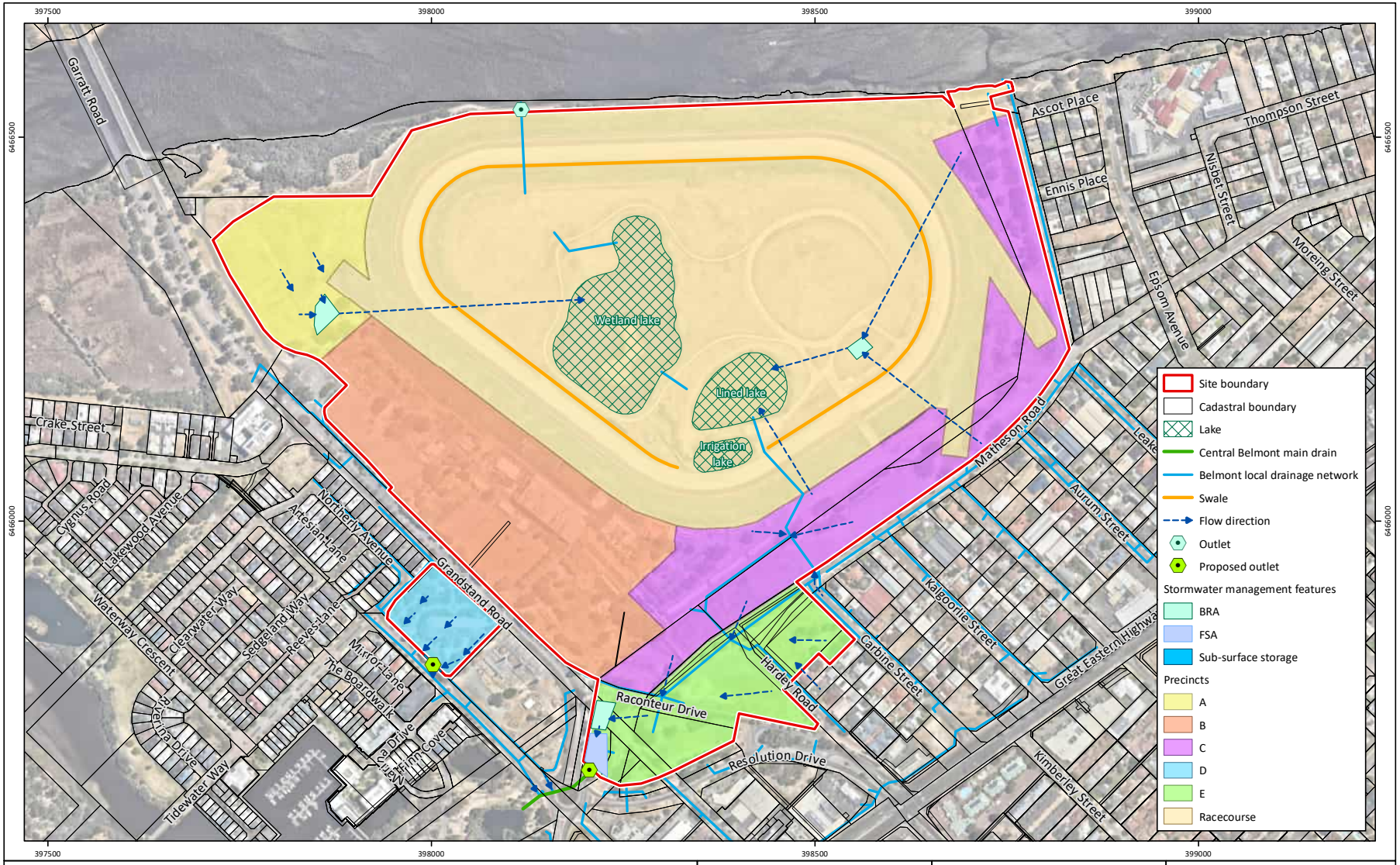


Figure 7: Ascot LSP Precinct Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F29

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 100 200
Metres
Scale: 1:6,500@A4
GDA2020 MGA Zone 50

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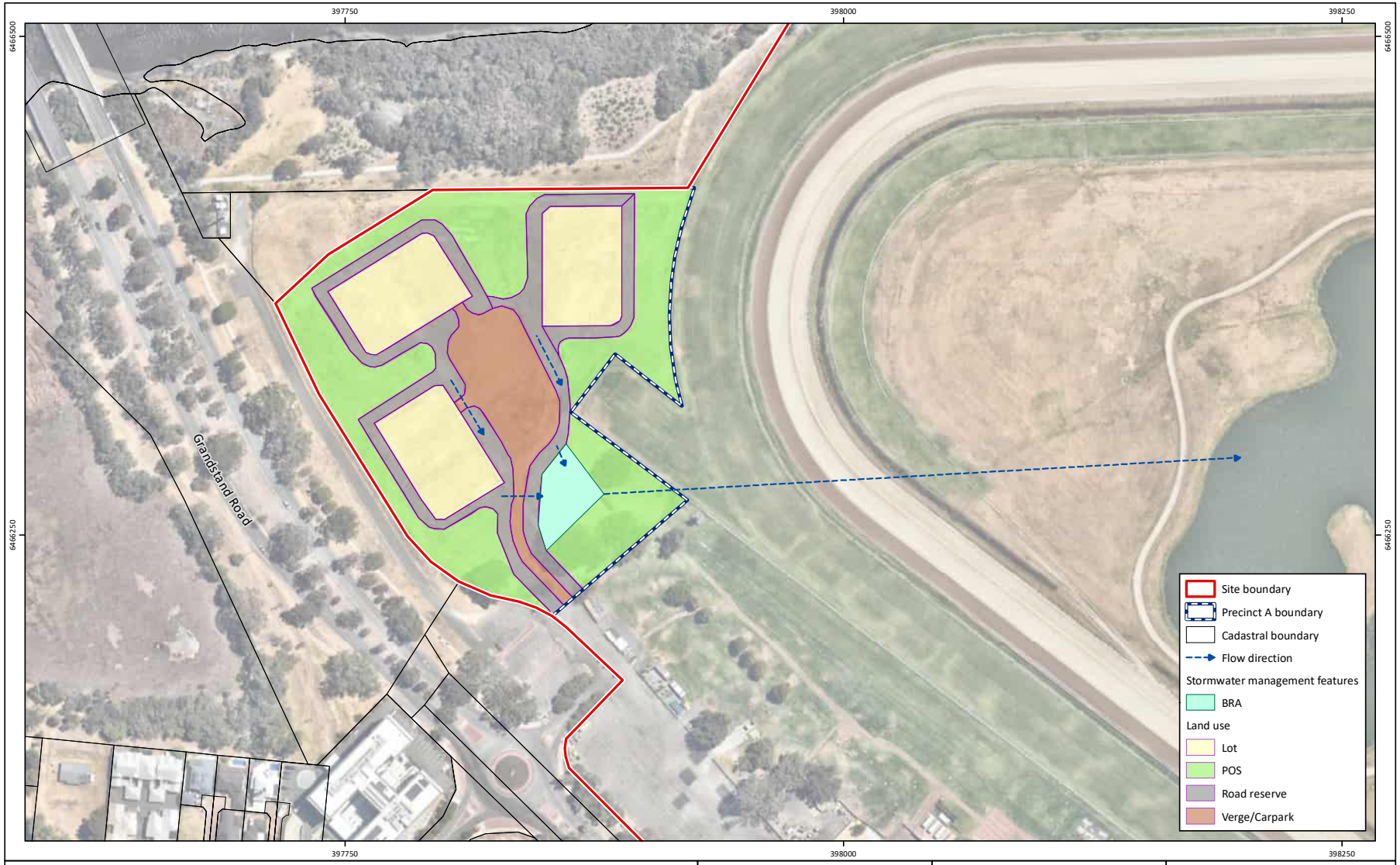


Figure 7A: Precinct A Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F32

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 40 80
Metres
Scale: 1:2,500@A4
GDA2020 MGA Zone 50

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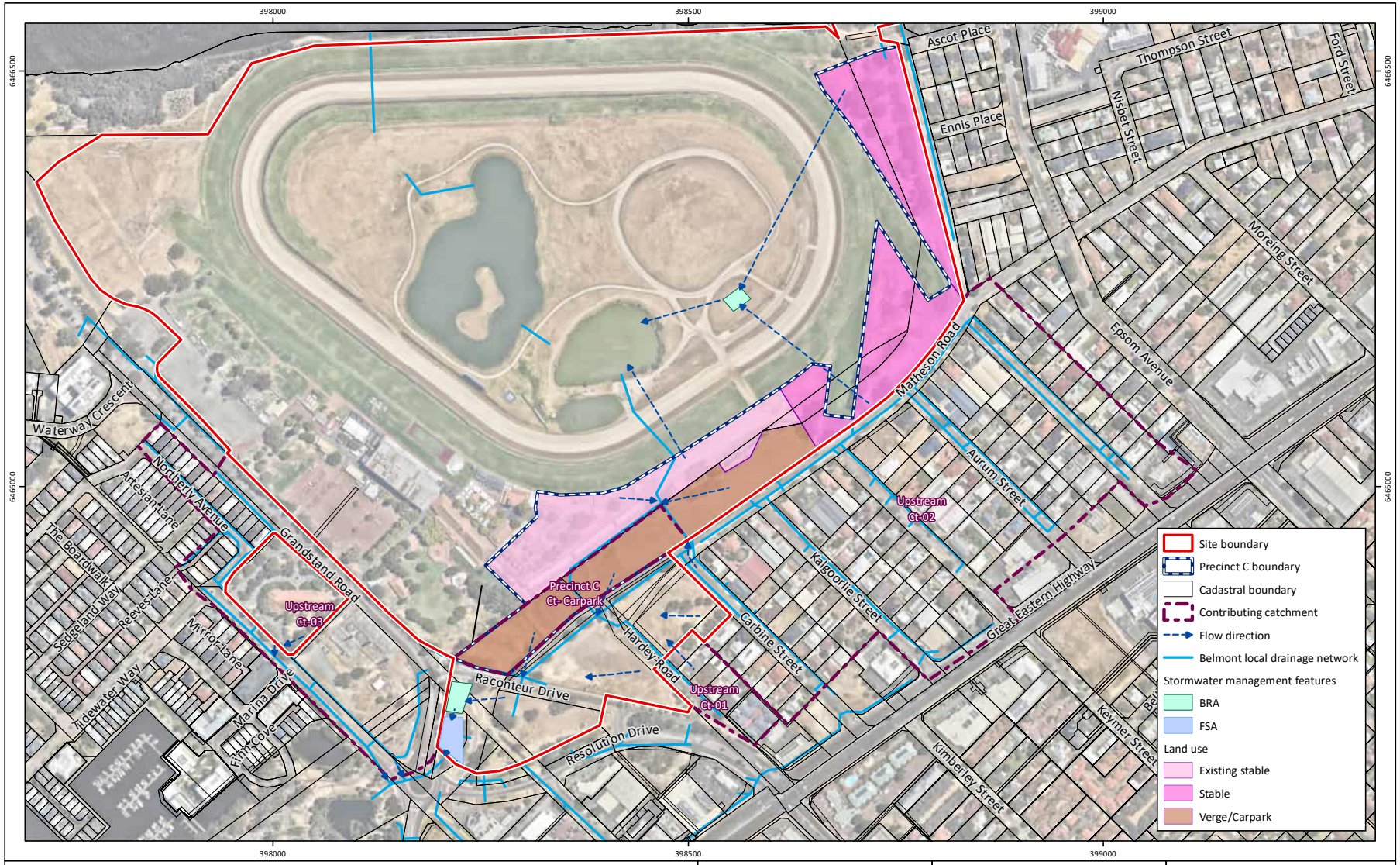


Figure 7B: Precinct C Stormwater Management Plan

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number: EP23-109(03)--F33
Drawn: WJC
Date: 01/05/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 100 200
Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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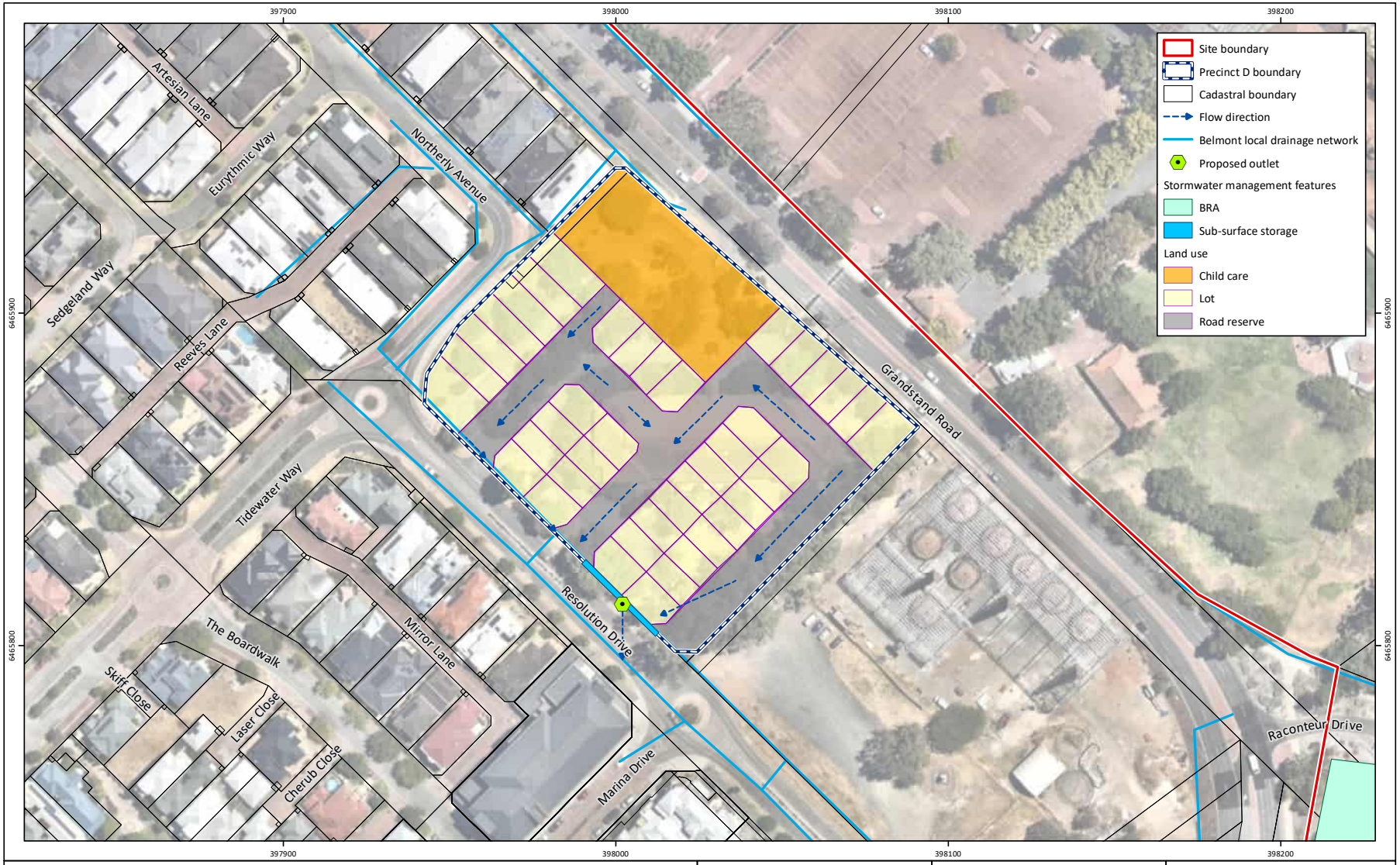


Figure 7C: Precinct D Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F34

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 25 50
Metres
Scale: 1:1,500@A4
GDA2020 MGA Zone 50

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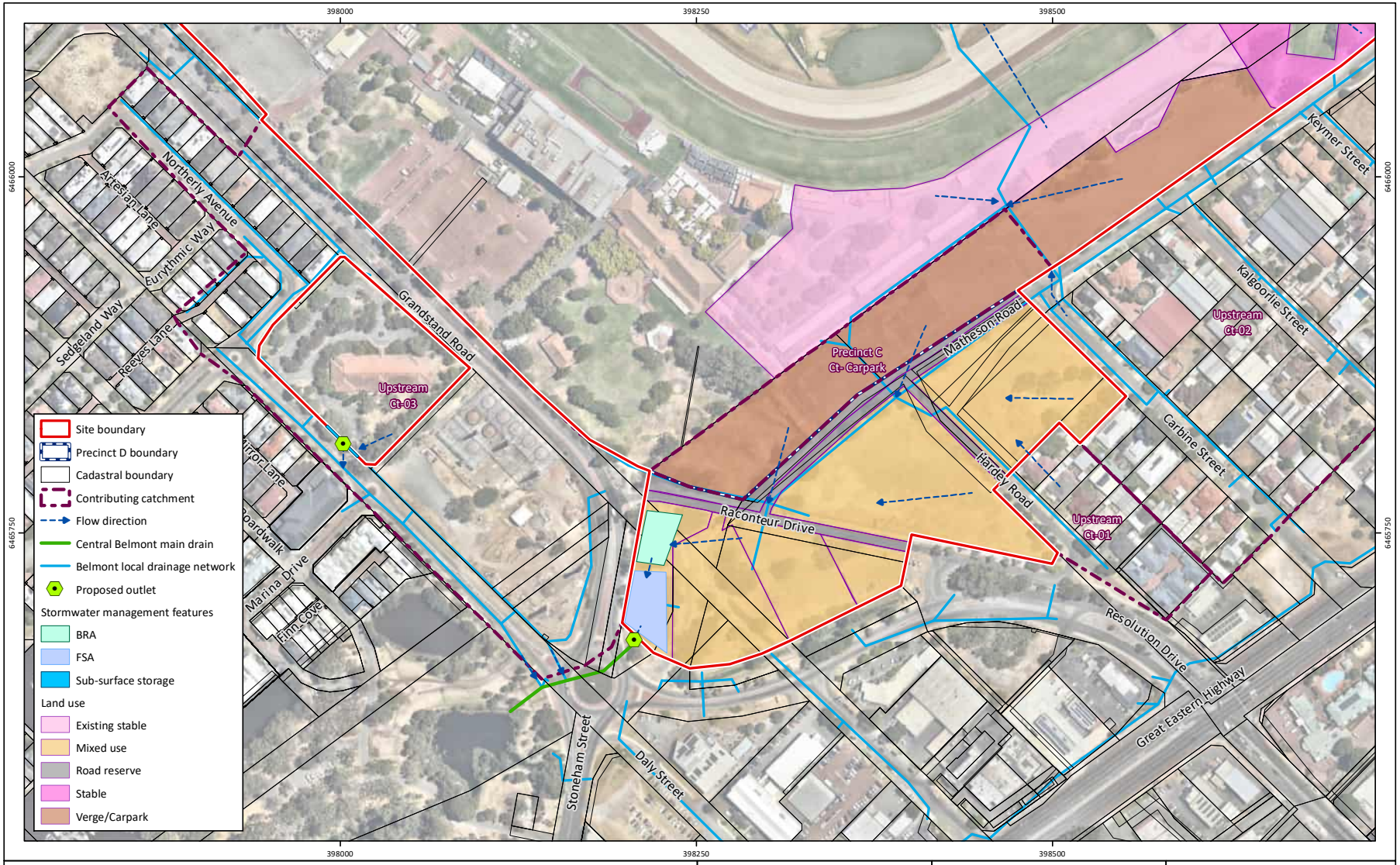


Figure 7D: Precinct E Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F35

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

Scale: 1:3,500@A4
GDA2020 MGA Zone 50

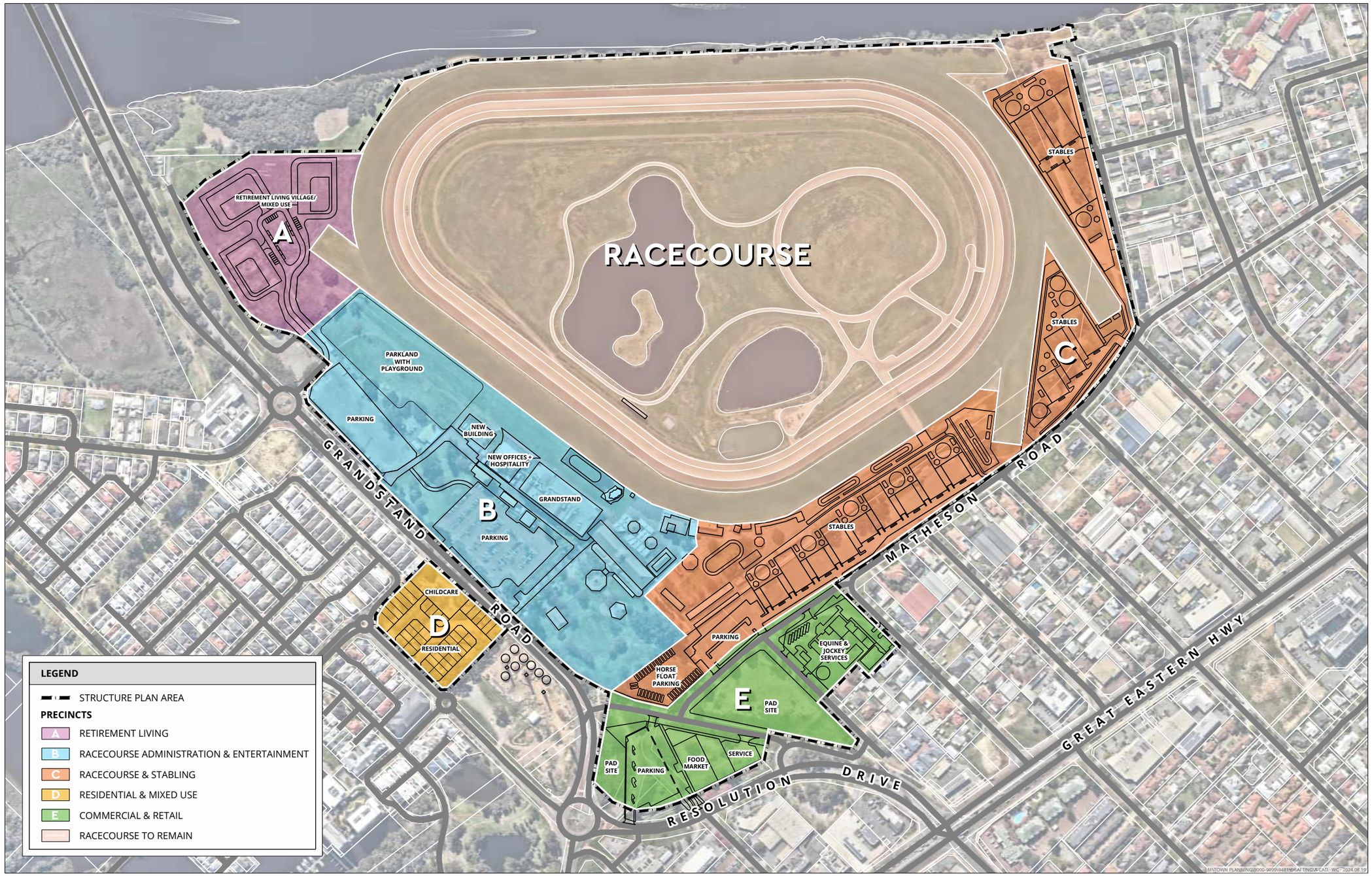
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Appendix A

Concept plan

ROWE Group Design (2023)



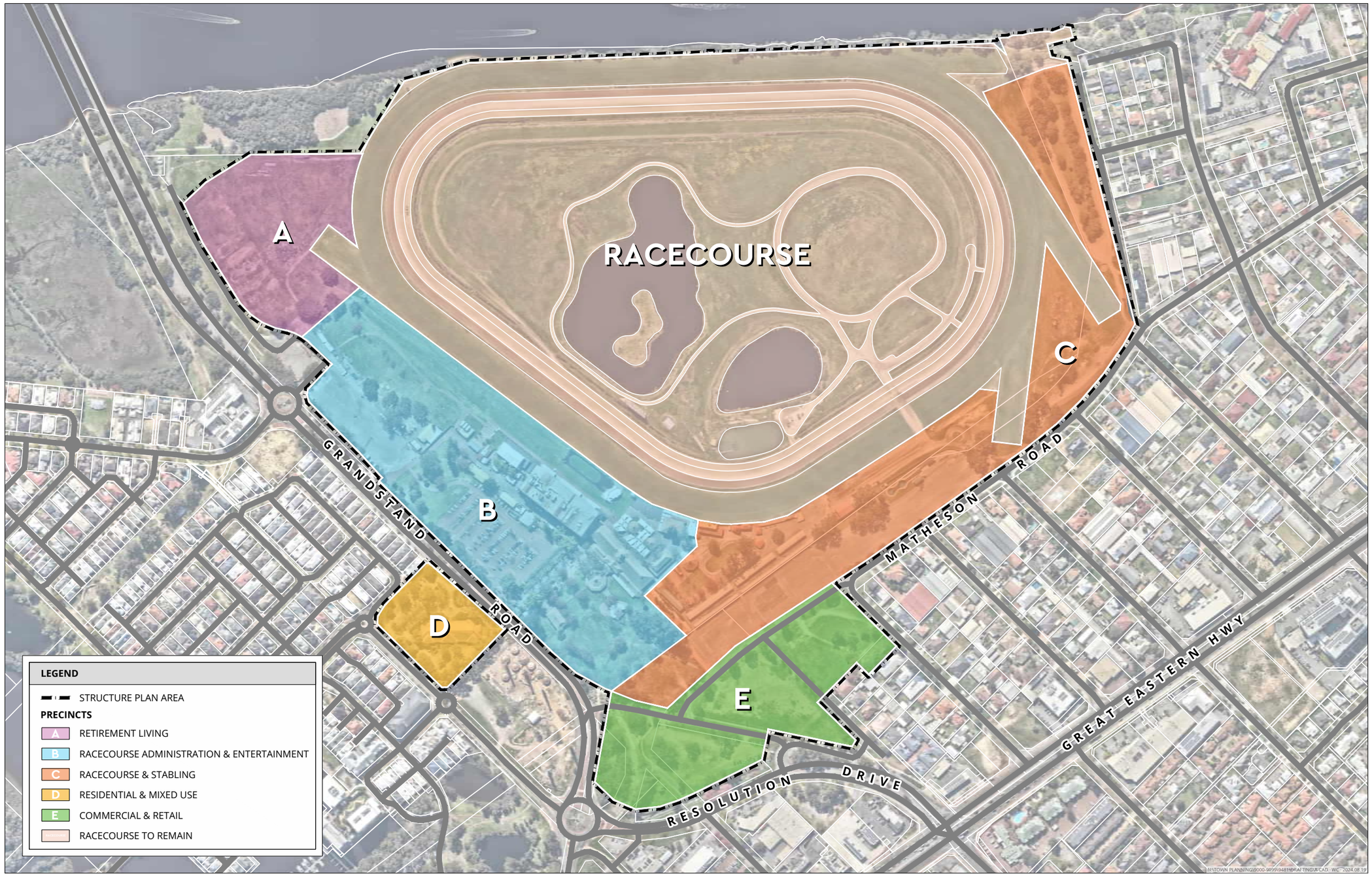
DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

N
0 100 m
SCALE @ A3: 1:4000
9481-CON-01-D

DRAWN: WC
DATE CREATED: 2024.08.19
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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ROWE GROUP DESIGN



STRUCTURE PLAN PRECINCTS

VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

N
0 100 m
SCALE @ A3: 1:4000
9481-FIG-02-C

DRAWN: WC
DATE CREATED: 2024.08.19
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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ROWE GROUP DESIGN

Appendix B

Geotechnical Reports

Precinct A – Douglas Partners 2024

Precinct D – Galt 2024

Douglas PARTNERS

GROUNDED EXPERTISE

Report on Preliminary Geotechnical Investigation

Proposed Residential Development

Part of Lot 9002 Grandstand Road, Ascot WA

Prepared for Perth Racing

Project 219164.03

25 January 2024

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Document History
Details

Project No.	219164.03
Document Title	Report on Preliminary Geotechnical Investigation
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Report Prepared For	Perth Racing
Filename	219164.03.R.001.Rev0

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Venkat Vallurapalli/Brendan Divilly	Frederic Verheyde	25 January 2024

Distribution of Copies

Status	Issued to
Revision 0	Perth Racing

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature	Date
Author	25 January 2024
Reviewer	25 January 2024

FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Douglas PARTNERS | GROUNDED EXPERTISE

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Appendix A: About This Report

Appendix B: Test Location Plan

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Appendix C: Geotechnical Laboratory Test Certificates

FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Report on Preliminary Geotechnical Investigation
Proposed Residential Development
Part of Lot 9002 Grandstand Road, Ascot WA

1. Introduction

This report presents the results of a preliminary geotechnical investigation undertaken for a proposed residential development across Part of Lot 9002 Grandstand Road, Ascot WA. The investigation was commissioned by Mr. James Oldring of Perth Racing in a signed order to proceed dated 8 August 2023 and was undertaken in accordance with Douglas' proposal dated 8 May 2023.

It is understood that Perth Racing is evaluating the feasibility of developing the northwest portion of Lot 9002 for possible residential use (the 'site').

The objective of the investigation is to assess the subsurface soil and groundwater conditions at across the site to provide preliminary comments on:

- The geotechnical suitability of the site for the proposed development.
- Geotechnical opportunities and constraints relevant to the proposed development.
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks.
- Site preparation, including the possible reuse of existing soil as controlled fill.
- Excavation conditions.
- The likely site classification in accordance with the requirements of AS 2870-2011.
- Appropriate earthquake design factor for the site, in accordance with AS 1170.4-2007.
- Suitable foundation systems, including preliminary design parameters.
- Preliminary design parameters for the design of retaining structures and batter slopes.
- Depth to groundwater at the time of the investigation.
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

The investigation included eight cone penetration tests, 16 test pits and one borehole excavated and drilled as a part of detailed site investigation (for contamination), and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on the items listed above.

The investigation was conducted concurrently with a detailed site investigation (for contamination), which has been reported under separate cover (219164.01.R.001.Rev0). The detailed site investigation (for contamination) report should be read in conjunction with this report.

2. Site Description

The site comprises an irregular shaped area, approximately 36.2 ha in size, that covers a part of Lot 9002 Grandstand Road, within the Ascot Racecourse.

At the time of the field work, the majority of the site was vacant and vegetated with short grass. A few mature trees, about 5 m to 10 m in height, occupied the southern part of the site. A parking lot and small loading area were located at the south-western corner of the site. Some fly-tipped rubbish, including fences and posts, were observed at several locations across the site.

According to publicly available LiDAR data (DEM derived to 5 m), the topography across Lot 9002 is relatively flat with existing surface levels ranging from approximately RL 2 m relative to the Australian Height Datum (AHD) in the western part of the site to RL 3.5 in the north-eastern corner of the site.

The Perth 1: 50 000 Environmental Geology sheet indicates that shallow sub surface conditions beneath the western two thirds of the site comprise sandy silt of the Guildford Formation, and beneath the north-eastern corner and eastern corner of the site comprise alluvium.

The Perth Groundwater Atlas (2004) indicates that in May 2003, the groundwater level beneath the site was less than RL 1 m, or between approximately 1.0 m and 2.5 m below the existing surface level. The Atlas also indicates that the groundwater flow direction beneath the site in May 2003 was approximately northwest towards the Swan River.

The published acid sulfate soil risk mapping indicates that the site is located within an area which is mapped as "*high to moderate risk of acid sulfate soils occurring within 3 m of natural soil surface*".

3. Field Work Methods

Field work for the investigation was carried out between 11 October and 9 November 2023 and comprised:

- The excavation of 16 test pits.
- The drilling of one borehole.
- Perth sand penetrometer (PSP) or Dynamic cone penetrometer (DCP) testing adjacent to each test pit or borehole location.
- The performance of cone penetration tests at 8 locations (CPT24 to CPT31A). A total of 14 CPTs were undertaken after repeating CPTs at some locations in attempt to achieve greater testing depth following shallow refusal in uncontrolled fill.

The test pits (locations 7 to 22) were excavated using a 5-tonne excavator, equipped with 450 mm toothed bucket, and the borehole (location 23) was drilled using a 250 mm diameter power auger attached to the same excavator. The ground conditions at each test pit and borehole were logged in accordance with Australian Standard (AS 1726, 2017) by a geo-environmental engineer from Douglas. Soil samples were recovered from selected locations for subsequent laboratory testing.

Dynamic cone penetrometer (DCP) and Perth sand penetrometer (PSP) tests were undertaken adjacent to the test pit and borehole locations in accordance with Australian Standards (AS 1289.6.3.3, 1997; AS 1289.6.3.2, 1997) to assess the in-situ density of the shallow soils.

The CPTs use a 36 mm diameter instrumented cone with a following 130 mm long friction sleeve attached to rods of the same diameter, pushed continuously at a rate of 20 mm/sec into the soil by hydraulic thrust from a truck rig. Strain gauges in the cone and sleeve measure resistance to penetration and friction along the sleeve during penetration. This data is recorded on a computer and analysed to assess the type, properties and condition of the materials penetrated. The CPT's were pushed to termination depths of up to 20.2 m. Upon withdrawing the CPT probe, each test hole was dipped in an attempt to measure groundwater levels. CPTs were repeated at several test locations to attempt achieving greater testing depth following shallow CPT refusal on inferred hard foreign inclusions in the uncontrolled fill.

Test locations were determined using a handheld GPS and site features and are marked on Drawing 1, Appendix B. Surface elevations were recorded using a differential GPS with a reported accuracy of 0.1 m.

4. Field Work Results

4.1 Ground Conditions

The logs of the ground conditions and results of the field testing are presented in Appendix B, together with notes defining descriptive terms and classification methods, in Appendix A.

- **Uncontrolled FILL**
    - **Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL (SP, SP-SM, SM and GP-GM)** – generally sandy fill (or gravelly material associated with pavement layers at location 23), uncontrolled (apart from the pavement layers), from surface to depths of between 0.6 m and 3.6 m depth, encountered at all locations. A layer of organic sandy fill layer was observed between 1.4 m and 1.8 m depth at location TP8. The sandy fill was generally loose to medium.
    - **Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY (SM, SC, CI and CL-CI)** – generally stiff to very stiff, either underlying the aforementioned sandy fill material or interbedded within layers of sandy fill, encountered at test pit locations 9, 20, 21, 23, and CPT locations 24, 24A, 29 and 29A.

  A considerable amount of foreign inclusions such as fragments of brick, glass, timber, geo-fabric, concrete, plastic, rubber, scrap metal, terracotta pipes, redundant cables and PACMs were observed at all test pit locations, except location 22. A layer of asphalt was encountered at 0.95 m depth at TP9. The fill materials across the site are uncontrolled.

  It is noted that the fill extended below groundwater level at many locations.

Overlying natural soils including:

- **Clayey soils including Clayey SAND and CLAY** – ranging between very soft to soft and stiff to very stiff, encountered under the fill materials at CPTs 25, 30 and 31A to depths between 4.2 m and 14.9 m.
- **Sandy soils including SAND and Silty SAND** – underlying and interbedded within the above clayey soils at CPTs 25, 30 and 31A. The sand was generally very loose and loose to medium dense to depths between 10.5 m and 14.9 m, becoming medium dense and dense below.

4.2 Groundwater

Groundwater level observations between 18 September and 9 November 2023 are summarised in Table 1 and are shown on the logs in Appendix B.

The test holes were immediately backfilled following sampling, which precluded longer-term monitoring of groundwater levels. Six monitoring wells (MW01 to MW06) were installed as part of the preliminary environmental investigation (reported separately) and groundwater observations available from these wells at the time of report writing have been included in Table 1.

Table 1: Summary of Groundwater Levels

Location	Date of Measurement	Ground Surface Level [1] (m AHD)	Groundwater Depth (m)	Groundwater Level [2] (RL m AHD)
MW01	18 September 2023	1.9	1.30	0.6
MW02		2.0	1.46	0.5
MW03		3.2	2.37	0.8
MW04		2.4	1.59	0.8
MW05		2.5	1.21	1.3
MW06		2.2	1.09	1.1
TP7	9 November 2023	2.9	2.30	0.6
TP9		2.1	2.10	0.0
TP12		2.1	2.10	0.0
TP13		2.8	2.50	0.3
TP15		2.2	2.40	-0.2
TP16		2.6	2.50	-0.1
TP17		2.2	2.10	0.1
TP19		2.2	1.80	0..4
TP20		2.0	2.10	-0.1
TP21		2.1	1.80	0.3
TP22		2.3	1.80	0.5
BH23		2.4	1.70	0.7
CPT25	11 October 2023	3.4	3.00	0.4
CPT28		1.9	1.30	0.6
CPT29A		2.3	2.20	0.1
CPT30		3.2	2.80	0.4
CPT31A		2.1	2.00	0.1

Notes for Table 1: [1]: Surface level measured using a differential GPS.
[2]: Groundwater Level = Surface Level – Groundwater Depth.

It should be noted that groundwater levels are affected by climatic conditions and land usage and will therefore vary with time. In addition, owing to the proximity of the Swan River, the groundwater levels are expected to be impacted by the tidal river conditions and river flood levels.

5. Laboratory Testing

A geotechnical laboratory testing programme was carried out by a NATA accredited laboratory and comprised:

- the particle size distributions on seven samples;
- the Atterberg Limits and linear shrinkage on three samples; and
- the organic content on four samples.

Results of the laboratory testing are summarised in Tables 2. The test certificates are presented in Appendix C.

Table 2: Results of Laboratory Testing for Soil Identification

Location	Depth (m)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)	OC (%)	Material
TP8	1.5	9	61	30	-	-	-	-	6.8	FILL / Organic SAND SP-SM, with gravel and silt
TP13	1.5	4	95	1	-	-	-	-	1.6	FILL / SAND SP, trace gravel and silt
TP19	2.5	5	83	12	-	-	-	-	1.5	FILL / SAND SP, trace gravel and silt
TP21	2.0	40	51	9	37	24	13	8.5	-	Sandy CLAY CI, medium plasticity, trace gravel
TP22	2.0	7	93	0	NO	NP	NP	-	-	SAND SP-SM, with silt
TP23	2.0	45	48	7	44	22	22	9.5	-	FILL / Sandy CLAY CI, medium plasticity, trace gravel
TP23	2.5	12	87	1	-	-	-	-	1.2	FILL / SAND SP-SM, with silt, trace gravel

Notes: Fines = Finer than 75 µm.
Sand = Between 2.36 mm and 75 µm.
Gravel = Larger than 2.36 mm.
LL – liquid limit PL – plastic limit PI – plasticity index LS – linear shrinkage
OC – organic content NO – not obtainable NP – non plastic

6. Proposed Development

At the time of preparing this report, the details for the proposed development were not yet available. Notwithstanding, it is understood that the proposed development is likely to be residential and, given the location, is presumed would likely be multistorey and possibly include a basement level.

7. Comments

7.1 Site Suitability

The investigation indicates that the site is generally underlain by uncontrolled fill overlying very soft to stiff clayey materials and very loose sandy soils becoming medium dense and dense with depth as described in Section 4.1 above.

From a geotechnical standpoint, there are several significant geotechnical constraints that will adversely impact on any development of the site including;

- Deep uncontrolled fill, unsuitable to support shallow foundations, and will impact on construction activities associated with deep piled foundations.
- Deep very soft and very loose natural soils under the uncontrolled fill, unsuitable to support shallow foundations.
- Shallow groundwater which will make earthworks across the site any possible remediation works of the above difficult. It should be noted that the abovementioned uncontrolled fill and soft soils both extend below groundwater.

Owing to the significant geotechnical constraints, any possible development will likely require a piled foundation solution into the medium dense and dense sandy soils, encountered below depths of approximately 10 m to 15 m. Additional geotechnical investigation will be required to confirm the foundation design and suitable pile design parameters. Also, noting that any proposed additional loading of the ground (for instance from the placement of fill to raise site levels, if proposed) would generate further consolidation of the soft soils underlying the site and cold result in some possible significant ground settlement. Therefore, surcharging areas (by placing temporary fill prior to construction of any structure) outside the proposed building envelopes might also be required during the site preparation to manage the risk of differential settlements between proposed buildings and adjacent ground, following their construction.

7.2 Site Classification

The shallow ground conditions beneath the site comprise uncontrolled fill materials and deep loose and soft soil deposits. Based on the results of the investigation and in accordance with Australian Standard (AS 2870, 2011), a site classification of 'Class P' applies to the site, owing to the presence of the uncontrolled fill and deep loose and soft soil.

7.3 Site Seismic Classification

Owing to the uncontrolled fill and deep very loose and very soft soil deposits across the site, an earthquake design soil sub-class of Ee is considered appropriate for this site in accordance with Australian Standard (AS 1170.4, 2007). The Hazard Factor (Z) for the site is 0.09, according to Australian Standard (AS 1170.4, 2007). Due to the deep loose soil below the water table, the site also has a significant potential for liquefaction. An assessment on the liquefaction potential of the site should be considered during any detailed investigation, when more details can be collected on the extent of deep loose soils.

7.4 Excavation Conditions

The encountered ground conditions generally comprise uncontrolled fill, with some large foreign inclusions within the fill, extending below groundwater. Conventional earthmoving equipment (such as large excavators, say at least 20 t) should be generally suitable for shallow excavations in the surficial uncontrolled fill. Shallow groundwater is likely to impact excavations across the site.

The majority of the uncontrolled fill encountered during this preliminary investigation is considered to be geotechnically unsuitable for re-use as structural fill in its current condition. Any further consideration to reuse the uncontrolled fill would require some specific geotechnical provisions, such as screening and disposing its unsuitable components. Separating the re-useable granular components (e.g. the sandy fill) from its cohesive components (e.g. clayey fill) might also prove to be practically difficult. Owing to the significant variability of uncontrolled fill materials across the site, any re-use potential from a geotechnical standpoint should be confirmed on-site by a geotechnical engineer. Some environmental considerations (i.e. contamination) are also anticipated to be required. Overall, at this stage of the study, the reuse of the encountered uncontrolled fill should be considered to be associated with some significant constraints that might preclude such reuse.

7.5 Slope Stability

During construction, it is recommended that temporary batter slopes across the site are maintained flatter than 2:1 (H:V) if not retained. This batter angle is valid provided no surcharge loads (including live loads such as vehicles and machinery) apply at the top of the slope. In uncontrolled fill materials, a safe batter angler not steeper than 3:1 (H:V) is recommended for design for slopes not greater than 3 m in height, however, owing to variability of the uncontrolled fill materials, this value should be adjusted during construction based on the encountered conditions.

The design of unpropped flexible or rigid walls should be undertaken using a triangular pressure distribution and the earth pressure parameters given in Table 4. In addition to the soil pressure, wall design should also allow for external loads such as buildings, live loads and hydrostatic pressure. Owing to the likely significant settlements associated with the uncontrolled fill and deep soft soils, the requirement to adopt a piles foundation system to support proposed retaining walls is anticipated.

Table 4: Preliminary Soil Parameters for Earth Retaining Design

Soil Type and Density	Soil Unit Weight Above Water γ (kN/m^3)	Submerged Soil Unit Weight γ' (kN/m^3)	Drained Angle of Friction Φ' (°)	Undrained Shear Strength Cu (kPa)	Coefficient of Earth Pressure – Active K_a	Coefficient of Earth Pressure – Passive K_p	Coefficient of Earth Pressure – at Rest K_o
Uncontrolled Fill Materials	16	6	28	-	0.36	2.7	0.5

It should be noted that the passive earth pressure coefficient (second last column of Table 4) is an ultimate value and does not incorporate a factor of safety. Because the stress-strain relationship curve for lateral loading is not linear, relatively large strains are required to mobilise full passive pressure, but only relatively small strains are required to mobilise half the passive pressure, therefore it would be prudent to incorporate a factor of safety of at least 2 for uncontrolled fill materials, to derive design values from the ultimate values.

7.6 Foundation Options

Shallow footings are not considered suitable across this site, owing to the significant thickness of uncontrolled fill and deep loose and soft soils.

7.6.1 Piles

It is anticipated that a piled foundation system, with deep bored piles that penetrate the deep loose and soft soils into the medium dense and dense sandy soils at depth, would likely be required for any foundations on-site.

Bored piles will require temporary or permanent casing throughout the uncontrolled fill materials, noting that possible obstructions within the uncontrolled might cause some difficulties when driving the casing or drilling the pile hole. This pile type will involve soil excavation to target founding level and hence would produce spoil that needs to be handled and disposed of in a suitable manner, which will need to also be considered from an environmental standpoint.

Installation through the uncontrolled fill materials could be affected by the possible presence of large, hard inclusions and the design of the pile installation methodology should take this possibility into consideration.

The settlement of the uncontrolled fill will exert negative skin friction on the piles, which the piles will need to be designed to accommodate or be constructed in sleeves.

Additional deep geotechnical boreholes will be required across the site to inform on the pile design.

7.6.1 Controlled Modulus Columns

Controlled modulus columns could be installed as an alternative to conventional pile foundations, allowing shallow footings to be used whilst controlling settlements to acceptable limits.

Installation of controlled modulus columns involves displacing a column of material using a reverse flight auger, densifying the soil around the auger, and backfilling the resulting hole with cement ground under moderate pressure to create a 'hard' inclusion in the ground. The columns are typically 250 mm to 500 mm in diameter. Column spacings of columns typically 1.8 m to 2.5 m but would need input from a specialist ground improvement contractor. Columns can be installed to depths of up to 50 m, so could penetrate to the base of the uncontrolled fill and deep loose and soft soils. However, if large hard inclusions such as concrete slabs or beams, are encountered then the auger may experience refusal, as the CPTs did at several locations during the preliminary geotechnical investigation.

A load transfer platform, such as a granular, well compacted fill layer, possibly reinforced with geogrid or geotextile, would be needed to transfer loads from shallow foundations to the columns.

One main benefit of this ground improvement option (compared to piling) would be to minimise differential settlement across the site and notably between buildings and surrounding grounds. However, it would likely be limited to low level development (say 2 to 3 level buildings), and this option is anticipated to likely be prohibitively expensive, with likely significant mobilisation and installation costs. The advice of a specialist ground improvement contractor, such as Menard Oceania, is suggested to be sought to further assess the suitability of this ground improvement to the proposed development.

7.7 Pavement Construction

The uncontrolled fill across the site does not form a suitable subgrade material for pavement in its current condition. Depending on the expected loading of proposed pavement, the requirement for some over-excavation of uncontrolled fill is likely. Construction should involve the use of a geo-composite layer (such as Global Synthetics' Combigrid) across the base of the over-excavation, overlain by a 500 mm thick layer of compacted crushed limestone, placement of a layer of geogrid (such as Global Synthetics' Secugrid), and a further 500 mm of compacted sand fill. The base of the constructed floating pavement footprint should be at least 2 m wider on each side than the total pavement width (4 m wider in total) to account for a suitable batter and transfer of load. Standard flexible pavements could then be constructed on the 1 m thick raft of stiffened subgrade. Placement of the initial base layer of composite geogrid may be difficult across areas of exposed uncontrolled fill. As such, depending on the site conditions, a 300 mm thick capping layer of clean fill may be required.

Regardless of the above site preparation, some settlement of the pavement should be expected over its service life and should be considered in the selection of the pavement surfacing. The use of pavers should be considered as such surfacing treatment would deform without cracking. Alternatively, a bituminous seal should be preferred over say an asphalt, owing to greater flexibility and to decrease maintenance and repair requirements, noting however that seals are less resistant than asphalt to shearing forces from tyres of turning heavy vehicles. The use a specialised asphalt, such as a stone mastic asphalt, could also be considered, noting it would be less resistant to the risk of cracking than a seal. Some allowance for regular maintenance and repairs should be allowed during the serviceability of the pavement.

7.8 Stormwater Drainage

Owing to the occurrence of low permeability soils and groundwater at shallow depth, the site is considered unsuitable for on-site stormwater disposal. It is suggested that stormwater is controlled using positive drainage or a subsoil drainage network, connected to a suitable outflow.

7.9 Additional Geotechnical Investigation

Additional geotechnical investigation across the site, by way of deep geotechnical boreholes (as a minimum), further CPT and additional laboratory testing, should be undertaken to help refine the ground model, provide pile design parameters, confirm suitable bearing strata for piles, and assess the soil aggressivity and exposure classification for piles. It is recommended that the detailed investigation programme be developed once some details of the proposed development

are known, if possible, in order to target specific geotechnical issues associated with the development.

The investigation covered in this report should be considered preliminary and as noted in selected sections of the report, additional detailed geotechnical testing at a greater testing frequency is anticipated once the project design has progressed.

8. References

AS 1170.4. (2007). *Structural Design Actions, Part 4: Earthquake Actions in Australia.* Reconfirmed 2018. Incorporating Amendments 1 & 2: Standards Australia.

AS 1289.6.3.2. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - 9kg dynamic cone penetrometer test.* Reconfirmed 2013: Standards Australia.

AS 1289.6.3.3. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - Perth sand penetrometer test.* Reconfimed 2013: Standards Australia.

AS 1726. (2017). *Geotechnical Site Investigations.* Standards Australia.

AS 2159. (2009). *Piling - Design and Installation.* Standards Australia.

AS 2870. (2011). *Residential Slabs and Footings.* Standards Australia.

9. Limitations

Douglas Partners (DP) has prepared this report for this project at Part of Lot 9002 Grandstand Road, Ascot WA in accordance with DP's proposal dated 8 May 2023 and acceptance received from Mr James Oldring in a signed services order dated 8 August 2023. The work was carried out under DP's Engagement Terms. This report is provided for the exclusive use of Perth Racing for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

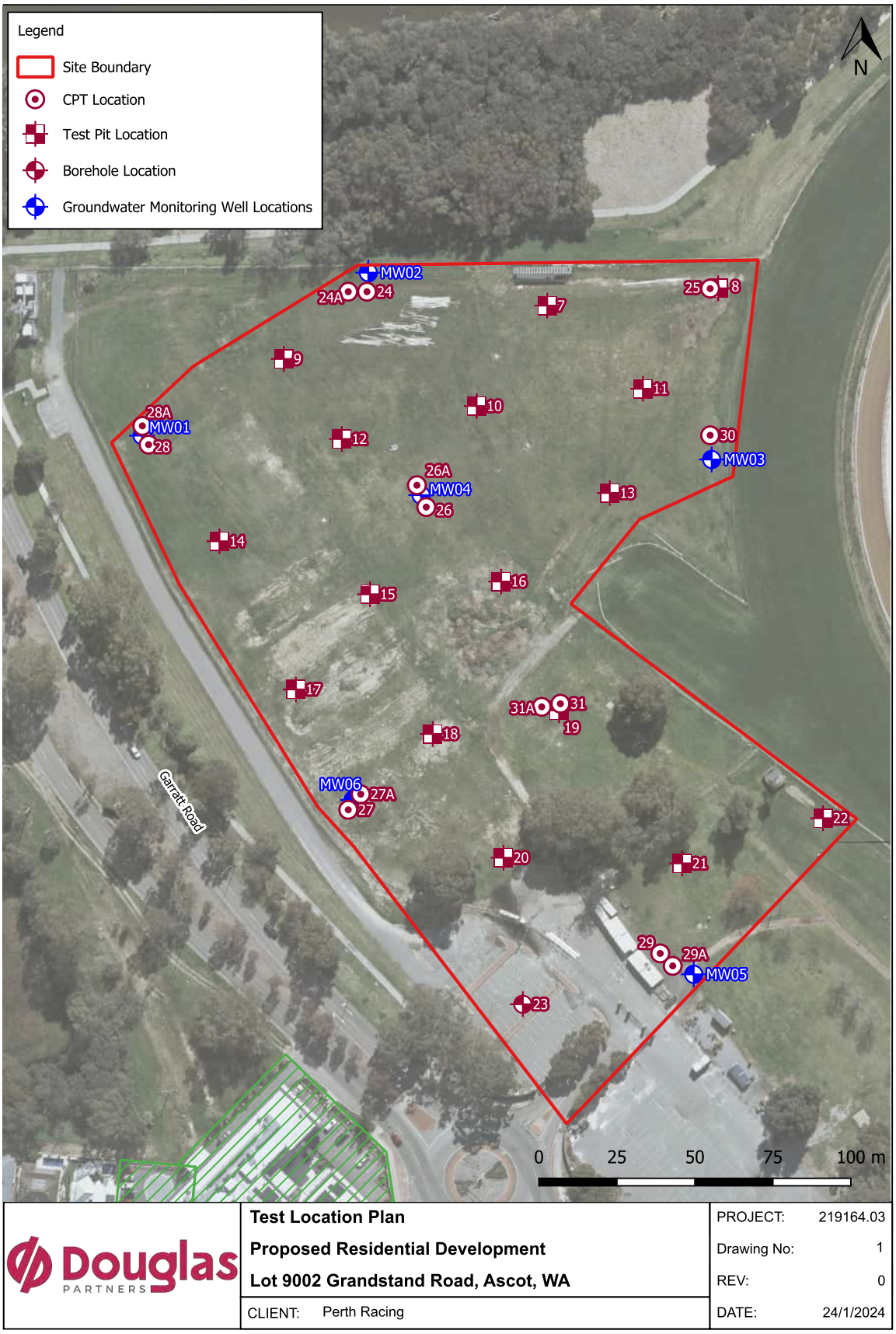
The scope of work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

Appendix B

Test Location Plan

Test Pit and Borehole Logs

CPT Results

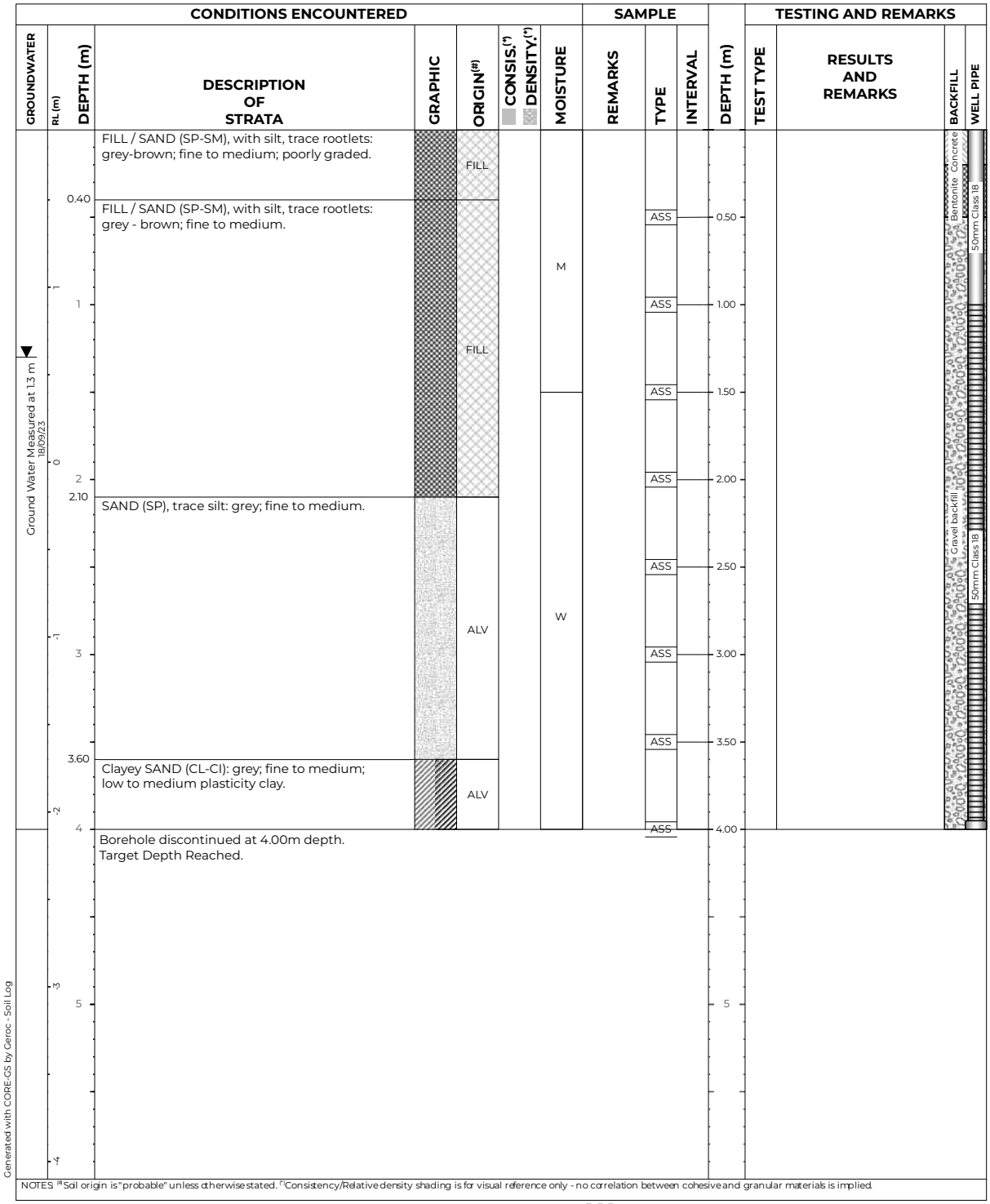

Legend
Site Boundary
CPT Location
Test Pit Location
Borehole Location
Groundwater Monitoring Well Locations
N
MW02
24A
24
25
8
7
9
11
10
28A
MW01
28
12
30
MW03
26A
MW04
26
13
14
16
15
17
31A
31
19
18
MW06
27A
27
Garratt Road
22
20
21
29
29A
MW05
23
0
25
50
75
100 m
Douglas
PARTNERS
Test Location Plan
Proposed Residential Development
Lot 9002 Grandstand Road, Ascot, WA
CLIENT: Perth Racing
PROJECT: 219164.03
Drawing No: 1
REV: 0
DATE: 24/1/2024

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 1.9 AHD
COORDINATE: E:397722.0, N:6466365.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 01
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



Generated with CORE-GS by Geroc - Soil Log

PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

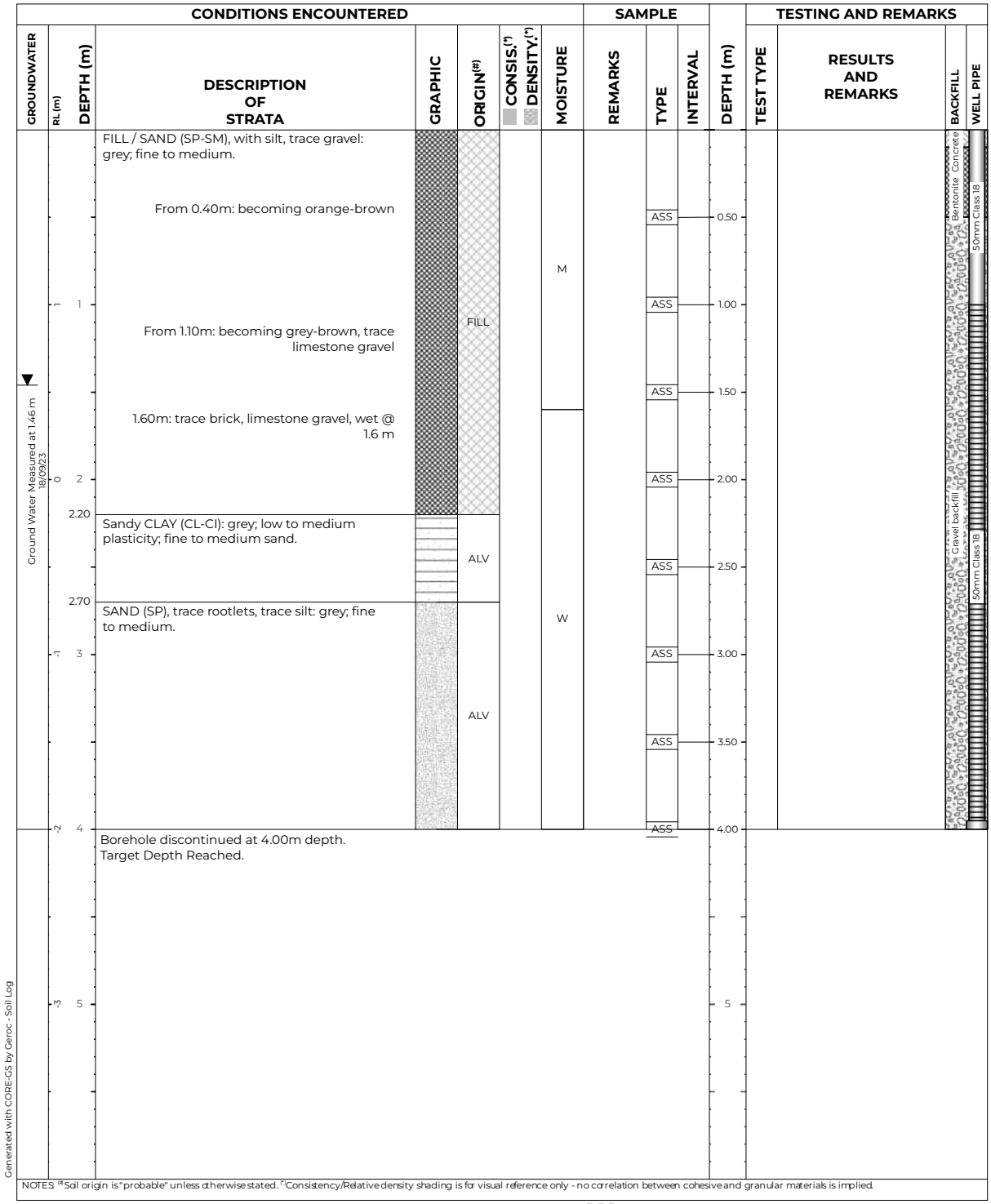
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397795.0, N:6466418.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 02
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.2 AHD
COORDINATE: E:397905.0, N:6466358.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 03
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	3		FILL / SAND (SP), trace silt: orange; fine to medium. From 0.30m: becoming grey, trace clay, limestone gravel		FILL						1			Bentonite Concrete; Gravel backfill; 50mm Class 18	50mm Class 18
	2	1.60	FILL / Clayey SAND (SC), trace gravel: grey; fine to medium; low to medium plasticity clay.		FILL						2				
▼ Ground Water Measured at 2.37 m 18/09/23	1	2.20	FILL / SAND (SP), trace silt: orange - grey; fine to medium. 2.80m: trace brick		FILL										
	0	3.00	FILL / Clayey SAND (SC): grey; fine to medium; low to medium plasticity clay. 3.30m-3.50m: with bitumen layer		FILL						3				
		3.60	FILL / CLAY (CL-CI), trace sand: grey - green; low to medium plasticity.		FILL										
	-1	4	Borehole discontinued at 4.00m depth. Target Depth Reached.								4				
	-2	5									5				

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Generated with CORE-GS by Geroc - Soil Log

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397812.0, N:6466346.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 04
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS	BACKFILL	WELL PIPE
	2		FILL / SAND (SP-SM), with silt, trace rootlets: orange grey; fine to medium.		FILL				ASS		0.50			Bentonite Concrete	50mm Class 18
		0.60	FILL / SAND (SP), with gravel, trace clay: grey; fine to medium; fine to medium gravel.												
	1								ASS		1.00				
			1.50m: trace brick, wet						ASS		1.50			Gravel backfill	
Ground Water Measured at 1.59 m 18/09/23					FILL										
	0		2.00m: trace brick						ASS		2.00				
									ASS		2.50				
			3.00m: trace brick						ASS		3.00				50mm Class 18
		3.20	SAND (SP), trace silt: grey-orange; fine to medium.		ALV										
	-1	3.40	Clayey SAND (SC): orange-grey; fine to medium; low to medium plasticity clay.		ALV				ASS		3.50				
		3.60	Sandy CLAY (CL): grey; low to medium plasticity; fine to medium sand.		ALV										
		4							ASS		4.00				
			Borehole discontinued at 4.00m depth. Target Depth Reached.												
	-2														
		5									5				
	-3														

NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log

PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

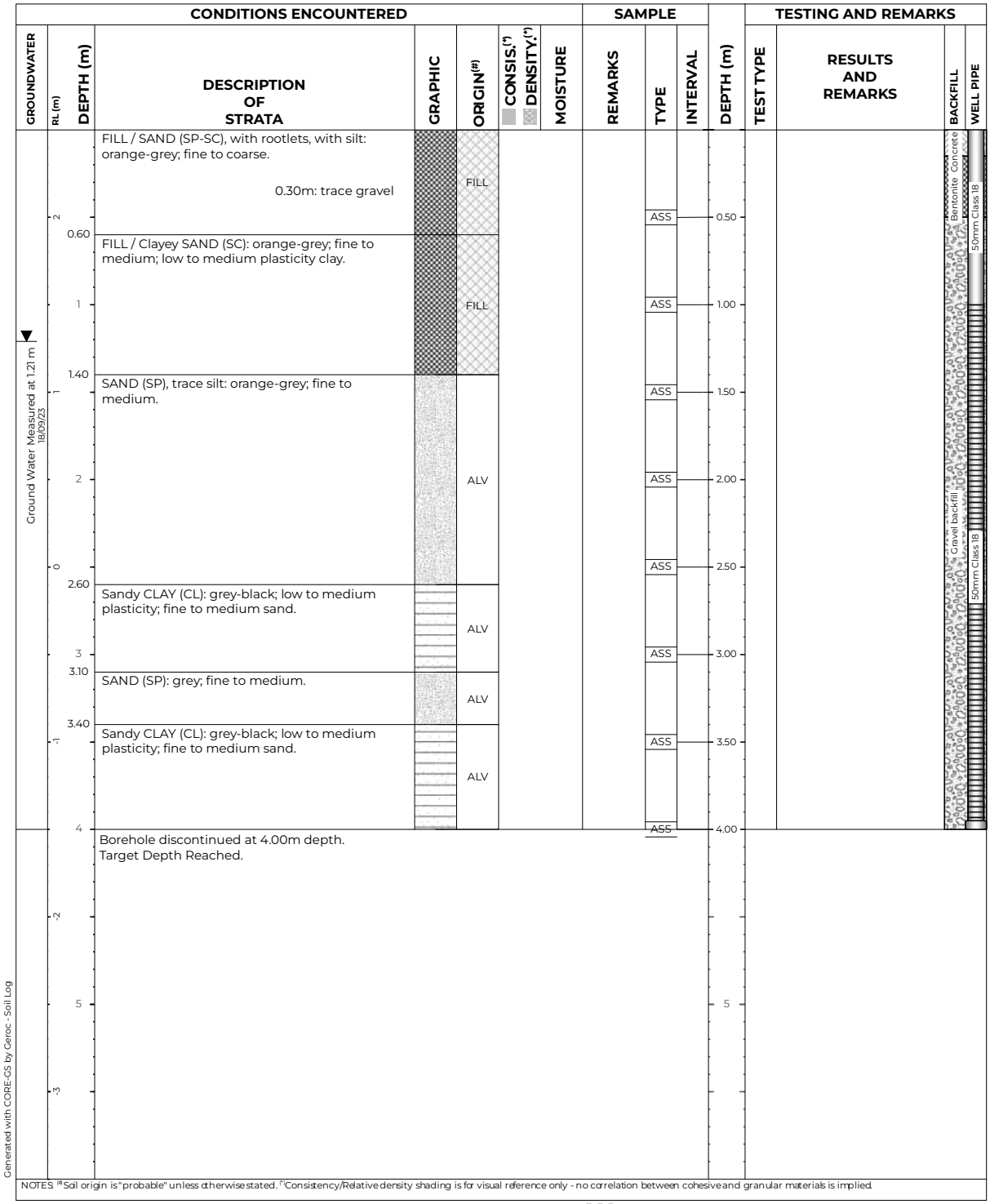
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.5 AHD
COORDINATE: E:397900.0, N:6466193.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 05
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397790.0, N:6466249.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 06
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(^) / DENSITY.(^)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	2		FILL / SAND (SP) : Sand, with rootlets, trace silt: orange-grey; fine to medium.		FILL									Bentonite Concrete	
		0.40	FILL / SAND (SP), with gravel: grey-brown; fine to medium.						ASS		0.50				
	1		From 0.80m: becoming grey, no gravel								1				
▼			From 1.10m: becoming orange-grey		FILL									Gravel backfill	50mm Class 18
Ground Water Measured at 1.09 m 18/09/23	0		From 1.80m: becoming grey and trace brick								2				
		2.20	FILL / Clayey SAND (CL): grey; fine to medium; low to medium plasticity clay; may be natural.		FILL										
		2.60	SAND (SP): grey; fine to medium.		ALV						3				
	-1	3.10	Sandy CLAY (CL): dark grey; low to medium plasticity; fine to medium sand.		ALV										50mm Class 18
	-2	4	Borehole discontinued at 4.00m depth. Target Depth Reached.								4				
	-3										5				

NOTES: (#) Soil origin is "probable" unless otherwise stated. (^) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log

PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.9 AHD
COORDINATE: E:397852.9, N:6466410.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP07
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(†) DENSITY.(†)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium. From 0.17m: becoming orange. 0.54m: trace geo-fabric		FILL	MD to VD	D to M		ES		0.10	PID	<1ppm
								ES		0.40	PID	<1ppm
	0.60	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand. 0.84m: trace geo-fabric		FILL						0.50		
	0.90	FILL / GRAVEL (GP-GM) : Gravel, with mulch, with sand: dark brown and dark grey-brown; with silt.		FILL				ES		1.00	PID	<1ppm
	1.40	FILL / SAND (SP-SM), with silt: dark grey; fine to medium. 1.50m: trace PACM fragment. From 1.60m-2.60m: with fragments of bricks, concrete and metal roofing sheetings		FILL	ND	M	ASB9, ASB10, AF/FA	D		1.10		
								ES		1.50	PID	<1ppm
										1.60		
				FILL				ES		2.00	PID	<1ppm
										2.10		
						W		ES		2.50	PID	<1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).								2.60		

09/11/23

DCP9/150





NOTES: (#) Soil origin is "probable" unless otherwise stated. (†) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.3 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.6 AHD
COORDINATE: E:397905.7, N:6466414.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP08
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	3 / 0	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.			VD			ES		0.10	PID	<1 ppm
		From 0.43m: becoming pale grey, trace gravel		FILL				ES		0.50 0.60	PID	<1 ppm
	1	From 1.20m: becoming grey				M		ES		1.00 1.10	PID	<1 ppm
	1.40 / 2	FILL / organic SAND (SP-SM), with silt, with gravel: dark grey-brown; fine to medium; trace fragments of brick and concrete.		FILL	ND		AF/FA ASB 8	D ES MAT		1.50 1.60	PID	<1 ppm
		1.55m-2.00m: with fragments of brick, concrete and PVC										
	1.80 / 2	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium.						D ES		2.00 2.10	PID	<1 ppm
		2.20m: trace metal sheet, PVC		FILL								
		2.40m: trace rubber pipe, metal bar						ES		2.50 2.60	PID	<1 ppm
		Test Pit discontinued at 2.70m depth. (Test Pit terminated due to slow digging).										

PSP/150: 5, 10, 15, Refusal 20





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397768.9, N:6466392.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP09
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
	2		FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		0.45	FILL / Clayey SAND (SC): orange-brown; fine to medium; low to medium plasticity clay.		FILL				D ES		0.50 0.60	PID	<1ppm
		0.95 0.98	FILL / ASPHALTIC CONCRETE: black, 7 mm sized nominal aggregate.										
	1		FILL / Silty SAND (SM): brown; fine to medium. From 1.15m: becoming grey-brown From 1.20m: with fragments of brick, concrete slab of 0.4 m in thickness, geo-fabric, metal bar and terracotta pipe 1.40m: trace metal sheet		FILL	ND	M		ES		1.00 1.10 1.50 1.60	PID	<1ppm
09/11/23	0	2	1.90m-2.10m: trace pockets of Clayey SAND SC						ES		2.00 2.10	PID	<1ppm
			Test Pit discontinued at 2.30m depth. (Collapsing conditions).				W						

PSP/150: 5, 10, 15; REFUSAL 25 25





NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log with Photo

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397829.1, N:6466375.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP10
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: bands of grey, orange-brown and pale grey; fine to medium.		FILL	MD to D		DUP 2	ES		0.10	PID	<1ppm
								ES		0.50	PID	<1ppm
		0.70m: trace geo-fabric								0.60		
	0.80	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL				ES		1.00	PID	<1ppm
	1									1.10		
	1.20	FILL / SAND (SP), trace rootlets, trace silt: grey -brown; fine to medium.		FILL	ND			ES		1.50	PID	<1ppm
	1	From 1.40m-1.80m: with fragments of brick and concrete								1.60		
		From 1.80m: becoming dark grey, trace fragments of brick and concrete						ES		2.00	PID	<1ppm
	2									2.10		
	0	Test Pit discontinued at 2.15m depth. (Test Pit terminated due to slow digging).										

PSP/hr: 5 10 15





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.1 AHD
COORDINATE: E:397881.2, N:6466387.1
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP11
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	3	FILL / SAND (SP-SM), with silt: grey and orange-brown; fine to medium.			VD	D to M		ES		0.10	PSP/150	5 10 15 REFUSAL 25 25
		From 0.35m: becoming grey						ES		0.50 0.60		
	1						DUP 3	D ES		1.00 1.10		
	2			FILL	ND	M						
		From 1.60m: becoming dark grey, trace fragments of brick						D ES		1.60 1.70		
		From 1.70m-2.40m: with fragments of brick and concrete										
	2	1.80m: piece of concrete boulder (1 m x 0.5 m) observed						ES		2.00 2.10		
	1	2.10m: trace plastic bottle, glass bottle, concrete rubble										
		2.30m: trace fragments of wooden plank and timer						D		2.30		
		Test Pit discontinued at 2.40m depth. (Test Pit terminated due to slow digging).										





NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Generated with CORE-GS by Geroc - Soil Log with Photo

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397785.4, N:6466366.6
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP12
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(^) DENSITY.(^)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
	2		FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
			From 0.20m: becoming yellow-brown										
									ES		0.50	PID	<1ppm
											0.60		
	0.85		FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL				D		1.00	PID	<1ppm
	0.90							AF/FA, ASB 6, ASB 7	ES		1.10		
	1		FILL / SAND (SP), trace fragments of brick, scrap metal, timber and rubber cable, trace silt: dark grey-brown; fine to medium.										
			1.30m-1.80m: with fragments of plastic waste, insulation material, terracotta pipes and concrete, trace PACM fragments		FILL	ND	M		ES		1.50	PID	<1ppm
											1.60		
			From 1.90m: becoming green-grey, trace pockets of CLAY CL-CI						B		2.00	PID	<1ppm
▼ 09/11/23	0	2					W		ES		2.10		
			Test Pit discontinued at 2.30m depth. (Collapsing conditions).										

PSP/NSP 5 10 15 25





NOTES: (#) Soil origin is "probable" unless otherwise stated. (^) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.8 AHD
COORDINATE: E:397872.7, N:6466350.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP13
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
		FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; 10% non-plastic fines. From 0.15m: becoming orange		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		0.70m: trace geo-fabric						D		0.50	PID	<1ppm
	0.75							ES		0.60	PSP/150	5 10 15 25
	2 / 1	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL				ES		1.00 1.10	PID	<1ppm
		1.20m: trace geo-fabric										
	1.30	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium. 1.50m-2.40m: with fragments of bricks and concrete slab			ND	M		D ES		1.50 1.60	PID	<1ppm
	1 / 2			FILL				ES		2.00 2.10	PID	<1ppm
▼ 09/11/23						W		ES		2.50 2.60	PID	<1ppm
	0	Test Pit discontinued at 2.70m depth. (Collapsing conditions).										





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397745.6, N:6466334.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP14
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
	2	0.25	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
			FILL / Silty SAND (SM): brown and grey-brown; weakly to moderately cemented.									DCP9/150	5 10 15 29 30
									D		0.50	PID	<1ppm
									ES		0.60		
			0.65m: trace fragments of brick and glass										
			0.72m-2.00m: with framgnes of brick, metal sheet and insulation material										
	1		0.92m: trace fragments of plastic waste, glass and limestone boulders						ES		1.00	PID	<1ppm
											1.10		
					FILL	ND	M		ES		1.50	PID	<1ppm
											1.60		
	0	2	2.00m: becoming gren-grey, trace fragments of timber, brick and concrete blocks, with pockets of Clayey SAND SC						ES		2.00	PID	<1ppm
											2.10		
			From 2.20m: with fragments of brick and scrap metal						D		2.40		
			Test Pit discontinued at 2.50m depth. (Test Pit terminated due to slow digging).										





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397794.3, N:6466319.4
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP15
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0 (2)	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: orange-brown; fine to medium.		FILL	VD	D to M		ES		0.10	PID	<1ppm
		From 0.24m: becoming grey									DCP9/150	
		From 0.42m: becoming pale grey						D		0.50	PID	<1ppm
								ES		0.60		
	0.75 (1.45)	FILL / Sandy GRAVEL (GP-GM), with silt: dark brown and grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND							22
	0.95 (1.25)	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.		FILL	ND	M		D		1.00	PID	<1ppm
	1 (1)							ES		1.10		
		1.20m: trace fragments of timber, terracotta pipe and scrap metal										
		1.50m: trace redundant cable						ES		1.50	PID	<1ppm
										1.60		
		From 1.80m: becoming orange-brown										
	2 (0)	2.00m: trace PACM pipe					AF/FA, ASB 5	ES		2.00	PID	<1ppm
		2.10m: trace fragments of timer								2.10		
▼ 08/11/23		From 2.40m: becoming dark grey				W						
								ES		2.50		
										2.60		
		Test Pit discontinued at 2.70m depth. (Test Pit flooded with water seepage).										





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NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.4 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397837.5, N:6466321.2
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP16
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.34 / 2	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.		FILL				ES		0.10	PID	<1ppm
		FILL / Sandy (GP-GM), with silt: grey; fine to medium sand.		FILL	ND	D to M		ES		0.50 0.60	PID	<1ppm
	0.84	0.80m: trace fragments of plastic waste										
	1	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						ES		1.00 1.10	PID	<1ppm
		1.50m: trace fragments of plastic waste		FILL	MD to D	M		D ES		1.50 1.60	PID	<1ppm
	2	2.00m: trace metal plate (0.5 m x 0.5 m) 2.10m: with limestone boulders			ND			ES		2.00 2.10	PID	<1ppm
▼ 08/11/23	0					W		D ES		2.50 2.60	PID	<1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).										

DCP9/150: 5, 10, 15





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NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397775.7, N:6466289.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP17
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.15 / 2	FILL / SAND (SP-SM), with silt, trace rootlets: orange - grey; fine to medium.		FILL				ES		0.10	PID	<1ppm
		FILL / Sandy GRAVEL (GP-GM), with fragments of concrete, with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	L to VD	D to M		ES		0.50 0.60	PID	<1ppm
	0.90 / 1	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						ES		1.00 1.10	PID	<1ppm
		1.10m: trace fragments of plastic waste			ND	M						
		1.60m: trace metal sheets		FILL			ASB 3	ES		1.50 1.60	PID	<1ppm
		1.90m: piece of concrete block observed										
08/11/23	2 / 0						ASB 4	ES		2.00 2.10	PID	<1ppm
		Test Pit discontinued at 2.50m depth. (Collapsing conditions).				W						

TESTING AND REMARKS: PID <1ppm; DCP9/150 (5, 10, 15, 25)





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397816.0, N:6466272.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP18
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; weakly cemented.		FILL		D to M		ES		0.10	PID	<1ppm
	0.26	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND							
	0.45	FILL / SAND (SP), with fragments of brick and concrete, with clay: grey; fine to medium.					ASB 1	ES		0.50 0.60	PID	<1ppm
		0.50m-1.50m: with fragments of tile and brick, trace PACM fragments										
		0.75m: trace metal bar			MD to VD						DCP 9/150	5 10 15
	1	1.00m: trace fragments of redundant cables, glass, geo-fabric and limestone blocks		FILL		M		D ES		1.00 1.10	PID	<1ppm
		From 1.20m: with limestone boulders			ND							
								ES		1.40 1.50	PID	<1ppm
		Test Pit discontinued at 1.50m depth. (Test Pit terminated due to slow digging).										
	2									2		
	0											





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

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TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397856.8, N:6466280.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP19
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS
	2	0.20	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL			DUP 1	ES		0.10	PID	<1ppm
			FILL / Sandy GRAVEL (GP-GM), with silt: orange-brown; medium to coarse; fine to medium sand; Gravel is crushed limestone.		FILL	ND	D		D		0.50	PID	<1ppm
									ES		0.60		
		0.70	FILL / SAND (SP-SM), with silt, trace gravel: grey-brown; fine to medium.										
	1		0.75m: trace concrete slab, fragments of brick and terracotta pipes										
			From 0.90m: with fragments of brick			MD			ES		1.00	PID	<1ppm
			From 1.20m: becoming grey, trace fragments of timber		FILL		M				1.10	PSP 150	5 10 15
			From 1.60m: becoming grey-brown						ES		1.50	PID	<1ppm
09/11/23											1.60		
		1.90	FILL / SAND (SP), trace roots, trace silt: dark grey; fine to medium.			ND			ES		2.00	PID	<1ppm
	2				FILL		W				2.10		
	0		2.40m: trace fragments of sea shells						D		2.50	PID	<1ppm
									ES		2.60		
			Test Pit discontinued at 2.60m depth. (Collapsing conditions).										





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

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TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397838.6, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP20
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.05	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	MD to VD	D to M		ES		0.10	PID	<1ppm
	0.34	FILL / Sandy GRAVEL (GP-GM), with silt: yellow-brown; medium to coarse; fine to medium sand.										
		FILL / SAND (SP-SM), with silt, trace gravel: grey and orange-brown; fine to medium. 0.50m: with fragments of brick and concrete						ES		0.50	PID	<1ppm
		0.80m: trace fragments of rubber waste and scrap metal								0.60		
	1			FILL				D		1.00	PID	<1ppm
								ES		1.10		
		From 1.20m: becoming dark grey, with fragments of brick				M						
		1.30m-2.10m: with hydrocarbon odour										
		1.50m: with pockets of Clayey SAND SC						D		1.50	PID	9.4ppm
								ES		1.60		
	1.80	FILL / Clayey SAND (SC): dark grey; fine to medium; low to medium plasticity clay.			ND							
08/11/23	0.2							ES		2.00	PID	1.4ppm
		From 2.10m: becoming green-grey		FILL		W				2.10		
								ES		2.50	PID	1.1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).								2.60		

PSP/hr





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NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

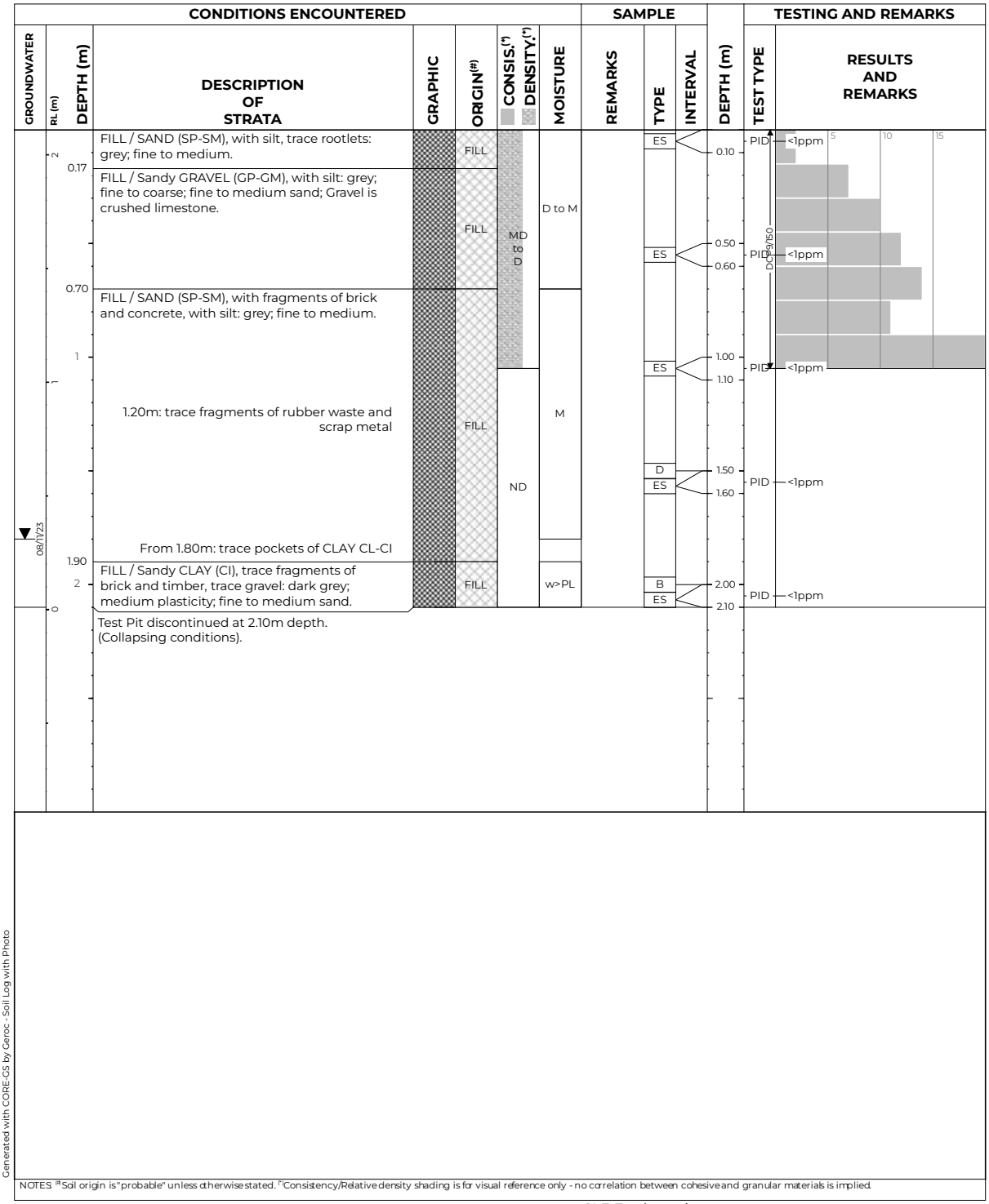
Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397896.5, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP21
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1



NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log with Photo

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.3 AHD
COORDINATE: E:397941.6, N:6466244.9
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP22
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	MD	D to M		ES		0.10	PID	<1ppm
		From 0.22m: becoming orange										
		From 0.40m: becoming brown						ES		0.50	PID	<1ppm
		From 0.70m: becoming dark grey-brown								0.60		
	1					M		ES		1.00	PID	<1ppm
	1									1.10		
	1.40	SAND (SP-SM), with silt: pale yellow-brown; fine to medium.		possibly ALV	ND			ES		1.50	PID	<1ppm
09/11/23		From 1.70m: becoming orange-grey								1.60		
	2					W		B		2.00	PID	<1ppm
								ES		2.10		
	0	Test Pit discontinued at 2.20m depth. (Collapsing conditions).										

PSP/hr





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397844.9, N:6466181.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP23
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.05	ASPHALT: black, 7 mm sized nominal aggregate.		FILL		D						
	0.15	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand; BASECOURSE, gravel is crushed rock.		FILL	ND							
	0.30	FILL / Sandy GRAVEL (GP-GM), with silt: red-brown; medium to coarse, angular to sub-angular; fine to medium sand; SUB-BASE, gravel is granitic and lateritic.		FILL		M		ES		0.50 0.60	PID	<1ppm
	0.65	FILL / Silty SAND (SM), trace gravel: brown; fine to medium; with pockets of Clayey SAND SC. 0.90m: trace fragments of brick			MD to D							
	1	FILL / Clayey SAND (SC): orange-grey; fine to medium; low to medium plasticity clay.		FILL		M		D ES		1.00 1.10	PID	<1ppm
08/11/23	1.40	FILL / SAND (SP), trace silt: grey; fine to medium; trace pockets of Clayey SAND SC. 1.80m: trace fragments of brick		FILL				ES		1.50 1.60	PID	<1ppm
	1.90	FILL / Sandy CLAY (CI), trace gravel: dark grey; medium plasticity; fine to medium sand.		FILL	ND	W		D ES		2.00 2.10	PID	<1ppm
	2.20	FILL / SAND (SP-SM), with silt: dark grey; fine to medium.		FILL				D ES		2.50 2.60	PID	<1ppm
		Borehole discontinued at 2.60m depth. (Collapsing conditions).										

DCP9/150: 5, 10, 15





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
CASING: Nil

REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.7 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Appendix C

Geotechnical Laboratory Test Certificates

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ASTM D2974-14 (Test Method C)

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256-18262_1_ORG
Project:	Proposed Residential Development	*Sample No.*	WG23.18256-18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	Various See Below	*Date Tested:*	15/11/2023

TEST RESULTS - Organic Content

Sampling Method: Sampled by Client, Tested as Received

Testing Completed By: WGLS-LC

Furnace Temperature (°C): 440

Sample Number	Sample Identification	Ash Content (%)	Organic Content (%)
WG23.18256	TP13/1.5	98.4	1.6
WG23.18257	TP8/1.5 m	93.2	6.8
WG23.18258	TP19/2.5	98.5	1.5
WG23.18262	BH23/2.5 m	98.8	1.2

Comments:

Approved Signatory: Coneill

Name: Cody O'Neill

Date: 16/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

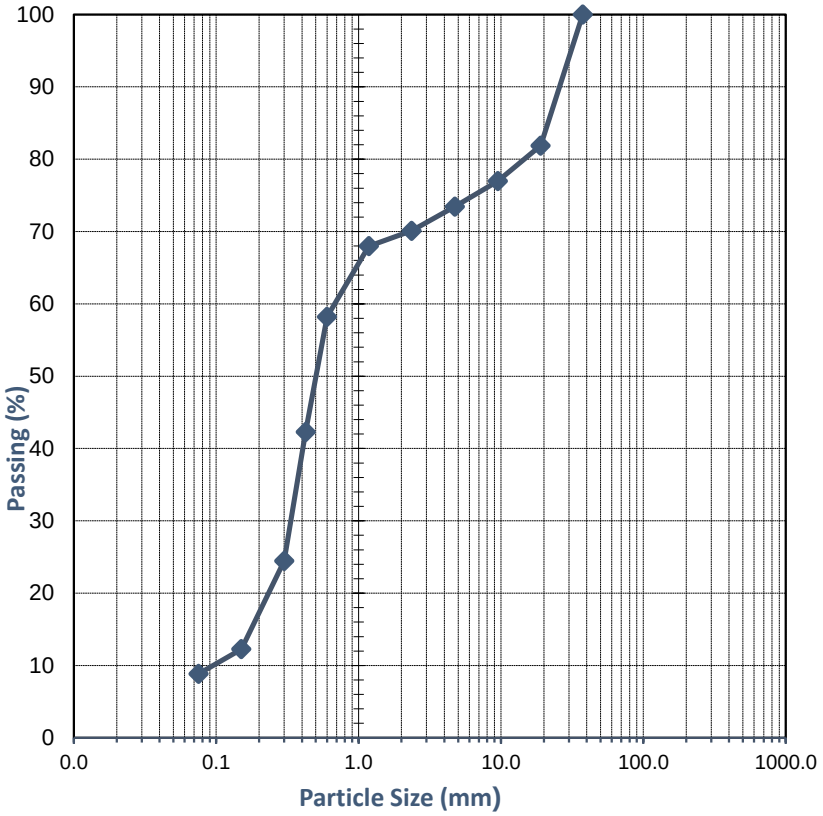
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18257_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18257
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP8/1.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	82
9.5	77
4.75	73
2.36	70
1.18	68
0.600	58
0.425	42
0.300	24
0.150	12
0.075	9



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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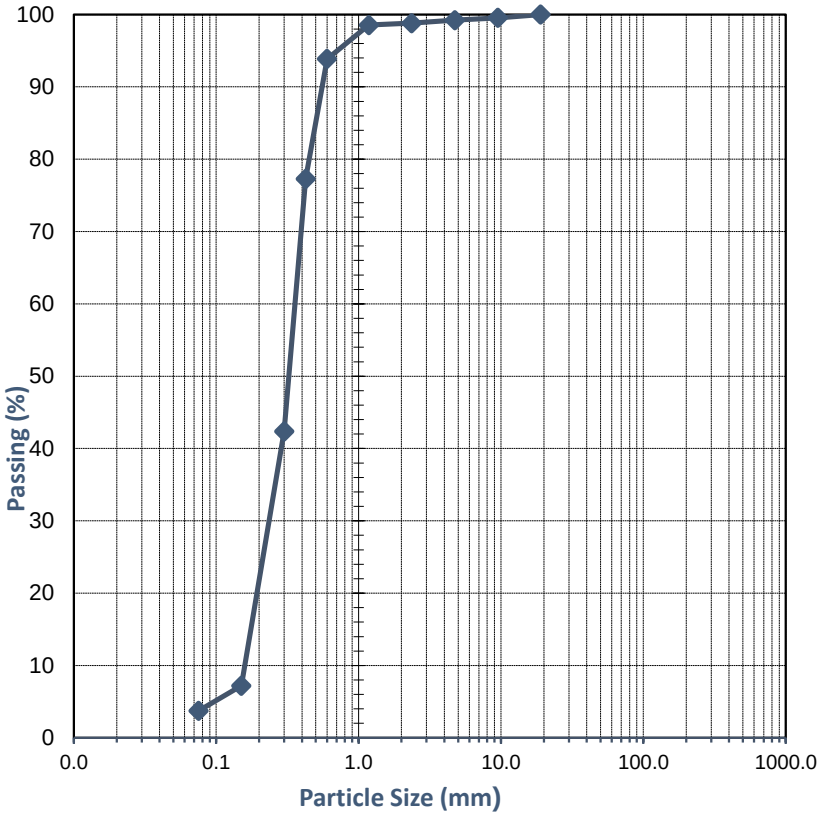
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18256
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP13/1.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	99
2.36	99
1.18	99
0.600	94
0.425	77
0.300	42
0.150	7
0.075	4



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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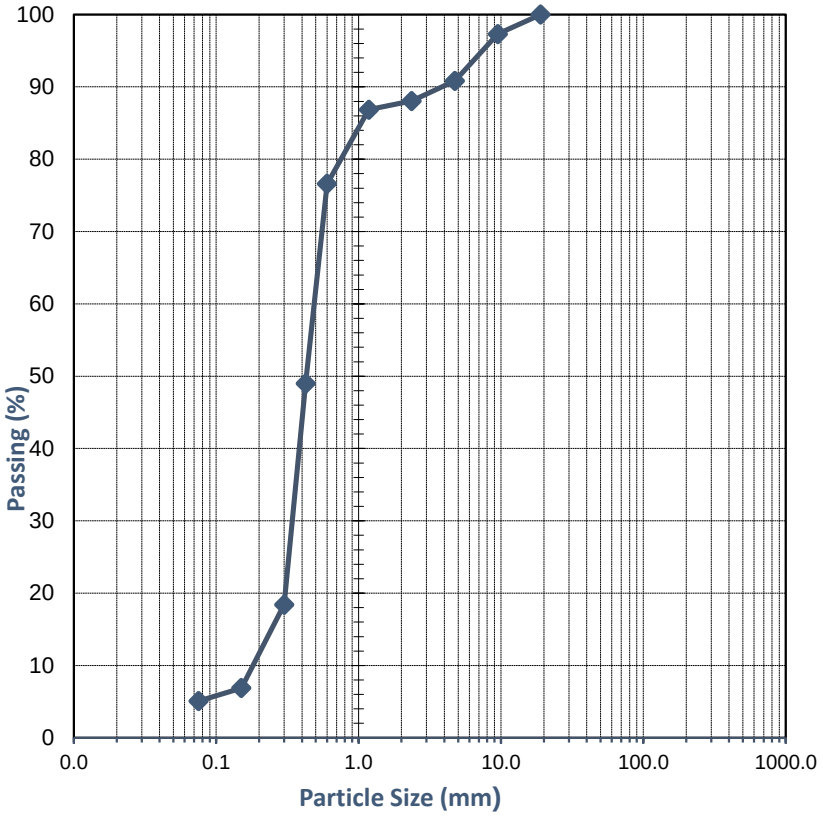
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18258_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18258
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP19/2.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	97
4.75	91
2.36	88
1.18	87
0.600	77
0.425	49
0.300	18
0.150	7
0.075	5



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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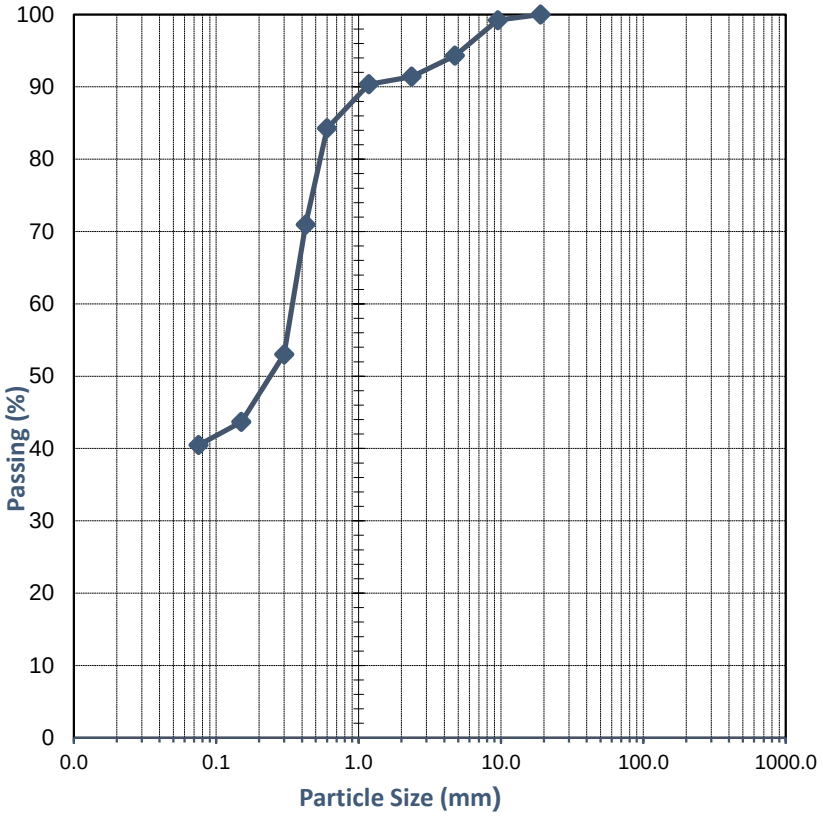
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	99
4.75	94
2.36	91
1.18	90
0.600	84
0.425	71
0.300	53
0.150	44
0.075	40



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**37**
AS 1289.3.2.1	**Plastic Limit (%)**	**24**
AS 1289.3.3.1	**Plasticity Index (%)**	**13**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**8.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet

Date: 20/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

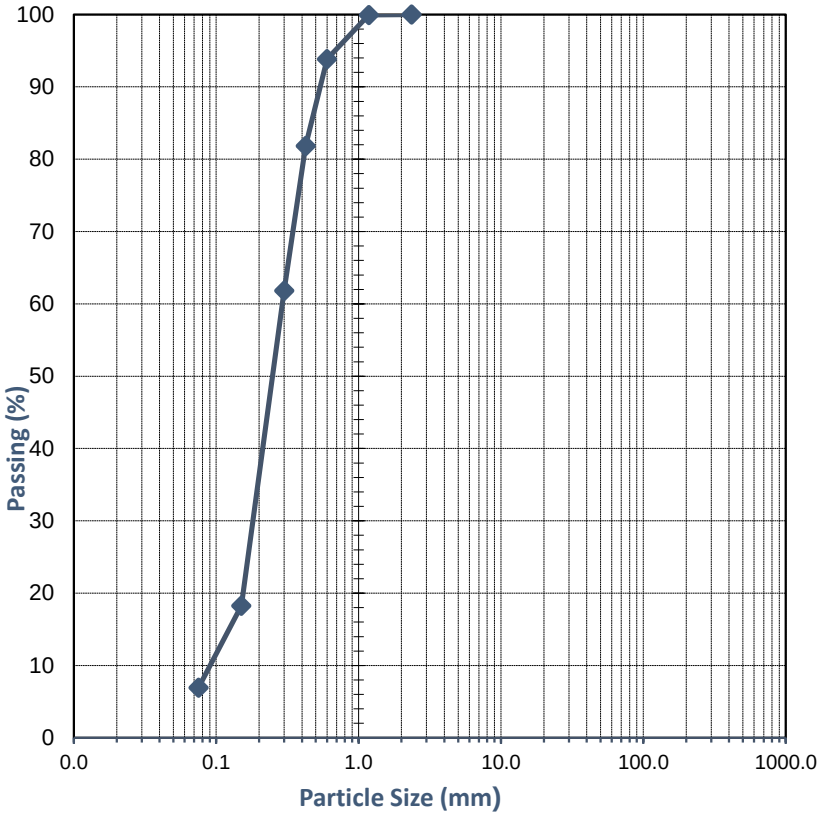
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/2023
Sample Identification:	TP22/2.0	*Date Tested:*	22/11 - 23/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	
2.36	100
1.18	100
0.600	94
0.425	82
0.300	62
0.150	18
0.075	7



Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 23/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP22/2.0	*Date Tested:*	23/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Matthew Lichon

Date: 24/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

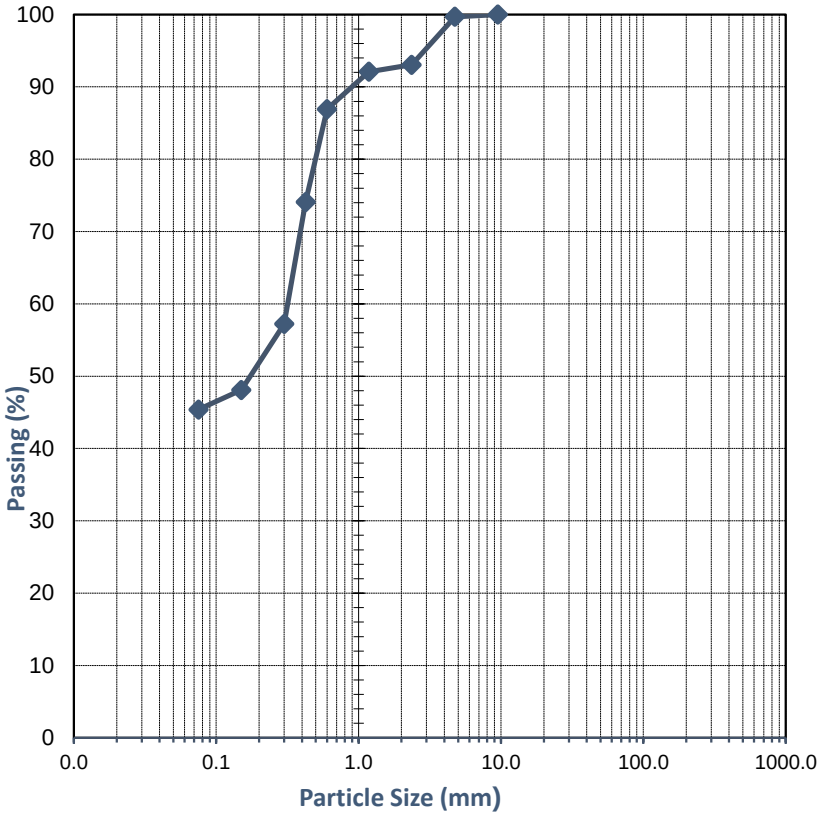
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	93
1.18	92
0.600	87
0.425	74
0.300	57
0.150	48
0.075	45



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**44**
AS 1289.3.2.1	**Plastic Limit (%)**	**22**
AS 1289.3.3.1	**Plasticity Index (%)**	**22**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**9.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet

Date: 20/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

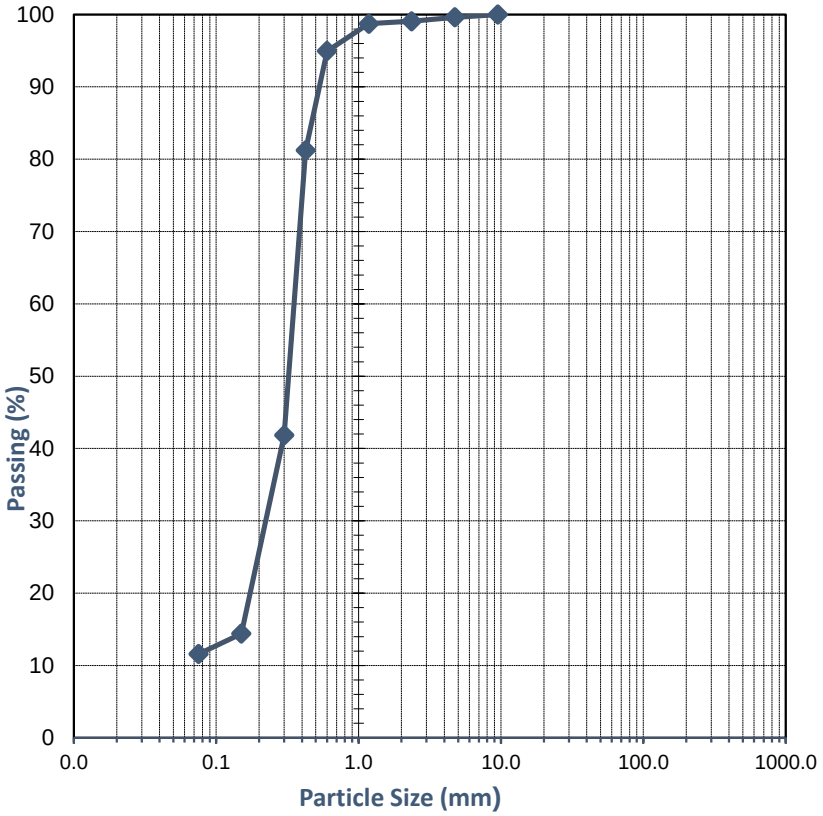
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18262_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	99
1.18	99
0.600	95
0.425	81
0.300	42
0.150	14
0.075	12



Comments:

Approved Signatory: Cody O'Neill

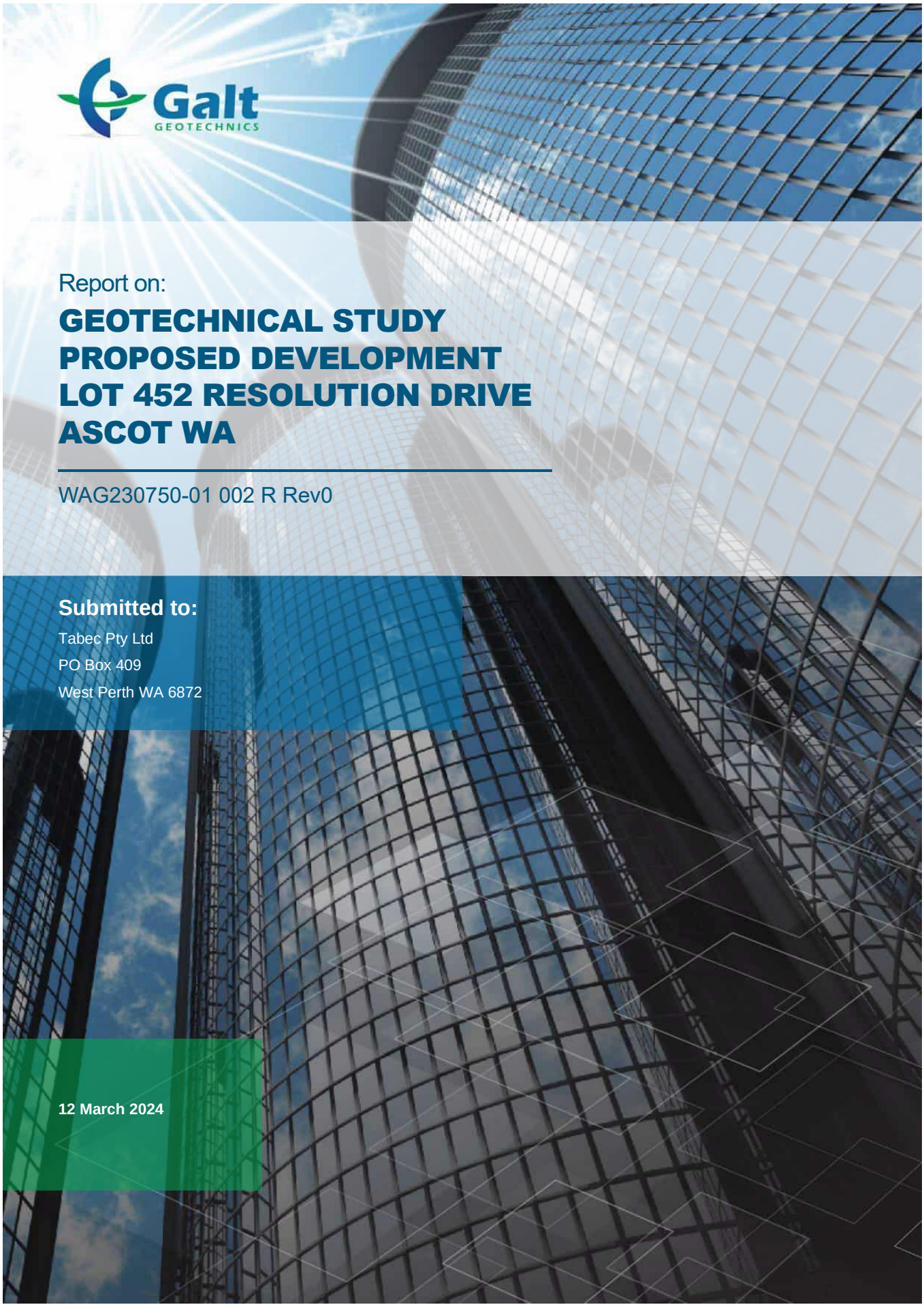
Name: Cody O'Neill

Date: 17/November/2023

NATA **Accreditation No. 20599**
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Galt GEOTECHNICS

Report on:

GEOTECHNICAL STUDY PROPOSED DEVELOPMENT LOT 452 RESOLUTION DRIVE ASCOT WA

WAG230750-01 002 R Rev0

Submitted to:

Tabec Pty Ltd
PO Box 409
West Perth WA 6872

12 March 2024

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Figure 1: Site and Location Plan

Appendix A: Site Photographs
Appendix B: Cone Penetration Test Results
Appendix C: Machine Borehole and Monitoring Well Logs
Appendix D: Laboratory Test Results

Standard Geotechnical Definitions, Recommendations, Requirements and Limitations

1. INTRODUCTION

This report presents the outcomes of Galt Geotechnics' (Galt's) geotechnical study for the proposed development at Lot 452 Resolution Drive, Ascot ("the site").

This report is to be read in conjunction with the appended "Geotechnical Definitions, Recommendations, Requirements and Limitations". 'Clause GDR1', etc. refer to this Appendix, found at the back of this report.

2. KEY FINDINGS

Site Description

Table 1: Summary of Site

Item	Comment
Site Extent	Refer Figure 1.
Site Area	About 1.14 Ha.
Current Site Surface Levels[1]	About RL 3 m AHD.
Vegetation	Mature trees, shrubs and lawn in landscaped areas covering a large portion of the site.
Existing Infrastructure	Single Storey building (used by Perth Racing Security Services) with surrounding accessways, car parking and landscaped areas.
Site History[2]	**Prior to 1953**: two residences in northern portion of site. Remainder of site relatively clear. **1953 to 1985**: Relatively unchanged. Undeveloped portion of site used as laydown area, car park area, and to stockpile materials at different times. **1989**: Existing Perth Racing Security Services development (as described above) is present **1989 to Present**: Site relatively unchanged.

NOTES: ***1.*** *Site level based on correspondence with client.*

2. *Site history based on aerial imagery (Landgate).*

3. PROPOSED DEVELOPMENT

Table 2: Summary of Proposed Development

Item	Comment
Proposed Development	Unknown, assumed subdivision for commercial/residential purposes.
Proposed Finished Level	Assumed within about 1 m of current ground levels.
Cut/Fill	Assumed ± 1 m with up to 5 m excavation to connect development to existing sewer.
Assumed Foundation Type	Shallow Footings.
Assumed Retaining Walls	Gravity walls up to 1 m in height.
Assumed Stormwater Disposal	Off site into council network.
Assumed Sewage Disposal	Off site via reticulated sewer.

NOTES: ***1.*** *FFL – finished floor level*

2. *Proposed development details based on supplied information.*

4. PROJECT OBJECTIVES

The objectives of the study were to:

- Assess the geotechnical suitability of the site for the proposed development;

- Geotechnical opportunities and constraints relevant to the proposed development;
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks;
- Site preparation including possible reuse of existing soil as controlled fill;
- Excavation conditions;
- The likely site classification;
- Suitable foundation systems including preliminary design parameters;
- Preliminary design parameters for the design of retaining structures and batter slopes;
- Depth to groundwater at time of investigation; and
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

5. FIELDWORK

Fieldwork was carried out in the presence of a representative from Galt between the 8 and 14 February 2024 and comprised:

Table 3: Summary of Field Data

Type	Results Appendix	Summary	GDR Clause	Equipment Used	No. Tests	Depth Range (m)
Site Plan	Figure 1	-	-	Hand held GPS[1]	-	-
Photographs	A	-	-	-	-	-
Cone Penetration Tests (CPTs)	B	Section 8	GDR3.2	14-tonne truck	5	1.6 to 10.1
Machine Auger Boreholes (BH)	C	Section 8	GDR3.3	AMS Power Probe	4	0.7 to 6.5
Monitoring Well (MW)	C	Section 8	GDR3.3	AMS Power Probe	1	6.0

NOTES: ***1.*** *Hand held GPS is accurate to ±5 m.*

6. LABORATORY TESTING

Laboratory test certificates are presented in Appendix D, and summarised in Attached Tables 1 and 2.

7. SITE CONDITIONS

7.1. Geology

Table 4: Summary of Geology Mapping

Map Sheet	Map Scale	Mapped Soils	Typical Site Findings
Perth	50K	Guildford Formation, described as: *"SANDY SILT - strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin."*	**Thin topsoil** (landscaped areas) **and pavement materials** (car parks / access ways) **over FILL: SAND / SAND** to about 0.4 m to 0.9 m depth, **over Sandy CLAY / CLAY**.

7.2. Groundwater

Table 5: Summary of Groundwater Levels

Item	Date	Depth Range (m)	Elevation Range (m AHD)	Comment
Perth Groundwater Atlas	1997	-	3.0	Historical maximum
Department of Water and Environmental Regulation (DWER) Flood Mapping	-	-	2.7 to 2.9 (DWER mapped 1% AEP flood event level)	Portion of site along southern and south western site boundaries, and the northern side of Grandstand road are mapped as being part of flood fringe by DWER. **Advice on development within the defined flood event (DFE) floodplain is provided by DWER on a case by case basis. DWER recommends a minimum building floor level of 0.50 metres above this level (RL 3.4 m AHD).**
Site observations in MW01	February 2024	3.03	-	Based on highest recorded water levels in monitoring well.
Site observations in CPT test probes	February 2024	1.90 to 2.80	-	CPT probes may not have had sufficient time to recharge to hydrostatic levels.
Recommended Design	-	-	2.7 to 2.9	Groundwater likely to perch on clay soils at site. Proposed development must be designed for DWER DFE flood event.

NOTES: ***1.*** *Depths for site observations based on the site surface level at the time of investigation.*

8. GROUND MODEL

The encountered subsurface conditions are summarised as comprising:

- **Surficial Topsoil (in landscaped areas)** up to 0.3 m thick **and Hardstand Fill Layers** (in carparks and access ways); **overlying**
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Geotechnical design parameters for the generalised subsurface units described above are presented in Table 6.

Table 6: Geotechnical Model Units and Design Parameters

Unit Name	γ_{bulk} (kN/m^3)	ϕ' (°)	c' (kPa)	S_u (kPa)	E_v (MPa)	ν	k_0	Wall Friction=0		Wall Friction=0.5ϕ	
								k_a	k_p	k_a	k_p
Compacted Approved FILL	18	36	-	-	50	0.25	0.41	0.26	3.85	0.22	6.54
SAND / Silty SAND / Clayey SAND	18	35	-	-	25	0.3	0.43	0.27	3.69	0.24	6.08
Sandy CLAY / CLAY	18	21	0 to 5	150	30	0.45	Earth pressure coefficients can be calculated for undrained or drained conditions as outlined in GDR11.2.2 using Firm parameters (undrained) or Fines Content >35% & PI 40% (drained).				

NOTES:

1. *These units are a generalization of results from individual tests, which should be referred to for more information.*
2. *Conditions at CPT locations below depth of soil sample recovery are inferred (refer to clause GDR3.2)*
3. *Surficial topsoil and hardstand layers are not included as discrete units.*
4. *Compacted approved fill is as described in Table 7.*
5. *For all earth pressure coefficients (retaining wall design) refer to clause GDR11.2 for more detail and interpretation. Unit weights for retaining structure design should be as per GDR11.2 or 1 kN/m^3 greater than the values in the table above.*

γ_{bulk} – bulk unit weight
ϕ' – effective friction angle
S_u – undrained shear strength
c'– effective cohesion
E_v – vertical elastic modulus
ν – Poisson's Ratio
k_a – coefficient of active earth pressure (Coulomb – AS4678-2002, Appendix E)
k_p – coefficient of passive earth pressure (Coulomb – AS4678-2002, Appendix E)
k_0 – coefficient of at-rest earth pressure (Jaky)

9. GEOTECHNICAL ASSESSMENT

9.1. Summary

Table 7: Summary of Geotechnical Assessment

Type	Clause	Parameter	Comment
Site Suitability	-	-	We consider the site to be geotechnically suitable for the proposed subdivision development. Standard site preparation measures will apply. However, groundwater could impact construction if it occurs during winter. Flood levels will impact site levels (refer Table 5).
Construction Methodology and Suitability	-	-	Shallow footings in accordance with AS2870-2011 will be suitable for this site. Mass retaining will be suitable for retaining however, must be designed for potential flooding of the site. Stormwater disposal via infiltration is **not** suitable.
Site Classification (AS2870)	GDR5	S	Where **no less than 0.7 m of sand** (including insitu silty sand and clayey sand layers encountered in BH03 and BH04) is present **over in situ CLAY / Sandy CLAY.**
Site Subsoil Class (AS1170.4)	-	Ce	Base of superficial formation mapped to be about 25 m below ground.
Site Preparation	GDR6	-	**GDR6.2.1 Common Measures** followed by **GDR6.2.4 Clayey Sites** followed by **GDR6.2.5 Sand Topping Layer.**
Approved Fill	GDR8	-	**Approved Fill** for this site is to comprise **Permeable Sand**. Only relatively thin surficial layers of sand at the site (excluding topsoil) are suitable as approved fill. If additional fill is required, imported **Permeable Sand** will be needed. Although not classed as 'approved fill', where clay is encountered in trench excavations, this material could possibly be reused to backfill the same portion of the trench (excluding any special fill materials required around buried elements). However, this material will be difficult to work and moisture condition to near optimum (particularly if removed from below the groundwater table).
Compaction Control	GDR7	-	A PSP may be used for compaction control on **Permeable Sand.** Deemed to comply values for 'Tamala' sand in GDR7.4 are applicable. Where filling with clay is done (in trenches, etc), compaction control must be done with the NDG as outlined in GDR7.3 Nuclear Density Gauge.
Shallow Footings	GDR9	q_{all} = 100 kPa to 250 kPa	Design tables for shallow footings are presented in Section 9.2. Estimated settlements are not considered excessive. 70% of the settlement is expected to occur during construction.
Earth Pressure Coefficients	GDR11	Table 6	Earth pressure coefficients are presented in Table 6.
Unsaturated Hydraulic Conductivity	GDR13	-	On site disposal of stormwater unlikely to be suitable due to shallow depth to clay and potential for flooding adjacent the site. Off site disposal of stormwater likely to be required.
Pavement Subgrade CBR	GDR16	CBR = 10%	Subgrade to comprise compacted **Approved Fill no less than 0.6 m thick.**
Soil Aggressivity	GDR17	-	Refer Section 9.3
Batters	GDR12	**Temporary:** Sand: 1V:2H Clay: 1V:1H **Permanent:** 1V:3H	Batter angles apply to soil units (refer Table 6) above the water table, as per GDR12.3. Dewatering and possibly retention (i.e. shoring) required below the groundwater table.
Excavations	GDR12.1	20 Ton Excavator	Potential for obstructions (buried concrete, Soakwells etc…), cemented soils and surficial pavement layers must be considered when selecting earthmoving plant.

NOTES:
1. q_{all} – allowable bearing pressure (maximum for all footings, refer to footing tables for further details)

9.2. Shallow Footings

Table 8: Isolated Pad Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	120	< 5
0.5	1.0	130	< 5
1.0	1.0	240	5 - 10
1.0	2.0	250	10 - 15
1.0	3.0	250	20 - 25

NOTES:
1. d_e – minimum embedment depth (below finished ground level or floor slab)
2. b – Footing breadth (footings assumed approximately square)
3. q_{all} – allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.
4. s – estimated settlement (excludes shrink/swell from site class)
5. Refer to GDR9
6. Groundwater assumed to be at ground level.

Table 9: Isolated Strip Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	100	< 5
0.5	1.0	130	5 - 10
1.0	1.0	190	10 - 15
1.0	2.0	250	20 - 25

NOTES:
1. d_e – minimum embedment depth (below finished ground level or floor slab)
2. b – Footing breadth (footings assumed long relative to breadth)
3. q_{all} – allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.
4. s – estimated settlement (excludes shrink/swell from site class)
5. Refer to GDR9
6. Groundwater assumed to be at ground level.

9.3. Soil Aggressivity

Results of aggressivity testing on clay samples is summarised in Attached Table 2. The results indicate the clay is 'non aggressive' to concrete and steel (in accordance with AS2159-2009) with a AS3600-2009 classification of 'A1'.

Based on regional experience, we anticipate the sand will have the same aggressivity classifications as the underlying clay where above the groundwater. However, for concrete in sand below the water table, an AS2159-2009 'mild' classification, and AS3600-2009 'A2' classification is appropriate.

Groundwater was not tested.

10. CLOSURE

GALT GEOTECHNICS PTY LTD





Owen Woodland CPEng
Geotechnical Engineer

Tyrone Mardesic CPEng
Geotechnical Engineer

https://galtgeo.sharepoint.com/sites/wag230750/shared documents/01 tabec si/03 correspondence/wag230750-01 002 r rev0.docx

Attached Table 1: Summary of Geotechnical Index Test Results

Test Name	Sample Depth (m)	Soil Class (AS1726 2017)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PI (%)	LS (%)
BH03	1.5 - 2.2	CLAY (CI)	89	11	0	46	28	12.5
BH04	1.0 - 1.3	Sandy CLAY (CI)	54	43	3	34	20	8.5

Notes

1. *Particle size distribution (by mass)*
   Gravel: 2.36 mm – 63 mm *Sand: 0.075 mm – 2.36 mm* *Fines: <0.075 mm*
2. *Atterberg Limits*
   LL: Liquid limit *PI: Plasticity index* *LS: Linear shrinkage*
   NO: Not obtainable *NP: Non-plastic*

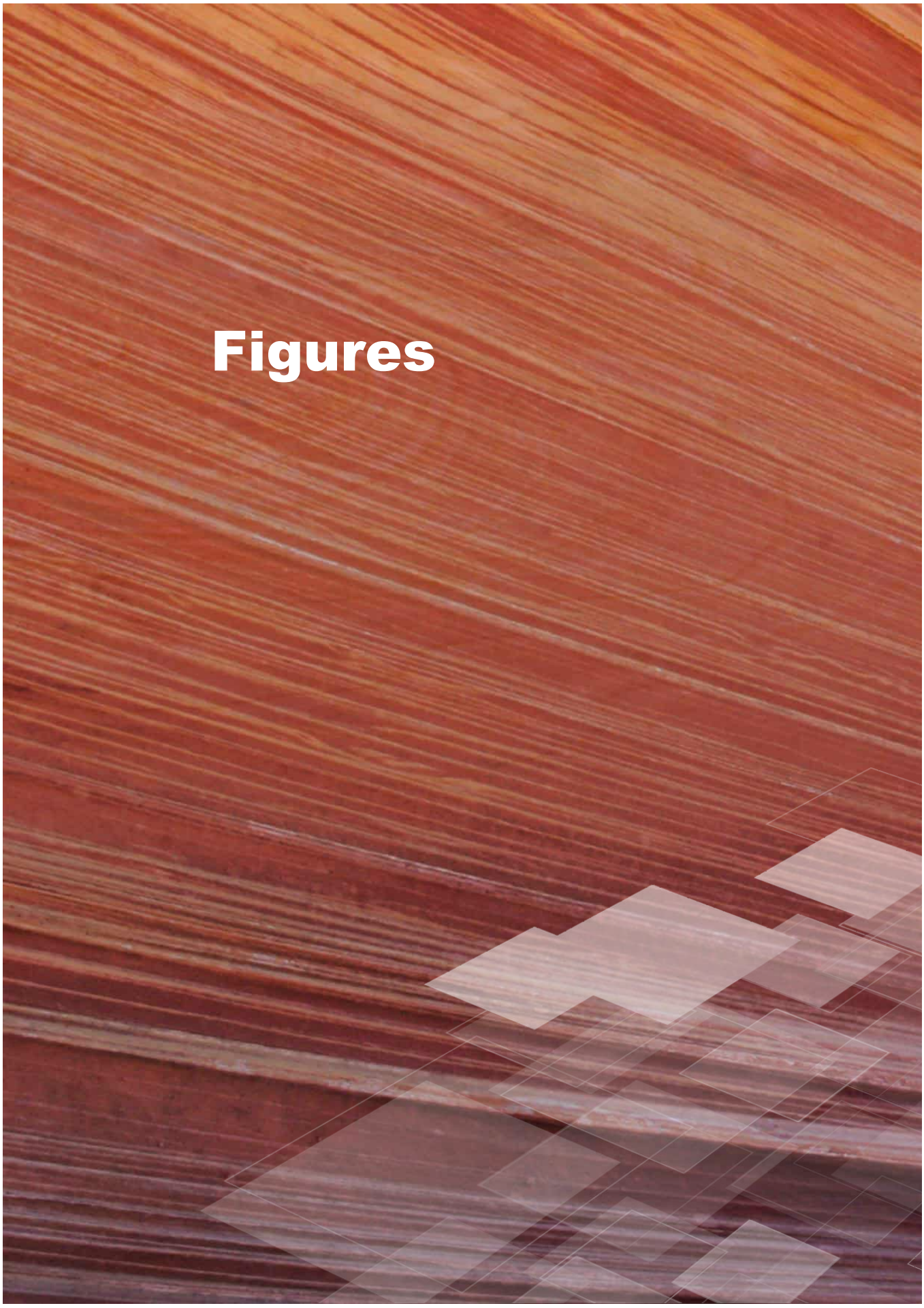
Attached Table 2: Summary of Chemical Test Results and Exposure Classification

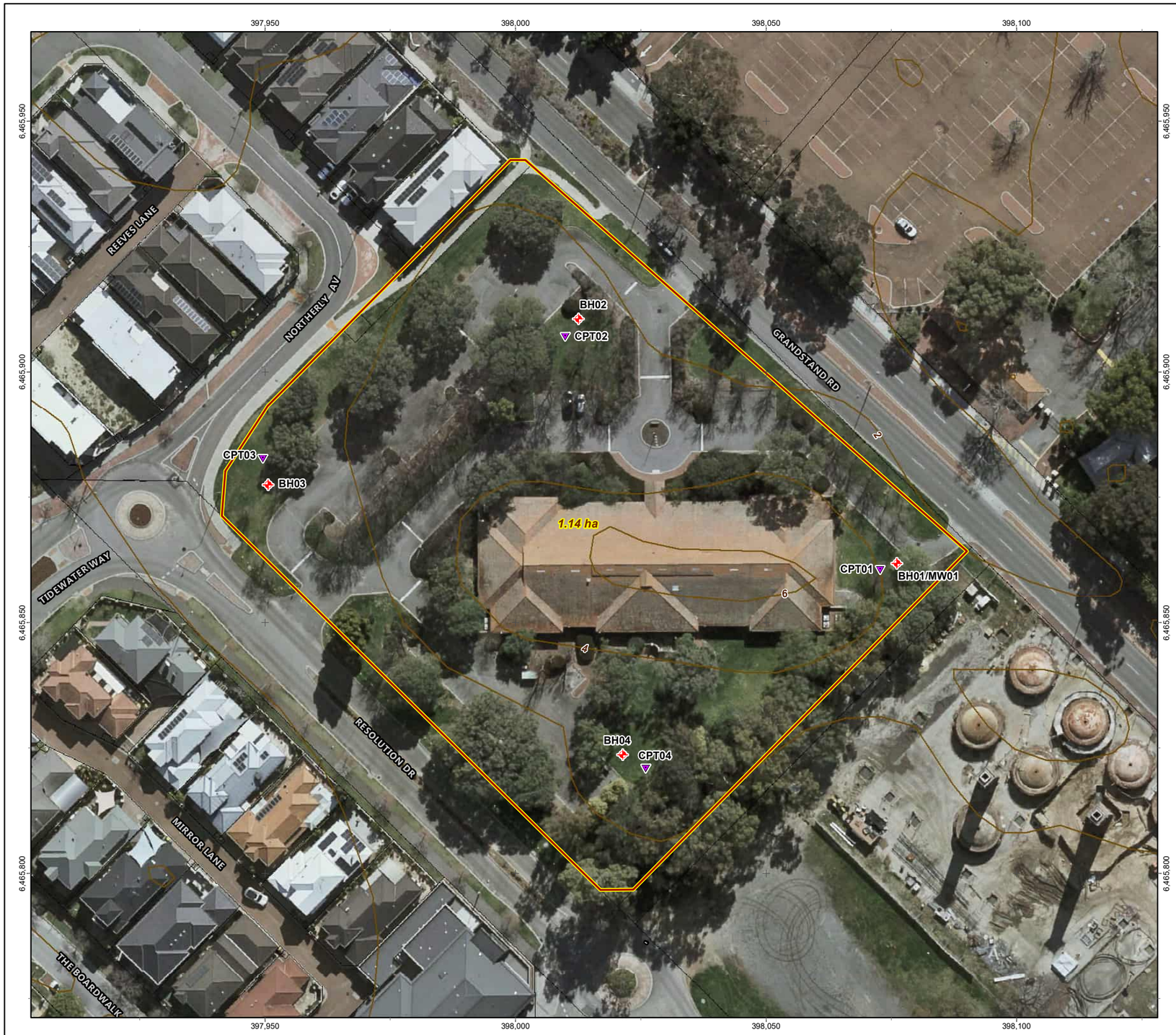
Location	Sample Depth (m)	Soil Description	Soil Condition	pH	SO_4 (ppm)	Cl (ppm)	AS2159 Steel EC	AS2159 Concrete EC	AS3600 Concrete EC
BH03	1.5 - 2.2	CLAY (CI)	B	8.8	100	210	Non-Aggressive	Non-Aggressive	A1
BH04	1.0 - 1.3	Sandy CLAY (CI)	B	7.5	170	94	Non-Aggressive	Non-Aggressive	A1

NOTES:

1. *Soil condition*
   A – high permeability soils (sands and gravels) which are below water table. *B – Low permeability soils (silts and clays) and all soils above water table*
2. *Sulfate expressed as SO_4*
3. *Cl – Chloride*
4. *ER – Electrical Resistivity*
5. *EC – Exposure Classification*
5. *Exposure Classification for AS2159-2009 (for steel and concrete piles)*
   [Exposure Classification for AS3600-2009 (for buried concrete structures)]

Non-aggressive [A1]	*Mild [A2]*	*Moderate [B1]*	*Severe [B2]*	*Very Severe [C2]*


Figures





Legend

- Site Boundary
- Borehole
- Cone Penetration Test

N

0 10 20 30 40 50
Meters

NOTES
Aerial Imagery and Cadastre sourced from Landgate/SLIP



SCALE	1:750 (A3)
DRAWN	CED
DATE DRAWN	13/2/2024
CHECKED	_
DATE CHECKED	_
PROJECTION	GDA 1994 MGA Zone 50

Galt Geotechnics Pty Ltd
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Osborne Park WA 6017

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CLIENT	**TABEC CIVIL ENGINEERING CONSULTANTS**
PROJECT	PROPOSED DEVELOPMENT
LOCATION	LOT 452 RESOLUTION DRIVE ASCOT
TITLE	SITE & LOCATION PLAN
Job No	WAG230750-01
Fig No	FIGURE 1
Rev	A

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Appendices

Appendix A: Site Photographs

Photograph 1: Near CPT02 facing south



Photograph 2: Near CPT02 facing south west



Photograph 3: Site photo from near northern portion of site



Appendix C: Machine Borehole and Monitoring Well Logs

EXPLANATORY NOTES TO BE READ WITH BOREHOLE AND TEST PIT REPORTS

METHOD OF DRILLING OR EXCAVATION

AC	Air Core	E	Excavator	PQ3	PQ3 Core Barrel
AD/T	Auger Drilling with TC-Bit	EH	Excavator with Hammer	PT	Push Tube
AD/V	Auger Drilling with V-Bit	HA	Hand Auger	R	Ripper
AT	Air Track	HE	Hand Excavation	RR	Rock Roller
B	Bulldozer Blade	HQ3	HQ3 Core Barrel	SON	Sonic Rig
BH	Backhoe Bucket	N	Natural Exposure	SPT	Driven SPT
CT	Cable Tool	NMLC	NMLC Core Barrel	WB	Washbore
DT	Diatube	PP	Push Probe	X	Existing Excavation

SUPPORT

T	Timbering

PENETRATION EFFORT (RELATIVE TO THE EQUIPMENT USED)

VE	Very Easy	E	Easy	F	Firm
H	Hard	VH	Very Hard		

WATER

►	Water Inflow	▼	Water Level
◄	Water Loss (complete)		
◁	Water Loss (partial)		

SAMPLING AND TESTING

B	Bulk Disturbed Sample	P	Piston Sample
BLK	Block Sample	PBT	Plate Bearing Test
C	Core Sample	U	Undisturbed Push-in Sample
CBR	CBR Mould Sample		U50: 50 mm diameter
D	Small Disturbed Sample	SPT	Standard Penetration Test
ES	Environmental Soil Sample		Example: 3, 4, 5 N=9
EW	Environmental Water Sample		3,4,5: Blows per 150 mm
G	Gas Sample		N=9: Blows per 300 mm after
HP	Hand Penetrometer		150 mm seating interval
LB	Large Bulk Disturbed Sample	VS	Vane Shear; P = Peak
M	Mazier Type Sample		R = Remoulded (kPa)
MC	Moisture Content Sample	W	Water Sample

ROCK CORE RECOVERY

TCR = Total Core Recovery (%) $= \frac{CRL}{TCL} \times 100$

RQD = Rock Quality Designation (%) $= \frac{ALC>100}{TCL} \times 100$

TCL	Length of Core Run
CRL	Length of Core Recovered
ALC>100	Total Length of Axial Lengths of Core Greater than 100 mm Long

METHOD OF SOIL DESCRIPTION
BOREHOLE AND TEST PIT REPORTS

Galt GEOTECHNICS

GRAPHIC LOG & SOIL CLASSIFICATION SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

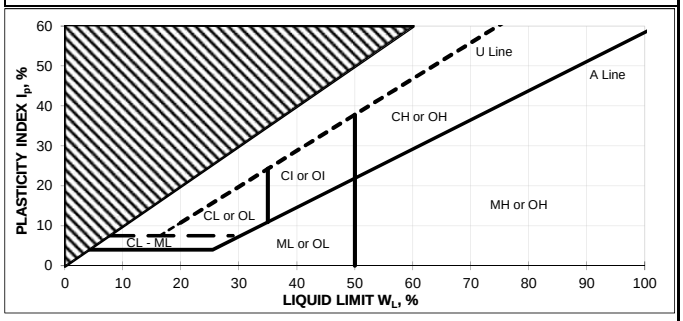
NOTE: Dual classification given for soils with a fines content between 5% and 12%.

SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).
NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name		**Particle Size (mm)**
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002

PLASTICITY - MODIFIED CASAGRANDE CHART - AS1726-2017



RESISTANCE TO EXCAVATION		
Symbol	**Term**	**Description**
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	**Term**
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	**Description**
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	**Term**	**Undrained Shear Strength (kPa)**
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	**Organic Content % of dry mass**
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	**Term**	**Density Index (%)**
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85

Galt

REPORT OF BOREHOLE: BH01/MW01

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

General comments: Monitoring Well Installed at this location

Drilling Method	Depth (m)	Water	Classification Code	Soil Origin	Graphic Log	Consistency/Density	Moisture	Material Description	Structural and Additional Observations	Well Diagram
90mm Solid Auger	0.3		SP	Natural			D	Natural SAND: dark brown and black, fine to coarse grained, with low plasticity clay, (trace organics present in upper 200mm).	(trace organics present in upper 200mm)	Backfill (Drill Spoil)
	0.45		SP	Natural		MD-D		Natural SAND: pale yellow, fine to coarse grained, trace low plasticity clay.		50mm PVC Solid; Bentonite (Sealed above Slotted PVC)
	0.9		SP	Natural				Natural SAND: dark brown and black, fine to coarse grained, trace low plasticity clay.		
	1		Cl	Natural		VSt-H		Natural Sandy CLAY: medium plasticity, brown and pale orange, fine grained sand, inorganic, clay is highly desiccated.	Clay is highly desiccated	
	2									
	2.3		SC	Natural				Natural Clayey SAND: low plasticity clay, brown and dark brown, fine to coarse grained, trace fine to medium sized gravel.		Filter Pack (Gravel Filter Medium installed)
	2.5		Cl	Natural		VSt-H		Natural CLAY: medium plasticity, brown and pale orange, trace fine to medium grained sand, inorganic, clay is desiccated at shallower depths.	Clay is desiccated at shallower depths	
	3	▼								
	4									50mm PVC Slotted
	5									
	6							**BH01/MW01 Terminated at 6m (Target Depth GW @3.03m)**		
	7									
	8									



Galt

REPORT OF BOREHOLE: BH02

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger				Natura		SP	Natural SAND: dark grey and black, fine to coarse grained, trace low plasticity clay, (trace organics present in upper 200mm).	M-D	MD-D		
			1				**BH02 refusal at 0.7m (Refusal on Desiccated Clay Groundwater not encountered)**				
			2								
			3								
			4								
			5								
			6								
			7								
			8								

Page 1 of 1

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REPORT OF BOREHOLE: BH03

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.1	Topsoil		SP	Topsoil SAND: dark grey, fine to medium grained, trace medium plasticity clay, with roots / organics.	D			
			0.25	Fill		SP	Fill SAND: brown, medium dense to dense, fine to medium grained, trace low plasticity clay.		MD-D		
			0.4	Fill		GP	Fill Sandy GRAVEL: grey, medium dense to dense, fine to medium sized, fine to medium grained sand, trace low to medium plasticity clay.				
				Natural		SM	Natural Silty SAND: grey brown, fine to medium grained.				
			0.7	Natural		CI	Natural CLAY: medium plasticity, grey, with fine to medium grained sand, inorganic, trace organics, clay is desiccated at shallow depths.		VSt-H		
			1								
			1.5	Natural		CI	As above, brown, trace organics.				
			2								
			3								
			4	Natural		CI	As above.	M			
			5								
			6				**BH03 Terminated at 6m (Target depth. Groundwater not encountered)**				
			7								
			8								



Page 1 of 1

Galt

REPORT OF BOREHOLE: BH04

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.25	Topsoil		SP	Topsoil SAND: grey, fine to medium grained, trace medium plasticity clay, trace / with organics.	D			
			0.5	Fill		SP	Fill SAND: brown, fine to medium grained, trace low plasticity clay.				
			1	Natural		SC	Natural Clayey SAND: medium plasticity clay, brown, fine to medium grained.				
			1.2	Natural		Cl	Natural Sandy CLAY: medium plasticity, brown mottled red, fine to medium grained sand, trace fine to medium sized gravel, inorganic, clay is desiccated.		VSt-H		
			1.5	Natural		Cl	Natural CLAY: medium plasticity, brown, with fine to medium grained sand, inorganic, clay is desiccated at shallow depths.				
			3	Natural		Cl	As above.	M			
			4.5	Natural		Cl	As above.	W			
							BH04 Terminated at 6.5m (Target depth. Groundwater possibly at 4.5 m depth)				

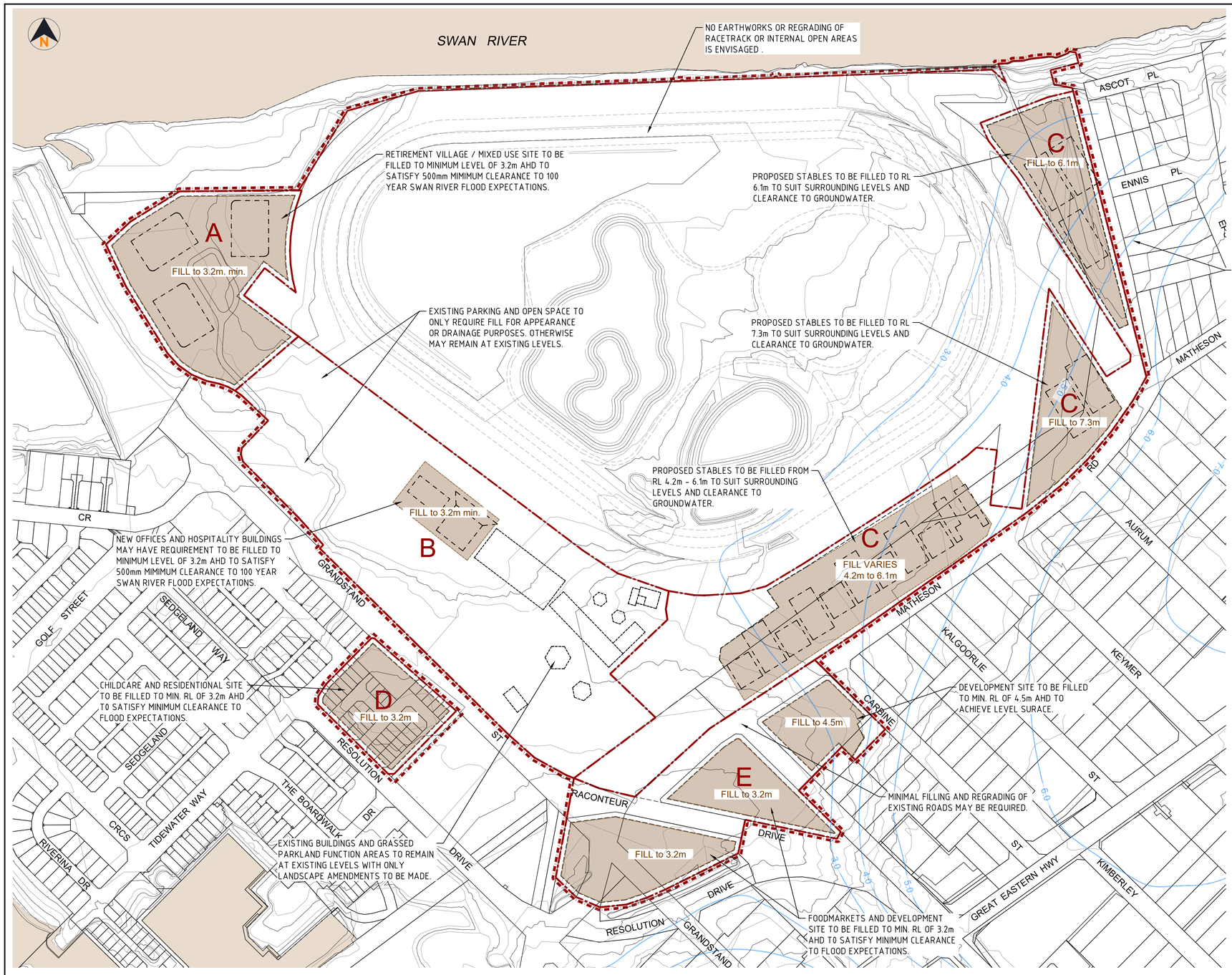


Page 1 of 1

Appendix C

Preliminary Civil Drawing

Tabec 2024



No.	DATE	DRAWN	APPROVED	AMENDMENT
C	21.06.24	PK	JZ	MINIMUM FILL LEVELS AMENDED IN LINE WITH THE LWMS
B	18.06.24	PK	JZ	PRELIMINARY ISSUE FOR INFORMATION ONLY
A	24.01.24	PK	JZ	PRELIMINARY ISSUE FOR REVIEW

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COLOUR
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CLIENT: PERTH RACING

DESIGNED	CHECKED	APPROVED
PK	JZ	
DRAWN	CHECKED	DATE
PK	JZ	

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PROJECT: ASCOT RACECOURSE - LOCAL STRUCTURE PLAN

TITLE: EARTHWORKS CONCEPT PLAN

DRAWING NUMBER: 2541-00-100

ISSUE: C

Plotted By: jkeenan Plot Date: 21/06/24 - 14:47 Cad File: C:\JOBS\Active\TB-JOBS\2541 - Ascot Racecourse LSP_JOY\CAD\CAD\2541-100\2541-100.dwg

Appendix D

Modelling Assumption Report



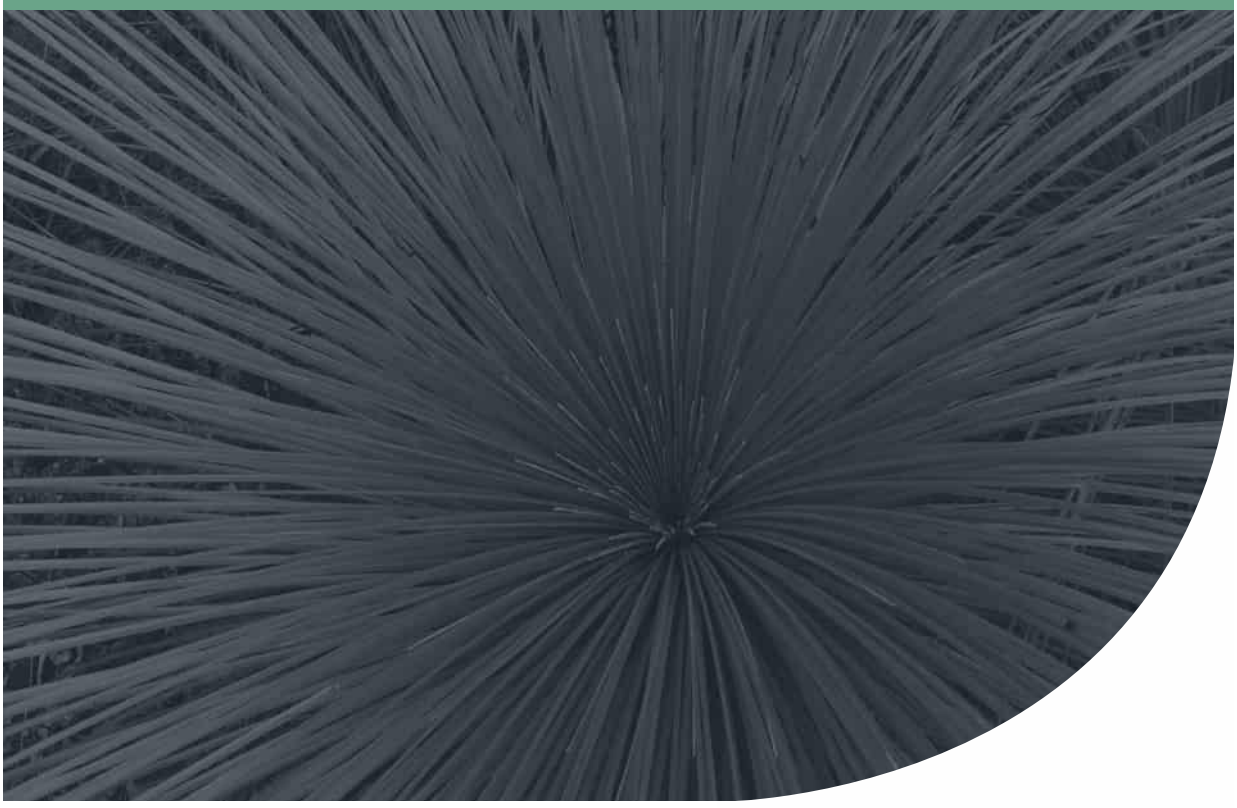
Emerge Associates 2024

Modelling Assumptions Report

Golden Gateway Local Structure Plan

Project No: EP23-109(03)

Prepared for Perth Racing
May 2024



Document Control

Doc name:	Modelling Assumptions Report Golden Gateway Local Structure Plan				
Doc no.:	EP23-109(03)--008 JM				
Version	Date	Author		Reviewer	
1	May 2024	Joyti Mabruk	JM	David Coremans	DPC
	Appendix to the LWMS				

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1 Background

Perth Racing (the 'proponent') proposed to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the Ascot Racecourse area. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse.

2 Methodology

XPSWMM hydrologic and hydraulic modelling software (v21.3) was used to calculate the surface water runoff volumes within the road reserves and lots associated with the development of Ascot Racecourse.

The hydrologic component of the software uses the Laurenson non-linear runoff-routing method to simulate runoff from design storm events. Key assumptions regarding the hydrologic model include:

- Runoff is proportional to slope, area, infiltration and percentage of imperviousness of a catchment.
- Sub-catchment areas and slopes are determined from surveyed topographical data and earthworks plans.
- Infiltration rates and percentage imperviousness have been selected based on experience with model preparation for similar soil conditions.

Runoff from each sub-catchment is routed through the catchment using the hydraulic component of XPSWMM. Generally, assumptions associated with the hydraulic component of the model include:

- Virtual links (i.e. purely for model construction, not equivalent to flow path onsite) between nodes within a sub-catchment are given the length of 10 m and slope of 0.05 to minimise the lag time of conveying the water from a sub-catchment node to a 'storage' node, a 'dummy intermediate' node or a conduit/link.
- Links between sub-catchment storages act as conveyance channels (e.g. sheet flow within roads in a 1% annual exceedance probability (AEP)). These links are given lengths and slopes that are representative of the site conditions and actual pathway lengths between catchments.
- All channels are designed with a width of 5 m, roughness of 0.014 (Manning's n) and are trapezoidal in shape. This allows for easy conveyance and represents concrete pipes and road surfaces within the model.
- Where relevant median swales, bio-retention areas (BRAs), and flood storage areas (FSAs) are modelled as nodal-reservoirs with infiltration depth-rating curves to account for differential infiltration rates with changing depth.

2.1 Rainfall

The ensemble temporal patterns obtained from the Australian Rainfall and Runoff (AR&R) Data Hub (AR&R 2019) were used for the rainfall analysis.

Durations ranging between 15 min and 72 hours were tested, with the peak flood elevation being assessed as the determining result.

Following the process suggested by AR&R (Ball J et al. 2019), the highest mean duration was selected as the critical duration. AR&R also recommends that when it is not practical to run the entire ensemble array, the ensemble that produces the result closest to the mean (for the critical duration) should be adopted and provided in **Table 1**.

Table 1: Critical Duration Analysis

Catchment	Critical Duration (20% AEP)	Critical Duration (10% AEP)	Critical Duration (1% AEP)
Precinct A	3 hour duration ensemble 4	3 hour duration ensemble 1	3 hour duration ensemble 1
Precinct C	30 min duration ensemble 6	30 min duration ensemble 7	30 min duration ensemble 8
Precinct D	1 hour duration ensemble 1	30 min duration ensemble 5	30 min duration ensemble 1
Precinct E	45 min duration ensemble 6	30 min duration ensemble 5	30 min duration ensemble 8

3 Pre-development model

The catchment parameters determined for Precinct D within the LWMS for the initial loss – continuous loss model have been adopted to account for catchment losses. The pre-development loss parameters used are given in **Table 2**.

Table 2: Pre-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Existing residential/Carpark	15	0.1	0.014

Catchment analysis for pre-development scenario was based on topographic contour data, site visit and aerial photography. Pre-development catchment area within Precinct D is 1.145 ha.

4 Post-development model

An initial loss continuing loss model was adopted to account for post-development catchment losses. The post-development catchment area, land types and loss values were based on the structure plan design, typical infiltration rates for the soils which occur onsite and based on project team experience. Post-development catchment areas and land types within the site were informed by sub-division plan provided by LPD surveyors. **Table 3** summarises the loss parameters used within the post-development model.

Table 3: Post-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Road Surface	1	0.1	0.02
Road Verge	9	1.5	0.05
Fully Impervious	1	0.1	0.02
Roof	1	0.1	0.02
Lot IMP	1	0.1	0.02
Gardens	25	2	0.05
POS	25	2	0.05
Precinct E Lots	15	0.1	0.014

A summary of post-development catchment information is provided in **Table 4** with the catchment plan and basin location shown in Figure 08 of the LWMS.

Table 4: Post-development catchment areas (ha)

Road reserve	Lots	Road Reserve	POS	Fully Impermeable	Child Care
Precinct A	0.714	0.606	1.360	0.330	-
Precinct C	-	5.903	-	-	-
Precinct D	0.526	0.421	-	-	0.199
Precinct E	3.622	0.365	0.219	-	-

The following assumptions were incorporated into the model:

- Precinct A
  - Lots will have 100% roof areas and road reserve contains 5% pervious verge and 95% impervious bitumen areas.
  - POS will be 100% pervious.
  - There is no current connection point for drainage to be exported from Precinct A.
  - 1 single basin/Flood storage area (FSA) for both treatment and flood mitigation.
  - Base of the FSA will need to be vegetated with reeds/rushes as per a biofilter.
  - FSA will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.

- A hydraulic conductivity of 1m/day is assumed.

- Precinct C
  - The existing portion of Precinct C already connected to the centre of the track (existing buildings and stables) and no change has been assumed.
  - Rest of the Precinct C were modelled as two separate catchments i.e., carpark and stables which are 95% impervious and 5% pervious.
  - 1m deep sub-surface storage has been designed to accommodate 1% AEP event.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.
  - The carpark in Precinct C that discharges to the southwest will discharge to Precinct E.

- Precinct D
  - Lots will have 50% roof areas, 45% paved areas and 5% pervious garden areas, the childcare has roof areas and Road reserve contains 20% pervious verge and 80% impervious bitumen areas.
  - 1m deep sub-surface storage has been designed to accommodate and detain upto 1% AEP events that will mimic pre-development flow of 0.4.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.

- Precinct E
  - The carpark in Precinct C discharges to Precinct E.
  - Outflow of pre-development Water Corporation (WC) drain is 0.95 m^3/s as per WC modelling.
  - All lots of Precinct E retain 15mm of rainfall.
  - Runoff above 15 mm rainfall up to the 1% AEP will be managed by a detention basin which will mimic pre-development 1% AEP peak flow of 0.463 m^3/s.
  - The basin will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.
  - A hydraulic conductivity of 1m/day is assumed.

5 References

5.1 General references

The references listed below have been considered as part of preparing this document.

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M and Testoni I (Editors) 2019, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geoscience Australia).

5.2 Online references

Australian Rainfall and Runoff (AR&R) 2021, ARR Data Hub, viewed 1 December 2021, Available from: <https://data.arr-software.org/>.

Bureau of Meteorology (BoM) 2021a, Climate Data Online, viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

Bureau of Meteorology (BoM) 2021b, Design Rainfall Data System (2016), viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

Appendix E

Central Belmont Main Drain Water Corporation

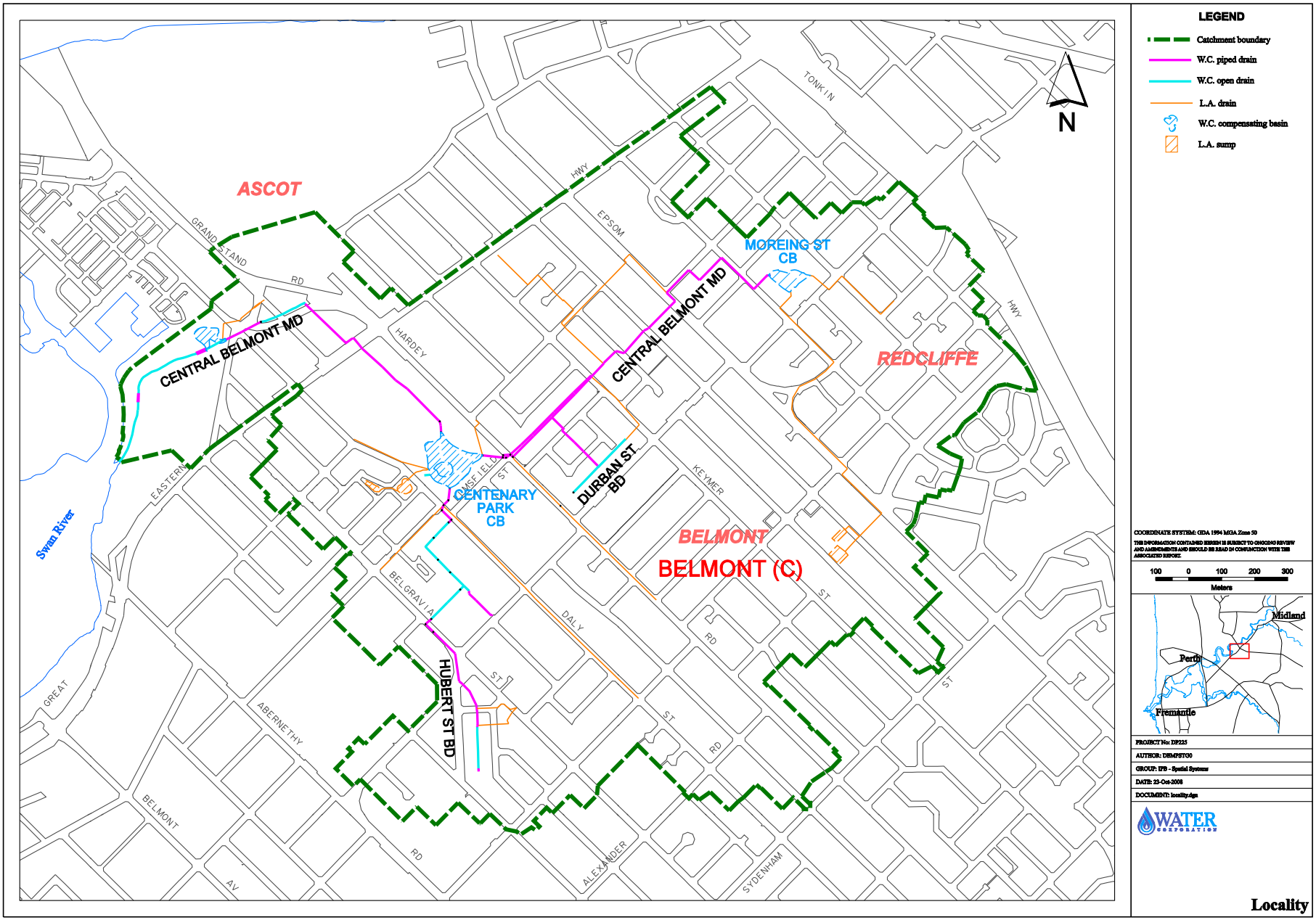
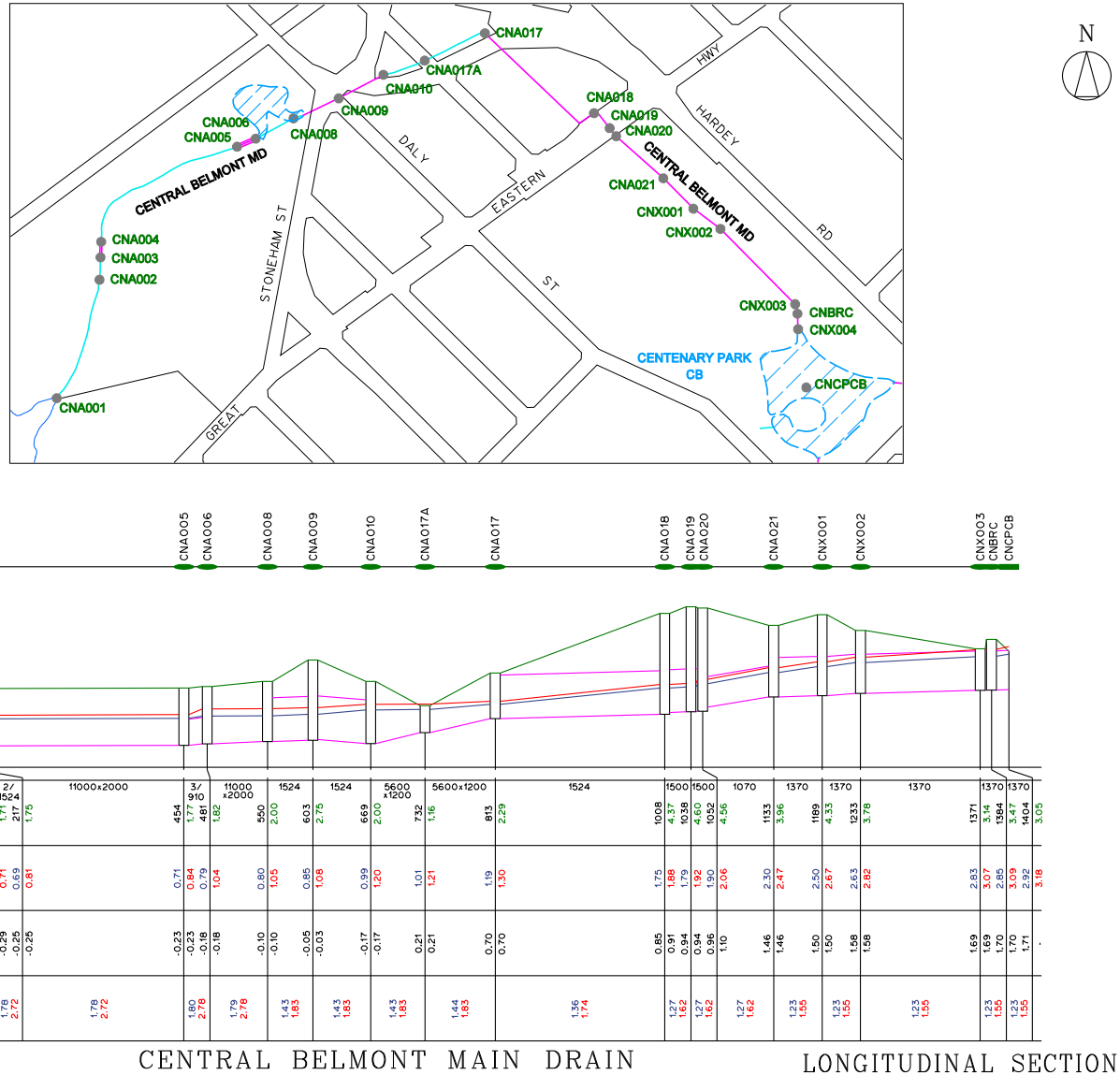

ASCOT
REDCLIFFE
BELMONT
BELMONT (C)
CENTRAL BELMONT MD
CENTRAL BELMONT MD
MOREING ST CB
CENTENARY PARK CB
DURBAN ST BD
HUBERT ST BD
Swan River
GRAND STAND RD
HARDEY
EPSOM
TONKIN HWY
HWY
EASTERN
KEYMER
BELGRAVIA
DALY
GREAT
ABERNETHY
BELMONT
RD
ALEXANDER
SYDENHAM
N
LEGEND
Catchment boundary
W.C. piped drain
W.C. open drain
L.A. drain
W.C. compensating basin
L.A. sump
COORDINATE SYSTEM: GDA 1994 MGA Zone 50
100 0 100 200 300
Meters
Midland
Perth
Fremantle
PROJECT No: DP225
AUTHOR: DEMPST00
GROUP: IPD - Spatial Systems
DATE: 23-Oct-2008
DOCUMENT: locality4gs
WATER CORPORATION
Locality

Figure 1.1

THE INFORMATION CONTAINED HEREIN IS SUBJECT TO ONGOING REVIEW AND AMENDMENTS AND SHOULD BE READ IN CONJUNCTION WITH THE ASSOCIATED REPORT.



CENTRAL BELMONT MAIN DRAIN LONGITUDINAL SECTION

Hgls and Flows Existing Scheme (1 of 2)

Figure C1.1

AUTHOR: DEMPSTER DESIGN FILE: Central Belmont MD.dgn

WATER CORPORATION

PROJECT N°: DP225 DATE: 05/01/2009 COORDINATE SYSTEM: MGA94 - Zone 50

ATTACHMENT 4

Retail Assessment (Net Benefit Test)

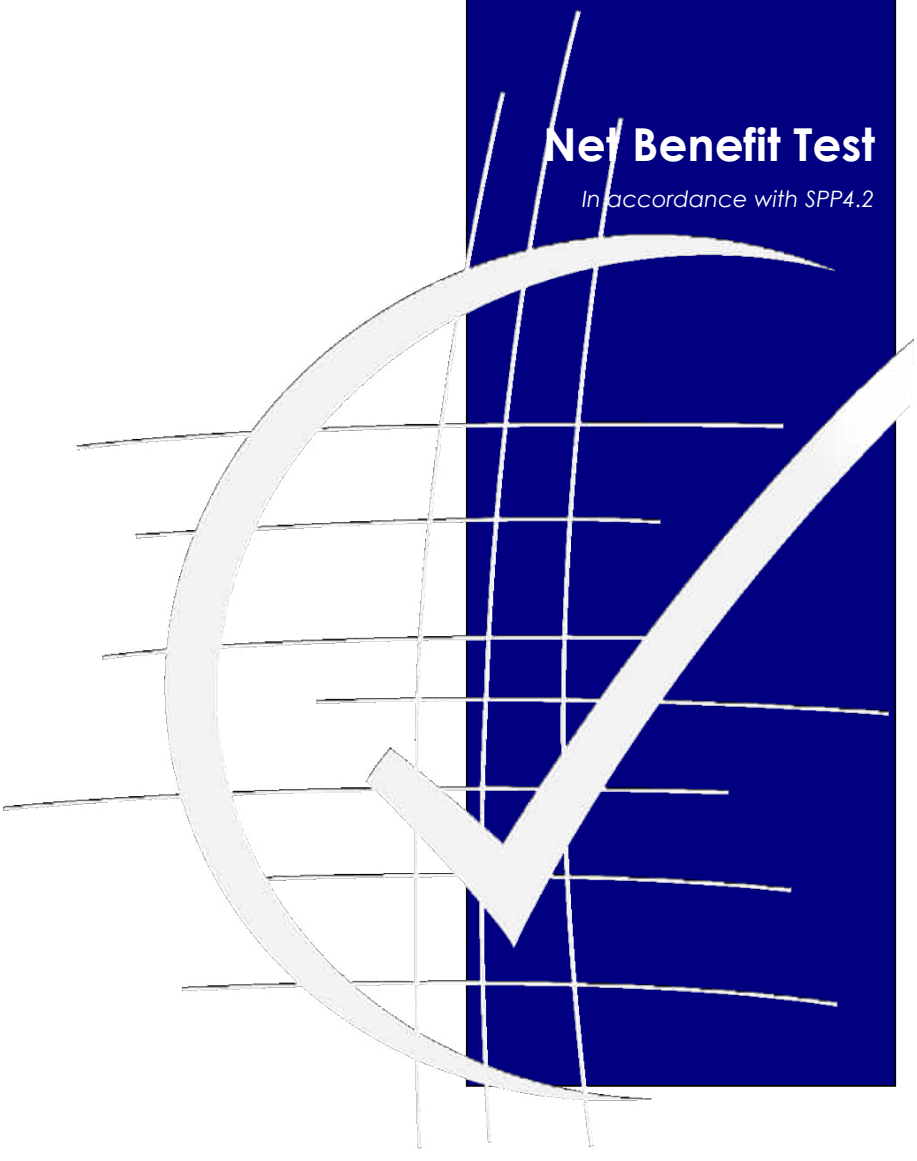
Taktics4

Proposed Activity

Ascot, City of Belmont

Net Benefit Test

In accordance with SPP4.2



Project

Project name	**Ascot Centre**
Project number	**2360**
Prepared for	**Perth Racing / Rowe Group**

Contact

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Version

Document Name	Date	Description	Prepared
2360-Ascot-NBT-T4-Draft-02	May 2024	Draft for Consideration	GRD
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2360-Ascot-NBT-T4-Final-01.docx	**Aug 2024**	**Draft for Consideration**	**GRD**

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Document Name	Date	Distribution	Format	Delivery
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Taktics4 acknowledges the First Nations people as the custodians of the land which is the subject of this assessment. Taktics4 recognise and respect their continuing culture, and Elders past, present, and emerging.

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1. EXECUTIVE SUMMARY

This assessment considers the net benefit of two proposed activity categories proposed in Ascot, in the City of Belmont. The assessment has been prepared in response to the policy requirements established by State Planning Policy 4.2. This Net Benefit Test assesses:

1. Proposed local centre of 3,400 sqm NLA (PLUC 5 – 'SHOP')
2. Proposed bulky goods precinct of 9,600 sqm (PLUC 6 – 'OTHER RETAIL')

Proposed Local Centre

The assessment reveals that the proposed local centre activity will generate a Net Benefit by:

- being sustainable from 2026 – satisfying an existing resident trade area and filling an existing demand/gap/need in the market
- having low – insignificant impacts on surrounding activity network – with any impacts likely to be offset by potential sales growth generated by additional resident population and spending over the next 15 years.
- creating up to 85 full time equivalent jobs,
- reducing the number of vehicle km required to be travelled by residents in the immediate trade area.

Residents in Ascot and Belmont:

- are the communities most likely to experience the benefit from the proposed activity.
- are estimated to account for 40% of total sales / trips at the proposed activity.
- do not currently have access to a full line supermarket-based centre within 2.5 km.
- travel up to 2.5 km each way (5 km round trip) every time they access their full line supermarket needs.

Proposed Bulky Goods

The assessment reveals that the proposed activity will generate a Net Benefit by:

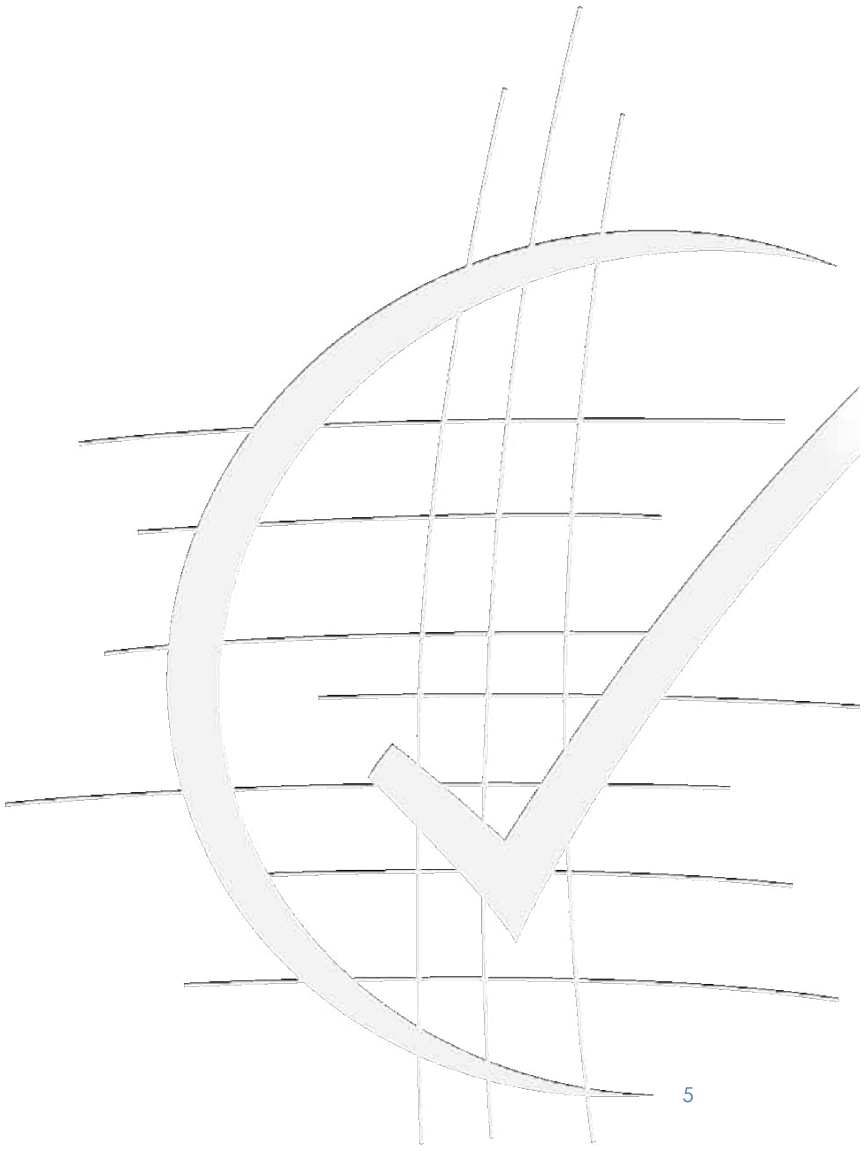
- complementing the existing offer in the vicinity
- being accessible through strong north south and east west connections.
- creating up to 120 jobs.
- having low/insignificant impacts on existing and planned activity precincts – which will subsequently be offset by planned population and retail spending growth in the trade area.

Net Benefit

Subsequently, the proposed activity:

- will not impact the integrity of the surrounding activity centre network – and as such will not have any negative impact on existing or planned public or private investment in the trade area.
- will reduce the amount of trip kilometres that Ascot and Belmont residents must travel each year to satisfy their daily/weekly and bulky goods shopping needs.
- will save over 530,000 to 700,000 trips p.a. to centres outside their trade area
- will save between 40 and 50 trips per person per annum.

- will save between 2.7 M km p.a. and 3.5 M km p.a. of vehicular travel per annum
- is consistent with the objectives and outcomes of SPP 4.2.
- is aligned with local planning strategies.



2. INTRODUCTION

This assessment represents a 'Net Benefit Test' for two activity categories proposed in Ascot, City of Belmont. The Net Benefit Test has been prepared in response to the policy requirements established by State Planning Policy 4.2 – Activity Centres. The Net Benefit Test assesses:

1. a proposed local centre of 3,400 sqm NLA (PLUC 5 – 'SHOP')
2. a proposed bulky goods precinct of 9,600 sqm (PLUC 6 – 'OTHER RETAIL')

This assessment has been prepared in three distinct parts and should be read in conjunction with the proposed Local Structure Plan and Scheme Amendment documents.

Part 1	Relevant market variables appropriate to the assessment of both activity types	Activity Centre Network Trade Area Definition Population Retail Spending Profile Retail Spending capacity
Part 2	Proposed Local Centre (PLUC 5)	Market Demand/Need Impact Test Net Benefit Test
Part 3	Proposed Bulky Goods (PLUC 6)	Market Demand/Need Impact Test Net Benefit Test

2.1 Purpose

A net benefit occurs when the benefits (pros) to the community arising from a proposal outweigh any identified impacts (cons) to the community arising from a proposal. The Net Benefit Test assesses the potential impacts and benefits of a proposal to the community and on existing and planned activity centres and is expected to answer the following questions.

- Is there a demand for additional floorspace, and if so, how does the proposal meet this demand?
- How will the proposed development impact on the role of the activity centre?
- How will the proposal impact the viability and vibrancy of other activity centres in the hierarchy?
- Are any potential impacts reduced or mitigated over the longer term?
- What is the anticipated loss and/or gain of services to the community?
- What is the anticipated impact on access (distance, time, mode of travel) to services by the community?
- Will the proposal contribute to a net increase in employment?
- Does the proposal align with the objectives and outcomes of this policy and the planning framework?

A Net Benefit Test is to be prepared when:

- A proposal introduces floorspace in an existing or planned activity centre which exceeds the floorspace identified for that centre in a current 'Needs Assessment'.
- A proposal introduces new land or rezones land to facilitate major development or out-of-centre development.

2.2 Out-of-Centre Development

An Out of Centre Development is defined by SPP4.2 as a proposal which introduces:

- Category A or B activity centre (see table) uses outside of an existing or planned activity centre as identified by a Needs Assessment (regardless of land size).
- More than 500 sqm NLA of Category A uses outside an existing or planned activity centre as identified by a Needs Assessment.

Exemptions to Out of Centre Development includes:

- Development applications for Category B activity centre uses where the existing zoning contemplates (P, D, A) land uses.
- Development applications for Category A activity centre uses up to 1,500 sqm NLA where they are located substantially within the 400m walkable catchment of a rail station.

Out of Centre Development may only be appropriate where a proposal:

- is sufficiently separated from nearby activity centres to minimise negative impacts to those activity centres (as demonstrated through the Net Benefit Test).
- is in proximity to existing housing at an average dwelling density of at least 25 dwellings per gross Urban Zone (Region Schemes) hectare within a 400 m walkable catchment of the development; and
- accessible to its catchment community by walking and cycling, minimising the need for additional private vehicle trips.

2.3 Major Development

A major development is defined by SPP4.2 as a proposal which introduces additional Category A activity floor space which exceeds the threshold for the activity centre hierarchy in the table below.

FIGURE 1 - MAJOR DEVELOPMENT FLOORSPACE THRESHOLDS by CENTRE TYPE

Existing Activity Centre Hierarchy	**Additional Floor space threshold (sqm NLA)**
Strategic	10,000
Specialised	3,000
Secondary	10,000
District	5,000
Neighbourhood	3,000
Local	1,500
Proposed Activity Centre Hierarchy	any development in a proposed / planned centre is a major development regardless of floor space amount

2.4 Activity Centre Uses

Assessments are only required to be undertaken for the following activity types.

FIGURE 2 – PLANNING CATEGORY

Planning Land Use Code (PLUC)	Category A Activity Centre Uses	Category B Activity Centre Uses
5 – 'SHOP'	Shop Liquor Store - Large Fast Food Outlet Lunch Bar Restaurant & Café	Convenience store Liquor store - small Restricted premises Service station
6 – 'OTHER RETAIL'		Bulky goods showroom Motor vehicle, boat, or caravan sales

2.5 Scope and Methodology

The Net Benefit Test is to be based on:

- The contextual description of the proposal and location with supporting maps, identifying if out-of-centre, within-centre or new activity centre.
- The change in net lettable area (NLA) of the shop/ retail (PLUC 5 - SHP) and/or other retail (PLUC 6 - RET) floor space.
- The defined trade area (including primary trade area and any secondary and tertiary trade areas).
- The estimated existing and forecast population of the trade area.
- The trade area resident attributes and implications for floorspace need and spending estimates.
- The estimated existing and forecast expenditure of the trade area using latest ABS Household Expenditure Survey or other reliable source.
- The estimated average annual sales (aggregate and per sqm NLA) for the proposed development and/or activity centre pre-and post-development proposal.

2.6 Modelling Method

The retail model is designed to assess the likely propensity for a resident in a particular area to visit/spend at each centre in the network. Based on the proximity of the resident to each centre, the role and function of each centre, the size of the retail offer at each centre, relative to other centres. The sales potential for the proposed centre will be based on the extent to which it may capture retail sales from each trade area. The results of the retail modelling shows:

- The expected market share that each centre may expect to capture from each trade area.
- The retail sales that may therefore be expected to be captured by each centre in the network from the designated trade areas.
- The relative contribution of each trade area to the overall sales at each centre.

The model results are focused primarily on the centres which can be expected to generate most of their sales from within the modelled trade areas. Centres located on the fringe of, or outside the trade areas will only show that proportion of sales captured from the trade areas. Subsequently, centres on the fringe of, or outside will not show a true sales figure, but rather

that part of the sales captured solely from within the trade area modelled. The impact assessment typically focuses primarily on the existing and planned centres closest to the proposed centre.

2.7 Measuring Impact

The potential sales generated by the development of the proposed centre will be drawn from centres in the network that would have reasonably expected to capture those sales had the proposed centre not been developed. The impact of the proposal on existing and planned activity centres is defined as an estimate of the retail turnover for each relevant activity centre identified for the following scenarios:

- without the proposed activity centre and
- with the new activity centre(s) assumed to be developed (or expanded).
- The differences between the 'without' and 'with' scenario is the potential turnover impact for each activity centre.

Competition between businesses in and of itself is not considered a relevant planning consideration. The impact of a proposal on an activity centre is defined as the potential loss of services and any associated detriment to the community caused by the proposed development. The following impact percentage and risk level for retail turnover is provided as a general guide and should not be used as the only indicator of acceptability of a proposal.

FIGURE 3 - SPP4.2 IMPACT and RISK GUIDE

Impact Percentage	Potential Impact	Risk Level	Description
0-5%	Insignificant	Low	Any impacts are likely to be temporary and have no long-term effects on the viability of individual activity centres.
5-10%	Moderate	Medium	Impacts are likely to be more significant for individual centres, but overall network sustainability is unlikely to be undermined in the long term.
10% +	Significant	High	Impacts are likely to be very significant for individual centres and are likely to undermine the long-term network sustainability.

Where the short-term impact is initially high before falling to a medium or low level in the long term, consideration should be given to how the development can be staged or if there needs to be any additional short-term benefits to ensure that level of service is always maintained. However, the overall impact of the proposal may be lessened or offset by the potential growth in sales each activity centre may generate from the introduction of additional residents and spending in the trade area over time.

3. ACTIVITY CENTRE NETWORK

The existing and planned activity centres in the immediate network of a proposed activity centre represents a key determinant for assessing the demand for a proposed activity centre. The following activity centres are considered most likely to influence and be influenced by the proposed activity.

3.1 Strategic / Secondary Activity Centres

A Strategic Centre and two Secondary Centres are estimated to influence the potential demand and sustainability of the proposed activity.

Morley Strategic Centre

Designated / Classified	Strategic Centre	SPP4.2
Performs the role of a	Strategic Centre	
Location from proposed activity	4.5 km north	
Estimated current 'Shop' floor space (PLUC 5)	99,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, W, A, S, K, T	
Estimated current 'Other Retail' floor space (PLUC 6)	22,500 sqm NLA	(LUS 2015/17)
Development potential	Medium	

Belmont

Designated / Classified	Secondary Centre	SPP4.2
Performs the role of a	Secondary Centre	
Location from proposed activity	3.0 km south	
Estimated current 'Shop' floor space (PLUC 5)	63,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, W, A, K, BW	
Estimated current 'Other Retail' floor space (PLUC 6)	30,000 sqm NLA	(LUS 2015/17)
Development potential	Medium	

Victoria Park

Designated / Classified	Secondary Centre	SPP4.2
Performs the role of a	Neighbourhood	
Location from proposed activity	4.5 km southwest	
Estimated current 'Shop' floor space (PLUC 5)	22,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	W	
Estimated current 'Other Retail' floor space (PLUC 6)	25,000 sqm NLA	(LUS 2015/17)
Development potential	Low	

3.2 District Centres

Four district centres are estimated to influence the potential demand and sustainability of proposed the activity.

Inglewood

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Neighbourhood	
Location from proposed activity	4 km north	
Estimated current 'Shop' floor space (PLUC 5)	10,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, W, A	
Estimated current 'Other Retail' floor space (PLUC 6)	2,700 sqm NLA	(LUS 2015/17)
Development potential	Low	

Bayswater

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Local	
Location from proposed activity	2.5 km north	
Estimated current 'Shop' floor space (PLUC 5)	3,800 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Maylands

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Neighbourhood	
Location from proposed activity	3 km northwest	
Estimated current 'Shop' floor space (PLUC 5)	12,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, 2 x IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Ashfield

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Local	
Location from proposed activity	3 km northeast	
Estimated current 'Shop' floor space (PLUC 5)	750 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Medium	

3.3 Neighbourhood/Local

Four neighbourhood/local centres are estimated to influence the potential demand and sustainability of the proposed activity.

Rivervale

Designated / Classified	Neighbourhood Centre	
Performs the role of a	Local	
Location from proposed activity	2.5 km southwest	
Estimated current 'Shop' floor space (PLUC 5)	3,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Kooyong

Designated / Classified	Neighbourhood Centre	
Performs the role of a	Local	
Location from proposed activity	3 km southwest	
Estimated current 'Shop' floor space (PLUC 5)	2,250 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Belvidere

Designated / Classified	Neighbourhood Centre	
Performs the role of a	Local	
Location from proposed activity	1.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	6,200 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Epsom

Designated / Classified	Local Centre	
Performs the role of a	Local	
Location from proposed activity	1.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	6,200 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

3.4 Service Commercial Precincts / Other Centres

Airport

Designated / Classified	Specialised Centre	
Performs the role of a	Neighbourhood	
Location from proposed activity	2.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	5,000 sqm NLA	
Majors / Anchor Tenants	W	
Estimated current 'Other Retail' floor space (PLUC 6)	25,000 sqm NLA	
Development potential	High	

Great Eastern Highway

Designated / Classified	N/a	
Performs the role of a	Service Commercial	
Location from proposed activity	1.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	8,600 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	-	
Estimated current 'Other Retail' floor space (PLUC 6)	4,700 sqm NLA	(LUS 2015/17)
Development potential	Medium	

3.5 Summary

Analysis of the activity centre network reveals that:

- Residents in the trade area have access to approximately 70,500 sqm NLA of total convenience-based retail floor space.
- There are no full line supermarkets within 1.5 km of the proposed activity.
- There are only two full line supermarkets (Coles at Maylands and Woolworths at Airport) within 3km of the proposed activity.
- There are four small, limited line IGA supermarkets located between 1.5 km and 3 km of the proposed activity.
- The closest 'clusters' of multiple supermarket operators are located at Belmont (3 km) and Inglewood (4 km)

- There are three classified district activity centres north of the proposed activity (Maylands, Bayswater, Ashfield), yet none of these activity centres perform the role of a district centre and function more as neighbourhood or local centres due to their limited retail offer.
- Residents in the trade area have access to nearly 105,000 sqm NLA of bulky goods retail activity across six precincts.

FIGURE 4
EXISTING & PLANNED ACTIVITY CENTRES FRAMEWORK
By Centre Name, by Centre Type, by Floorspace /Year

Total Convenience		Estimated NLA Floorspace (sqm) by Year				
Centre Name	**Centre Type**	**2023**	**2026**	**2031**	**2036**	**2041**
Morley	Strategic	13,100	13,100	13,100	13,100	13,100
Belmont	Secondary	11,250	11,250	11,250	11,250	11,250
East Vic Park	District	5,400	5,400	5,400	5,400	5,400
Victoria Park	Secondary	3,750	3,750	3,750	3,750	3,750
Inglewood	District	8,750	8,750	8,750	8,750	8,750
Bassendean	District	4,400	4,400	4,400	4,400	4,400
Maylands	District	4,600	4,600	4,600	4,600	4,600
GEH (west)	Local	1,500	1,500	1,500	1,500	1,500
Airport	Special	4,400	4,400	4,400	4,400	4,400
Bayswater	District	500	500	500	500	500
Belvidere	Local	3,000	3,000	3,000	3,000	3,000
Rivervale (Kooyong)	Local	1,250	1,250	1,250	1,250	1,250
Ashfield	District	550	550	550	550	550
GEH (east)	District	6,900	6,900	6,900	6,900	6,900
Epsom	Local	1,200	1,200	1,200	1,200	1,200
All Existing and Planned Centres		**70,550**	**70,550**	**70,550**	**70,550**	**70,550**
Ascot		-	3,400	3,400	3,400	3,400
All Centres		**70,550**	**73,950**	**73,950**	**73,950**	**73,950**

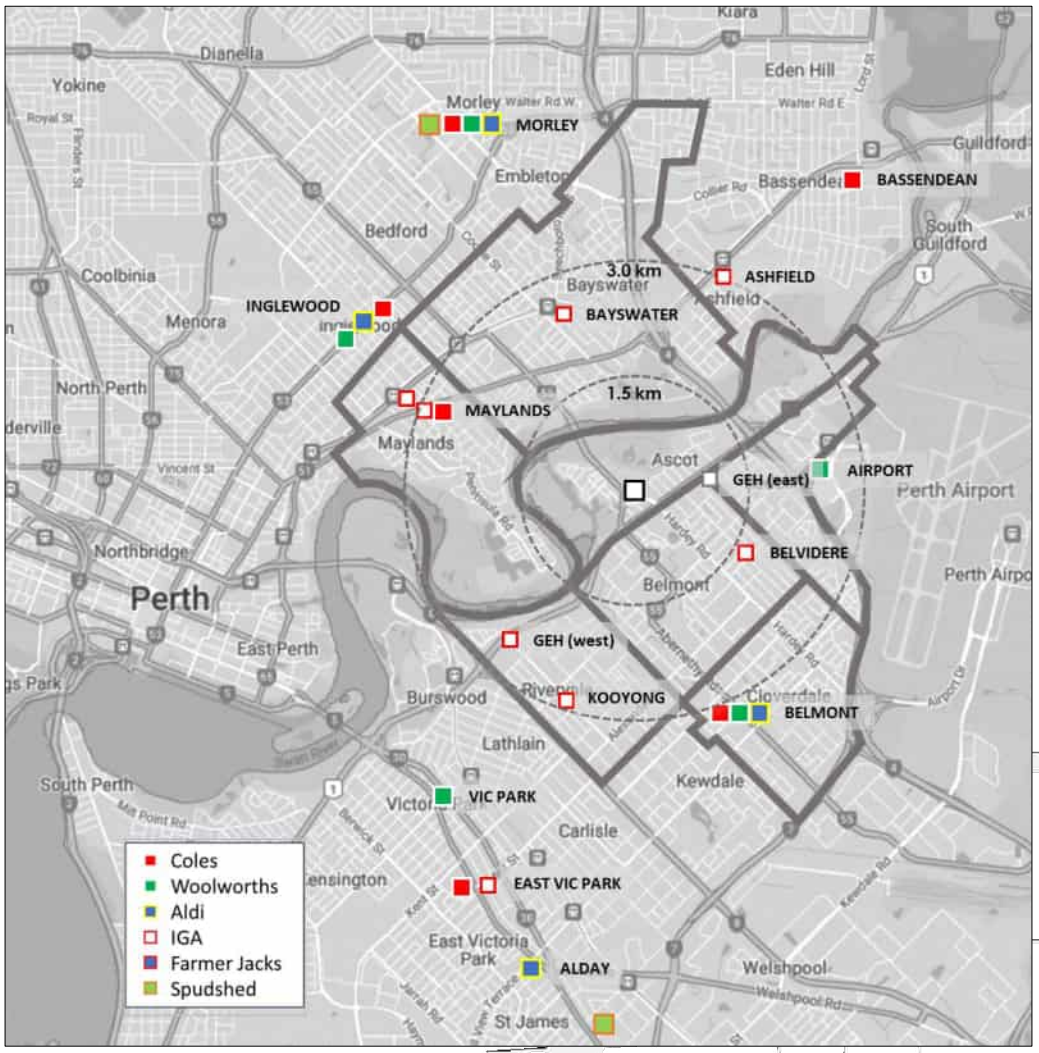
Land Use Employment Survey (WAPC 2015) / Taktics4

FIGURE 5
EXISTING & PLANNED ACTIVITY CENTRES FRAMEWORK
By Centre Name, by Centre Type, by Floorspace /Year

Bulky Goods/LFR		Estimated NLA Floorspace (sqm) by Year				
Centre Name	**Centre Type**	**2023**	**2026**	**2031**	**2036**	**2041**
Morley	Strategic	22,500	22,500	22,500	22,500	22,500
Belmont	Secondary	30,000	30,000	30,000	30,000	30,000
East Vic Park	District	0	0	0	0	0
Victoria Park	Secondary	25,000	25,000	25,000	25,000	25,000
Inglewood	District	2,700	2,700	2,700	2,700	2,700
Bassendean	District	0	0	0	0	0
Maylands	District	0	0	0	0	0
GEH (west)	Local	0	0	0	0	0
Airport	Special	20,000	20,000	20,000	20,000	20,000
Bayswater	District	0	0	0	0	0
Belvidere	Local	0	0	0	0	0
Rivervale (Kooyong)	Local	0	0	0	0	0
Ashfield	District	0	0	0	0	0
Eastgate/GE Hwy	District	4,700	4,700	4,700	4,700	4,700
Epsom	District	0	0	0	0	0
All Existing and Planned Centres		**104,900**	**104,900**	**104,900**	**104,900**	**104,900**
Ascot			9,600	9,600	9,600	9,600
All Centres		**104,900**	**114,500**	**114,500**	**114,500**	**114,500**

Land Use Employment Survey (WAPC 2015) / Taktics4

FIGURE 6 - SUPERMARKET BASED ACTIVITY CENTRES



Taktics4

4. TRADE AREA

The trade area for retail activity is largely determined by a range of industry, market and consumer-based principles. Consumer dynamics vary significantly between different retail categories and is influenced by the frequency in which consumers require access to certain retail goods and services. Retailers, shopping centre developers, and urban planners acknowledge this variation in dynamics through the establishment of a clearly defined hierarchy of activity centres which reflect different shopping trips and expectations for consumers/residents.

4.1 Market Behaviour

Convenience retail

Convenience retail trips include visits to supermarkets, other food and grocery stores, newsagencies, and cafes/takeaway stores. These trips are typically daily or weekly trips and are generally made to activity centres closest to the resident/consumer. Activity centres serving this category are typically anchored by a supermarket, or small grocery store and classified as Neighbourhood and/or Local Centres.

Comparative retail

Comparative retail trips include visits to department stores, discount department stores, fashion, and household goods stores. These are typically less frequent trips than convenience-based trips and consumers are more likely to target specific items, brands, products, and prices on these trips. They are therefore more likely to travel further to access these goods and services. Centres serving this category are typically anchored by a Department Store or DDS and classified as Strategic, Secondary, or District Centres. These centres invariably also serve a convenience-based role.

Large Format/Bulky Goods

Homewares, furnishing, and recreation goods are more likely to reflect infrequent trips for targeted goods/purchases. Consumers are prepared to travel further for these goods and services. These centres are less likely to include a convenience-based role beyond access to cafes/takeaway facilities as part of the shopping experience.

Behaviour Philosophy

The fundamental retail consumer principles adopted by modelling techniques in this assessment are that residents are generally:

- Less likely to travel beyond the nearest Strategic Centre and or Secondary Centre to visit another centre with the same role/function/offer.
- Less likely to travel beyond the nearest District Centre to visit another District Centre with the same role/function/offer.
- Just as likely to travel beyond one supermarket-based neighbourhood centre to visit another supermarket-based centre with another operator (i.e., to shop at a Coles instead of a Woolworths or vice versa).
- Less likely to travel beyond the nearest local centre to visit another local centre with the same role/function/offer (i.e., to drive past one IGA to shop at another IGA).

That is not to say that residents will not visit other centres, but that they will not visit these centres frequently enough to establish a pattern of behaviour.

4.2 Delineation of Trade Area

The trade area for proposed activity represents the area likely to generate most of the sales for a proposed activity centre. A trade area can be defined by applying these market behaviour principles, collating proximity of existing and planned urban areas with their accessibility to existing and planned centres, based on road networks, and physical barriers.

The trade area for the proposed activity may be delineated by residents in**:**

Ascot, Belmont	Mainly within 1.5 km of the proposed activity.
Redcliffe, Rivervale, Bayswater, Maylands, Cloverdale	All or partly within 1.5 km-3.0 km of the proposed activity.

This trade area comprises residents which are likely to generate most of the sales for the proposed activity. The trade area is divided north and south by the Swan River. However, the proposed activity is located on a road with access across the river, which therefore creates direct access to residents in the trade areas to the north and the south. The trade area incorporates residents across three Local Government Areas – City of Belmont, City of Bayswater, and Town of Victoria Park.

4.3 Population

The existing and forecast resident population in the trade area represents the first variable for determining the demand for retail activity in a trade area. According to adopted population forecasts for the three local government areas the total trade area is:

- Estimated to contain nearly 78,000 residents in 2026.
- Forecast to increase to 93,500 residents by 2041.
- Therefore, estimated to grow by 15,800 additional residents over the 15-year period at an average of over 1,050 additional residents p.a.

Ascot and Belmont trade areas are:

- Estimated to contain a resident population of 11,000 residents in 2026.
- Forecast to increase to 16,400 residents by 2041.
- Therefore, estimated to grow by an additional 5,400 over a 15-year period at an average of 300 additional residents per annum.
- Expected to be the trade areas with the largest proportional growth over the next 15 years.

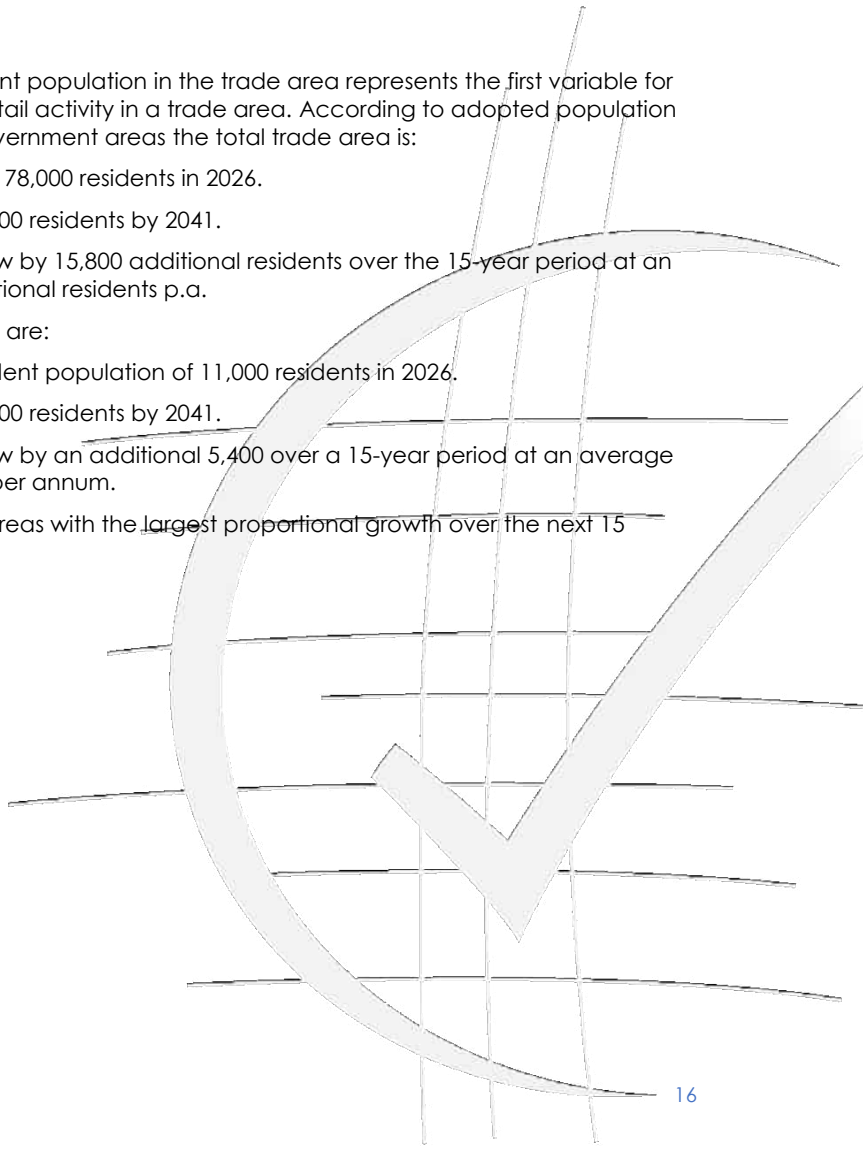
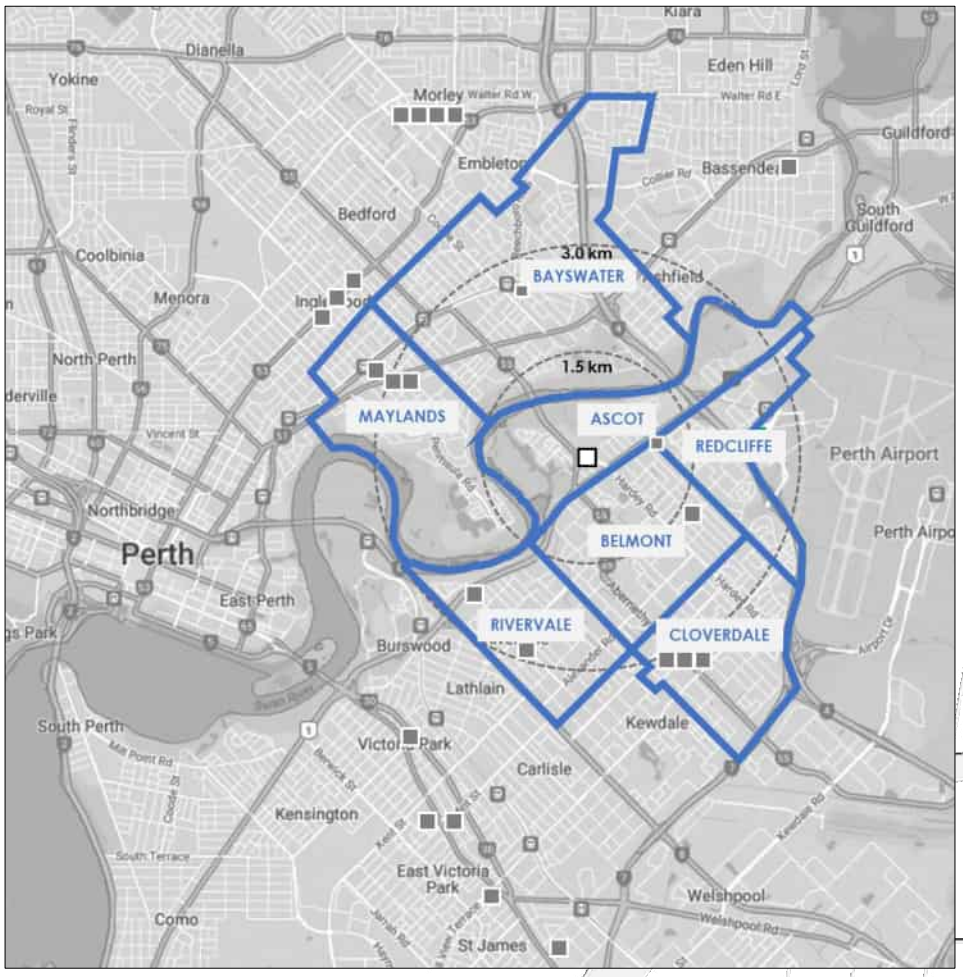


FIGURE 7 - TRADE AREA MAP



Taktics4/Australian Bureau of Statistics/ id forecast

FIGURE 8

CURRENT and FORECAST POPULATION
By Trade Area by Year

Catchment	2023	2026	2031	2036	2041	2023-2041	%
Bayswater	25,050	25,600	26,800	28,000	29,200	4,150	17%
Maylands	13,350	13,400	13,900	14,400	14,900	1,550	12%
Ascot	3,300	3,400	3,700	4,600	5,200	1,900	58%
Belmont	7,400	7,600	9,000	10,300	11,200	3,800	51%
Rivervale	11,850	12,400	13,400	14,200	15,000	3,150	27%
Redcliffe	5,400	5,500	5,700	5,800	7,000	1,600	30%
Cloverdale	9,500	9,800	10,200	10,500	11,000	1,500	16%
Total Trade Area	**75,850**	**77,700**	**82,700**	**87,800**	**93,500**	**17,650**	**23%**
Average growth per census		1,850	5,000	5,100	5,700		
Average growth p.a.	-	617	1,000	1,020	1,140		
Average growth p.a. (%)		0.8%	1.3%	1.2%	1.3%		

id forecast - LGA Bayswater, Belmont Victoria Park

Taktics4/Australian Bureau of Statistics/ id forecast

4.4 Resident Demographic Profiles

The demographic profile of the resident population in a trade area represents a second level of demand for retail activity in a trade area. Consumer spending surveys confirm that residents with different personal, household and economic characteristics are likely to exhibit different spending behaviour regarding the amount they buy and the type of goods they buy. The demographic characteristics of the resident population in the trade area will determine the retail spending profile and retail spending capacity available to retailers/centres in the trade areas. Key demographic characteristics include household composition, dwelling tenure, and income potential. Relevant socio-economic characteristics for residents in the trade area are highlighted below.

Person and Household Profile

The resident population in the Ascot, Belmont, Bayswater trade area is characterised by:

- an average age of 40 years which is 3.8% above the Perth average.
- an average household size of 2.3 persons per dwelling which is 9% smaller than the Perth average.
- a higher representation of one person households.
- a predominantly Australian born population.
- an ethnic/cultural balance consistent with Perth averages.
- a stable resident base with longevity in the trade area.

Employment, Income, Economic Profile

The resident labour force in the Ascot, Belmont, Bayswater trade area is characterised by:

- a labour force participation rate consistent with Perth averages.
- a higher representation of professionals.
- a higher representation of labour force employed in the retail, accommodation, and F&B sector and professional services sector.
- an average personal income that is 6% above Perth averages.
- an average of 2 incomes per dwelling which is 5% below Perth averages.
- an average household income that is 1% higher than Perth averages.
- an average mortgage that is 1% higher than Perth averages.
- an average rent that is 6% lower than Perth averages.
- a higher representation of rental dwellings.
- a slightly lower representation of dwellings with a mortgage.

Dwelling Profile

The dwelling stock in the Ascot, Belmont, Bayswater trade area is characterised by:

- slightly higher representation of townhouses and semi-detached dwellings.
- an average of 3 bedrooms per dwellings which is 9% smaller than the average Perth dwelling.

4.5 Resident Retail Spending Profile

Resident retail spending profiles for the trade area are derived by extrapolating data from a range of sources including:

- Household Expenditure Survey by socio economic characteristics (ABS 2015)
- Population and Household Census by socio economic characteristics (ABS 2021)
- Retail Sales by store categories (ABS 2024)

Correlation of data from these sources relative to the demographic profiles of an area produces an estimate of the average retail spending potential of residents within that area. Some of the trade areas may not currently have sufficient population bases to extract valid demographic profiles. Where trade areas do not have sufficient population base the retail spending profiles have been adopted from neighbouring/adjoining trade areas. Correlation of demographic profiles to retail spending profiles for residents in the trade area reveal that:

- Ascot and Bayswater residents are estimated to have an average total retail spending profile of between $19,550 and $21,900 per resident p.a. which is higher than Perth averages.
- Maylands, Belmont, Rivervale, Redcliffe, and Cloverdale residents have an average total retail spending profile of between $15,200 and $16,600 per resident p.a. which is lower than Perth averages.

FIGURE 9

ESTIMATED AVERAGE RETAIL SPENDING PER CAPITA
By Retail Category by Trade Area
Dec-23

Retail Store Category	Total Convenience Retail	Total Comparison Retail	Total Shop	Bulky Goods/LFR	Total 'Shop' & 'Other Retail'
Bayswater	$11,143	$5,367	$16,510	$3,046	$19,556
Maylands	$9,464	$4,446	$13,910	$2,605	$16,515
Ascot	$12,289	$6,240	$18,529	$3,363	$21,891
Belmont	$8,933	$4,198	$13,130	$2,468	$15,598
Rivervale	$9,495	$4,461	$13,956	$2,613	$16,568
Redcliffe	$8,829	$4,149	$12,977	$2,441	$15,418
Cloverdale	$8,741	$4,108	$12,848	$2,418	$15,267
Perth Average	***$10,374***	***$4,872***	***$15,246***	***$2,839***	***$18,086***

8501.0 Retail Trade, Australia
Retail Turnover, State by Industry Subgroup

4.6 Resident Retail Spending Capacity

The resident retail spending capacity represents the total retail spending that is generated by residents in a trade area that is available to be capture by existing and planned centres in the trade area (and beyond). It is measured by multiplying the average potential resident retail spending profile for each area by the forecast resident population in each area to determine the forecast resident retail spending capacity of each trade area over time. Based on the average potential resident retail spending profiles for supermarkets, residents in the trade area are estimated to generate:

FIGURE 10

ESTIMATED ANNUAL RESIDENT RETAIL SPENDING CAPACITY in TRADE AREA ($M p.a.)
By Retail Category by Year

	2023	2026	2031	2036	2041
Total Convenience Retail	$755	$774	$823	$875	$931
Total Comparison Retail	$360	$368	$392	$417	$444
Total Shop	$1,115	$1,142	$1,215	$1,291	$1,374
Bulky Goods/LFR	$208	$213	$226	$240	$256
Total 'Shop & Other' Retail	$1,323	$1,355	$1,441	$1,532	$1,630

8501.0 Retail Trade, Australia
Retail Turnover, State by industry Subgroup

Convenience based retail spending

Residents across the total trade area are estimated to spend:

- $774 M p.a. in convenience-based shops/centres in 2026.
- $931 M p.a. in convenience-based shops/centres by 2041.

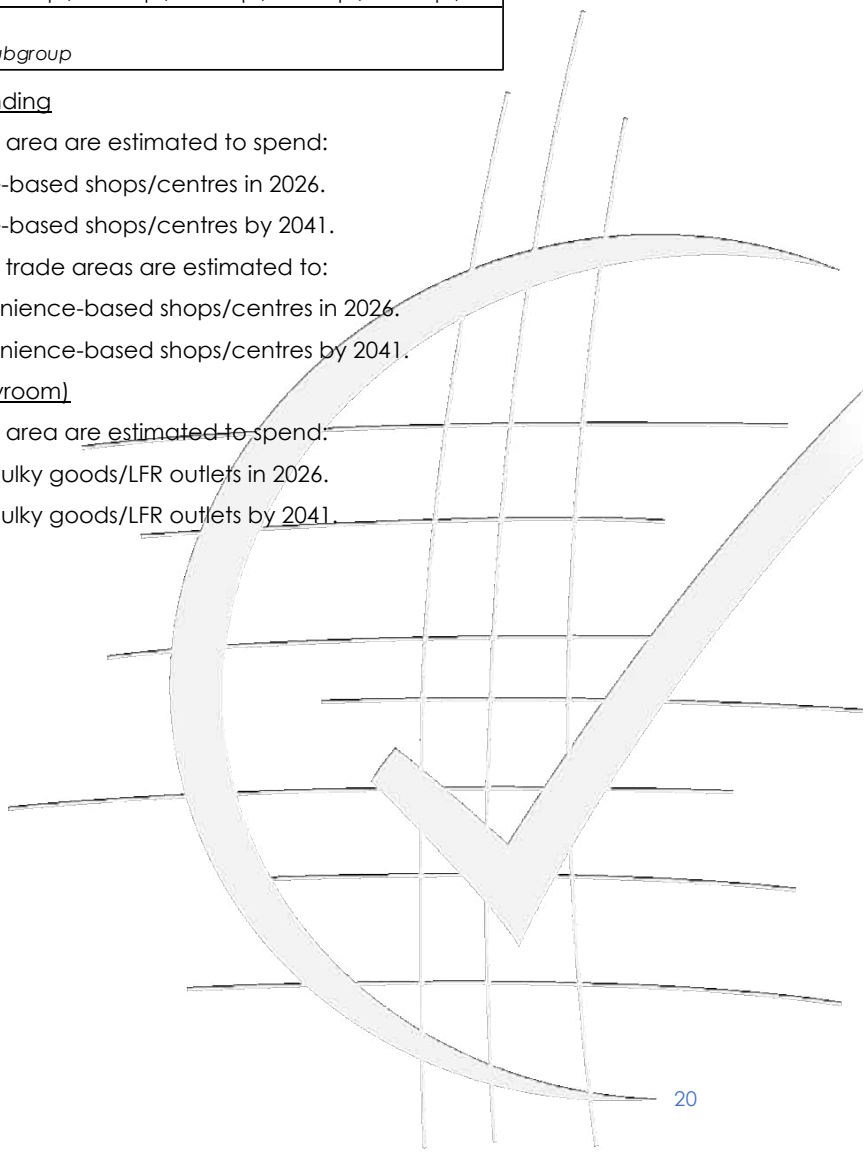
Residents in Ascot and Belmont trade areas are estimated to:

- spend $106 M p.a. in convenience-based shops/centres in 2026.
- spend $164 M p.a. in convenience-based shops/centres by 2041.

Other Retail (Bulky Goods/Showroom)

Residents across the total trade area are estimated to spend:

- spend $213 M p.a. in total bulky goods/LFR outlets in 2026.
- spend $256 M p.a. in total bulky goods/LFR outlets by 2041.



5. PART A – LOCAL CENTRE

This section assesses the potential market demand for, and potential sustainability of a proposed local centre at Ascot. This assessment subsequently informs the assessment of potential impacts at existing and planned activity centres. The proposed local centre is:

- Included as part of the planning for the City of Belmont Golden Gateway Precinct.
- Located 3 km from the nearest supermarket-based activity centre.
- Classified as a planned activity centre.
- Not classified as an out of centre development.
- Considered a major development because it proposes 3,400 sqm NLA of PLUC 5 activity.

Eligibility for Exemption from a Net Benefit Test

The proposed local centre activity:

- is accessible to an existing walkable trade area.
- includes more than 1,500 sqm NLA of PLUC 5 activity
- is not located within 400 metres of a railway station.
- is therefore not eligible for exemption from a Net Benefit Test under the provisions of SPP4.2.

5.1 Market Share

Market share represents the proportion of resident spending generated from a trade area to a proposed activity centre. Market share is a measure of influence that a centre will have over customers in an area.

Example:

Total annual retail spending generated by residents in a trade area is $100M p.a.

A centre is capturing a market share of 20% of that retail spending

The centre therefore captures $20M p.a. in sales from the trade area

The proposed local centre if developed by 2026, is estimated to capture:

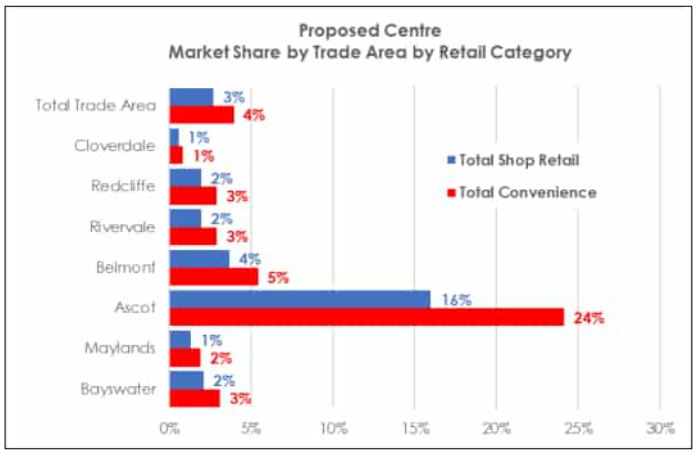
Convenience Spending

- 24% of all convenience/food/grocery/local spending generated by residents in Ascot.
- 5% of all convenience/food/grocery/local spending generated by residents in Belmont.
- A combined total of 4% of all convenience/food/grocery/local spending generated by residents across the total trade area.

Total Retail Spending

- 16% of all retail spending generated by residents in Ascot.
- 4% of all retail spending generated by residents in Belmont.
- A combined total of 3% of all retail spending generated by residents in the total trade area.

FIGURE 11



Taktics4 Retail Model

5.2 Sales Contribution

Sales contribution represents the proportion of a centres annual sales that is captured from a trade area. Sales contribution is a measure of the reliance / exposure that an activity centre has to a trade area.

Example:

A centre is capturing total retail sales of $20M p.a.

$15M p.a. of those sales are being captured from one trade area.

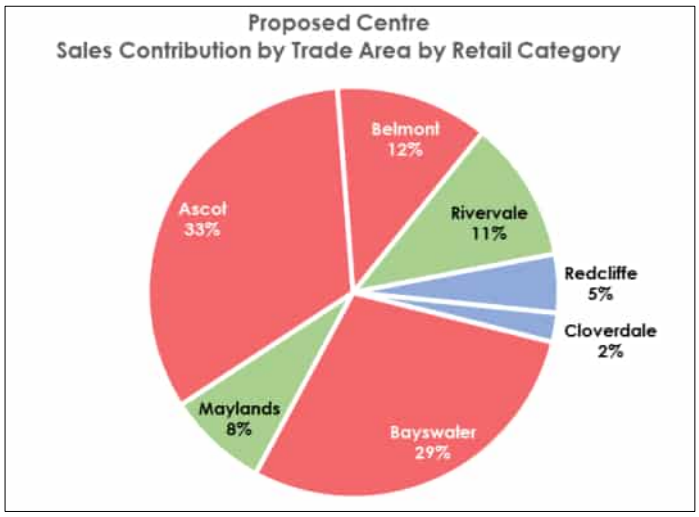
Therefore 75% of the centre sales are being contributed from that trade area.

The proposed local centre is ultimately estimated to generate:

- 62% of its forecast annual retail sales from residents in the immediate suburbs of Ascot (33%), and Bayswater (29%).
- 31% of its forecast annual retail sales from residents in Maylands, Belmont, and Rivervale.
- A combined total of 74% of its forecast annual retail sales will be derived from residents in the immediate local catchment it is intended to serve.

This sales contribution level is consistent with industry expectations.

FIGURE 12



Taktics4 Retail Model

5.3 Sales Potential

The Sales Potential represents the total sales that a centre may be expected to capture based on achieving the estimated market share from each trade area. It is a measure of a centre's viability and sustainability. Sales potential is measured by either annual sales and/or by sales productivity. Sales productivity is the total annual sales of centre divided by the total retail floor space NLA of the centre.

Example:

A centre captures total annual retail sales of $20M p.a.

The centre has a retail floor space of 4,000 sqm NLA.

The centre has a sales productivity of $20M p.a. divided by 4,000 sqm NLA = $5,000/sqm p.a.

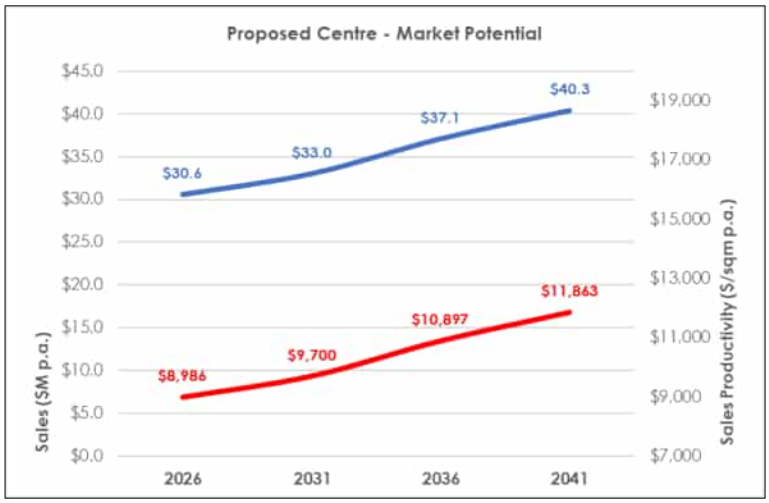
The proposed local centre if developed ~~in 2026~~ is estimated to have the potential to generate:

- $30.6M p.a. at $9,000/sqm p.a. by 2026
- $33.0M p.a. at $9,700/sqm p.a. by 2031
- $37.1M p.a. at $10,900/sqm p.a. by 2036
- $40.3M p.a. at $11800/sqm p.a. by 2041

The proposed local centre at Ascot:

- Has the potential to generate sufficient sales to be sustainable by 2026, satisfying industry measures conducive to a sustainable supermarket based ~~local centre~~.
- Serve an immediate role in meeting the day-to-day convenience needs of residents in the immediate walkable catchment of the proposed local centre.
- Rely predominantly on sales being captured from the immediate suburbs of Ascot, Maylands and Belmont.
- Be sustainable despite a potential market capture of only 16% of total retail sales from resident spending in Ascot, leaving 84% of retail spending to be captured by existing and planned centres.

FIGURE 13



Taktics4 Retail Model

5.4 Sales Impact

Sales impact represents the potential loss of sales at a centre due to the development of another centre. Sales impact is measured by comparing the potential sales of a centre at a particular year/period with the other centre included and excluded from the equation/modelling. Sales impact may be measured by potential actual annual sales or a percentage of potential annual sales.

Example

A centre is forecast to generate annual sales of $20M p.a. in 2026 without the proposed centre being developed by 2026.

The centre is forecast to generate annual sales of $18M p.a. in 2026 if the proposed centre is developed by 2026.

The centre is therefore estimated to experience a potential sales impact of $2M p.a. in 2026.

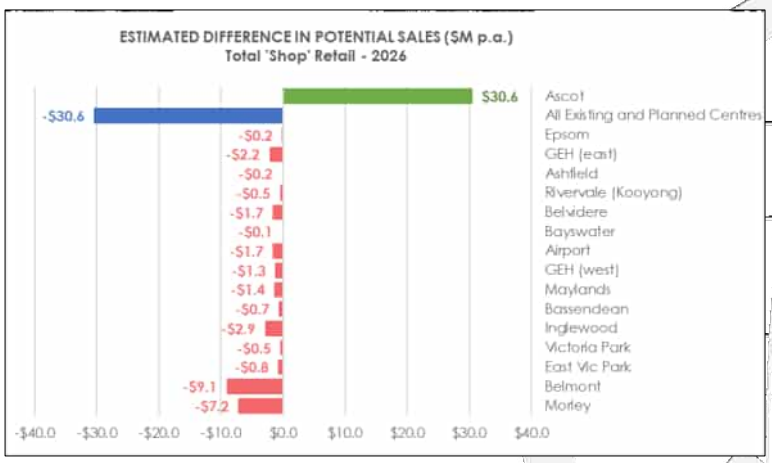
The centre is estimated to subsequently experience a potential sales impact of 10% of its sales ($2M p.a. loss from its $20M p.a.)

Actual Sales

Modelling the activity centres network with and without the proposed activity reveals that the development of the proposed activity by 2026 would have the potential to capture $30.6M p.a. in retail sales that might otherwise be captured from existing or planned centres.

Over 68% of all retail sales generated by the proposed local centre would be captured from four centres including Belmont Centre (-$9.1M p.a.), Morley Centre (-$7.2M p.a.), Inglewood (-$2.9M p.a.), and Maylands ($1.4M p.a.). This is because these centres currently contain the retail offer that a proposed local centre is likely to provide at Ascot.

FIGURE 14
ESTIMATED ACTUAL ANNUAL SALES CAPTURED from OTHER ACTIVITY CENTRES by SHOP SALES by FIRST YEAR TRADE of PROPOSED ACTIVITY (2026)



Taktics4 Retail Model (2024)

Percentage of Sales

The modelling shows that upon trading in 2026, the retail sales captured by a proposed local centre has the potential to impact the overall retail sales generated by residents in the trade area at:

Belmont

The public and private investment at Belmont Centre will not be impacted by the proposed local centre. The potential sales impact is forecast to be less than 3.0% which is classified as insignificant impact/risk. The potential sales impact at Belmont is in effect considerably less than 3.0% as the model only shows the potential loss in sales at Belmont from residents in the modelled trade area. The Belmont Centre generates sales from a more extensive trade area than the trade area for the proposed local centre.

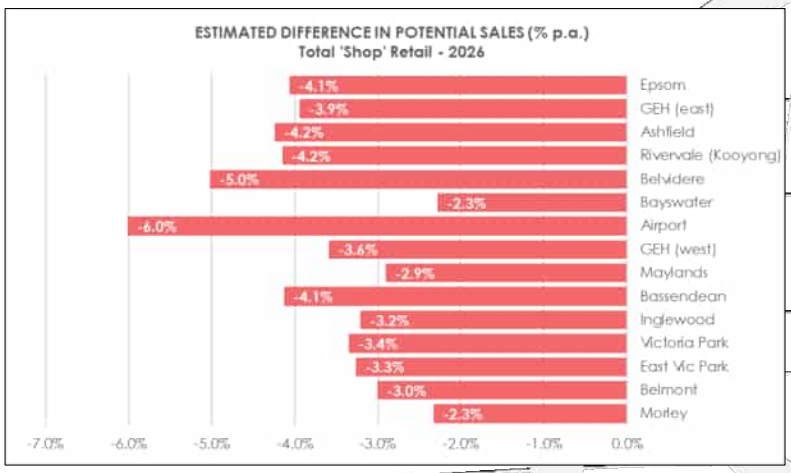
Morley

The public and private investment at Morley Centre will not be impacted by the proposed local centre. The potential sales impact is forecast to be less than 2.3% which is classified as insignificant impact/risk. The potential sales impact is in effect considerably less than 2.3% as the model only shows the potential loss in sales at Morley from residents in the modelled trade area. The Morley Centre generates sales from a more extensive trade area than the trade area for the proposed local centre.

Bayswater

The public and private investment at Bayswater will not be impacted by the proposed local centre. The potential sales impact at Bayswater is less than 2.3% which is classified as low impact/low risk. The low impact is because the Bayswater Centre does not provide the offer intended at the proposed local centre. Therefore, the Bayswater Centre is not capturing the sales that will be captured by the proposed local centre.

FIGURE 15
ESTIMATED IMPACT of PROPOSED ACTIVITY on ANNUAL SALES at OTHER ACTIVITY CENTRES by SHOP SALES by FIRST YEAR TRADE of PROPOSED ACTIVITY (2026)



Taktics4 Retail Model (2024)

Local Centres

Centres at Epsom (4.1%), Ashfield (4.2%), Rivervale/Kooyong (4.2%) and Belvidere (5.0%) are all estimated to be impacted by between 4% and 5%. These impacts are classified as insignificant impact65/ low risk. There is not expected to be an impact to private or public investment. This is because these centres do not currently offer the extent of the retail offer intended to be provided by the proposed local centre.

Airport

The convenience-based centre anchored by Woolworths at the Airport, is the only centre which is estimated to experience a moderate impact (6%). The potential sales impact is in effect considerably less than 6.0% as the model only shows the potential loss in sales at the Airport from resident spending generated from within the modelled trade area. The Airport Centre generates sales from a far more extensive trade area than the trade area for the proposed local centre.

5.5 Sales Growth

Sales Growth represents the increase in retail sales that may be expected from a centre because of an increase in population growth in the trade area.

For example:

A centre is currently capturing total retail sales of $20M p.a.

It achieves these sales by capturing 20% market share of all resident spending in the trade area.

Therefore, the trade area has a current resident retail spending capacity of $100M p.a.

Residential development occurs in the trade area at 10% growth over a five-year period.

In five years, the resident retail spending capacity in the trade area has increased to $110M p.a.

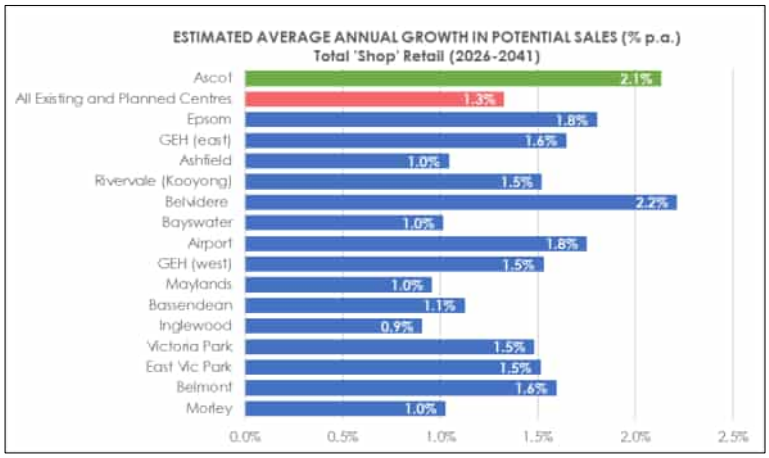
The sales potential for the centre is forecast to increase to $22M p.a. (in constant dollars) despite maintain the same market share within the trade area.

This potential sales growth across centres has the potential to offset any initial sales impact generated by the development of a proposed local centre.

The population in the total trade area is expected to increase from 77,700 in 2026 to 93,500 in 2041. This population growth will result in an increase in resident retail spending capacity in the total trade area from $1,142M p.a. in 2026 to $1,374M p.a. in 2041. That represents an additional $232M p.a. in the total trade area for all centres to capture.

The graph shows that beyond the development of the proposed local centre in 2026, all centres in the trade area, or area of influence by the proposed local centre is forecast to have the potential to experience an average annual growth in sales of between 1% and 2.0% p.a. over the subsequent 15 years.

FIGURE 16
ESTIMATED AVERAGE ANNUAL SALES GROWTH at ACTIVITY CENTRES SHOP SALES Between 2026 and 2041



Taktics4 Retail Model (2024)

5.6 Summary

The findings in this Net Benefit Test confirm that a proposed local centre at Ascot will result in insignificant/low risk impacts on the surrounding existing and planned activity centres network. With any potential sales impact offset by the potential for substantial average sales growth in the trade area over the next 15 years.

Overall, the development of the proposed local centre at Ascot is not expected to generate significant impacts for the surrounding centres network. The centres network is currently bereft of full line supermarket-based centres. This means that residents in the trade area are already bypassing the smaller local centres to access their convenience retail needs at centres further afield than they should have to travel.

6. PART B - BULKY GOODS

This section assesses the potential market demand for, and potential sustainability of proposed 'Other' Retail Bulky Goods Precinct at Ascot. This assessment is necessary to subsequently inform the assessment of potential impacts at existing and planned activity centres. The proposed bulky goods activity is considered an 'out of centre' development.

6.1 Market Share

Market share represents the proportion of resident spending generated from a trade area to the proposed centre. Market share is a measure of influence that a centre will have over customers in an area.

Example:

Total annual retail spending generated by residents in a trade area is $100M p.a.

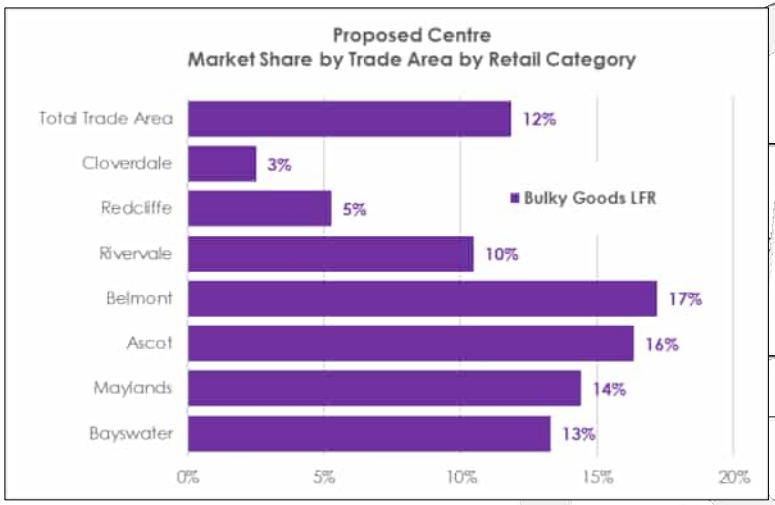
A centre is capturing a market share of 20% of that retail spending

The centre therefore captures $20M p.a. in sales from the trade area

The proposed bulky goods activity if developed by 2026, is estimated to capture:

- 12% of all bulky goods spending generated by residents across the total trade area.
- relatively consistent market capture between 13%-17% of all bulky goods retail spending from residents in Ascot, Belmont, Maylands, Bayswater and Rivervale.5% of all convenience/food/grocery/local spending generated by residents in Belmont, reflecting the propensity for residents to travel further to access this type of retail category.

FIGURE 17



Taktics4 Retail Model

6.2 Sales Potential

The Sales potential represents the total sales that a centre may be expected to capture based on achieving the estimated market share from each trade area. It is a measure of a centre's viability and sustainability. Sales potential is measured by either annual sales and/or by sales productivity. Sales productivity is the total annual sales of centre divided by the total retail floor space NLA of the centre.

Example:

A centre captures total annual retail sales of $20M p.a.

The centre has a retail floor space of 4,000 sqm NLA.

The centre has a sales productivity of $20M p.a. divided by 4,000 sqm NLA = $5,000/sqm p.a.

The proposed local centre if developed in 2026 is estimated to have the potential to generate:

$25.2M p.a. at $2,600/sqm p.a. by 2026

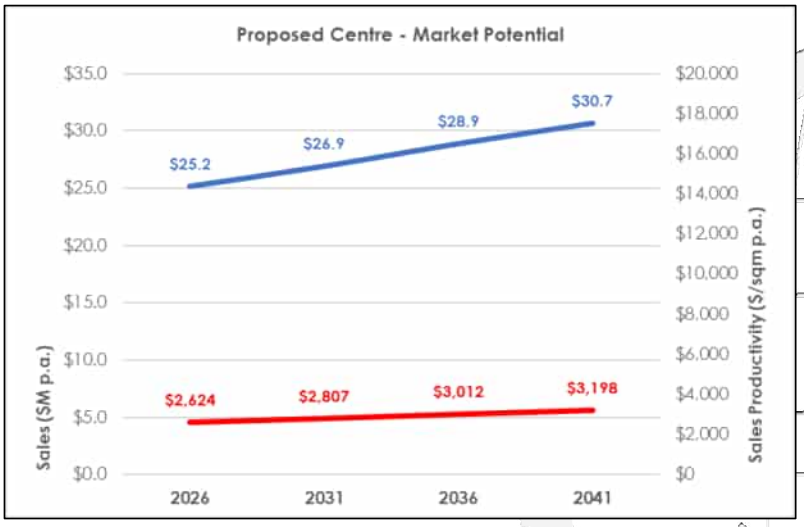
$26.9M p.a. at $2,800/m p.a. by 2031

$28.9M p.a. at $3,000/sqm p.a. by 2036

$30.7M p.a. at $3,200/sqm p.a. by 2041

The proposed bulky goods activity at Ascot has the potential to generate sufficient sales to be sustainable by 2026, satisfying industry measures conducive to a sustainable bulky goods activity. Be sustainable despite a potential market capture of only 12% of total bulky goods sales from resident spending in the total trade area, leaving 88% of bulky goods retail spending to be captured by existing and planned centres.

FIGURE 18



Taktics4 Retail Model

6.3 Sales Impact

Sales impact represents the potential loss of sales at a centre due to the development of another centre. Sales impact is measured by comparing the potential sales of a centre at a particular year/period with the other centre included and excluded from the equation/modelling. Sales impact may be measured by potential actual annual sales or a percentage of potential annual sales.

Example

A centre is forecast to generate annual sales of $20M p.a. in 2026 without the proposed centre being developed by 2026.

The centre is forecast to generate annual sales of $18M p.a. in 2026 if the proposed centre is developed by 2026.

The centre is therefore estimated to experience a potential sales impact of $2M p.a. in 2026.

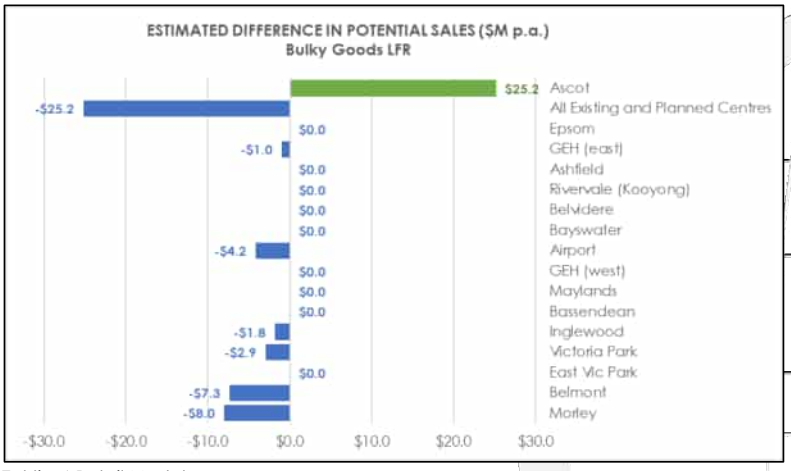
The centre is estimated to subsequently experience a potential sales impact of 10% of its sales ($2M p.a. loss from its $20M p.a.)

Actual Sales

The development/introduction of the proposed bulky goods activity in Ascot by 2026 will have the potential to capture $25.2M p.a. in retail sales that might otherwise be captured from existing or planned centres.

Over 81% of all retail sales generated by the proposed bulky goods activity to be captured from four centres including Belmont Centre (-$7.3M p.a.), Morley Centre (-$8.0M p.a.), Airport (-$-4.2M p.a.), and Victoria Park ($-2.9M p.a.).

FIGURE 19



Taktics4 Retail Model

Percentage of Sales

The modelling shows that upon trading in 2026, the retail sales captured by proposed bulky goods activity centre has the potential to impact the overall retail sales generated by residents in the trade area at:

Belmont

The public and private investment at Belmont Centre will not be impacted by the proposed local centre. The potential sales impact is forecast to be less than 4.2% which is classified as insignificant impact/risk. The potential sales impact at Belmont is in effect considerably less than 4.2% as the model only shows the potential loss in sales at Belmont from residents in the modelled trade area. The Belmont Centre generates sales from a more extensive trade area than the trade area for the proposed bulky goods activity at Ascot.

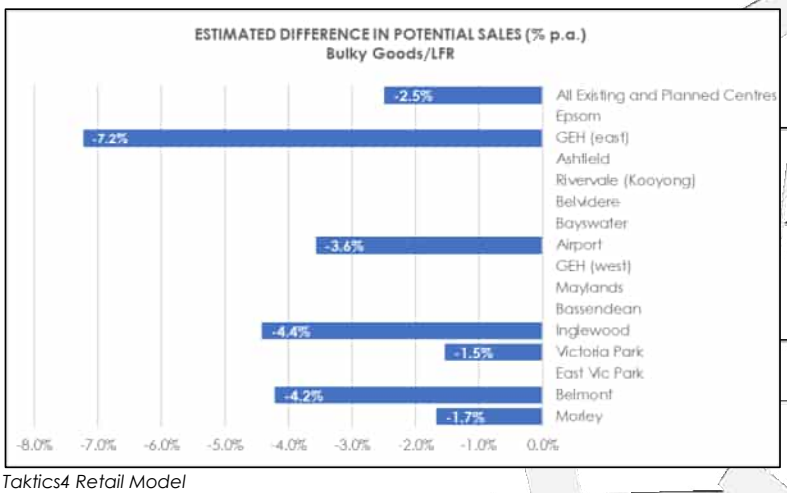
Morley

The public and private investment at Morley Centre will not be impacted by the proposed bulky goods activity. The potential sales impact is forecast to be less than 1.7% which is classified as insignificant impact/risk. The potential sales impact is in effect considerably less than 1.7% as the model only shows the potential loss in sales at Morley from residents in the modelled trade area. The Morley Centre generates sales from a more extensive trade area than the trade area for the proposed bulky goods activity at Ascot.

Airport

The public and private investment at the Airport will not be impacted by the proposed bulky goods activity. The potential sales impact is forecast to be less than 3.6% which is classified as insignificant impact/risk. The potential sales impact is in effect considerably less than 3.6% as the model only shows the potential loss in sales at the Airport from residents in the modelled trade area. The Airport generates sales from a more extensive trade area than the trade area for the proposed bulky goods activity at Ascot.

FIGURE 20



Taktics4 Retail Model

6.4 Sales Growth

Sales Growth represents the increase in retail sales that may be expected from a centre because of an increase in population growth in the trade area.

For example:

A centre is currently capturing total retail sales of $20M p.a.

It achieves these sales by capturing 20% market share of all resident spending in the trade area.

Therefore, the trade area has a current resident retail spending capacity of $100M p.a.

Residential development occurs in the trade area at 10% growth over a five-year period.

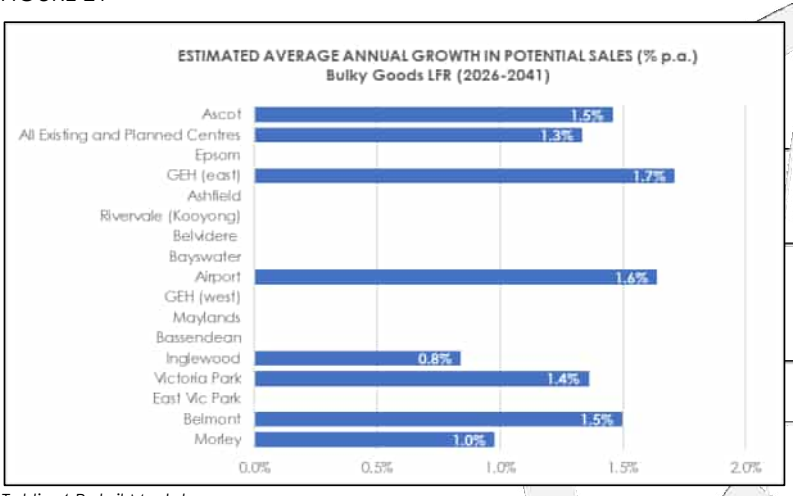
In five years, the resident retail spending capacity in the trade area has increased to $110M p.a.

The sales potential for the centre is forecast to increase to $22M p.a. (in constant dollars) despite maintain the same market share within the trade area.

This potential sales growth across centres has the potential to offset any initial sales impact generated by the development of a proposed local centre.

The population in the total trade area is expected to increase from 77,700 in 2026 to 93,500 in 2041. This population growth will result in an increase in resident retail spending capacity in the total trade area from $1,142M p.a. in 2026 to $1,374M p.a. in 2041. That represents an additional $232M p.a. in the total trade area for all centres to capture. The graph shows that beyond the development of the proposed bulky goods in 2026, all relevant centres in the trade area, or area of influence by the proposed bulky goods activity at Ascot is forecast to have the potential to experience an average annual growth in sales of between 1.0% and 2.0% p.a. over the subsequent 15 years.

FIGURE 21

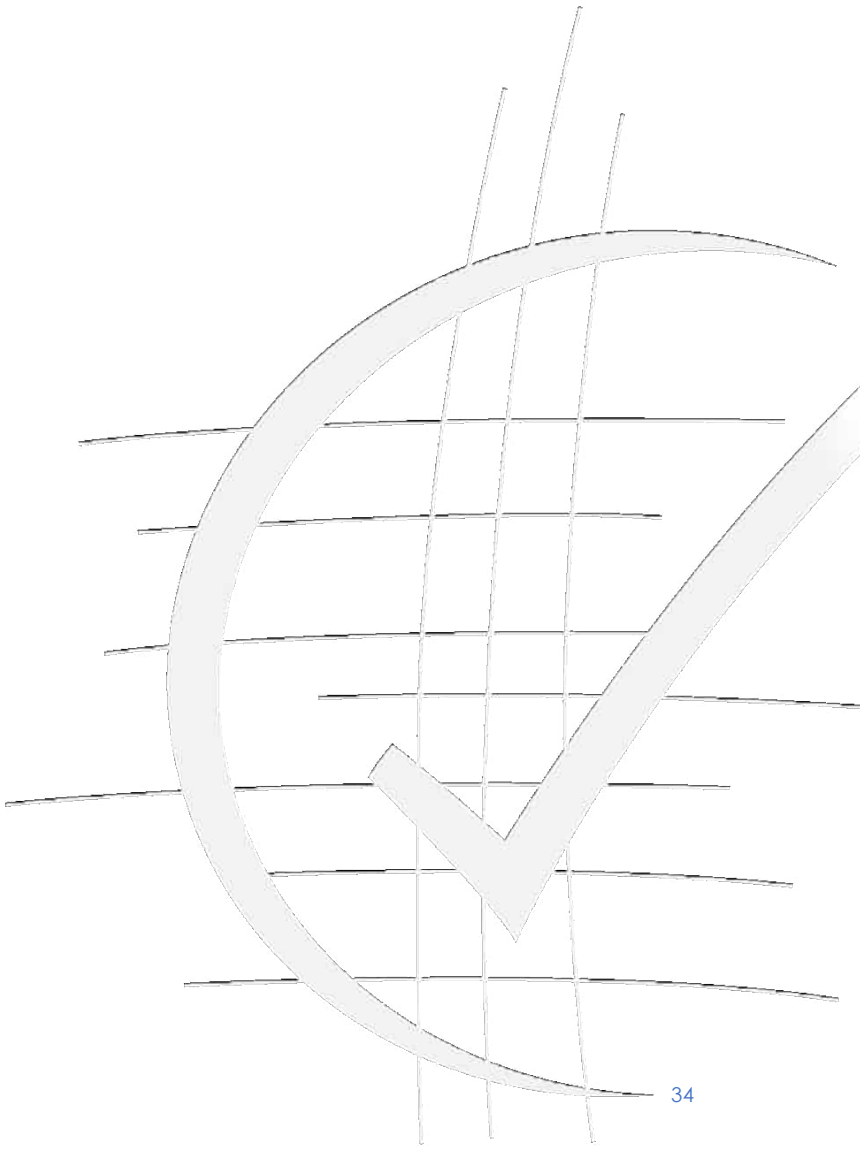


Taktics4 Retail Model

6.5 Summary

The findings in this Net Benefit Test confirm that proposed bulky goods activity at Ascot will.

- Result in insignificant/low risk impacts on the surrounding existing and planned activity centres network. With any potential sales impact offset by the potential for substantial average sales growth in the trade area over the next 15 years.
- Subsequently not have an unreasonable impact on the delivery and sustainability of private and public infrastructure at other activity centres.



7. NET BENEFIT TEST

When estimating benefits to the community, the Net Benefit Test should:

- Detail what benefit will occur due to the proposed development.
- Use existing data and standards to measure the size of the benefit and how important it will be to the community.
- Identify those in the community who will be likely to experience the benefit.
- Estimate how many individuals are expected to experience the benefit.
- Describe the degree of change expected due to the benefit.
- Determine the expected duration for which stakeholders are expected to experience the benefit.

SPP4.2 provides a guide to estimating/measuring the net benefit to the community including:

7.1 Employment

Will the proposal provide new jobs in addition to any that may be lost elsewhere – net additional jobs?

The proposed activity has the potential to create up to 205 Full Time Equivalent jobs including 85 in the shopping precinct and 120 in the bulky goods showroom precinct.

FIGURE 22

TOTAL EMPLOYMENT OPPORTUNITIES

PLUC	Activity Type	Floor space (sqm NLA)	Ratio (FTE jobs/sqm)	FTE Jobs
PLUC 5	Shops	3,400	40	85
PLUC 6	Bulky Goods/Showroom	9,600	80	120
Combined		**13,000**	**63**	**205**

Land Use and Employment Survey (WAPC 2017)

Will the proposed activity contribute to diversifying local jobs – creating more strategic employment versus population-driven employment?

Will the proposal have the potential to improve access to economic opportunity for minority and vulnerable groups?

Employment in shop and bulky goods activity typically attracts residents which fit the following:

- Female labour force
- Part time labour force
- Young adult labour force
- Local labour force
- Labour force without access to a motor vehicle

Gender	Employment Sector	
	Total Retailing	All Sectors
Male Employees	34%	43%
Female Employees	66%	57%
All Employees	**100%**	**100%**

The proposed activity is conducive to the female employment labour force. Females on average represent 66% of all retail related jobs compared to 57% for all job sectors.

Employment Status	Employment Sector	
	Total Retailing	All Sectors
Full Time Employment	38%	54%
Part time Employment	62%	46%
All Employment	**100%**	**100%**

The proposed activity is conducive to the part time employment labour force. Part time employees represent 62% of all retail related jobs compared to 46% for all job sectors.

Age of Employee	Employment Sector	
	Total Retailing	All Sectors
15-19 years	19%	9%
All Ages	**100%**	**100%**

The proposed activity is conducive to young adults in the labour force. Young adults represent 19% of all retail related jobs compared to 9% for all job sectors.

Distance Travelled	Employment Sector	
	Total Retailing	All Sectors
less than 2.5 km	15%	10%
2.5 km - 10 km	42%	32%
All Distances	**100%**	**100%**

The proposed activity is conducive to residents who live within 2.5 km of the proposed activity. 15% of all residents in retail related jobs on average travel up to 2.5km from their home compared to 10% for all job sectors.

Travel Mode	Employment Sector	
	Total Retailing	All Sectors
Car, as passenger	9%	6%
Bicycle	1%	0%
Walked only	2%	2%
Walked, Cycled, Passenger	**11%**	**8%**
All Modes	**100%**	**100%**

The proposed activity is conducive to residents who do not have ready access to motor vehicle for travel to work. 11% of residents working in the retail sector cycle, walk or travel by passenger to work compared to 8% for all job sectors.

The impact assessment shows that all activity centres in the network have the potential to increase sales and subsequently not need to reduce employment levels. The proposed local centre is therefore expected to provide new local jobs for residents.

7.2 Impact

How is the proposal expected to impact upon the current and expected turnover and role of relevant activity centres?

The proposed activity is estimated to have an initial low / insignificant risk to activity centres in the network. Any impacts on these activity centres are likely to be temporary and have no long-term effects on the viability of individual activity centres. The initial impacts to activity centres are expected to be offset by future growth in sales from resident and spending growth.

Will the proposal increase the choice and availability of goods and services in the area?

Retail modelling confirms that the residents in Ascot and Belmont are the communities most likely to experience the benefit from the proposed activity. Residents in Ascot and Belmont are estimated to account for 60% of total sales / trips at the proposed activity confirming the importance of the proposed activity to these residents.

Ascot and Belmont trade area currently comprise 11,000 residents. Ascot and Belmont trade area resident population base will grow to 16,400 residents by 2041. Despite this population profile, residents in Ascot do not currently have access to a full line supermarket-based centre within 2.5 km. Ascot residents must therefore travel up to 2.5 km each way (5 km round trip) every time they access their full line supermarket needs.

The introduction of the proposed activity will fill an identified gap in the supply and demand of convenience-based activity in the Ascot and Belmont area.

7.3 Impact on Activity Centre Hierarchy

Retail modelling confirm that the proposed activity centre is sufficiently sized, located and configured to satisfy the local trade area needs without impinging on the trading potential of other centres. And that the proposed centre will not have a significant or long-term impact on any of the individual activity centres modelled as part of the centres network.

It therefore follows that the proposed activity centre will not create any unreasonable or detrimental impact on the role and function of the activity centre hierarchy and framework in the trade area.

All centres will have the opportunity to compete for the additional retails sales available through the increased retail spending capacity planned in the trade area. It will be up to each of the centres and their respective operators in the existing and planned network to establish plans and strategies to target that additional retail spending capacity.

The forecast population growth in the trade area will ultimately create the potential for all centres in the network to achieve an average increase in sales of between 1% and 3% per annum over the period between 2026 and 2041. This average sales growth will further offset the immediate impact experienced from the introduction of the proposed activity.

7.4 Compatibility

Is the proposal compatible with surrounding land uses?

The proposed activity will introduce proposed activity in the middle of a trade area which contains 11,000 – 16,400 residents within a 1.5 km radius of the proposed activity. This resident population is a significant base for a supermarket-based centre.

7.5 Environment

Will there be an improvement in the level of amenity and vibrancy that benefits the wider community? Will the proposal include land uses such as healthcare, education, and community facilities? Will the proposal have an impact on overall vehicle trips? Will car-based net trips (by distance) increase or reduce because of the proposal?

The proposed activity has the potential to create a community hub for the Ascot and Belmont communities. increasing a sense of place for residents. The proposed activity does not in itself create these facilities. However, some of these facilities will likely be attracted to the area because of the introduction of the proposed activity.

The proposed activity has the potential to reduce the amount of trip kilometres that Ascot and Belmont residents must travel each year to satisfy their daily/weekly shopping needs. As stated, the Ascot and Belmont resident population base represents 11,000 growing to 16,400 residents who will benefit directly from the proposed activity. Ascot and Belmont residents therefore have the potential to:

- reduce the amount of trip kilometres that Ascot and Belmont residents must travel each year to satisfy their daily/weekly shopping needs.
- save over 530,000 to 700,000 trips p.a. to centres outside their trade area
- save between 40 and 50 trips per person per annum.
- save between 2.7 M km p.a. and 3.5 M km p.a. of vehicular travel per annum

7.6 Infrastructure

Is there significant government investment in services, infrastructure or development in the area or nearby centres that may be affected by the proposal? Will the proposal impact patronage/viability of the investment and what is the expected impact? Will the proposal include new, or improvements to existing transport infrastructure, particularly walking, cycling and public transport, that increases access and helps manage congestion? Will the proposal include enhancements to utilities that benefit the local area?

As previously stated, the proposed activity has the potential to significantly reduce the number of trips/trip km by residents especially for residents in Ascot and Belmont. Residents in these areas will be far more likely to walk to the proposed activity than their current trip patterns to supermarket-based centres over 2 km from the proposed activity. The proposed activity has the potential to generate demand for enhancements to community and non-retail related to services in the local area.

7.7 Strategic Alignment

Is the proposal consistent with the strategic planning for the area? Is it aligned with the relevant regional strategy and approved local planning strategy? Is the size and scale of the proposal consistent with the level of the hierarchy? What are the potential impacts on the activity centre hierarchy? Is the proposal consistent with the objectives and outcomes of SPP 4.2?

The proposed activity is classified as a planned centre in an adopted planning instrument. The proposed activity is a size, scale, function, and role that is consistent with and complements the overall activity centre hierarchy. The proposed local centre activity is consistent with the City of Belmont's Activity Centre Planning strategy.

The proposed activity will not have a significant impact on any of the activity centres in the network. The proposed activity does not have the potential to result in the loss of or change the role and function of any activity centre in the network. As such the proposed activity is not have the potential to have any impact or change to the activity centre hierarchy.

The Net Benefit Test confirms that the proposed activity satisfies the criteria for assessing the benefits to the community and is therefore consistent with the objectives and outcomes of SPP4.2.

ATTACHMENT 5

Transportation Noise Assessment

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Transportation Noise Assessment

Ascot Racecourse Structure Plan

Reference: 23118540-01

Prepared for:
Perth Racing C/- Davison Advisory Services

Reference: 23118540-01

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Date	Rev	Description	Author	Verified
16-Nov-23	0	Issued to Client	Terry George	-

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1. INTRODUCTION

A Local Structure Plan (LSP) and Scheme Amendment are being prepared for landholdings in Ascot, referred to as the Ascot Racecourse Structure Plan (refer *Figure 1-1*). Parts of the site will be potentially impacted by road traffic noise, being the subject of this report, with consideration given to *State Planning Policy No. 5.4 Road and Rail Noise*, being the subject of this report.

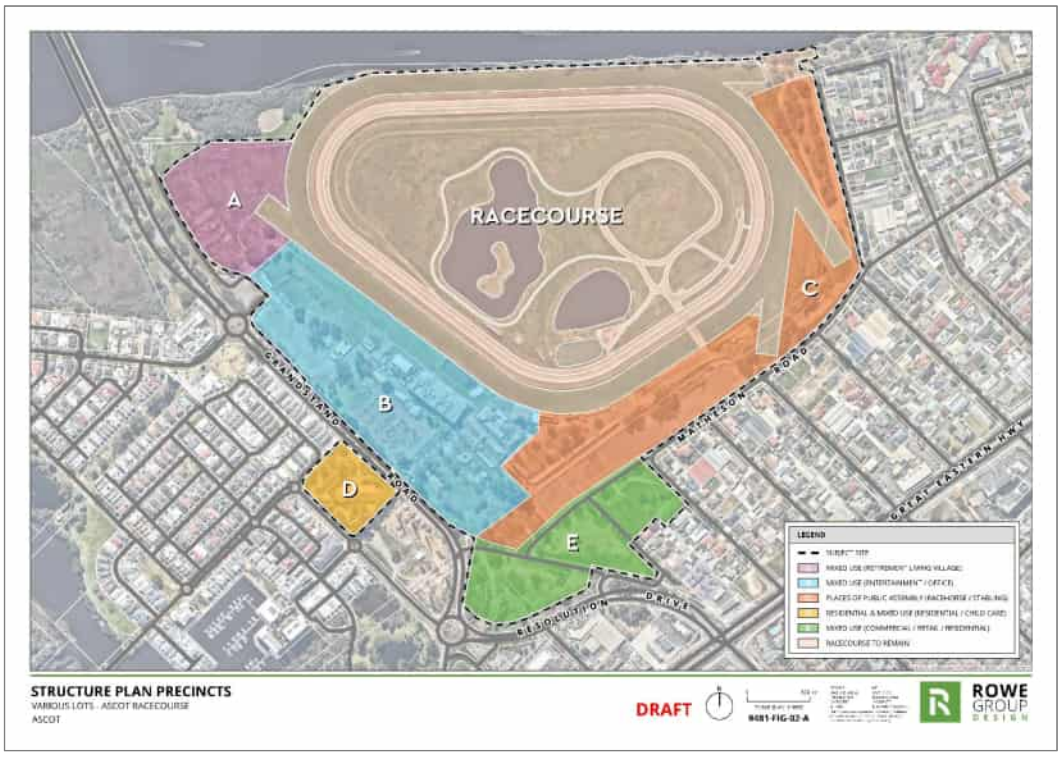


Figure 1-1: Structure Plan Precincts

Appendix B contains a description of some of the terminology used throughout this report.

2. CRITERIA

The criteria relevant to this project is provided in *State Planning Policy No. 5.4 Road and Rail Noise* (hereafter referred to as SPP 5.4) produced by the Western Australian Planning Commission (WAPC). SPP 5.4 is supported by the *Road and Rail Noise Guidelines* (the Guidelines) and the Department of Planning, Lands and Heritage mapping. The objectives of SPP 5.4 are to:

- Protect the community from unreasonable levels of transport noise;
- Protect strategic and other significant freight transport corridors from incompatible urban encroachment;
- Ensure transport infrastructure and land-use can mutually exist within urban corridors;
- Ensure that noise impacts are addressed as early as possible in the planning process; and
- Encourage best practice noise mitigation design and construction standards.

Table 2-1 sets out noise targets that are to be achieved by proposals under which SPP 5.4 applies. Where the targets are exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

Table 2-1: Noise Targets for Noise Sensitive Land-Use

Scenario	Outdoor Noise Target		Indoor Noise Target	
Noise-sensitive land-use and/or development	55 dB $L_{Aeq(Day)}$	50 dB $L_{Aeq(Night)}$	40 dB $L_{Aeq(Day)}$ (Living and Work Areas)	35 dB $L_{Aeq(Night)}$ (Bedrooms)

Notes:

- Day period is from 6am to 10pm and night period from 10pm to 6am.
- The outdoor noise target is to be measured at 1-metre from the most exposed, habitable[1] facade of a noise sensitive building.
- For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 *Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* (as amended) for each relevant time period.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practicable to do so using the various noise mitigation measures outlined in the Guidelines.

The application of SPP 5.4 is to consider anticipated traffic volumes for the next 20 years from when the noise assessment has been undertaken.

[1] *A habitable room is defined in State Planning Policy 3.1 as a room used for normal domestic activities that includes a bedroom, living room, lounge room, music room, sitting room, television room, kitchen, dining room, sewing room, study, playroom, sunroom, gymnasium, fully enclosed swimming pool or patio.*

3. METHODOLOGY

The site is within the trigger distance of Great Eastern Highway, considered to be a 'Strategic Freight/Major Traffic Route' as shown on the PlanWA Maps (refer *Table 1-1* and *Figure 3-1*).

Table 3-1: Transport Corridor Classification and Trigger Distances

Transport Road Classification	Trigger Distance	Distance Measured From
Strategic Freight and Major Traffic Routes Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume	300 metres	Road carriageway edge
Other Significant Freight/Traffic Routes These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meets the criteria of either ≥ 100 Class 7 to 12 Austroads vehicles daily or ≥ 23,000 daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)	200 metres	Road carriageway edge



Figure 3-1: Subject Site Locality in Relation to Road (Source: DPLH PlanWA)

The methodology used in this assessment is to follow the screening assessment procedure provided in the Guidelines. From *Table* 2 of the Guidelines (refer *Figure 3-2*), noise levels at the proposed site are up to 58 dB $L_{Aeq(Day)}$, with Great Eastern Highway being a total of 6 lanes and at its closest point at a distance of 130 metres.

The forecast levels provided in the Guidelines assume open and level ground. The Guidelines allow a 4 dB reduction in noise level where:

- an existing building or structure screens more than 50% of the most exposed part of the noise-sensitive land-use; or
- where a solid continuous minimum 1.8 metre noise wall/fence exists or is proposed; or
- through a combination of permanent structures and terrain so there is no direct line of sight.

In this project, the 4 dB reduction is applicable to the ground floor due to other buildings located between the subject site and road corridor.

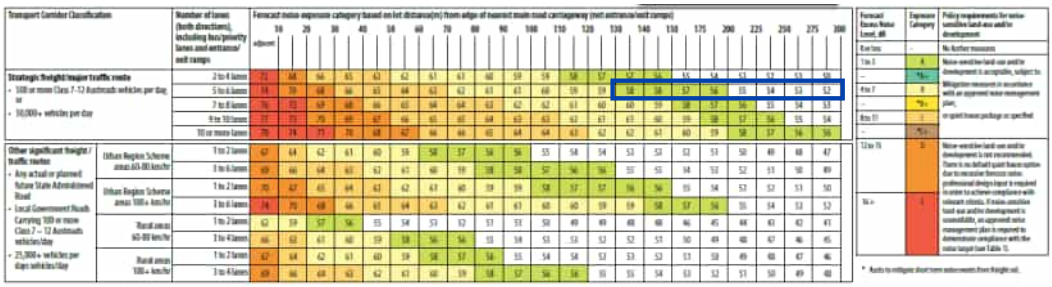


Figure 3-2: Noise Exposure Forecast Table from Guidelines

4. RESULTS

The results of the screening assessment are summarised as follows:

- Zone E is within 200 metres of Great Eastern Highway;
- Zone E is mixed use and therefore may have some noise sensitive (residential) uses subject to compliance with SPP 5.4;
- Zone E is no closer than 130 metres to Great Eastern Highway placing parts within Exposure A:
  - Due to the screening effect of existing buildings, any ground floor noise sensitive uses would be compliant with the outdoor noise target; and
  - Noise sensitive uses above ground floor and within 200 metres of Great Eastern Highway would be subject to Package A (refer *Appendix A*), including a notification on title. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available.



Figure 4-1: Exposure Levels to Upper Floors of Noise Sensitive Buildings

5. CONCLUSION

The objectives of SPP 5.4 are to achieve:

- Indoor noise levels specified in *Table 2-1* in noise-sensitive areas (e.g. bedrooms and living rooms of houses); and
- A reasonable degree of acoustic amenity for outdoor living areas on each residential lot.

Where the outdoor noise targets of *Table 2-1* are achieved, no further noise controls are necessary. Based on the SPP 5.4 screening assessment procedure, any part of the development outside of 200 metres is compliant. Any ground floor noise sensitive development within 200 metres is also compliant.

The only area of potential exceedance, based on the screening assessment procedure of SPP 5.4 are upper residential floors within Zone E where a small area is shown to be in Exposure A. As the Structure Plan develops further, measurements could be undertaken to quantify actual noise levels from Great Eastern Highway, rather than using the screening assessment procedure. Alternatively given the relatively low impact, the screening assessment procedure can be adopted, applying Quiet House Package A to upper floors of noise sensitive dwellings within the marked area on *Figure 4-1*. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available

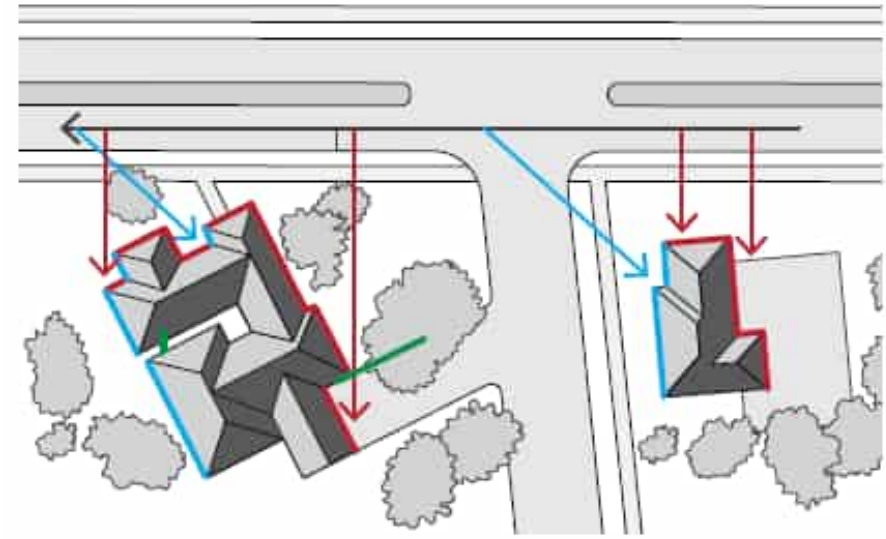
Appendix A – Quiet House Packages

The packages and information provided on the following pages are taken from *Road and Rail Noise Guidelines* (September 2019).

Where outdoor and indoor noise levels received by a noise-sensitive land-use and/or development exceed the policy's noise target, implementation of quiet house requirements is an acceptable solution.

With regards to the packages, the following definitions are provided:

- **Facing** the transport corridor (red): Any part of a building façade is 'facing' the transport corridor if any straight line drawn perpendicular (at a 90 degree angle) to its nearest road lane or railway line intersects that part of the façade without obstruction (ignoring any fence).
- **Side-on** to transport corridor (blue): Any part of a building façade that is not 'facing' is 'side-on' to the transport corridor if any straight line, at any angle, can be drawn from it to intersect the nearest road lane or railway line without obstruction (ignoring any fence).
- **Opposite** to transport corridor (green): Neither 'side on' nor 'facing', as defined above.



ATTACHMENT 6

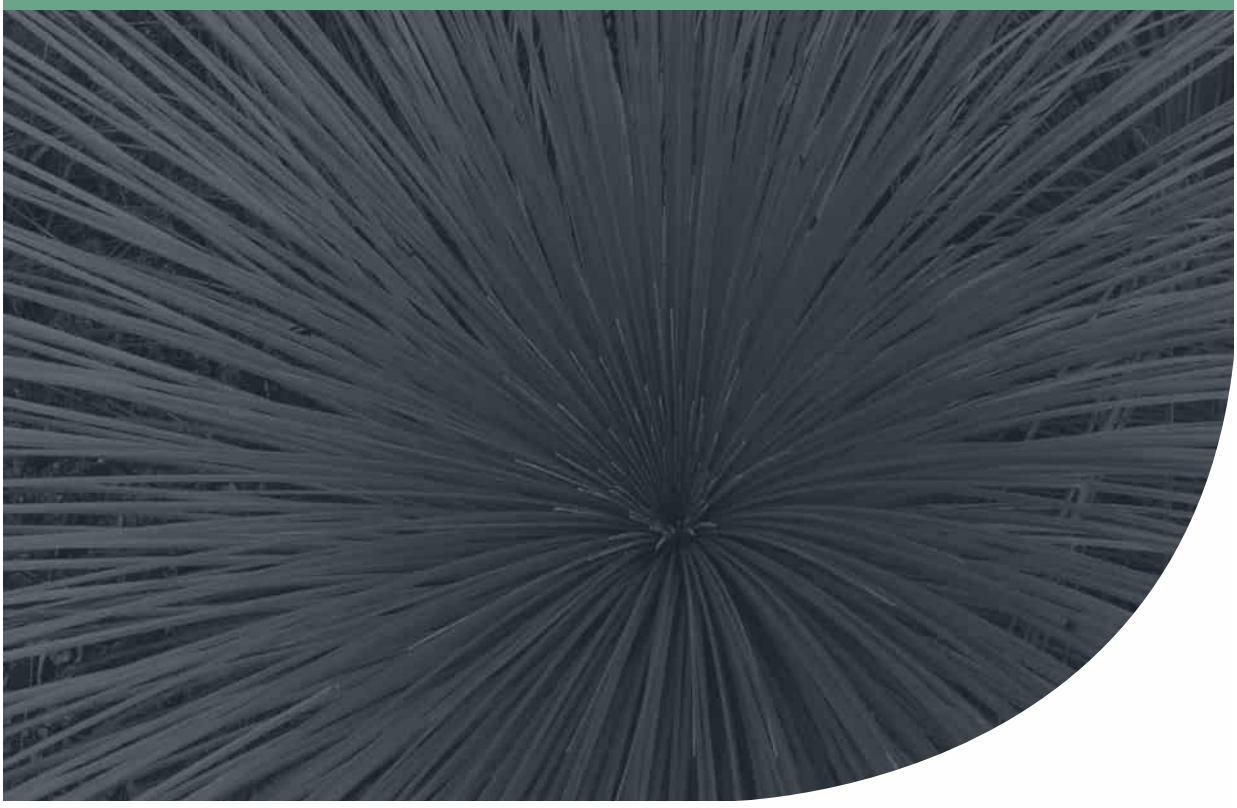
Environmental Assessment Report

Environmental Assessment Report

Ascot Racecourse Structure Plan

Project No: EP23-109(05)

Prepared for Perth Racing
July 2024



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Executive Summary

Perth Racing (the 'proponent') propose to progress a structure plan (SP) over an area of land in Ascot. The area is bounded by the Swan River to the north, Grandstand Road to the west and south, Matherson Road to the south and existing residential areas to the east, and is referred to herein as 'the site'. The site includes the Ascot Racecourse area. The site is located approximately 8.5km east of Perth central business district (CBD) and is approximately 62 ha in size, within the City of Belmont (CoB). The SP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse. The proponent additionally intends to progress a local planning scheme amendment for the site in parallel with the structure plan process.

The site is currently zoned 'Urban', 'Parks and Recreational', and 'Private Recreation' under the Metropolitan Regional Scheme (MRS). Under the Local Planning Scheme No. 15 (LPS 15), the site is currently zoned as 'Place of Public Assembly' and 'Mixed Use'. A small portion of the site is 'Parks and Recreation: water supply sewerage and drainage'.

This Environmental Assessment Report (EAR) supports the SP and is the principal supporting environmental document for the scheme amendment and SP process for the site. It includes a preliminary assessment of the proposed SP land uses, future management considerations and associated predicted environmental outcomes, against the applicable environmental factors as defined by the Environmental Protection Authority (EPA) policy framework.

The proponent has taken a range of measures to provide for the accommodation of environmental values within the Ascot SP. This is primarily achieved through the strategic location of public open space (POS) in the northern area of the site to retain intact native vegetation, as well as retention of existing wetland features located centrally within the site.

In this context, the SP has considered the identified environmental values within the site, including the proposed future retention of:

- Subtropical and temperate coastal saltmarsh TEC/PEC
- Native vegetation
- Fauna habitat.

As part of the future development process, considerations, approvals and management plans are likely to be necessary for individual proponents of development proposals within the Ascott SP, which would further minimise environmental impacts that have the potential to arise through development in accordance with the SP. The management framework and relevant considerations are summarised in **Table 1**.

Table 1: Summary of environmental management framework and relevant considerations

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision and/or Development	Construction
Flora and Vegetation	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Native Vegetation Clearing permit pursuant to Part V of the EP Act if clearing is required within the SP area and clearing is not exempt. • Preparation of a Conservation and Environment Management Plan (CEMP), where required.	Clearing Permit and compliance with approval conditions and management plans, in accordance with the EP Act.
Terrestrial Fauna	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Potential impacts to MNES (listed black cockatoo species) in relation to the EPBC Act and the need to consider referral in accordance with the *Matters of National Environmental Significance Significant Impact Guidelines* (DotE 2013). • Preparation of a fauna management plan, where required, to minimise impacts to fauna through the clearing and construction works.	Compliance with approval conditions and management plans, in accordance with the EP Act and EPBC Act, where required.
Acid Sulfate Soils	Environmental Assessment Report including preliminary investigations.	• Detailed ASS Investigation and Management Plan for intrusive works in areas mapped as 'Class 1: High to moderate risk' will likely be required in accordance with the WAPC's *Acid Sulfate Soils Planning Guidelines* (2008).	Implementation of ASS Management Plan.
Inland Waters	The LWMS prepared for the SP by Emerge Associates (2024b) (**Appendix E**).	• Detailed UWMPs will be required (most relevant to Precinct D) to support individual subdivision applications. Other precincts may be developed under Development Approval and therefore water management will likely be documented through Stormwater Management Plans (SMs). Both UWMPs and SMPs will be prepared in accordance with the *Better Urban Water Management* Framework. • Protection of the Swan River and associated Conservation Category Wetland (CCW) through consideration of hydrological processes and water quality management into design of future development areas to protect the adjacent Swan River and associated values. • Development Control Area (DCA) permit application for works within or affecting the DCA to the DBCA in accordance with the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007*.	Compliance with UWMP/SMP and DCA permit if necessary.

Table 1: Summary of environmental management framework and relevant considerations (continued)

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision	Construction
Social Surroundings	Preliminary investigations for Aboriginal Cultural Heritage. Transport Noise Assessment for the proposed SP (Lloyd George Acoustics 2023) in accordance with SPP 5.4.	• Detailed Acoustic Assessment and Management Plan (where required) or 'Quiet House Package A' implemented to upper floors of noise sensitive dwellings within Precinct E.	Section 18 approval may be required pursuant to the *Aboriginal Heritage Act 1972* prior to ground disturbing works. Compliance with noise management plan and appropriate house packages applied where appropriate.

Overall, a range of environmental impact mitigation measures (primarily impact avoidance and minimisation) are proposed within the SP layout and through the future environmental management framework. In this context, it is anticipated that implementation of the proposed SP can be suitably managed through future stages of the land use planning processes (including development) such that the EPA objectives for the relevant environmental factors can be achieved.

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Appendix A

Ascot Racecourse Structure Plan (ROWE Group Design, 2024)

Appendix B

Ascot Racecourse Precinct Plan (ROWE Group Design, 2024)

Appendix C

Draft Master Plan Concept (ROWE Group Design, 2024)

Appendix D

Flora, Vegetation and Fauna Assessment (Emerge Associates 2024a)

Appendix E

Local Water Management Strategy (Emerge Associates 2024b)

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
CoB	City of Belmont
DEC	Department of Environment and Conservation (now DER)
DEP	Department of Environmental Protection (now DER)
DER	Department of Environment Regulation
DFES	Department of Fire and Emergency Services
DoE	Department of Environment (now DER)
DoW	Department of Water
DPLH	Department of Planning, Lands and Heritage
EPA	Environmental Protection Authority
WAPC	Western Australia Planning Commission

Table A2: Abbreviations – General terms

General terms	
AHEF	Aboriginal Heritage Enquiry Form
BPA	Bushfire prone area
CBD	Central Business District
CCW	Conservation category wetland
EAR	Environmental Assessment Report
ESA	Environmentally sensitive area
MUW	Multiple use wetland
PEC	Priority ecological community
P3	Priority 3
REW	Resource enhancement wetland
SP	Structure Plan
SPP	State Planning Policy
T	Threatened
TEC	Threatened ecological community
UFI	Unique feature identifier

Table A3: Abbreviations –Legislation

Legislation	
AH Act	*Aboriginal Heritage Act 1972*
BAM Act	*Biosecurity and Agriculture Management Act 2007*
CS Act	*Contaminated Sites Act 2003*
EP Act	*Environmental Protection Act 1986*
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*

Table A4: Abbreviations – units of measurement

Units of measurement	
ha	Hectare
m	Metre
m AHD	m in relation to the Australian height datum
mBNS	m below natural surface

1 Introduction

1.1 Background

Perth Racing (the proponent) proposes to progress a structure plan (SP) over an area of land in Ascot to support and guide future development (the Ascot SP; referred to herein as 'the SP'). The SP area includes the existing Ascot Racecourse and is bounded by the Swan River to the north, Grandstand Road to the west and south, Matherson Road to the south and existing residential areas to the east (referred to herein as 'the site'; see **Figure 1**). The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within the City of Belmont (CoB). The SP layout is shown in **Appendix A** and consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse, as demonstrated below on **Plate 1**, **Figure 1**, and provided in **Appendix B**.

The proponent additionally intends to progress a local planning scheme amendment as well as the structure planning process in parallel for the site. The site is currently zoned 'Urban', 'Parks and Recreation', and 'Private recreation' under the Metropolitan Regional Scheme (MRS). Under the Local Planning Scheme No. 15 (LPS 15), the site is currently zoned as 'Place of Public Assembly' and 'Mixed Use'.

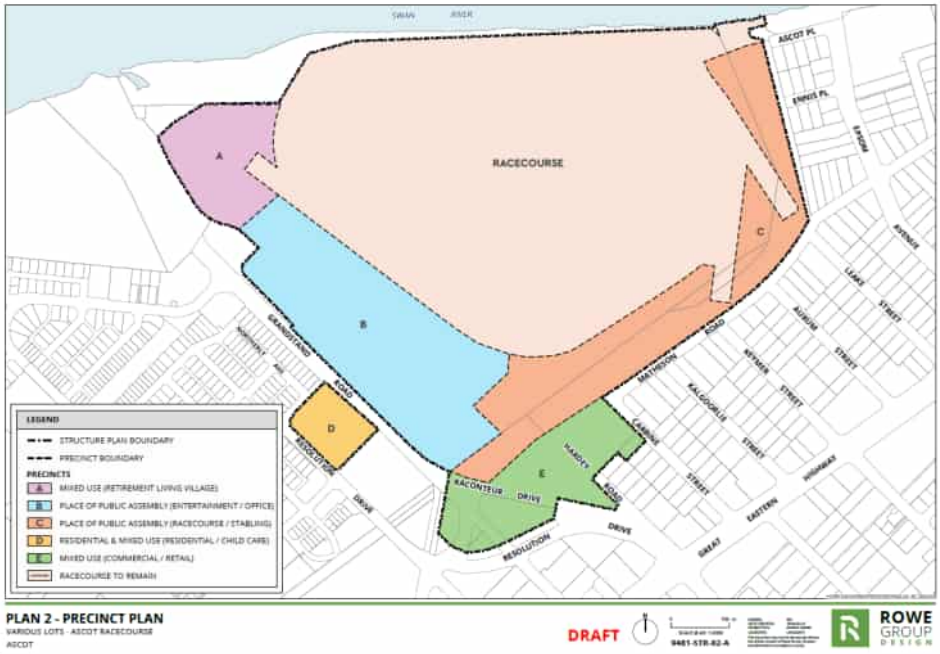


Plate 1: Ascot Racecourse Precinct Plan with proposed uses (draft)

1.2 Purpose of this report

The proponent engaged Emerge Associates (Emerge) to prepare an Environmental Assessment Report (EAR), with the intent to be the principal supporting environmental document for the local scheme amendment and SP process for the site. The EAR supports the structure planning process and provides a synthesis of information regarding the environmental values and attributes of the site. The EAR is consistent with the Western Australia Planning Commission's (WAPC) *Structure Plan Framework* (WAPC 2015) and:

- Identifies and assesses the existing environmental values and attributes of the site (**Section 2**).
- Discusses the land use planning context and the proposed SP, in the context of applicable statutory requirements under applicable legislation (**Section 3**).
- Provides an assessment of the proposed SP layout and land uses and predicted environmental outcomes against the applicable Environmental Protection Authority (EPA) environmental factors and objectives (**Section 4**).

1.3 Previous surveys and assessments

The following surveys, investigations and assessment reports were prepared to support preparation of the SP and are relevant to this EAR:

- Reconnaissance Flora, Vegetation, Fauna and Targeted Black Cockatoo Habitat Assessment (Emerge 2024a) (Appendix D)
- Ascot Racecourse Local Water Management Strategy (Emerge 2024b) (Appendix E)
- Transport Noise Assessment (Lloyd George Acoustics 2023).

An Environmental Report was prepared for the Draft Golden Gateway Local Structure Plan (LSP) in 2018 by Essential Environmental for the CoB (Essential Environmental 2018). The Draft Golden Gateway LSP is located immediately south of the site and is being progressed but has not been finalised. The Golden Gateway LSP no longer includes the site, and this SP is proposed to progress on Perth Racings landholdings exclusively. A review of the Golden Gateway LSP was undertaken as part of the preparation of this report to understand background information and context for the proposed SP.

The Draft Golden Gateway LSP provides contextual information for the proposed SP due to the proximity, and specifically through the following documents:

- Golden Gateway Bushfire Management Plan (Urbaqua 2018)
- Golden Gateway Local Structure Plan Environmental Report (Essential Environmental 2018)
- Golden Gateway Local Water Management Strategy (Essential Environmental 2018).

2 Existing Environment

The outcomes of desktop and site-specific investigations undertaken by Emerge and others have informed the identification and assessment of the existing environmental attributes and values within the site and are discussed in the below **Section 2.1** to **Section 2.8**.

The Environmental Protection Authority (EPA) identifies a number of environmental principles, factors and objectives within the *Statement of Environmental Principles, Factors and Objectives* (EPA 2018), which are used to guide the determination of significant environmental impacts and whether impacts can be appropriately mitigated or managed. Existing environmental values have been described according to the applicable EPA environmental factor (where applicable to the site), which include:

- Landforms
- Terrestrial environmental quality
- Flora and vegetation
- Terrestrial fauna
- Inland waters
- Social surroundings.

2.1 Landforms

2.1.1 Landform, soils and geology

The site occurs on the Swan Coastal Plain, the geomorphic unit that characterises much of the Perth metropolitan area. The site is within the Pinjarra System with a portion of the site within the Bassendean System. The Pinjarra System is described as *poorly drained coastal plain with variable alluvial and aeolian soils*, whilst the older Bassendean Dune system is characterised by lower relief, with variable depth to groundwater, consisting of lower sandy hills interspersed with permanent and seasonal wetlands (Churchward and McArthur 1980; Gozzard 2011).

Geological Survey of Western Australia (Gozzard 2007) indicates that the site lies within the Swan River Terraces system having Guildford formation of Alluvial and leached yellow sand. As shown on **Figure 2**, the site soil types include:

- **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.
- **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some some fine to medium sand, soft when moist, variable clay content.
- **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin.

2.1.2 Topography

The site is generally flat with a slightly higher elevation in its eastern extent. The northern portion of the site, adjacent to the Swan River, lies at 0 m Australian Height Datum (mAHD). The remainder of the site is slightly elevated, ranging from 1 mAHD to the northwest to 7 mAHD to the east.

The topographic contours of the site are shown on **Figure 3**.

2.2 Terrestrial Environmental Quality

2.2.1 Acid sulfate soils

Acid sulfate soils (ASS) refers to naturally occurring soils and sediment containing iron sulphide (iron pyrite) materials. In their natural state, present in waterlogged and/or anoxic conditions, ASS generally do not present any risk to the environment. However, when oxidised, ASS can pose issues through sulphuric acid production, which can present a range of risks for the surrounding environment, infrastructure, and human health.

The Department of Water and Environmental Regulation (DWER) provides broad-scale mapping indicating areas of potential ASS risk (DWER 2023). A review of the DWER mapping indicates that the majority of the site is considered to have 'high to moderate' risk of ASS occurrence and a small portion in the south is considered to have 'moderate to low' risk of ASS occurring within the 3 m of the natural surface.

The DWER ASS risk mapping is shown on **Figure 4**.

2.2.2 Potential site contamination

A review of the publicly available DWER Contaminated Sites Database indicates that no areas within the site are registered as a 'contaminated site' pursuant to the *Contaminated Sites Act 2003*. A basic summary of records (BSR) of Lot 9002 on DP60342 was requested from DWER which shows that Lot 9002 (including the racecourse, Precinct A and Precinct B) is classified as "possibly contaminated – investigation required" and the extent of which is shown on **Figure 4**Figure 4. The contamination is associated with the sites historical land use for horse racing and runoff from animal storage on the site and agistment in the surrounding areas causing the potential for contamination, including nutrient runoff. Monitoring and investigation is required to be reviewed by DWER and potentially re-classified and the proponent has commenced investigations to address this. The BSR notes that if groundwater is to be abstracted, analytical testing should be undertaken to determine if groundwater is suitable for its intended use.

2.2.3 Historical context

Historical aerial images available from 1953 and onwards (Landgate 2023) were reviewed and show that Ascot Racecourse has existed since prior to 1953 (**Plate 2**) and the associated racecourse infrastructure, including grandstands and stables were established between 1953 and 1977. Residential development to the south east of the site steadily increased between 1953 to 1995 and majority of residential development to the south west occurred between 1995 and 2005 (see **Plate 2** to **Plate 4**).



Plate 2: 1953 aerial (Landgate 2023)



Plate 3: 2005 aerial (Landgate 2023)



Plate 4: 2024 aerial (Landgate 2023)

2.3 Flora and Vegetation

2.3.1 Regional Context

Native vegetation within the site can be classified based on regional vegetation mapping. Heddle *et al.* (1980) mapping shows the site as comprising the 'Guildford' complex , which is described as 'open forest to tall open forest and woodland'. The site is within 'Bassendean association 1009',typically comprising a combination of *Corymbia calophylla*, *Eucalyptus wandoo* and *Eucalyptus marginata (DPIRD 2021).* This association was determined to have 16.4% remaining of its original pre-European extent within the Swan Coastal Plain, of which 0.02% is protected for conservation purposes (Government of Western Australia 2019).

The EPA's *Environmental Guidance for Planning and Development Studies* (EPA 2008) states that the loss of biodiversity caused by habitat fragmentation is significantly greater once a habitat type falls below 30% of its original extent. The Guidance also references the biodiversity conservation national objective and target of retaining 30% of the original extent of each vegetation association, and the states' minimum target of 10% for constrained urban areas such as the Swan Coastal Plain. The percentage remaining of the Bassendean vegetation association (16.4%) is below the 30% retention objective but above the 10% minimum retention target for the Swan Coastal Plain.

Vegetation is typically considered to represent an intact occurrence of its overarching vegetation complex when it is in 'good' or better condition. As outlined in **Section 2.3.4**, vegetation in some portions of the site has been assessed to be in 'good' or 'very good' condition; therefore, this indicates that these areas of remnant native vegetation within the site, is consistent with vegetation associations of the 'Guildford' formation.

2.3.2 Site-specific investigations

Emerge completed a reconnaissance flora and vegetation survey for the site on 27 March 2023 in accordance with EPA's *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016; Emerge Associates 2024a). The survey boundary incorporated the entire site.

The survey included traversing the site on foot and recording composition and condition of vegetation. Photographs were taken during the survey to show particular site conditions. Prior to the field survey, information on the habitat preferences of threatened and priority flora species and communities were reviewed. Areas of potentially suitable habitat for threatened and priority flora species were opportunistically traversed along transects and searched for conservation significant species, as required.

The findings of the survey and the associated assessment report (Emerge Associates 2024a) is summarized below and is contained within **Appendix D.**

2.3.3 Vegetation units

Four vegetation units were identified within the site during the field survey and descriptions of each is provided below in **Table 2**. The associated vegetation mapping is shown in **Figure 5.**

Table 2: Description and extent of vegetation type identified within the site

Vegetation Community	Description	Area (ha)
Er	Woodland *Corymbia calophylla* over closed grass/forbland of pasture weeds and scattered native species (or absent).	1.12
Cc	Woodland *Eucalyptus rudis* over closed grass/forbland of pasture weeds and scattered native species (or absent)..	0.28
ErJkSt	Open woodland Eucalyptus rudis and occasional Melaleuca raphiophylla over sedgeland Juncus kraussii and Schoenoplectus tabernaemontani over low shrubland Suaeda australis over forbland Apium prostratum subsp. prostratum var. prostratum and Heliotropium curassavicum over grassland *Avena sp., Cynodon dactylon and * Paspalum vaginatum (or absent).	0.17
To	Fringing rushland of *Typha orientalis*, with occasional planted native and non-native trees, shrubs and/or non-woody vegetation, over closed grass/forbland of pasture weeds.	0.46
Non-native	Heavily disturbed areas comprising bare ground and weeds with occasional native trees and forbs and/or sealed ground and buildings.	56.62

2.3.4 Vegetation condition

The majority of the site was heavily disturbed with limited intact native vegetation present. The vegetation was therefore mostly determined to be in 'degraded – completely degraded' and 'completely degraded' condition with a small portion determined to be 'very good – good'. Vegetation condition is shown in **Figure 6** and detailed below in **Table 3**.

Table 3: Vegetation condition categories within the site

Condition category (Keighery (1994))	Size (ha)
Pristine	0
Excellent	0
Very good	0
Good – very good	0.07
Good	0
Degraded	1.04
Degraded – completely degraded	0.98
Completely degraded	56.57

2.3.5 Threatened and Priority Ecological Communities

Threatened Ecological Communities (TECs) are recognised as ecological communities that are rare or under threat and therefore warrant special protection.

At a Commonwealth level, TECs are afforded statutory protection under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and at a State level, TECs are afforded statutory protection under the *Biodiversity Conservation Act 2016* (BC Act). Under both Acts, TECs are listed as either 'critically endangered', 'endangered' or 'vulnerable', noting listing status may be different between Commonwealth and State frameworks.

Ecological communities that are not listed as threatened, but are otherwise considered rare or under threat, may be added to the Department of Biodiversity, Conservation and Attractions (DBCA) priority list (DBCA 2022, 2023). PECs are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority 4' (P4). Whilst PECs are not afforded statutory protection under the BC Act, they are recognised and categorised by the DBCA and are considered through State environmental approval processes.

The 'subtropical and temperate coastal saltmarsh' ecological community is listed as a TEC ('vulnerable') under the EPBC Act and as a PEC (P3) under the BC Act. The TEC/PEC was identified within a portion of the ErJkSt vegetation unit, located in a small part of the site to the north (**Figure 7**). A total of 0.07 ha of this TEC/PEC was mapped within the site. Only part of the ErJkSt vegetation unit represents the TEC/PEC with the remaining ErJkSt vegetation unit representing canopy overhang into the site with limited to no understory vegetation, which is not characteristic of the TEC/PEC.

2.3.6 Conservation significant flora

Flora species that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth and State level, flora species may be listed as 'threatened' pursuant to the EPBC Act and BC Act. However, listing status may be different between Commonwealth and State levels. Flora species that are not listed as threatened, but are otherwise considered rare or under threat, may be added to the DBCA priority list (DBCA 2022, 2023). Priority flora are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority

4' (P4). Whilst priority flora are not afforded statutory protection under the BC Act, they are recognised and categorised by the DBCA and are considered through approval processes.

The desktop search results identified a total of 100 flora species including 25 threatened and 75 priority flora species as occurring or potentially occurring within a 9 km radius of the site. Of these, two priority flora species (*Angianthus micropodioides* (P3) and *Aponogeton hexatepalus* (P4)) were considered to have 'high' or 'moderate' likelihood of occurrence within the site (Emerge Associates 2024a).

No threatened or priority flora species were recorded during the survey and suitable habitat for threatened or priority species was not considered to be present (Emerge Associates 2024a). The two threatened and priority flora species identified in the desktop assessment were not considered likely to occur due to lack of suitable habitat.

2.3.7 Weeds

The term 'weed' can refer to any plant that requires some form of action to reduce its effect on the economy, the environment, human health and amenity. At a State level, a particularly invasive or detrimental weed species may be listed as a 'declared pest' pursuant to the *Biosecurity and Agriculture Management Act 2007* (BAM Act), indicating that it warrants special management to limit its spread. At a Commonwealth level, the Australian government has compiled a list of 32 Weeds of National Significance (WoNS) (DoEE 2019c).

A total of 58 weed species were recorded during the field survey. One weed species recorded, (**Tamarix aphylla* (athel pine)), is listed as a declared pest. Athel pine is listed in the exempt keeping category, meaning management is not obliged.

2.3.8 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are prescribed protection under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and have been identified to protect native vegetation values of areas surrounding significant, threatened or scheduled flora, vegetation communities or ecosystems.

Within an ESA, no exemptions under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* apply and would indicate that the site is likely to support significant environmental values. However, exemptions under Schedule 6 of the *Environmental Protection Act 1986* (EP Act) apply, including any clearing in accordance with a subdivision approval under the *Planning and Development Act 2005* (a recognised exemption under the Schedule 6 of the *Environmental Protection Act 1986*).

The Swan River, located adjacent to the site, is also considered a "Conservation Category Wetland" and as such, a portion of the site (3.4 ha) is listed as an ESA (**Figure 8**).

A total of 1.10 ha of vegetation meeting the definition of 'native vegetation' pursuant to the EP Act occurs within the site, as shown in **Figure 7**. This is comprised of scattered flooded gum (*Eucalyptus rudis*) and marri (*Corymbia calophylla*) trees, and fringing vegetation (vegetation type ErJkSt).

2.3.9 Bush Forever

The Government of Western Australia's *Bush Forever Policy* (Government of WA 2000) is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The objective of Bush Forever is to protect comprehensive representations of all original vegetation complexes by targeting a minimum of 10% of each for protection. Bush Forever areas represent regional ecosystems and habitat and have a vital role in conserving Perth's biodiversity.

No Bush Forever Sites occur within the site. The closest Bush Forever Site is Bush Forever Site 313 – Swan River Saltmarshes, Bayswater/Maylands, located approximately 100 m to the northwest of the site, separated by Grandstand and Garrett Road (see **Figure 8**).

2.3.10 Ecological linkages

Ecological linkages are linear landscape elements that allow the movement of fauna, flora and genetic material between areas of remnant habitat. The Perth Biodiversity Project, supported by the Western Australian Local Government Association have identified and mapped regional ecological linkages within the Perth Metropolitan Region (WALGA and PBP 2004). While the linkages generally align with areas of vegetation and Bush Forever areas, in many locations these linkages are not contiguous with vegetation coverage.

Ecological linkage ID 35 (Swan River) partially overlaps the northern portion of the site. However, most of the northern portion of the site does not support native vegetation due to historical clearing, and only a small portion remains within the northeast of the site.

Broadscale identified ecological linkages are shown in **Figure 8**.

2.3.11 City of Belmont Collective Local Biodiversity Strategy

In partnership with Town of Bassendean and City of Bayswater, the CoB developed a collective Local Biodiversity Strategy (LBS) as a commitment to the protection and enhancement of a network of local natural areas (LNAs).

LNAs across the three councils were ranked by viability using the Natural Area Initial Assessment templates detailed in the Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (WALGA, 2004). The viability assessment was used to determine the reserves of high biodiversity value that would benefit from increased protection status. The highest viability areas within the CoB were as follows:

- Goodwood Parade Estuarine Dampland
- Signall Hill
- Tomato Lakes Bushland.

No reserves deemed to have high biodiversity value, as outlined in the LBS, were identified as occurring within the site. As such, no LNAs need to be considered as part of future development within the site.

2.4 Terrestrial Fauna

2.4.1 Site-specific surveys and investigations

In conjunction with the flora and vegetation assessment, Emerge Associates undertook a basic fauna and targeted black cockatoo survey, and the assessment boundary encompassed the entire site. The targeted black cockatoo survey extended beyond the SP area, and three potential habitat trees located adjacent to the site were identified outside the SP area. These trees are located beyond the SP area however the location of the trees are shown in Figure 7 of **Appendix D**.

Transects were traversed across the site, during the day, and the characteristics of fauna habitat and presence of fauna species was recorded. Microhabitats such as logs, rocks and leaf litter were investigated and evidence of species presence such as tracks, scats, skeletal remains, foraging evidence or calls was also noted. An opportunistic fauna species list was compiled and fauna habitat values were described, with particular reference to conservation significant fauna species that have the potential to occur within the site.

The findings of the survey and the associated assessment report (Emerge Associates 2024a) is summarised below and contained within **Appendix D.**

2.4.2 Fauna habitat

Emerge (2024) identified four habitat types within the site with most of the site (52.64 ha) described as 'cleared' (see **Table 4**). Habitat values in the site are limited by historical disturbance and are primarily suited to widespread fauna species with non-specific habitat requirements.

The fringing woodland fauna habitat, associated with the **ErJkSt** vegetation unit, was noted to provide a cover of native trees and understory cover of riparian vegetation that offers habitat for ground dwelling fauna. The fringing woodland is associated with the Swan River and extends into the northeast of the site. The scattered trees and shrubs habitat type comprised of large native trees was associated with vegetation units **Cc** and **Er** would provide value to native birds and other arboreal fauna (see **Figure 5**).

Table 4: Fauna habitats identified within the site

Fauna habitat	Description	Area (ha)
Fringing woodland	Native fringing vegetation consisting of a native tree overstorey and an understorey of sedges/rushes.	0.07
Wetland	Wetland waterbodies and associated riparian sedgeland/rushland.	3.72
Scattered trees and shrubs	Scattered native and non-native trees and shrubs, providing habitat mainly for avifauna.	5.45
Cleared	Predominantly grassy weeds, bare ground and built form.	52.64

Twenty-four fauna species were recorded within the site including two conservation significant fauna species.

2.4.3 Conservation significant fauna

Fauna species that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth and State level, fauna species may be listed as 'threatened' pursuant to the EPBC Act and BC Act, respectively. However, listing status may be different between Commonwealth and State levels. Fauna species that are not listed as threatened, but are otherwise considered rare or under threat, may be added to the DBCA priority list (DBCA 2022, 2023). Priority fauna are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority 4' (P4). Whilst priority fauna are not afforded statutory protection under the BC Act, they are recognised and categorised by the DBCA and are considered through environmental approval processes.

A total of 77 conservation significant fauna species were identified as occurring or potentially occurring within a 10 km radius of the site (Emerge Associates 2024a). Of these, 11 species were considered to have a 'moderate' or 'high' likelihood of occurrence within the site, including six migratory and/or specifically protected bird species, two threatened bird species, one priority bird species and two priority mammal species **Table 5**.

The field survey confirmed the 11 species identified from the desktop assessment have the potential to occur within the site. Based on observations of fauna habitat for migratory species, it was noted that occurrences of migratory species within the site are likely to be a flyover or for marginal foraging habitat due to the site and surrounding area lacking suitable habitat.

Rakali may utilise the Swan River and are likely to occasionally occur in the northern most portion of the site associated with the fringing woodland habitat type. Quenda may occur in understorey vegetation or where grasses provide dense cover.

One threatened species, *Zanda banksii naso* (forest red-tailed black cockatoo (FRTBC)) and one P4 species (*Oxyura australis* (blue-billed duck)) were recorded at the time of survey (Emerge Associates 2024a). FRTBC were observed foraging in the southern portion of the site in cape lilac (*Melia azedarach*), which were overhanging from adjacent private properties.

Table 5: Conservation significant fauna species with potential to occur within the site

Taxa	Common name	Conservation Status	
		EP Act	EPBC Act
Birds			
Zanda banksii naso[1]	Forest red-tailed black cockatoo	VU	VU
Zanda latirostris[2]	Carnaby's black cockatoo	EN	EN
Oxyura australis	Blue-billed duck	P4	-
Pandion haliaetus	Osprey	MI	MI
Apus pacificus	Pacific swift	MI	MI

[1] Previously *Calyptorhynchus*
[2] Previously *Calyptorhynchus*

Table 5: Conservation significant fauna species with potential to occur within the site (continued)

Taxa	Common name	Conservation Status	
		EP Act	EPBC Act
Calidris ruficollis	Red-necked stint	MI	MI
Plegadis falcinellus	Glossy Ibis	MI	MI
Thalasseus bergii	Crested tern	MI	MI
Falco peregrinus	Peregrine falcon	OS	-
Mammals			
Hydromys chrysogaster	Rakali	P4	-
Isoodon fusciventer	Quenda	P4	-

2.4.3.1 Black Cockatoos

Three threatened species of black cockatoo occur in the south-west of WA:

- *Zanda*[3] *latirostris* (Carnaby's black cockatoo) (CBC) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Zanda*[4] *baudinii* (Baudin's black cockatoo) (BBC) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) (FRTBC) which is listed as 'vulnerable' under the EPBC Act and the BC Act.

The site is within the modelled distribution of CBC and FRTBC (DAWE 2022) and are therefore these species have been considered further in this section. Additionally, FRTBC were observed during the survey, in cape lilac (*Melia azedarach*) overhanging the site boundary (Emerge Associates 2024a). The site does not lie within the modelled distribution of BBC and therefore, the species is not likely to occur and have not been considered further.

Black cockatoo habitat consists of breeding, roosting and foraging categories. Foraging and breeding habitat for CBC and FRTBC was identified. No roosts or evidence of roosts were observed. However, tall trees within the site have the potential to be roosting trees. Foraging and breeding habitat for CBC and FRTBC was identified.

Foraging habitat was identified and classified as either 'primary' or 'secondary' based on black cockatoo foraging preferences. Primary food plants were defined as those with historical and contemporary records of regular consumption by a black cockatoo species. Secondary food plants were defined as plant species that black cockatoo species have been recorded consuming occasionally or that, based on their limited extent or agricultural origin, should not be considered a sustaining resource.

A total of 1.27 ha of foraging habitat for CBC was recorded, of which 0.35 ha comprised primary foraging habitat. Primary foraging habitat included 0.28 ha of primary native foraging habitat

[3] Previously *Calyptorhynchus*
[4] Previously *Calyptorhynchus*

associated with *Corymbia calophylla,* 0.07 ha of primary non-native foraging habitat associated with *Pinus pinaster*. A total of 0.92 ha of secondary foraging habitat was recorded, including 0.41 ha of secondary native foraging habitat associated with *Acacia saligna*, *Jacksonia furcellata* and X*anthorrhoea* spp*.* and 0.51 ha of secondary non-native habitat associated with *Eucalyptus gomphocephala* (**Figure 9**).

A total of 0.84 ha of foraging habitat for FRTBC was recorded in the site, which comprises 0.28 ha of primary native habitat associated with *Corymbia calophylla,* 0.07 ha of secondary native foraging habitat associated with *Jacksonia furcellata* and 0.49 ha of non-native secondary habitat associated with *Eucalyptus gomphocephala* and *Eucalyptus camaldulensis* (see **Figure 10**).

The extent of foraging habitat by value category is detailed in **Table 6**.

Table 6: Foraging habitat recorded within the site

Foraging habitat	Black cockatoo species and area of foraging habitat (ha)	
	Carnaby's	Forest red-tailed
Primary native	0.28	0.28
Primary non-native	0.07	0
Secondary native	0.41	0.07
Secondary non-native	0.51	0.49
Total	**1.27**	**0.84**

Breeding habitat was identified through 'habitat trees' which are typically defined as a native eucalypt that is known to support (or with the potential to support) black cockatoo breeding. Habitat trees include species such as marri, jarrah, blackbutt, tuart, wandoo, salmon gum or to a lesser extent flooded gum, with a diameter at breast height (DBH) of greater than 50 cm (or DBH greater than 30 cm for wandoo or salmon gum). A total of 66 habitat trees were recorded during the fauna survey. Of these, 5 trees contained hollows potentially suitable for black cockatoo breeding and the remaining 61 habitat trees did not contain hollows potentially suitable for black cockatoo breeding. Hollow potential for breeding habitat was based on inspection from ground level, which could be further verified through more detailed hollow inspections (Emerge Associates 2024a). The location of the habitat trees within the site are shown on **Figure 11**.

2.5 Inland Waters

2.5.1 Surface water

The surface hydrology within the site is dominated by the Swan River, which is located adjacent to the site. During summer, the influence of the river is limited to the riverine fringe, while in winter levels rise and can extend inland. The 1 in 100-year flood and fringe level area (see **Figure 12**) shows that the north east corner and the north west corner of the site is within the floodway and the flood fringe area extends into the site.

Within the centre of the racecourse there are three lakes including an irrigation lake, a lined lake for overflow from the irrigation lake and a wetland lake, which is the largest lake and allows excess

water to flow under the grass track to the Swan River (Emerge Associates 2024b). The irrigation lake is filled from an adjacent production bore and provides irrigation for the racetrack and surrounding landscaped areas. The lined lake is sealed with a natural clay liner and is used to provide irrigation for landscaped areas and water features.

2.5.2 Groundwater

2.5.2.1 Regional groundwater

The *Water Register* (DWER 2023) indicates that groundwater beneath the site is a multi-layered system comprised of the following:

- City of Bayswater – Perth Superficial Swan unconfined aquifer
- Perth South – Perth Leederville confined aquifer
- Perth South – Perth Yarragadee confined aquifer.

The Perth Groundwater Map indicates (DWER 2023) that the groundwater level sits at 0.5 mAHD across the site. The groundwater clearance from southeast to northwest of the site ranges from 6.5 m to 0.5 m (**Figure 12**).

2.5.2.2 Site-specific groundwater monitoring

Groundwater monitoring has been undertaken within the SP area. There are two groundwater level and quality monitoring bores and one production bore within the Racecourse, which are monitored by Perth Racing.

Groundwater depth monitoring undertaken by D.C. Blandford & Associates Pty Ltd in 2001 (D.C Blandford & Associates 2001) indicated groundwater depths ranging between 2.03 mAHD to 0.16 mAHD at the site. Additional results from bore monitoring of the Ascot Racecourse undertaken by JDA in 2022 indicated that groundwater levels ranged from 2.06 m below natural surface (mBNS) to 0.34 mBNS.

Groundwater depth monitoring was undertaken within Precinct A where six monitoring wells were installed for the geotechnical investigation by Douglas Partners (2024). The groundwater depth varied from 1.09 m below ground level (mBGL) to 2.37 mBGL during January 2024 (Douglas Partners 2024). Groundwater depth monitoring was undertaken within Precinct D by Galt Geotechnics during the geotechnical investigation. The highest groundwater level was reported as 3.03 mBGL during February 2024 (Galt 2024).

Groundwater quality monitoring was also undertaken by D.C. Blandford & Associates Pty Ltd in 2001. Concentrations of total nitrogen, nitrate, total phosphorus, as well as pH indicated minor fluctuations throughout the year, but trends were generally consistent with previous results. Results indicated metals concentrations below laboratory detection limits, with the exception of one elevated nickel concentration detected.

Groundwater quality monitoring undertaken by JDA Consulting Hydrologists in 2022 (JDA 2022) indicated similar conditions to the 2001 results. Groundwater salinity and pH levels were below the trigger value and within the guideline limits. Concentrations of total nitrogen and total phosphorous were in exceedance but were generally consistent with historical trends at the site.

2.5.3 Wetlands

Wetlands include "*areas of seasonally, intermittently or permanently waterlogged soils or inundated land, whether natural or otherwise, fresh and saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries*" (Wetlands Advisory Committee 1977). Wetlands can further be recognised by the presence of vegetation associated with waterlogging or the presence of hydric soils such as peat, peaty sand or carbonate mud (Hill *et al.* 1996).

Wetlands of international significance (such as Ramsar wetlands) are afforded protection under the EPBC Act. No such wetlands occur within or in close proximity to the site.

At a regional level, DBCA maintains the Geomorphic Wetlands of the Swan Coastal Plain dataset (DBCA 2023), which categorises wetland features into management categories to guide land use and conservation, as outlined in **Table 7**. Wetland types are based on landform shape and water permanence, whilst management categories of wetlands are determined based on hydrological, biological and human use features.

Table 7: Geomorphic wetland management categories

Management Category	Description of wetland	Management objectives
Conservation Category Wetland (CCW)	Support high levels of attributes	Preserve wetland attributes and functions through reservation in national parks, crown reserves and state owned land. Protection provided under environmental protection policies.
Resource Enhancement Wetland (REW)	Modified or degraded but still supporting substantial attributes and functions	Restore wetland through maintenance and enhancement of wetland functions and attributes. Protection via crown reserves, state or local government owned land, environmental protection policies and sustainable management on private properties.
Multiple Use Wetland (MUW)	Few remaining important wetland attributes and functions but still provide important hydrological functions	Use, development and management considered in the context of water, town and environmental planning through land care.

The Geomorphic Wetlands of the Swan Coastal Plain dataset indicates three Multiple Use Category Wetland (MUW) areas (UFI 8424, UFI 8425 and UFI 8426) and one Resource Enhancement Wetland (REW) area (UFI 8423 are present within the site. After review of local surface water hydrology, the Geomorphic Wetlands of the Swan Coastal Plain dataset mapping and field observations (refer to **Figure 5** and **Figure 6** of Emerge Associates 2024b), it was determined that the area designated as an REW in the Geomorphic Wetlands of the Swan Coastal Plain dataset does not accurately reflect the conditions observed on ground.

The Swan River Estuary, situated outside the northern boundary of the site, is recognised as a "Conservation Category Wetland" (CCW) (UFI 1316 - Estuary waterbody) within the Geomorphic Wetlands of the Swan Coastal Plain dataset and has additional significant ecological, cultural and heritage values (DEC 2011). The riparian vegetation identified in Emerge Associates (2024a) is associated with the Swan River and extends into the northeast of the site. Riparian vegetation would provide habitat for waterbirds, including birds which nest in dense stands of sedges and rushes and those waterbirds which forage in mud flats along the river. In addition, the fringing vegetation would

provide habitat for both terrestrial and aquatic fauna species, including reptiles, small mammals, fish and invertebrates.

The location of the geomorphic wetlands is shown on **Figure 12.**

2.5.4 Public drinking water source areas

DWER proclaims Public Drinking Water Source Areas (PDWSAs) to protect identified drinking water sources, including surface water and groundwater sources (DoW 2009). They are proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 1947* as Water Reserves, Catchment Areas or Underground Water Pollution Control Areas.

No PDWSAs exist within or surrounding the site.

2.6 Social Surroundings

2.6.1 Aboriginal cultural heritage

An enquiry was submitted to the Department of Planning, Lands and Heritage (DPLH) through the Aboriginal Heritage Enquiry Form (AHEF), which identified Site 3753 partially intersects with the western edge of the site and Site 3756 is located immediately adjacent to the site (**Figure 13**). Details on these sites are shown below:

- Site ID 3753 – Registered site, Name: Perth, Type: Historical, mythological, hunting place, named place, natural feature.
- Site ID 3536 – Registered site, Name: Swan River, Type: Creation / Dreaming Narrative.

It should be noted that the Site 3753 boundary is a broader area and the exact area is not defined (**Figure 13**). Therefore, it is possible that the exact location of Site 3753 is outside the site boundary.

2.6.2 Non-Indigenous heritage

A review of the State Heritage Office database (Heritage Council WA 2022) was undertaken to determine presence of sites or features of non-indigenous heritage significance within the site at a federal, state and local government level.

The Ascot Racecourse Complex (place number 06123) is listed at a local level with the CoB and occurs across the racecourse itself, which is excluded from any development areas within the SP. A portion of the Ascot Racecourse Complex is also mapped across the site (Precinct A, B and C) and comprises original buildings and newly established buildings.

The following places occur in the surrounding area and are state or local listed places:

- Bristile Kilns (fmr), Belmont (place number 00868) (state)
- Garratt Road Bridge (place number 11342) (state)
- Ascot Residential & Stables Precinct (place number 16779) (local).

2.6.3 Surrounding land uses

The surrounding area is mostly residential, with the exception of commercial land and some public open space to the south and the Swan River and public open space to the north (**Figure 13**). A Parks and Recreation Reserve (reserved under the MRS), associated with the Swan River foreshore, extends along the northern boundary of the site and intersects with a portion of the site. This area includes part of the racecourse itself and vegetation within the northeast of the site. Both of these areas are planned to be retained as part of the SP.

No surrounding land uses are likely to cause amenity impacts associated with dust, gaseous or odour emissions.

Great Eastern Highway is less than 300 m south of the southern boundary of the SP which will require consideration of transport noise and management/mitigation in line with the State Planning Policy (SPP) 5.4 *Road and Rail Noise*. Precinct E falls within the SPP 5.4 area and requires further consideration regarding potential noise impacts.

2.7 Other Considerations

2.7.1 Bushfire hazards

Review of the Department of Fire and Emergency Services (DFES) Bushfire Prone Area (BPA) mapping (DFES 2021) indicated no Bushfire Prone Areas (BPA) within the site. The nearest BPA is greater than 500 m to the west of the site and therefore no further consideration to bushfire hazards is required.

2.8 Summary of Existing Environmental Values

Table 8 below summarises the existing environmental values occurring within the site, as identified and discussed previously in **Sections 2.1** to **2.7**.

Table 8: Summary of existing environmental values within the site relevant to EPA factors

EPA factor	Summary of existing environmental values within the site
Landforms	• No restricted landforms or unique geological features have been identified within the site. • The Swan River is located adjacent to the site.
Terrestrial environmental quality	• The majority of the site is considered to have high to moderate risk of ASS occurrence and a small portion in the south is considered to have moderate to low risk of ASS occurring within the 3 m of the natural surface. • Lot 9002 (including Precinct A and Precinct B) is classified as "possibly contaminated – investigation required" pursuant to the *Contaminated Sites Act 2003.*

Table 8: Summary of existing environmental values within the site relevant to EPA factors (continued)

EPA factor	Summary of existing environmental values within the site
Flora and vegetation	• No threatened or priority flora species were recorded in the site. The threatened and priority flora species identified in the desktop assessment are not considered to occur in the site due to lack of suitable habitat. • The majority of the site is heavily disturbed (degraded to completely degraded) and limited native intact native vegetation is present. • One small patch of vegetation (vegetation community type ErJkSt) was identified in 'good – very good' condition. • A total of 0.07 ha of the 'subtropical and temperate coastal saltmarsh' TEC/PEC (listed as Vu under the EPBC Act and listed as P3 under the EP Act) occurs within the northern portion of the site adjacent to the Swan River. • A total of 1.1 ha of native vegetation as classified under the EP Act was mapped within the site.
Terrestrial fauna	• Eleven conservation significant fauna species were considered to have a 'moderate' or 'high' likelihood of occurrence within the site including six migratory and/or specifically protected bird species, two threatened bird species, one priority bird species and two priority mammal species. • One priority listed species, blue-billed duck (P4) was recorded during the survey (Emerge Associates 2024a). • As a result of historical disturbance, the site contains limited fauna habitat and is likely only utilised by fauna traversing through the wider area, especially birds. However, the small patch of 'Fringing Woodland' in the site's northeast may provide habitat value for smaller ground-dwelling fauna. **Black cockatoos** • CBC (EN) and FRTBC (VU) have the potential to occur within the site based on the desktop assessment undertaken. • FRTBC was observed foraging in the southern portion of the site in cape lilac (*Melia azedarach*), which were overhanging from adjacent private properties (Emerge Associates 2024a). • 66 potential black cockatoo habitat trees were recorded within the site. • A total of 1.27 ha of foraging habitat for CBC was recorded, of which 0.35 ha comprised primary foraging habitat. • A total of 0.84 ha of foraging habitat for FRTBC was recorded, of which 0.28 ha comprised primary foraging habitat.
Inland waters	• No CCWs have been identified within the site; however, the Swan River is a CCW and occurs immediately north of the site. • Three MUWs (UFI 8424, UFI 8425, UFI 8426) are mapped across the site. • One REW (UFI 8423) is mapped across the site, however, after review of local surface water hydrology, the Geomorphic Wetlands of the Swan Coastal Plain dataset mapping and field observations (refer to **Figure 5** and Figure 6 of Emerge Associates 2024b), it was determined that the area designated as an REW in the Geomorphic Wetlands of the Swan Coastal Plain dataset does not accurately reflect the conditions observed on ground.
Social surroundings	• Aboriginal Cultural Heritage Site 3753 partially overlaps with a portion of the west of the site and Site ID 3536 (Swan River) is located immediately north of the site. These places are associated with creation/dreaming narrative and is also associated with a mythological value. • The Ascot Racecourse Complex, place number 06123, occurs across the racecourse itself and Precinct A, B and C. • Noise and acoustic impact from Great Eastern Highway must be considered for Precinct E residential development.
Other considerations	• No Bushfire Prone Areas exist within the site.

3 Proposed Land Use and the Planning and Approval Framework

3.1 Ascot Racecourse Proposed Development

The proposed zoning for the SP is in line with existing zoning in adjacent areas and aims to provide a framework of what might be considered appropriate from a land use planning perspective, and provides a framework for the future land use, subdivision and development within the site. Additionally, a master plan has been prepared which provides a detailed conceptual layout for proposed residential and commercial areas, the road network, public open spaces and other facilities (**Appendix C**). The master plan (**Appendix C**) indicates the following future land use per precinct as:

- The racecourse is proposed to remain, within which there is expected to be minimal future additional development.
- Precinct A is proposed to include a retirement living village.
- Precinct B includes the existing car parking and racecourse grandstand and is proposed to include additional car parking spaces and provide new buildings for offices/hospitality.
- Precinct C includes proposed stables, horse float parking and car parking.
- Precinct D includes a proposed residential area and childcare centre.
- Precinct E includes proposed equine and jockey services, car parking and pad site and potential retail and bulky goods.

The SP has been developed through an iterative and collaborative design process involving a variety of stakeholders, including a multi-disciplinary design team providing expertise in the following fields:

- Town planning and urban design
- Environmental planning
- Aboriginal heritage
- Hydrology
- Civil and geotechnical engineering
- Traffic engineering
- Economic analysis.

3.1.1 Environmental considerations of the structure plan

Environmental values and considerations have been addressed as part of the SP design process, which has culminated in the proposed SP and master plan layout provided in **Appendix A** and **Appendix C**.

As outlined above, the primary structural basis of the SP layout has generally been informed by the location and extent of the various existing district-scale land uses. This has provided a level of restriction to the ability for the SP layout to strategically respond to environmental values within the site. Notwithstanding, the proponent has taken a range of measures to provide for the future retention of significant environmental values where possible (i.e. where there remains flexibility in the layout design process).

3.1.1.1 Public Open Space

The area reserved for Parks and Recreation in the northern extent of the SP, along the foreshore of the Swan River, has been retained as Parks and Recreation as part of the proposed land uses within the SP. Retention of this vegetation avoids direct impacts to the 0.07 ha of subtropical and temperate coastal saltmarsh TEC/PEC. In addition, this vegetation was identified as being in good to very good condition with potential to provide canopy cover and habitat for avian species as well as riparian vegetation for ground dwelling fauna.

3.1.1.2 Hydrology

To address the proximity of the Swan River and support the SP design and process, a Local Water Management Strategy (LWMS) has been prepared by Emerge Associates (2024b) to consider water sensitive urban design principles, flood storage requirements and a water conservation strategy. The principal management objective for hydrology within the site is to ensure that post-development environmental flows and/or hydrological cycles are maintained or improved upon pre-development conditions, especially regarding the Swan River located adjacent to the site and lake features within the site. Specifically, the LWMS has aimed to:

- Protect water quality in the Swan River by providing appropriate water quality treatment at source.
- Mitigate potential flooding within the SP area and immediate surrounds.
- Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater.
- Provide a broad level stormwater management framework to support future urban development.
- Incorporate appropriate best management practices into the drainage systems that address the environmental and stormwater management issues identified.
- Minimise transport of nutrients/pollutants to groundwater.
- Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area.
- Gain support from DWER, DBCA, CoB and Water Corporation for the proposed method to manage stormwater within the site.

3.1.1.3 Wetlands

A total of three MUW as per the Geomorphic Wetlands of the Swan Coastal Plain dataset exist within the site, specifically within the boundary of the Ascot Racecourse track. No considerations are required for MUWs however the planning and design of the SP does not intend to disturb the MUW.

One REW (UFI 8423) is mapped across the site, however, after review of local surface water hydrology, the Geomorphic Wetlands of the Swan Coastal Plain dataset mapping and field observations (refer to **Figure 5** and Figure 6 of Emerge Associates 2024b), it was determined that the area designated as a REW is unlikely represent a REW. Regardless, the planning and design of the SP has avoided the REW and no disturbance to the REW is anticipated.

3.1.1.4 Conservation significant fauna

The SP design retains the most suitable fauna habitat, the fringing woodland habitat type which is associated with the remnant vegetation along the foreshore reserve. This vegetation was noted to provide habitat for conservation significant fauna species, including rakali and will be retained in the current SP design.

The black cockatoo foraging habitat identified by the field survey is patchily distributed across the site and interspersed with plant species not used by CBC or FRTBC. No signs of use were identified during the targeted black cockatoo survey, such as chew marks, droppings or moulted feathers within any of the habitat trees with hollow(s) in the site.

The potential foraging habitat and habitat trees for CBC and FRTBC within the site is unlikely to represent critical foraging or breeding habitat, given its small extent within an urban setting with minimal potentially suitable hollows and no evidence of use by CBC or FRTBC. Potential black cockatoo habitat trees identified will be opportunistically retained. The potential foraging and breeding habitat in the SP occurs within the 'Place of public assembly,' where future development is permitted to occur. Black cockatoo habitat will need to be considered as part of future subdivision and development approvals.

3.1.1.5 Aboriginal cultural heritage

Whilst not identified as occurring within the precinct areas, the Swan River (Site ID 3536) is a key Aboriginal cultural heritage site for consideration. The SP design retains the Parks and Recreation Reserve which excludes future development adjacent to the Swan River and protects this place of cultural heritage significance from potential development impacts.

No works associated with SP development are currently proposed to directly impact the Swan River, however, should any future proposed works impact the riverbank, foreshore or any other Aboriginal cultural heritage site, approval for the proposed works under Section 18 of the *Aboriginal Heritage Act 1972* would be required.

3.1.1.6 Non-Indigenous heritage

The Ascot Racecourse Complex (place 06123) includes the racecourse itself and the surrounding proposed precincts, excluding Precinct D, as outlined in the SP. The SP design proposes to retain the racecourse itself and does not propose development within the racecourse. The remaining part of the Ascot Racecourse Complex (place 06123) is within Precinct A, B, C and E. The SP design for these precincts allows for the development of additional facilities and renovation of current facilities.

3.2 Future planning and environmental approvals process

A key component of implementing the future development of any area is the relevant environmental management framework. Subject to approval and endorsement of the structure plan by the WAPC, development of the site will be progressed through subdivision and/or development approval/s. Where required, the environmental management requirements can be implemented through

applicable subdivision and/or development approval conditions. The future planning and environmental approvals process is discussed in this section.

3.2.1 Metropolitan Region Scheme

The site is currently zoned a combination of 'Urban,' 'Private Recreation' and 'Parks and Recreation' under the Metropolitan Region Scheme (MRS). The majority of surrounding land is zoned as 'Urban,' and land abutting the Swan River reserved for 'Parks and Recreation'. The MRS zoning of Precinct A area is currently 'Private Recreation' and lodgment of an MRS amendment may be required with the Western Australian Planning Commission (WAPC) to rezone the Precinct A area from 'Private Recreation' to be consistent with finalised land uses.Correspondingly, LPS 15 could be amended either through a concurrent or subsequent local scheme amendment (see further details regarding LPS 15 in **Section 3.2.2**).

Any scheme amendment request received and initiated by the responsible authority (WAPC), would be formerly referred to the EPA under Section 48A of the EP Act (unless exempt under Section 48AAA of the EP Act). This is discussed further in **Section 3.2.4**.

3.2.2 Local Planning Scheme No. 15

The site is currently zoned 'Public place of assembly' and 'Mixed Use' under the CoB LPS 15. The existing Ascot Racecourse covers the majority of the site, which attributes the 'Place of public assembly' zoning and the south of the site within part of Precinct E is zoned 'Mixed Use'.

The current LPS 15 zonings are inconsistent with the proposed land uses within Precinct A and Precinct D. As such, a local scheme amendment will be required to rezone Precinct A from 'place of public assembly' to 'retirement living/mixed use' and to rezone Precinct D from 'Place of Public Assembly' to 'Mixed Use'.

The Swan River foreshore is also subject to the *City of Belmont Foreshore Precinct Plan* (CoB 2018) which guides the future use and management of the Belmont foreshore and the development interface with the Parks and Recreation reserve.

3.2.3 *Environmental Protection Act* 1986 - Section 38 proposals

Section 38 of the EP Act enables any person to refer a 'proposal' (as opposed to a planning scheme, as per Section 48) likely to have a significant impact on the environment to the EPA, who then decide whether or not to assess the proposal. The SP area, or part thereof, will need to be considered in relation to Section 38 of the EP Act.

A preliminary assessment of the anticipated environmental outcomes as a result of the anticipated future urban development (based on the SP layout) has been undertaken against relevant EPA factors and objectives, which is outlined in **Section 4**. Based on this assessment, it is not considered likely that any future development within the SP would require referral to the EPA pursuant to Section 38 of the EP Act.

3.2.4 *Environmental Protection Act 1986* - Section 48 scheme amendment referral

An amendment to a planning scheme (regional or local) is required to be referred to the EPA (unless exempt under Section 48AAA of the EP Act) to determine whether environmental assessment is required, pursuant to Section 48 of the EP Act. All amendments to a planning scheme are required to be referred to the EPA by the responsible authority (in this case, the WAPC) unless the amendment is exempt under Section 48AAA of the EP Act. Exemptions under Section 48AAA relate to amendments that seek changes to the planning scheme that do not relate to the environment and will not impact the environment and therefore do not require EPA consideration. Exemptions include:

- Amendments seeking to correct an administrative or minor error, amend a definition or correct a title in the planning scheme if it will not impact the operation of the scheme.
- Amendments seeking to classify an area of land as a reserve for Parks and Recreation or Regional Open Space.
- Amendments seeking to zone an area of land as a reserve if the land has been subdivided and developed by an approved redevelopment scheme and the redevelopment scheme no longer applies and the amendment is required to reflect a zone or reserve created in accordance with the approved redevelopment scheme.
- Amendments seeking to create, alter or remove a road reserve of a regional road if a clearing permit under Part V of the EP Act has been granted or if the impacts associated with construction of the road has been assessed under Part IV of the EP Act and a decision has been made that the proposal can be implemented.

The required scheme amendment for the SP will not be exempt under Section 48AAA of the EP Act. Upon referral on an amendment to a planning scheme, the EPA will make a decision on whether the proposed scheme amendment requires formal assessment and often consider significance in their assessment. The EPA may also provide informal advice on the proposed scheme amendment without formally assessing the scheme or determine that the proposed amendment is not capable of being environmentally acceptable. Areas of the SP area not assessed under Section 48A will need to be considered and referred under Section 38 of the EP Act if impacts to the environment are considered significant. As stated above, a preliminary assessment of the anticipated environmental outcomes as a result of the anticipated future urban development (based on the SP layout) has been undertaken against relevant EPA factors and objectives and is outlined in **Section 4**.

Section 48A outlines that any proposal likely to have a significant impact on the environment, but which is within an area and for a land use that is subject to an assessed scheme (i.e. a scheme for which a determination has been made by the EPA under Section 48A), is not required to be referred to the EPA under Section 38 of the EP Act.

Section 48A will only apply to the SP area which has undergone a scheme amendment (regional or local) through the Section 48A process and where the potential environmental impacts were considered by the EPA. The EPA may choose to provide advice at this time and defer assessment of environmental factors to subsequent stages of the planning process, which would mean Section 48A would not apply and referral under Section 38 would be required. Based on the assessment undertaken and the nature/layout of the SP it is unlikely that any future development within the SP extent would quire referral to the EPA pursuant to Section 38 of the EP Act.

3.2.5 Environmental Protection Act 1986 – Part V Clearing Permits

Where native vegetation is required to be cleared within the site, this will likely be undertaken in accordance with a subdivision approval and associated authorised subdivision works, which will provide an exemption from the requirements for a native vegetation clearing permit. Should bulk earthworks or any other works be commenced within the site that requires clearing of native vegetation before subdivision approvals are gained, a clearing permit pursuant to Part V of the EP Act will be required.

In addition, and as part of subdivision, the WAPC may include a standard condition (model subdivision condition EN2) which requires:

Prior to the commencement of subdivisional works, measures being undertaken to identify any vegetation on the site worthy of retention, including any potential habitat or foraging trees for threatened fauna species, and protection measures implemented to ensure such vegetation is not impacted by subdivisional works (Local Government).

This can be used to ensure that vegetation retention opportunities (likely to be limited to mature trees) are considered through the subdivisional works process.

3.2.6 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides statutory protection for listed Matters of National Environmental Significance (MNES). The CBC is listed as endangered and FRTBC is listed as vulnerable under the EPBC Act. Any future development proposals within the SP should consider the requirements of the EPBC Act in relation to CBC and FRTBC and their habitat, which will primarily be in relation to the potential breeding habitat.

The subtropical and temperate coastal saltmarsh TEC is listed as vulnerable under the EPBC Act. TEC's listed in the vulnerable category are not considered matters of national environmental significance (MNES) for the purposes of Part 3 of the EPBC Act and therefore no further considerations to the TEC/PEC are required in relation to the EPBC Act.

Individual proponents of future development within the site will need to consider their obligations under the EPBC Act and the potential need to refer any proposed action that may have a significant impact on MNES. This would largely be limited to the consideration of potential impacts on listed black cockatoo species. While this would be considered on a proposal-by-proposal basis (and potentially progressed by different proponents), it is unlikely that the potential impacts on black cockatoo would be considered significant.

3.2.7 Swan and Canning River Development Control Area

The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and the Swan Canning River Park. Any proposed development on land adjacent to the river within the DCA and/or partly within DCA would be subject to assessment and approval by the DBCA through a permit application, under Part 5 of the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007*.

4 Assessment of Predicted Environmental Outcomes

The predicted environmental outcomes that will need to be accommodated in the implementation of the proposed SP, through future development, have been assessed against the EPA objectives for each environmental factor relevant to the site (as listed in **Section 2**).

This is provided in **Table 9**, which considers the spatial layout responses of the SP and provision of POS intended to provide for the protection and conservation of existing environmental assets within the site. In addition, **Table 9** also outlines the future management of environmental values or considerations that will require further specific attention as part of the future development of the site.

A range of environmental impact mitigation measures (primarily impact avoidance and minimisation) are proposed within the SP layout and through the future environmental management framework. In this context, it is anticipated that implementation of any future development within the proposed SP can be suitably managed through future stages of the land use planning processes (including subdivision and development) such that the EPA objectives for the relevant environmental factors can be achieved.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Landforms	To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected.	The Swan River is located immediately adjacent to the north of the site. No development is proposed within the Swan River foreshore Reserve. Additionally, retention of the riparian vegetation associated with the Swan River in the northern portion of the site allows for protection of biological diversity and ecological integrity along the Swan River foreshore. Further responses associated with the Swan River in regard to hydrology are discussed below.	Future management considerations for the Swan River in regard to inland waters are discussed below.	No significant impacts likely
Terrestrial environmental quality	To maintain the quality of land and soils so that environmental values are protected.	There are no SP spatial responses to terrestrial environmental quality considerations, which primarily relate to ASS risk. To address Lot 9002 which is classified as "potentially contaminated – investigation required", investigations have been commenced by the proponent in preparation of anticipated subdivision or development approval conditions.	To facilitate development within the site, ASS investigations and management considerations for the site will likely be required (as a portion of the site is mapped as Class 1 'high to moderate' risk of ASS occurring within 3 m of the natural soil surface). Given the relatively shallow depths to groundwater within portions of the site, any dewatering that may be required for development works would likely trigger the need for a dewatering and ASS management plan. If required, any future ASS considerations will be identified and suitably managed by each proponent as part of the future development process in accordance with the WAPC's *Acid Sulfate Soils Planning Guidelines* (2008). Any future development within Lot 9002 will need to resolve the current CS Act classification, and this would involve the completion of investigations and any remediation that is identified as being required.	Any potential impacts associated with ASS can be suitably minimised at future development stages within the site. If determined to be required, an ASS management plan and dewatering management plans would be prepared and implemented as part of any works associated with subdivision or development works. Site contamination will be adequately investigated and remediation completed (if required) to resolve any site contamination risk.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Flora and vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	The SP layout has been designed to maintain the northern vegetated area within Parks and Recreation Reserve. This includes 0.07 ha of the subtropical and temperate coastal saltmarsh TEC/PEC. Retention of this vegetation in the northern portion of the site allows for protection of flora, vegetation, biological diversity and ecological integrity along the Swan River foreshore. Remaining vegetation within the site was recorded in 'degraded' to 'completely degraded' condition with minimal environmental value. As such, no additional SP vegetation retention provisions are considered necessary.	Should any works within the site that require clearing of native vegetation prior to subdivision approvals, a clearing permit pursuant to Part V of the EP Act will be required, unless otherwise exempt from a clearing permit. Subdivision approval and associated authorised subdivision works will provide an exemption from the requirements for a clearing permit. Future subdivision and/or development applications and approval conditions would consider vegetation retention where possible. Conditions associated with subdivision and/or development approvals often require the preparation of a Conservation and Environment Management Plan, which would further minimise potential impacts to retained flora and vegetation values during proposed construction in development stages.	Overall, the SP layout responds to flora and vegetation values where possible, primarily associated with retention of established vegetation along the Swan River foreshore. Protection of an area of subtropical and temperate coastal saltmarsh TEC/PEC is also a key outcome of this response.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Terrestrial fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	The SP layout has been designed to maintain the northern vegetated area within POS. Retention of this vegetation in the northern portion of the site allows for protection of biological diversity and ecological integrity along the Swan River foreshore. A total of 66 habitat trees potentially suitable for black cockatoo breeding were identified within the site, of which five contain potentially suitable hollows for black cockatoo breeding habitat. A total of 1.27 ha and 0.84 ha of foraging habitat (primary and secondary) for CBC and FRTBC, respectively, was recorded within the site. Of this, primary foraging habitat (native and non-native) comprised a total of 0.35 ha and 0.27 ha for CBC and FRTBC, respectively. The remaining area consisted of secondary foraging habitat. The foraging habitat is patchily distributed and is interspersed with plant species not used for CBC or FRTBC for foraging. No signs of use were identified during the targeted black cockatoo survey, such as chew marks, droppings or moulted feathers within any of the habitat trees with potential hollow(s). The potential foraging habitat and habitat trees for threatened black cockatoo species mapped within the site are unlikely to represent critical foraging or breeding habitat, given its small extent within an urban setting with minimal potentially suitable hollows and no evidence of use by CBC or FRTBC.	Where future development works within the site will result in potential impacts to MNES (including CBC and FRTBC), proponents will need to consider their EPBC Act obligations and need for referral, based on the specific impacts of their proposed action. Individual proposed actions can be addressed through preliminary self-assessment against the *Matters of National Environmental Significance Significant Impact Guidelines* (DotE 2013) in relation to any potential impacts on MNES. As part of future subdivision, there may be requirements to prepare a fauna management plan prior to works commencing for development involving clearing of native vegetation or any fauna habitat in order to minimise impacts to fauna during clearing and construction works. Fauna management plans can be prepared as required as part of future subdivision works and are often associated with conditions of subdivision and/or development approval. Conditions associated with subdivision and/or development approvals often require the preparation of a Conservation and Environment Management Plan, which would further minimise potential impacts to fauna during proposed construction in development stages.	Overall, the SP layout responds to terrestrial fauna values, primarily associated with retention of intact native vegetation along the northern border of the site, providing potential habitat for terrestrial fauna. Notwithstanding, impacts to MNES such as CBC and FRTBC are possible and EPBC Act obligations will need to be considered by proponents before development, depending on the nature and extent of the development and magnitude of likely impacts. In general, the extent of impact on black cockatoo is not likely to be considered significant.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Inland waters	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.	The *State Water Strategy for Western Australia* (Government of WA 2003) and *Better Urban Water Management* (WAPC 2008) endorses the promotion of integrated water cycle management and application of water sensitive urban design (WSUD) principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies. Whilst not a spatial response, a Local Water Management Strategy (LWMS) has been prepared by Emerge Associates for the site in line with water sensitive urban design principles, flood storage requirements and a water conservation strategy. The principal management objective for hydrology within the site is to ensure that post-development environmental flows and/or hydrological cycles are maintained or improved upon pre-development conditions, especially regarding the Swan River adjacent to the site and lake features retained within the site. Specifically, the LWMS has aimed to: • Protect water quality in the Swan River by providing appropriate water quality treatment at source. • Mitigate potential flooding within the SP area and immediate surrounds. • Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater. • Provide a broad level stormwater management framework to support future urban development. • Incorporate appropriate best management practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified.	A LWMS has been prepared to support the SP process. Detailed Urban Water Management Plans (UWMP) will be required in support of individual subdivision applications in accordance with the *State Water Strategy for Western Australia* (Government of WA 2003) and *Better Urban Water Management* (WAPC 2008). UWMPs will be most relevant most relevant to Precinct D. Other precincts may be developed under a Development Approval and therefore water management will likely be documented within a Stormwater Management Plan (SMP) also in accordance with *Better Urban Water Management* (WAPC 2008). Should any future developments propose to impact the Swan River CCW and as such impact the mapped ESA associated with the Swan River, wetland buffers and separation distances should be implemented in accordance with the draft *Guideline for the Determination of Wetland Buffer Requirements* (WAPC 2005) for protection of wetland values, habitat protection, edge effects and water quality management with relevant guidelines to protect wetland values, habitat and water quality. Where proposed development is within or adjacent to the Swan and Canning River Development Control Area (DCA), proponents will be required to submit a DCA permit application to the DBCA in accordance with the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007.*	The SP does not specifically respond to the inland waters environmental factor. However, the LWMS defines the intended hydrological management approach, which will be implemented during future development.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Inland waters (continued)	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected (continued).	• Minimise transport of nutrients/pollutants to groundwater. • Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area. Three MUWs and one REW will be retained in the current SP design. Although an REW is mapped within the site, after review of local surface water hydrology, aerial imagery and field observations (refer to Figure 5 and Figure 6 of Emerge Associates 2024b), it was determined that the area designated as an REW in the Geomorphic Wetlands of the Swan Coastal Plain dataset does not accurately reflect the conditions observed on ground. However, the REW will be retained in the current SP design. The Swan River is a CCW and is located immediately adjacent to the site. The SP design avoids the CCW and associated ESA by retaining the Parks and Recreation Reserve which encompasses the CCW buffer area and values associated with the Swan River.		

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Social Surroundings	To protect social surroundings from significant harm.	Aboriginal Cultural Heritage (ACH) site 3536 (Swan River) is located immediately north of the site and ACH Site3753 has a minor overlap with the western boundary of the site. These sites are not considered to be potentially impacted by the proposed SP layout. However, should any future development propose to impact these sites, further consultation and AH Act requirements would be required. The Ascot Racecourse Complex (place 06123) is a non-indigenous heritage place, located within the site. The SP design proposes to retain the racecourse itself and excludes the racecourse from proposed development. The remaining part of the Ascot Racecourse Complex (place 06123) is within Precinct A, B and C. The SP design of these precincts allows for the development of additional facilities and renovation of current facilities. No responses are required in regard to noise and acoustics.	The Swan River is associated with Site 3536 and as such any future proposed works that may impact the riverbank and/or the foreshore will require approval under Section 18 of the *Aboriginal Heritage Act 1972*. Further requirements and consultation would be required to identify the extent of Site 3753 within the SP area and if future consideration is required in accordance with the *Aboriginal Heritage Act 1972*. Future development would need to consider the Ascot Racecourse Complex heritage site and can be addressed as part of any Development Approval process. A Transport Noise Assessment for the proposed SP was undertaken by Lloyd George Acoustics in November 2023 (Lloyd George Acoustics 2023) to understand the spatial responses that might be required to address potential noise and acoustic impacts in the SP from the adjacent Great Eastern Hwy. Based on the results, future proponents undertaking noise sensitive development in Precinct E could undertake further noise assessments to quantify actual noise levels from Great Eastern Highway, rather than using the screening assessment criteria. Alternatively, the screening assessment procedure could be adopted, resulting in requirements for a 'Quiet House Package A' to upper floors of noise sensitive dwellings within Precinct E. Future development would need to consider noise impacts from the racecourse and can be addressed as part of any Development Approval process.	Any potential impacts to social surroundings can be suitably mitigated through a range of impact avoidance and minimisation measures such that it is unlikely any significant residual impacts will occur.

5 Conclusions

The proponent has taken a range of measures to provide for the future retention of relevant environmental values within the Ascot SP. This is primarily achieved through the strategic location of the Parks and Recreation Reserve in the northern area of the site to preserve intact native vegetation.

In this context, the SP has been designed to respond to the identified environmental values within the site where possible, including the proposed retention of:

- Subtropical and temperate coastal saltmarsh TEC/PEC
- Fauna habitat
- Native vegetation.

A local scheme amendment will be required to rezone Precinct A from 'place of public assembly' to 'retirement living/mixed use' and to rezone Precinct D from 'Place of Public Assembly' to 'Mixed Use'.

Considerations, approvals and management plans may be necessary for each individual proponent for future development works, which would further minimise environmental impacts through development within the SP area. Environmental factors and the management framework considerations are summarised in **Table 10.**

Overall, a range of environmental impact mitigation measures (primarily impact avoidance and minimisation) are proposed within the SP layout and through the future environmental management framework. In this context, it is anticipated that implementation of the proposed SP can be suitably managed through future stages of the land use planning processes (including development) such that the EPA objectives for the relevant environmental factors can be achieved.

Table 10: Summary of Environmental Management Framework Considerations

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision and/or Development Approval	Construction
Flora and Vegetation	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Native Vegetation Clearing permit pursuant to Part V of the EP Act if clearing is required within the SP area and clearing is not exempt. • Preparation of a Conservation and Environment Management Plan (CEMP), where required.	Clearing Permit and compliance with approval conditions and management plans.
Terrestrial Fauna	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Potential impacts to MNES in relation to the EPBC Act and need to consider the need for referral in accordance with the *Matters of National Environmental Significance Significant Impact Guidelines* (DotE 2013). • Preparation of a fauna management plan for any development within the SP area prior to works commencing for development involving clearing of native vegetation or any fauna habitat.	Compliance with approval conditions and management plans, in accordance with EPBC Act, where required.
Acid Sulfate Soils	Environmental Assessment Report including preliminary investigations.	• Detailed ASS Investigation and Management Plan for areas mapped as 'Class 1: High to moderate risk' will likely be required in accordance with the WAPC's *Acid Sulfate Soils Planning Guidelines* (2008).	Implementation of ASS Management Plan.
Inland Waters	The LWMS prepared for the SP by Emerge Associates (2024b) (**Appendix E**).	• Detailed UWMPs will be required (mostly relevant to Precinct D) to support individual subdivision applications. Other precincts may be developed under Development Approval and therefore water management will likely be documented through SMPs. Both UWMPs and SMPs will be prepared in accordance with the *Better Urban Water Management* Framework. • Protection of the Swan River CCW and ESA through consideration of hydrological processed and water quality management into design of future development areas to protect the adjacent Swan River and associated values. • DCA permit application for works within or affecting the DCA to the DBCA in accordance with the Swan and Canning Rivers Management Act 2006 and the Swan and Canning River Management Regulations 2007.	Compliance with UWMP/SMP and approved DCA permit.

Table 10: Summary of Environmental Management Framework Considerations (continued)

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision and/or Development Approval	Construction
Social Surroundings	Preliminary investigations for Aboriginal Cultural Heritage. Transport Noise Assessment for the proposed SP (Lloyd George Acoustics 2023) in accordance with SPP 5.4.	• Detailed Acoustic Assessment and Management Plan (where required) or 'Quiet House Package A' implemented to upper floors of noise sensitive dwellings within Precinct E. • Completion of any contamination investigations and identification of any remediation requirements within Lot 9002.	Approval pursuant to Section 18 of the *Aboriginal Heritage Act 1972* will be required prior to ground disturbing works if impacts to known sites are likely. Compliance with noise management plan and appropriate house packages applied where appropriate. Completion of remediation works (if required) for Lot 9002.

6 References

6.1 General references

The references listed below have been considered as part of preparing this document.

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Figures

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Figure 2: Site Geology

Figure 3: Topographic Contours

Figure 4: Acid Sulfate Soils

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Figure 6: Vegetation Condition

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Figure 8: Bush Forever, Ecological Linkages and Environmental Sensitive Areas

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Figure 12: Hydrological Features

Figure 13: Social Surroundings



Figure 1: Site Location

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan

Client: Perth Racing

Plan Number:
EP23-109(05)--F06
Drawn: WJC
Date: 03/04/2024
Checked: EKB
Approved: JDH
Date: 29/04/2024

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Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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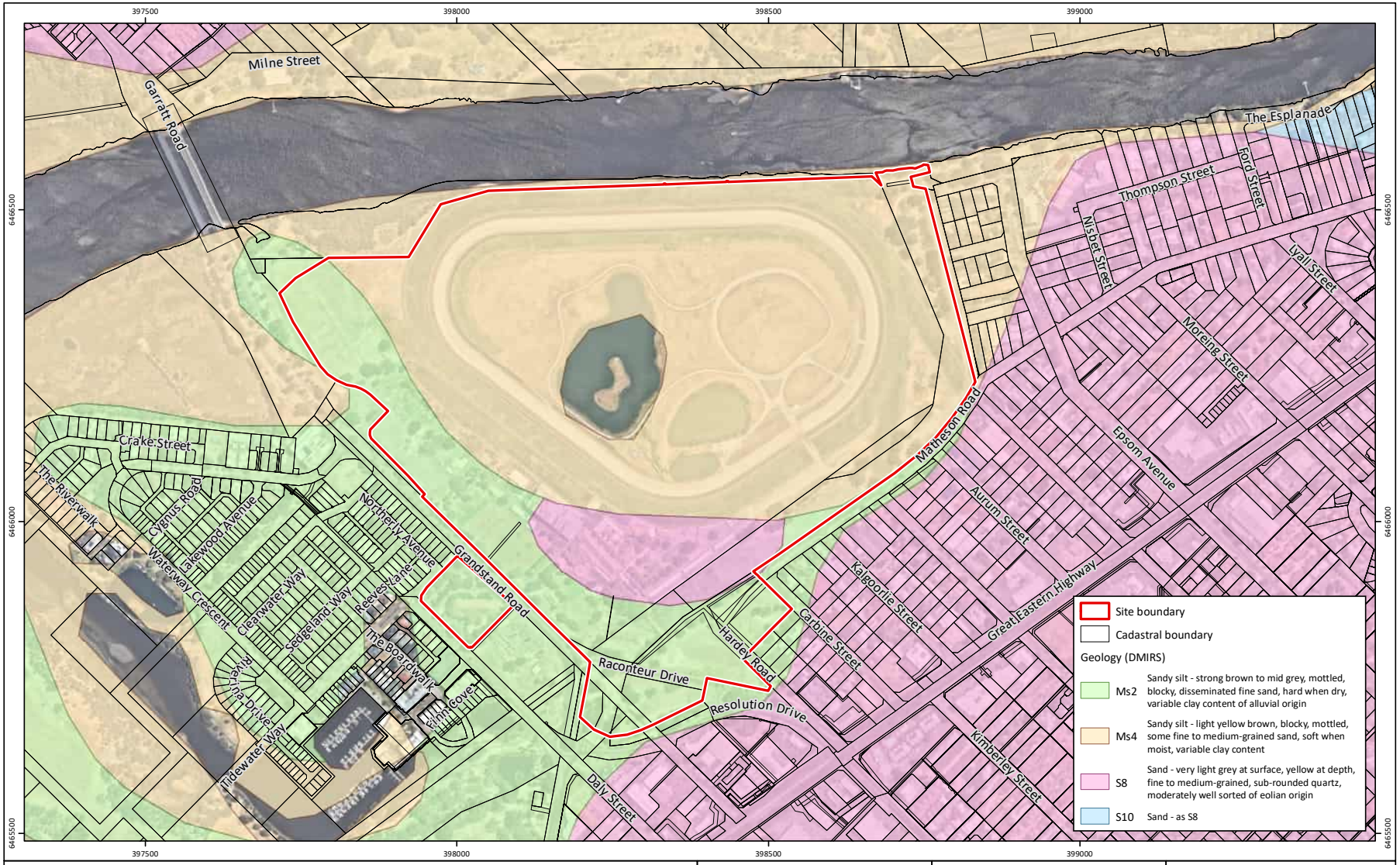


Figure 2: Site Geology

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(05)--F07

Drawn:	WJC
Date:	03/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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Figure 3: **Topographic Contours**

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan

Client: Perth Racing

Plan Number:
EP23-109(05)--F08

Drawn:	WJC
Date:	03/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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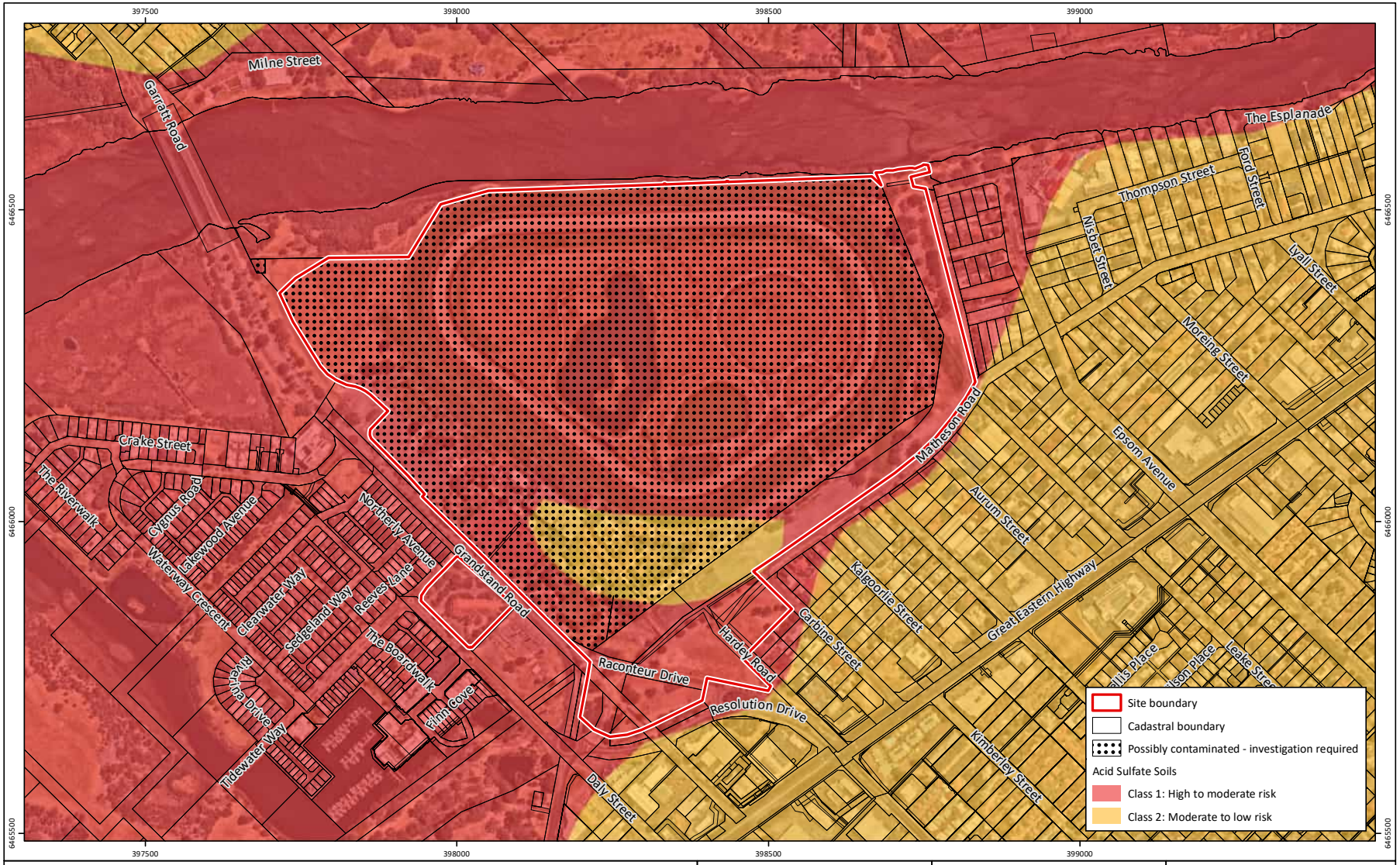


Figure 4: Acid Sulfate Soils

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan
Client: Perth Racing

Plan Number:
EP23-109(05)--F09a
Drawn: WJC
Date: 22/07/2024
Checked: EKB
Approved: JDH
Date: 23/07/2024

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Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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Figure 5: Vegetation Types

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(05)--F10

Drawn:	WJC
Date:	03/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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Metres
Scale: 1:6,500@A4
GDA2020 MGA Zone 50

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Figure 6: Vegetation Condition

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(05)--F11

Drawn:	WJC
Date:	03/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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Metres
Scale: 1:6,500@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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Figure 7: **Threatened and Priority Ecological Community and Native Vegetation under the EP Act**

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan

Client: Perth Racing

Plan Number: EP23-109(05)--F12
Drawn: WJC
Date: 03/04/2024
Checked: EKB
Approved: JDH
Date: 01/05/2024

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Metres
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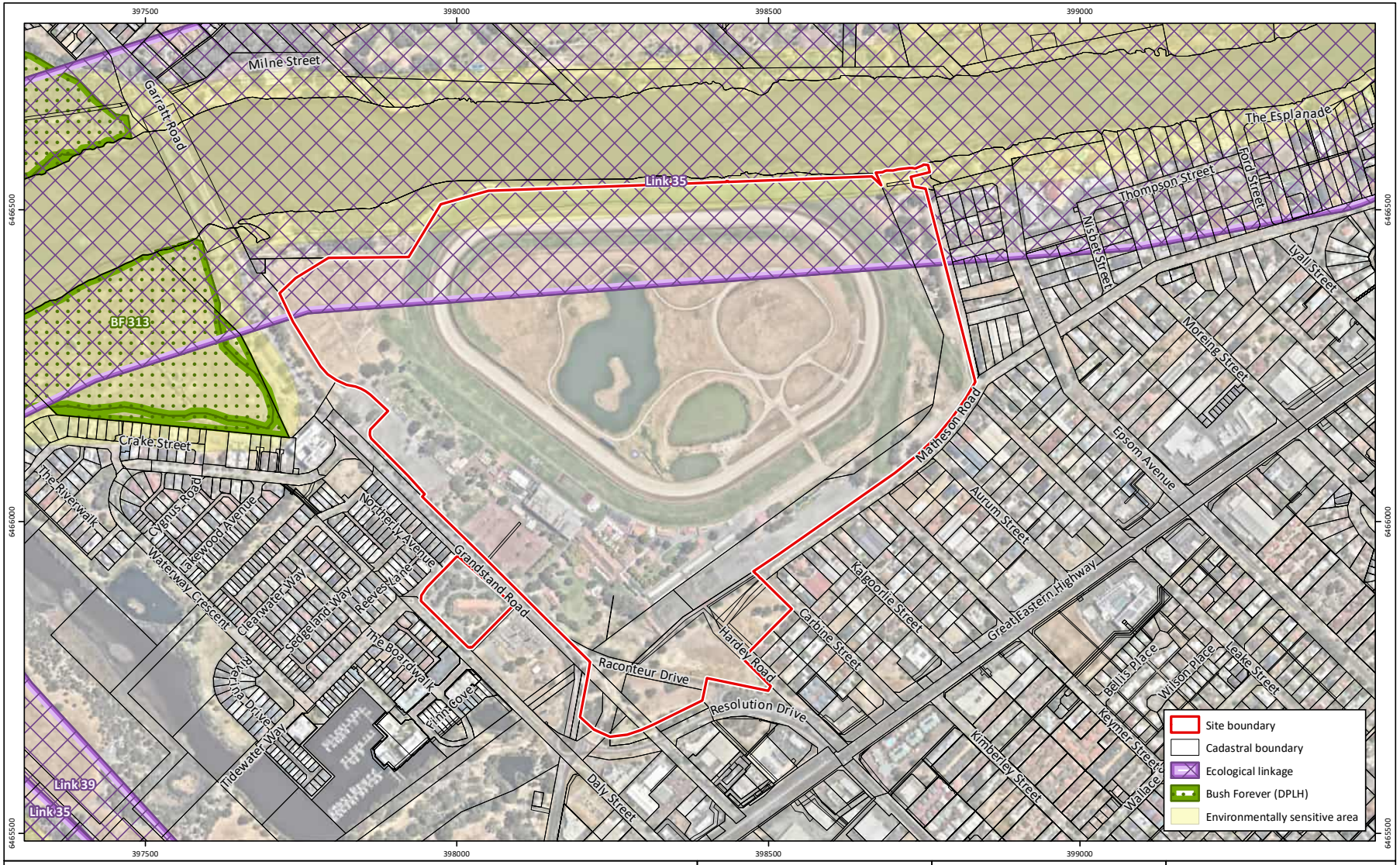


Figure 8: **Bush Forever, Ecological Linkages and Environmentally Sensitive Areas**

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Client:	Perth Racing

Plan Number:
EP23-109(05)--F13

Drawn:	WJC
Date:	03/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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Figure 9: **Carnaby's Black Cockatoo Foraging Habitat**

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number: **EP23-109(05)--F20**

Drawn:	WJC
Date:	08/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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Metres
Scale: 1:6,500@A4
GDA2020 MGA Zone 50

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Figure 10: Forest Red-tailed Black Cockatoo Foraging Habitat

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(05)--F21

Drawn:	WJC
Date:	08/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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Scale: 1:6,500@A4
GDA2020 MGA Zone 50

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Figure 11: Black Cockatoo Habitat Trees

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(05)--F22a

Drawn:	GAR
Date:	28/06/2024
Checked:	TDP
Approved:	RAW
Date:	01/07/2024

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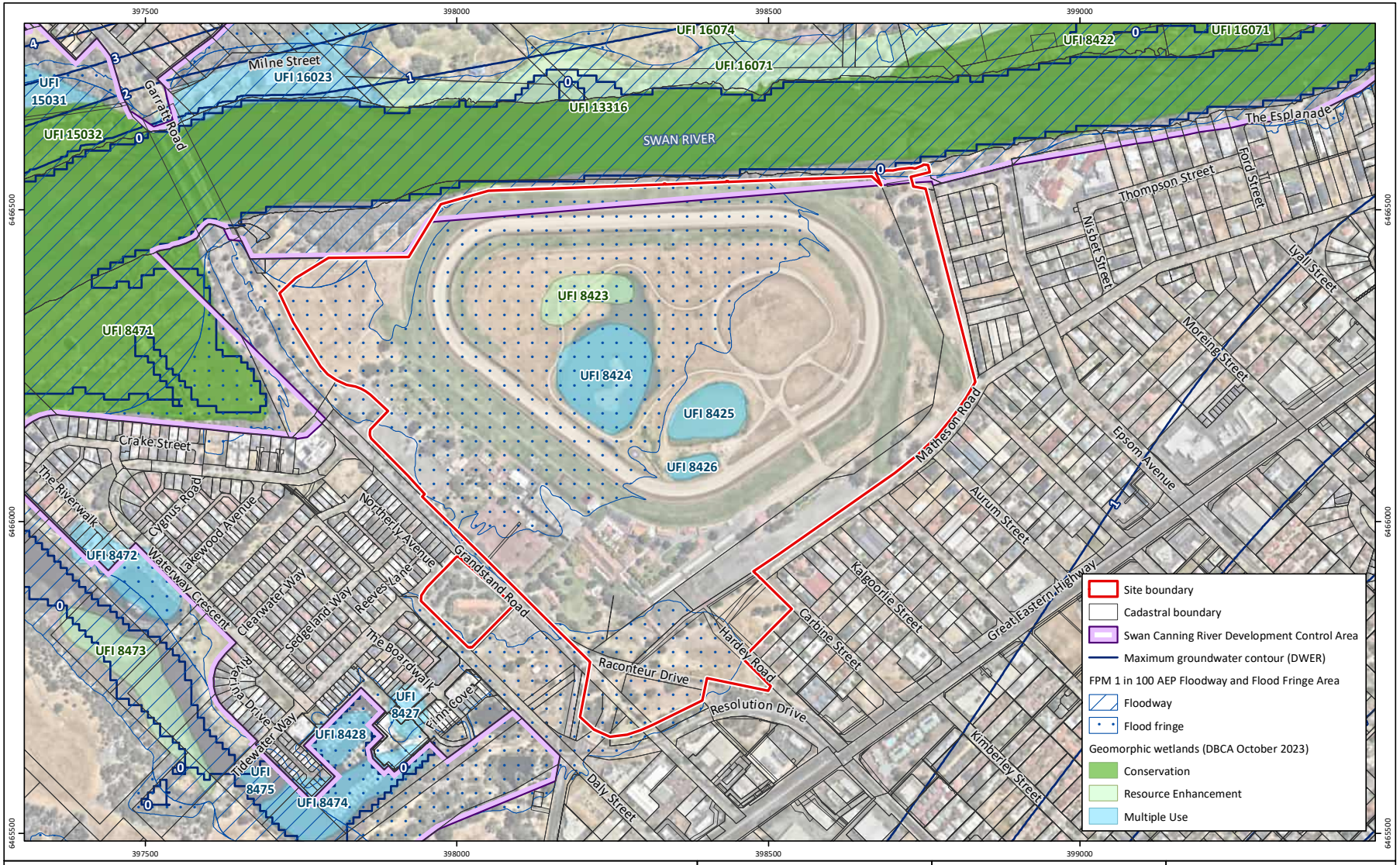


Figure 12: Hydrological Features

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(05)--F14

Drawn:	WJC
Date:	03/04/2024
Checked:	EKB
Approved:	JDH
Date:	01/05/2024

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Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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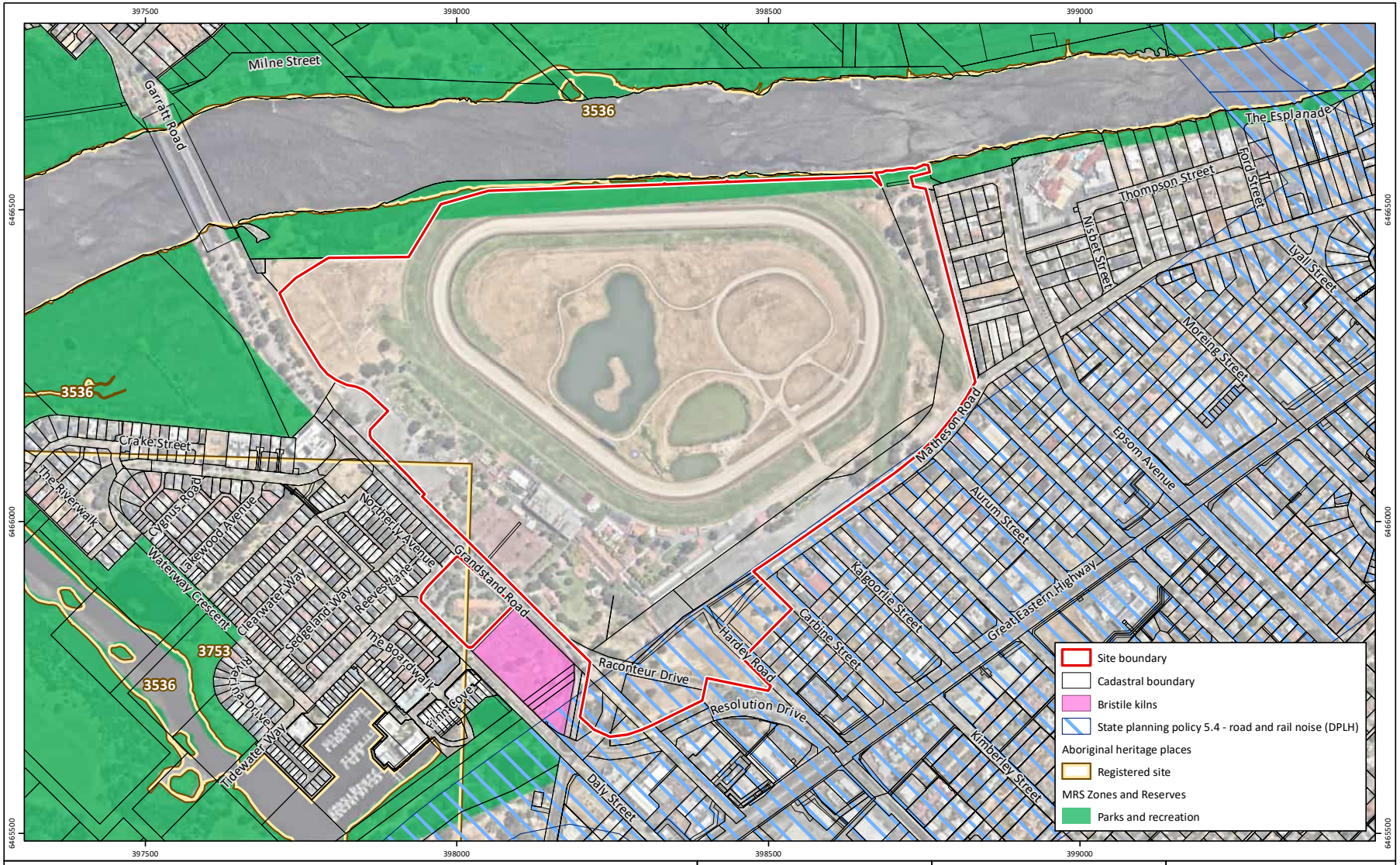


Figure 13: Social Surroundings

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(05)--F15a

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Date:	08/05/2024
Checked:	EKB
Approved:	JDH
Date:	09/05/2024

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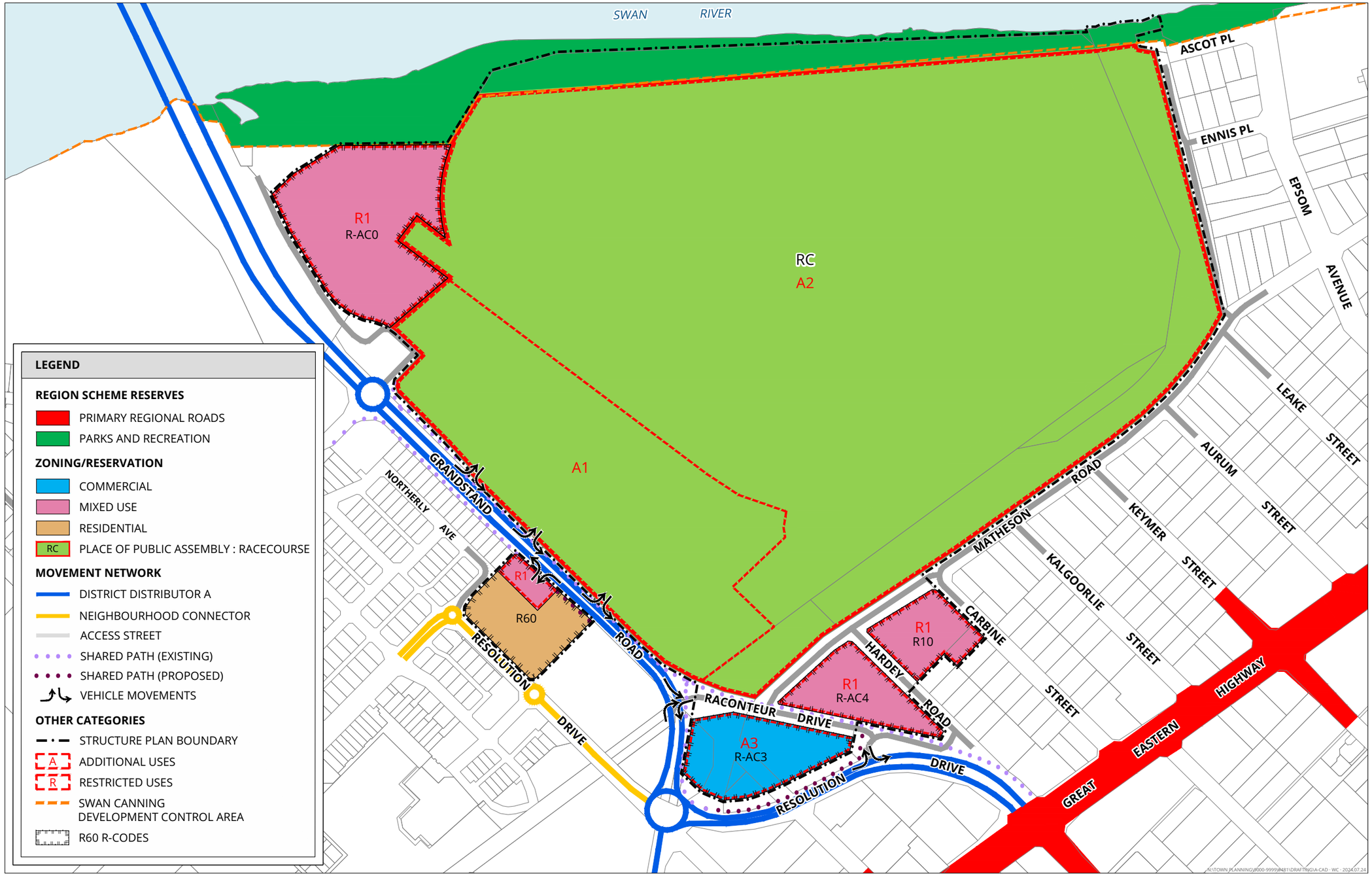
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Appendix A

Ascot Racecourse Structure Plan (ROWE Group Design, 2024)



PLAN 1 - STRUCTURE PLAN
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

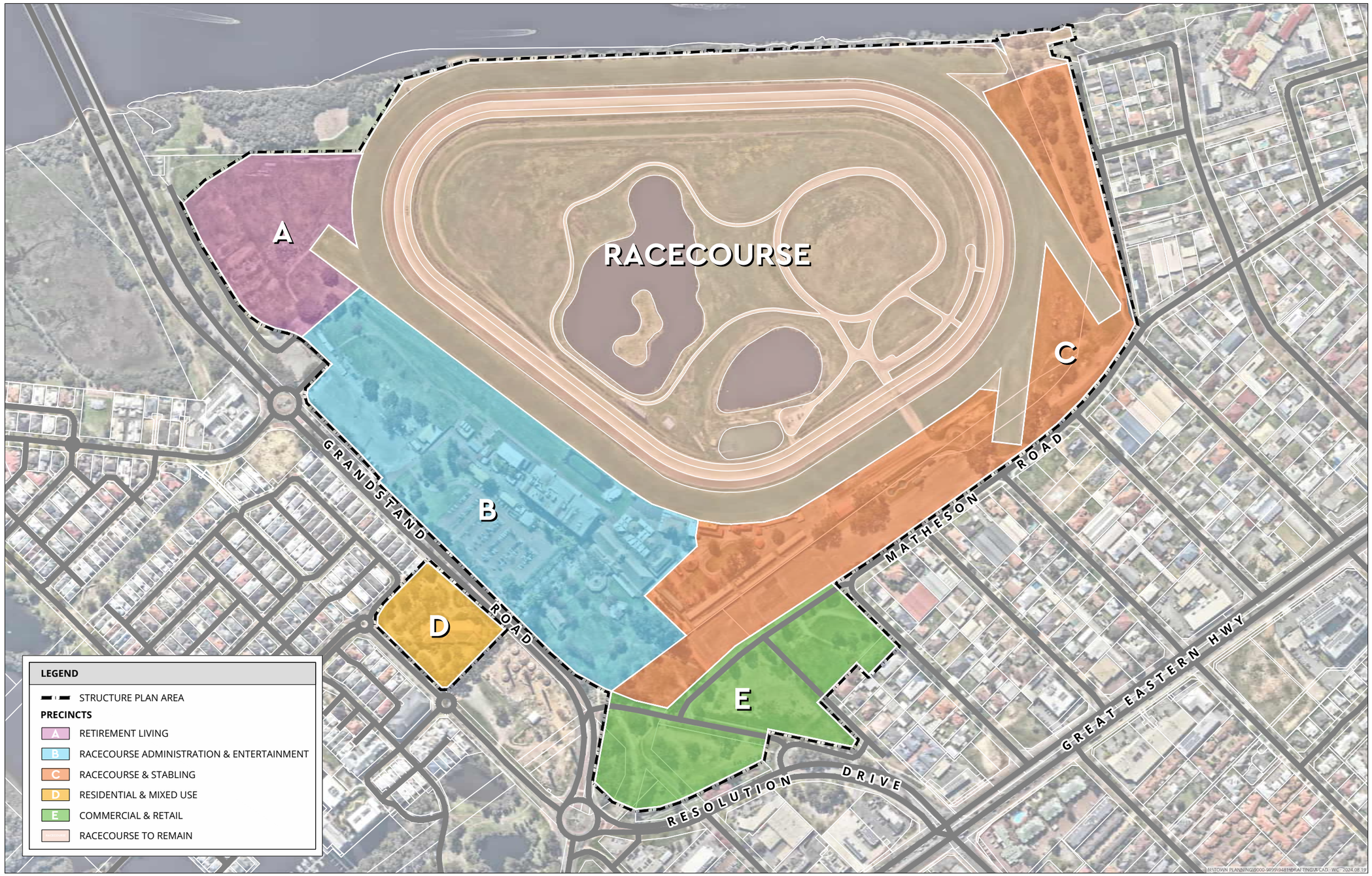
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DATE CREATED: 2024.07.24
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
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ROWE GROUP DESIGN

Appendix B

Ascot Racecourse Precinct Plan (ROWE Group Design, 2024)



STRUCTURE PLAN PRECINCTS

VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

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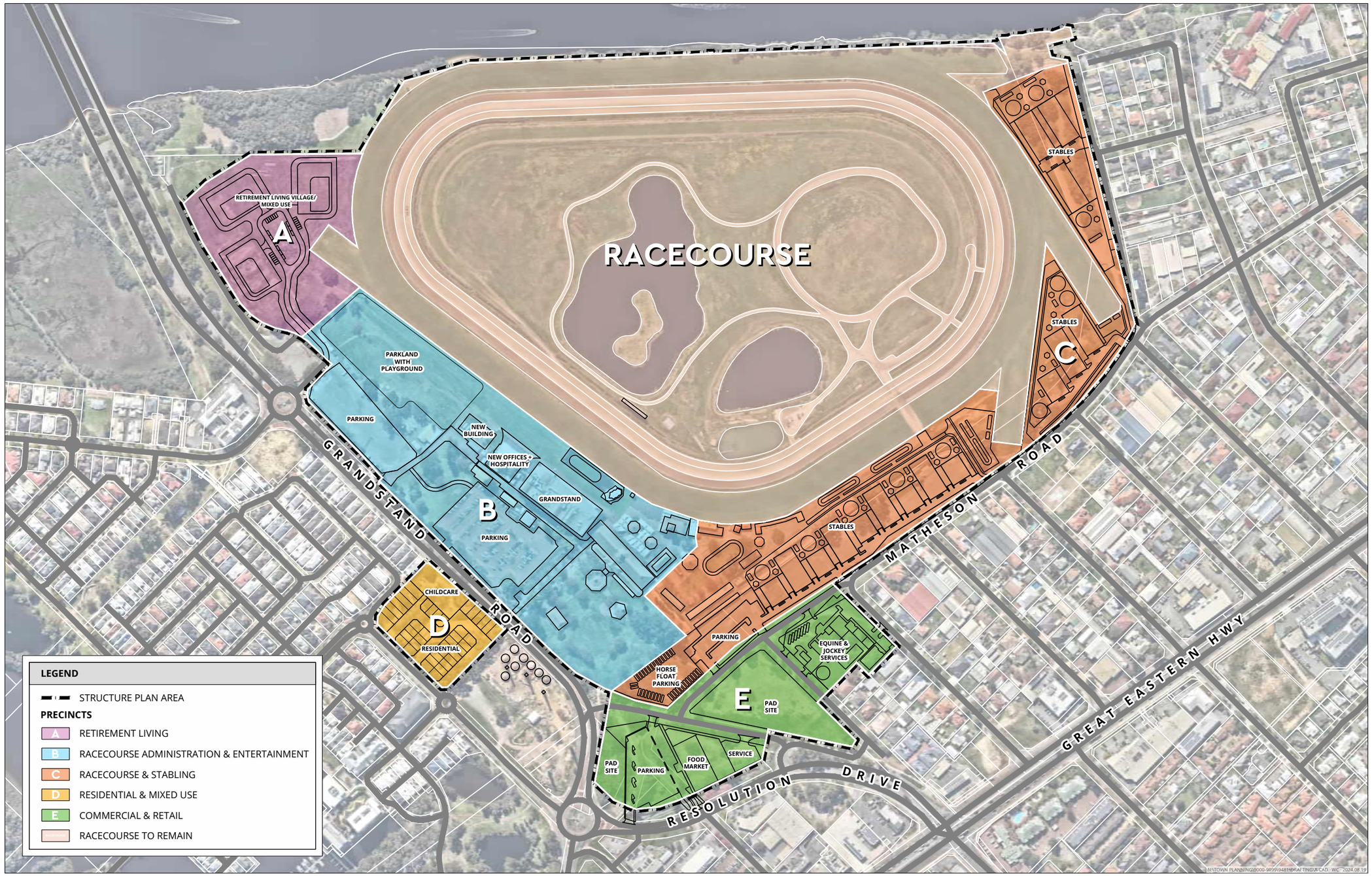
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CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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ROWE GROUP DESIGN

Appendix C

Draft Master Plan Concept (ROWE Group Design, 2024)



DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

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SCALE @ A3: 1:4000
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PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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ROWE GROUP DESIGN

Appendix D

Flora, Vegetation and Fauna Assessment (Emerge Associates 2024a)

TECHNICAL MEMORANDUM

Flora, Vegetation and Fauna Assessment
Various lots, Grandstand Rd and Raconteur Dr, Ascot

PROJECT NUMBER	EP23-109(06)	**DOC. NUMBER**	EP23-109(06)—003A TDP
PROJECT NAME	Ascot Local Structure Plan	**CLIENT**	Perth Racing
AUTHOR	TDP/AJU	**REVIEWER**	RAW
VERSION	A	**DATE**	11/07/2024

1. INTRODUCTION

1.1. Project background

Emerge Associates (Emerge) were engaged by Perth Racing to undertake a flora, vegetation and fauna assessment at Lots 1, 3, 13, 50, 452, 7705 and 9002 Grandstand Rd and Lots 51 and 100 Raconteur Dr, Ascot, in the City of Belmont (herein referred to as the 'site').

The site is located approximately 5.5 kilometres (km) east of the Perth Central Business District within the City of Belmont. The site extends over approximately 61.8 hectares (ha) and is bounded by Matheson Rd to the east, Grandstand Rd to the west, Resolution Dr to the south, and the Swan River to the north. The location of the site is shown in **Figure 1**.

1.2. Purpose and scope of work

The flora, vegetation and fauna assessment was required to support the development of a Local Structure Plan (LSP) within the site. Specifically, the scope of work was to provide sufficient detail on the flora, vegetation and fauna values within the site to inform this process.

As part of the scope of work the following tasks were completed:

- Desktop review of relevant background information pertaining to the site and surrounds, including database searches for conservation significant flora, fauna and communities.
- A field survey to record flora, vegetation and fauna values.
- Identification of potential habitat for conservation significant flora and vegetation.
- Documentation of the desktop assessment, methodology, field surveys and results into a report.

2. Desktop assessment

A search was conducted for threatened, specially protected and priority flora and fauna that may occur or have been recorded within a 10 km radius of the site using NatureMap (DBCA 2023), *Protected Matters Search Tool* (DCCEEW 2023), *Atlas of Living Australia* (ALA 2023) and the Department of Biodiversity, Conservation and Attraction's (DBCA) conservation significant fauna and flora databases (reference no. FAUNA#8125/53-0323FL).

2.1. Likelihood of occurrence method

2.1.1. Flora and vegetation

The distribution and habitat preferences of threatened flora species and ecological communities listed in **Section 2** were reviewed against site context information[1] and preliminary survey results. Likelihood of occurrence of threatened flora species and ecological communities within the site was classified as 'high', 'moderate', 'low' or 'negligible' as outlined below in **Table 1**.

Table 1: Decision matrix for likelihood of occurrence of threatened and priority flora and ecological communities

		Distribution[1]	
		Reliable record within search area	No reliable record within search area (20 km)
Habitat	Suitable	High	Negligible
	Potentially suitable	Moderate	
	Unsuitable	Low	

[1]Reliable record defined as validated, recent (within the last ~40 years) and spatially accurate (refer DBCA search meta data) in order to exclude unverified range or habitat projections.

2.1.2. Fauna

The distribution and habitat preferences of the threatened and specially protected fauna species identified from **Section 2** was reviewed against site context[1] information and preliminary survey results. Likelihood of occurrence of threatened and specially protected fauna species within the site was classified as 'high', 'moderate', 'low', 'negligible' or 'nil' as outlined in **Table 2**. Noting some marine species were excluded due to lack of suitable habitat.

Table 2: Decision matrix for likelihood of occurrence of threatened, specially protected and priority fauna

		Reliable record[1]		Unreliable record[2]
		Access to site not impeded	Access to site impeded	
Habitat	Suitable	High	Low	Nil
	Potentially suitable	Moderate		
	Unsuitable	Negligible		

[1]Reliable record defined as DBCA or validated ALA record from the last ~20 years, [2]Unreliable record defined as record >20 years old or PMST prediction.

2.2. Likelihood of occurrence results

2.2.1. Threatened and priority flora

A total of 100 conservation significant flora species were identified from database searches as occurring or potentially occurring within 9km of the site. Based on background information available for the site and habitat preferences of the species, two priority flora species were considered to have a high or moderate likelihood of occurring within the site, as outlined in

[1] Including relevant Commonwealth documentation such as approved conservation advice, listing advice and other relevant literature.

Table 3. The complete likelihood of occurrence assessment is provided as **Appendix A**.

Table 3: Threatened or priority flora species with a high or moderate likelihood occurrence in the site

Species	Status		Life strategy	Flowering period
	WA	EPBC Act		
Angianthus micropodioides	P	P3	-	Nov-Dec or Jan-Feb
Aponogeton hexatepalus	P	P4	-	Jul-Oct

2.2.2. Vegetation

The database search results identified 13 TECs and 6 PECs as occurring or potentially occurring within a 10 km radius of the site. Information on these communities is provided in **Appendix C**.

Due to historical disturbance the likelihood of occurrence of any TEC or PEC was considered negligible.

2.2.3. Threatened, specially protected and priority fauna

A total of 77 conservation significant fauna species were identified from database searches as occurring or potentially occurring within 10 km of the site.

Two threatened, six specially protected and three priority species were classified as having a 'high' or 'moderate' likelihood of occurrence. The legislative or policy status and habitat preferences of these species are shown in **Table 4**.

The remainder of the conservation significant fauna species identified in the desktop assessment (66 species) were considered as having a 'low', 'negligible' or 'nil' likelihood of occurrence. Refer to **Table 4** and **Appendix D** for detail on individual species likelihood of occurrence.

Table 4: Summary of conservation significant fauna species with potential to occur in the site

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Birds				
Apus pacificus	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities.
Calidris ruficollis	Red-necked stint	MI	MI	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands (coastal and inland), saltfields, sewage ponds.
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	VU	Eucalypt and Corymbia forests, often in hilly interior. More recently also observed in more open agricultural and suburban areas including Perth metropolitan area. Attracted to seeding *Corymbia calophylla*, *Eucalyptus marginata*, introduced *Melia azedarach* and *Eucalyptus* spp. trees.
Falco peregrinus	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes.
Oxyura australis	Blue-billed duck	P4	-	Mainly deeper freshwater swamps and lakes; occasionally saltlakes and estuaries freshened by flood waters.

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Pandion haliaetus	Osprey	MI	MI	Coasts, estuaries, bays, inlets, islands, and surrounding waters; coral atolls, reefs, lagoons, rock cliffs, stacks.
Plegadis falcinellus	Glossy Ibis	MI	MI	Well-vegetated wetlands, wet pasture, ricefields, floodwaters, floodplains, brackish or occasionally saline wetlands, mangroves, mudflats and occasionally dry grassland.
Thalasseus bergii	Crested tern	MI	MI	Mainly blue-water seas (especially within 3 km of land), including southern estuaries in summer and autumn (when free of silt); also tidal creeks in north, but not penetrating far into larger estuaries.
Zanda latirostris	Carnaby's black cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of *Pinus* spp. Attracted to seeding *Banksia* spp., *Hakea* spp., *Eucalyptus* spp., *Corymbia calophylla*, *Grevillea* spp., and *Allocasuarina* spp.
Mammals				
Hydromys chrysogaster	Rakali	P4	-	Areas with permanent water, fresh, brackish or marine. Likely to occur in all major rivers and most of the larger streams as well as bodies of permanent water in the lower south-west. Intact riparian vegetation and associated bank stability is critical to their survival.
Isoodon fusciventer	Quenda	P4	-	Dense scrubby, often swampy, vegetation with dense cover up to one metre high.

3. Methods

3.1.1. Vegetation

Vegetation units were identified from information collected during the field survey in January 2024. The vegetation was described according to the dominant species present using the structural formation descriptions of the *National Vegetation Inventory System* (NVIS) (NVIS Technical Working Group 2017). The identified vegetation units were mapped on aerial photography during the field survey and boundaries were interpreted from aerial photography and notes taken in the field. Vegetation condition was mapped on aerial photography based on notes recorded during the field survey to define areas with differing condition and using the Keighery (1994) scale **Table 5**.

Table 5: Vegetation condition scale applied during the field assessment

Condition	Definition (Keighery 1994)
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation

Condition	Definition (Keighery 1994)
	structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

3.1.2. Threatened and priority ecological community

Areas of native vegetation potentially representing a TEC were assessed against key diagnostic characteristics and, if available, size and/or vegetation condition thresholds.

3.1.3. Native vegetation under the EP Act

Vegetation within the site that meets the definition of 'native vegetation' under the *Environmental Protection Act 1986* (EP Act) was mapped on aerial imagery.

3.1.4. Fauna habitat

Transects were traversed across the site, during the day, and the characteristics of fauna habitat and presence of fauna species was recorded. Microhabitats such as logs, rocks and leaf litter were investigated and secondary evidence of species presence such as tracks, scats, skeletal remains, foraging evidence or calls was also noted.

3.1.5. Black cockatoo habitat

Black cockatoo foraging, breeding and roosting habitat was assessed and mapped within the site.

Foraging habitat

Foraging habitat was identified by assessing vegetation in the site for plant species known to provide food for black cockatoos (Davies 1966; Saunders 1980; Johnstone and Storr 1998; Johnstone and Kirkby 1999; Groom 2011; Johnstone *et al.* 2011; DAWE 2022). Foraging habitat was classified as either 'native' or 'non-native' based on the predominant vegetation's naturalised status and in accordance with DAWE (2022).

It was also classified as either 'primary' or 'secondary' based on black cockatoo foraging preferences. Primary food plants were defined as those with historical and contemporary records of regular consumption by a black cockatoo species. Secondary food plants were defined as plants that black cockatoo species have been recorded consuming occasionally or that, based on their limited extent or agricultural origin, should not be considered a sustaining resource. A list of plant species classified as primary or secondary food plants is provided as **Appendix E**.

Each patch of foraging habitat was assigned a foraging value for each species of black cockatoo likely to occur within the site. As it is not always possible to separate out food plants from non-food plants,

mapped foraging habitat may also include vegetation comprising non-food plants. The proportion of non-food plants in mapped foraging habitat was minimised as far as practicable.

Evidence of black cockatoo foraging, such as chewed fruits, was searched for within the site and allocated to a black cockatoo species where possible.

Breeding habitat

Breeding habitat comprises 'habitat trees' which was defined as a native eucalypt that is typically known to support black cockatoo breeding such as marri, jarrah, blackbutt, tuart, wandoo, salmon gum or to a lesser extent flooded gum, with a DBH ≥50 cm or DBH ≥30 cm for wandoo or salmon gum.

All native eucalypts within the site that met the required DBH were recorded. Occasionally, native eucalypts were encountered that met DBH requirements but did not contain a trunk/branch of a sufficient size to support a hollow suitable for use by black cockatoos. For example, the tree may have been less than 3 m tall or had a trunk that forked between 1.3 m and 3 m in height and after the fork no limbs had a diameter of ≥50 cm or ≥30 cm for wandoo or salmon gum. These trees were not recorded as habitat trees as the likelihood they would form a suitable hollow was low.

Habitat trees were individually identified and the attributes outlined in **Table 6** were recorded for each tree.

Table 6: Attributes recorded for each habitat tree in the site

Attribute	Description
GPS location	The location was recorded using a handheld GPS unit
Tree species	Species and common name were identified
Diameter at breast height (DBH) (cm)	DBH was measured at breast height (1.3 m) using a diameter tape
Hollows potentially suitable for breeding by a black cockatoo	Number of hollows potentially suitable for breeding by a black cockatoo recorded (assessed from ground level only)

Each habitat tree was assigned to a category listed in **Table 7** based on current black cockatoo guidelines (DAWE 2022).

Table 7: Habitat tree categories (DAWE 2022)

Category	Specifications
Known nesting tree	Trees (live or dead but still standing) which contains a hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).
Suitable nesting tree	Trees with suitable nesting hollows present^, although no evidence of use. Note that any species of tree may develop suitable hollows for breeding.
Potential nesting tree	Trees that have a suitable DBH to develop a nest hollow, but do not currently have suitable nesting hollows. Trees suitable to develop a nest hollow in the future are 300-500 mm DBH. Note that many species of eucalypt may develop suitable hollows for breeding.

^Hollow determined to be suitable for use as breeding habitat by black cockatoos.

Roosting habitat

If present, groups of tall native and non-native trees were assumed to provide roosting habitat. The presence of active or historical roosts in these trees was determined through evidence of roosting activity, such as branch clippings, droppings or moulted feathers.

4. Results

4.1. Flora

4.1.1. Flora species inventory

A total of 58 weed species and 21 native species were recorded in the site during the field surveys. This comprises a total of 29 families and 60 genera. The dominant families containing native taxa were Myrtaceae (three native taxa) and Fabaceae (three native taxa). The family containing the most non-native taxa was Poaceae (thirteen non-native species).

A complete species list is provided in **Appendix B**.

4.1.2. Threatened and priority flora

No threatened or priority flora were recorded and none are considered likely to occur in the site due to the lack of suitable habitat.

4.1.3. Declared pests

One species listed as a declared pest (pursuant to s22(2) of the *Biosecurity and Agriculture Management Act 2007*), **Tamarix aphylla* (athel pine), was recorded within the site. Athel pine is listed in exempt keeping category meaning management is not obliged.

4.2. Vegetation

4.2.1. Vegetation units

Four vegetation units were identified within the site: Cc, Er, ErJkSt, and non-native.

A description and the area of each vegetation unit is provided in **Table 8** and representative photographs of each are provided in **Plate 1** to **Plate 4**. The location of each vegetation unit is shown in **Figure 2**.

Table 8: Vegetation unit present within the site

Vegetation Unit	Description	Area (ha)
Er	Woodland *Corymbia calophylla* over closed grass/forbland of pasture weeds and scattered native species (or absent) (**Plate 1**).	1.12
Cc	Woodland *Eucalyptus rudis* over closed grass/forbland of pasture weeds and scattered native species (or absent) (**Plate 2**).	0.28
ErJkSt	Open woodland *Eucalyptus rudis* and occasional *Melaleuca raphiophylla* over sedgeland *Juncus kraussii* and *Schoenoplectus tabernaemontani* over low shrubland *Suaeda australis* over forbland *Apium prostratum* subsp. *prostratum* var. *prostratum* and *Heliotropium curassavicum* over grassland **Avena* sp., *Cynodon dactylon* and **Paspalum vaginatum* (or absent) (**Plate 3**).	0.17

Vegetation Unit	Description	Area (ha)
To	Fringing rushland of *Typha orientalis*, with occasional planted native and non-native trees, shrubs and/or non-woody vegetation, over closed grass/forbland of pasture weeds.	0.46
Non-native	Heavily disturbed areas comprising bare ground and weeds with occasional native trees and forbs and/or sealed ground and buildings (**Plate 4**).	56.62



*Plate 1: Vegetation unit **Er** in 'degraded' condition*



*Plate 2: Vegetation unit **Cc** in 'degraded' condition*



*Plate 3: Vegetation unit **ErJkSt** in 'good – very good' condition*



*Plate 4: Vegetation unit **Non-native** in 'completely degraded' condition*

4.2.2. Vegetation condition

The vegetation in the site occurred in 'good – very good', 'degraded', 'degraded - completely degraded' and 'completely degraded condition. The extent of vegetation by condition category is detailed in **Table 9** and shown in **Figure 3**.

Table 9: Vegetation condition categories within the site

Condition category (Keighery (1994))	Size (ha)
Pristine	0
Excellent	0
Very good	0
Good – very good	0.07
Good	0
Degraded	1.04
Degraded – completely degraded	0.98
Completely degraded	56.57

4.2.3. Threatened and priority ecological communities

The 'subtropical and temperate coastal saltmarsh' TEC which is listed as vulnerable under the EPBC Act was identified within a patch of ErJkSt the northern portion of the site as shown in **Figure 5**. A total of 0.07 ha of this TEC/PEC was mapped. Not all of the ErJkSt represents the TEC as some patches represent canopy overhang into the site with limited to no understory vegetation.

The 0.07 ha of coastal saltmarsh TEC vegetation mapped in the site also represents the State listed Priority 3 (P3) PEC of the same name.

4.2.4. Native vegetation under the EP Act

A total of 1.10 ha of vegetation meeting the definition of 'native vegetation' pursuant to the EP Act occurs within the site, as shown in **Figure 4**. This comprises of scattered flooded gum (*Eucalyptus rudis*) and marri (*Corymbia calophylla*) trees, and fringing vegetation **ErJkSt** (**Table 8**).

4.3. Fauna

4.3.1. Fauna habitat

Habitat values in the site are limited by historical disturbance and are primarily suited to widespread fauna species with non-specific habitat requirements.

The ErJkSt vegetation provides a cover of native trees and understory cover of riparian vegetation that would offer cover for ground dwelling fauna.

Large native trees associated with plant communities Cc and Er would also provide value to native birds and other arboreal fauna. The extent of fauna habitat is detailed in **Table 10** and shown in **Figure 5.**

Table 10: Fauna habitats identified within the site

Fauna habitat	Description	Area (ha)
Fringing woodland	Native fringing vegetation consisting of a native tree overstorey and an understorey of sedges/rushes.	0.07
Wetland	Wetland waterbodies and associated riparian sedgeland/rushland.	3.72

Scattered trees and shrubs	Scattered native and non-native trees and shrubs, providing habitat mainly for avifauna.	5.45
Cleared	Predominantly grassy weeds, bare ground and built form.	52.64

4.3.2. Fauna species inventory

Twenty-four fauna species were recorded within the site:

- *Aix sponsa* (wood duck)
- *Anas gracilis* (grey teal)
- *Anas superciliosa* (Pacific black duck)
- *Anhinga novaehollandiae* (Australasian darter)
- *Cacatua sanguinea* (little corella)
- *Calyptorhynchus banksii* (forest red-tailed black cockatoo)
- *Columba livia* (feral pigeon)
- *Corvus coronoides* (Australian raven)
- *Cygnus atratus* (black swan)
- *Eolophus roseicapilla* (galah)
- *Equus ferus* (horse)
- *Fulica atra* (Eurasian coot)
- *Grallina cyanoleuca* (magpie-lark)
- *Gymnorhina tibicen* (Australian magpie)
- *Malacorhynchus membranaceus* (pink-eared duck)
- *Microcarbo melanoleucos* (little pied cormorant)
- *Oxyura australis* (blue-billed duck)
- *Pelecanus conspicillatus* (Australian pelican)
- *Phalacrocorax sulcirostris* (little black cormorant)
- *Porphyrio porphyria* (purple swamphen)
- *Rhipidura leucophrys* (willie wagtail)
- *Spilopelia chinensis* (spotted dove)
- *Tadorna tadornoides* (Australian shelduck)
- *Threskiornis moluccus* (Australian white ibis)
- *Trichoglossus moluccanus* (rainbow lorikeet)

4.3.3. Conservation significant fauna

One threatened (forest red-tailed black cockatoo, (VU)) and one priority (blue-billed duck, (P4)) fauna species were recorded at the time of survey.

Zanda latirostris (Carnaby's black cockatoo (EN)) is considered to have a high likelihood of occurring in this site and is discussed further below in **Section 4.3.4**. Six additional conservation significant bird species not recorded during the survey have potential to occur within the site:

Apus pacificus (Pacific swift (MI)), and *Falco peregrinus* (peregrine falcon (OS)) are both highly mobile species that are sometimes recorded over urbanised areas. Any occurrence of these species is likely

to be a flyover or brief forage as the site and surrounding area lacks suitable habitat for breeding or persistence of any other kind. *Calidris ruficollis* (red-necked stint (MI)), and *Thalasseus bergii* (crested tern (MI)) are both shorebirds which may briefly utilise the site as marginal foraging habitat. *Plegadis falcinellus* (glossy ibis (MI)) are known to forage in wet grassland areas when nearby to water sources but this type of habitat is likely to provide a marginal foraging resource. *Pandion haliaetus* (osprey (MI)), have been recorded nesting nearby and are therefore likely to forage near or within the site.

Two priority 4 mammal species not recorded during the survey, *Hydromys chrysogaster* (rakali) and *Isoodon fusciventer* (quenda), could also occur in the site. Rakali may utilise the Swan River and so could occasionally occur in the northern most portion of the site associated with the ErJkSt vegetation. Quenda commonly occur in urban areas, particularly where understorey vegetation or grasses provide dense cover.

4.3.4. Black cockatoos

Forest red-tailed black cockatoo was observed foraging in the site in cape lilac (*Melia azedarach*) overhanging the site. The site lies within the modelled distribution of Carnaby's black cockatoo and therefore they may also occur. The site does not lie within the modelled distribution of Baudin's black cockatoo and therefore they are not likely to occur and have not been considered further.

4.3.4.1. Breeding habitat

A total of 66 black cockatoo habitat trees were recorded, of which five contained hollows potentially suitable for black cockatoo breeding based on inspection from ground level. Internal hollow inspection using a camera pole or drone would be required to confirm if hollows are suitable for breeding by black cockatoos. The remaining 61 habitat trees did not contain hollows suitable for black cockatoo breeding.

The habitat trees comprised four tuarts, eight marris and 54 *Eucalyptus rudis* (flooded gum) trees.

A summary of the habitat trees recorded within the site is provided in **Table 11** and the locations of habitat trees are shown in **Figure 7**.

Table 11: Habitat trees

Category	No. trees
Known nesting trees	0
Suitable nesting trees	5
Potential nesting trees	61
Total nesting trees	66

4.3.4.2. Roosting habitat

No roosts or evidence of roosting was observed in the site. Tall trees within the site represent potential roosting trees.

4.3.4.3. Foraging habitat

A total of 1.27 ha of foraging habitat for Carnaby's black cockatoo was recorded in the site, which comprised 0.28 ha of primary native foraging habitat associated with *Corymbia calophylla,* 0.07 ha of

primary non-native foraging habitat associated with *Pinus pinaster*, 0.41 ha of secondary native foraging habitat associated with *Acacia saligna*, *Jacksonia furcellata* and *Xanthorrhoea* spp. and 0.51 ha of secondary non-native habitat associated with *Eucalyptus gomphocephala*.

A total of 0.84 ha of foraging habitat for forest red-tailed black cockatoo was recorded in the site, which comprises 0.28 ha of primary native habitat associated with *Corymbia calophylla,* 0.07 ha of secondary native foraging habitat associated with *Jacksonia furcellata* and 0.49 ha of non-native secondary habitat associated with *Eucalyptus gomphocephala* and **Eucalyptus camaldulensis.*

The extent of foraging habitat by value category is detailed in **Table 12** and shown in **Figure 8** and **Figure 9**.

Table 12: Foraging habitat recorded within the site

Foraging habitat	Black cockatoo species and area of foraging habitat (ha)	
	Carnaby's	Forest red-tailed
Primary native	0.28	0.28
Primary non-native	0.07	0
Secondary native	0.41	0.07
Secondary non-native	0.51	0.49
Total	1.27	0.84

5. CONCLUSIONS

Outcomes of the assessment include the following:

- No threatened or priority flora species were recorded in the site. None of the threatened and priority flora species identified in the desktop assessment are considered to occur in the site due to lack of suitable habitat and/or because they were not recorded during the field survey.
- The majority of the site is heavily disturbed (degraded to completely degraded) and limited native intact native vegetation is present. One small patch of vegetation (ErJkSt) is identified in 'good – very good' condition.
- A total of 0.07 ha of the 'subtropical and temperate coastal saltmarsh' TEC/PEC occurs within the northern portion of the site adjacent to the Swan River.
- One threatened, forest red-tailed black cockatoo (EN), and one priority, blue-billed duck (P4), species were recorded in the site. A further nine conservation significant fauna species also have potential to occur in the site.
- As a result of historical disturbance, the site contains limited high-quality fauna habitat and is likely only utilised by fauna traversing through the wider area, especially birds. However, the small patch of 'fringing woodland' fauna habitat in the site's northeast (associated with vegetation type ErJkSt) may provide value for smaller ground-dwelling fauna.
- A total of 66 black cockatoo habitat trees were recorded of which five contained hollows potentially suitable for breeding. Internal hollow inspection would be required to confirm if these hollows are suitable for black cockatoo breeding.
- No evidence of roosting was recorded in the site. Tall trees in the site may represent potential roosting trees.
- A total of 1.27 ha of foraging habitat for Carnaby's black cockatoo and 0.84 ha of foraging habitat for forest red-tailed black cockatoo exists in the site.

6. REFERENCES

6.1. General references

Atlas of Living Australia (ALA) 2023, *Atlas of Living Australia - Spatial Portal*, <http://www.ala.org.au/>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023, *NatureMap*, <https://static.dbca.wa.gov.au/pages/naturemap.html>.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2022, *Referral guideline for 3 WA threatened black cockatoo species*.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, *Protected Matters Search Tool*, <https://pmst.awe.gov.au/#/map>.

Keighery, B. 1994, *Bushland Plant Survey: A guide to plant community survey for the community*, Wildflower Society of WA (Inc), Nedlands.

NVIS Technical Working Group 2017, *Australian Vegetation Attribute Manual: National Vegetation Information System*, Department of the Environment and Energy, Canberra.

6.2. Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 6.1**, with access date information provided in **Table R 1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
DCCEEW (2023)	24 January 2024	Protected Matters Search Tool
DBCA (2023)	28 March 2023	NatureMap
ALA(2023)	24 January 2024	Spatial Portal - Atlas of Living Australia

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Figures

Figure 1: Site Location

Figure 2: Vegetation Units

Figure 3: Vegetation Condition

Figure 4: Threatened Ecological Community

Figure 5: Native Vegetation Under the EP Act

Figure 6: Fauna Habitat

Figure 7: Black Cockatoo Habitat Trees

Figure 8: Carnaby's Black Cockatoo Foraging Habitat

Figure 9: Forest Red-tailed Black Cockatoo Foraging Habitat



Figure 1: Site Location

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(06)--F01

Drawn:	AS
Date:	13/02/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

N

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Metres

Scale: 1:8,000@A4

GDA2020 MGA Zone 50

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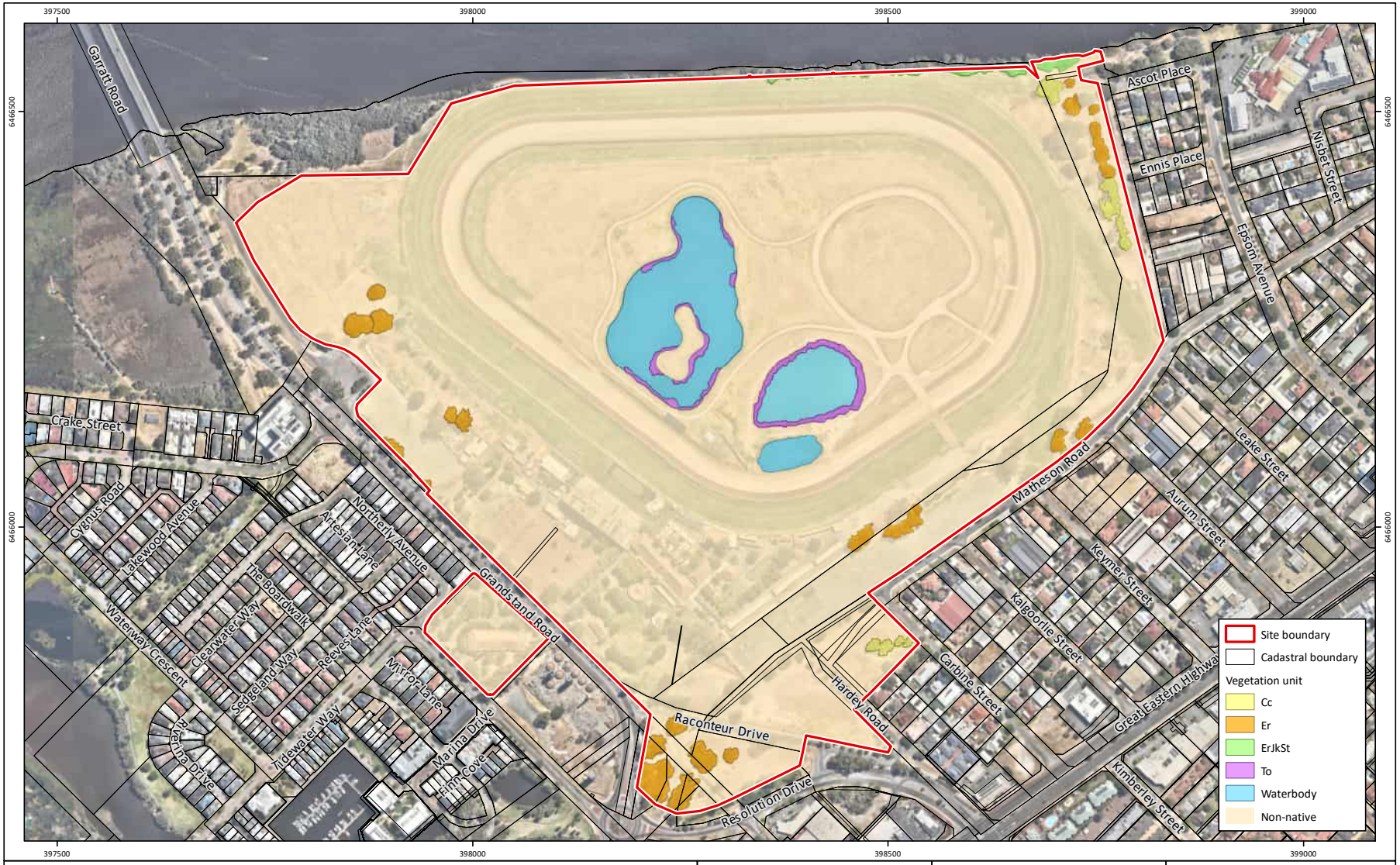


Figure 2: Vegetation Units

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(06)--F02

Drawn:	AS
Date:	13/02/2024
Checked:	AJU
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Date:	08/04/2024

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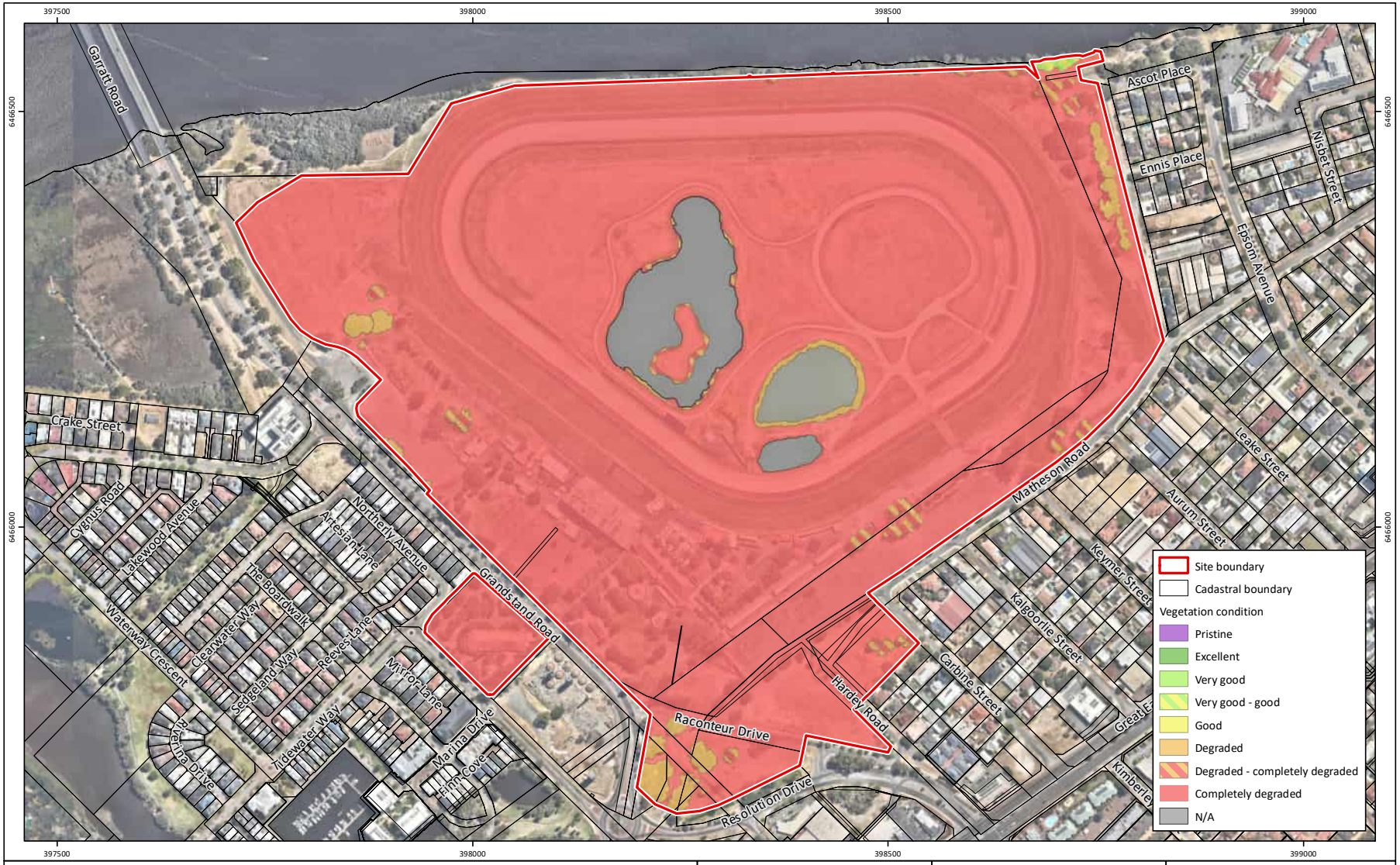


Figure 3: Vegetation Condition

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(06)--F03

Drawn:	AS
Date:	13/02/2024
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Date:	08/04/2024

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Metres

Scale: 1:6,000@A4

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Figure 4: Threatened and Priority Ecological Community

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(06)--F04

Drawn:	AS
Date:	13/02/2024
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Approved:	RAW
Date:	08/04/2024

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Scale: 1:6,000@A4

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Figure 5: Native Vegetation Under the EP Act

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(06)--F16

Drawn:	WJC
Date:	04/04/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

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Metres

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Figure 6: Fauna Habitat

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Client:	Perth Racing

Plan Number: EP23-109(06)--F05

Drawn:	AS
Date:	13/02/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

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Metres

Scale: 1:6,000@A4

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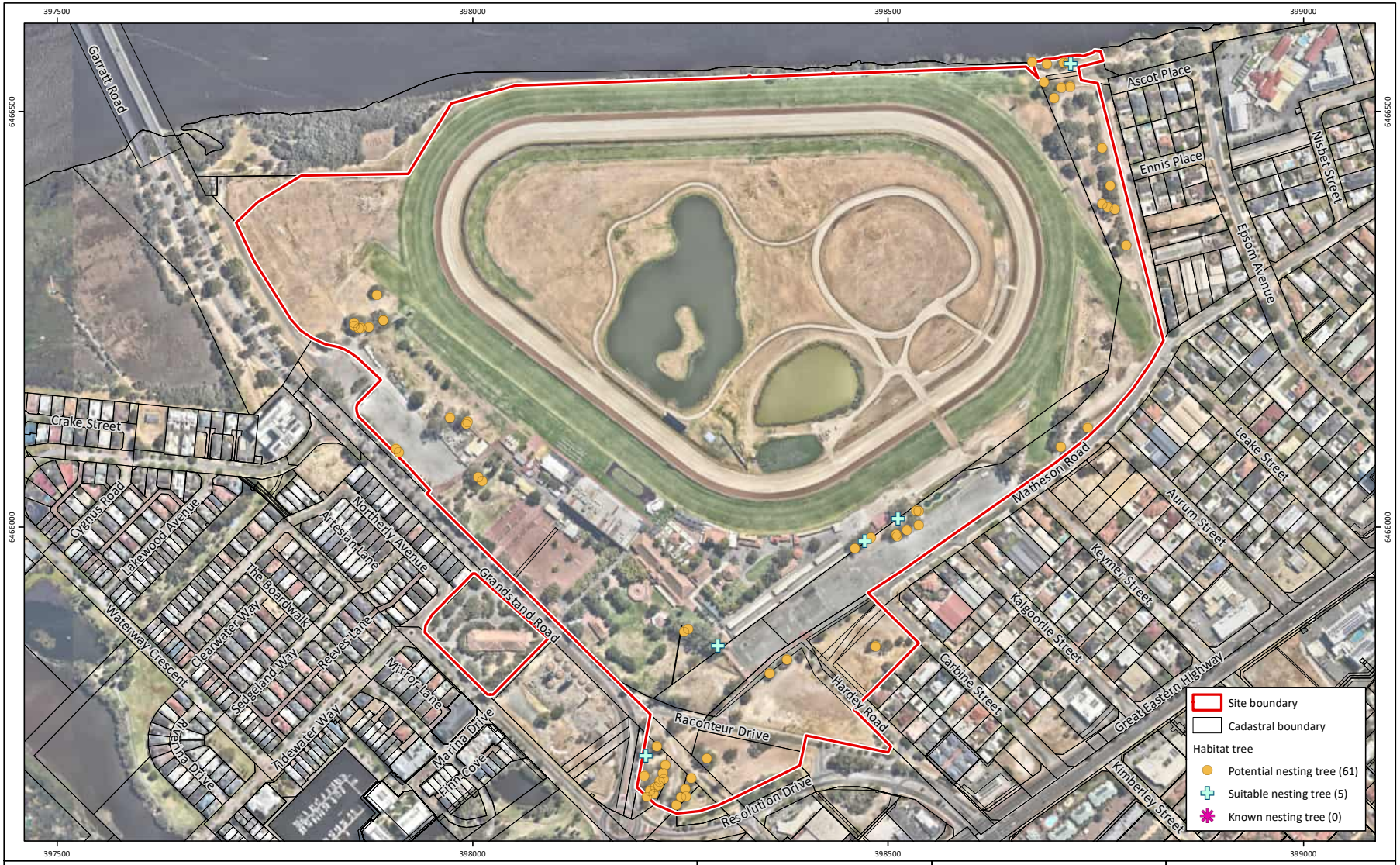


Figure 7: **Black Cockatoo Habitat Trees**

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(06)--F19a

Drawn:	GAR
Date:	28/06/2024
Checked:	TDP
Approved:	RAW
Date:	01/07/2024

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Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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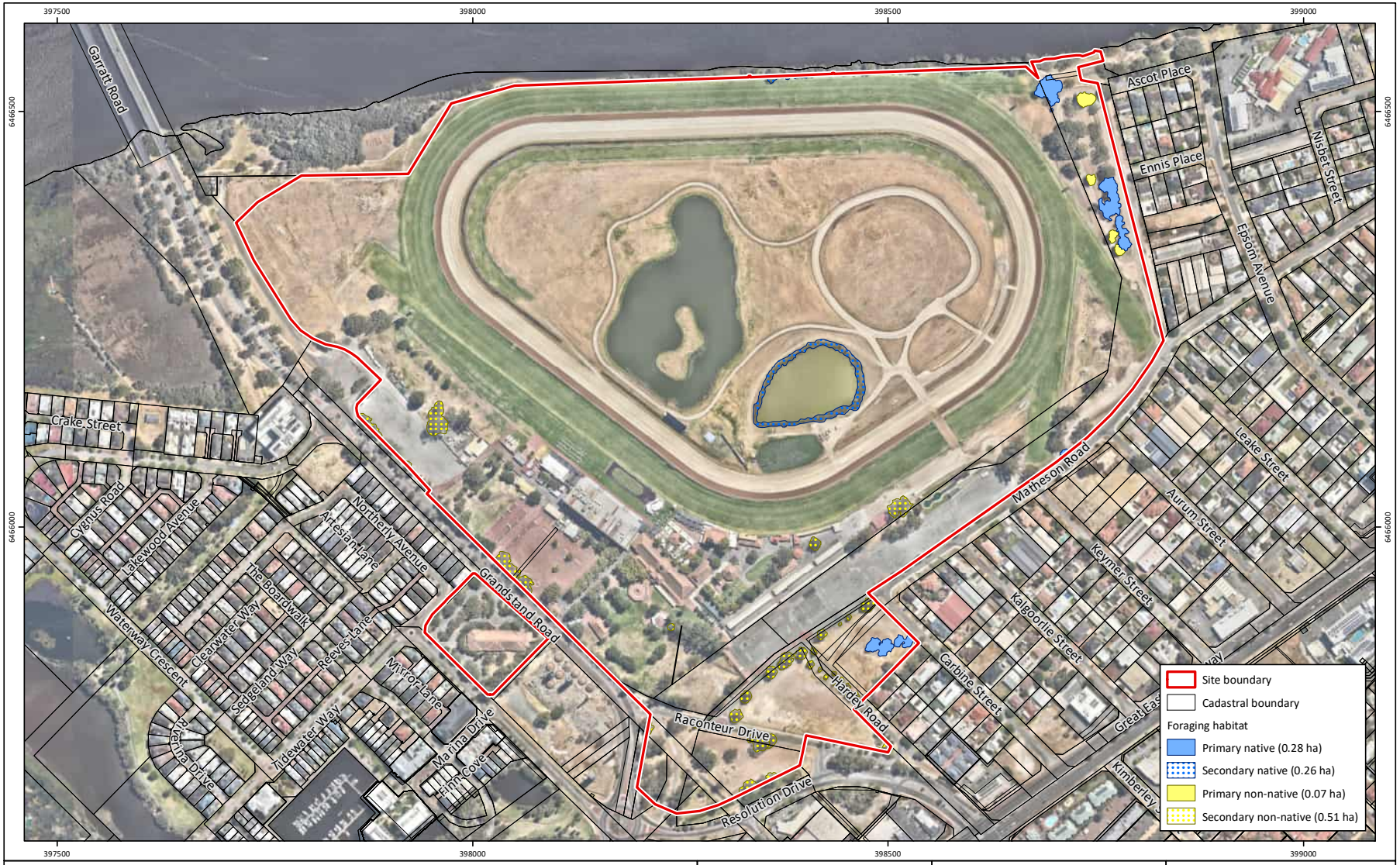


Figure 8: **Carnaby's Black Cockatoo Foraging Habitat**

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(06)--F17

Drawn:	WJC
Date:	04/04/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

N

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Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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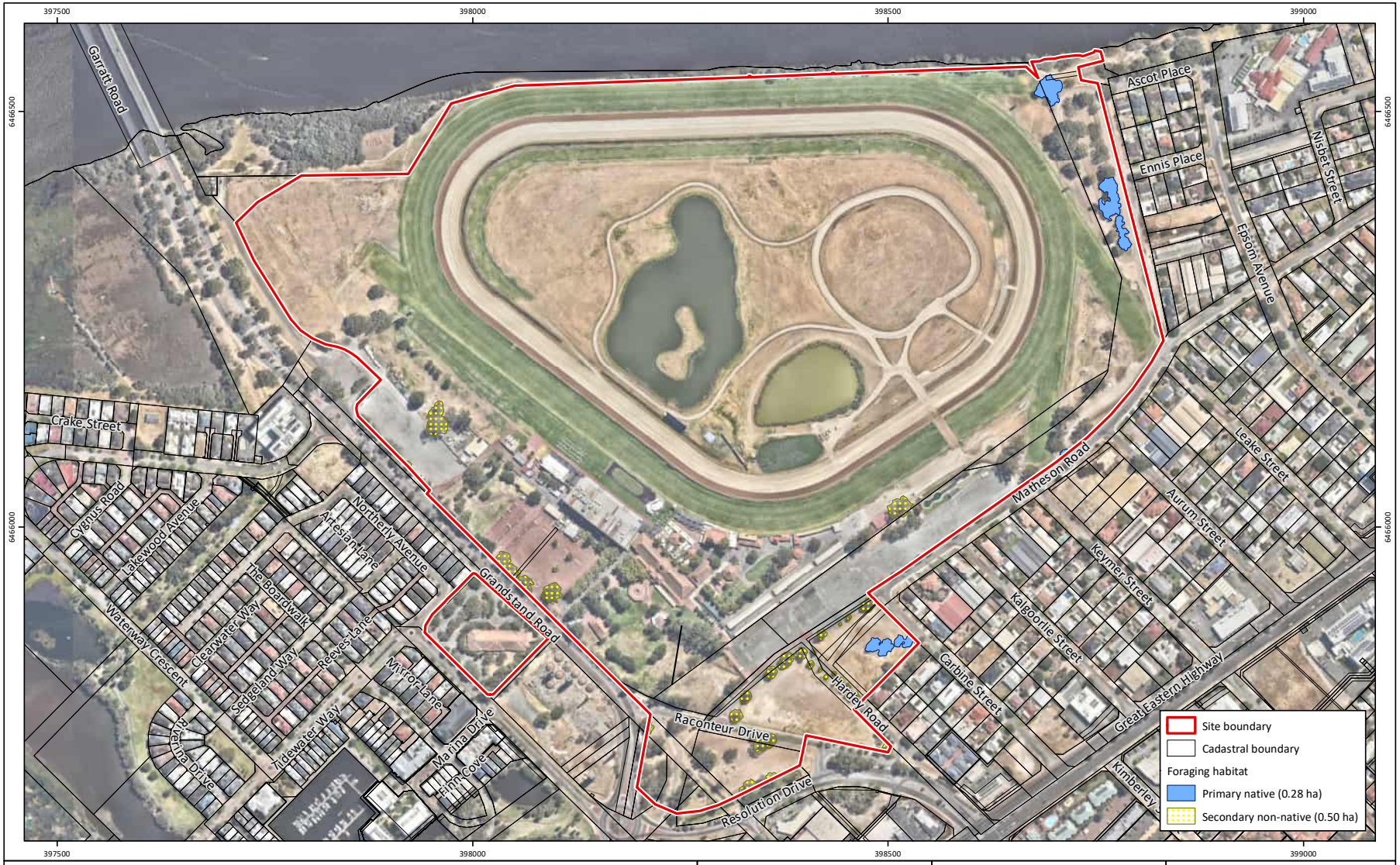


Figure 9: **Forest Red-tailed Black Cockatoo Foraging Habitat**

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(06)--F18

Drawn:	WJC
Date:	04/04/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

N

0 100 200
Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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Appendix A

Conservation Significant Flora Likelihood of Occurrence

Conservation Significant Flora Likelihood of Occurrence
Perth Racing Golden Gateway Structure Plan

Species name	Level of		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Calectasia cyanea	CR	CR	P	Heathland on white sand or laterite gravel over laterite. Known only from one population near Albany.	Jun-Oct	Low
Grevillea thelemanniana	CR	CR	P	Sand, sandy clay. Winter-wet low-lying flats.	May-Nov	Low
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	CR	CR	P	Low woodland on grey, clayey sand with lateritic pebbles (Pinjarra Plain) near winter wet flats.	Sep-Nov	Low
Caladenia huegelii	CR	EN	PG	Well-drained, deep sandy soils in lush undergrowth in a variety of moisture levels.	Sep-early Nov	Low
Calytrix breviseta subsp. breviseta	CR	EN	P	Seasonally wet sandy-clay soil on swampy flats	Oct-Nov	Low
Drakaea elastica	CR	EN	PG	Bare patches of sand within otherwise dense vegetation in low-lying areas alongside winter-wet swamps. Typically in banksia woodland or thickets of Kunzea glabrescens.	late Sep-Oct/Nov, survey Jul-Aug	Low
Eucalyptus x balanites	CR	EN	P	Light coloured sandy soils over laterite. Habitat consists of gently sloping heathlands; open mallee woodland over shrubland (Population 2) or heathland with emergent mallees (population 1)	Oct - Feb	Low
Trithuria occidentalis	CR	EN	A	Partly submerged on the edge of shallow winter-wet clay pans in very open shrubland.	Oct-Nov	Low
Diuris purdiei	EN	EN	PG	Sand to sandy clay soils in areas subject to winter inundation.	late September to mid-October, but only after a summer or early autumn fire (Brown et al., 1998)	Low
Grevillea curviloba subsp. incurva	EN	EN	P	Sand, sandy loam. Winter-wet heath.	Aug-Sep	Low
Macarthuria keigheryi	EN	EN	P	Low-lying winter-wet damp grey/white sands in open patches.	Sep-Dec or Feb-Mar	Low

	WA	EPBC Act	strategy		period	occurrence
Thelymitra stellata	EN	EN	PG	Sandy loam, clay or gravel over laterite or gravel.	Sep-Nov	Low
Andersonia gracilis	VU	EN	P	Seasonally damp, black sandy clay flats near or on the margins of swamps.	Sep-Nov	Low
Banksia mimica	VU	EN	P	Flat to gentle slopes in grey and white sand in open woodlands.	Dec-Jan	Low
Drakaea micrantha	EN	VU	PG	Open sandy patches often adjacent to winter-wet swamps.	Sept- early Oct	Low
Acacia denticulosa	VU	VU	P	Sand, loam, clay. Granite outcrops, rarely on sandplains.	Sep-Oct	Low
Anigozanthos viridis subsp. Terraspectans	VU	VU	P	Grey sand, clay loam. Winter-wet depressions.	Aug-Sep	Low
Conospermum undulatum	VU	VU	P	Sand and sandy clay soils, on flat or gently sloping sites between the Swan and Canning Rivers	May-Oct	Low
Diuris drummondii	VU	VU	PG	In low-lying depressions in peaty and sandy clay swamps.	Nov-Jan	Low
Diuris micrantha	VU	VU	PG	Dark grey-black sandy clay-loam in winter wet depressions or swamps. Often in shallow standing water.	Aug/Sep- early Oct	Low
Eleocharis keigheryi	VU	VU	P	Clay or sandy loam in freshwater creeks and transient waterbodies such as seasonally wet clay pans.	Aug-Dec	Low
Eucalyptus rhodantha var. rhodantha	VU	VU	P	Grey/yellow/red sand over laterite. Undulating country, hillslopes.	Jul-Sep or Dec-Jan	Low
Morelotia australiensis	VU	VU	P	Sand over clay, winter wet depressions and drainage lines.	Nov-Dec	Low
Eremophila glabra subsp. chlorella	EN	-	P	Sandy clay. Winter-wet depressions.	Jul-Nov	Low
Hypocalymma magnificum	EN	-	P	Sandy loam, granite.	Aug-Nov (limited information)	Low
Bolboschoenus fluviatilis	P1	-	P	Floodplain with grey/brown wet sand.	Nov	Moderate
Calandrinia sp. Bayswater (C. Andrews s.n. 11/1902)	P1	-	Unknown	Unknown	Unknown	Low

	WA	EPBC Act	strategy		period	occurrence
Drosera patens	P1	-	P	Sandy soils on margins of winter-wet depressions, swamps and lakes.	Aug-Dec	Low
Drosera x sidjamesii	P1	-	P	Along lake margins, close to winter high-water line	Nov-Dec or Jan-Mar	Low
Haloragis scoparia	P1	-	P	Clay in winter-wet areas.	May	Low
Hydrocotyle striata	P1	-	A	Sand and clay in springs and creeklines.	Nov	Low
Levenhookia preissii	P1	-	A	Grey or black, peaty sand. Swamps	Sep-Dec/Jan	Low
Ptilotus sericostachyus subsp. roseus	P1	-	P	Unknown. Seem to be associated with wetlands/rivers.	Sep-Dec	Moderate
Senecio gilbertii	P1	-	P	Peaty sand in swamps and on slopes.	Sep-Nov	Low
Thelymitra magnifica	P1	-	PG	Gravelly soil on stony ridges.	Sep-Oct	Low
Typhonium peltandroides	P1	-	P	Shallow sand amongst rough sandstone, red clay. Sides of gorges, vine thickets, rocky sites or along watercourses.	Dec or Jan-Feb	Low
Acacia benthamii	P2	-	P	Sand, typically on limestone breakaways	Aug - Sept	Low
Calothamnus macrocarpus	P2	-	P	Rocky quartzite soils, sand. Slopes.	Feb or Aug-Dec	Low
Chamelaucium floriferum subsp. diffusum	P2	-	P	Sand, clay. Frequently with outcropping granite.	Jan-Dec	Low
Eucalyptus educta	P2	-	P	Shallow soils. Granite rocks.	Apr	Low
Grevillea manglesii subsp. ornithopoda	P2	-	P	Red-brown loam over clay	Sep-Nov	Low
Hypocalymma inopinatum	P2	-	P	White sand on laterite. Shallow sandy loam Slopes and rises (limited information).	Nov? (limited information	Low
Johnsonia pubescens subsp. cygnorum	P2	-	P	Grey white yellow sands on flats and seasonally wet areas.	Sep	Low
Lepyrodia curvescens	P2	-	P	Sand, laterite. Seasonally inundated swampland.	Sep-Nov	Low
Melaleuca viminalis	P2	-	P	Sand, clay in creeklines and wetlands.	Oct-Dec	Moderate
Phyllangium palustre	P2	-	A	Winter-wet claypans, low-lying seasonal wetlands on clay	Oct-Nov	Low
Poranthera moorokatta	P2	-	A	Sandy or clay soils. Dampland or low sandy dunes.	Oct or Feb	Low
Thelymitra variegata	P2	-	P	Sandy clay, sand, laterite.	Jun-Sep	Low

	WA	EPBC Act	strategy		period	occurrence
Thysanotus brachiatus	P2	-	P	Grey sand	Nov-Dec	Low
Adenanthos cygnorum subsp. chamaephyton	P3	-	P	Grey sand, lateritic gravel.	Jul or Sep to Dec or Jan	Low
Alyogyne sp. Great Victoria Desert (D.J. Edinger 6212)	P3	-	P	Unknown	Unknown	Low
Angianthus micropodioides	P3	-	A	Saline sandy soils on edge of rivers, depressions and clay pans.	Nov-Dec or Jan-Feb	Moderate
Babingtonia urbana	P3	-	P	Grey sand, lateritic gravel.	Jan-Mar	Low
Banksia pteridifolia subsp. vernalis	P3	-	P	White/grey sand over laterite.	Sep-Oct	Low
Beaufortia purpurea	P3	-	P	Lateritic or granitic soils on rocky slopes.	Oct-Feb	Low
Byblis gigantea	P3	-	P	Sandy-peat swamps. Seasonally wet areas.	Sep-Jan	Low
Carex tereticaulis	P3	-	P	Black peaty sand.	Sep-Oct	Low
Conostylis bracteata	P3	-	P	Sand, limestone. Consolidated sand dunes	Aug-Sep	Low
Cyathochaeta teretifolia	P3	-	P	Grey sand, sandy clay in swamps and creek edges.	Oct-Jan	Low
Dampiera triloba	P3	-	P	Damp peat/loam soil.	Aug-Dec	Low
Dicrastylis micrantha	P3	-	P	Red sand. Sandplains.	Sep-Dec	Low
Eryngium sp. Subdecumbens (G.J. Keighery 5390)	P3	-	A	Clay in seasonal wetlands.	Sep-Nov	Low
Haemodorum loratum	P3	-	P	Grey or yellow sand, gravel.	Nov	Low
Halgania corymbosa	P3	-	P	Gravelly soils, soils over granite.	Aug-Nov	Low
Hibbertia leptotheca	P3	-	P	Brown to white sand with limestone.	Aug-Sep	Low
Hypocalymma quadrangulare	P3	-	P	Sandy loam in depressions (limited infroamtion)	Jul-Sep (limited information)	Low
Isopogon autumnalis	P3	-	P	Yellow-grey sand.	Feb,Mar,Apr, May or June	Low
Jacksonia gracillima	P3	-	P	Sand, often adjacent to winter wet areas	Sep-Dec	Low
Lasiopetalum glutinosum subsp. glutinosum	P3	-	P	Brown clay loam on slopes	Sep-Dec	Low
Lasiopetalum membranaceum	P3	-	P	Sand over limestone	Sep-Dec	Low

	WA	EPBC Act	strategy		period	occurrence
Meionectes tenuifolia	P3	-	P	Clay loam in seasonally wet areas.	Oct-Dec	Low
Myriophyllum echinatum	P3	-	A	Clay in winter-wet flats.	Nov	Low
Platysace ramosissima	P3	-	P	Sandy soils.	Oct-Nov	Low
Schoenus benthamii	P3	-	P	White, grey ands, sandy clay in winter wet flats and swamps	Oct-Nov	Low
Schoenus pennisetis	P3	-	A	Grey or peaty sand in swamps and winter-wet depressions.	Aug-Sep	Low
Stylidium aceratum	P3	-	A	Sandy soils in swamp heathland.	Oct-Nov	Low
Stylidium asteroideum	P3	-	P	Sand, clay, loam in winter wet areas.	Sep-Nov	Low
Stylidium paludicola	P3	-	P	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland	Oct-Dec	Low
Styphelia filifolia	P3	-	P	Brown over pale yellow sand.	Feb-Apr	Low
Thysanotus anceps	P3	-	P	White or grey sand, lateritic gravel, laterite.	Oct-Dec	Low
Verticordia venusta	P3	-	P	Yellow sand, sandy gravel. Sandplains.	Sep-Dec or Jan	Low
Aponogeton hexatepalus	P4	-	P	Mud. Freshwater: ponds, rivers, claypans.	Jul-Oct	Moderate
Calothamnus accedens	P4	-	P	Sandy soils over laterite.	Sep-Jan	Low
Calothamnus graniticus subsp. leptophyllus	P4	-	P	Clay over granite, lateritic soils. Hillsides.	Jun-Aug	Low
Cyanothamnus tenuis	P4	-	P	Laterite, stony soils, granite.	Aug-Nov	Low
Dodonaea hackettiana	P4	-	P	Sand, outcropping limestone.	Jul-Oct	Low
Drosera occidentalis	P4	-	P	Flat, brown/white/yellow moist sand/clay/peat, often near swamps.	Oct-Dec/Jan	Low
Eucalyptus caesia subsp. caesia	P4	-	P	Loam. Granite outcrops.	May-Sep	Low
Eucalyptus caesia subsp. magna	P4	-	P	Loam. Granite outcrops.	May-Sep	Low
Eucalyptus kruseana	P4	-	P	Sandy loam. Granite outcrops & hills.	Jun-Sep	Low
Grevillea pimeleoides	P4	-	P	Gravelly soils over granite. Rocky hillsides.	May-Nov	Low
Hydrocotyle lemnoides	P4	-	A	Floating in swamps.	Aug-Oct	Low

	WA	EPBC Act	strategy		period	occurrence
Jacksonia sericea	P4	-	P	Calcareous and sandy soils on Swan Coastal Plain	Dec-Feb	Low
Lasiopetalum bracteatum	P4	-	P	Sandy clay, clay, lateritic gravel along drainage lines, creeks, gullies, granite outcrops.	Aug-Nov	Low
Ornduffia submersa	P4	-	A	Sandy clay in inundated wetland/creek.	Aug-Nov	Low
Schoenus griffinianus	P4	-	P	White sand	Sep-Oct	Low
Schoenus natans	P4	-	A	Aquatic, in winter-wet depressions.	Oct	Low
Stylidium longitubum	P4	-	A	Sandy clay, clay. Seasonal wetlands.	Oct-Dec	Low
Stylidium striatum	P4	-	P	Brown clay over laterite on hill slopes.	Oct-Nov	Low
Verticordia lindleyi subsp. Lindleyi	P4	-	P	Sand and sandy clay in winter wet areas.	May or Nov-Jan	Low

Note: CR=critically endangered, EN=endangered, VU=vulnerable, P1=Priority 1, P2=Priority 2, P3=Priority 3, P4=Priority 4, P=perennial, PG=perennial geophyte, A=annual.

Appendix B

Flora Species Inventory

Flora Species List
Perth Racing Golden Gate Strucure Plan Support

Family	Status	Species
Amaranthaceae		
	*	*Amaranthus viridis*
	*	*Atriplex prostrata*
		Suaeda australis
Anacardiaceae		
	*	*Schinus terebinthifolia*
Apiaceae		
		Apium prostratum subsp. prostratum var. prostratum
Araliaceae		
	*	*Schefflera arboricola*
Araucariaceae		
	*	*Araucaria heterophylla*
Arecaceae		
	*	*Arecaceae sp.*
	*	*Phoenix canariensis*
	*	*Syagrus romanzoffiana*
	*	*Washingtonia filifera*
Asphodelaceae		
	Pl	*Xanthhorrea sp.*
Asteraceae		
	*	*Erigeron sp.*
	*	*Hypochaeris glabra*
	*	*Lactuca serriola*
	*	*Ursinia anthemoides*
Bignoniaceae		
	*	*Jacaranda mimosifolia*
Boraginaceae		
		Heliotropium curassavicum
Casuarinaceae		
		Casuarina ?cunninghamiana
		Casuarina obesa
	Pl	*Casuarina sp.*
Cyperaceae		
		Bolboschoenus caldwellii
	*	*Cyperus ?tenuiflorus*
	*	*Cyperus congestus*
	*	*Cyperus polystachyos*
		Lepidosperma longitudinale
		Schoenoplectus tabernaemontani
Fabaceae		
		Acacia saligna
	*	*Acacia iteaphylla*
		Kennendia prostrata
	*	*Tipuana tipu*
	*	*Trifolium michelianum*
		Viminaria juncea
Fabaeae		
	*	*Erythrina indica*

Juncaceae		
		Juncus kraussii
Malvaceae		
	*	*Brachychiton populneus*
	*	*Malva sp.*
Moraceae		
	*	*Ficus macrophylla*
Myrtaceae		
	Pl	*Agonis flexuosa*
	Pl	*Callistemon sp.*
		Corymbia calophylla
	*	*Corymbia citriodora*
	*	*Corymbia cladocalyx*
	*	*Eucalyptus ?leptopoda*
	*	*Eucalyptus botryoides*
	*	*Eucalyptus camaldulensis*
	*	*Eucalyptus cladocalyx*
	Pl	*Eucalyptus gomphocephala*
	*	*Eucalyptus grandis*
	*	*Eucalyptus leucoxylon*
	*	*Eucalyptus maculata*
		Eucalyptus rudis
	*	*Eucalyptus sideroxylon*
	*	*Eucalyptus sp.*
		Melaleuca rhaphiophylla
	*	Myrtaceae sp.
Onagraceae		
	*	*Oenothera drummondii*
Pinaceae		
	*	*Pinus sp.*
Plantaginaceae		
	*	*Plantago lanceolata*
Plantanaceae		
	*	*Platanus ×hispanica*
Poaceae		
	*	*Avena barbata*
	*	*Bambusa sp.*
	*	*Briza maxima*
	*	*Cenchrus ciliaris*
	*	*Cortaderia selloana*
	*	*Cynodon dactylon*
	*	*Ehrharta calycina*
	*	*Ehrharta longiflora*
	*	*Ergagrostis curvula*
	*	*Melinis repens*
	*	*Paspalum dilatatum*
	*	*Paspalum vaginatum*
	*	*Setaria verticillata*
Polygonaceae		

	*	*Persicaria ?decipiens*
	*	*Polygonum aviculare*
Rosaceae		
	*	*Rosa sp.*
Solanaceae		
	*	*Solanum nigrum*
Tamaricaceae		
	*	*Tamarix aphylla*
Typhaceae		
		Typha sp.

*=non-native, Pl=planted

Appendix C

Conservation Significant Communities Likelihood of Occurrence

Conservation Significant Communities Likelihood of Occurrence
Perth Racing Golden Gateway Structure Plan

Code	Community name	TEC/ PEC	Level of significance		Likelihood of occurrence
			State	EPBC Act	
SCP10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994))	TEC	EN	CR	Low
SCP07	Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson et al. (1994))	TEC	VU	CR	Low
Tuart woodlands	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	TEC/ PEC	P3	CR	Low
SCP3a	Corymbia calophylla - Kingia australis woodlands on heavy soils, Swan Coastal Plain (floristic community type 3a as originally described in	TEC	CR	EN	Moderate
SCP3c	Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))	TEC	CR	EN	Moderate
SCP20c	Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in in Gibson et al. (1994))	TEC	CR	EN	Low
SCP20b	Banksia attenuata and/or Eucalyptus marginata woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. (1994))	TEC	EN	EN	Low
SCP20a	Banksia attenuata woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994))	TEC	EN	EN	Low
Muchea Limestone	Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain	TEC	EN	EN	Low
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	TEC/ PEC	P3	EN	Low
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	TEC/ PEC	P3	VU	High
SCP02	Southern wet shrublands, Swan Coastal Plain (floristic community type 2 as originally described in Gibson et al. (1994)	TEC	EN	-	Low
SCP3b	Corymbia calophylla - Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al. (1994))	TEC	VU	-	Moderate
SCP22	Banksia ilicifolia woodlands	PEC	P3	-	Low
SCP21c	Low lying Banksia attenuata woodlands or shrublands	PEC	P3	-	Low
SCP23b	Swan Coastal Plain Banksia attenuata - Banksia menziesii woodlands	PEC	P3	-	Low

Note: TEC=threatened ecological community, PEC=priority ecological community, CR=critically endangered, EN=endangered, VU=vulnerable, P3=priority 3

Appendix D

Conservation Significant Fauna

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Birds					
Actitis hypoleucos	Common sandpiper	MI	MI	Edge of sheltered waters salt or fresh, e.g. estuaries, mangrove creeks, rocky coasts, near-coastal saltlakes (including saltwork ponds), river pools, lagoons, claypans, drying swamps, flood waters, dams and sewage ponds. Preferring situations where low perches are available (Johnstone & Storr 1998).	Nil
Anous tenuirostris melanops	Australian lesser noddy	EN	VU	Very common in blue-water seas around the Abrolhos (endemic to this area, accidental occurrences on lower west coast of Australia) (Johnstone and Storr 1998).	Nil
Apus pacificus	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities (Pizzey & Knight 2012).	Moderate
Botaurus poiciloptilus	Australasian bittern	EN	EN	In or over water, in tall reedbeds, sedges, rushes, cumbungi, lignum. Also occurs in ricefields, drains in tussocky paddocks and occasionally in saltmarshes and brackish wetlands (TSSC 2019).	Negligible
Cacatua pastinator pastinator	Muir's corella	CD	-	Wheat and sheep farming country with remnant native forest. Species is restricted to the south-west corner of WA, near Lake Muir (DPaW 2015).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Calidris acuminata	Sharp-tailed sandpiper	VU (MI)	VU (MI)	Occurs in tidal mudflats, saltmarshes and mangroves, as well as, shallow fresh, brackish or saline inland wetlands. It is also known from floodwaters, irrigated pastures and crops, sewage ponds, saltfields (Pizzey & Knight 2012).	Nil
Calidris alba	Sanderling	MI	MI	Mainly steeply shelving sandy beaches exposed to ocean swell. Also sandy inlets, estuarine sandbanks and near-coastal saltlakes (including saltwork ponds) (Johnstone & Storr 1998).	Nil
Calidris canutus	Red knot	EN	EN (MI)	Mud and sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds (Pizzey & Knight 2012).	Nil
Calidris ferruginea	Curlew sandpiper	CR	CR (MI)	Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater lakes and swamps. Also beaches and near-coastal sewage ponds (Johnstone & Storr 1988).	Negligible
Calidris melanotos	Pectoral sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also samphire flats around estuaries and saltlakes (Johnstone & Storr 1998).	Nil
Calidris ruficollis	Red-necked stint	MI	MI	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands (coastal and inland), saltfields, sewage ponds (Pizzey and Knight 2012).	Moderate

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Calidris subminuta	Long-toed stint	MI	MI	Mainly freshwater swamps (especially when drying and where vegetation is short), river pools, lagoons and claypans; also brackish pools, sewage ponds and samphire flats around estuaries and saltlakes (Johnstone & Storr 1988).	Nil
Calidris tenuirostris	Great knot	CR	CR (MI)	Mud or sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds (Johnstone & Storr 1988).	Negligible
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	VU	Eucalypt and Corymbia forests, often in hilly interior. More recently also observed in more open agricultural and suburban areas including Perth metropolitan area. Attracted to seeding Corymbia calophylla, Eucalyptus marginata, introduced Melia azedarach and Eucalyptus spp. trees (Johnstone et al. 2013).	High
Charadrius leschenaultii	Great sand plover	VU	VU (MI)	Wide sandy or shelly beaches, sandpits, tidal mudflats, reefs, sand cays, mangroves, saltmarsh, dune wilderness, bare paddocks, seldom far inland (Pizzey & Knight 2012).	Negligible
Dasyornis longirostris	Western bristlebird	EN	EN	Dense, low, closed coastal heaths. Open heaths with dense clumps of shrubs, eucalypt thickets and tall swampy heaths. Much reduced by fire, draining for agriculture, but may need fire for optimal status over 50-10+ years. Current range in WA confined to south coast from Albany to Hopetoun (Pizzey and Knight 2012).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Diomedea amsterdamensis	Amsterdam Island albatross	CR	EN (MI)	The Amsterdam albatross is a marine, pelagic seabird. It nests in open patchy vegetation (among tussocks, ferns or shrubs) near exposed ridges or hillocks (Weimerskirch et al. 1985). It sleeps and rests on ocean waters when not breeding (Marchant and Higgins 1990)	Nil
Diomedea epomophora	Southern royal albatross	VU	VU (MI)	Rare visitor to Western Australian seas; it breeds on subantarctic islands south of New Zealand (Johnstone and Storr 1998).	Nil
Diomedea exulans	Wandering albatross	VU	VU (MI)	Marine, pelagic and aerial species. It breeds on Macquarie Island and feeds in Australian portions of the Southern Ocean (DoE 2018).	Nil
Elanus scriptus	Letter-winged kite	P4	-	Open to sparsely wooded country and grassland near tree-lined streams or watercourses (Johnstone and Storr 1998).	Nil
Falco hypoleucos	Grey falcon	VU	-	Species occurs in arid and semi-arid Australia, where it inhabits timbered lowland plains. In particular Acacia shrublands and that are crossed by tree-lined water courses. Species has also been observed hunting in treeless areas and frequenting tussock grassland and open woodlands (TSSC 2020).	Nil
Falco peregrinus	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes (Johnstone and Storr 1998).	Moderate

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Hydroprogne caspia	Caspian tern	MI	MI	Mainly sheltered areas, estuaries (when not laden with silt) and tidal creeks; occasionally near-coastal saltlakes (including saltwork ponds) and brackish pools in lower courses of rivers; rarely fresh waters (DCCEEW 2023).	Negligible
Ixobrychus dubius	Australian little bittern	P4	-	Dense vegetation surrounding/within freshwater pools, swamps and lagoons, well screened with trees. Shelters in dense beds of Typha spp., Baumea spp. and tall rushes in freshwater swamps around lakes and along rivers (Johnstone and Storr 1998).	Negligible
Ixobrychus flavicollis australis	Black bittern	P2	-	Freshwater pools, swamps and lagoons, well-screened with trees. Occasionally feeding by day but mainly sheltering in dense waterside vegetation (Melaleuca spp., Eucalyptus camaldulensis, Pandanus spp. and long grass) (Johnstone and Storr 1998).	Nil
Leipoa ocellata	Malleefowl	VU	VU	Scrubs and thickets of Eucalyptus spp., Melaleuca lanceolata and Acacia linophylla; also other dense litter-forming shrublands. Attracted to fallen wheat in stubbles and along roads (Johnstone and Storr 1998).	Nil
Limosa lapponica	Bar-tailed godwit	MI	MI	Estuarine sand and mudflats and sandy beaches with loads of seaweed; also reef flats and near-coastal saltlakes (including saltwork and sewage ponds) (Johnstone and Storr 1998).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Limosa limosa	Black-tailed godwit	EN MI	EN (MI)	Tidal mudflats, estuaries, sewage ponds, shallow river margins, brackish or saline inland lakes, flooded pastures, airfields (Pizzey & Knight 2012).	Nil
Macronectes giganteus	Southern giant-petrel	MI	EN (MI)	Breeds on southern subantarctic and antarctic islands. May visit Western Australian waters from February to December (mostly June to September) (Johnstone and Storr 1998).	Nil
Macronectes halli	Northern giant petrel	MI	VU (MI)	Breeds on subantarctic islands. May visit Western Australian water from February to September (Johnstone and Storr 1998).	Nil
Numenius madagascariensis	Eastern curlew	CR	CR (MI)	Mainly tidal mudflats; also reef flats, sandy beaches and rarely near-coastal lakes (including saltwork ponds) (Johnstone and Storr 1998).	Nil
Oxyura australis	Blue-billed duck	P4	-	Mainly deeper freshwater swamps and lakes; occasionally saltlakes and estuaries freshened by flood waters (Johnstone and Storr 1998).	High
Pachyptila turtur subantarctica	Fairy prion	-	VU	Breeds on subantarctic islands and is presumed to frequent subtropical waters during non-breeding period (TSSC 2015).	Nil
Pandion haliaetus	Osprey	MI	MI	Coasts, estuaries, bays, inlets, islands, and surrounding waters; coral atolls, reefs, lagoons, rock cliffs, stacks (Pizzey & Knight 2012).	High

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Phoebetria fusca	Sooty albatross	EN	VU (MI)	Marine, pelagic species that tolerates a wide range of sea surface temperatures and salinities. breeds on subtropical and subantarctic islands in the Indian and Atlantic Oceans, on vegetated cliffs and steep slopes that are sheltered from prevailing winds, often amongst tussock grass (Pizzey & Knight 2012).	Nil
Platycercus icterotis xanthogenys	Western rosella (inland)	P4	-	Open eucalypt woodlands with heath understorey (Pizzey & Knight 2012).	Negligible
Plegadis falcinellus	Glossy Ibis	MI	MI	Well-vegetated wetlands, wet pasture, ricefields, floodwaters, floodplains, brackish or occasionally saline wetlands, mangroves, mudflats and occasionally dry grassland (Pizzey & Knight 2012).	Moderate
Pluvialis fulva	Pacific golden plover	MI	MI	Estuaries, mudflats, saltmarshes, mangroves; rocky reefs and stranded seaweed on ocean shores; margins of shallow open inland swamps; sewage ponds, short-grass paddocks, sportsgrounds, airfields, ploughed land (Pizzey & Knight 2012).	Nil
Pluvialis squatarola	Grey Plover	VU (MI)	VU (MI)	Mudflats, saltmarsh, tidal reefs and estuaries, rarely inland (Pizzey and Knight 2012).	Negligible
Rostratula australis	Australian painted snipe	EN	EN	Mainly shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (Marchant and Higgins 1993).	Negligible
Sternula nereis nereis	Australian fairy tern	VU	VU	Sheltered blue-water seas close to land, estuaries (when free of silt) and near-coastal lakes (Johnstone and Storr 1998).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Thalassarche cauta	Shy albatross	VU	VU (MI)	Scarce visitor (late May to mid-October) to southwestern and western seas. Breeds on islands off Tasmania and south New Zealand (Johnstone and Storr 1998).	Nil
Thalassarche impavida	Campbell albatross	VU	VU (MI)	Scarce visitor to south-western and western Australian seas. Breeds on Campbell Island (Pizzey & Knight 2012).	Nil
Thalassarche melanophris	Black-browed albatross	EN	VU (MI)	Seas of south and west coasts. Visitor to Western Australian mainland from January to early November (mostly May to September). Breeds on southern subantarctic and Antarctic islands (Johnstone and Storr 1998).	Nil
Thalassarche steadi	White-capped albatross	VU	VU (MI)	Scarce visitor (late May to mid-October) to southwestern and western seas. Breeds on islands off Tasmania and south New Zealand (Johnstone and Storr 1998).	Nil
Thalasseus bergii	Crested tern	MI	MI	Mainly blue-water seas (especially within 3 km of land), including southern estuaries in summer and autumn (when free of silt); also tidal creeks in north, but not penetrating far into larger estuaries (DCCEEW 2023).	Moderate
Tringa glareola	Wood sandpiper	MI	MI	Mainly shallow fresh waters (lagoons, swamps, claypans, river pools, dams, bore overflows and sewage ponds); occasionally brackish swamps, rarely saltlakes and estuaries (Pizzey & Knight 2012).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Tringa nebularia	Common greenshank	EN (MI)	EN (MI)	Mudflats, estuaries, saltmarshes, margins of lakes, wetlands, claypans (fresh and saline), commercial saltfields, sewage ponds (Pizzey & Knight 2012).	Nil
Tyto novaehollandiae novaehollandiae	Australian masked owl	P3	-	Forests, open woodlands, farmlands with large trees. E.g. river red gums, adjacent cleared country, timbered watercourses, paperbark woodlands and caves (Pizzey & Knight 2012).	Nil
Zanda baudinii	Baudin's black cockatoo	EN	EN	Mainly eucalypt forests. Attracted to seeding Corymbia calophylla, Banksia spp., Hakea spp., and to fruiting apples and pears (Johnstone and Storr 1998).	Negligible
Zanda latirostris	Carnaby's black cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of Pinus spp. Attracted to seeding Banksia spp., Hakea spp., Eucalyptus spp., Corymbia calophylla, Grevillea spp., and Allocasuarina spp. (Johnstone and Storr 1998).	High
Invertebrates					
Euoplos inornatus	Inornate trapdoor spider	P3	-	Has previously been recorded in jarrah forest, including near clay banks and granite outcrop. Most records are from the Darling scarp/Jarrah Forest Region, with limited records from the Swan Coastal Plain (DBCA 2020).	Nil
Hylaeus globuliferus	Woollybush bee	P3	-	Males are territorial and may be found perched on the growing tips of Adenanthos sp., Banksia sp. or Jacksonia sp. Has also been recorded visiting the flowers of Grevillea sp. (PaDIL 2022).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Idiosoma sigillatum	Swan Coastal Plain shield-backed trapdoor spider	P3	-	Widely distributed in sandy areas on the Swan Coastal Plain and on Rottnest Island (Prince 2003). Species predominantly recorded from remnant banksia woodland vegetation and heath on sandy soils (Rix et. al 2018).	Negligible
Leioproctus contrarius	a short-tongued bee	P3	-	Life history and habits are poorly documented/ unknown. It has been recorded only on flowers of Goodeniaceae and possibly Lechenaultia stenosepala (Bamford 2003).	Nil
Leioproctus douglasiellus	a short-tongued bee	EN	CR	Life history and habits are poorly documented/ unknown. It has been recorded only on the flowers of Goodenia filiformis and Anthotium junciforme (Houston 2000).	Negligible
Neopasiphae simplicior	a short-tongued bee	EN	CR	This species of native bee has been collected on flowers of Goodenia filiformis, Lobelia tenuior, Angianthus preissianus and Velleia sp. (Houston 2000).	Nil
Synemon gratiosa	Graceful sun-moth	P4	-	Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the preferred host plant Lomandra maritima. Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant L. hermaphrodita is widespread (DEC 2011).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Westralunio carteri	Carter's freshwater mussel	VU	VU	Occurs in greatest abundance in slower flowing streams with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots. Also occupies lentic systems including large water supply dams and even on-stream farm dams. Salinity tolerance quite low (Morgan et al. 2011).	Nil
Mammals					
Bettongia penicillata ogilbyi	Woylie	CR	EN	Woodlands and adjacent heaths with a dense understorey of shrubs, particularly Gastrolobium spp. (TSSC 2018).	Nil
Dasyurus geoffroii	Chuditch	VU	VU	Wide range of habitats from woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. Appears to utilise native vegetation along roadsides in the wheatbelt (DEC 2012).	Low
Dasyurus hallucatus	Northern quoll	EN	EN	Most abundant in rocky eucalypt woodland but occurs in range of vegetation types, mostly within 200 km of the coast (Menkhorst & Knight 2011).	Nil
Falsistrellus mackenziei	Western false pipistrelle	P4	-	High rainfall forests dominated by jarrah, karri, marri, and tuart. Occupies hollow logs for breeding and resting (Van Dyck and Strahan 2008). Also known to utilise Banksia woodland on the Swan Coastal Plain (Hosken and O'Shea 1995).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Hydromys chrysogaster	Rakali	P4	-	Areas with permanent water, fresh, brackish or marine. Likely to occur in all major rivers and most of the larger streams as well as bodies of permanent water in the lower south-west (Christensen et al. 1984). Intact riparian vegetation and associated bank stability is critical to their survival (DWER 2023).	Moderate
Isoodon fusciventer	Quenda	P4	-	Dense scrubby, often swampy, vegetation with dense cover up to one metre high (DEC 2012)	Moderate
Macrotis lagotis	Bilby	VU	VU	Open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises and hummock grassland (spinifex) growing on sandplains and dunes, drainage systems, salt lake systems and other alluvial areas (DBCA 2017).	Nil
Myrmecobius fasciatus	Numbat	EN	EN	Generally dominated by Eucalyptus spp. that provide hollow logs and branches for shelter and termites for food (van Dyck & Strahan 2008).	Nil
Notamacropus irma	Western brush wallaby	P4	-	Dry sclerophyll forest, Banksia spp. woodlands and shrublands, typically favouring dense low vegetation that provides dense cover (Christensen and Strahan 1983).	Negligible
Phascogale tapoatafa wambenger	South-western brush-tailed phascogale	CD	-	Dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover (Triggs 2003).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Pseudocheirus occidentalis	Western ringtail possum	CR	CR	On the Swan Coastal Plain in Agonis flexuosa woodlands and Agonis flexuosa/ Eucalyptus gomphocephala forests. Also Eucalyptus marginata forests (DBCA 2017).	Nil
Reptiles					
Ctenotus delli	Dell's skink	P4	-	Jarrah and marri woodland with a shrub dominated understorey, sheltering in dense vegetation, inside grass trees and beneath rocks, sometimes in burrows (Nevill 2005).	Nil
Ctenotus gemmula	-	P3	-	Pale soils supporting heathlands and usually in association with Banksia spp. (Bush et al. 2010)	Nil
Ctenotus ora	Coastal plains skink	P3	-	Sandy substrates with low vegetation (including heath) in open Eucalyptus spp. and Corymbia calophylla woodland over Banksia spp. (Kay and Keogh 2012).	Nil
Lerista lineata	Perth slider	P3	-	Sandy coastal heath and low scrubland. Banksia spp. woodland, Eucalyptus gomphocephala open woodland over deep sands, and coastal dunes immediately adjacent to the beach (Wilson and Swan 2021).	Nil
Neelaps calonotos	Black-striped snake	P3	-	Coastal and near-coastal dunes, sandplains supporting heathlands and Banksia spp. woodlands (Bush et al. 2010).	Negligible
Pseudemydura umbrina	Western swamp tortoise	CR	CR	Clay based ephemeral swamps (Bush et al. 2010).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Pseudonaja affinis exilis	Rottnest Island dugite	P4	-	Subspecies found on Rottnest Island. Found in a wide range of habitats including coastal dunes, heathlands, scrublands, and woodlands, but tend to prefer sandy areas. More urban spaces that have been degraded also make an attractive habitat for these shy reptiles, with golf courses, industrial parks and agricultural country among areas listed as potential home environments (Wilson and Swan 2021).	Nil
Note: CR=critically endangered, EN=endangered, VU=vulnerable, CD=conservation dependent, MI=migratory, OS=other specially protected, P1=Priority 1, P2=Priority 2, P3=Priority 3, P4=Priority 4. Species with a high or moderate likelihood to occur within the site are shaded green.					

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Appendix E

Black Cockatoo Foraging Plant Species List

Black Cockatoo Foraging Plants

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Acacia baileyana	Cootamundra wattle	Secondary	-	-	Groom 2011
Acacia pentadenia	Karri wattle	Secondary	-	-	Groom 2011
Acacia saligna	Orange wattle	Secondary	-	-	Groom 2011
Agonis flexuosa	Peppermint tree	Secondary	-	-	Groom 2011
Allocasuarina fraseriana	Sheoak	Secondary	Secondary	Secondary	Johnstone & Storr 1998; Johnstone *et al.* 2010; Johnstone 2017; DoEE 2017
Allocasuarina spp.		Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Anigozanthos flavidus	Tall kangaroo paw	-	Secondary	-	Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Araucaria heterophylla	Norfolk island pine	Secondary	-	-	Groom 2011; DoEE 2017
Banksia ashbyi	Ashby's banksia	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia attenuata	Slender banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia baxteri	Baxter's banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia carlinoides	Pink dryandra	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia coccinea	Scarlet banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia dallanneyi	Couch honeypot dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia ericifolia	Heath-leaved banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia fraseri		Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia gardneri	Prostrate banksia	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia grandis	Bull banksia	Primary	Secondary	-	Saunders 1980; Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia hookeriana	Hooker's banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia ilicifolia	Holly banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; Johnstone & Storr 1998; DoEE 2017
Banksia kippistiana		Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia leptophylla		Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia lindleyana	Porcupine banksia	Primary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Banksia littoralis	Swamp banksia	Primary	Secondary	-	Saunders 1980; Groom 2011Johnstone & Storr 1998; Johnstone *et al.* 2010; DoEE 2017
Banksia menziesii	Firewood banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia mucronulata	Swordfish dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia nivea	Honeypot dryandra	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia nobilis	Golden dryandra	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia praemorsa	Cut-leaf banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia prionotes	Acorn banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia prolata		Primary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Banksia quercifolia	Oak-leaved banksia	Primary	Secondary	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia sessilis	Parrot bush	Primary	Secondary	-	Saunders 1980; Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia speciosa	Showy banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia spp.		Primary	Secondary	-	Saunders 1979; DSEWPaC 2012; DoEE 2017
Banksia squarrosa	Pingle	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia tricuspis	Pine banksia	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia undata	Urchin dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia verticillata	Granite banksia	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Brassica campestris	Canola	Secondary	-	-	Groom 2011; DoEE 2017
Callistemon spp.		Secondary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Callistemon viminalis	Captain cook bottlebrush	Secondary	-	-	Groom 2011
Callitris sp.		Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Carya illnoinensis	Pecan	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; Groom 2014; DoEE 2017
Casuarina cunninghamiana	River sheoak	Secondary	-	-	Groom 2011
Citrullus lanatus	Pie or afghan melon	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Corymbia calophylla	Marri	Primary	Primary	Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Saunders 1979; Johnstone & Kirkby 2008
Corymbia citriodora	Lemon scented gum	Secondary	Secondary	Secondary	Johnstone *et al.* 2010; DSEWPaC 2012; Groom 2011; Johnstone 2017
Corymbia ficifolia	Red flowering gum	Secondary	-	-	Groom 2011
Corymbia haematoxylon	Mountain marri	Secondary	-	Secondary	Groom 2011; DoEE 2012; DoEE 2017
Corymbia maculata	Spotted gum	-	-	-	-
Darwinia citriodora	Lemon-scented darwinia	Secondary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Diospryros sp.	Sweet persimmon	Secondary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eremophila glabra	Tarbush	Secondary	-	-	Groom 2011
Erodium aureum		Secondary	-	-	Groom 2011
Erodium botrys	Long storksbill	Secondary	Secondary	-	Groom 2011; Johnstone & Storr 1998; Johnstone *et al.* 2010
Erodium spp.		Secondary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Eucalyptus caesia	Silver princess	Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone 2017
Eucalyptus camaldulensis	River red gum	-	-	Secondary	DoEE 2012; DoEE 2017
Eucalyptus decipiens	Red heart/moit	-	-	Secondary	Johnstone 2017
Eucalyptus diversicolor	Karri	-	-	Primary	Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998
Eucalyptus erythrocorys	Illyarrie	Secondary	-	Secondary	DSEWPaC 2012; DoEE 2017; Johnstone 2017, Johnstone *et al.* 2010
Eucalyptus gomphocephala	Tuart	Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus grandis	Flooded gum, rose gum	-	-	Secondary	DoEE 2012; DoEE 2017
Eucalyptus lehmannii	Bushy yate	-	-	Secondary	Johnstone 2017
Eucalyptus leucoxylon	Yellow gum	Secondary	-	-	Groom 2014

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Eucalyptus loxophleba	York gum	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus marginata	Jarrah	Primary	Secondary	Primary	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone 2017
Eucalyptus patens	Blackbutt	Primary	-	Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Groom 2011
Eucalyptus pleurocarpa	Tallerack	Secondary	-	-	Groom 2011
Eucalyptus preissiana	Bell-fruited mallee	Secondary	-	-	Groom 2011
Eucalyptus robusta	Swamp mahogany	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Eucalyptus salmonophloia	Salmon gum	Primary	-	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DSEWPaC 2012; DoEE 2017
Eucalyptus staeri	Albany blackbutt	-	-	Secondary	Johnstone & Storr 1998
Eucalyptus todtiana	Coastal blackbutt	Secondary	-	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; Johnstone & Kirkby 2008
Eucalyptus wandoo	Wandoo	Primary	Secondary	Primary	Saunders 1980; Johnstone *et al* . 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Ficus sp.	Fig	Secondary	-	-	Groom 2011
Grevillea armigera	Prickly toothbrushes	Primary	-	-	Groom 2011
Grevillea bipinnatifida	Fuschia grevillea	Primary	-	-	Groom 2011
Grevillea hookeriana	Red toothbrushes	Primary	-	-	Groom 2011
Grevillea hookeriana subsp. apic	Black toothbrushes	Primary	-	-	Groom 2011
Grevillea paniculata	Kerosene bush	Primary	-	-	Groom 2011
Grevillea paradoxa	Bottlebrush grevillea	Primary	-	-	Groom 2011
Grevillea petrophiloides	Pink poker	Primary	-	-	Groom 2011
Grevillea robusta	Silky oak	Primary	-	-	Johnstone *et al.* 2010; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Grevillea spp.		Primary	-	-	Saunders 1979; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Grevillea wilsonii	Native fuchsia	-	Secondary	-	Johnstone *et al.* 2010
Hakea auriculata		Primary	-	-	Saunders 1980; Groom 2011
Hakea candolleana		Primary	-	-	Groom 2011
Hakea circumalata	Coastal hakea	Primary	-	-	Groom 2011
Hakea commutata		Primary	-	-	Groom 2011
Hakea conchifolia	Shell-leaved hakea	Primary	-	-	Groom 2011
Hakea costata	Ribbed hakea	Primary	-	-	Groom 2011
Hakea cristata	Snail hakea	Primary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Hakea cucullata	Snail hakea	Primary	-	-	Groom 2011
Hakea cyclocarpa	Ramshorn	Primary	-	-	Saunders 1980; Groom 2011
Hakea eneabba		Primary	-	-	Groom 2011
Hakea erinacea	Hedgehog hakea	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Hakea falcata	Sickle hakea	Primary	-	-	Groom 2011
Hakea flabellifolia	Fan-leaved hakea	Primary	-	-	Groom 2011
Hakea gilbertii		Primary	-	-	Saunders 1980; Groom 2011
Hakea incrassata	Golfball or marble hakea	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Hakea lasiantha	Woolly flowered hakea	Primary	-	-	Johnstone *et al* . 2010; Groom 2011
Hakea lasianthoides		Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Hakea laurina	Pin-cushion hakea	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Hakea lissocarpha	Honeybush	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea marginata		-	Secondary	-	Johnstone *et al.* 2010
Hakea megalosperma	Lesueur hakea	Primary	-	-	Groom 2011
Hakea multilineata	Grass leaf hakea	Primary	-	-	Groom 2011
Hakea neospathulata		Primary	-	-	Groom 2011
Hakea obliqua	Needles and corks	Primary	-	-	Saunders 1980; Groom 2011
Hakea oleifolia	Dungyn	Primary	-	-	Groom 2011

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Hakea pandanicarpa subsp. crassifolia	Thick-leaved hakea	Primary	-	-	Groom 2011
Hakea petiolaris	Sea urchin hakea	Primary	-	-	Groom 2011
Hakea polyanthema		Primary	-	-	Groom 2011
Hakea preissii	Needle tree	Primary	-	-	Groom 2011
Hakea prostrata	Harsh hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea psilorrhyncha		Primary	-	-	Groom 2011
Hakea ruscifolia	Candle hakea	Primary	Secondary	-	Saunders 1980; Groom 2011; Johnstone *et al.* 2010
Hakea scoparia	Kangaroo bush	Primary	-	-	Groom 2011
Hakea smilacifolia		Primary	-	-	Groom 2011
Hakea spp.		Primary	Secondary	-	Saunders 1979; DSEWPaC 2012; DoEE 2017
Hakea stenocarpa	Narrow-fruited hakea	Primary	Secondary	-	Johnstone et al. 2010; Groom 2011
Hakea sulcata	Furrowed hakea	Primary	-	-	Groom 2011
Hakea trifurcata	Two-leaved hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea undulata	Wavy-leaved hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea varia	Variable-leaved hakea	Primary	Secondary	-	Saunders 1980; Groom 2011
Harpephyllum caffrum	Kaffir plum	-	-	Secondary	Johnstone 2017
Helianthus annuus	Sunflower	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Hibiscus sp.	Hibiscus	Secondary	-	-	Groom 2011
Isopogon scabriusculus		Secondary	-	-	Groom 2011
Jacaranda mimosifolia	Jacaranda	Secondary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Jacksonia furcellata	Grey stinkwood	Secondary	-	-	Groom 2011
Kingia australis	Kingia	-	Secondary	-	Johnstone *et al.* 2010
Lambertia inermis	Chittick	Secondary	-	-	Johnstone & Storr 1998; Groom 2011
Lambertia multiflora	Many-flowered honeysuckle	Secondary	-	-	Saunders 1980; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Liquidamber styraciflua	Liquid amber	Primary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; Groom 2014; Personal observation
Lupinus sp.	Lupin	Secondary	-	-	Saunders 1980; Groom 2011
Macadamia integrifolia	Macadamia	Primary	Secondary	-	Johnstone *et al.* 2010; Grooms 2011; Groom 2014
Malus domestica	Apple	Secondary	Secondary	-	Johnstone *et al* . 2010; Johnstone & Storr 1998; DSEWPaC 2012; DoEE 2017; Groom 2011
Melaleuca leuropoma		Secondary	-	-	Saunders 1980; Groom 2011
Melia azedarach	Cape lilac or white cedar	Secondary	-	Primary	Johnstone *et al.* 2010; Groom 2011
Mesomeleana spp.		Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Olea europea	Olive	-	-	Secondary	Johnstone 2017
Persoonia longifolia	Snottygobble	-	-	Secondary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Pinus canariensis	Canary island pine	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Pinus caribea	Caribbean pine	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Pinus pinaster	Pinaster or maritime pine	Primary	-	-	Groom 2011
Pinus radiata	Radiata pine	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Pinus spp.		Primary	Secondary	-	Johnstone & Storr 1998; Saunders 1979; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Protea 'Pink Ice'		Secondary	-	-	Groom 2011
Protea repens		Secondary	-	-	Groom 2011
Protea spp.		Secondary	-	-	Johnstone *et al.* 2010
Prunus amygdalus	Almond tree	Secondary	-	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Pyrus communis	European pear	-	Secondary	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Quercus spp.	Oak	-	Secondary	-	Johnstone *et al.* 2010

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Raphanus raphanistrum	Wild radish	Secondary	-	-	Groom 2011; DoEE 2017
Reedia spathacea		-	Secondary	-	Johnstone *et al.* 2010
Rumex hypogaeus	Doublegee	Secondary	-	-	Saunders 1980
Stenocarpus sinuatus		Secondary	-	-	Johnstone *et al.* 2010
Syzygium smithii	Lilly pilly	Secondary	-	-	Groom 2014
Tipuana tipu	Tipu or rosewood tree	Primary	-	-	Groom 2011, Groom 2014
Xanthorrhoea preissii	Grass tree	Secondary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Xylomelum occidentale	Woody pear	Secondary	-	-	Groom 2014

CBC=Carnaby's black cockatoo, BBC=Baudin's black cockatoo and FRTBC=Forest red-tailed black cockatoo

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Appendix E

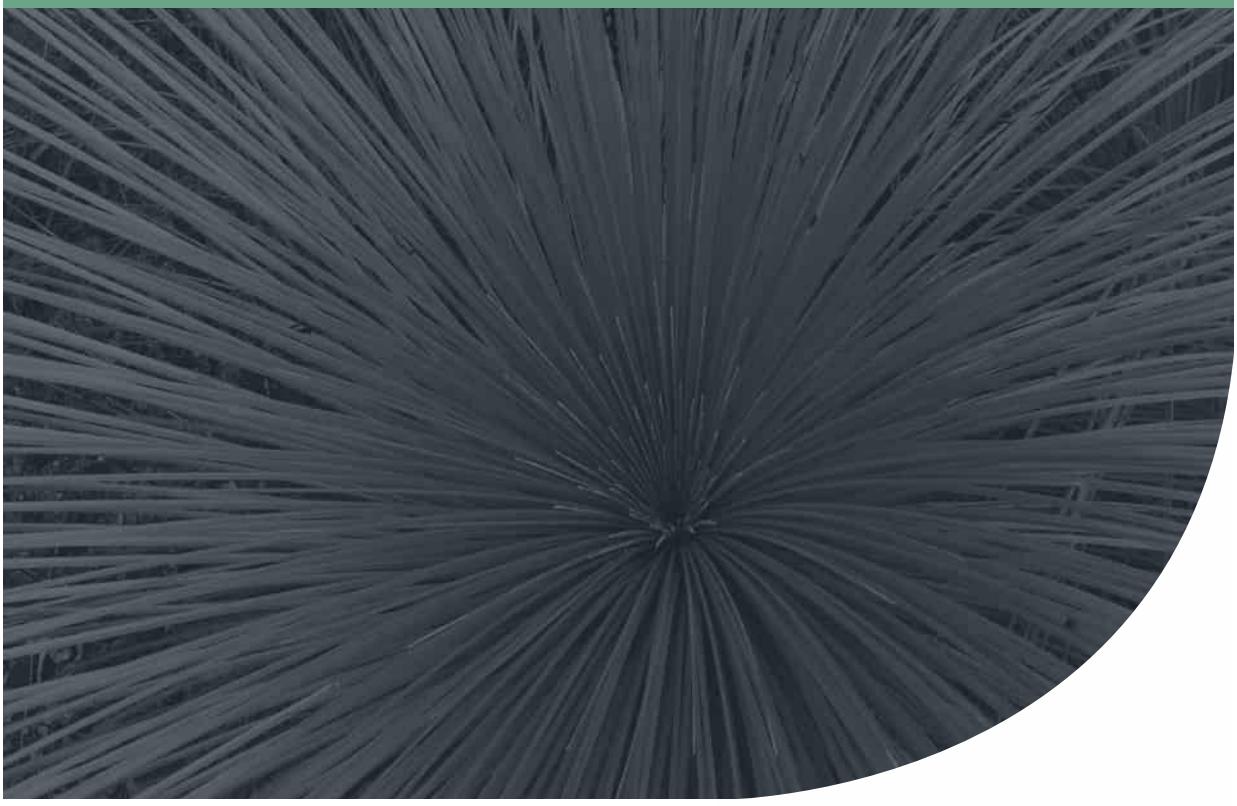
Local Water Management Strategy (Emerge Associates 2024b)

Local Water Management Strategy

Ascot Racecourse Local Structure Plan

Project No: EP23-109(03)

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Executive Summary

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B (largely unchanged form existing), Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**. The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and City of Belmont (CoB). The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
    - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
    - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
    - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).
- The highest groundwater level beneath the site is reported 3.03 mBGL during February 2024 (Galt 2024), located beneath Precinct D.

- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The Central Belmont Main Drain (CBMD), managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Matheson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the racecourse. These are understood to receive runoff from the Grandstand buildings in Precinct B and stables/buildings in Precinct C.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

The design criteria and the manner in which they are proposed to be achieved are presented in **Table E1**.

Table E1: Water management criteria and compliance summary

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Water Conservation	WC1	For residential dwellings consumption target of 60 kL/person/year scheme water.	Provide advice to Precinct A and Precinct D residents on water conservation measures	Proponent	Point of sale
			RWTs can be utilised for non-potable uses	Lot owner	Post-house construction
			Promotion and use of WWG in lots within Precinct D and other open spaces across all precincts	Proponent/Lot owner	Point of sale/Post-house construction
			Promotion and use of water efficient appliances within Precinct A and Precinct D	Proponent/Lot owner	Point of sale/Post-house construction
			Mandate water efficient fittings within Precinct A and Precinct D	CoB	Building approval
	WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in all open spaces and verges	Proponent	Landscape design
			Open spaces designed to use no more than allocated groundwater		
			Minimise water requirements for open spaces and verge maintenance		
			Use of water efficient appliances within Precinct A and Precinct D	Lot owner	Post-house construction
			Use of WWG principles within Precinct A and Precinct D		
	WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the racecourse.	Proponent	Landscape design

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Stormwater Management	SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.	Lot owner/developer	Construction
	SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.	Proponent	Construction
			Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.	Proponent	Construction
	SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.95 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.	Proponent	Construction
	SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the basins.	Proponent	Detailed drainage design
	SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.	Proponent	Detailed drainage design
	SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the nutrient concentrations within surface water meet the regional water quality target.	Proponent	Detailed drainage design
	SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within POS and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use	Landscape/Maintenance Contactor/Proponent	Landscape Implementation/ Point of Sale
	SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.	Proponent	Detailed drainage design

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Groundwater Management	GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, and subsoil drainage will be provided in the POS.	Proponent	Detailed drainage design
	GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.	Proponent	Detailed drainage design

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Appendices

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Central Belmont Main Drain Water Corporation

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
ANZECC	Australian and New Zealand Environment and Conservation Council
BoM	Bureau of Meteorology
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
CoB	City of Belmont
WC	Water Corporation of Western Australia (Water Corp)

Table A2: Abbreviations – General terms

General terms	
AEP	Annual exceedance probability
ASS	Acid sulfate soils
CCW	Conservation category wetland
CEMP	Construction Environmental Management Plan
DCA	Development Control Area
DMP	Drainage management plan
EC	Electrical conductivity
FMP	Foreshore management plan
LWMS	Local Water Management Strategy
MGL	Maximum groundwater level
MRS	Metropolitan Region Scheme
NWQMS	National Water Quality Management Strategy
POS	Public open space
SCWQIP	Swan and Canning Water Quality Improvement Plan
SRA	Swan River Alluvium
TDS	Total dissolved solids
TEC	Threatened ecological community
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids

General terms	
TWL	Top water level
UFI	Unique feature identifier
UWMP	Urban Water Management Plan
WSUD	Water sensitive urban design
WWG	Water wise gardening

Table A3: Abbreviations – units of measurement

Units of measurement	
cm	centimetre
ha	hectare
m	metre
m^2	square metre
m^3	cubic metre
m^3 / s	cubic metres per second
mAHD	metres in relation to the Australian height datum
mBGL	metres below ground level
mm	millimetre
mS / cm	millisiemens per centimetre
µg/L	micrograms per litre
mg / L	milligrams per litre

Table A4: Terminology – design rainfall

Rainfall event	Annual exceedance probability (AEP)	Approximate equivalent average recurrence interval (ARI)
Small	1 exceedance year (EY) event (frequent)	1 in 1 year ARI event
Minor (residential purposes)	20% AEP event	1 in 5 year ARI event
Minor (commercial purposes)	10% AEP event	1 in 10 year ARI event
Major	1% AEP event	1 in 100 year ARI event

1 Introduction

1.1 Background

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse and Perth Racing Administration lot/building on Grandstand Road. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**.

1.2 Town planning context

The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

1.3 Purpose of this report

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and CoB. The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

1.4 Policy Framework

There are a number of State Government legislation and policies of relevance to the site. These policies include:

- *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d)
- *Swan and Canning Rivers Management Act 2006* (Government of WA 2006)
- *Policy 49 – Planning for stormwater management affecting the Swan Canning Development Control Area* (DPaW 2016)
- *Local Planning Scheme No. 15 (City of Belmont)* (WAPC 2023a)
- *State Water Plan* (Government of WA 2007)
- *Draft State Planning Policy 2.9: Planning for Water Guidelines* (DPLH 2021)
- *State Planning Policy 2.10 Swan Canning River System* (WAPC 2006b)
- *Guidance Statement No. 33: Environmental Guidance for Planning and Development* (EPA 2008)
- *Liveable Neighbourhoods* (WAPC 2009a)
- *Planning Bulletin No. 64: Acid Sulfate Soils* (WAPC 2009b)

In addition to the above policies, there are a number of published guidelines and standards available that provide direction regarding the water management characteristics that urban developments should aim to achieve. These are key inputs that relate either directly or indirectly to the site and include:

- *Better Urban Water Management* (WAPC 2008b)
- *Urban Water Management Plans: Guidelines for Preparing Plans and for Complying with Subdivision Conditions* (DoW 2008)
- *National Water Quality Management Strategy (NWQMS)* (ANZECC 2000)
- *Australian Runoff Quality* (Wong et al. 2006)
- *National Water Quality Management Strategy* (ANZECC 2000)
- *Stormwater Management Manual for Western Australia* (DoW 2007)
- *Decision Process for Stormwater Management in Western Australia* (DWER 2017)
- *Australian Rainfall and Runoff* (Ball J et al. 2019)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008)
- *Golden Gateway Structure Plan* (CoB 2019).

1.5 Previous Studies

1.5.1 Golden Gateway Local Water Management Strategy

The draft Golden Gateway LWMS (Essential Environmental 2018b) was prepared to support the Golden Gateway Structure Plan (CoB 2019) by Essential Environmental. The LWMS was prepared in consideration of *Better Urban Water Management* (WAPC 2008b) and *State Planning Policy 2.9: Water Resources* (WAPC 2006a). The key objectives and design criteria of the draft LWMS (Essential Environmental 2018b) included:

Water Conservation:

- Ensure the efficient use of all water resources in the redeveloped urban form and aim to achieve highest value use of fit-for-purpose water.
- Maintain opportunities for future generations by using water more efficiently.

Stormwater management:

- The first 15 mm of rainfall is to be retained within all lots through a combination of raingardens, water tanks and soakwell systems.
- Raingardens and tree-pits are to be installed in all new or upgraded streets to provide infiltration of the first 15 mm of rainfall.
- Minor event runoff from events larger than 15mm total depth are to be managed in accordance with serviceability requirements of the City of Belmont.
- Roads and public open spaces are to be designed to cater for the surface overflow for more severe storm events with habitable floors at least 0.3 m above the 1% AEP flood or storage level at any location.
- Habitable floors are to be constructed at least 0.5m above the 1% AEP flood level in the Swan River adjacent to the development area.

- Water quality treatment systems and stormwater management structures should be designed in accordance with the *Stormwater Management Manual for Western Australia* (DoW 2007) and *Australian Runoff Quality: A guide to water sensitive urban design* (Wong et al. 2006).

Groundwater management:

- Groundwater management systems are to be designed as free discharging under normal operating conditions.
- Flows from groundwater management systems are to be treated prior to discharge.

1.6 LWMS objectives

Whilst the criteria proposed in the Golden Gateway LWMS are relevant to some parts of the Ascot Racecourse structure plan area, it is not representative of all areas and site characteristics and therefore only partially applicable. This LWMS supports the Ascot Racecourse Structure Plan, which proposes an alternate layout (to the Golden Gateway Structure Plan) to some of the land uses surrounding the Ascot Racecourse. The design criteria and objectives proposed in this LWMS are generally based on those proposed in the Golden Gateway LWMS, though with additional consideration for site and Precinct- specific characteristics. This LWMS adopts the following major objectives:

- Protect water quality in the Swan River by providing appropriate water quality treatment at source.
- Mitigate potential flooding within the Structure Plan area and immediate surrounds.
- Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater.
- Provide a broad level stormwater management framework to support future urban development.
- Incorporate appropriate best management practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified.
- Minimise development construction costs, which will result in reduced land costs for future home owners.
- Minimise transport of nutrients/pollutants to groundwater.
- Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area.
- Gain support from DWER, DBCA, CoB and Water Corporation for the proposed method to manage stormwater within the site.

Detailed objectives for water management within the site are further discussed in **Section 4**.

2 Proposed Development

A total of approximately 62.0 ha is proposed to be developed as shown on **Figure 1**. The Ascot Racecourse Structure Plan proposes six precincts with different objectives and character, and these include:

- **Precinct A –** Approximately 3.0 ha for retirement living/village and mixed use purposes
- **Precinct B –** Approximately 9.3 ha for the use of public assembly (i.e. entertainment/office purposes)
- **Precinct C –** Approximately 8.0 ha for the use of public assembly (i.e. racecourse/stabling purposes)
- **Precinct D –** Approximately 1.5 ha for residential/childcare purposes
- **Precinct E –** Approximately 4.2 ha for mixed use (i.e. commercial/retail purposes)
- **The Racecourse –** Approximately 36.0 ha of retained 'Place of Public Assembly: Racecourse' uses.

The proposed land uses surrounding Ascot Racecourse will be integrated into the Racecourse Precinct. Management of surface and groundwater will take a water sensitive urban design (WSUD) approach that will integrate the management of water within the Precincts with the Racecourse and immediately surrounding infrastructure.

The WSUD measures that will be adopted within the Structure Plan area will include:

- Bio-retention areas (BRAs) to meet water quality treatment requirements
- Subsurface infiltration cells that will facilitate at-source infiltration
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse
- Flood storage areas (FSAs) to provide flood detention, retention and infiltration as close to source as possible.

The WSUD approaches are further discussed in **Section 6**.The detailed concept plan and preliminary civil drawings are provided in **Appendix A** and **Appendix C**.

3 Pre-development Environment

3.1 Sources of information

The following sources of information were used to provide a broad regional environmental context for the site:

- *Geological Survey of Western Australia* (Gozzard 2007)
- *Map Viewer Plus* (Landgate 2023)
- *Water Register* (DWER 2024c)
- *Perth Groundwater Map* (DWER 2024a)
- *Weather and Climate Statistics Data* (BoM 2024)
- *Acid Sulfate Soil Mapping* (DWER 2023a)
- *Water Information Reporting* (DWER 2024b).

In addition to the above information, site-specific investigations have been conducted. These have aimed at providing more detail to the existing regional information. These site-specific investigations and information have been available from the following sources:

- *Draft Golden Gateway Structure Plan* (CoB 2019)
- *Draft Golden Gateway LWMS* (Essential Environmental 2018b)
- *Draft Golden Gateway Environmental Report* (Essential Environmental 2018a)
- *Draft Infrastructure Assessment Report : Golden Gateway Precinct* (Cardno 2017)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008).

3.2 Land use context

The site has been used as the Ascot Racecourse since 1892 (Landgate 2023). The northeast portion of the site is being used for horse racing and training purposes and the surrounding area is being used for stabling, training and entertainment venues which support the above purposes. Some portions of the site are predominantly cleared (e.g. Precinct A, Precinct E) and are occasionally used for parking or other temporary uses. The Precinct D area is used for commercial purposes, being the current Perth Racing administration building.

3.3 Climate

The site experiences a dry Mediterranean climate of hot dry summers and cool wet winters and is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August (BoM 2024). The region experiences rainfall for 84.8 days annually (on average).

3.4 Topography

The site is mostly flat with a slight downward slope from east to north and northwest, with a few low points. The variance in topography of the Precincts is described further as:

- The Racecourse slopes from Precinct C towards the Swan River with topography approximately 7 m Australian Height Datum (mAHD) to 1m AHD and from 7 mAHD (east) to 3 mAHD (west). There are a few local depressions (i.e., lakes and swale) observed within the centre of the racecourse.
- Precinct A has a generally flat topography of 2 mAHD with a high point of 3 mAHD to the west adjacent to Grandstand Road.
- Precinct B slopes from south to north (4 mAHD to 2 mAHD) and from west to east (3 mAHD to 2 mAHD). Precinct D and E are generally flat with a topography of 3 mAHD and 2 mAHD respectively.
- Parts of Precinct C (existing stables and buildings) drain towards the Racecourse, however most of Precinct C is currently carpark that drains towards Precinct E and the Southern Main Drain.
- Precinct D is generally flat with a topographic level 3 mAHD.
- Precinct E has a gentle slope from east to west. The topography of the precinct ranges from 4 mAHD to the east to 2 mAHD to the west.

The topographic contours of the site are shown on **Figure 2**.

3.5 Geotechnical conditions

3.5.1 Geology and soils

The Perth Metropolitan Region 1:50,000 Environmental Geology Series (Gozzard 1986) *and Sea to scarp - geology, landscape, and land use planning in the southern Swan Coastal Plain* (Gozzard 2011) describes that the site lies in the Swan River Terraces system, being underlain by the Guildford formation of alluvial and leached yellow sand. The regional geological mapping indicates that the site soils include:

- **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
- **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
- **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin

The regional geological mapping is shown on **Figure 3**.

3.5.2 Precinct A geotechnical investigation

A detailed geological investigation has been carried out in January 2024 (Douglas Partners 2024) for Precinct A (see **Appendix B**). This investigation generally confirms the regional geological mapping, and the ground conditions of Precinct A are described as:

- Uncontrolled Fill
  - Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL
  - Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY
- Overlying natural soils includes
  - Clayey soils including Clayey SAND and CLAY
  - Sandy soils including SAND and Silty SAND

Douglas Partners (2024) concluded that if unmodified, Precinct A is considered unsuitable for on-site stormwater disposal due to the low permeability soils and shallow groundwater depth. To meet geotechnical requirements, stormwater should be managed by connecting to a suitable outflow (Douglas Partners 2024).

3.5.3 Precinct D geotechnical investigation

Galt has undertaken a geotechnical study in March 2024 (Galt 2024) for Precinct D (provided in **Appendix B**) and has described the Precinct D ground conditions as:

- **Surficial Topsoil** (in landscaped areas) up to 0.3 m thick and **Hardstand Fill Layers** (in carparks and access ways); overlying
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Whilst detailed geotechnical investigations have not been undertaken in each Precinct, it is expected that the soils encountered will be generally consistent with regional geological mapping and the investigations undertaken for Precincts A and D and will consist of generally shallow layers of sand overlying sandy clay of the Guildford formation. Such soils are unlikely to be suitable for onsite infiltration of all stormwater and onsite detention unless modified and stormwater management will need to be supplied with an outlet so that flood storage areas have a way to drain between storm events.

3.5.4 Acid sulfate soils

The acid sulfate soil (ASS) risk mapping (DWER 2023b) indicates that most of the site is considered to have a high to moderate risk of ASS occurring within the 3 m of the natural surface. Some portions of Precinct B, Precinct C and the Racecourse are mapped to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.

The ASS risk mapping is shown on **Figure 4**.

3.6 Environmental assets

3.6.1 Environmentally sensitive area

The northern portion of the site (along the Swan River) is identified as an environmentally sensitive area (ESA). ESAs are shown on **Figure 5**.

3.6.2 Sewerage sensitive area

The entirety of the site is classified as a sewage sensitive area (SSA) by the *Government Sewerage Policy* (DPLH 2019). The two classifications of relevance to the site define a SSA as:

- a) Estuary catchments on the Swan and Scott Coastal Plains.
- f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.

3.6.3 Geomorphic wetlands

The *Geomorphic Wetlands of the Swan Coastal Plain* dataset indicates the following wetlands within the site:

- Multiple Use Category Wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
- Resource Enhancement Wetland (REW) area (UFI 8423)

The Swan River, situated immediately adjacent to the northern boundary of the site, is recognised as a "Conservation Category Wetland" (CCW) (UFI 1316 - Estuary waterbody) within the *Geomorphic Wetlands of the Swan Coastal Plain* dataset and has additional significant ecological, cultural and heritage values (DEC 2011).

The location of the geomorphic wetlands is shown on **Figure 5.**

3.7 Hydrology

3.7.1 Surface water

3.7.1.1 Water Resources

The dominant hydrological feature of the site is the Swan River estuary. The estuary is subject to marked seasonality, which controls the salinity of the site, and particularly the foreshore area. This seasonality is a result of the short winter rainfall patterns, a small tidal range and the landform of the estuary (Hodgkin and John 1986).

The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park (shown on **Figure 6**). Any proposed development on land adjacent river within the DCA and/or partly within DCA are subject to assessed and approved by the Department of Biodiversity, Conservation and Attraction (DBCA) under Part 5 of the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007* (CoB 2018).

Water management strategies will be needed to ensure protection (i.e. water quality improvement) of the Swan River. The catchments of the Swan Canning River system are the subject of the Swan Canning Water Quality Improvement Plan (SRT 2009) which contains catchment management measures and control actions.

The major event flood levels in the Swan River have been documented in recent studies undertaken on behalf of DWER (DWER 2023c).These flood levels, along with the extent of floodway/floodplain

are shown in the DWER online floodplain mapping tool. This tool indicates that the anticipated 1% AEP flood level adjacent to the site is 2.8 mAHD – noting that this level includes consideration for future climate change. The extent of floodway/floodplain from the Swan River adjacent to the site is shown on **Figure 6**.

3.7.1.2 Lakes

There are three lakes within the racecourse including:

- **Irrigation lake** – located adjacent to the Production Bore 1 (PB01) and has a volume of 6,000 m^3 to 7,000 m^3. Water is pumped out from PB01 into the lake, and irrigation water is drawn from the Irrigation Lake. During winter the Irrigation Lake overflows into the adjacent Lined Lake. The current irrigation demand for the Racecourse is approximately 3,000 m^3/day, there is no shortage of irrigation water supply as the lake has sufficient storage capacity. The top water level (TWL) of the Irrigation Lake is approximately 3.1 mAHD.
- **Lined Lake** – this Lake is sealed with a natural clay liner and fed via a 225 mm overflow pipe from the Irrigation Lake. The Lined Lake overflows into the Wetland Lake. The elevation of the Lined Lake is approximately 2.1 mAHD.
- **Wetland lake** – is the largest of the three lakes and has approximately 2.6 ha of surface area. The Wetland Lake has a TWL of approximately 0.4 mAHD. Two overflow pipes at the northern end of the Wetland Lake allow excess water within the Lake to flow to the Swan River.

Peak water levels within the Lined Lake and Wetland Lake were predicted for a 10% AEP storm event (Evangelisti & Associates 1997). The peak water level for was 2.68 mAHD in the Lined Lake which then discharged to the Wetland Lake. The Wetland Lake discharged to the Swan River after reaching the peak water level of 0.53 mAHD. The lakes are connected by 450 mm RCP pipes. The outfall into the Swan River is directed via two pipes (450 mm RCP and 375 mm RCP). The pipes are fitted with headwall and tidal control gate to mitigate inundation from the Swan River (Evangelisti & Associates 1997).

The location of the lakes and overflow pipes are shown on **Figure 6**.

3.7.1.3 Drainage network systems

The Central Belmont Main Drain (CBMD) is managed by the Water Corporation and is the regional drainage system and has a catchment area of 189 ha and which discharges into the Swan River. Catchment plans for the CBMD indicate that inflow from the site occurs in the southwestern corner of Precinct E, where an open drain connects to the CBMD at node CAN008 as shown in **Appendix E** and **Figure 6**.

The CoB has a local drainage piped network located beneath Hardey Road adjacent to Precinct C and which discharges to the CBMD within Precinct E. A larger local CoB network extends along Matheson Road to the East. This is currently connected to the 900 mm pipe that discharges northwards to the lined lake within the centre of the racecourse.

CoB local drainage pipes also exist beneath Grandstand Road adjacent to Precinct A however there is no current connection between Precinct A and the local drainage network. The same network also extends past/adjacent to Precinct D along the northern end of Resolution Drive, however there is no

current connection from Precinct D to the local pipe network. The pipe network along Resolution Drive includes a 450 mm and 525 mm pipe which are understood to discharges into the CBMD. Whilst the CoB catchment has not been modelled to determine peak flows under differing storm durations, an estimate can be made based on the capacity of the pipes which discharge to the CBMD. The combined capacity of the two existing pipes is estimated to be 0.62 m^3/s, and therefore the allowable discharge from Precinct C and Precinct E is estimated to be 0.33 m^3/s.

Within the Racecourse an existing swale is being used around the racecourse to convey water from the track into the central Wetland Lake.

The location of the swales within the Racetrack Precinct and outlet to Swan River from the Wetland Lake is shown on **Figure 6**.

3.7.2 Groundwater

3.7.2.1 Groundwater Resource

The groundwater beneath the site is a multi-layered system comprised of the following:

City of Bayswater – Perth Superficial Swan unconfined aquifer. The Superficial Aquifer is approximately 20 m thick under the Ascot Racecourse, with the base of the aquifer under the racecourse at approximately - 20 mAHD (Davidson, 1995). The aquifer is recharged directly by rainfall and from the Swan River.

King Park Aquifer. The Kings Park Aquifer is 155 m thick starting from - 20 mAHD and is recharged laterally from the adjacent northern Mirrabooka Aquifer and Superficial Aquifer. The Kings Park Aquifer comprises 2 members: the Mullaloo Sandstone and Como Sandstone. Only the Mullaloo Sandstone member is present at the Ascot site (Davidson, 1995). The Mullaloo Sandstone member is underlain by the Kardinya Shale confining bed of the Osborne Formation.

The groundwater salinity in the aquifer in 1995 was mapped as 500 mg/L to 1,000 mg/L TDS (Davidson, 1995). However, data in recent years indicates the aquifer salinity levels are increasing due to saltwater intrusion.

Perth South – Perth Leederville confined aquifer is below -160 mAHD and is approximately 370 m thick. In the Ascot area the Leederville Aquifer is confined but further to the south and north of Perth it is hydraulically connected to the Superficial Aquifer. The Leederville Aquifer comprises of four formations under the Ascot Racecourse, namely Henley Sandstone, Pinjar Member, Wanneroo Member and the Mariginiup Member.

Groundwater flow is generally westwards through the Leederville Aquifer. Lateral discharge can occur to the Kings Park Aquifer but depends on levels of abstraction in the Leederville Aquifer adjacent to the discharge area.

Generally, groundwater salinity in the Leederville Aquifer can be divided into an upper and a lower zone. The upper zone is generally fresh with salinity ranging from 250 to 1,000 mg/L. Salinity in the lower zone (below -400 mAHD) ranges from 1,000 mg/L to greater than 3,000 mg/L.

Groundwater is abstracted from an artesian production bore (PB1) assigned to the Leederville Aquifer to meet the irrigation demand of the Racecourse and surrounds. The bore is located adjacent the Irrigation Lake at the south corner of the Ascot Racecourse track. The bore is screen in the upper Leederville Formation which extends between -160 mAHD and -400 mAHD.

The allocation status of aquifers is further discussed in **Section 5.1.2**.

3.7.2.2 Groundwater levels

Perth Groundwater Map indicates (DWER 2023e) that the regional groundwater level sits at 0.5 m AHD across the site. Therefore, the groundwater clearance from southeast to northwest of the site ranges from 6.5 m to 0.5 m.

There are two groundwater level and quality monitoring bores (Bore1 and Bore2) and one production bore (PB1) within the Racecourse (see **Figure 2**) which are monitored by Perth Racing. Groundwater levels in these are monitored monthly.

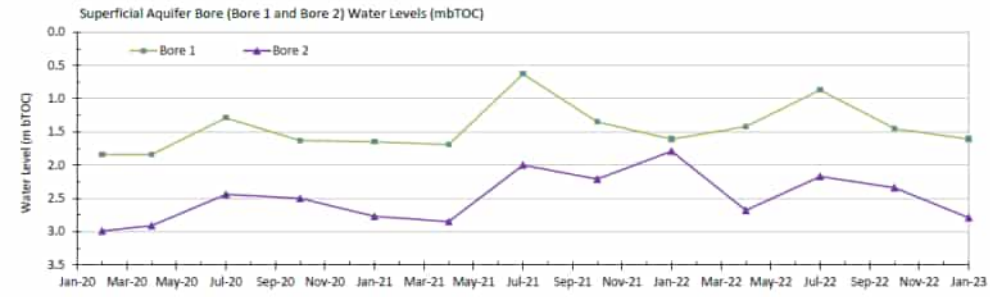


Plate 1: Groundwater levels within the Superficial Aquifer at Bore1 and Bore2 (JDA 2023)

Plate 1 depicts the groundwater levels observed within the Racecourse which clearly indicates the rise and fall of groundwater levels seasonally. The peak groundwater level at Bore 1 and Bore 2 were recorded 1.26 m AHD and 1.70 m AHD respectively, during August 2022.

Monitoring has recently been undertaken within Precinct A. Six monitoring wells were installed for the Precinct A geotechnical investigation. The groundwater depth below the surface of the Precinct A (during January 2024) varied from 1.09 m below ground level (mBGL) to 2.37 mBGL (Douglas Partners 2024).

Monitoring has also recently been undertaken within Precinct D by Galt Geotechnics during the geotechnical investigation. The highest groundwater level beneath Precinct D is reported as 3.03 mBGL during February 2024 (Galt 2024).The various monitoring data/sources have been collated to prepare estimated maximum groundwater contours beneath the site. These have also considered the surface elevation of swales adjacent to the racetrack and the reported TWL of the Wetland Lake. The regional groundwater levels are shown in **Figure 2,** with spot heights recorded at the various locations also provided. It is noted that these do not necessarily represent the annual maximum groundwater levels at all parts of the site given the various timing of measurement of groundwater. Notwithstanding the variability of timing, it is likely that the management of stormwater (and in

particular infiltration) will more likely be influenced by localised soil conditions than seasonal peak groundwater levels in the superficial aquifer.

3.7.2.3 Groundwater quality

Water quality monitoring was conducted monthly at PB1 and quarterly at Bore1 (JDA 2023). Water quality parameters those were analysed during the monitoring period include:

Monitoring Bore (Bore1)

- EC
- pH
- TDS
- Total phosphorus (TP)
- Filterable Reactive Phosphorus or Phosphorus in Orthophosphate (PO_4-P)
- Total Nitrogen (TN)
- Nitrogen in Total Oxidised Nitrogen (NO_x-N)
- Nitrogen in Ammonia (NH_3-N)
- Total Kjeldahl Nitrogen (TKN)

Production Bore (PB1)

- Electrical conductivity (EC)
- pH
- Total Dissolved Solids (TDS)

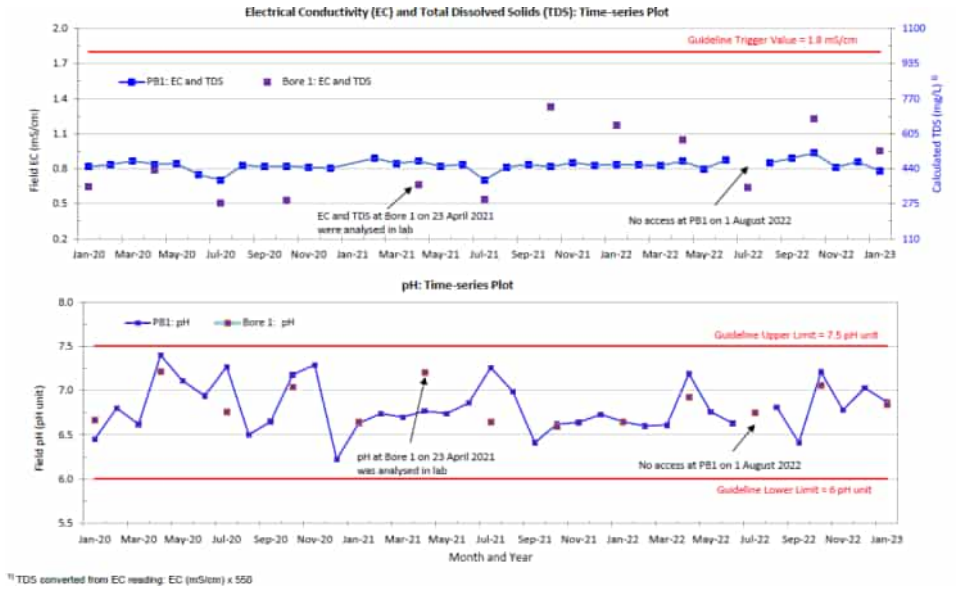


Plate 2: Water Quality (EC, TDS and pH) Monitoring results (JDA 2023)

Plate 2 and **Plate 3** illustrate the water quality of the groundwater within the site is generally consistent over the monitoring periods with typically low variance in parameters tested. EC, TDS and

pH values did not display any exceedances of the trigger values. However, TN and TP regularly exceeded the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L (respectively). It is also noted a large exceedance in TN occurred in August 2022 however this does not appear to be representative of long-term values.



Plate 3: Water Quality (TN and TP) Monitoring results (JDS 2023)

3.8 Summary of existing environment

In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
  - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
  - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
  - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).

- The highest groundwater level beneath Precinct D is reported 3.03 mBGL during February 2024 (Galt 2024).
- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The CBMD, managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Mathieson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the Racecourse. These are understood to receive runoff from the grandstand buildings in Precinct B and stables/buildings in Precinct C.
- Allowable discharge to the CBMD from the local drainage network is 0.95 m^3/s based on Water Corporation modelling.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

4 Design Criteria and Objectives

This section outlines the objectives and design criteria that this LWMS and future management plans must achieve. The water management strategy includes water conservation, groundwater management and stormwater management.

4.1 Integrated water cycle management

Better Urban Water Management (WAPC 2008a) endorses the promotion of integrated water cycle management and application of WSUD principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies.

The key principles of integrated water cycle management include:

- Considering all water sources, including wastewater, stormwater and groundwater
- Integrating water and land use planning
- Allocating and using water sustainably and equitably
- Integrating water use with natural water processes
- Adopting a whole catchment integration of natural resource use and management.

Integrated water cycle management addresses not only physical and environmental aspects of water resource use and planning, but also integrates other social and economic concerns. Water management design objectives should therefore seek to deliver better outcomes in terms of:

- Potable water consumption
- Stormwater quality management
- Groundwater management.

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. The existing environmental context of the site has been discussed in **Section 3** of this document. Guidance regarding environmental values and criteria is provided by a number of national and state policies/guidelines and site-specific studies undertaken in and around the site. These were detailed in **Section 1.4** and **Section 1.5** respectively.

4.2 Water conservation

This LWMS proposes the following water conservation criteria:

Criteria WC1 For residential dwellings, consumption target of 60 kL/person/year.

Criteria WC2 Ensure the efficient use of all water resources

Criteria WC3 Non-potable irrigation water to be sourced from existing groundwater licences held over the area.

The manner in which this objective will be achieved is further detailed in **Section 5**.

4.3 Stormwater management

The principle behind stormwater management at the site is to mimic the pre-development hydrological conditions and utilise existing infrastructure where sensible to do so, as described in **Section 3.7**. This principle and the guidance documents discussed in **Section 1.4** and **Section 1.5** and have guided the stormwater management criteria.

Criteria SW1 Retain and treat the first 15 mm of rainfall as close to source as possible and within site.

Criteria SW2 Detain up to 1% AEP rainfall event on-site.

Criteria SW3 Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.

Criteria SW4 Finished floor levels must have a minimum of 300 mm clearance above the 1 % AEP TWL in the FSA.

Criteria SW5 All lots must have a minimum of 500 mm clearance above the 1 % AEP flood level in the Swan River.

Criteria SW6 Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.

Criteria SW7 Reduce nutrient loads by applying appropriate non-structural measures.

Criteria SW8 Design infiltration areas to avoid creating mosquito habitat.

The manner in which these objectives will be achieved is further detailed in **Section 6**.

4.4 Groundwater management

The principle behind the groundwater management strategy is to maintain the existing groundwater hydrology. The groundwater management criteria for the site include:

Criteria GW1 Surface based infiltration structures should have 300 mm clearance above the MGL.

Criteria GW2 Habitable floor levels should have a clearance to the MGL of at least 1.2 m.

The manner in which the groundwater management objectives will be achieved is further detailed in **Section 7**.

5 Water Conservation Strategy

5.1 Fit for purpose water use

Conservation of water through fit-for-purpose use and best management practices is encouraged so that scheme water is not wasted. Fit-for-purpose describes the use of water that is of a quality suitable for the required use of the water. Fit-for-purpose principles have been utilised in the water conservation strategy for the site and will achieve **Criteria WC1**.

5.1.1 Scheme water supply

Scheme water will be supplied by the Water Corporation Integrated Water Supply System. Scheme water is proposed to be used for all potable uses. Scheme water will also service some external uses, where fit-for-purpose alternatives are not available.

5.1.2 Groundwater

As discussed in **Section 3.7.2.1**, the site is located beneath a multi-layered system comprising of the Superficial Swan, Kings Park Formation, Leederville and Yarragadee aquifers.

The proponent holds a groundwater allocation from the Perth South Leederville confined aquifer for the following:

- GWL 178519 - 347,000 kL

This licence will be used to meet the irrigation requirements for the Racecourse Precinct, Precinct A, Precinct B and part of Precincts C and E.

The above-mentioned measure will achieve **Criteria WC3**.

5.1.3 Rainwater tanks

Rainwater tanks (RWTs) can be used within private lots to harvest roof runoff. This water is considered non-potable but can be used to supplement non-potable water uses.

5.2 Lot scale water conservation measures

This LWMS proposes that the water conservation measures to be adopted would include RWTs, waterwise principles for lot scale gardens and within estate landscaping (WWG) and water efficient fixtures and appliances (WEFA) to ensure that the residential portion of the development minimises the use of water. These are summarised in the following sections.

5.2.1 Rainwater tanks

The use of RWTs will not be mandated, and the stormwater quantity management strategy does not rely on their use. They are therefore only considered to be a water conservation measure. Given that rainwater tanks will not be mandated or supplied by the proponent, it has been assumed that these would be implemented by 7.5% of households within Precinct D. Whilst they may be considered for

Precinct A they are not proposed to be taken up in other Precincts. The assumed uptake rate has been based on data obtained from the Australian Bureau of Statistics (ABS 2013). It is assumed (for the purposes of the water balance analysis) that all rainwater tanks have a capacity of 3 kL.

5.2.2 Water efficient fixtures and appliances

Water conservation strategy for the site proposes the use of WEFA. Water efficient fittings will be mandated through the building licence, while uptake of water efficient appliances can be encouraged by State and Local Government rebates in addition to education from the proponent at point of sale. WEFA are relevant to Precinct A and Precinct D. It is assumed that water efficient appliances will be implemented by 40% of households within Precinct A and Precinct D, which has been based on data obtained from the Australian Bureau of Statistics (ABS 2013, 2014).

5.2.3 Waterwise gardens

Landscape packages will not be provided as a part of the land sale contract. Lot scale waterwise gardening principles (WWG) are only relevant for Precinct D. These will be achieved by promoting Waterwise gardening principles (WWG) (WC 2003) at the time of sale of land within Precinct D. It is assumed that 75% of households in Precinct D will implement WWG principles within lot gardens (ABS 2013). WWG principles include:

- Soil to be improved with soil conditioner certified to Australian Standard (AS) 4454 to a minimum depth of 150 mm where turf is to be planted and a minimum depth of 300 mm for garden beds.
- The irrigation system shall be designed and installed according to best water efficient practices:
  - The controller must be 'hydrozoned'.
  - Emitters must disperse coarse droplets or be subterranean.
- Garden beds to be mulched to 75mm with a product certified to AS4454.
- Increasing community awareness of water conservation by promoting Waterwise practices, fixtures and fittings at the point of sale.

WWG principles will also be considered for Precinct A and Precinct E, however it is anticipated that these areas will have minimal irrigated landscaping to which this would apply. The current approach to irrigation within the Racecourse Precinct, Precinct B and Precinct C adopts a range of water conservation measures (including non-irrigated area and retention of existing trees/vegetation) to ensure that Perth Racing operates within the available groundwater allocation. This approach is not proposed to be significantly modified.

The above measures will assist in achieving **Criteria WC1** and **WC2**.

5.3 Water use analysis

5.3.1 Lot scale water use analysis

A water use analysis has been undertaken for Precinct D to estimate the expected individual residential lot water use to demonstrate the effectiveness of the water conservation strategy. The water use analysis has been based on the rates and calculation methodology presented in the Water

Corporation (2011) spreadsheet *AltWaterSupply_Water_Use_Model.xls*. This spreadsheet has been adapted to model the effects of using the water conservation measures proposed, and key assumptions include:

- Lot area has been based on a conceptual lot layout (see **Appendix A**).
- Average residency of 2.6 people per single lot dwelling. This value has been calculated from data provided by ABS for new housing developments in Perth (ABS 2022).
- Assumed up-take rates include:
  - 100% uptake of water efficient fittings
  - 40% uptake of water efficient appliances
  - 7.5% uptake of RWTs
  - 55% uptake of WWG principles.

The results of the water balance indicate that if households in Precinct A and Precinct D adopt the proposed water conservation measures (e.g. efficient fittings, RWT, WWG principals) at typical uptake rates they will use an average of 33.0 kL/year/person. This achieves the water target of no more than 60 kL/year/person of scheme water and satisfies **Criteria WC1**.

5.4 Wastewater management

The wastewater generated from the site will be managed by connecting the development to the Water Corporation deep sewer network.

5.5 Water conservation management criteria compliance

A summary of the proposed water conservation management criteria and how these are addressed is provided within **Table 1.**

Table 1: Water conservation management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
WC1	Residential consumption target of 60 kL/person/year scheme water.	Provide advice to residents in Precinct A and Precinct D on water conservation measures
		RWTs can be utilised for non-potable uses within Precinct D
		Promotion and use of WWG in lots within Precinct D
		Promotion and use of water efficient appliances to Precinct A and Precinct D
		Mandate water efficient fittings within Precinct A and Precinct D
WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in open spaces
		Open spaces designed to use no more than allocated groundwater
		Minimise water requirements for open space and verge maintenance
		Use of water efficient appliances within Precinct A and Precinct D
		Use of WWG principles in lots in Precinct D

Table 2: Water conservation management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the Racecourse and surrounding Precincts.

6 Stormwater Management

The principle behind the stormwater management strategy for the site is to maintain the existing hydrology by detaining, retaining and treating runoff from the small rainfall event (i.e. first 15 mm) as close to source as possible and detaining/retaining the major event (1% AEP) on site prior to discharge to either the centre of the Racecourse (i.e. self-retained) or to the CBMD the pre-development outflow rates. Due to the existing soil conditions (See **Section 3.5**), the site is not well suited for structural controls utilising infiltration of stormwater unless modified. However, given that fill will be utilised to ensure that habitable floor levels are above the 1% AEP flood elevation of the Swan River, final elevations will be approximately 4 mAHD. Where fill is used to achieve this there will be sufficient clearance to MGL and permeability of soils to adopt WSUD measures which utilise infiltration.

WSUD measures proposed will vary across the Precincts and will include:

- BRAs to achieve water quality treatment (Precincts A, C, D and E)
- FSAs to detain runoff prior to discharge to the adjacent road network system
- Subsurface infiltration cells that will facilitate at-source infiltration (Precinct D)
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse (for Precinct A and C)
- FSAs to provide flood detention and infiltration as close to source as possible (Precinct E).

The overall approach to precinct drainage is shown on **Figure 7**.

The WSUD measures that will be implemented as a part of the development are described in the following sections. Precinct B has been assumed to be self-retained and a portion of Precinct C (already connected to the Lakes in the centre of the track) has been assumed to be the same as it is now. Surface runoff modelling undertaken using XPSWMM has been used to inform the design of stormwater infrastructure as detailed in the following sections. Assumptions used to represent the post-development environment are provided in the modelling assumptions report in **Appendix D**.

6.1 Lot scale drainage measures

Lots within Precinct D and Precinct E will retain the first 15 mm rainfall event runoff within soakwells/soakage which will need a capacity of 150 m^3/ha. Lot storage is the responsibility of the lot owner and will be assessed as part of the building approval process prior to construction.

The use of soakwells/soakage areas will assist in achieving **Criteria SW1**.

6.2 Development drainage measures

6.2.1 Bio-retention areas

Runoff from the first 15 mm of rainfall will be captured and retained within a vegetated BRA located in open spaces. The BRA is assumed to have a depth of 500 mm with 1:3 side slopes. Treatment of

runoff will be provided through interaction with vegetation and adsorption to sand particles through infiltration prior to reaching groundwater.

The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10). This will be finalised prior to detailed design. The location of the BRA will either be in a drainage reserve, an open space or they may be within the centre of the Racecourse as a separate treatment area (separate from the existing Lakes). The sizing and spatial requirements of BRAs will be confirmed in the detailed designs.

The use of BRA will assist in achieving **Criteria SW1, SW6,** and **SW8**.

6.2.2 Flood detention/storage

An FSA will be utilised to detain runoff above the first 15 mm and up to the 1% AEP rainfall event. To achieve this, the invert of the FSA will have sufficient clearance above groundwater 300 mm. FSAs are assumed to be 1.2 m depth with 1:6 side slope and will be integrated into POS or drainage reserve, and will overflow to the Water Corporation drainage network. The sizes and spatial requirements for the FSA will be confirmed in the detailed designs and development stages.

The use of an FSA will assist in achieving **Criteria SW1, SW2, SW4,** and **SW6.**

6.2.3 Subsurface storage

Surface runoff generated by lots, stables and hardstand/carpark areas will be directed into sub-surface storage. Precinct D will have an independent drainage pipe network within individual precincts which convey flows to downstream sub-surface retention structures.

These structures have been sized to accommodate up to the 1% AEP rainfall event and have been designed as a 1 m deep structure. The detailed configurations could be modified to suit site constraints. These will either be location beneath road reserve/verge or beneath an open space and will require an overflow connection to the local (CoB) drainage network to ensure that they can dry out. The sizes and spatial requirements for the subsurface storages are provided in **Table 2** and illustrated in **Figure 7A**: Precinct A Stormwater Management Plan

Figure 7B: Precinct C Stormwater Management Plan

Figure .

The use of the sub-surface storage will assist in achieving **Criteria SW1, SW2,** and **SW6.**

6.2.4 Lake storage

Precinct A and Precinct C (stables) will first direct runoff to a bio-retention areas, however overflow from these will be catered for in the Wetland Lake. In a 1% AEP storm event an additional 78 mm of depth will occur within the Wetland Lake from both Precincts.

As indicated in **Section 3.7.1.2**, the Wetland Lake is connected/discharges to the Swan River via a 375 mm and 450 mm culvert. These are not proposed to be modified. The combined nominal flow capacity of the 375 mm and 450 mm pipes is approximately 0.4 m^3/s. The inlet, length, grade, etc of

these pipes is not proposed to be modified and therefore the current overflow regime from the site to the Swan River will remain unchanged.

The use of the Wetland Lake storage will assist in achieving **Criteria SW1, SW2, SW3,** and **SW6.**

6.3 Precinct based drainage approach

6.3.1 Precinct A

There is no current connection point for drainage to be exported from site to the local CoB network. Runoff will therefore need to be managed within Precinct A and the Racecourse. Precinct A will require a single BRA that will address treatment of water quality; this will be located within Precinct A as close to source as possible. The BRA should have the following characteristics:

- Base will be vegetated with reeds/rushes as per a biofilter
- 1:3 side slopes
- Depth of 300 – 500 mm pending final design
- Volume of the BRA will need to achieve 194 m^3
- Nominal surface area of 450 m^2.

In addition to the volume achieved by the BRA, in a major (1% AEP) storm event a further 1,345m^3 of flood retention storage will be required. The proposed earthwork level of Precinct A (4.0 mAHD) means that it is possible to direct runoff exceeding BRA capacity to the Wetland Lake in the centre of the Racecourse. This approach will add approximately 52 mm to the central 2.6 ha Wetland Lake.

The volumes of storage required and locations of storage across the Precincts is summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7A**.

6.3.2 Precinct B and Racecourse

As indicate previously, there are no substantial changes proposed to Precinct B. Precinct B currently manages surface runoff within the precinct and adjacent Racecourse, largely via at source infiltration, swales around the perimeter of the track surface and the existing lake system Precinct B and the Racecourse are proposed to be retained largely as is.

As indicated in **Section 3**, the Wetland Lake currently has a piped overflow connection to the Swan River. This overflow pipe(s) reportedly rarely overflow and can be controlled via a structure at the outlet (which also prevents tidal influence on the Wetland Lake). The Wetland Lake has a 2.6 ha surface area, and therefore can provide significant volume of stormwater retention in the event of a major storm event. There are no new connections proposed to the Swan River and there are no changes proposed to the management approach currently taken for the Wetland Lake and the current piped outlets.

6.3.3 Precinct C

Precinct C is the existing stables area, adjacent carparks and future stables areas along the south and east of the Structure Plan area. The existing buildings currently either infiltrate runoff at source or

discharge to the Lined Lake in the centre of the Racecourse. This approach is proposed to be retained.

Surface runoff generated by hardstand/carpark areas of Precinct C will be directed and discharged towards Precinct E via the existing connections to the CoB drainage network along Matheson Road or via the existing pipe connection in the southwest of the Structure Planning area to the existing connection to the CBMD (Water Corporation drainage system) within Precinct E.

The drainage requirements for the southern (carpark) portion of Precinct C are therefore detailed with those proposed for Precinct E.

For the two currently undeveloped portions of Precinct C (future stables along the south and east of the Structure Plan area), the post-development drainage system will collect the runoff from these areas and direct them to the centre of the Racecourse. Initial treatment will be provided by a BRA which accommodates 418 m^3, with a nominal surface area of 924 m^2.

Runoff exceeding the capacity of the BRA (which will be 684 m^3) will be directed to the Wetland Lake. The direction of major event stormwater runoff to the Wetland Lake will add 26 mm to the top water level of the Wetland Lake.

The volumes required to be treated and for flood mitigation for Precinct C are summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7B**.

6.3.4 Precinct D

As indicated in **Section 6.1**, private lots and the childcare building within Precinct D are assumed to retain the first 15 mm within the lot boundary, most likely within soakwells, which should be appropriate given that some measure of imported fill will be required to meet clearance above regional flood levels. Based on the density of lots proposed in Precinct and lack of open space, this precinct will need 42 m^3 of subsurface storage to accommodate and detain the 1% AEP storm event to ensure that the post development peak flow rates will mimic the pre -development conditions. This is assumed to be located adjacent to Resolution Drive as shown in **Figure 7C**. The outflow from this Precinct will likely be predominantly overland flow once the first 15 mm of storage has reached capacity, however a low flow to ensure that these can adequately drain between storm events is recommended.

The volumes required to be treated and for flood mitigation for Precinct D are summarised in **Table 2**.

6.3.5 Precinct E

Surface runoff from across Precinct E (inclusive of Precinct C hardstand/carpark) will be conveyed via the drainage network firstly to a BRA for water quality treatment and then this will overflow to an FSA (detention drainage structure) at the south western corner of Precinct E for detention of the 1% AEP storm event. Overflow from Precinct E basin will discharge into the CBMD (Water Corporation drainage system) at existing flow rates. The Water Corporation surface runoff modelling of the CBMD indicates that the local drainage network contributes 0.95 m^3/s at node CNA008. This is understood to be contributed to by existing 450 mm and 525 mm pipes beneath Resolution Drive and therefore it is assumed that 0.62 m^3/s is taken up by the existing pipe network, and approximately 0.33 m^3/s of

capacity is available to convey runoff from Precinct C, Precinct E and upstream contributing catchments.

The volumes required to be treated and for flood mitigation for Precinct E are summarised in **Table 2**. The approach to water management in Precinct E is shown in **Figure 7D**.

6.3.6 Precinct drainage summary

The requirements for water quality treatment within the Precincts is summarised in **Table 2**.

Table 2: Precinct drainage summary

Precinct	First 15 mm requirement (m^3)	Location of first 15 mm	1% AEP flood mitigation requirement (m^3)	Location of 1% AEP flood mitigation requirement	1% AEP outflow from site
Precinct A	194	BRA located within Precinct A	1,345	Wetland Lake, centre of Racecourse	0
Precinct B	No change to existing	Precinct B	No change to existing	Precinct B	Self-retained
Precinct C (Stables)	418	BRA located in the centre of the Racecourse	684	Wetland Lake in centre of Racecourse	0
Precinct C (carpark)	Combined with Precinct E volumes	BRA in Precinct E	Combined with Precinct E volumes	FSA in Precinct E	
Precinct D	28	Subsurface storage cells beneath road reserve/drainage reserve	42	Subsurface storage cells beneath road reserve/drainage reserve	0.402 m^3/s to local drainage network/road pavement
Precinct E	365	Southwest corner of Precinct E, adjacent to FSA	930	South west corner of Precinct E	0.32 m^3/s to CBMD

There will be no new connections to the Swan River or to the CBMD, and the existing flow regimes at these outlet points will be maintained. Specifically with regard to overflow from the Wetland Lake which occurs via gravity, the peak flow rates that the existing 375 mm and 450 mm pipes are capable of achieving (approximately 0.4 m^3/s) will not change given that the inlet, length, grade and outlet of these pipes is not proposed to be modified.

Precinct D will require a connection to the local drainage network, however the outflow rate will be nominal, and has not been accounted for when sizing the subsurface storage cells within Precinct D. The direction of runoff from Precinct A and a portion of Precinct C to the centre of the Racecourse will require a BRA with a surface area of 1,105 m^2 (for Precinct C) and will add a total of 78 mm depth to the top water levels within the Wetland Lake.

The precinct areas and a summary of the approach to surface water management are shown on **Figure 7**.

6.3.7 Non-structural measures

A number of non-structural measures will be implemented to help reduce nutrient loads within stormwater runoff. These measures include:

- Minimising fertiliser use to establish and maintain vegetation within POS and road verges.
- Street sweeping at regular intervals.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- Minimising the use of turf within open spaces.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.
- Education of residents regarding fertiliser use and nutrient absorbing vegetation species within lots.

The above measures will assist in achieving **Criteria SW7**.

6.3.8 Earthwork levels

Finished floor levels of the entire development will be set at minimum of 4.0 mAHD (See **Appendix C**) which will assist in achieving **Criteria SW5**.

6.4 Stormwater criteria compliance

A summary of the proposed stormwater design criteria and how these are addressed is provided in **Table 3**.

Table 3: Stormwater management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.
SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.
		Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.
SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.32 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.
SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the habitable floor levels must have a

		minimum of 300 mm clearance above the 1% AEP TWL in the basins.
SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.
SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the long term nutrient concentrations within surface water meet the regional water quality targets.

Table 4: Stormwater management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within open space and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use
SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.

7 Groundwater Management

7.1 Groundwater management approach

The principle behind groundwater management is to maintain the existing hydrology across the site, provide appropriate protection from groundwater inundation, and maintain or improve existing groundwater quality.

7.2 Groundwater level management

The regional groundwater map (DWER 2023e), localised measurement of groundwater and the surface contours of the site (see **Section 3.4** and **Figure 2**) indicate that there is sufficient clearance to groundwater beneath the site to facilitate infiltration of stormwater runoff, on the basis that fill is being imported to raise finished levels to 4.0 mAHD.

Whilst the underlying parent soils have demonstrated generally low permeability, the earthworks approach will require import of fill to 4.0 mAHD to achieve clearance above the 1% AEP flood level in the Swan River for Precinct A, Precinct D and Precinct E. Therefore, stormwater will be encouraged to infiltrate at source wherever possible to minimise stormwater runoff and to adopt an at-source approach to management of runoff where possible. This will occur within soakwells, permeable portions of lots and BRAs which will have at least 300 mm of clearance above the MGL. The above-mentioned measure will assist in achieving **Criteria GW1**.

For Precinct C (stables) runoff will be directed to the centre of the racetrack. The stables facilities do not require a specific separation from groundwater, and in order to accommodate equine uses the land between buildings/facilities should be as flat as possible. The most appropriate response is therefore to accommodate stormwater quality treatment and flood retention within the centre of the racetrack. Given the low permeability of soils in the centre of the racetrack, the BRA is unlikely to achieve separation from groundwater or the low permeability soil layer. This is however considered acceptable as it is consistent with the presence of the three Lakes currently within the centre of the racetrack.

The control of groundwater by subsoil drainage is not proposed due to requirements to provide adequate clearance above the 1% AEP flood levels and the proximity of the Swan River. Rather, groundwater separation requirements will be achieved by the use of imported fill as described above. The earthworks strategy provided in **Appendix C** shows that all habitable floor levels will be greater than 1.2 m above the MGL. The above-mentioned measure will assist in achieving **Criteria GW2**.

As previously discussed, there are no changes proposed to the form of development within Precinct B or to the Racecourse. These areas are currently managed by the swales aligned with the existing racetrack which control soil moisture conditions in these areas, and which discharge to the Wetland Lake. This approach will be retained in the post-development environment.

7.3 Groundwater quality management

Whilst not specified in a design criterion, the main objective for groundwater quality management is to maintain or improve the existing groundwater quality. This can be achieved by reducing the total nutrient load into the groundwater that originates from the site. Groundwater that originates from the site is surface runoff that has infiltrated into the soil profile. Therefore, improving groundwater quality can be achieved by treatment of the surface runoff prior to infiltrating to groundwater.

The reduction of nutrient load to the groundwater will be achieved by:

- Retention of existing trees within open spaces wherever possible.
- Directing stormwater to a vegetated (with native wetland species) BRA.
- The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10).
- Minimise fertiliser use to establish and maintain vegetation within open space areas and road verges.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- The use of turf will be minimised, however where adopted a drought tolerant turf species that require minimal water, and nutrients will be used.
- Roll-on turf will be used within the open space areas and road verges, to prevent the high nutrient input requirement during establishment of the turf.
- Garden beds should not be immediately adjacent to BRAs to reduce nutrient transportation into these infiltration areas.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.

The above measures will improve the quality of water prior to it infiltrating into the underlying groundwater.

7.4 Groundwater criteria compliance summary

A summary of the proposed groundwater quantity design criteria and how these are addressed within the site is provided in **Table 4**.

Table 4: Groundwater criteria compliance summary

Criteria number	Criteria description	Manner in which compliances will be achieved
GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, the exception being the BRA in the centre of the racetrack.
GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.

8 Subdivision and Urban Water Management Plans

The requirements to undertake preparation of more detailed water management plans to support subdivision is generally imposed as a condition of subdivision. This will be most relevant to Precinct D. Other precincts may be developed under a Development Approval and therefore water management will likely be documented within a Stormwater Management Plan (SMP). The development of future UWMP/SMPs should follow *Urban Water Management Plans: Guidelines for preparing plans and for Complying with Subdivision Conditions* (DoW 2008).

While strategies have been provided within this LWMS that address planning for water management within the site, it is a logical progression that future subdivision designs and the supportive UWMP/SMP will clarify details not provided within the LWMS. The main areas that will require further clarification within future UWMP/SMPs may include (pending which precinct is being addressed):

- Extent of land uses within Precincts
- Connection to local and Main Drainage networks
- Surface runoff modelling
- Implementation of water conservation strategies
- Non-structural water quality improvement measures
- Management and maintenance requirements
- Construction period management strategy.

These are further detailed in the following sections. As stated above, ongoing (post-development) monitoring of groundwater will be detailed in the UWMP/SPM, however in this LWMS is outlined broadly in **Section 9**.

8.1 Extent of land uses within Precincts

It is expected that the layout and extent of land uses within Precincts may evolve over time. Future water planning documents will need to be updated to align with the most up to date spatial plans for each Precinct. Changes to the spatial plans will likely have an implication on the size of stormwater infrastructure and possibly their location, and should be revised and clarified in future UWMP/SMPs.

8.2 Connection to local and Main Drainage networks

This LWMS has made assumptions regarding connectivity to the CoB local drainage network and to the Water Corporation's CBMD. These are assumptions are made based on the information available at the time of preparing this LWMS and may need to be revised pending feedback from these agencies. This could result in updates to surface runoff modelling (see **Section 8.3**).

8.3 Surface runoff modelling

It is acknowledged that the water management strategies documented in this LWMS are based upon broad-scale assumptions and to some extent regional data. These assumptions are considered

adequate for development of this LWMS and are of an appropriate level of detail. However, verification of proposed subdivision drainage designs will be undertaken once the specific basin designs and extent of inclusion of finer scale WSUD elements are confirmed.

It is expected that future UWMP/SMPs will update surface runoff modelling as appropriate, and this may result in evolution of the spatial layout of the structure plan/future subdivisions or detailed civil design approach.

8.4 Implementation of water conservation strategies

The non-potable water needs from the Precincts are to be accommodated from the existing groundwater allocation and therefore, track water usage is a significant consideration. Notwithstanding licensed volumes available, there is minimal new open space areas proposed within the Precincts that would demand significant additional groundwater allocation, and it is therefore anticipated that non-potable water needs can be met by the existing licence held by Perth Racing.

A number of potential measures to conserve water have been presented within this LWMS. These water conservation strategies will be incorporated into design and the on-going maintenance of the Precinct A, B and C open spaces and where relevant. Landscape concept design measures that will be incorporated into the water conservation strategy will be further detailed within the future UWMP/SMPs produced for the development.

The manner in which the developer intends to promote water conservation measures discussed in this LWMS to future lot owners will also be discussed within the future UWMP/SMPs.

8.5 Non-structural water quality improvement measures

Guidance for the development and implementation of non-structural water quality improvement measures is provided within the *Stormwater Management Manual for Western Australia* (DWER 2022). Some measures will be more appropriately implemented by CoB for local roads, such as street sweeping, however many can be implemented relatively easily within the design and maintenance of the subdivision and the open space areas. It is expected that any privately managed development areas (e.g. Precinct A, Precinct B and Precinct C) will be managed by Perth Racing or another appropriate management body, and that the management of areas exposed to equine uses (Precinct C and the Racecourse) will continue to adopt contemporary best practice nutrient management.

Future UWMP/SMPs will provide an implementation plan/timing/responsibility for measures such as street sweeping, public education (through measures such as signage that may be implemented to raise awareness), etc.

8.6 Management and maintenance requirements

The management measures to be implemented to address surface water quality (such as the use of vegetation within WSUD assets) will require ongoing maintenance. It is therefore expected that the future UWMP/SMPs will detail management and maintenance procedures that will set out required maintenance actions (e.g. gross pollutant removal), timing (e.g. how often it will occur), locations (e.g. exactly where it will occur) and responsibilities (e.g. who will be responsible for carrying out the

actions). Given that approval from the CoB will be sought for the proposed measures, it is anticipated that consultation will be undertaken and referral to guiding policies and documents will be made.

8.7 Construction period management strategy

It is anticipated that the construction stage will require some management of various aspects (e.g. soil erosion, sedimentation of downstream water bodies, dust, surface runoff, noise, traffic etc.). The management measures undertaken for construction management will be addressed either in the future UWMP/SMPs or a separate Construction Management Plan (CMP).

9 Monitoring

9.1 Post-development monitoring

The post-development monitoring of water quality should be undertaken within groundwater immediately upstream and downstream of BRAs within Precinct A, Precinct C and Precinct E. It should also be undertaken at the outlet to or adjacent to the subsurface detention system in Precinct D. This should be undertaken via shallow groundwater bores installed immediately upstream and immediately downstream based on local groundwater flow direction, based on information available at the time (or in the case of Precinct D it could be at the outlet from the subsurface storage cells).

The monitoring should also consider and be generally consistent in the approach with the monitoring undertaken to comply with conditions of Groundwater Licence GWL 178519.

The WSUD measures (BRAs) should also be monitored to ensure their continued effectiveness. This should occur at the outlets from BRAs prior to their discharge to the Wetland Lake. It is noted that this may be difficult to achieve as it will require a rainfall event > 15 mm and to be timed to occur when overflow is occurring or alternatively auto samplers could be employed.

Monitoring of the outlet to the Swan River from the Wetland Lake is not proposed to be undertaken given the infrequent nature of overflow from the Lake to the River. Further, the Lake intersects shallow groundwater and any discharge from the pipes to the River is likely to be influenced by local groundwater quality.

9.1.1 Trigger values

The water quality targets from the *National Water Quality Management Strategy* (ANZECC and ARMCANZ 2000) and the trigger criteria are acknowledged as long term targets for the site, being 1.2 mg/L for TN and 0.065 mg/L for TP. However, it is also recognised that recent site monitoring undertaken (and reported in **Section 3**) shows repeated exceedances of the NWQMS default trigger criteria. Therefore, short term trigger values are proposed based on the approximate average nutrient concentrations measured in groundwater, and these are shown in **Table 5**.

Table 5: Post-development trigger values

Analyte	pH	EC (uS/cm)	TN (mg/L)	TP (mg/L)
Value	6-7.5	1800	3.0	0.15

Monitoring should be undertaken on a quarterly basis and should include:

- pH
- Conductivity
- Dissolved oxygen
- Temperature
- Nutrients (TN, TP)
- Nutrient Species (Ammonium, NH_4, Oxides of nitrogen, NO_x ortho-phosphorous (ORP))

9.1.2 Condition monitoring

It is proposed that the overall condition of the Precincts will be monitored on a bi-annual basis. This monitoring will be implemented after the completion of the civil and landscaping works and will continue for a period of two years.

A visual assessment will be undertaken to monitor the overall condition of the Precincts, with the aim to ascertain that the maintenance activities are achieving the overall management objectives for the development. The parameters that will be monitored include:

- Gross pollutants
- Terrestrial weeds
- Irrigation
- Vegetation density
- Paths, benches, walkways and other infrastructure.

The management and maintenance objectives will be detailed within future UWMPs along with details of the corresponding monitoring program.

9.1.3 Contingency Action Plan

If the results from the initial monitoring occasion indicate that nutrient concentrations exceed the nominated (short term) trigger values, a number of contingency measures may be employed.

The first action that should be undertaken if groundwater trigger criteria are exceeded is to repeat the monitoring to remove the potential for sampling error. If the repeat monitoring still shows results which breach the trigger value, the next action will be to compare the upstream (incoming) nutrient concentrations with the outgoing (downstream) nutrient concentrations. If the downstream nutrient concentrations are >50% higher than the upstream nutrient concentrations, the following actions should be undertaken:

- Review open space nutrient application practices to identify source if possible.
- Conduct surveillance of Precincts and drainage infrastructure to determine any other potential and obvious nutrient inputs.
- Remove source if possible (i.e. fertiliser input, etc.).
- Remove sediment–bound nutrients by removing basin sediments.
- Manual removal of plant material from BRAs to facilitate further nutrient uptake.

If the downstream nutrient concentrations are found to be generally consistent with the upstream concentrations the next action will be to conduct a site – specific comparison of long-term background data presented in this LWMS. There is some amount of variability (temporally) in nutrient concentrations experienced across the site, and this is the reason for the proposed short and long term trigger values. The comparison of measured values to trigger values and historical monitoring data should then be used as a management tool to determine if the trigger values should be revised.

Following the implementation of the above contingency measures the groundwater quality will be re – sampled. If the results of the analysis still show water quality characteristics which breach the trigger values an additional set of upstream/downstream monitoring bores may be installed. The

additional bores would be sampled as per the ongoing sampling regime already being undertaken for the first two bores. If the additional locations demonstrate results consistent with the initial monitoring, an assessment will be undertaken as to whether the results are representative of a broader site management concern, and whether any additional contingency actions need to be implemented onsite.

9.2 Reporting

A post-development monitoring report will be prepared on conclusion of the two-year monitoring period and will be provided to CoB on request. This will be undertaken per Precinct once development within the Precinct has occurred. Interim results (spreadsheet) can be provided to either CoB, DWER or DBCA on request during the monitoring program.

10 Implementation

10.1 Roles and responsibility

The LWMS provides a framework that the proponent can utilise to assist in establishing stormwater management methods that have been based upon site-specific investigations, are consistent with relevant State and Local Government policies and have been endorsed by DWER, DBCA and CoB. The responsibility for working within the framework established within the LWMS rests initially with the proponent, although it is anticipated that a future UWMP/SMP will be developed in consideration of other relevant policies and documents. A summary of roles and responsibilities relevant to the current and future planning stages and ongoing management of the site is summarised in **Table 6**.

Table 6: Roles and responsibilities for various planning stages

Stakeholder	Perth Racing	City of Belmont	Water Corporation	DWER	DBCA	WAPC
LWMS preparation	√					
LWMS review and advice		√	√	√	√	
LWMS approval				√		√
UWMP/SMP & civil design preparation	√					
UWMP/SMP review and approval		√				
Precinct implementation	√					
Post development Precinct management	√					
Public roads/open space ongoing management	√	√				

10.2 Funding

The proponent will fund all subdivision, civil and landscape works within the public realm (roads and open spaces) and within Precincts that are being privately managed (Precinct A, Precinct B and Precinct C). Development of individual lots will be the responsibility of the lot owner at the lot-scale development application stage.

10.3 Review

It is not anticipated that this LWMS will be reviewed unless the Ascot Racecourse Structure plan undergoes significant change post-lodgement of the LWMS. If the proposed layout of the

development is substantially modified, the surface runoff modelling undertaken for this LWMS may need to be reviewed and the criteria revised to ensure that all are still appropriate.

The next stage of water management for most of the Precincts is UWMP preparation to support subdivision (relevant to Precinct D) or SMP preparation to support Development Approval (relevant to all other precincts). The UWMP/SMP is largely an extension of the LWMS, as it should provide detail to the designs proposed within this LWMS and will demonstrate compliance with the criteria proposed in **Section 4**. Regardless of whether a UWMP or SMP is prepared, these should be prepared as per *Better Urban Water Management*.

The next stage of development following the UWMP is single lot development. It is recognised that certain elements of the LWMS and the UWMP will not be implemented until this late stage, and that there is little or no statutory control that can be applied to ensure the implementation of any remaining measures. While the remaining measures are unlikely to be enforced at this stage their implementation could be encouraged by the CoB through policy (or modification of these where necessary), building licence or awareness programs (such as the Water Corporation Waterwise program).

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11.1 General references

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11.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 11.1**, with access date information provided in **Table R1**.

Table R1 Access dates for online references

Reference	Date accessed	Website or dataset name
(ABS 2013)	19/4/2024	ABS: Water Use and Conservation Data
(ABS 2014)	19/4/2024	ABS: Energy Use and Conservation Data
(DWER 2023a)	12/04/2024	Acid Sulfate Soil Risk Map
(BoM 2024)	12/04/2024	Climate Data
(Landgate 2023)	31/01/2024	Landgate Map Viewer Plus
(WAPC 2023a)	11/12/2023	Local Planning Scheme No. 15 Map
(DWER 2024a)	12/04/2024	Perth Groundwater Map
(DWER 2024b)	12/04/2024	Water Information Reporting
(DWER 2024c)	12/04/2024	Water Register
(DWER 2023c)	26/04/2024	FPM Floodplain Area (DWER-020)

Figures

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Figure 7B: Precinct C Stormwater Management Plan

Figure 7C: Precinct D Stormwater Management Plan

Figure 7D: Precinct E Stormwater Management Plan



Figure 1: Site Location

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F23

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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Figure 2: **Topographic and Groundwater Contours**

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number:
EP23-109(03)--F24
Drawn: WJC
Date: 26/04/2024
Checked: JM
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GDA2020 MGA Zone 50

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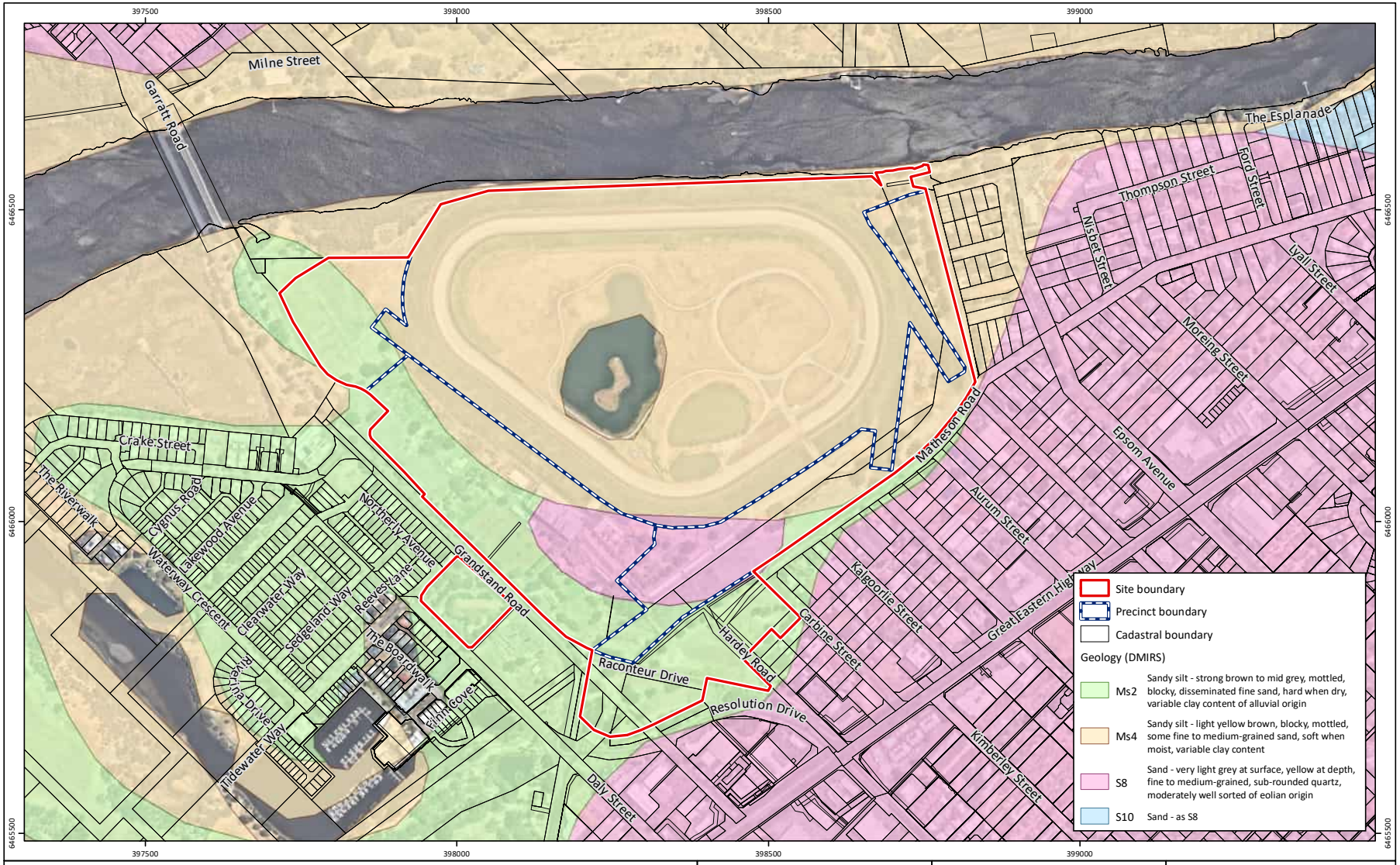


Figure 3: Geological Mapping

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F25

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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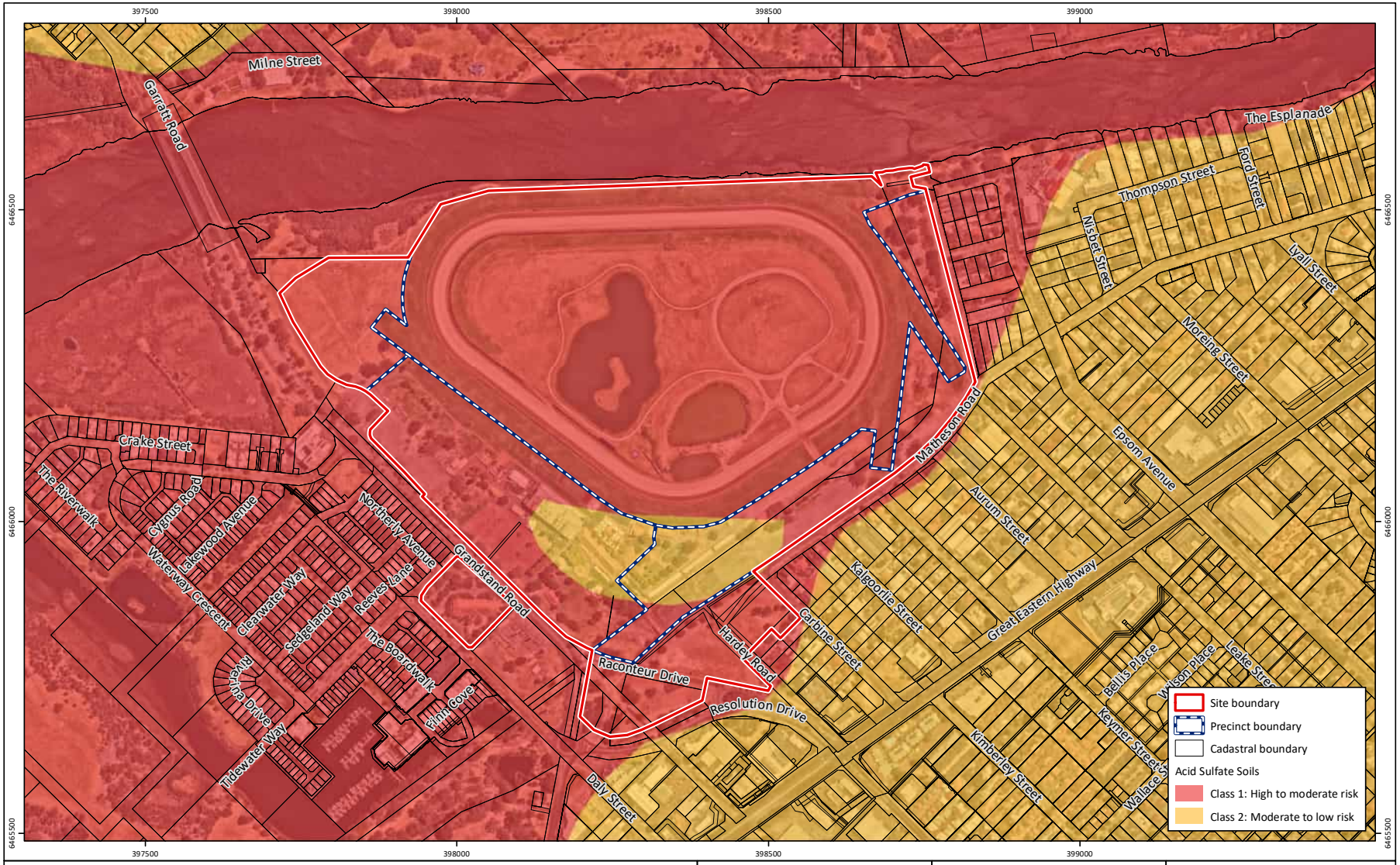


Figure 4: Acid Sulfate Soil Mapping

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F26

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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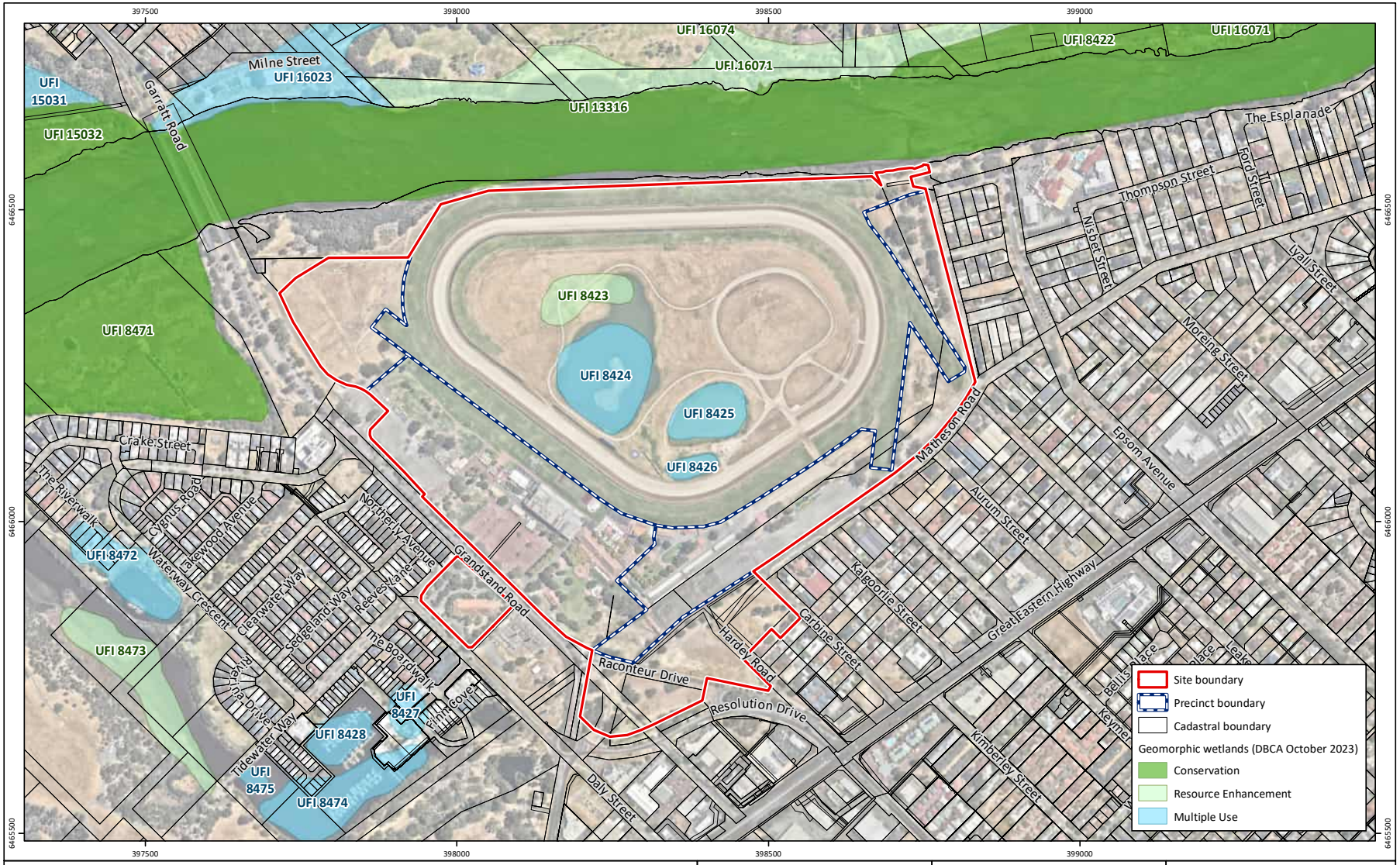


Figure 5: Environmental Assets

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F27
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

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GDA2020 MGA Zone 50

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While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
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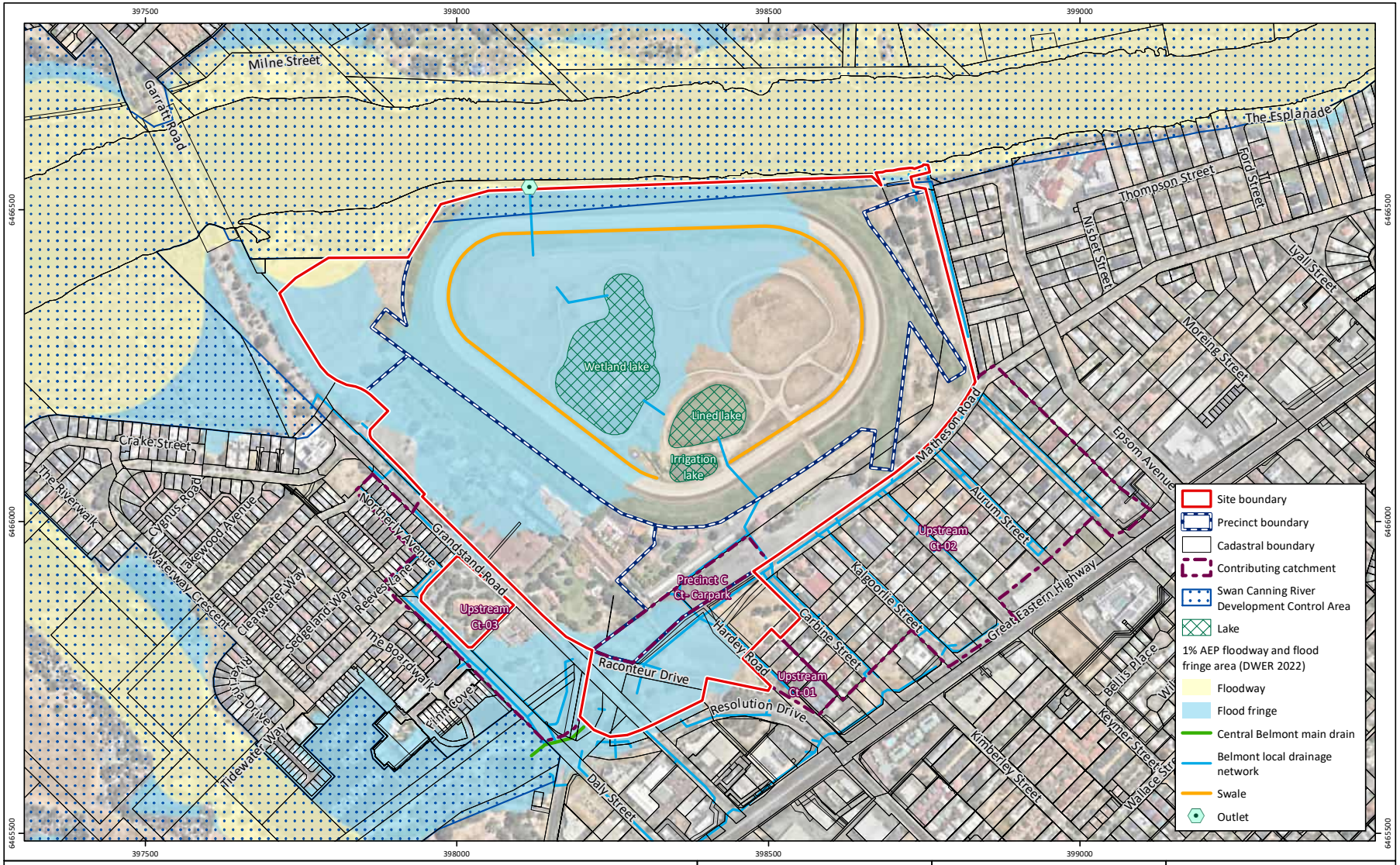


Figure 6: Hydrological Features

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F28

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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©Landgate (2024). Nearmap Imagery date: 05/02/2024

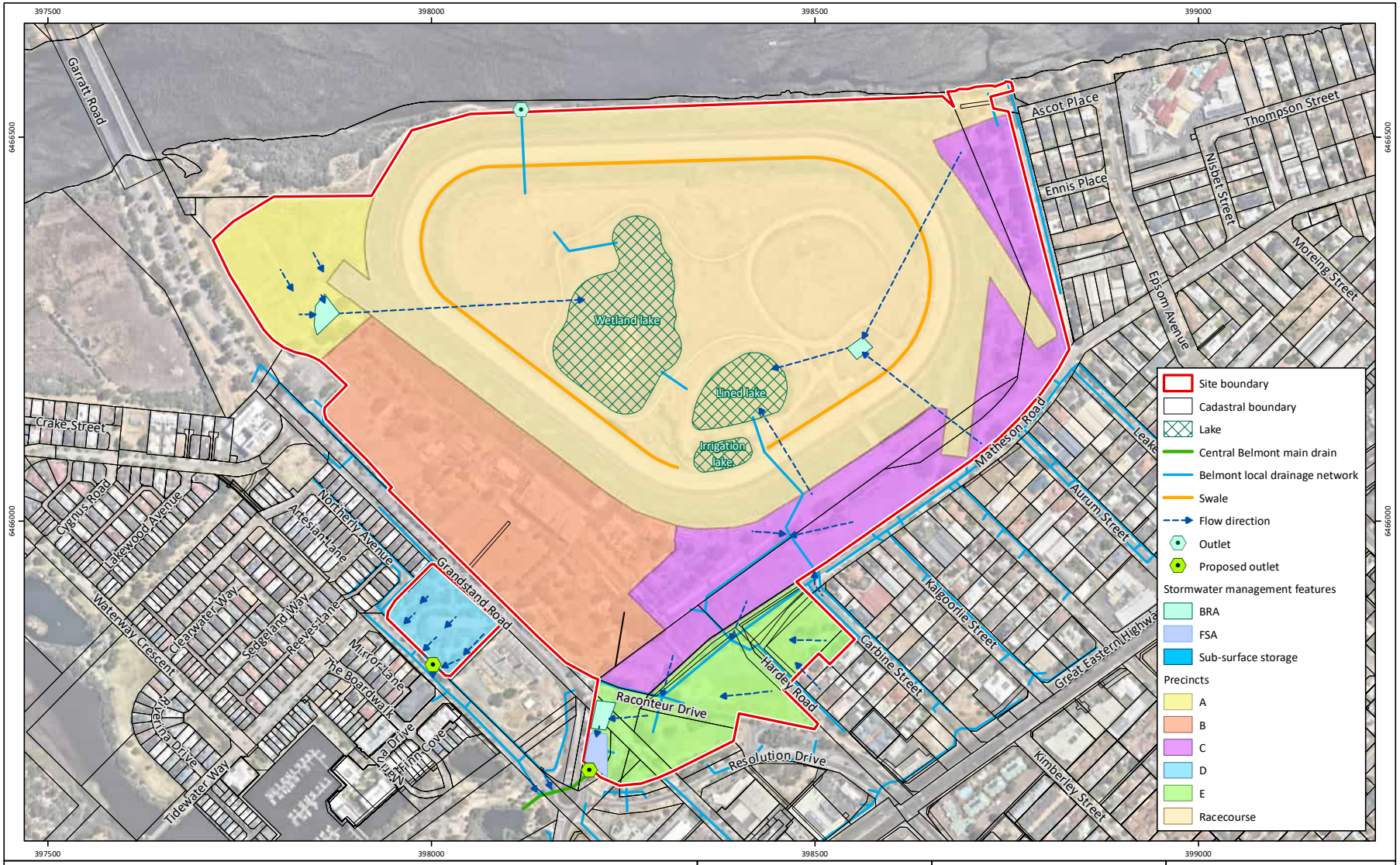


Figure 7: Ascot LSP Precinct Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F29

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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Metres
Scale: 1:6,500@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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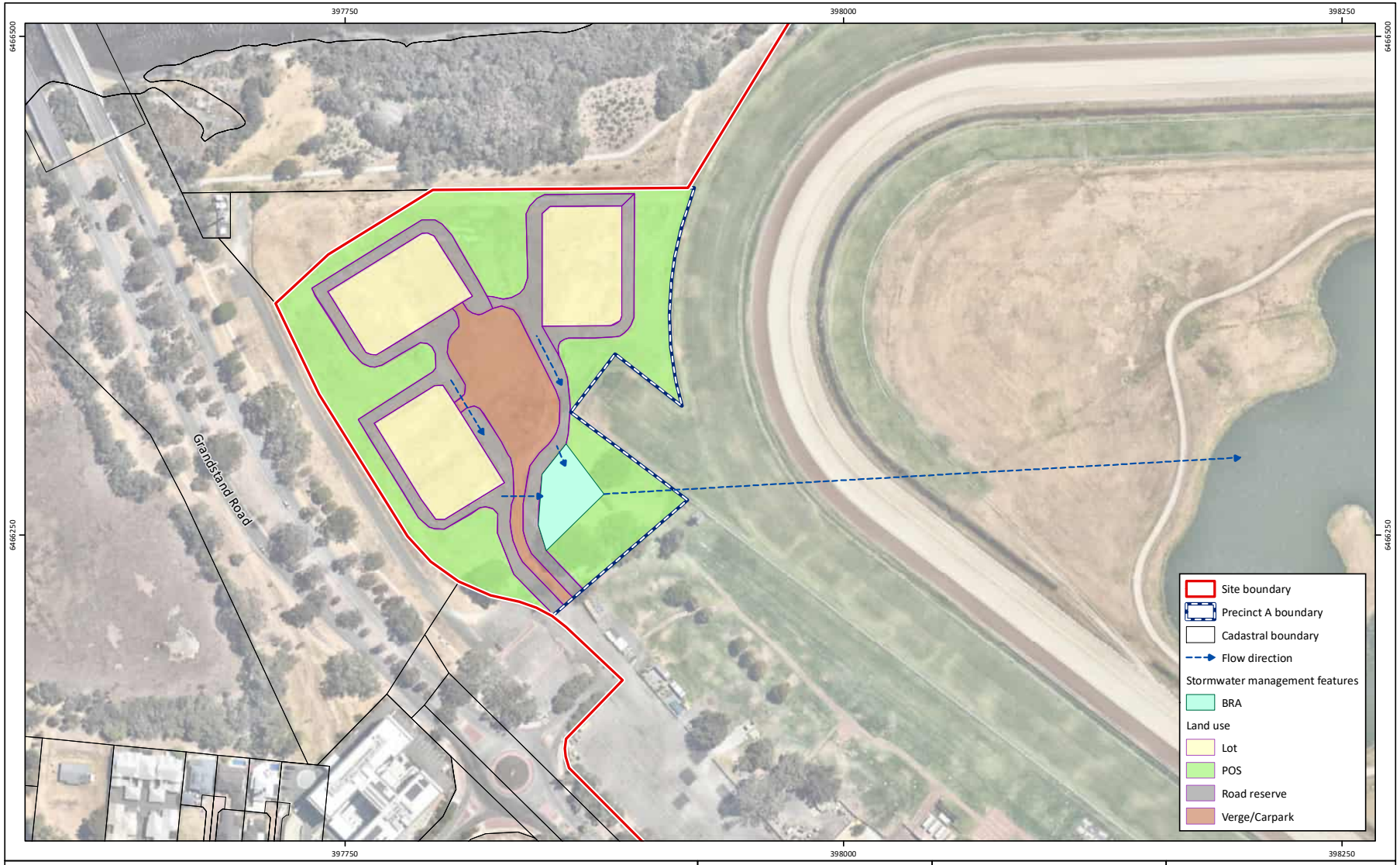


Figure 7A: Precinct A Stormwater Management Plan

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number:
EP23-109(03)--F32
Drawn: WJC
Date: 01/05/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 40 80
Metres
Scale: 1:2,500@A4
GDA2020 MGA Zone 50

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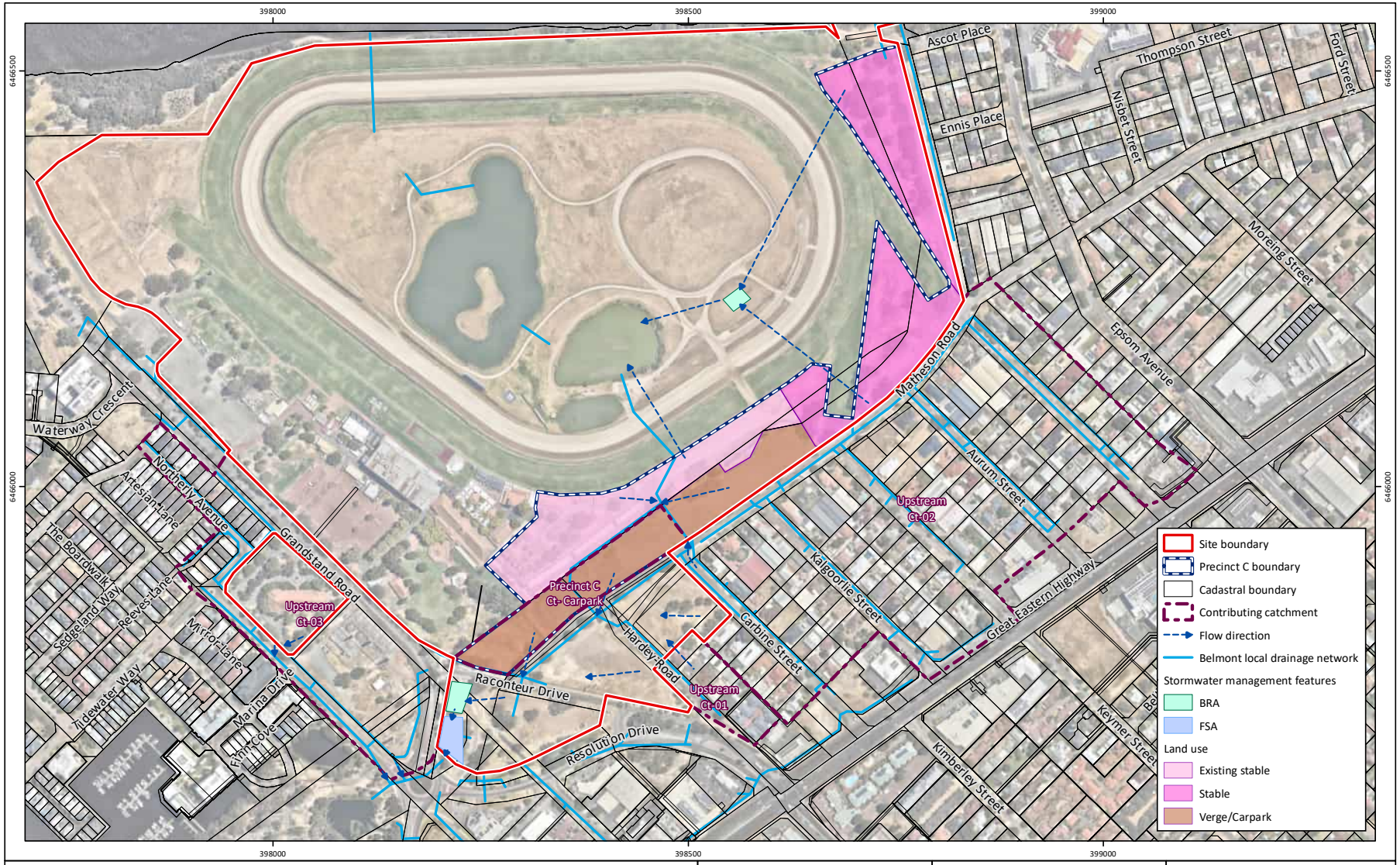


Figure 7B: Precinct C Stormwater Management Plan

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number: EP23-109(03)--F33
Drawn: WJC
Date: 01/05/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 100 200
Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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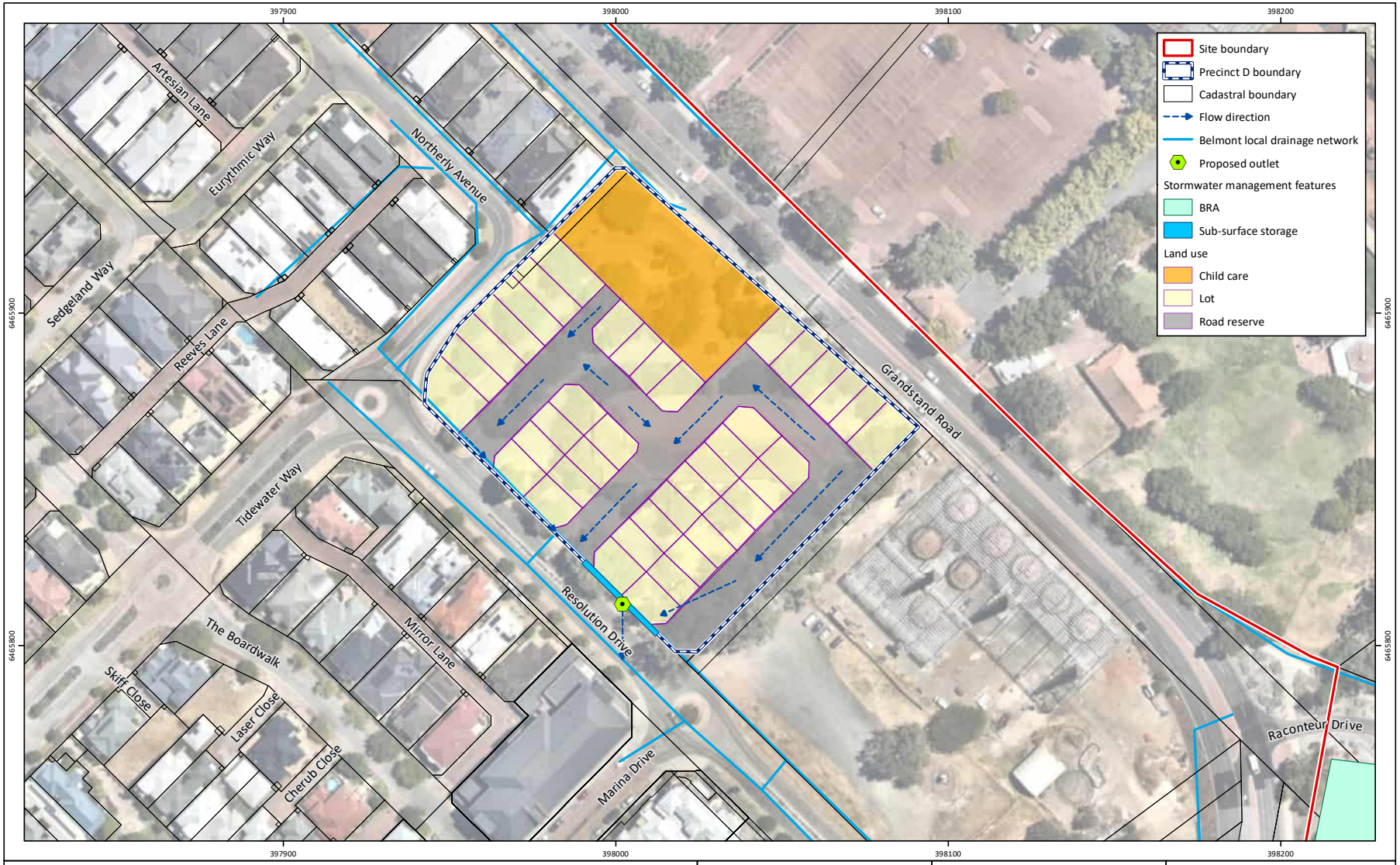


Figure 7C: Precinct D Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F34

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 25 50
Metres

Scale: 1:1,500@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

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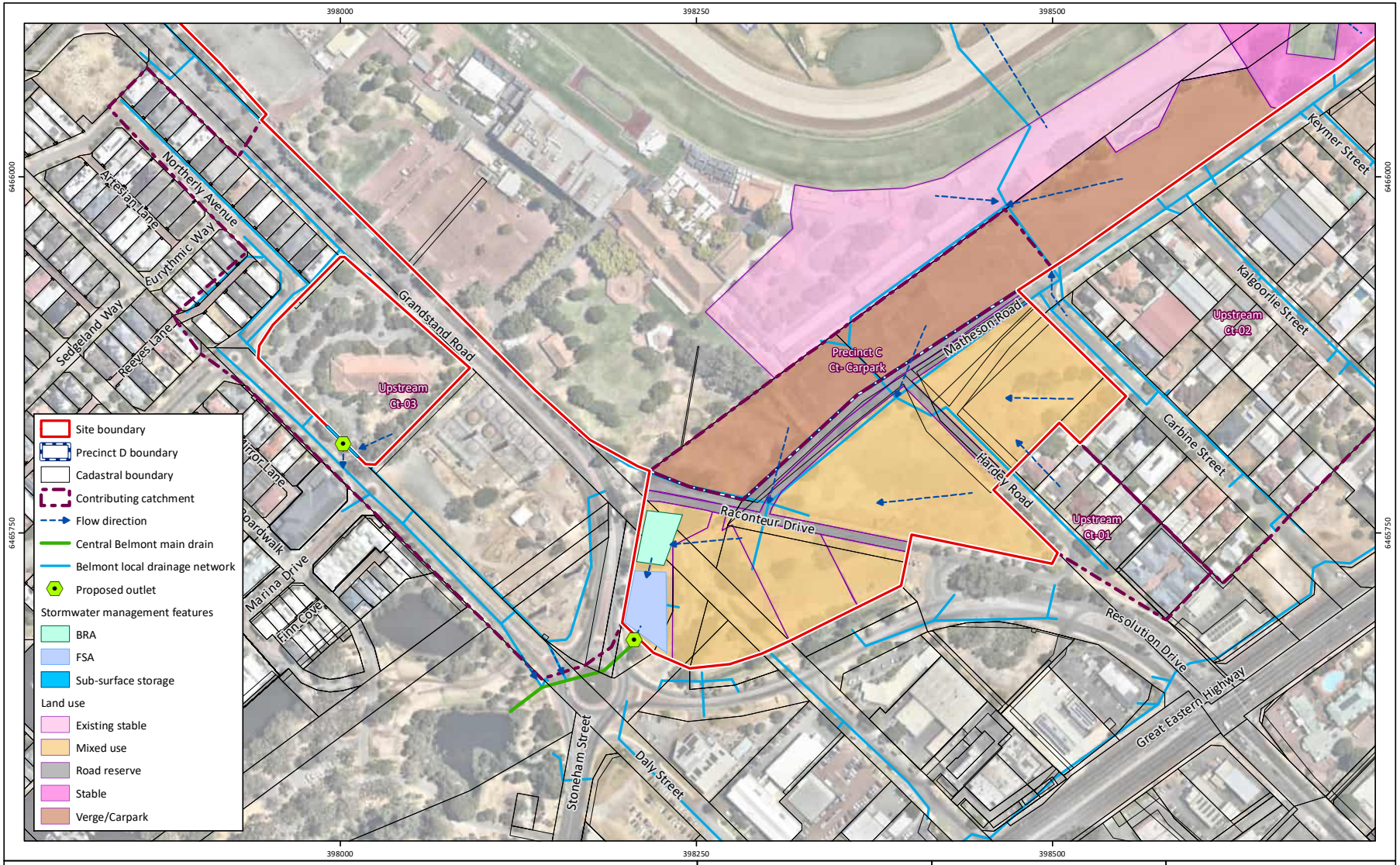


Figure 7D: Precinct E Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:
EP23-109(03)--F35

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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Scale: 1:3,500@A4
GDA2020 MGA Zone 50

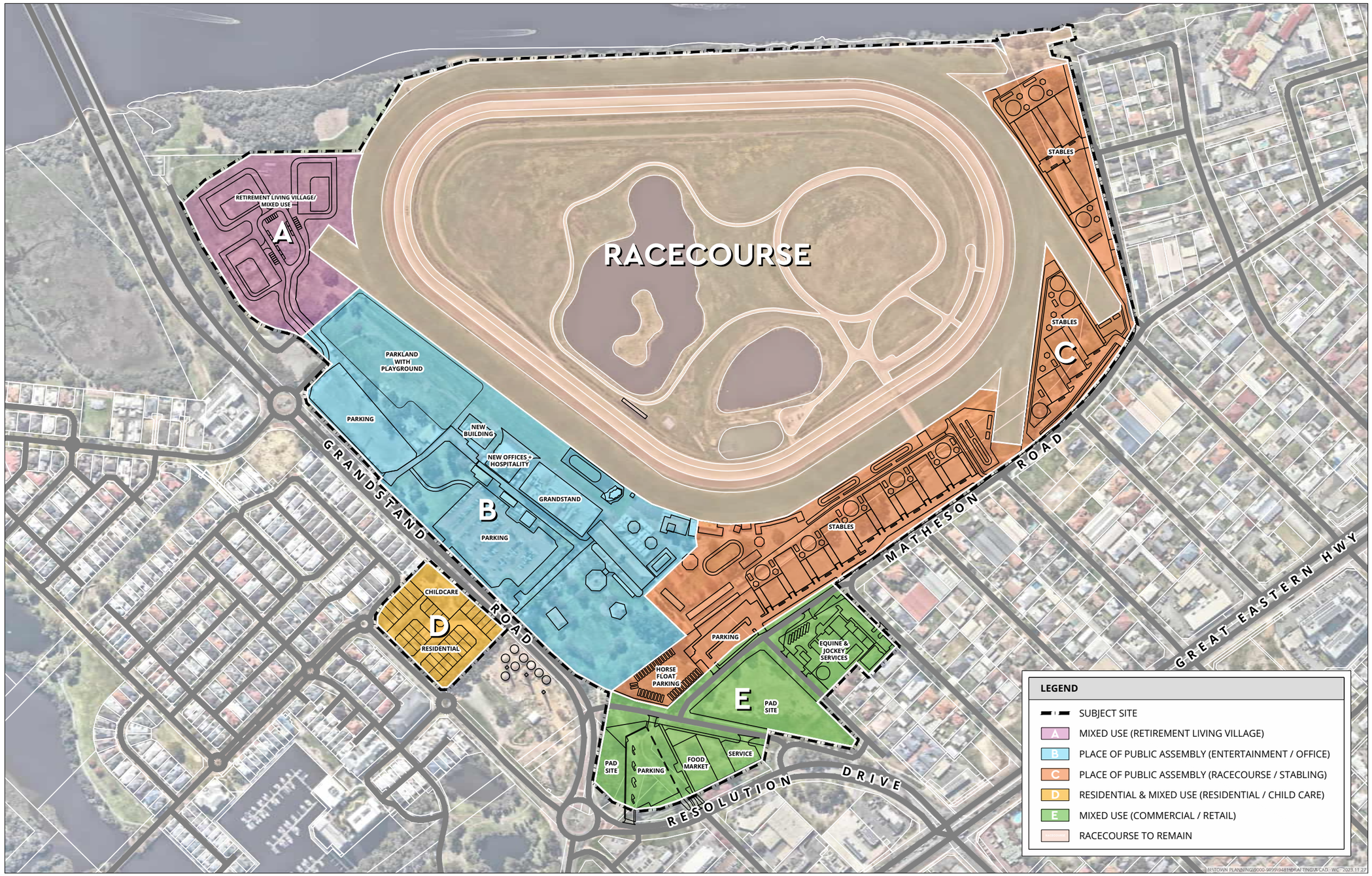
emerge ASSOCIATES

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Appendix A

Concept plan

ROWE Group Design (2023)



DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

DRAFT

N

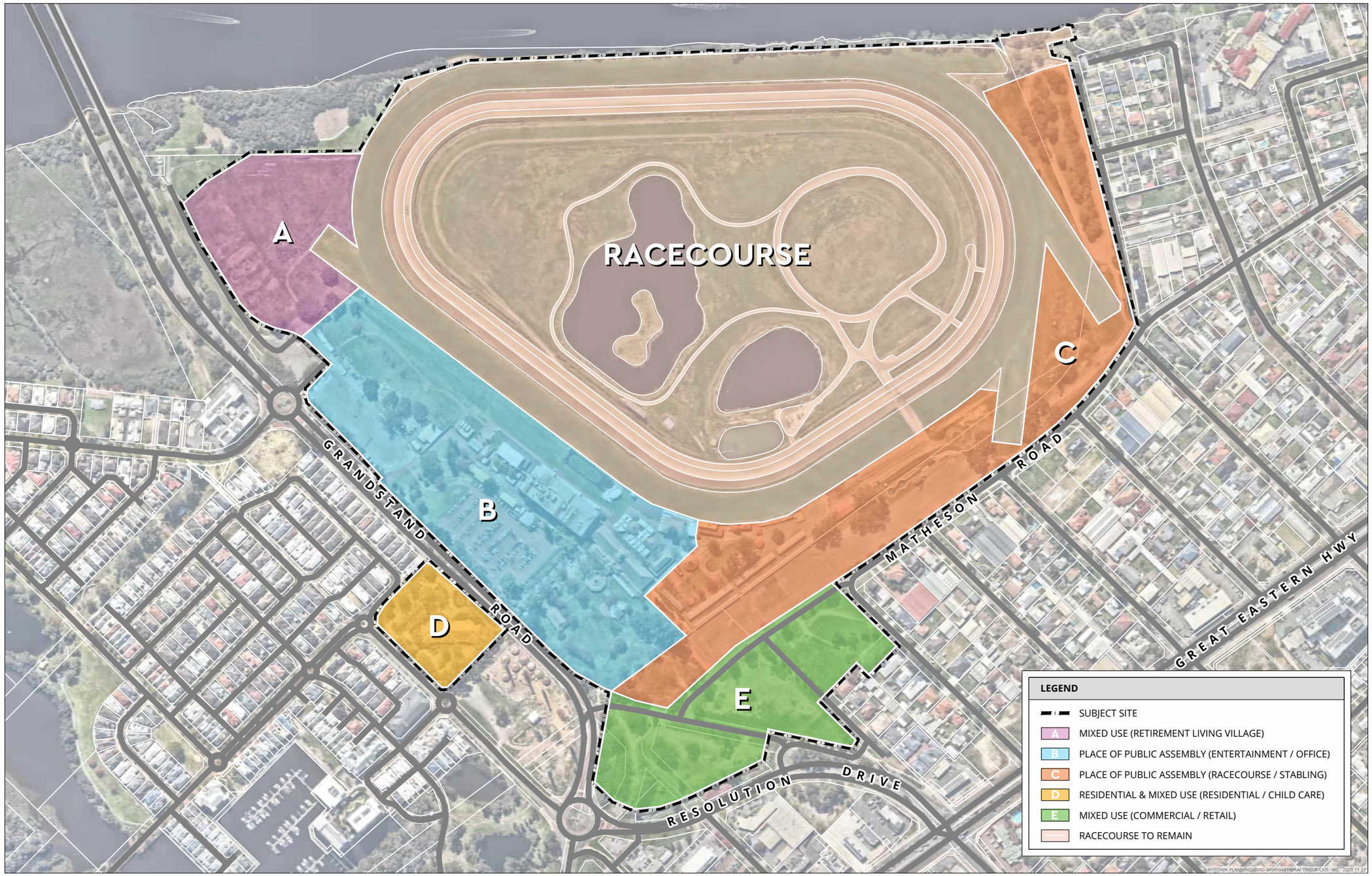
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SCALE @ A3: 1:4000

9481-CON-01-C

DRAWN: WC
DATE CREATED: 2023.11.27
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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ROWE GROUP DESIGN



STRUCTURE PLAN PRECINCTS
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

DRAFT

N

0 100 m
SCALE @ A3: 1:4000
9481-FIG-02-B

DRAWN: WC
DATE CREATED: 2023.11.27
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831
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ROWE GROUP DESIGN

Appendix B

Geotechnical Reports

Precinct A – Douglas Partners 2024

Precinct D – Galt 2024

Douglas PARTNERS

GROUNDED EXPERTISE

Report on Preliminary Geotechnical Investigation

Proposed Residential Development

Part of Lot 9002 Grandstand Road, Ascot WA

Prepared for Perth Racing

Project 219164.03

25 January 2024

Douglas Partners Pty Ltd
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Document History
Details

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Report Prepared For	Perth Racing
Filename	219164.03.R.001.Rev0

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Venkat Vallurapalli/Brendan Divilly	Frederic Verheyde	25 January 2024

Distribution of Copies

Status	Issued to
Revision 0	Perth Racing

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature	Date
Author	25 January 2024
Reviewer	25 January 2024

FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Douglas PARTNERS | GROUNDED EXPERTISE

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Appendix A: About This Report

Appendix B: Test Location Plan

Test Pit and Borehole Logs

CPT Results

Appendix C: Geotechnical Laboratory Test Certificates

FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Report on Preliminary Geotechnical Investigation
Proposed Residential Development
Part of Lot 9002 Grandstand Road, Ascot WA

1. Introduction

This report presents the results of a preliminary geotechnical investigation undertaken for a proposed residential development across Part of Lot 9002 Grandstand Road, Ascot WA. The investigation was commissioned by Mr. James Oldring of Perth Racing in a signed order to proceed dated 8 August 2023 and was undertaken in accordance with Douglas' proposal dated 8 May 2023.

It is understood that Perth Racing is evaluating the feasibility of developing the northwest portion of Lot 9002 for possible residential use (the 'site').

The objective of the investigation is to assess the subsurface soil and groundwater conditions at across the site to provide preliminary comments on:

- The geotechnical suitability of the site for the proposed development.
- Geotechnical opportunities and constraints relevant to the proposed development.
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks.
- Site preparation, including the possible reuse of existing soil as controlled fill.
- Excavation conditions.
- The likely site classification in accordance with the requirements of AS 2870-2011.
- Appropriate earthquake design factor for the site, in accordance with AS 1170.4-2007.
- Suitable foundation systems, including preliminary design parameters.
- Preliminary design parameters for the design of retaining structures and batter slopes.
- Depth to groundwater at the time of the investigation.
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

The investigation included eight cone penetration tests, 16 test pits and one borehole excavated and drilled as a part of detailed site investigation (for contamination), and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on the items listed above.

The investigation was conducted concurrently with a detailed site investigation (for contamination), which has been reported under separate cover (219164.01.R.001.Rev0). The detailed site investigation (for contamination) report should be read in conjunction with this report.

2. Site Description

The site comprises an irregular shaped area, approximately 36.2 ha in size, that covers a part of Lot 9002 Grandstand Road, within the Ascot Racecourse.

At the time of the field work, the majority of the site was vacant and vegetated with short grass. A few mature trees, about 5 m to 10 m in height, occupied the southern part of the site. A parking lot and small loading area were located at the south-western corner of the site. Some fly-tipped rubbish, including fences and posts, were observed at several locations across the site.

According to publicly available LiDAR data (DEM derived to 5 m), the topography across Lot 9002 is relatively flat with existing surface levels ranging from approximately RL 2 m relative to the Australian Height Datum (AHD) in the western part of the site to RL 3.5 in the north-eastern corner of the site.

The Perth 1: 50 000 Environmental Geology sheet indicates that shallow sub surface conditions beneath the western two thirds of the site comprise sandy silt of the Guildford Formation, and beneath the north-eastern corner and eastern corner of the site comprise alluvium.

The Perth Groundwater Atlas (2004) indicates that in May 2003, the groundwater level beneath the site was less than RL 1 m, or between approximately 1.0 m and 2.5 m below the existing surface level. The Atlas also indicates that the groundwater flow direction beneath the site in May 2003 was approximately northwest towards the Swan River.

The published acid sulfate soil risk mapping indicates that the site is located within an area which is mapped as "*high to moderate risk of acid sulfate soils occurring within 3 m of natural soil surface*".

3. Field Work Methods

Field work for the investigation was carried out between 11 October and 9 November 2023 and comprised:

- The excavation of 16 test pits.
- The drilling of one borehole.
- Perth sand penetrometer (PSP) or Dynamic cone penetrometer (DCP) testing adjacent to each test pit or borehole location.
- The performance of cone penetration tests at 8 locations (CPT24 to CPT31A). A total of 14 CPTs were undertaken after repeating CPTs at some locations in attempt to achieve greater testing depth following shallow refusal in uncontrolled fill.

The test pits (locations 7 to 22) were excavated using a 5-tonne excavator, equipped with 450 mm toothed bucket, and the borehole (location 23) was drilled using a 250 mm diameter power auger attached to the same excavator. The ground conditions at each test pit and borehole were logged in accordance with Australian Standard (AS 1726, 2017) by a geo-environmental engineer from Douglas. Soil samples were recovered from selected locations for subsequent laboratory testing.

Dynamic cone penetrometer (DCP) and Perth sand penetrometer (PSP) tests were undertaken adjacent to the test pit and borehole locations in accordance with Australian Standards (AS 1289.6.3.3, 1997; AS 1289.6.3.2, 1997) to assess the in-situ density of the shallow soils.

The CPTs use a 36 mm diameter instrumented cone with a following 130 mm long friction sleeve attached to rods of the same diameter, pushed continuously at a rate of 20 mm/sec into the soil by hydraulic thrust from a truck rig. Strain gauges in the cone and sleeve measure resistance to penetration and friction along the sleeve during penetration. This data is recorded on a computer and analysed to assess the type, properties and condition of the materials penetrated. The CPT's were pushed to termination depths of up to 20.2 m. Upon withdrawing the CPT probe, each test hole was dipped in an attempt to measure groundwater levels. CPTs were repeated at several test locations to attempt achieving greater testing depth following shallow CPT refusal on inferred hard foreign inclusions in the uncontrolled fill.

Test locations were determined using a handheld GPS and site features and are marked on Drawing 1, Appendix B. Surface elevations were recorded using a differential GPS with a reported accuracy of 0.1 m.

4. Field Work Results

4.1 Ground Conditions

The logs of the ground conditions and results of the field testing are presented in Appendix B, together with notes defining descriptive terms and classification methods, in Appendix A.

- **Uncontrolled FILL**
    - **Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL (SP, SP-SM, SM and GP-GM)** – generally sandy fill (or gravelly material associated with pavement layers at location 23), uncontrolled (apart from the pavement layers), from surface to depths of between 0.6 m and 3.6 m depth, encountered at all locations. A layer of organic sandy fill layer was observed between 1.4 m and 1.8 m depth at location TP8. The sandy fill was generally loose to medium.
    - **Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY (SM, SC, CI and CL-CI)** – generally stiff to very stiff, either underlying the aforementioned sandy fill material or interbedded within layers of sandy fill, encountered at test pit locations 9, 20, 21, 23, and CPT locations 24, 24A, 29 and 29A.

  A considerable amount of foreign inclusions such as fragments of brick, glass, timber, geo-fabric, concrete, plastic, rubber, scrap metal, terracotta pipes, redundant cables and PACMs were observed at all test pit locations, except location 22. A layer of asphalt was encountered at 0.95 m depth at TP9. The fill materials across the site are uncontrolled.

  It is noted that the fill extended below groundwater level at many locations.

Overlying natural soils including:

- **Clayey soils including Clayey SAND and CLAY** – ranging between very soft to soft and stiff to very stiff, encountered under the fill materials at CPTs 25, 30 and 31A to depths between 4.2 m and 14.9 m.
- **Sandy soils including SAND and Silty SAND** – underlying and interbedded within the above clayey soils at CPTs 25, 30 and 31A. The sand was generally very loose and loose to medium dense to depths between 10.5 m and 14.9 m, becoming medium dense and dense below.

4.2 Groundwater

Groundwater level observations between 18 September and 9 November 2023 are summarised in Table 1 and are shown on the logs in Appendix B.

The test holes were immediately backfilled following sampling, which precluded longer-term monitoring of groundwater levels. Six monitoring wells (MW01 to MW06) were installed as part of the preliminary environmental investigation (reported separately) and groundwater observations available from these wells at the time of report writing have been included in Table 1.

Table 1: Summary of Groundwater Levels

Location	Date of Measurement	Ground Surface Level [1] (m AHD)	Groundwater Depth (m)	Groundwater Level [2] (RL m AHD)
MW01	18 September 2023	1.9	1.30	0.6
MW02		2.0	1.46	0.5
MW03		3.2	2.37	0.8
MW04		2.4	1.59	0.8
MW05		2.5	1.21	1.3
MW06		2.2	1.09	1.1
TP7	9 November 2023	2.9	2.30	0.6
TP9		2.1	2.10	0.0
TP12		2.1	2.10	0.0
TP13		2.8	2.50	0.3
TP15		2.2	2.40	-0.2
TP16		2.6	2.50	-0.1
TP17		2.2	2.10	0.1
TP19		2.2	1.80	0..4
TP20		2.0	2.10	-0.1
TP21		2.1	1.80	0.3
TP22		2.3	1.80	0.5
BH23		2.4	1.70	0.7
CPT25	11 October 2023	3.4	3.00	0.4
CPT28		1.9	1.30	0.6
CPT29A		2.3	2.20	0.1
CPT30		3.2	2.80	0.4
CPT31A		2.1	2.00	0.1

Notes for Table 1: [1]: Surface level measured using a differential GPS.
[2]: Groundwater Level = Surface Level – Groundwater Depth.

It should be noted that groundwater levels are affected by climatic conditions and land usage and will therefore vary with time. In addition, owing to the proximity of the Swan River, the groundwater levels are expected to be impacted by the tidal river conditions and river flood levels.

5. Laboratory Testing

A geotechnical laboratory testing programme was carried out by a NATA accredited laboratory and comprised:

- the particle size distributions on seven samples;
- the Atterberg Limits and linear shrinkage on three samples; and
- the organic content on four samples.

Results of the laboratory testing are summarised in Tables 2. The test certificates are presented in Appendix C.

Table 2: Results of Laboratory Testing for Soil Identification

Location	Depth (m)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)	OC (%)	Material
TP8	1.5	9	61	30	-	-	-	-	6.8	FILL / Organic SAND SP-SM, with gravel and silt
TP13	1.5	4	95	1	-	-	-	-	1.6	FILL / SAND SP, trace gravel and silt
TP19	2.5	5	83	12	-	-	-	-	1.5	FILL / SAND SP, trace gravel and silt
TP21	2.0	40	51	9	37	24	13	8.5	-	Sandy CLAY CI, medium plasticity, trace gravel
TP22	2.0	7	93	0	NO	NP	NP	-	-	SAND SP-SM, with silt
TP23	2.0	45	48	7	44	22	22	9.5	-	FILL / Sandy CLAY CI, medium plasticity, trace gravel
TP23	2.5	12	87	1	-	-	-	-	1.2	FILL / SAND SP-SM, with silt, trace gravel

Notes: Fines = Finer than 75 µm.
Sand = Between 2.36 mm and 75 µm.
Gravel = Larger than 2.36 mm.
LL – liquid limit PL – plastic limit PI – plasticity index LS – linear shrinkage
OC – organic content NO – not obtainable NP – non plastic

6. Proposed Development

At the time of preparing this report, the details for the proposed development were not yet available. Notwithstanding, it is understood that the proposed development is likely to be residential and, given the location, is presumed would likely be multistorey and possibly include a basement level.

7. Comments

7.1 Site Suitability

The investigation indicates that the site is generally underlain by uncontrolled fill overlying very soft to stiff clayey materials and very loose sandy soils becoming medium dense and dense with depth as described in Section 4.1 above.

From a geotechnical standpoint, there are several significant geotechnical constraints that will adversely impact on any development of the site including;

- Deep uncontrolled fill, unsuitable to support shallow foundations, and will impact on construction activities associated with deep piled foundations.
- Deep very soft and very loose natural soils under the uncontrolled fill, unsuitable to support shallow foundations.
- Shallow groundwater which will make earthworks across the site any possible remediation works of the above difficult. It should be noted that the abovementioned uncontrolled fill and soft soils both extend below groundwater.

Owing to the significant geotechnical constraints, any possible development will likely require a piled foundation solution into the medium dense and dense sandy soils, encountered below depths of approximately 10 m to 15 m. Additional geotechnical investigation will be required to confirm the foundation design and suitable pile design parameters. Also, noting that any proposed additional loading of the ground (for instance from the placement of fill to raise site levels, if proposed) would generate further consolidation of the soft soils underlying the site and cold result in some possible significant ground settlement. Therefore, surcharging areas (by placing temporary fill prior to construction of any structure) outside the proposed building envelopes might also be required during the site preparation to manage the risk of differential settlements between proposed buildings and adjacent ground, following their construction.

7.2 Site Classification

The shallow ground conditions beneath the site comprise uncontrolled fill materials and deep loose and soft soil deposits. Based on the results of the investigation and in accordance with Australian Standard (AS 2870, 2011), a site classification of 'Class P' applies to the site, owing to the presence of the uncontrolled fill and deep loose and soft soil.

7.3 Site Seismic Classification

Owing to the uncontrolled fill and deep very loose and very soft soil deposits across the site, an earthquake design soil sub-class of Ee is considered appropriate for this site in accordance with Australian Standard (AS 1170.4, 2007). The Hazard Factor (Z) for the site is 0.09, according to Australian Standard (AS 1170.4, 2007). Due to the deep loose soil below the water table, the site also has a significant potential for liquefaction. An assessment on the liquefaction potential of the site should be considered during any detailed investigation, when more details can be collected on the extent of deep loose soils.

7.4 Excavation Conditions

The encountered ground conditions generally comprise uncontrolled fill, with some large foreign inclusions within the fill, extending below groundwater. Conventional earthmoving equipment (such as large excavators, say at least 20 t) should be generally suitable for shallow excavations in the surficial uncontrolled fill. Shallow groundwater is likely to impact excavations across the site.

The majority of the uncontrolled fill encountered during this preliminary investigation is considered to be geotechnically unsuitable for re-use as structural fill in its current condition. Any further consideration to reuse the uncontrolled fill would require some specific geotechnical provisions, such as screening and disposing its unsuitable components. Separating the re-useable granular components (e.g. the sandy fill) from its cohesive components (e.g. clayey fill) might also prove to be practically difficult. Owing to the significant variability of uncontrolled fill materials across the site, any re-use potential from a geotechnical standpoint should be confirmed on-site by a geotechnical engineer. Some environmental considerations (i.e. contamination) are also anticipated to be required. Overall, at this stage of the study, the reuse of the encountered uncontrolled fill should be considered to be associated with some significant constraints that might preclude such reuse.

7.5 Slope Stability

During construction, it is recommended that temporary batter slopes across the site are maintained flatter than 2:1 (H:V) if not retained. This batter angle is valid provided no surcharge loads (including live loads such as vehicles and machinery) apply at the top of the slope. In uncontrolled fill materials, a safe batter angler not steeper than 3:1 (H:V) is recommended for design for slopes not greater than 3 m in height, however, owing to variability of the uncontrolled fill materials, this value should be adjusted during construction based on the encountered conditions.

The design of unpropped flexible or rigid walls should be undertaken using a triangular pressure distribution and the earth pressure parameters given in Table 4. In addition to the soil pressure, wall design should also allow for external loads such as buildings, live loads and hydrostatic pressure. Owing to the likely significant settlements associated with the uncontrolled fill and deep soft soils, the requirement to adopt a piles foundation system to support proposed retaining walls is anticipated.

Table 4: Preliminary Soil Parameters for Earth Retaining Design

Soil Type and Density	Soil Unit Weight Above Water γ (kN/m^3)	Submerged Soil Unit Weight γ' (kN/m^3)	Drained Angle of Friction Φ' (°)	Undrained Shear Strength Cu (kPa)	Coefficient of Earth Pressure – Active K_a	Coefficient of Earth Pressure – Passive K_p	Coefficient of Earth Pressure – at Rest K_o
Uncontrolled Fill Materials	16	6	28	-	0.36	2.7	0.5

It should be noted that the passive earth pressure coefficient (second last column of Table 4) is an ultimate value and does not incorporate a factor of safety. Because the stress-strain relationship curve for lateral loading is not linear, relatively large strains are required to mobilise full passive pressure, but only relatively small strains are required to mobilise half the passive pressure, therefore it would be prudent to incorporate a factor of safety of at least 2 for uncontrolled fill materials, to derive design values from the ultimate values.

7.6 Foundation Options

Shallow footings are not considered suitable across this site, owing to the significant thickness of uncontrolled fill and deep loose and soft soils.

7.6.1 Piles

It is anticipated that a piled foundation system, with deep bored piles that penetrate the deep loose and soft soils into the medium dense and dense sandy soils at depth, would likely be required for any foundations on-site.

Bored piles will require temporary or permanent casing throughout the uncontrolled fill materials, noting that possible obstructions within the uncontrolled might cause some difficulties when driving the casing or drilling the pile hole. This pile type will involve soil excavation to target founding level and hence would produce spoil that needs to be handled and disposed of in a suitable manner, which will need to also be considered from an environmental standpoint.

Installation through the uncontrolled fill materials could be affected by the possible presence of large, hard inclusions and the design of the pile installation methodology should take this possibility into consideration.

The settlement of the uncontrolled fill will exert negative skin friction on the piles, which the piles will need to be designed to accommodate or be constructed in sleeves.

Additional deep geotechnical boreholes will be required across the site to inform on the pile design.

7.6.1 Controlled Modulus Columns

Controlled modulus columns could be installed as an alternative to conventional pile foundations, allowing shallow footings to be used whilst controlling settlements to acceptable limits.

Installation of controlled modulus columns involves displacing a column of material using a reverse flight auger, densifying the soil around the auger, and backfilling the resulting hole with cement ground under moderate pressure to create a 'hard' inclusion in the ground. The columns are typically 250 mm to 500 mm in diameter. Column spacings of columns typically 1.8 m to 2.5 m but would need input from a specialist ground improvement contractor. Columns can be installed to depths of up to 50 m, so could penetrate to the base of the uncontrolled fill and deep loose and soft soils. However, if large hard inclusions such as concrete slabs or beams, are encountered then the auger may experience refusal, as the CPTs did at several locations during the preliminary geotechnical investigation.

A load transfer platform, such as a granular, well compacted fill layer, possibly reinforced with geogrid or geotextile, would be needed to transfer loads from shallow foundations to the columns.

One main benefit of this ground improvement option (compared to piling) would be to minimise differential settlement across the site and notably between buildings and surrounding grounds. However, it would likely be limited to low level development (say 2 to 3 level buildings), and this option is anticipated to likely be prohibitively expensive, with likely significant mobilisation and installation costs. The advice of a specialist ground improvement contractor, such as Menard Oceania, is suggested to be sought to further assess the suitability of this ground improvement to the proposed development.

7.7 Pavement Construction

The uncontrolled fill across the site does not form a suitable subgrade material for pavement in its current condition. Depending on the expected loading of proposed pavement, the requirement for some over-excavation of uncontrolled fill is likely. Construction should involve the use of a geo-composite layer (such as Global Synthetics' Combigrid) across the base of the over-excavation, overlain by a 500 mm thick layer of compacted crushed limestone, placement of a layer of geogrid (such as Global Synthetics' Secugrid), and a further 500 mm of compacted sand fill. The base of the constructed floating pavement footprint should be at least 2 m wider on each side than the total pavement width (4 m wider in total) to account for a suitable batter and transfer of load. Standard flexible pavements could then be constructed on the 1 m thick raft of stiffened subgrade. Placement of the initial base layer of composite geogrid may be difficult across areas of exposed uncontrolled fill. As such, depending on the site conditions, a 300 mm thick capping layer of clean fill may be required.

Regardless of the above site preparation, some settlement of the pavement should be expected over its service life and should be considered in the selection of the pavement surfacing. The use of pavers should be considered as such surfacing treatment would deform without cracking. Alternatively, a bituminous seal should be preferred over say an asphalt, owing to greater flexibility and to decrease maintenance and repair requirements, noting however that seals are less resistant than asphalt to shearing forces from tyres of turning heavy vehicles. The use a specialised asphalt, such as a stone mastic asphalt, could also be considered, noting it would be less resistant to the risk of cracking than a seal. Some allowance for regular maintenance and repairs should be allowed during the serviceability of the pavement.

7.8 Stormwater Drainage

Owing to the occurrence of low permeability soils and groundwater at shallow depth, the site is considered unsuitable for on-site stormwater disposal. It is suggested that stormwater is controlled using positive drainage or a subsoil drainage network, connected to a suitable outflow.

7.9 Additional Geotechnical Investigation

Additional geotechnical investigation across the site, by way of deep geotechnical boreholes (as a minimum), further CPT and additional laboratory testing, should be undertaken to help refine the ground model, provide pile design parameters, confirm suitable bearing strata for piles, and assess the soil aggressivity and exposure classification for piles. It is recommended that the detailed investigation programme be developed once some details of the proposed development

are known, if possible, in order to target specific geotechnical issues associated with the development.

The investigation covered in this report should be considered preliminary and as noted in selected sections of the report, additional detailed geotechnical testing at a greater testing frequency is anticipated once the project design has progressed.

8. References

AS 1170.4. (2007). *Structural Design Actions, Part 4: Earthquake Actions in Australia.* Reconfirmed 2018. Incorporating Amendments 1 & 2: Standards Australia.

AS 1289.6.3.2. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - 9kg dynamic cone penetrometer test.* Reconfirmed 2013: Standards Australia.

AS 1289.6.3.3. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - Perth sand penetrometer test.* Reconfimed 2013: Standards Australia.

AS 1726. (2017). *Geotechnical Site Investigations.* Standards Australia.

AS 2159. (2009). *Piling - Design and Installation.* Standards Australia.

AS 2870. (2011). *Residential Slabs and Footings.* Standards Australia.

9. Limitations

Douglas Partners (DP) has prepared this report for this project at Part of Lot 9002 Grandstand Road, Ascot WA in accordance with DP's proposal dated 8 May 2023 and acceptance received from Mr James Oldring in a signed services order dated 8 August 2023. The work was carried out under DP's Engagement Terms. This report is provided for the exclusive use of Perth Racing for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

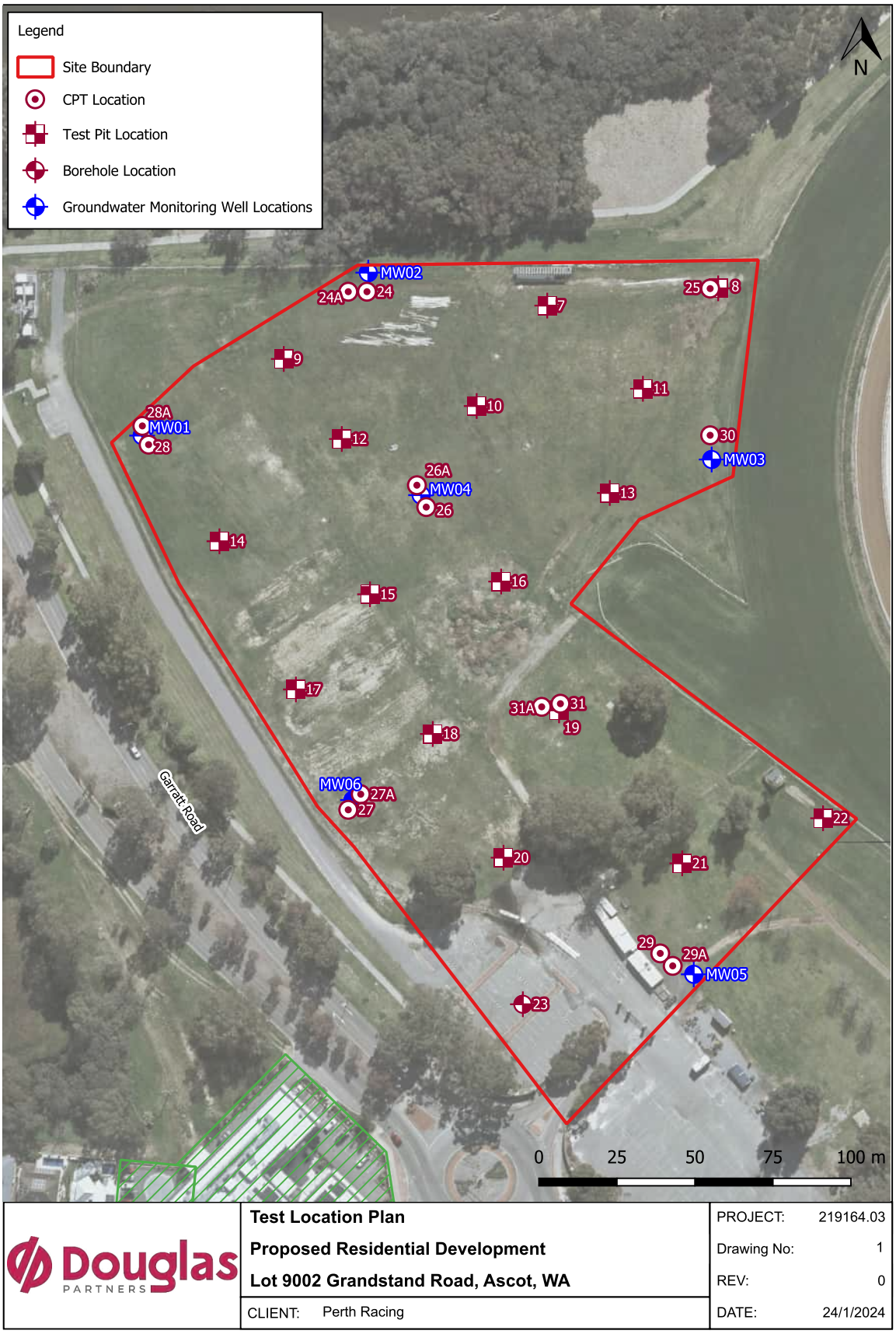
The scope of work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

Appendix B

Test Location Plan

Test Pit and Borehole Logs

CPT Results

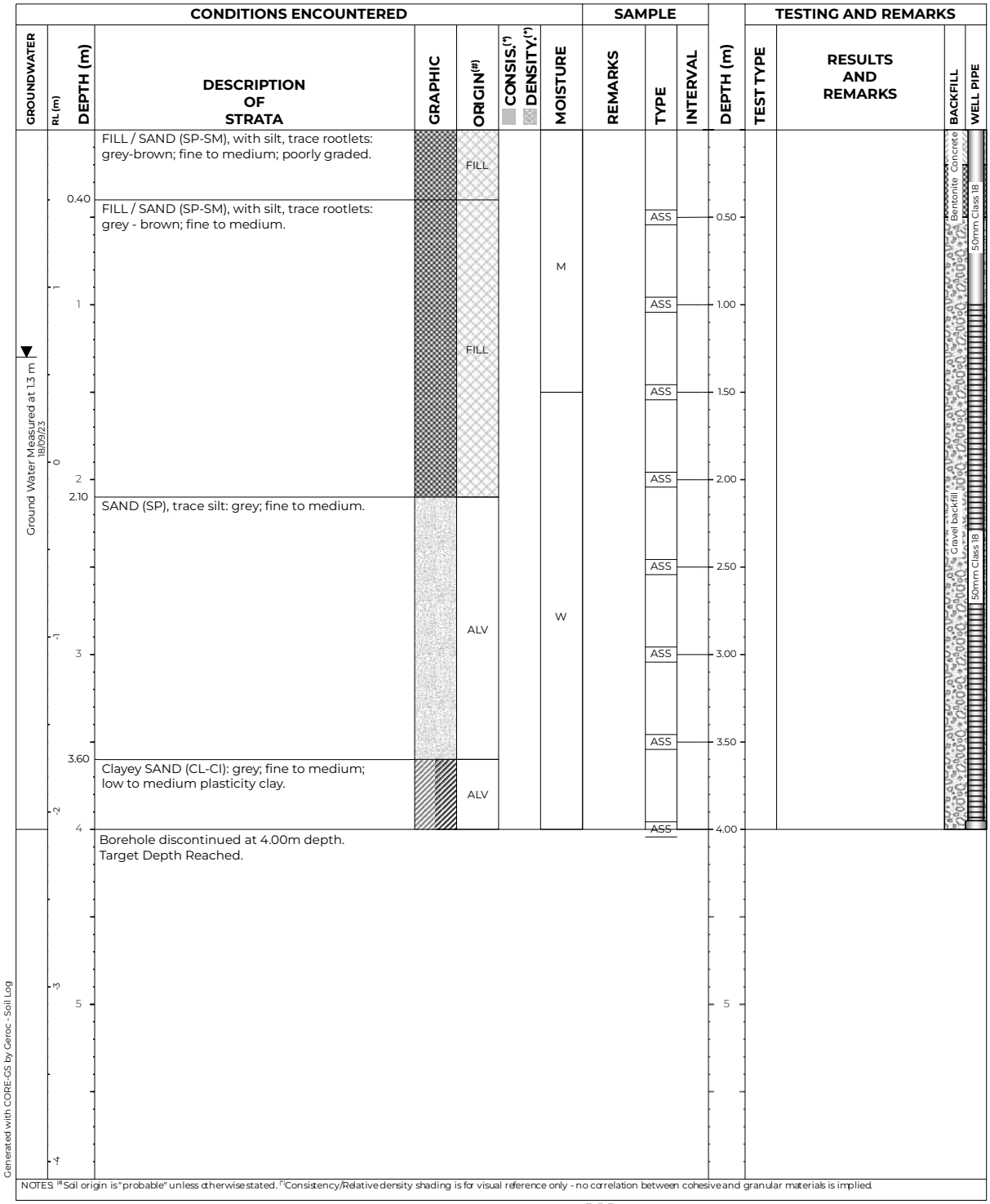

Legend
Site Boundary
CPT Location
Test Pit Location
Borehole Location
Groundwater Monitoring Well Locations
N
MW02
24A
24
25
8
7
9
11
10
28A
MW01
28
12
30
MW03
26A
MW04
26
13
14
16
15
17
31A
31
19
18
Garratt Road
MW06
27A
27
22
20
21
29
29A
MW05
23
0
25
50
75
100 m
Douglas
PARTNERS
Test Location Plan
Proposed Residential Development
Lot 9002 Grandstand Road, Ascot, WA
CLIENT: Perth Racing
PROJECT: 219164.03
Drawing No: 1
REV: 0
DATE: 24/1/2024

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 1.9 AHD
COORDINATE: E:397722.0, N:6466365.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 01
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

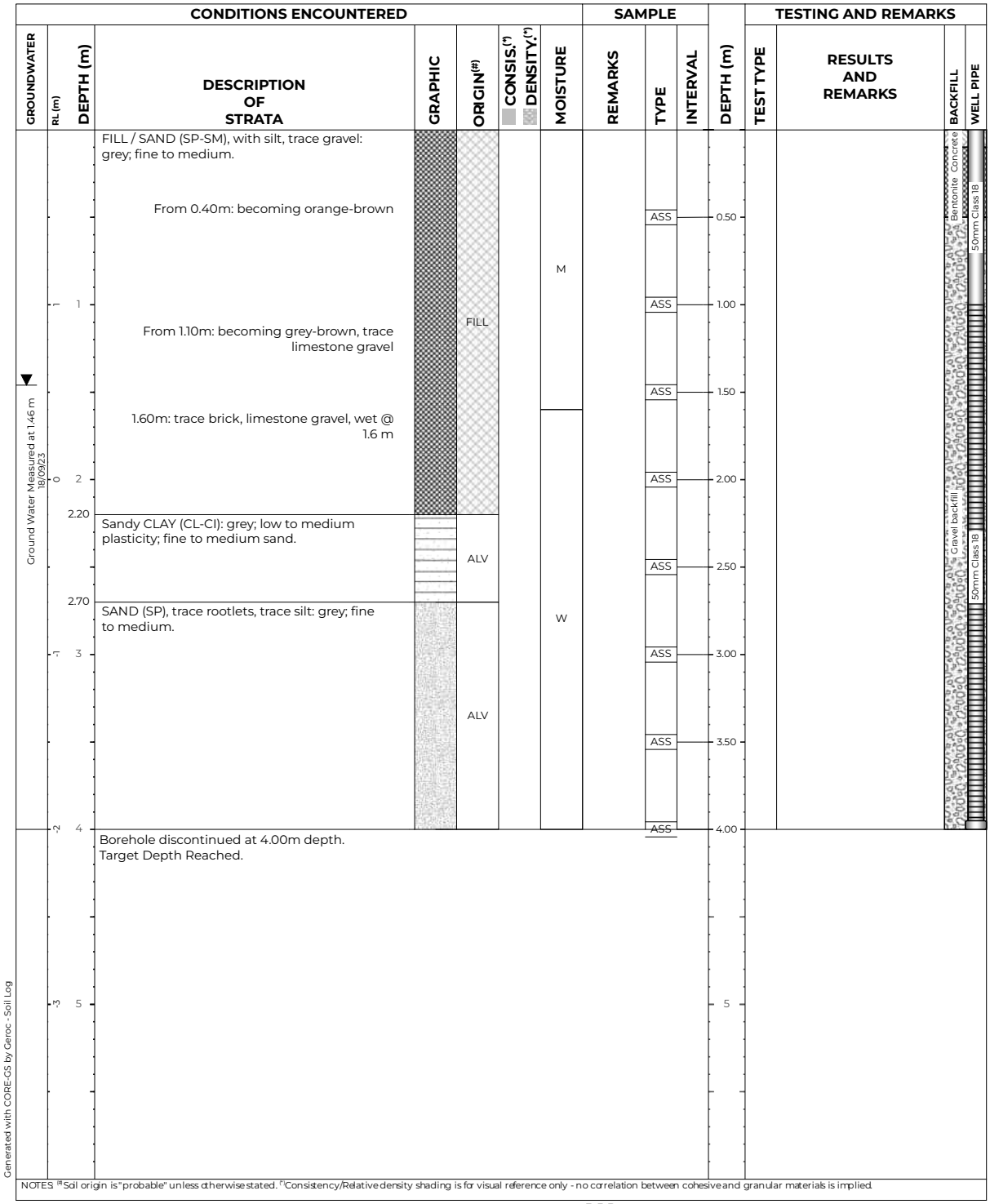
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397795.0, N:6466418.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 02
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.2 AHD
COORDINATE: E:397905.0, N:6466358.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 03
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) DENSITY.(*)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	3		FILL / SAND (SP), trace silt: orange; fine to medium. From 0.30m: becoming grey, trace clay, limestone gravel		FILL						1			Bentonite Concrete; Gravel backfill; 50mm Class 18	50mm Class 18
	2	1.60	FILL / Clayey SAND (SC), trace gravel: grey; fine to medium; low to medium plasticity clay.		FILL						2				
▼ Ground Water Measured at 2.37 m 18/09/23	1	2.20	FILL / SAND (SP), trace silt: orange - grey; fine to medium. 2.80m: trace brick		FILL										
	0	3.00	FILL / Clayey SAND (SC): grey; fine to medium; low to medium plasticity clay. 3.30m-3.50m: with bitumen layer		FILL						3				
	-1	3.60	FILL / CLAY (CL-CI), trace sand: grey - green; low to medium plasticity.		FILL										
		4	Borehole discontinued at 4.00m depth. Target Depth Reached.								4				
	-2	5									5				

NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Generated with CORE-GS by Geroc - Soil Log

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397812.0, N:6466346.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 04
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(^) / DENSITY.(^)	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS	BACKFILL	WELL PIPE
	2		FILL / SAND (SP-SM), with silt, trace rootlets: orange grey; fine to medium.		FILL				ASS		0.50			Bentonite Concrete	50mm Class 18
		0.60	FILL / SAND (SP), with gravel, trace clay: grey; fine to medium; fine to medium gravel.						ASS		1.00			Gravel backfill	
	1	1							ASS		1.50				
▼			1.50m: trace brick, wet												
Ground Water Measured at 1.59 m 18/09/23	0	2	2.00m: trace brick		FILL				ASS		2.00				50mm Class 18
									ASS		2.50				
		3	3.00m: trace brick						ASS		3.00				
	-1	3.20	SAND (SP), trace silt: grey-orange; fine to medium.		ALV										
		3.40	Clayey SAND (SC): orange-grey; fine to medium; low to medium plasticity clay.		ALV				ASS		3.50				
		3.60	Sandy CLAY (CL): grey; low to medium plasticity; fine to medium sand.		ALV										
		4	Borehole discontinued at 4.00m depth. Target Depth Reached.						ASS		4.00				
	-2														
		5									5				
	-3														

NOTES: (#) Soil origin is "probable" unless otherwise stated. (^) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log

PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

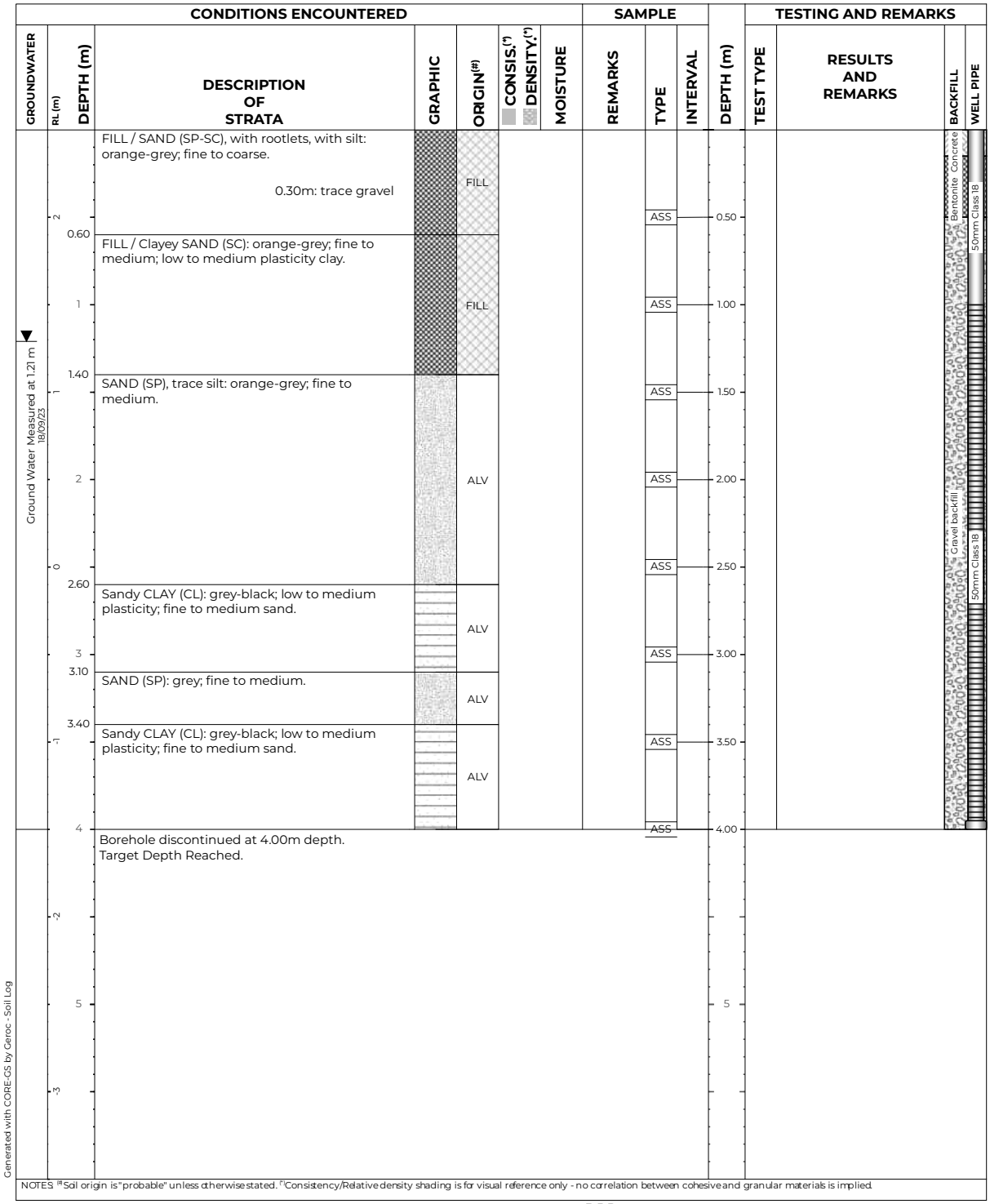
Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.5 AHD
COORDINATE: E:397900.0, N:6466193.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 05
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397790.0, N:6466249.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 06
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS			
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
Ground Water Measured at 1.09 m 18/09/23	2	FILL / SAND (SP) : Sand, with rootlets, trace silt: orange-grey; fine to medium.		FILL									Bentonite Concrete	
	0.40	FILL / SAND (SP), with gravel: grey-brown; fine to medium.						ASS		0.50				50mm Class 18
	1	From 0.80m: becoming grey, no gravel								1				
		From 1.10m: becoming orange-grey		FILL									Gravel backfill	
		From 1.80m: becoming grey and trace brick												
	2									2				
	2.20	FILL / Clayey SAND (CL): grey; fine to medium; low to medium plasticity clay; may be natural.		FILL										
	2.60	SAND (SP): grey; fine to medium.		ALV										
	3									3				
	3.10	Sandy CLAY (CL): dark grey; low to medium plasticity; fine to medium sand.		ALV										50mm Class 18
	4	Borehole discontinued at 4.00m depth. Target Depth Reached.								4				
	5									5				

NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log

PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.9 AHD
COORDINATE: E:397852.9, N:6466410.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP07
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.00 / 2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	MD to VD	D to M		ES		0.10	PID	<1ppm
		From 0.17m: becoming orange									DCP9/150	5 10 15
		0.54m: trace geo-fabric						ES		0.40 / 0.50	PID	<1ppm
	0.60	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL								
		0.84m: trace geo-fabric										
	0.90 / 1	FILL / GRAVEL (GP-GM) : Gravel, with mulch, with sand: dark brown and dark grey-brown; with silt.		FILL				ES		1.00 / 1.10	PID	<1ppm
	1.40	FILL / SAND (SP-SM), with silt: dark grey; fine to medium.		FILL	ND	M	ASB9, ASB10, AF/FA	D / ES		1.50 / 1.60	PID	<1ppm
		1.50m: trace PACM fragment										
		From 1.60m-2.60m: with fragments of bricks, concrete and metal roofing sheetings		FILL				ES		2.00 / 2.10	PID	<1ppm
09/11/23						W		ES		2.50 / 2.60	PID	<1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).										





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.3 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.6 AHD
COORDINATE: E:397905.7, N:6466414.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP08
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	3 / 0	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	VD	M		ES		0.10	PID	<1 ppm
		From 0.43m: becoming pale grey, trace gravel						ES		0.50 0.60	PID	<1 ppm
	1	From 1.20m: becoming grey						ES		1.00 1.10	PID	<1 ppm
	1.40 / 2	FILL / organic SAND (SP-SM), with silt, with gravel: dark grey-brown; fine to medium; trace fragments of brick and concrete.		FILL	ND		AF/FA ASB 8	D ES MAT		1.50 1.60	PID	<1 ppm
		1.55m-2.00m: with fragments of brick, concrete and PVC										
	1.80 / 2	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium.		FILL				D ES		2.00 2.10	PID	<1 ppm
		2.20m: trace metal sheet, PVC										
	1	2.40m: trace rubber pipe, metal bar						ES		2.50 2.60	PID	<1 ppm
		Test Pit discontinued at 2.70m depth. (Test Pit terminated due to slow digging).										

PSP/150: 5, 10, 15, Refusal 20





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NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397768.9, N:6466392.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP09
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
	0.45	FILL / Clayey SAND (SC): orange-brown; fine to medium; low to medium plasticity clay.		FILL				D ES		0.50 0.60	PID	<1ppm
	0.95 0.98	FILL / ASPHALTIC CONCRETE: black, 7 mm sized nominal aggregate.						ES		1.00 1.10	PID	<1ppm
	1	FILL / Silty SAND (SM): brown; fine to medium. From 1.15m: becoming grey-brown From 1.20m: with fragments of brick, concrete slab of 0.4 m in thickness, geo-fabric, metal bar and terracotta pipe 1.40m: trace metal sheet		FILL	ND	M		ES		1.50 1.60	PID	<1ppm
09/11/23	2 0	1.90m-2.10m: trace pockets of Clayey SAND SC						ES		2.00 2.10	PID	<1ppm
						W						
		Test Pit discontinued at 2.30m depth. (Collapsing conditions).										

PSP/150: 5, 10, 15; <1ppm; REFUSAL 25 25





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Generated with CORE-GS by Geroc - Soil Log with Photo

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397829.1, N:6466375.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP10
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: bands of grey, orange-brown and pale grey; fine to medium.		FILL	MD to D		DUP 2	ES		0.10	PID	<1ppm
		0.70m: trace geo-fabric						ES		0.50	PID	<1ppm
	0.80	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL						0.60		
	1							ES		1.00	PID	<1ppm
	1.20	FILL / SAND (SP), trace rootlets, trace silt: grey -brown; fine to medium.		FILL	ND					1.10		
		From 1.40m-1.80m: with fragments of brick and concrete						ES		1.50	PID	<1ppm
		From 1.80m: becoming dark grey, trace fragments of brick and concrete								1.60		
	2							ES		2.00	PID	<1ppm
		Test Pit discontinued at 2.15m depth. (Test Pit terminated due to slow digging).								2.10		
	0											

PSP/hr





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.1 AHD
COORDINATE: E:397881.2, N:6466387.1
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP11
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	3	FILL / SAND (SP-SM), with silt: grey and orange-brown; fine to medium.			VD	D to M		ES		0.10	PSP/150	5 10 15 REFUSAL 25 25
		From 0.35m: becoming grey						ES		0.50 0.60		
	1						DUP 3	D ES		1.00 1.10		
	2			FILL	ND	M						
		From 1.60m: becoming dark grey, trace fragments of brick						D ES		1.60 1.70		
		From 1.70m-2.40m: with fragments of brick and concrete										
	2	1.80m: piece of concrete boulder (1 m x 0.5 m) observed						ES		2.00 2.10		
	1	2.10m: trace plastic bottle, glass bottle, concrete rubble										
		2.30m: trace fragments of wooden plank and timer						D		2.30		
		Test Pit discontinued at 2.40m depth. (Test Pit terminated due to slow digging).										





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Generated with CORE-GS by Geroc - Soil Log with Photo

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397785.4, N:6466366.6
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP12
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2		FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
			From 0.20m: becoming yellow-brown										
									ES		0.50	PID	<1ppm
											0.60		
		0.85	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL								
		0.90											
	1	1	FILL / SAND (SP), trace fragments of brick, scrap metal, timber and rubber cable, trace silt: dark grey-brown; fine to medium.						D		1.00	PID	<1ppm
								AF/FA, ASB 6, ASB 7	ES		1.10		
			1.30m-1.80m: with fragments of plastic waste, insulation material, terracotta pipes and concrete, trace PACM fragments		FILL	ND	M		ES		1.50	PID	<1ppm
											1.60		
			From 1.90m: becoming green-grey, trace pockets of CLAY CL-CI						B		2.00	PID	<1ppm
09/11/23	0	2					W		ES		2.10		
			Test Pit discontinued at 2.30m depth. (Collapsing conditions).										

PSP/HSP: 5 10 15 25





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.8 AHD
COORDINATE: E:397872.7, N:6466350.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP13
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
		FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; 10% non-plastic fines. From 0.15m: becoming orange		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		0.70m: trace geo-fabric						D		0.50	PID	<1ppm
	0.75							ES		0.60	PSP/150	5 10 15 25
	2	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL				ES		1.00	PID	<1ppm
	1	1.20m: trace geo-fabric								1.10		
	1.30	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium. 1.50m-2.40m: with fragments of bricks and concrete slab			ND	M		D		1.50	PID	<1ppm
								ES		1.60		
	1			FILL				ES		2.00	PID	<1ppm
	2									2.10		
09/11/23						W		ES		2.50	PID	<1ppm
										2.60		
	0	Test Pit discontinued at 2.70m depth. (Collapsing conditions).										





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397745.6, N:6466334.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP14
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2 / 0.25	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		FILL / Silty SAND (SM): brown and grey-brown; weakly to moderately cemented.									DCP9/150	5 10 15 29 30
		0.65m: trace fragments of brick and glass						D		0.50	PID	<1ppm
		0.72m-2.00m: with framgnes of brick, metal sheet and insulation material						ES		0.60		
	1	0.92m: trace fragments of plastic waste, glass and limestone boulders						ES		1.00	PID	<1ppm
				FILL	ND	M				1.10		
								ES		1.50	PID	<1ppm
										1.60		
	2	2.00m: becoming gren-grey, trace fragments of timber, brick and concrete blocks, with pockets of Clayey SAND SC						ES		2.00	PID	<1ppm
	0	From 2.20m: with fragments of brick and scrap metal								2.10		
								D		2.40		
		Test Pit discontinued at 2.50m depth. (Test Pit terminated due to slow digging).										





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397794.3, N:6466319.4
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP15
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: orange-brown; fine to medium.						ES		0.10	PID	<1ppm
		From 0.24m: becoming grey		FILL	VD	D to M					DCP9/150	
		From 0.42m: becoming pale grey						D		0.50	PID	<1ppm
								ES		0.60		
	0.75	FILL / Sandy GRAVEL (GP-GM), with silt: dark brown and grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND							22
	0.95 1	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						D		1.00	PID	<1ppm
								ES		1.10		
		1.20m: trace fragments of timber, terracotta pipe and scrap metal										
		1.50m: trace redundant cable				M		ES		1.50	PID	<1ppm
										1.60		
		From 1.80m: becoming orange-brown		FILL	ND							
	2	2.00m: trace PACM pipe					AF/FA, ASB 5	ES		2.00	PID	<1ppm
		2.10m: trace fragments of timer								2.10		
▼ 08/11/23	0	From 2.40m: becoming dark grey				W		ES		2.50		
										2.60		
		Test Pit discontinued at 2.70m depth. (Test Pit flooded with water seepage).										





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.4 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397837.5, N:6466321.2
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP16
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	TESTING AND REMARKS: RESULTS AND REMARKS
	2	0.34	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.		FILL				ES		0.10	PID	<1ppm
			FILL / Sandy (GP-GM), with silt: grey; fine to medium sand.		FILL	ND	D to M		ES		0.50 0.60	PID	<1ppm
		0.84	0.80m: trace fragments of plastic waste										
	1		FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						ES		1.00 1.10	PID	<1ppm
			1.50m: trace fragments of plastic waste		FILL	MD to D	M		D ES		1.50 1.60	PID	<1ppm
	0	2	2.00m: trace metal plate (0.5 m x 0.5 m) 2.10m: with limestone boulders			ND			ES		2.00 2.10	PID	<1ppm
08/11/23							W		D ES		2.50 2.60	PID	<1ppm
			Test Pit discontinued at 2.60m depth. (Collapsing conditions).										

DCP9/150: 5, 10, 15





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397775.7, N:6466289.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP17
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.15	FILL / SAND (SP-SM), with silt, trace rootlets: orange - grey; fine to medium.		FILL				ES		0.10	PID	<1ppm
		FILL / Sandy GRAVEL (GP-GM), with fragments of concrete, with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	L to VD	D to M					DCP9/150	5 10 15 25
	0.90	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.		FILL	ND	M		ES		0.50 0.60	PID	<1ppm
		1.10m: trace fragments of plastic waste						ES		1.00 1.10	PID	<1ppm
		1.60m: trace metal sheets		FILL			ASB 3	ES		1.50 1.60	PID	<1ppm
08/11/23		1.90m: piece of concrete block observed				W	ASB 4	ES		2.00 2.10	PID	<1ppm
		Test Pit discontinued at 2.50m depth. (Collapsing conditions).										





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397816.0, N:6466272.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP18
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(*) / DENSITY.(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; weakly cemented.		FILL		D to M		ES	0.10	0.10	PID	<1ppm
	0.26	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND							
	0.45	FILL / SAND (SP), with fragments of brick and concrete, with clay: grey; fine to medium.					ASB 1	ES	0.50 0.60	0.50	PID	<1ppm
		0.50m-1.50m: with fragments of tile and brick, trace PACM fragments 0.75m: trace metal bar			MD to VD						DCP9/150	5 10 15
	1	1.00m: trace fragments of redundant cables, glass, geo-fabric and limestone blocks		FILL		M		D ES	1.00 1.10	1.00	PID	<1ppm
		From 1.20m: with limestone boulders			ND							
								ES	1.40 1.50	1.40	PID	<1ppm
	0	Test Pit discontinued at 1.50m depth. (Test Pit terminated due to slow digging).										
	2									2		





NOTES: (#) Soil origin is "probable" unless otherwise stated. (*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

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TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397856.8, N:6466280.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP19
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
		0.20	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL			DUP 1	ES		0.10	PID	<1ppm
			FILL / Sandy GRAVEL (GP-GM), with silt: orange-brown; medium to coarse; fine to medium sand; Gravel is crushed limestone.		FILL	ND	D		D		0.50	PID	<1ppm
									ES		0.60		
		0.70	FILL / SAND (SP-SM), with silt, trace gravel: grey-brown; fine to medium.										
			0.75m: trace concrete slab, fragments of brick and terracotta pipes										
			From 0.90m: with fragments of brick			MD			ES		1.00	PID	<1ppm
			From 1.20m: becoming grey, trace fragments of timber		FILL		M				1.10	PSP 150	5 10 15
09/11/23			From 1.60m: becoming grey-brown						ES		1.50	PID	<1ppm
											1.60		
		1.90	FILL / SAND (SP), trace roots, trace silt: dark grey; fine to medium.			ND			ES		2.00	PID	<1ppm
					FILL		W				2.10		
			2.40m: trace fragments of sea shells						D		2.50	PID	<1ppm
									ES		2.60		
			Test Pit discontinued at 2.60m depth. (Collapsing conditions).										





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397838.6, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP20
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.05	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	MD to VD	D to M		ES		0.10	PID	<1ppm
	0.34	FILL / Sandy GRAVEL (GP-GM), with silt: yellow-brown; medium to coarse; fine to medium sand.										
		FILL / SAND (SP-SM), with silt, trace gravel: grey and orange-brown; fine to medium. 0.50m: with fragments of brick and concrete						ES		0.50	PID	<1ppm
		0.80m: trace fragments of rubber waste and scrap metal								0.60		
	1			FILL				D		1.00	PID	<1ppm
								ES		1.10		
		From 1.20m: becoming dark grey, with fragments of brick				M						
		1.30m-2.10m: with hydrocarbon odour										
		1.50m: with pockets of Clayey SAND SC						D		1.50	PID	9.4ppm
								ES		1.60		
	1.80	FILL / Clayey SAND (SC): dark grey; fine to medium; low to medium plasticity clay.			ND							
08/11/23	0 2	From 2.10m: becoming green-grey		FILL		W		ES		2.00 2.10	PID	1.4ppm
								ES		2.50 2.60	PID	1.1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).										

PSP/hr





NOTES: [#] Soil origin is "probable" unless otherwise stated. [^] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

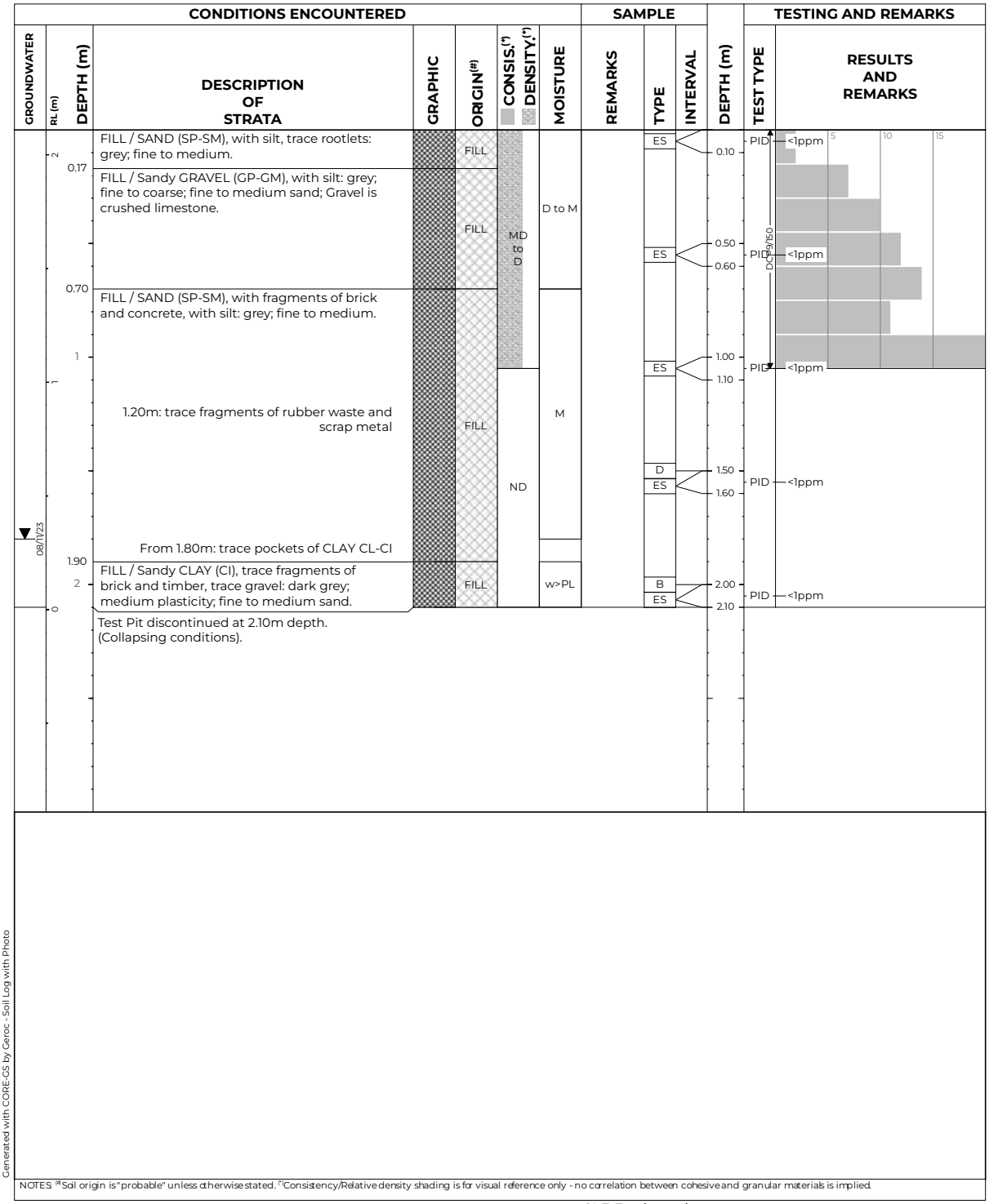
Douglas PARTNERS

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397896.5, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP21
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1



NOTES: (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV

METHOD:

REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log with Photo

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.3 AHD
COORDINATE: E:397941.6, N:6466244.9
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP22
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	MD	D to M		ES		0.10	PID	<1ppm
		From 0.22m: becoming orange										
		From 0.40m: becoming brown						ES		0.50	PID	<1ppm
		From 0.70m: becoming dark grey-brown								0.60		
	1					M		ES		1.00	PID	<1ppm
	1.40									1.10		
		SAND (SP-SM), with silt: pale yellow-brown; fine to medium.			ND			ES		1.50	PID	<1ppm
09/11/23		From 1.70m: becoming orange-grey		possibly ALV						1.60		
	2					W		B		2.00	PID	<1ppm
								ES		2.10		
	0	Test Pit discontinued at 2.20m depth. (Collapsing conditions).										

PSP/hr





NOTES: [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log with Photo

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397844.9, N:6466181.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP23
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS.(†) DENSITY.(†)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.05	ASPHALT: black, 7 mm sized nominal aggregate.		FILL		D						
	0.15	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand; BASECOURSE, gravel is crushed rock.		FILL	ND							
	0.30	FILL / Sandy GRAVEL (GP-GM), with silt: red-brown; medium to coarse, angular to sub-angular; fine to medium sand; SUB-BASE, gravel is granitic and lateritic.		FILL		M		ES		0.50 0.60	PID	<1ppm
	0.65	FILL / Silty SAND (SM), trace gravel: brown; fine to medium; with pockets of Clayey SAND SC. 0.90m: trace fragments of brick			MD to D							
	1	FILL / Clayey SAND (SC): orange-grey; fine to medium; low to medium plasticity clay.		FILL		M		D ES		1.00 1.10	PID	<1ppm
08/11/23	1.40	FILL / SAND (SP), trace silt: grey; fine to medium; trace pockets of Clayey SAND SC. 1.80m: trace fragments of brick		FILL				ES		1.50 1.60	PID	<1ppm
	1.90	FILL / Sandy CLAY (CI), trace gravel: dark grey; medium plasticity; fine to medium sand.		FILL	ND	W		D ES		2.00 2.10	PID	<1ppm
	2.20	FILL / SAND (SP-SM), with silt: dark grey; fine to medium.		FILL				D ES		2.50 2.60	PID	<1ppm
		Borehole discontinued at 2.60m depth. (Collapsing conditions).										





NOTES: (#)Soil origin is "probable" unless otherwise stated. (†)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
CASING: Nil

REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.7 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log with Photo

Appendix C

Geotechnical Laboratory Test Certificates

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ASTM D2974-14 (Test Method C)

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256-18262_1_ORG
Project:	Proposed Residential Development	*Sample No.*	WG23.18256-18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	Various See Below	*Date Tested:*	15/11/2023

TEST RESULTS - Organic Content

Sampling Method: Sampled by Client, Tested as Received

Testing Completed By: WGLS-LC

Furnace Temperature (°C): 440

Sample Number	Sample Identification	Ash Content (%)	Organic Content (%)
WG23.18256	TP13/1.5	98.4	1.6
WG23.18257	TP8/1.5 m	93.2	6.8
WG23.18258	TP19/2.5	98.5	1.5
WG23.18262	BH23/2.5 m	98.8	1.2

Comments:

Approved Signatory: Coneill

Name: Cody O'Neill

Date: 16/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

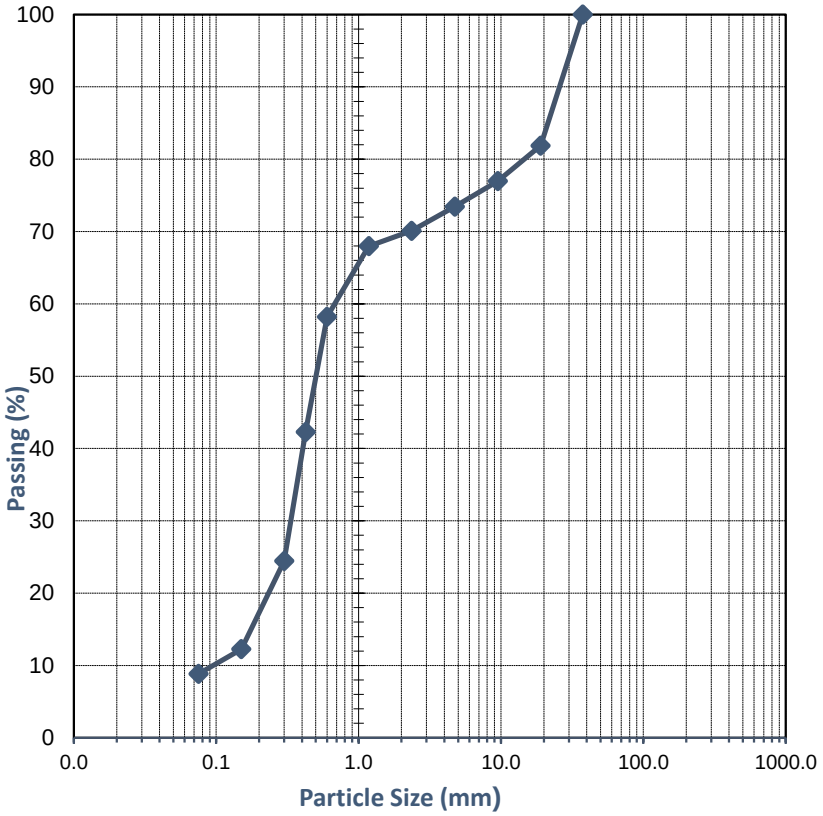
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18257_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18257
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP8/1.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	82
9.5	77
4.75	73
2.36	70
1.18	68
0.600	58
0.425	42
0.300	24
0.150	12
0.075	9



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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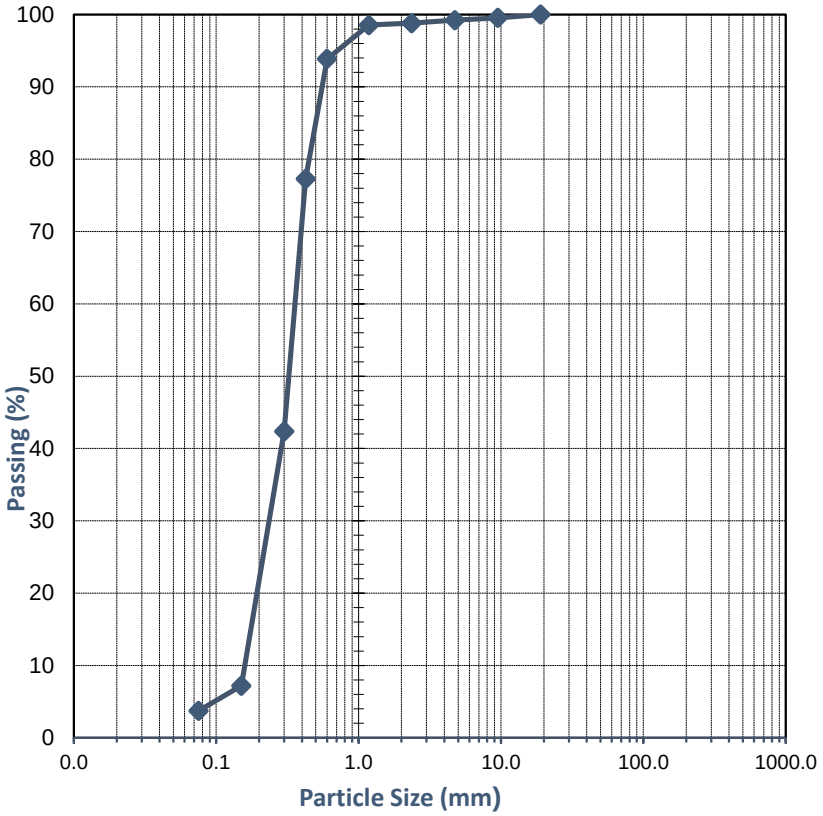
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18256
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP13/1.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	99
2.36	99
1.18	99
0.600	94
0.425	77
0.300	42
0.150	7
0.075	4



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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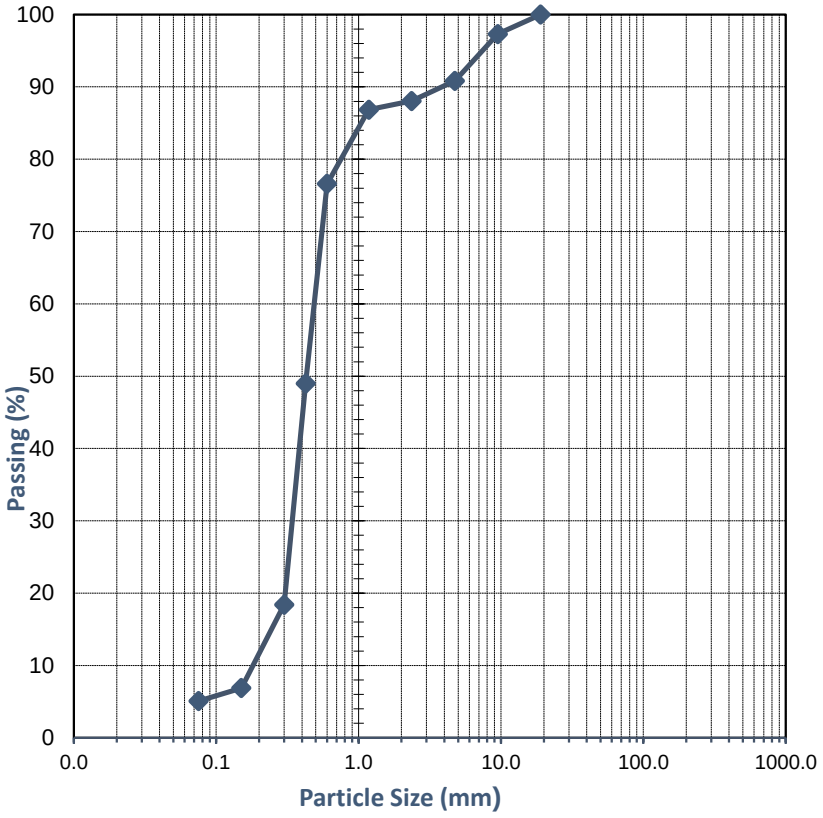
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18258_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18258
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP19/2.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	97
4.75	91
2.36	88
1.18	87
0.600	77
0.425	49
0.300	18
0.150	7
0.075	5



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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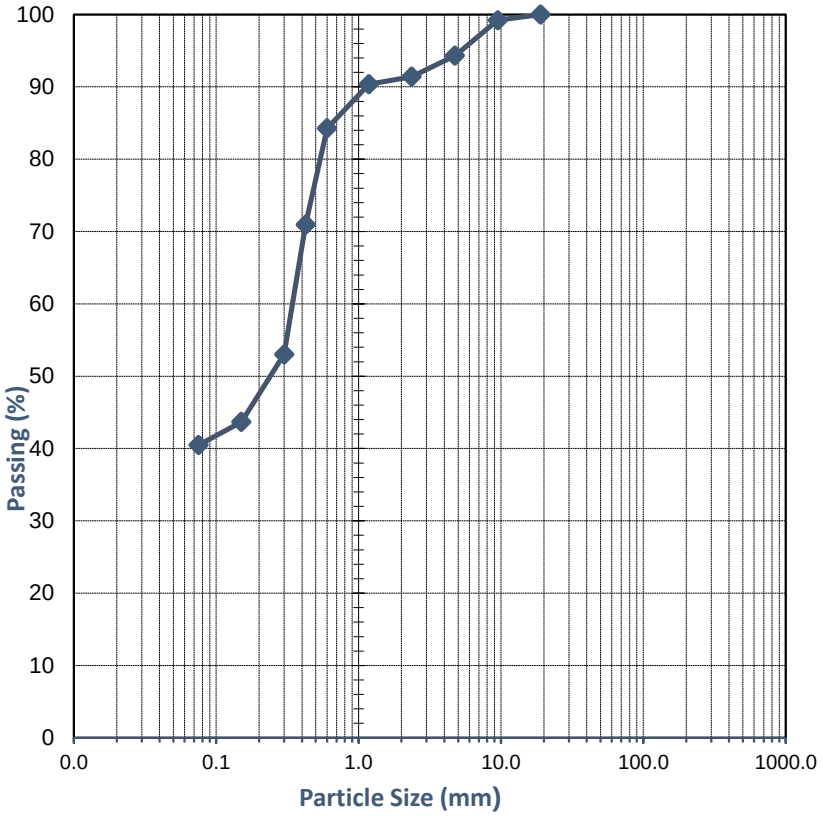
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	99
4.75	94
2.36	91
1.18	90
0.600	84
0.425	71
0.300	53
0.150	44
0.075	40



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**37**
AS 1289.3.2.1	**Plastic Limit (%)**	**24**
AS 1289.3.3.1	**Plasticity Index (%)**	**13**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**8.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet

Date: 20/November/2023

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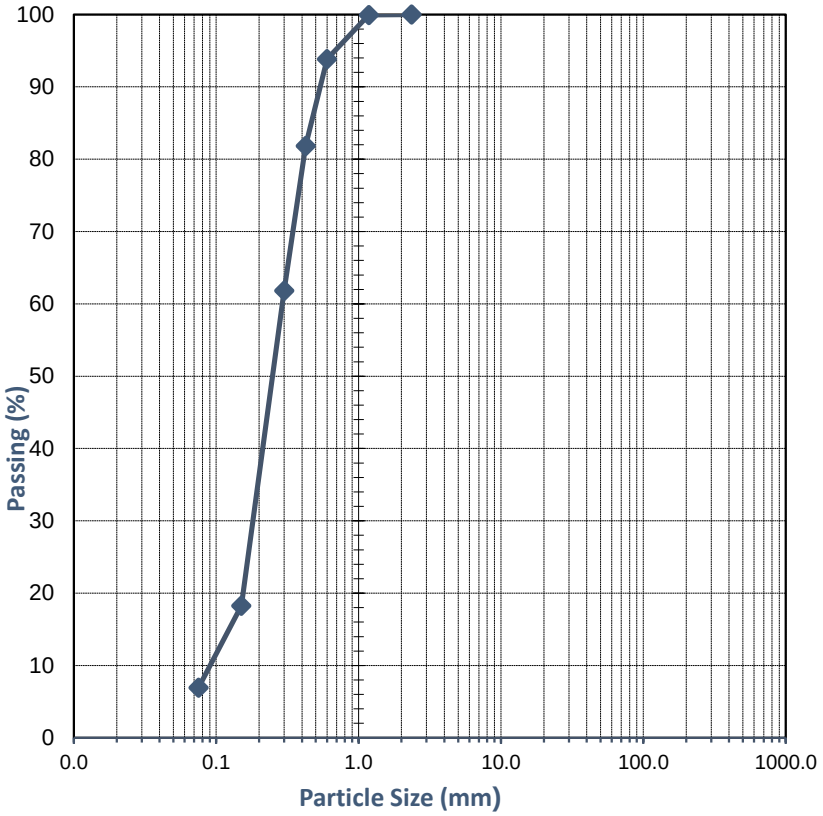
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/2023
Sample Identification:	TP22/2.0	*Date Tested:*	22/11 - 23/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	
2.36	100
1.18	100
0.600	94
0.425	82
0.300	62
0.150	18
0.075	7



Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 23/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP22/2.0	*Date Tested:*	23/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Matthew Lichon

Date: 24/November/2023

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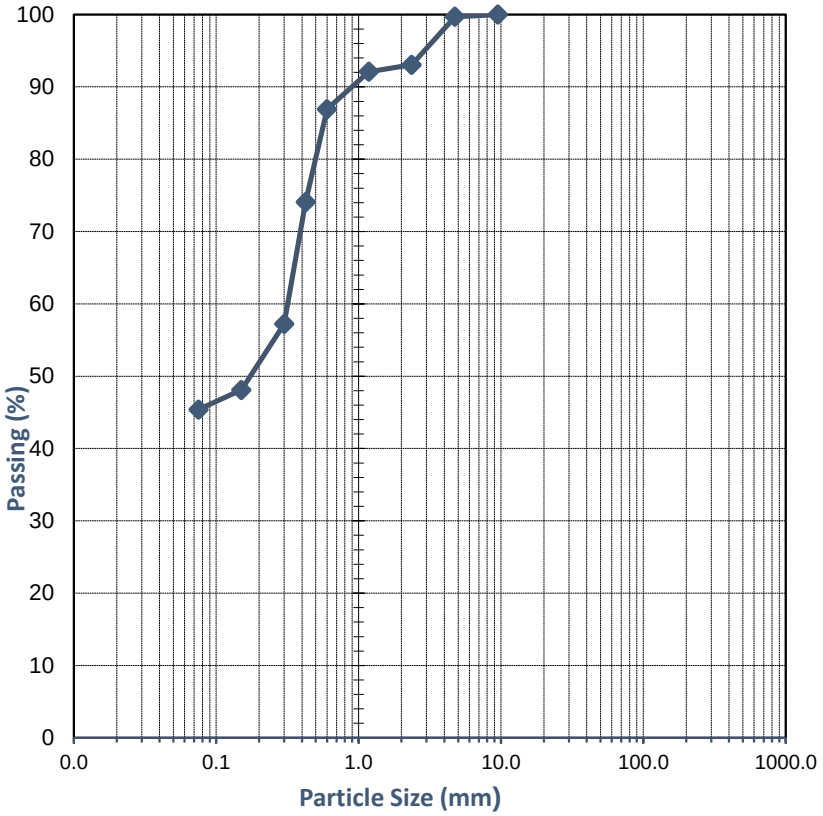
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	93
1.18	92
0.600	87
0.425	74
0.300	57
0.150	48
0.075	45



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**44**
AS 1289.3.2.1	**Plastic Limit (%)**	**22**
AS 1289.3.3.1	**Plasticity Index (%)**	**22**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**9.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet

Date: 20/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

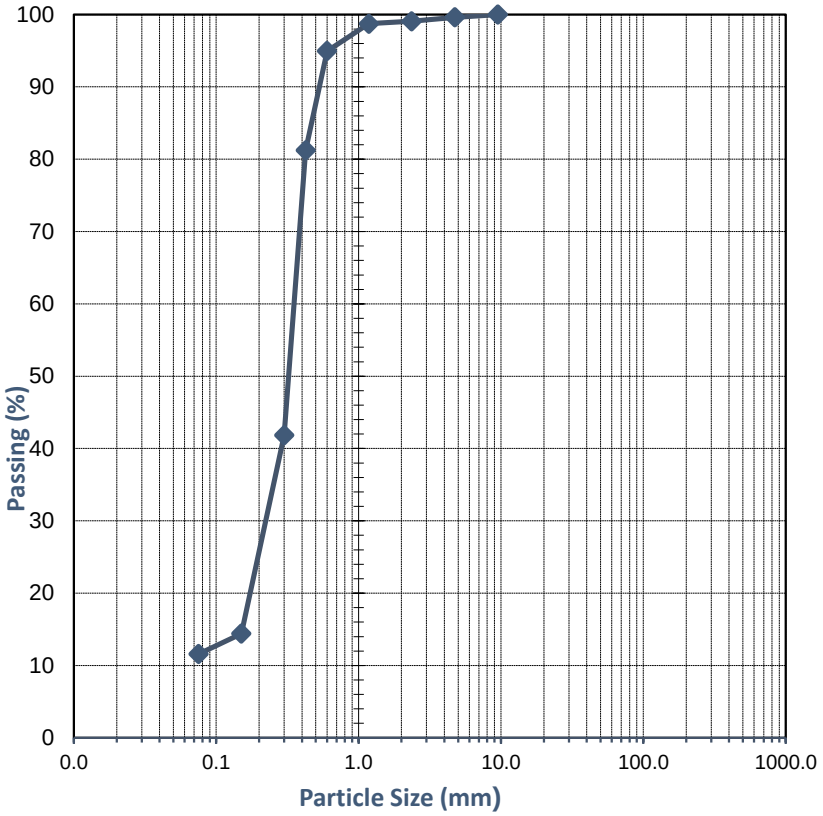
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18262_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	99
1.18	99
0.600	95
0.425	81
0.300	42
0.150	14
0.075	12



Comments:

Approved Signatory: Cody O'Neill

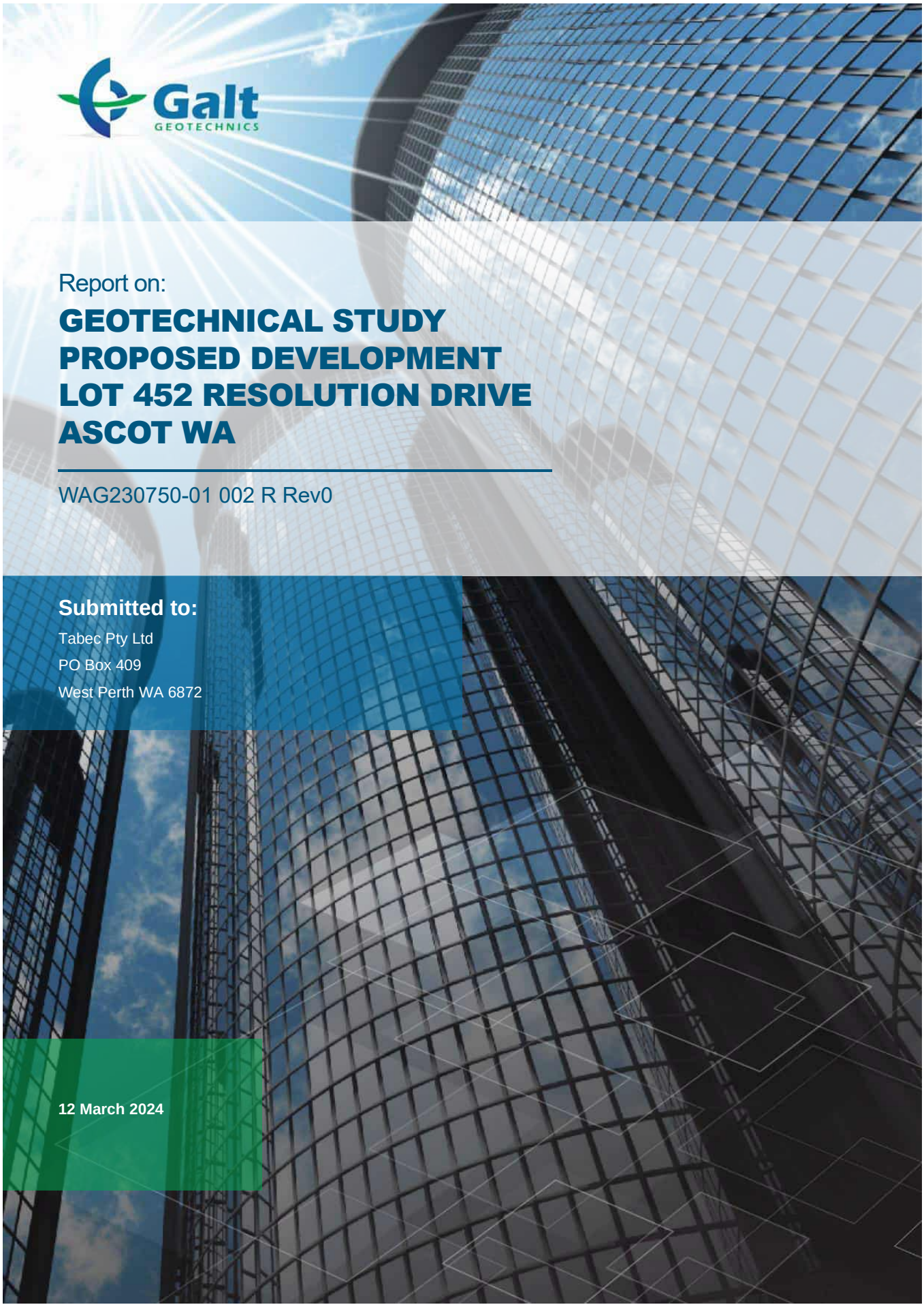
Name: Cody O'Neill

Date: 17/November/2023

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Galt GEOTECHNICS

Report on:

GEOTECHNICAL STUDY PROPOSED DEVELOPMENT LOT 452 RESOLUTION DRIVE ASCOT WA

WAG230750-01 002 R Rev0

Submitted to:

Tabec Pty Ltd
PO Box 409
West Perth WA 6872

12 March 2024

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Attached Table 2: Summary of Chemical Test Results and Exposure Classification 10

Figure 1: Site and Location Plan

Appendix A: Site Photographs
Appendix B: Cone Penetration Test Results
Appendix C: Machine Borehole and Monitoring Well Logs
Appendix D: Laboratory Test Results

Standard Geotechnical Definitions, Recommendations, Requirements and Limitations

1. INTRODUCTION

This report presents the outcomes of Galt Geotechnics' (Galt's) geotechnical study for the proposed development at Lot 452 Resolution Drive, Ascot ("the site").

This report is to be read in conjunction with the appended "Geotechnical Definitions, Recommendations, Requirements and Limitations". 'Clause GDR1', etc. refer to this Appendix, found at the back of this report.

2. KEY FINDINGS

Site Description

Table 1: Summary of Site

Item	Comment
Site Extent	Refer Figure 1.
Site Area	About 1.14 Ha.
Current Site Surface Levels[1]	About RL 3 m AHD.
Vegetation	Mature trees, shrubs and lawn in landscaped areas covering a large portion of the site.
Existing Infrastructure	Single Storey building (used by Perth Racing Security Services) with surrounding accessways, car parking and landscaped areas.
Site History[2]	**Prior to 1953**: two residences in northern portion of site. Remainder of site relatively clear. **1953 to 1985**: Relatively unchanged. Undeveloped portion of site used as laydown area, car park area, and to stockpile materials at different times. **1989**: Existing Perth Racing Security Services development (as described above) is present **1989 to Present**: Site relatively unchanged.

NOTES: ***1.*** *Site level based on correspondence with client.*

2. *Site history based on aerial imagery (Landgate).*

3. PROPOSED DEVELOPMENT

Table 2: Summary of Proposed Development

Item	Comment
Proposed Development	Unknown, assumed subdivision for commercial/residential purposes.
Proposed Finished Level	Assumed within about 1 m of current ground levels.
Cut/Fill	Assumed ± 1 m with up to 5 m excavation to connect development to existing sewer.
Assumed Foundation Type	Shallow Footings.
Assumed Retaining Walls	Gravity walls up to 1 m in height.
Assumed Stormwater Disposal	Off site into council network.
Assumed Sewage Disposal	Off site via reticulated sewer.

NOTES: ***1.*** *FFL – finished floor level*

2. *Proposed development details based on supplied information.*

4. PROJECT OBJECTIVES

The objectives of the study were to:

- Assess the geotechnical suitability of the site for the proposed development;

- Geotechnical opportunities and constraints relevant to the proposed development;
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks;
- Site preparation including possible reuse of existing soil as controlled fill;
- Excavation conditions;
- The likely site classification;
- Suitable foundation systems including preliminary design parameters;
- Preliminary design parameters for the design of retaining structures and batter slopes;
- Depth to groundwater at time of investigation; and
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

5. FIELDWORK

Fieldwork was carried out in the presence of a representative from Galt between the 8 and 14 February 2024 and comprised:

Table 3: Summary of Field Data

Type	Results Appendix	Summary	GDR Clause	Equipment Used	No. Tests	Depth Range (m)
Site Plan	Figure 1	-	-	Hand held GPS[1]	-	-
Photographs	A	-	-	-	-	-
Cone Penetration Tests (CPTs)	B	Section 8	GDR3.2	14-tonne truck	5	1.6 to 10.1
Machine Auger Boreholes (BH)	C	Section 8	GDR3.3	AMS Power Probe	4	0.7 to 6.5
Monitoring Well (MW)	C	Section 8	GDR3.3	AMS Power Probe	1	6.0

NOTES: ***1.*** *Hand held GPS is accurate to ±5 m.*

6. LABORATORY TESTING

Laboratory test certificates are presented in Appendix D, and summarised in Attached Tables 1 and 2.

7. SITE CONDITIONS

7.1. Geology

Table 4: Summary of Geology Mapping

Map Sheet	Map Scale	Mapped Soils	Typical Site Findings
Perth	50K	Guildford Formation, described as: *"SANDY SILT - strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin."*	**Thin topsoil** (landscaped areas) **and pavement materials** (car parks / access ways) **over FILL: SAND / SAND** to about 0.4 m to 0.9 m depth, **over Sandy CLAY / CLAY**.

7.2. Groundwater

Table 5: Summary of Groundwater Levels

Item	Date	Depth Range (m)	Elevation Range (m AHD)	Comment
Perth Groundwater Atlas	1997	-	3.0	Historical maximum
Department of Water and Environmental Regulation (DWER) Flood Mapping	-	-	2.7 to 2.9 (DWER mapped 1% AEP flood event level)	Portion of site along southern and south western site boundaries, and the northern side of Grandstand road are mapped as being part of flood fringe by DWER. **Advice on development within the defined flood event (DFE) floodplain is provided by DWER on a case by case basis. DWER recommends a minimum building floor level of 0.50 metres above this level (RL 3.4 m AHD).**
Site observations in MW01	February 2024	3.03	-	Based on highest recorded water levels in monitoring well.
Site observations in CPT test probes	February 2024	1.90 to 2.80	-	CPT probes may not have had sufficient time to recharge to hydrostatic levels.
Recommended Design	-	-	2.7 to 2.9	Groundwater likely to perch on clay soils at site. Proposed development must be designed for DWER DFE flood event.

NOTES: ***1.*** *Depths for site observations based on the site surface level at the time of investigation.*

8. GROUND MODEL

The encountered subsurface conditions are summarised as comprising:

- **Surficial Topsoil (in landscaped areas)** up to 0.3 m thick **and Hardstand Fill Layers** (in carparks and access ways); **overlying**
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Geotechnical design parameters for the generalised subsurface units described above are presented in Table 6.

Table 6: Geotechnical Model Units and Design Parameters

Unit Name	γ_{bulk} (kN/m^3)	ϕ' (°)	c' (kPa)	S_u (kPa)	E_v (MPa)	ν	k_0	Wall Friction=0		Wall Friction=0.5ϕ	
								k_a	k_p	k_a	k_p
Compacted Approved FILL	18	36	-	-	50	0.25	0.41	0.26	3.85	0.22	6.54
SAND / Silty SAND / Clayey SAND	18	35	-	-	25	0.3	0.43	0.27	3.69	0.24	6.08
Sandy CLAY / CLAY	18	21	0 to 5	150	30	0.45	Earth pressure coefficients can be calculated for undrained or drained conditions as outlined in GDR11.2.2 using Firm parameters (undrained) or Fines Content >35% & PI 40% (drained).				

NOTES:

1. *These units are a generalization of results from individual tests, which should be referred to for more information.*
2. *Conditions at CPT locations below depth of soil sample recovery are inferred (refer to clause GDR3.2)*
3. *Surficial topsoil and hardstand layers are not included as discrete units.*
4. *Compacted approved fill is as described in Table 7.*
5. *For all earth pressure coefficients (retaining wall design) refer to clause GDR11.2 for more detail and interpretation. Unit weights for retaining structure design should be as per GDR11.2 or 1 kN/m^3 greater than the values in the table above.*

γ_{bulk} – bulk unit weight
ϕ' – effective friction angle
S_u – undrained shear strength
c'– effective cohesion
E_v – vertical elastic modulus
ν – Poisson's Ratio
k_a – coefficient of active earth pressure (Coulomb – AS4678-2002, Appendix E)
k_p – coefficient of passive earth pressure (Coulomb – AS4678-2002, Appendix E)
k_0 – coefficient of at-rest earth pressure (Jaky)

9. GEOTECHNICAL ASSESSMENT

9.1. Summary

Table 7: Summary of Geotechnical Assessment

Type	Clause	Parameter	Comment
Site Suitability	-	-	We consider the site to be geotechnically suitable for the proposed subdivision development. Standard site preparation measures will apply. However, groundwater could impact construction if it occurs during winter. Flood levels will impact site levels (refer Table 5).
Construction Methodology and Suitability	-	-	Shallow footings in accordance with AS2870-2011 will be suitable for this site. Mass retaining will be suitable for retaining however, must be designed for potential flooding of the site. Stormwater disposal via infiltration is **not** suitable.
Site Classification (AS2870)	GDR5	S	Where **no less than 0.7 m of sand** (including insitu silty sand and clayey sand layers encountered in BH03 and BH04) is present **over in situ CLAY / Sandy CLAY.**
Site Subsoil Class (AS1170.4)	-	Ce	Base of superficial formation mapped to be about 25 m below ground.
Site Preparation	GDR6	-	**GDR6.2.1 Common Measures** followed by **GDR6.2.4 Clayey Sites** followed by **GDR6.2.5 Sand Topping Layer.**
Approved Fill	GDR8	-	**Approved Fill** for this site is to comprise **Permeable Sand**. Only relatively thin surficial layers of sand at the site (excluding topsoil) are suitable as approved fill. If additional fill is required, imported **Permeable Sand** will be needed. Although not classed as 'approved fill', where clay is encountered in trench excavations, this material could possibly be reused to backfill the same portion of the trench (excluding any special fill materials required around buried elements). However, this material will be difficult to work and moisture condition to near optimum (particularly if removed from below the groundwater table).
Compaction Control	GDR7	-	A PSP may be used for compaction control on **Permeable Sand.** Deemed to comply values for 'Tamala' sand in GDR7.4 are applicable. Where filling with clay is done (in trenches, etc), compaction control must be done with the NDG as outlined in GDR7.3 Nuclear Density Gauge.
Shallow Footings	GDR9	q_{all} = 100 kPa to 250 kPa	Design tables for shallow footings are presented in Section 9.2. Estimated settlements are not considered excessive. 70% of the settlement is expected to occur during construction.
Earth Pressure Coefficients	GDR11	Table 6	Earth pressure coefficients are presented in Table 6.
Unsaturated Hydraulic Conductivity	GDR13	-	On site disposal of stormwater unlikely to be suitable due to shallow depth to clay and potential for flooding adjacent the site. Off site disposal of stormwater likely to be required.
Pavement Subgrade CBR	GDR16	CBR = 10%	Subgrade to comprise compacted **Approved Fill no less than 0.6 m thick.**
Soil Aggressivity	GDR17	-	Refer Section 9.3
Batters	GDR12	**Temporary:** Sand: 1V:2H Clay: 1V:1H **Permanent:** 1V:3H	Batter angles apply to soil units (refer Table 6) above the water table, as per GDR12.3. Dewatering and possibly retention (i.e. shoring) required below the groundwater table.
Excavations	GDR12.1	20 Ton Excavator	Potential for obstructions (buried concrete, Soakwells etc…), cemented soils and surficial pavement layers must be considered when selecting earthmoving plant.

NOTES:
1. q_{all} – allowable bearing pressure (maximum for all footings, refer to footing tables for further details)

9.2. Shallow Footings

Table 8: Isolated Pad Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	120	< 5
0.5	1.0	130	< 5
1.0	1.0	240	5 - 10
1.0	2.0	250	10 - 15
1.0	3.0	250	20 - 25

NOTES:
1. d_e – minimum embedment depth (below finished ground level or floor slab)
2. b – Footing breadth (footings assumed approximately square)
3. q_{all} – allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.
4. s – estimated settlement (excludes shrink/swell from site class)
5. Refer to GDR9
6. Groundwater assumed to be at ground level.

Table 9: Isolated Strip Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	100	< 5
0.5	1.0	130	5 - 10
1.0	1.0	190	10 - 15
1.0	2.0	250	20 - 25

NOTES:
1. d_e – minimum embedment depth (below finished ground level or floor slab)
2. b – Footing breadth (footings assumed long relative to breadth)
3. q_{all} – allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.
4. s – estimated settlement (excludes shrink/swell from site class)
5. Refer to GDR9
6. Groundwater assumed to be at ground level.

9.3. Soil Aggressivity

Results of aggressivity testing on clay samples is summarised in Attached Table 2. The results indicate the clay is 'non aggressive' to concrete and steel (in accordance with AS2159-2009) with a AS3600-2009 classification of 'A1'.

Based on regional experience, we anticipate the sand will have the same aggressivity classifications as the underlying clay where above the groundwater. However, for concrete in sand below the water table, an AS2159-2009 'mild' classification, and AS3600-2009 'A2' classification is appropriate.

Groundwater was not tested.

10. CLOSURE

GALT GEOTECHNICS PTY LTD





Owen Woodland CPEng
Geotechnical Engineer

Tyrone Mardesic CPEng
Geotechnical Engineer

https://galtgeo.sharepoint.com/sites/wag230750/shared documents/01 tabec si/03 correspondence/wag230750-01 002 r rev0.docx

Attached Table 1: Summary of Geotechnical Index Test Results

Test Name	Sample Depth (m)	Soil Class (AS1726 2017)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PI (%)	LS (%)
BH03	1.5 - 2.2	CLAY (CI)	89	11	0	46	28	12.5
BH04	1.0 - 1.3	Sandy CLAY (CI)	54	43	3	34	20	8.5

Notes

1. Particle size distribution (by mass)

Gravel: 2.36 mm – 63 mm *Sand: 0.075 mm – 2.36 mm* *Fines: <0.075 mm*

2. Atterberg Limits

LL: Liquid limit *PI: Plasticity index* *LS: Linear shrinkage*

NO: Not obtainable *NP: Non-plastic*

Attached Table 2: Summary of Chemical Test Results and Exposure Classification

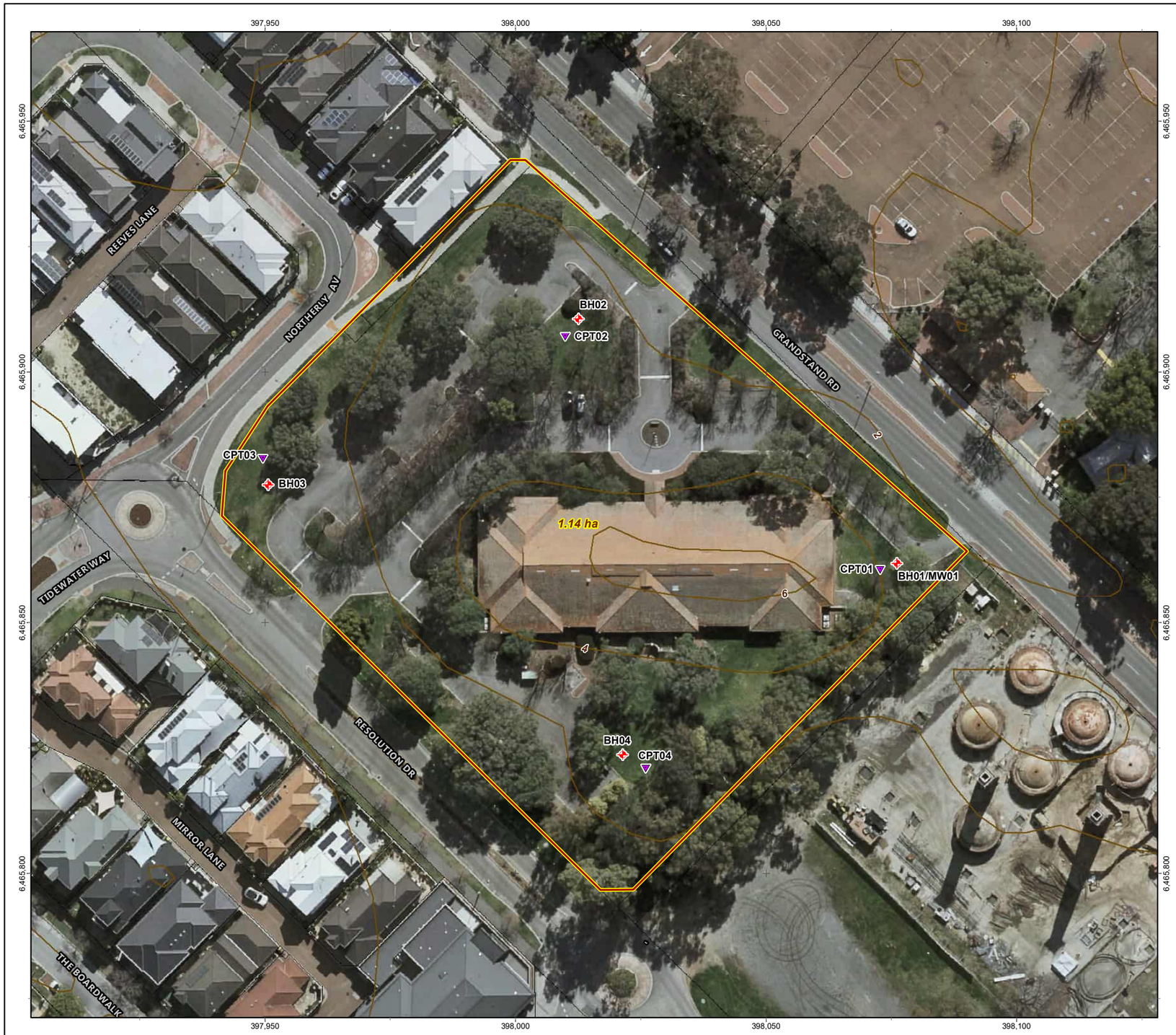
Location	Sample Depth (m)	Soil Description	Soil Condition	pH	SO_4 (ppm)	Cl (ppm)	AS2159 Steel EC	AS2159 Concrete EC	AS3600 Concrete EC
BH03	1.5 - 2.2	CLAY (CI)	B	8.8	100	210	Non-Aggressive	Non-Aggressive	A1
BH04	1.0 - 1.3	Sandy CLAY (CI)	B	7.5	170	94	Non-Aggressive	Non-Aggressive	A1

NOTES:

1. *Soil condition*
   A – high permeability soils (sands and gravels) which are below water table. *B – Low permeability soils (silts and clays) and all soils above water table*
2. *Sulfate expressed as SO_4*
3. *Cl – Chloride*
4. *ER – Electrical Resistivity*
5. *EC – Exposure Classification*
5. *Exposure Classification for AS2159-2009 (for steel and concrete piles)*
   [Exposure Classification for AS3600-2009 (for buried concrete structures)]

Non-aggressive [A1]	*Mild [A2]*	*Moderate [B1]*	*Severe [B2]*	*Very Severe [C2]*

Figures





Legend

- Site Boundary
- Borehole
- Cone Penetration Test

N

0 10 20 30 40 50
Meters

NOTES
Aerial Imagery and Cadastre sourced from Landgate/SLIP



SCALE	1:750	(A3)
DRAWN	CED	
DATE DRAWN	13/2/2024	
CHECKED	_	
DATE CHECKED	_	
PROJECTION	GDA 1994 MGA Zone 50	

Galt Geotechnics Pty Ltd
ACN : 138 490 865
Tel : +61 (0)8 6272-0200
Address : 50 Edward Street
Osborne Park WA 6017

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CLIENT	**TABEC CIVIL ENGINEERING CONSULTANTS**
PROJECT	PROPOSED DEVELOPMENT
LOCATION	LOT 452 RESOLUTION DRIVE ASCOT
TITLE	SITE & LOCATION PLAN
Job No	WAG230750-01
Fig No	FIGURE 1
Rev	**A**

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Appendices

Appendix A: Site Photographs

Photograph 1: Near CPT02 facing south



Photograph 2: Near CPT02 facing south west



Photograph 3: Site photo from near northern portion of site



Appendix C: Machine Borehole and Monitoring Well Logs

EXPLANATORY NOTES TO BE READ WITH BOREHOLE AND TEST PIT REPORTS

Galt GEOTECHNICS

METHOD OF DRILLING OR EXCAVATION

AC	Air Core	E	Excavator	PQ3	PQ3 Core Barrel
AD/T	Auger Drilling with TC-Bit	EH	Excavator with Hammer	PT	Push Tube
AD/V	Auger Drilling with V-Bit	HA	Hand Auger	R	Ripper
AT	Air Track	HE	Hand Excavation	RR	Rock Roller
B	Bulldozer Blade	HQ3	HQ3 Core Barrel	SON	Sonic Rig
BH	Backhoe Bucket	N	Natural Exposure	SPT	Driven SPT
CT	Cable Tool	NMLC	NMLC Core Barrel	WB	Washbore
DT	Diatube	PP	Push Probe	X	Existing Excavation

SUPPORT

T	Timbering

PENETRATION EFFORT (RELATIVE TO THE EQUIPMENT USED)

VE	Very Easy	E	Easy	F	Firm
H	Hard	VH	Very Hard		

WATER

►	Water Inflow	▼	Water Level
◄	Water Loss (complete)		
◁	Water Loss (partial)		

SAMPLING AND TESTING

B	Bulk Disturbed Sample	P	Piston Sample
BLK	Block Sample	PBT	Plate Bearing Test
C	Core Sample	U	Undisturbed Push-in Sample
CBR	CBR Mould Sample		U50: 50 mm diameter
D	Small Disturbed Sample	SPT	Standard Penetration Test
ES	Environmental Soil Sample		Example: 3, 4, 5 N=9
EW	Environmental Water Sample		3,4,5: Blows per 150 mm
G	Gas Sample		N=9: Blows per 300 mm after
HP	Hand Penetrometer		150 mm seating interval
LB	Large Bulk Disturbed Sample	VS	Vane Shear; P = Peak
M	Mazier Type Sample		R = Remoulded (kPa)
MC	Moisture Content Sample	W	Water Sample

ROCK CORE RECOVERY

TCR = Total Core Recovery (%) $= \frac{CRL}{TCL} \times 100$

RQD = Rock Quality Designation (%) $= \frac{ALC>100}{TCL} \times 100$

TCL	Length of Core Run
CRL	Length of Core Recovered
ALC>100	Total Length of Axial Lengths of Core Greater than 100 mm Long

METHOD OF SOIL DESCRIPTION
BOREHOLE AND TEST PIT REPORTS

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GRAPHIC LOG & SOIL CLASSIFICATION SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

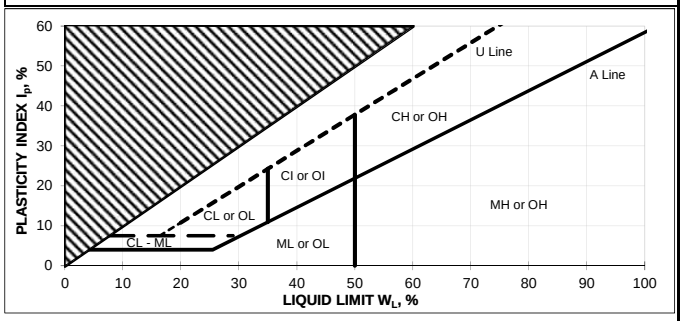
NOTE: Dual classification given for soils with a fines content between 5% and 12%.

SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).
NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name		**Particle Size (mm)**
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002

PLASTICITY - MODIFIED CASAGRANDE CHART - AS1726-2017



RESISTANCE TO EXCAVATION		
Symbol	**Term**	**Description**
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	**Term**
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	**Description**
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	**Term**	**Undrained Shear Strength (kPa)**
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	**Organic Content % of dry mass**
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	**Term**	**Density Index (%)**
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85

O:\Administration\Standard Forms and Documents\PMP17 Method of Soil Description-Rev6

Galt Form PMP17
December 2017

Galt

REPORT OF BOREHOLE: BH01/MW01

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

General comments: Monitoring Well Installed at this location

Drilling Method	Depth (m)	Water	Classification Code	Soil Origin	Graphic Log	Consistency/Density	Moisture	Material Description	Structural and Additional Observations	Well Diagram
90mm Solid Auger	0.3		SP	Natural			D	Natural SAND: dark brown and black, fine to coarse grained, with low plasticity clay, (trace organics present in upper 200mm).	(trace organics present in upper 200mm)	Backfill (Drill Spoil)
	0.45		SP	Natural		MD-D		Natural SAND: pale yellow, fine to coarse grained, trace low plasticity clay.		50mm PVC Solid; Bentonite (Sealed above Slotted PVC)
	0.9		SP	Natural				Natural SAND: dark brown and black, fine to coarse grained, trace low plasticity clay.		
	1		Cl	Natural		VSt-H		Natural Sandy CLAY: medium plasticity, brown and pale orange, fine grained sand, inorganic, clay is highly desiccated.	Clay is highly desiccated	
	2									
	2.3		SC	Natural				Natural Clayey SAND: low plasticity clay, brown and dark brown, fine to coarse grained, trace fine to medium sized gravel.		Filter Pack (Gravel Filter Medium installed)
	2.5		Cl	Natural		VSt-H		Natural CLAY: medium plasticity, brown and pale orange, trace fine to medium grained sand, inorganic, clay is desiccated at shallower depths.	Clay is desiccated at shallower depths	
	3	▼								
	4									50mm PVC Slotted
	5									
	6							**BH01/MW01 Terminated at 6m (Target Depth GW @3.03m)**		
	7									
	8									



Page 1 of 1

Galt

REPORT OF BOREHOLE: BH02

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger				Natura		SP	Natural SAND: dark grey and black, fine to coarse grained, trace low plasticity clay, (trace organics present in upper 200mm).	M-D	MD-D		
			1				**BH02 refusal at 0.7m (Refusal on Desiccated Clay Groundwater not encountered)**				
			2								
			3								
			4								
			5								
			6								
			7								
			8								

Page 1 of 1

Galt

REPORT OF BOREHOLE: BH03

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.1	Topsoil		SP	Topsoil SAND: dark grey, fine to medium grained, trace medium plasticity clay, with roots / organics.	D			
			0.25	Fill		SP	Fill SAND: brown, medium dense to dense, fine to medium grained, trace low plasticity clay.		MD-D		
			0.4	Fill		GP	Fill Sandy GRAVEL: grey, medium dense to dense, fine to medium sized, fine to medium grained sand, trace low to medium plasticity clay.				
				Natural		SM	Natural Silty SAND: grey brown, fine to medium grained.				
			0.7	Natural		Cl	Natural CLAY: medium plasticity, grey, with fine to medium grained sand, inorganic, trace organics, clay is desiccated at shallow depths.		VSt-H		
			1								
			1.5	Natural		Cl	As above, brown, trace organics.				
			2								
			3								
			4	Natural		Cl	As above.	M			
			5								
			6				**BH03 Terminated at 6m (Target depth. Groundwater not encountered)**				
			7								
			8								



Page 1 of 1

Galt

REPORT OF BOREHOLE: BH04

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.25	Topsoil		SP	Topsoil SAND: grey, fine to medium grained, trace medium plasticity clay, trace / with organics.	D			
			0.5	Fill		SP	Fill SAND: brown, fine to medium grained, trace low plasticity clay.				
			1	Natural		SC	Natural Clayey SAND: medium plasticity clay, brown, fine to medium grained.				
			1.2	Natural		Cl	Natural Sandy CLAY: medium plasticity, brown mottled red, fine to medium grained sand, trace fine to medium sized gravel, inorganic, clay is desiccated.		VSt-H		
			1.5	Natural		Cl	Natural CLAY: medium plasticity, brown, with fine to medium grained sand, inorganic, clay is desiccated at shallow depths.				
			3	Natural		Cl	As above.	M			
			4.5	Natural		Cl	As above.	W			
			6				**BH04 Terminated at 6.5m (Target depth. Groundwater possibly at 4.5 m depth)**				

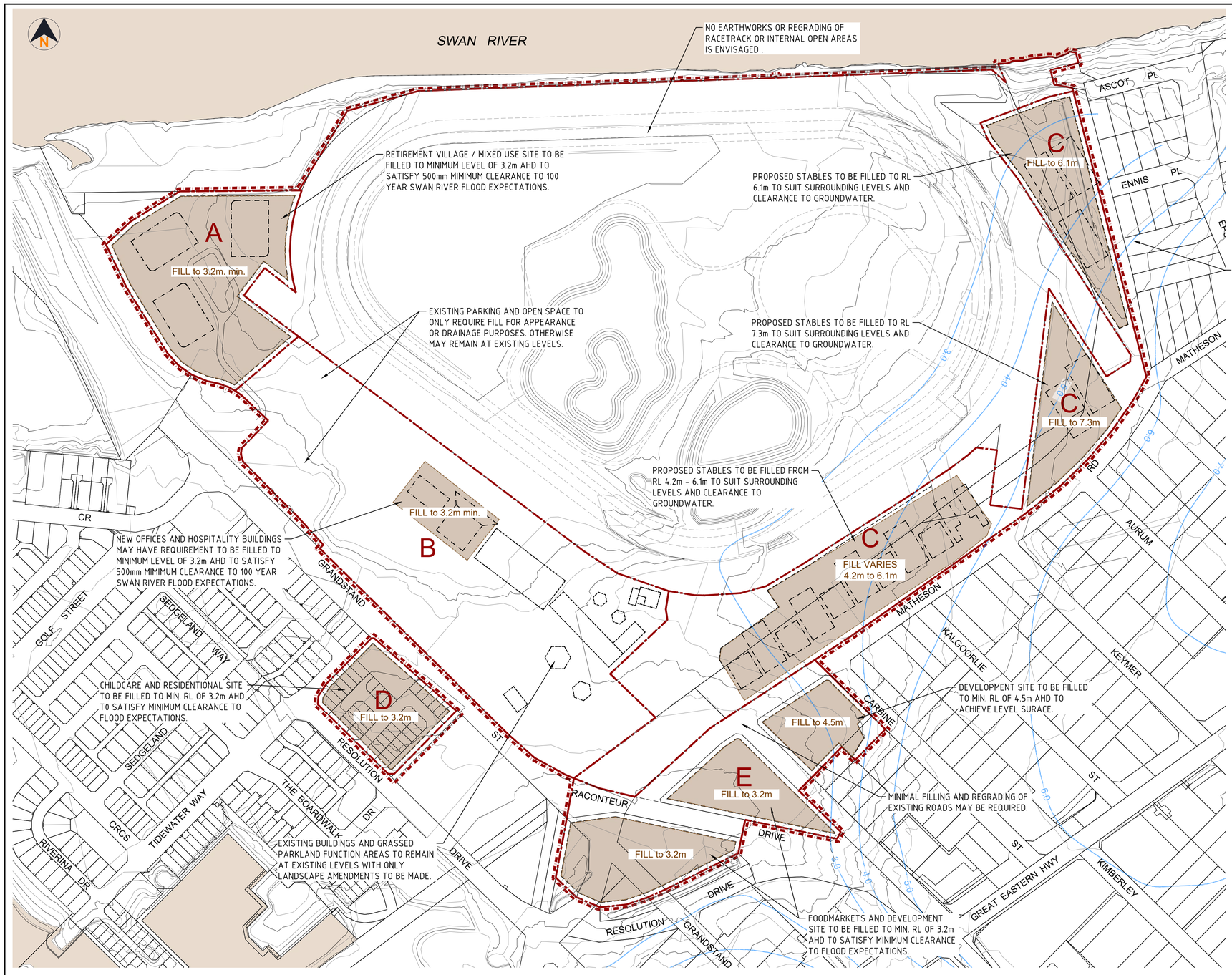


Page 1 of 1

Appendix C

Preliminary Civil Drawing

Tabec 2024



WAPC No.

SCALE 1:2000 0 40 80 120

A1

No.	DATE	DRAWN	APPROVED	AMENDMENT
C	21.06.24	PK	JZ	MINIMUM FILL LEVELS AMENDED IN LINE WITH THE LWMS
B	18.06.24	PK	JZ	PRELIMINARY ISSUE FOR INFORMATION ONLY
A	24.01.24	PK	JZ	PRELIMINARY ISSUE FOR REVIEW

FOR INFORMATION

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COLOUR
This drawing is required to be printed in full colour. Failure to do so may result in loss of information.

CLIENT: PERTH RACING

DESIGNED	CHECKED	APPROVED
PK	JZ	
DRAWN	CHECKED	DATE
PK	JZ	

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PROJECT: ASCOT RACECOURSE - LOCAL STRUCTURE PLAN

TITLE: EARTHWORKS CONCEPT PLAN

DRAWING NUMBER: 2541-00-100

ISSUE: C

Plotted By: jkeenan Plot Date: 21/06/24 - 14:47 Cad File: C:\JOBS\Admin\TB-JOBS\2541 - Ascot Racecourse LSP_JOY\CAD\CAD\2541-100\2541-100.dwg

Appendix D

Modelling Assumption Report



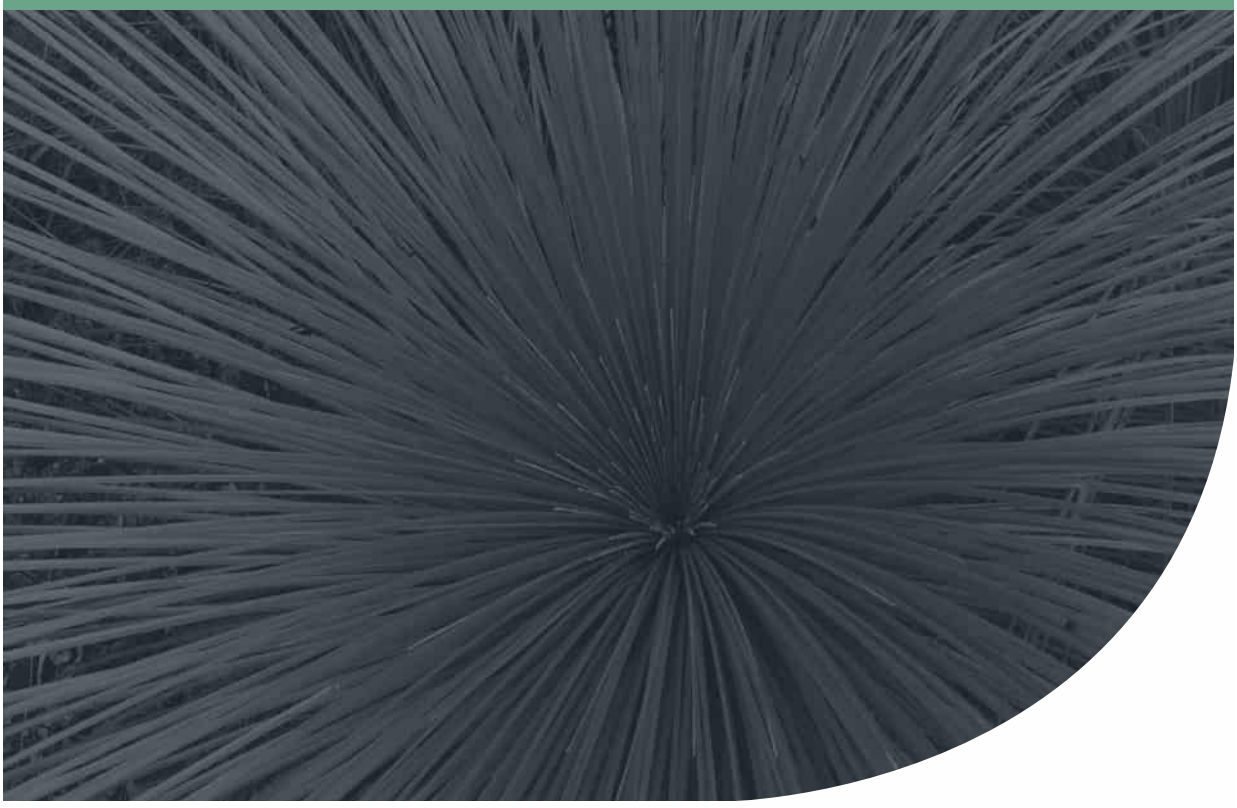
Emerge Associates 2024

Modelling Assumptions Report

Golden Gateway Local Structure Plan

Project No: EP23-109(03)

Prepared for Perth Racing
May 2024



Document Control

Doc name:	Modelling Assumptions Report Golden Gateway Local Structure Plan				
Doc no.:	EP23-109(03)--008 JM				
Version	Date	Author		Reviewer	
1	May 2024	Joyti Mabruk	JM	David Coremans	DPC
	Appendix to the LWMS				

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1 Background

Perth Racing (the 'proponent') proposed to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the Ascot Racecourse area. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse.

2 Methodology

XPSWMM hydrologic and hydraulic modelling software (v21.3) was used to calculate the surface water runoff volumes within the road reserves and lots associated with the development of Ascot Racecourse.

The hydrologic component of the software uses the Laurenson non-linear runoff-routing method to simulate runoff from design storm events. Key assumptions regarding the hydrologic model include:

- Runoff is proportional to slope, area, infiltration and percentage of imperviousness of a catchment.
- Sub-catchment areas and slopes are determined from surveyed topographical data and earthworks plans.
- Infiltration rates and percentage imperviousness have been selected based on experience with model preparation for similar soil conditions.

Runoff from each sub-catchment is routed through the catchment using the hydraulic component of XPSWMM. Generally, assumptions associated with the hydraulic component of the model include:

- Virtual links (i.e. purely for model construction, not equivalent to flow path onsite) between nodes within a sub-catchment are given the length of 10 m and slope of 0.05 to minimise the lag time of conveying the water from a sub-catchment node to a 'storage' node, a 'dummy intermediate' node or a conduit/link.
- Links between sub-catchment storages act as conveyance channels (e.g. sheet flow within roads in a 1% annual exceedance probability (AEP)). These links are given lengths and slopes that are representative of the site conditions and actual pathway lengths between catchments.
- All channels are designed with a width of 5 m, roughness of 0.014 (Manning's n) and are trapezoidal in shape. This allows for easy conveyance and represents concrete pipes and road surfaces within the model.
- Where relevant median swales, bio-retention areas (BRAs), and flood storage areas (FSAs) are modelled as nodal-reservoirs with infiltration depth-rating curves to account for differential infiltration rates with changing depth.

2.1 Rainfall

The ensemble temporal patterns obtained from the Australian Rainfall and Runoff (AR&R) Data Hub (AR&R 2019) were used for the rainfall analysis.

Durations ranging between 15 min and 72 hours were tested, with the peak flood elevation being assessed as the determining result.

Following the process suggested by AR&R (Ball J et al. 2019), the highest mean duration was selected as the critical duration. AR&R also recommends that when it is not practical to run the entire ensemble array, the ensemble that produces the result closest to the mean (for the critical duration) should be adopted and provided in **Table 1**.

Table 1: Critical Duration Analysis

Catchment	Critical Duration (20% AEP)	Critical Duration (10% AEP)	Critical Duration (1% AEP)
Precinct A	3 hour duration ensemble 4	3 hour duration ensemble 1	3 hour duration ensemble 1
Precinct C	30 min duration ensemble 6	30 min duration ensemble 7	30 min duration ensemble 8
Precinct D	1 hour duration ensemble 1	30 min duration ensemble 5	30 min duration ensemble 1
Precinct E	45 min duration ensemble 6	30 min duration ensemble 5	30 min duration ensemble 8

3 Pre-development model

The catchment parameters determined for Precinct D within the LWMS for the initial loss – continuous loss model have been adopted to account for catchment losses. The pre-development loss parameters used are given in **Table 2**.

Table 2: Pre-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Existing residential/Carpark	15	0.1	0.014

Catchment analysis for pre-development scenario was based on topographic contour data, site visit and aerial photography. Pre-development catchment area within Precinct D is 1.145 ha.

4 Post-development model

An initial loss continuing loss model was adopted to account for post-development catchment losses. The post-development catchment area, land types and loss values were based on the structure plan design, typical infiltration rates for the soils which occur onsite and based on project team experience. Post-development catchment areas and land types within the site were informed by sub-division plan provided by LPD surveyors. **Table 3** summarises the loss parameters used within the post-development model.

Table 3: Post-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Road Surface	1	0.1	0.02
Road Verge	9	1.5	0.05
Fully Impervious	1	0.1	0.02
Roof	1	0.1	0.02
Lot IMP	1	0.1	0.02
Gardens	25	2	0.05
POS	25	2	0.05
Precinct E Lots	15	0.1	0.014

A summary of post-development catchment information is provided in **Table 4** with the catchment plan and basin location shown in Figure 08 of the LWMS.

Table 4: Post-development catchment areas (ha)

Road reserve	Lots	Road Reserve	POS	Fully Impermeable	Child Care
Precinct A	0.714	0.606	1.360	0.330	-
Precinct C	-	5.903	-	-	-
Precinct D	0.526	0.421	-	-	0.199
Precinct E	3.622	0.365	0.219	-	-

The following assumptions were incorporated into the model:

- Precinct A
  - Lots will have 100% roof areas and road reserve contains 5% pervious verge and 95% impervious bitumen areas.
  - POS will be 100% pervious.
  - There is no current connection point for drainage to be exported from Precinct A.
  - 1 single basin/Flood storage area (FSA) for both treatment and flood mitigation.
  - Base of the FSA will need to be vegetated with reeds/rushes as per a biofilter.
  - FSA will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.

- A hydraulic conductivity of 1m/day is assumed.

- Precinct C
  - The existing portion of Precinct C already connected to the centre of the track (existing buildings and stables) and no change has been assumed.
  - Rest of the Precinct C were modelled as two separate catchments i.e., carpark and stables which are 95% impervious and 5% pervious.
  - 1m deep sub-surface storage has been designed to accommodate 1% AEP event.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.
  - The carpark in Precinct C that discharges to the southwest will discharge to Precinct E.

- Precinct D
  - Lots will have 50% roof areas, 45% paved areas and 5% pervious garden areas, the childcare has roof areas and Road reserve contains 20% pervious verge and 80% impervious bitumen areas.
  - 1m deep sub-surface storage has been designed to accommodate and detain upto 1% AEP events that will mimic pre-development flow of 0.4.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.

- Precinct E
  - The carpark in Precinct C discharges to Precinct E.
  - Outflow of pre-development Water Corporation (WC) drain is 0.95 m^3/s as per WC modelling.
  - All lots of Precinct E retain 15mm of rainfall.
  - Runoff above 15 mm rainfall up to the 1% AEP will be managed by a detention basin which will mimic pre-development 1% AEP peak flow of 0.463 m^3/s.
  - The basin will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.
  - A hydraulic conductivity of 1m/day is assumed.

5 References

5.1 General references

The references listed below have been considered as part of preparing this document.

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M and Testoni I (Editors) 2019, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geoscience Australia).

5.2 Online references

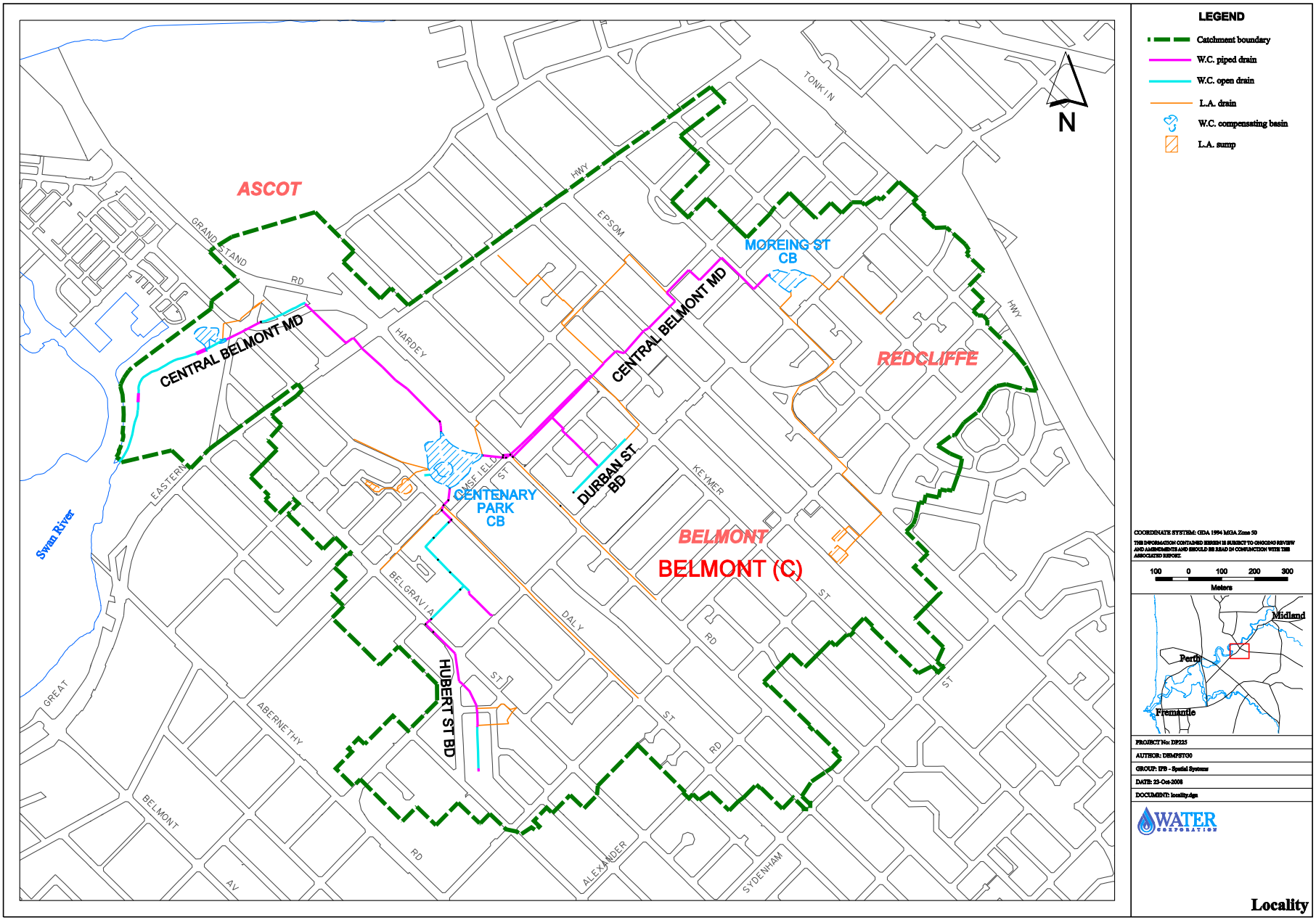
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Bureau of Meteorology (BoM) 2021a, Climate Data Online, viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

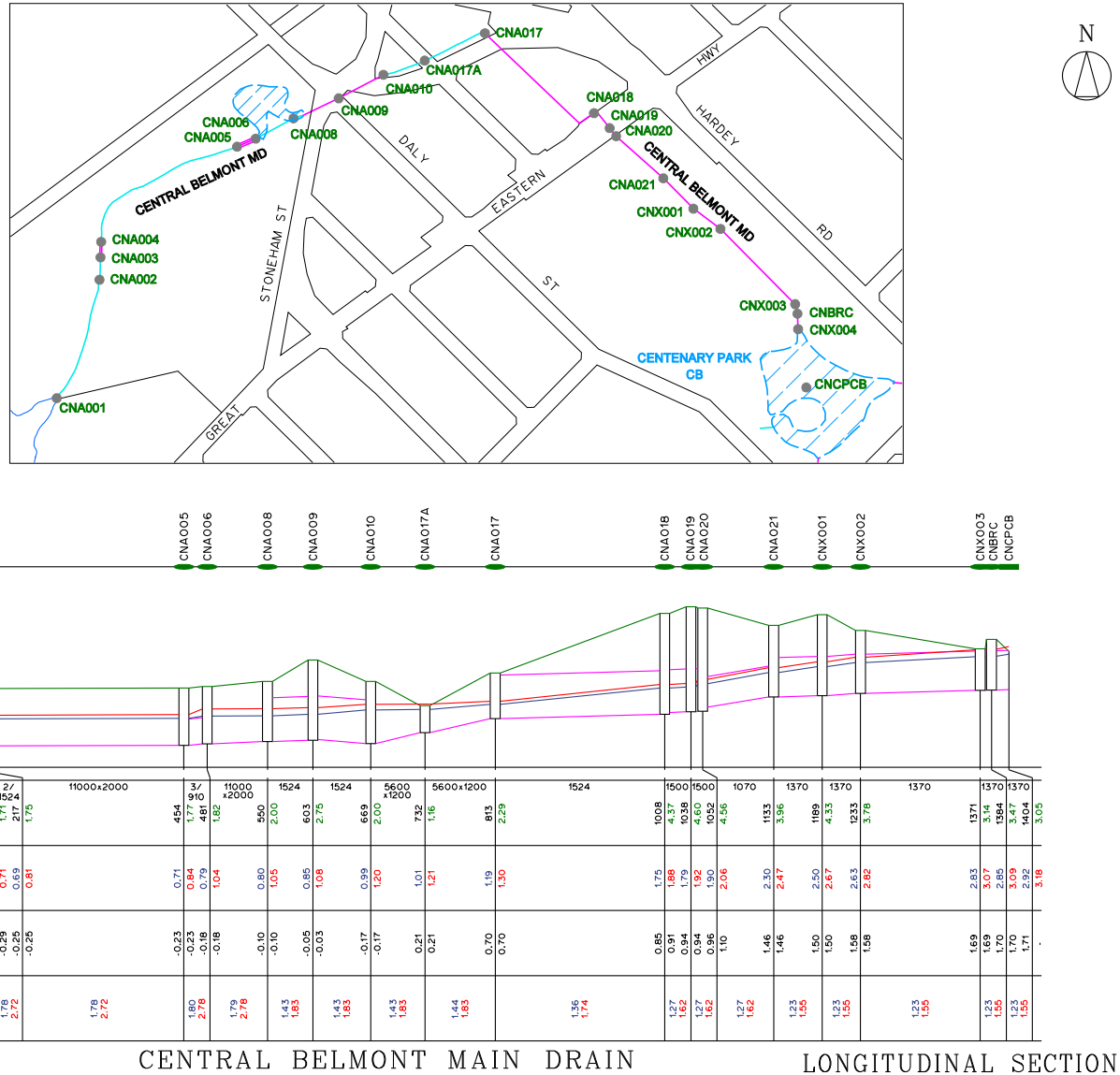
Bureau of Meteorology (BoM) 2021b, Design Rainfall Data System (2016), viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

Appendix E

Central Belmont Main Drain Water Corporation


ASCOT
REDCLIFFE
BELMONT
BELMONT (C)
CENTRAL BELMONT MD
CENTRAL BELMONT MD
MOREING ST CB
CENTENARY PARK CB
DURBAN ST BD
HUBERT ST BD
Swan River
GRAND STAND RD
HARDEY
EPSOM
TONKIN HWY
HWY
EASTERN
RIDGEFIELD ST
KEYMER ST
BELGRAVIA
DALY
ABERNETHY
GREAT
BELMONT AV
ALEXANDER RD
SYDENHAM RD
N
LEGEND
Catchment boundary
W.C. piped drain
W.C. open drain
L.A. drain
W.C. compensating basin
L.A. sump
COORDINATE SYSTEM: GDA 1994 MGA Zone 50
THE INFORMATION CONTAINED HEREIN IS SUBJECT TO CHANGES FOLLOWING REVIEW AND AMENDMENTS AND SHOULD BE READ IN CONJUNCTION WITH THE ASSOCIATED REPORT.
100 0 100 200 300
Meters
Midland
Perth
Fremantle
PROJECT No: DP225
AUTHOR: DEMPSTOO
GROUP: IPD - Spatial Systems
DATE: 23-Oct-2008
DOCUMENT: locality4gs
WATER CORPORATION
Locality
Figure 1.1

THE INFORMATION CONTAINED HEREIN IS SUBJECT TO ONGOING REVIEW AND AMENDMENTS AND SHOULD BE READ IN CONJUNCTION WITH THE ASSOCIATED REPORT.



CENTRAL BELMONT MAIN DRAIN LONGITUDINAL SECTION

Hgls and Flows Existing Scheme (1 of 2)

Figure C1.1

AUTHOR: DEMPSTER DESIGN FILE: Central Belmont MD.dgn

PROJECT N°: DP225 DATE: 05/01/2009 COORDINATE SYSTEM: MGA94 - Zone 50

ATTACHMENT 7

Engineering Servicing Report


TABEC
Civil Engineering Consultants
ASCOT RACECOURSE
Engineering Infrastructure Report
June 2024

CLIENT: **PERTH RACING C/O DAVISON ADVISORY**

PROJECT: **ASCOT RACECOURSE – LOT 9002 GRANDSTAND ROAD, ASCOT**

TITLE: **ENGINEERING INFRASTRUCTURE REPORT**

DOCUMENT REVIEW				
Revision	Date Issued	Written By	Reviewed By	Approved By
REV A	5/06/2024	J. ZIELINSKI	B. SMITH	B. SMITH
REV 0	4/07/2024	J. ZIELINSKI	B. SMITH	B. SMITH

Note:

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1 INTRODUCTION

This report has been prepared by TABEC Pty Ltd to provide broad servicing and infrastructure advice for the Ascot Racecourse and surrounding sites located at Lot 9002 Grandstand Road, Ascot.

The report provides civil engineering advice on the capability and future requirements of the development plan area to support the proposed residential and commercial land uses and the civil engineering influences on the development form. This report has been based on the civil engineering aspects, including earthworks, roads, drainage, wastewater and utility services required to support the development.

The investigation and preparation of the report are based on preliminary advice from the various service Authorities, desktop reviews and site investigations where appropriate. The report is supported by additional consultants and their inputs which are listed in the references. The information is current as of June 2024 and is subject to change as development proceeds around the subject land.

Figure 1 illustrates the location of the site, identified on the aerial image.



Figure 1 – Site Location and Aerial Image (2024 MNG Access)

2 THE STUDY AREA

The Ascot Racecourse is situated within the City of Belmont and is located in the proximity of Grandstand Road, Resolution Drive, Matheson Road, Ennis Place and the Swan River. The existing racecourse and its surrounding facilities are currently operational.

The subject site has been split into five precincts to assist with differentiating the various proposed uses across the lots. TABEC's understanding of these five precincts has been included below:



Figure 2 - Preliminary Structure Plan (Rowe Group Design)

Precinct A	• Retirement Living Village/Mixed Use – Apartments and a café (300m2) • 3 buildings, which will cater for a total of 330-390 dwellings.
Precinct B	• Racecourse Administration Office and Entertainment (No change to current zoning) • Office space – 680m2 NLA • Upper floor will be hospitality venue – 1000m2 in size
Precinct C	• Racecourse and on-course stabling facility (No change to current zoning) • Existing Racecourse to remain • 3 new on-course stabling complexes providing ~400 stables
Precinct D	• Childcare and residential (R60) • Childcare site – 2100m3 for 70-90 children. • Residential development will yield ~41 lots
Precinct E	• Approx 3,400m² retail floorspace • Approx 7000m² of non-retail commercial floorspace • Equine welfare centre

Whilst Precincts A, B and C are adjacent to the racecourse, Precinct D (Lot 452) and Precinct E are located outside of the racecourse lot 9002. Precinct D is surrounded by existing residential land use, and to the southeast, interfaces to the heritage-listed Ascot Kilns.

Precinct E is currently fragmented and consists of multiple lots and road reserve corridors. The Resolution Drive and Grandstand Rd road reserves within the subject site are not currently being utilised as public access streets, however, the existing reserve along the south boundary of the site and Lot 51 is a drainage reserve and is to remain, hence being excluded from the assembly development proposal.



Figure 3 - Precinct E Land Assembly (Rowe Group)

2.1 Landform / Topography

In reviewing the available Water Corporation contour information, the Ascot Racecourse Course (Lot 9002) has its lowest elevation of approximately 2mAHD at the northwest area of the site (Precinct A), which is adjacent to the Swan River and foreshore reserve. The Ascot Racecourse lot grades up to its highest elevation of approximately 7.5mAHD at the east corner of the site (Precinct C) adjacent to Matheson Road. The existing levels of Precinct C grade from this high point, down to approximately 3mAHD at the west interface near Raconteur Drive.

The existing internal surface levels of Precinct B within Lot 9002 range between 4mAHD at the south, to 2mAHD near Precinct A. Whilst no survey data is available for the adjacent road reserves, Precinct B is anticipated to be higher than the adjacent road levels at Grandstand Road, which then grades down to approximately 2mAHD towards to track.

The centre of the racetrack of Lot 9002 is generally lower than the surrounding racecourse site, with the levels and aerial imagery showing localized depressions with multiple lakes. Drawings from Evangelisti & Associates Engineering Drawings, dated 1997, show the depths of existing drainage Lake 1 (Wetland) and Lake 2 (Lined) being RL 1.0m and RL -0.75m respectively, with the top of lake water level ranging from RL 0.4m and 2.1m. The third existing lake does not serve a drainage purpose but serves as a source of irrigation water, with this overtopping into the drainage lakes at a top of water level of 3.1mAHD.

The Swan River Foreshore Reserve is located along the northern boundary of Lot 9002, and the levels steeply grade away from the track edge from approximately 3mAHD to 0mAHD at the northern boundary.

In reviewing contour information available from Water Corporation at Lot 452 Grandstand Road (Precinct D), the existing levels increase from 3.0mAHD to approximately 4.0mAHD closer to the centre of the lot at the existing building location, with the surrounding road reserve levels ranging between 2.5mAHD and 3mAHD. This site currently has existing mature trees and shrubs located across the Lot.

Fragmented areas of Precinct E have approximate levels grading from 4mAHD near the east at Raconteur Drive entry, down to approximately 2mAHD at the west. The site is generally flat with some trees and vegetation, however, there is an existing swale within the reserve south of the site along Resolution Drive with its swale base closer to 1.0mAHD. The perimeter of this swale is currently fenced onsite.

Contours of the site have been included below in Figure 4.

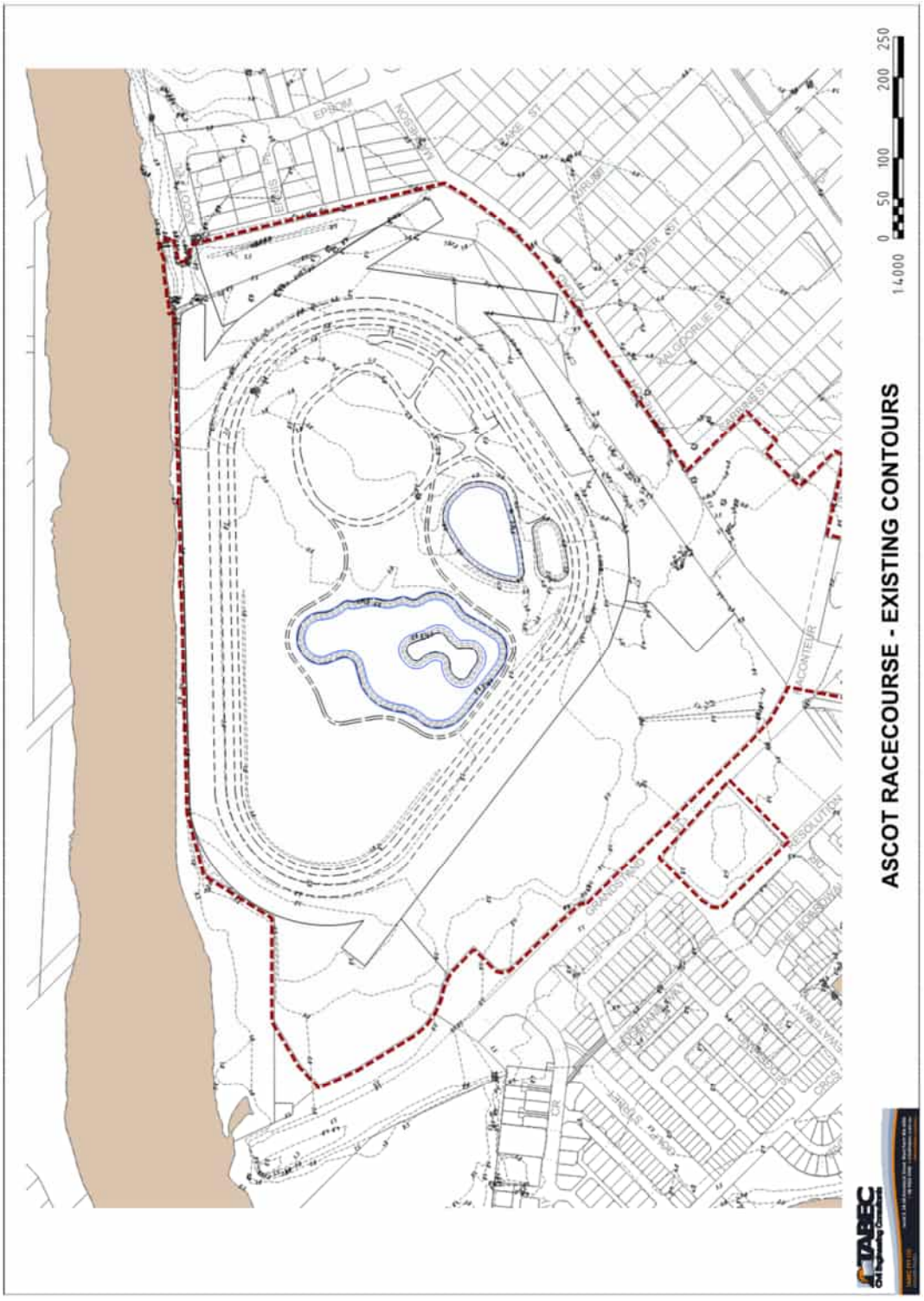


Figure 4 – Existing ground contours (TABEC 2024)

2.2 Ground Conditions and Ground Water

Geology mapping for the area has been identified as Pinjarra System, with poorly drained coastal plains and variable alluvial and aeolian soils.

Generally, the historical maximum groundwater contours are published by the Department of Water and Environment Regulation (DWER). The Golden Gateway Local Structure Plan Draft document (Essential Environmental 2018) shows maximum groundwater level (MGL) contours ranging from approximately 5mAHD located at the southeast area of the site, and generally fall to approximately 0.5mAHD along the Swan River and northwest of the site.

It is anticipated that there may be insufficient clearance above the published groundwater contours to development levels, and additional fill may be required to satisfy minimum groundwater clearance of 1.2m above MGL at Precinct A, Precinct D and Precinct E for residential and commercial purposes. This would be subject to further investigation on final development requirements and land uses.

Flood levels due to the Swan River have been previously investigated by DWER, with online floodplain mapping indicating flood levels in proximity to the Swan River at 2.8mAHD. All lots must have a minimum 500mm elevation above this Swan River flood level and a minimum of 300mm clearance above the 1% AEP top of water level of drainage basins.

Further geotechnical investigations have been undertaken across Precinct A, C and Precinct D to better understand the subsurface soil and groundwater conditions across the various sites, with this summarised below.

Precinct A

Douglas Partners carried out a site geotechnical investigation at Precinct A in January 2024 (Report reference 219164.03). From the field works, the subsurface conditions of this site were found to comprise uncontrolled fill, made up of sandy gravel material, loose sands, and clay, with the inclusion of foreign unsuitable materials such as brick, glass, scrap metals, concrete, rubber, pipes, and potential asbestos containing materials. In some locations, this uncontrolled fill extended below the groundwater level.

Natural materials found at the site underneath the uncontrolled fill, ranged from clayey sand, between depths of 4.2m to 14.9m, and sandy soils between 10.5m and 14.9m. Both materials ranged from very soft or loose, to dense and stiff.

Given the shallow ground conditions at Precinct A consisting of uncontrolled fill and deep loose and soft soils, the current site classification is Class P. Douglas Partners have therefore suggested shallow footings are not suitable and have anticipated a piled foundation system into deeper insitu soils would be necessary.

Groundwater levels at various locations within Precinct A have been measured over September, October and November 2023. From the assessment, the groundwater level ranged from -0.2m AHD (November) at the centre of the site, to 1.3m AHD (September) located at the site's southern boundary. The groundwater fluctuated inconsistently throughout the site, and these findings are not a clear representation of the maximum groundwater level.

Precinct B

Whilst no geotechnical investigation has been undertaken for Precinct B, the underlying material is anticipated to be consistent with those underlying ground conditions found at Precinct A and Precinct C. Based on adjacent geotechnical investigations at nearby Precincts, it could be anticipated that silty sand,

clay and clayey sands existing beneath surface level. Further geotechnical assessment will be required to ensure adequate treatment of ground conditions before further development within Precinct B, and to check conditions relating to uncontrolled fill, which is evident at Precinct A and Precinct C.

Precinct C

Douglas Partners carried out a site geotechnical assessment at Precinct C in December 2023 (Report reference 219164.02) for the proposed stables at Ascot Racecourse.

From the investigation, ground conditions differ depending on the test location within the site. Generally, uncontrolled fill was uncovered at most test locations with this depth ranging between 0.25m and 2.5m. Some test locations also observed unsuitable foreign materials such as plastic wrap, concrete and brick fragments. Sand and silty-sand can be uncovered below the uncontrolled fill to a depth of 2.5m, along with clayey sand and clay.

The uncontrolled material across Precinct C has led Douglas Partners to suggest piled foundations, with the site Classification currently Class P. Details of piled foundations can be found within the geotechnical report.

Notwithstanding, the site can be re-classified to Class S, provided that the site preparation is undertaken with the geotechnical recommendations. Areas of over-excavation to achieve Class S may uncover groundwater, and therefore dewatering may be required for earthworks and site preparation.

Groundwater levels at Precinct C have been measured onsite in September 2023, with the depth of groundwater fluctuating at each location. From the assessment, the groundwater level ranged considerably from 0.4m AHD (MW51) at the site near Aurum Street, to 5.6m AHD (BH39) located approximately 100m from the MW51 test pit, and therefore does not provide a clear and consistent overview of the groundwater throughout this area.

Precinct D

Galt Geotechnics carried out a site geotechnical assessment at Precinct D Lot 452 Resolution Drive, in March 2024 (REF WAG230750-01 002 R1) for the proposed residential and commercial development site.

The subsurface soil profile from the testing found sand fill to a depth of 0.4m to 0.9m depth, over sandy clay and clay material. At boreholes BH03, and BH04, layers of silty sand and clayey sand up to 0.7m thick extending to 1.2m depths were also found.

The site classification is considered Class S, where no less than 0.7m of sand and clayey sand layers are present over insitu clay and sandy clay.

Groundwater at the site in February 2024 was found to be approximately 1.9m to 3.03m depth below surface. Galt has suggested there is perched ground water between 2.7mAHD and 2.9mAHD. Whilst that the design level be 0.5m above DWER flood level events, which is a finished level of 3.4m AHD, adequate clearance would still need to be managed to groundwater.

Precinct E

No geotechnical investigation has been undertaken within Precinct E to confirm underlying soil conditions; however, it is anticipated ground conditions would be consistent with the natural material from the geotechnical investigations, and geological mapping.

2.3 Acid Sulfate Soils

The Ascot Racecourse and surrounding land are mapped as having a known high risk of encountering potential acid sulfate soils. As indicated in Figure 5, there is a reference to higher-risk areas in red within the site at depths within 3m of the surface. No acid sulfate soils were discovered during geotechnical testing at Precincts A, Precinct C, or Precinct D.

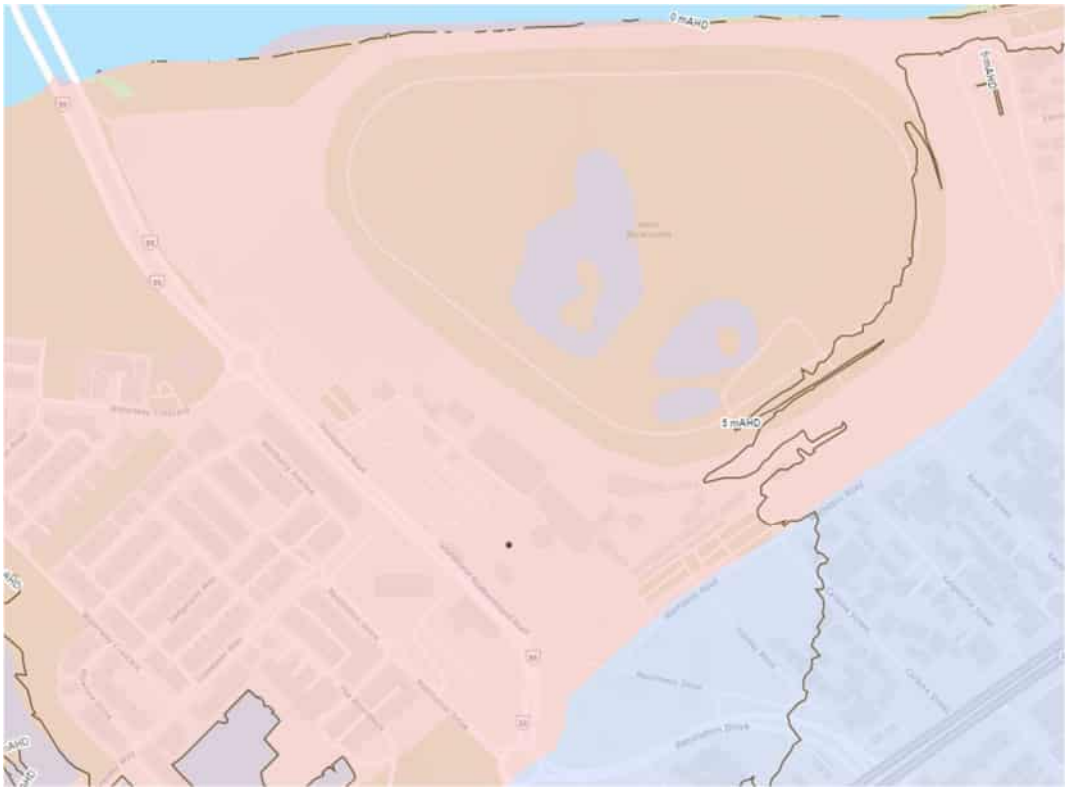


Figure 5 – MNG Access - Acid Sulfate Soils Risk Mapping (2024)

3 SITEWORKS

Siteworks for the development generally comprise the clearing of existing vegetation, stripping of topsoil and pavement, and the earth working of the existing ground surface to facilitate a required form of development.

The siteworks at Precinct A will be subject to the footing requirements due to the existing loose soils and uncontrolled fill beneath the surface. Due to groundwater conditions, remediation works may be difficult, therefore a pile foundation system has been suggested within the geotechnical report which may remove the requirement to remove underlaying uncontrolled fill. However, due to the settlement that may occur due to the soft and loose materials, it is anticipated that surcharging of the site may be necessary to reduce differential ground settlement, which could be carried out through temporary fill.

To achieve Class S at Precinct C, which will allow light-loaded structures to be constructed with shallow footings, site preparation will include 0.15m topsoil stripping and grubbing of existing vegetation, and over-excavation earthworks to achieve a minimum of 0.8m of sand separation above reactive clayey soils.

It is also important that there are no loose underlying soils to a depth not less than 1.5m below the foundation level to avoid settlement of the development.

3.1 Demolition and Remediation

Precinct A is free from structures and therefore demolition works are not anticipated to be required.

Depending on the final scope for Precinct B, Precinct C and Precinct E, demolition of existing car parking pavement and redundant asphalt roads within these areas may be required.

The demolition of the existing buildings, pavements and associated infrastructure within Precinct D will be required to enable the proposed residential and commercial development at this location. Whilst no asbestos was detected in any of the geotechnical samples at Precinct D, it should be noted that the adjacent northern road reserve, Northerly Ave, has been identified as remediated for restricted use, which may suggest potential asbestos-impacted fill below the surface.

4 EARTHWORKS

The preliminary earthwork pad levels have been reviewed by TABEC to demonstrate how the proposed development levels may be accommodated, given constraints due to groundwater, flooding and interface levels. Generally, earthworking of all proposed precincts will be required, whether this is in the form of remediation works due to subsurface soils or import fill to lift the development levels. Each precinct site will require site preparation, potential demolition, and stripping of existing pavements, vegetation and topsoil, after which the exposed ground will be proof compacted.

Due to existing groundwater hydrology and flood levels, which are discussed further in the LWMS prepared by Emerge (EP23-109, May 2024), the report recommends:

- Surface-based infiltration structures have a minimum 300mm clearance above the maximum groundwater level (MGL)
- Habitable floor levels should have a clearance to a maximum groundwater level (MGL) of at least 1.2m
- Finished floor levels must have a minimum 300mm clearance above the 1% AEP event, top of water level at storage basins.
- All lots to have a minimum of 500mm clearance above the 1% AEP flood level in the Swan River.

These drainage requirements and minimum flood elevation requirements will likely govern the finished floor-level requirements of the five Precincts. TABEC concept earthworks levels have been provided in Figure 6, with these levels to be refined during detailed design.

Precinct A

It is anticipated that the existing surface levels of Precinct A will be lifted to accommodate clearance to flooding, with the minimum finished levels at this location being approximately 3.2mAHD. With existing surface levels surrounding Precinct A being in the order of 2mAHD, the development will require further consideration on how the additional ~1-2m level difference may be accommodated and whether retaining walls are required, or if there is sufficient area to enable battering. Precinct A has a road reserve on the western boundary, and foreshore on the northern boundary, so any batter encroachment into these lots will require further discussion and approval with the relevant authorities.

Precinct B

As existing levels within Precinct B currently look to be conveying overland drainage towards the racecourse, any changes in levels are only anticipated to be those to lift new offices and hospitality levels. In Figure 6, TABEC has nominated the future building floor level at RL3.2 to satisfy flood levels.

Precinct C

Finished development levels at Precinct C will vary as it will be subject to tying into the existing road network at Raconteur Drive, Matheson Road, Ennis Place and the existing levels at the racecourse. Given the purposes of Precinct C, steep grades and level differences/retaining will likely need to be designed out to serve its purposes as on-course stabling and to facilitate horse movements.

It is anticipated that the future stable finish levels will be at approximately 4m AHD at the west and grade up to 6m AHD to the east in the proximity of Keymer Road, which is consistent with the grade of Matheson Road. These levels also tie in with the existing levels of the internal racecourse.

The private internal access road between the proposed stables and Matheson Road will be marginally lower than the stables floor levels by approximately 200mm, and grade consistently with the stable level steps.

The proposed stables to the east near Leake Street will need to be a minimum of 6.9m AHD, which will allow for internal sewer servicing of the site, and also provide clearance to groundwater levels. To tie in with the existing road reserve on Matheson Road, it is expected that these stables and the internal road will grade to approximately 7.4m AHD to the east.

The northeast development area of Precinct C adjacent to an existing reserve, will match in with existing interface levels. To satisfy sewer servicing and flood levels, it is anticipated that the level of this area of Precinct C will be approximately 6.1m AHD.

Precinct D

It is anticipated that additional sand fill will be required for Precinct D ensure sufficient separation for flood levels, and ground water levels. Precinct D will need to satisfy as a minimum habitable floor level of 3.2mAHD, however, the geotechnical investigation by GALT (February 2024) has identified perched ground water between 2.7mAHD and 2.9mAHD. Emerge Associates have recommended 1.2m clearance above maximum ground water level (MGL) to finish floor level which may increase the habitable floor level higher than the flooding requirements to approximately 4.0m AHD.

Further review of these finish levels will be required on further investigation of the maximum ground water, and drainage and subsoil drainage design which would ultimately determine the finish development levels.

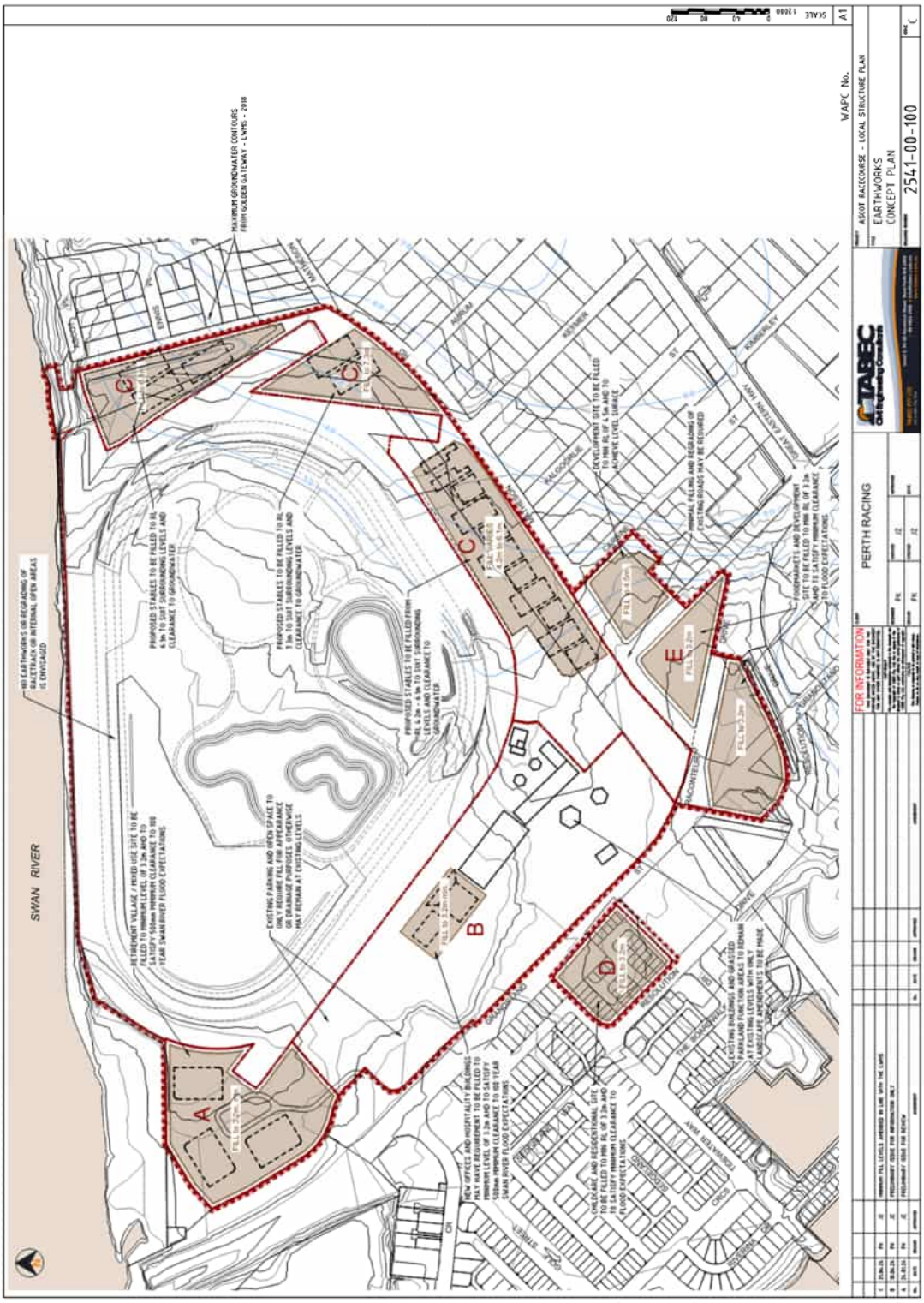


Figure 6 – TABEC Concept Earthwork levels for precincts (June 2024)

5 ROADS AND TRAFFIC

5.1 Existing Road Network

Surrounding Lot 9002 and Precincts A, B and C, are existing roads that are suitable to provide future access for these proposed developments. Lot 9002 is surrounded by Grandstand Road (Distributor A), Raconteur Drive (Access Road) and Matheson Road (Access Road). The Main Roads WA (MRWA) road database shown in Figure 7, indicates that Grandstand Road is operated and maintained by the MRWA with a speed limit of 60km/hr, with the other access roads being controlled by the City of Belmont. Whilst the east boundary of the site is located against a road reserve, no road currently exists with this being a sand/limestone track.

The existing roundabout at Grandstand Road and Waterway Cres currently provides access to Precincts A and B, and the existing car parks. There is also gated access from Grandstand Drive into Precinct B car parks at three other locations before reaching the Raconteur Drive intersection.

Matheson Road will remain as it currently is, and serve as the primary access for Precinct C, however, access to the northeast stables will be solely from Ennis Place as the only sealed road entry to this location.

Lot 100, located in Precinct E, currently has multiple private roads through this site. Raconteur Drive off Grandstand Road can provide vehicle access through to Resolution Drive, however this does have vehicle gates to restrict access at both boundaries. The intersection of Grandstand Road and Raconteur Drive is currently a left in, left out, however, does allow a right turn in from vehicles travelling north via a split in the median island. Two other existing roads within Lot 100 are fenced to reduce unauthorised access, with these being extensions of Matheson Road and Hardey Road.

Precinct D is located between Grandstand Road and Resolution Drive (Local Distributor), with access to the existing admin building being located at both Grandstand Road as a left in, left out, or via Resolution Drive. The existing median island on Grandstand Road restricts those vehicles travelling south from turning onto the car park.



Figure 7 – Main Roads WA GIS Road Hierarchy (MRWA 2024)

The land assembly at Precinct E as per Figure 3, will require further consideration for access to future commercial development. Resolution Drive has a raised centre median between the roundabout to Great Eastern Highway which currently restricts vehicle movements. This section of Resolution Drive is a Distributor A road and is controlled by Main Roads WA, with direct development access onto this road requiring MRWA approval.

6 STORMWATER DRAINAGE

Details of the stormwater and drainage strategy, flooding, and water treatments have been detailed within the LWMS prepared by Emerge Associates (EP23-109, 2024).

There are predominantly two significant drainage systems to convey stormwater within the LSP area to the Swan River. The first is the Central Belmont Main Drain which is managed by Water Corporation, and the second is the local drainage system located near Matheson Road, which conveys water from the surrounding road reserves into the lake system at the centre of the race course via a 900mm pipe.

The lakes system is interconnected, with flows discharging from this into the Swan River via a 450mm and 375mm concrete pipe at peak water level within the wetland lake of 0.53mAHD (Evangelisti & Associate 1997). The outlet is controlled to restrict tidal influence on the internal lake systems.

Whilst Grandstand Road has a pit and pipe network consisting of 450mm and 525mm concrete pipes, Precinct A does not currently have access to a stormwater connection, and as part of future development, it would be anticipated that drainage from this site would need to be treated and captured within Precinct A and the racecourse. Infiltration rates at Precinct A are low due to existing soils, however, with the increased level of the site and import fill to achieve flood level requirements, this may allow for some storage and bio-retention swale to infiltrate at source.

Precinct B currently captures and infiltrates water at source, with overland flow being graded towards the existing track. There was no evidence of Precinct B overflowing into the existing road reserve at Grandstand Road.

Consistent with the current drainage design onsite, the proposed stables and car park at Precinct C are anticipated to be a combination of infiltration at source where levels and soil conditions allow, and discharge to the lake system. The geotechnical assessment (Douglas Partners 2024) suggests this site is unsuitable for on-site stormwater disposal due to the shallow clay which may be impervious for drainage purposes. It could be expected that this clayey sub-surface will pond, and water will move laterally on this surface. Further investigation is required as part of the detailed design on the infiltration opportunities and discharge locations, and requirements for bio-retention swales to treat stormwater. The proposed car parks to the southwest of Precinct C are likely to flow towards the Water Corporation drainage system in Precinct E due to the low levels of the area being unable to convey stormwater to the lakes.

Precinct E, adjacent to Water Corporation's Belmont Main Drain, is anticipated to be treated via bio-retention swale before overflowing to a proposed detention basin storage for the 1% AEP event. Overflow from this basin will be into the Water Corporation's drainage system. (Emerge Associates 2024)

Whilst Precinct D has an existing 525mm and 300mm drainage pipe network along Resolution Drive, it is anticipated that there will be stormwater storage and infiltration at the site, with a 1% AEP event discharging into the local drainage network on Resolution Drive. Further investigation will be required during design to determine the final location for stormwater detention before entering Resolution Drive, as no POS has been identified for Precinct D.

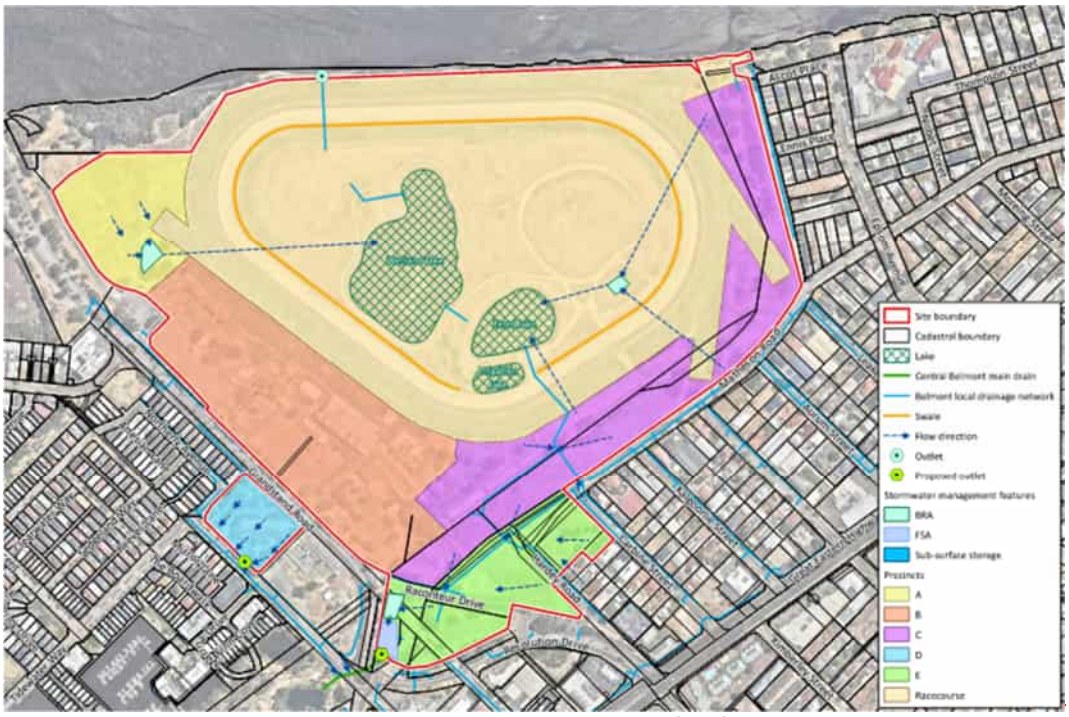


Figure 8 – Emerge Associates - Concept Drainage Catchments and Lake System (2024)

7 WASTEWATER

Water Corporation planning information was requested for the five precincts at Ascot Racecourse.

Precinct A

Precinct A is located off the existing Grandstand Service Road in proximity to the Waterway Cres roundabout. Whilst there is an existing sewer in proximity to Precinct A located at Waterway Cres, it is anticipated that this existing pipe network will not have sufficient cover below finish ground levels to extend from its current location, across Grandstand Road, and into the development. Therefore, alternative options have needed to be considered for wastewater servicing.

The first possible option would be to convey wastewater away from Precinct A and the future aged care site to the existing wastewater pump station to the east located on Ascot Place. This would require a private pump station within Precinct A, and approximately 950m of DN100 pressure main through the Ascot Racecourse lot adjacent to the Swan River and into a new gravity pipe system which would then discharge into the pump station. Given the pressure main would be crossing lot boundaries between Precinct A, and Ascot Racecourse, this would need to be reviewed further with Water Corporation to ensure the proposal is acceptable, and that the relevant easements/agreements are in place to protect these new sewer assets.

Alternatively, there is an opportunity to extend the 225mm sewer up Grandstand Road from the Marina Drive/Resolution Drive roundabout. This existing sewer is at RL-2.09m, and therefore should have sufficient depth to be extended and still service Precinct A if the development is earthworked higher closer to approximately 4m AHD. The connection to this wastewater catchment would trigger downstream upgrades due to capacity issues, with the existing 225mm sewer on Great Eastern Highway requiring an upgrade to a 300mm sewer as per Figure 10.



Figure 9 – Existing Gravity Wastewater Reticulation Services (Water Corporation)

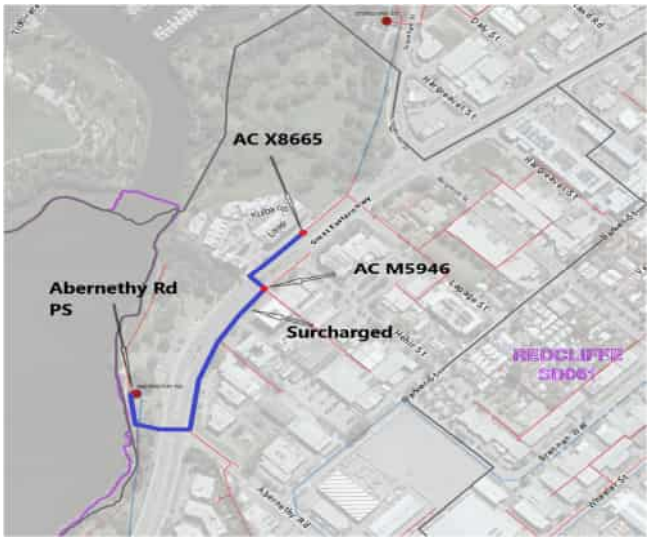


Figure 10 – Existing Gravity Wastewater Reticulation Services (Water Corporation)

Precinct B

In reviewing existing internal sewer plumbing for Lot 9002 (Ascot Racecourse), there is an existing sewer connection located at Raconteur Drive, at Access Chamber T3030. The sewer connection at this location currently services Precinct B, and a portion of the proposed Precinct C area. Whilst these two precincts are currently connected to the sewer at Raconteur Drive, Water Corporation has advised that there is no record of this connection, and the wastewater flows from this precinct have not been included in their planning assumptions. If wastewater flows from Precincts B and C are substantially increasing, further discussions are likely required to identify the increased flow of wastewater anticipated from the new developments.

According to the sewer flimsy as-cons acquired from Building and Energy Western Australia, the private sewer pipework from Precinct B to the existing Water Corporation main is located partially through Precinct E, Lots 13, and Lot 100 as per Figure 12. At the time of this report, all three lots are owned by the same entity. If the Precinct E land assembly proceeds and/or ownership of any of these lots is transferred, it may be necessary to divert the internal plumbing out of Lot 100 or Lot 13. In this instance, the Water Corporation sewer main may need to be extended to provide a sewer service connection that does not traverse other private lots.

Precinct C

Precinct C for the proposed on-course stabling facilities, will cover the outer edge of the Ascot Racecourse, from Raconteur Drive through to Ascot Place near the existing waste water pump station site. Due to this distance, multiple sewer connections will be required to adequately service the site as shown on Figure 11, with the service boundaries being subject to detailed design and finish levels.

Subject to Water Corporation's acceptance of private sewer crossing lot boundaries with the same ownership and final levels, the west portion of Precinct C (C1) between Kalgoorlie Street and Raconteur Drive will likely be conveyed to the west to the existing internal sewer. This is due to the existing levels of the site and Matheson Road, which generally grade lower as the site gets closer to Raconteur Drive.

There is an existing sewer connection available from Kalgoorlie Street with a connection invert level of 3.48m AHD, which is anticipated to service C2 with sufficient cover to finish levels.

New sewer lot connections will be required for both C3 and C4 areas within Precinct C, with the sewer invert levels into the site anticipated to be in the order of 3.30m AHD and 2.3m AHD respectively. The existing levels within C3 grade from approximately 6.5m to 7.2m AHD at the eastern boundary of C3. The C4 area has an existing surface level of approximately 5.6m AHD, which will likely require sand structural fill to approximately 6.1mAHD to be serviced with sewer.



Figure 11 – Existing Gravity Wastewater Reticulation Services (Water Corporation)

Precinct D

There is an existing sewer main located on the southern corner of Precinct D, located near the intersection of Marina Drive and Resolution Drive. Water Corporation has advised that a sewer connection to this existing 225mm PVC main is possible for the proposed residential development. The levels of this existing main are at an invert level -2.09mAHD and has sufficient depth to service the site.

The existing sewer junction to Lot 452 is anticipated to service the existing building within the lot, and will likely require removal as part of the development of Precinct D.

Precinct E

There is an existing 225mm PVC sewer south of Precinct E, located along Resolution Drive which ranges from approximately -0.02m AHD to 0.49m AHD at access chamber T3030 located at Raconteur Drive Link. The existing sewer main continuing northeast from this access chamber is located within Lot 100 which is private land. Whilst no easement currently exists over this portion of the Water Corporation pipe, it could be anticipated that this would be required as part of future amalgamation or development in the future.

The depth of this existing sewer should be sufficient to service the future development at Precinct E subject to the final lot layout allowing access to this existing main. As seen from Figure 12, Lots 51 and Lot 100 can be serviced from the existing main, however, the existing drainage reserve R45069 will require consideration when extending the sewer to service Lot 51.

The wastewater servicing of Lot 1 will require further investigation, but the Water Corporation sewer main could likely need to be extended to this site, possibly from Lot 52 at Resolution Drive.

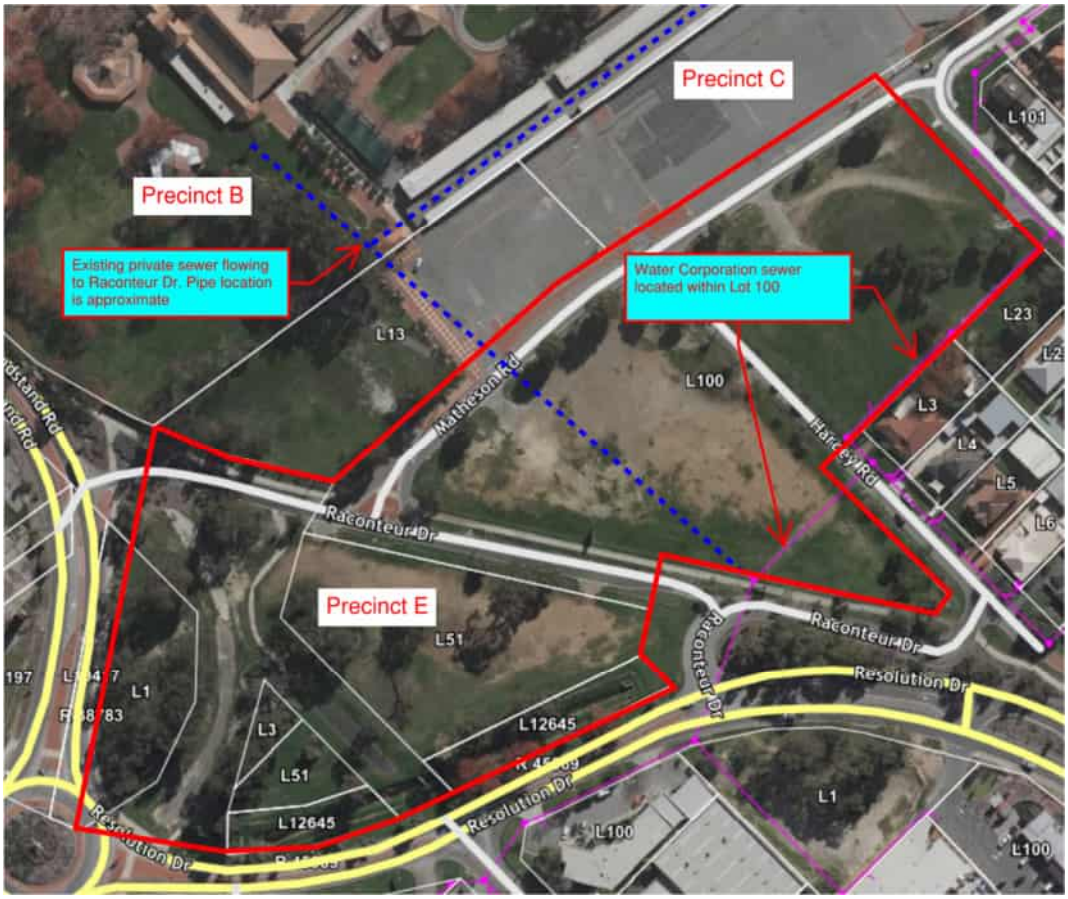


Figure 12 – Existing Gravity Wastewater Reticulation Services (Water Corporation)

Notwithstanding the advice outlined above, if the developer intends to upgrade or extend the sewer reticulation for any reason, they will be responsible for funding reticulation extensions to service the proposed lot with a gravity connection, which shall be designed and constructed to Water Corporation specifications. Standard Water Corporation infrastructure contributions will apply on a per-lot basis.

8 WATER SUPPLY

Advice was sought from Water Corporation regarding the established water reticulation system within the area and if service upgrades are required for the proposed development. Water Corporation has advised that the existing water reticulation in the area may be utilised to service the proposed Precincts depending on final water usage requirements, however, it should be noted that Precincts B and C are not currently included within the current Water Corporation planning assumptions.

Precinct A and Precinct B

Depending on the potable water capacity requirements for Precinct A, the existing 200dia water main located in the western verge of Waterway Cres and Grandstand roundabout should provide adequate supply to the proposed high-density developments. This 200mm water main would need to be extended to the development site from Grandstand Road to provide supply.

According to Water Corporation's database, Precinct B has an existing 100mm diameter water main feeding into the site with a 100mm meter and multiple existing 100mm fire services. The existing water main size along Grandstand Rd is 100mm PVC, therefore, if additional water is required and the supply needs to increase, an upgrade of this existing 100mm water main would be required which would require further investigation by Water Corporation.



Figure 13 - Existing Water Mains in proximity of Precincts

Precinct C and D

Precinct C has access to an existing 100mm water main located along the south verge of Matheson Road which has been constructed of varying materials (PVC, Asbestos Concrete, Cast Iron, Steel). Access to this main is readily available, however, if greater supply is required above what the 100mm diameter pipework supplied within the area, further investigation would be required with Water Corporation to increase the size of the water main to Precinct C.

Precinct D has an existing 150mm water main on the west verge of Resolution Drive, and a 100mm main on Grandstand Road, both of these providing adequate opportunity for connection and water supply.

Precinct E

There is an existing DN915mm steel water distribution main located along the eastern verge of Grandstand Road on the 2.1m alignment which also runs through the centre of Precinct E within the existing road reserve. A smaller existing DN100mm cast iron water main also conveys potable water through Precinct E within this road reserve corridor, with these mains being built in 1949 and 1987 respectively. Depending on the final use of Precinct E, it could be expected that as part of assembling the

lots in Precinct E, the Distribution Water Main and the DN100 CI main, may need to be relocated outside of the proposed lots, and reinstalled on their ultimate alignment within remaining road reserves. If these water main assets are to remain in their current location, Water Corporation would need to accept an easement over these assets with the DN915 and 100CI mains requiring 10 and 5m easements respectively.

It is anticipated that the existing DN100 cast iron water main will be suitable for water servicing. The existing DN915 steel distribution main located on the northern verge of Grandstand Road, and through Precinct E, would not be available for connection to the proposed development.

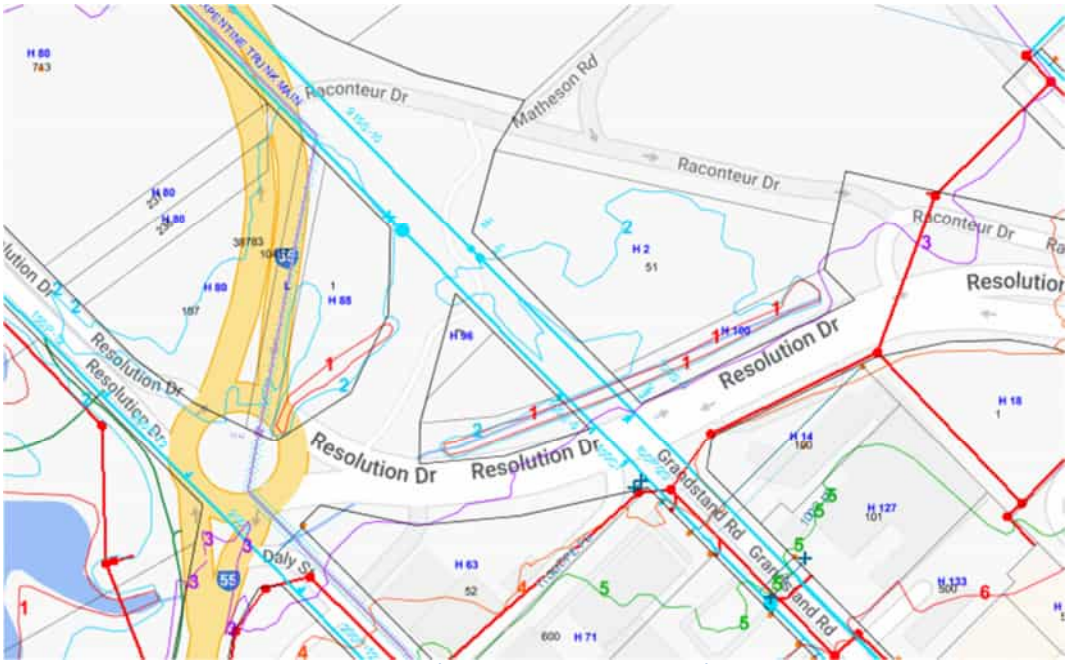


Figure 14 - Existing Water reticulation in Precinct E (Water Corporation Esinet 2024)

Whilst Water Corporation did not advise TABEC of any necessary upgrade of the old water pipe network, any modification to these existing pipes may result in the requirement to upgrade old cast iron water mains. Final upgrade requirements of the existing infrastructure will be clarified once water usage requirements are understood, and modelling has been undertaken by Water Corporation.

9 POWER SUPPLY

9.1 Power Requirements

The preliminary power requirements have been reviewed based on the proposed development at each of the precincts. It is estimated that the development equates to a total power requirement of 5.4MVA, with the new proposed developments within the precincts requiring the additional 4.2MVA. The existing developments within the precincts are estimated to be using 80% of the 1.5MVA currently available.

Load Type	Anticipated HV infrastructure required
Precinct A	1 x 1000kVA Transformer
Precinct B	**Existing** 1000kVA transformer and switchgear may be adequate **Existing** 500kVA transformer located near the grassed parkland function area may be adequate
Precinct C	**Existing** may be adequate subject to further review.
Precinct D	1 x 315kVA transformer
Precinct E	2 x 1000kVA and 1 x 315kVA transformers

The estimated load summary has been calculated as follows:

Precinct	Development Type	Approx. sqm / No. of Units	Average kVA / sqm	Approx Total kVA	
Precinct A	Retirement Living	390	3.1	1209	
	Commercial	300	140	42	**1251**
Precinct B	Office	680	140	95.2	
	Hospitality	1000	140	140	**235.2**
Precinct C	Stables	6400	10	64	**64**
Precinct D	Childcare	2100	75	157.5	
	Residential	41	4.7	192.7	**350.2**
Precinct E	Site 1 Retail	3400	140	476	
	Site 1 Office	2500	140	350	
	Site 1 Parking	5500	10	55	**881**
	Site 2 retail	7100	140	994	
	Site 2 Parking	3500	10	35	**1029**
	Site 3 Equine	5000	75	375	**410**
Total				**4185.4**	**kVA**
				5822.76	**Amps**

The anticipated additional power demand from the development is estimated to be in the order of 4.2MVA (4,200kVA).

9.2 Feeder Capacity

Western Power's (WP) Network Capacity Mapping tool indicates that the area is serviced by the Belmont Zone Substation and has more than 30MVA of power available on the network. Note that this information is unconfirmed by Western Power until such time as an application is being made to WP for connection.

To access the additional capacity in the network supplied at the Belmont Zone Substation, it is anticipated that 2 additional power feeders may need to be installed, 2.5km from the Belmont Substation Site to the development to adequately service the ultimate required supply.

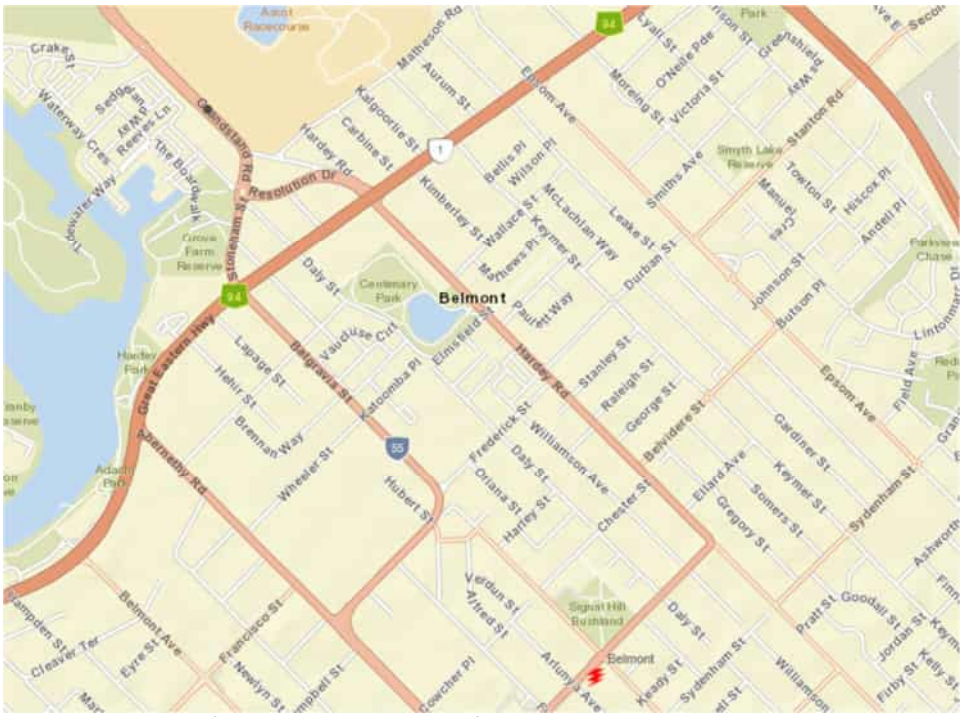


Figure 15 - WP Substation Site (Western Power Mapping 2024)

9.3 Existing Distribution Power Network

The Western Power Network Mapping tool (NCMT) and DBYD has indicated that there is high voltage (HV) servicing this development area. Existing 132kV overhead power is also located along Matheson Road, and along the east of Lot 9002.

There are also high voltage distribution cables surrounding the sites, with these being overhead power along Matheson Road, which transitions to underground at Resolution Drive, and north up Grandstand Road as seen within Figure 16.

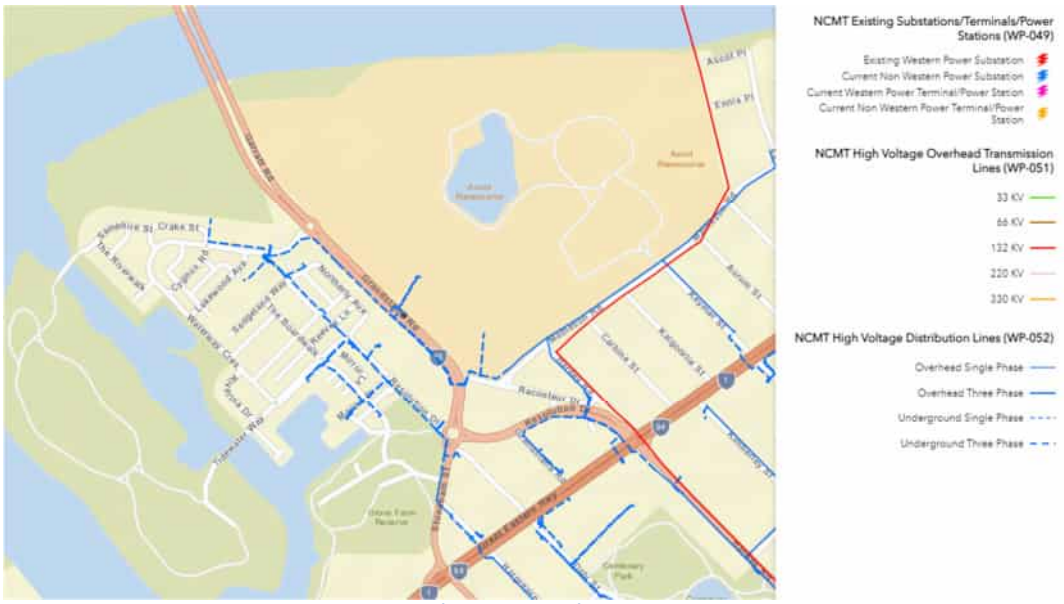


Figure 16 – NCMT Network Existing Power Services (Western Power)

10 COMMUNICATIONS

Ascot Racecourse is currently surrounded by NBN service in the area with FTTN Technology. It is expected with new developments or upgrades, that FTTP will be available.

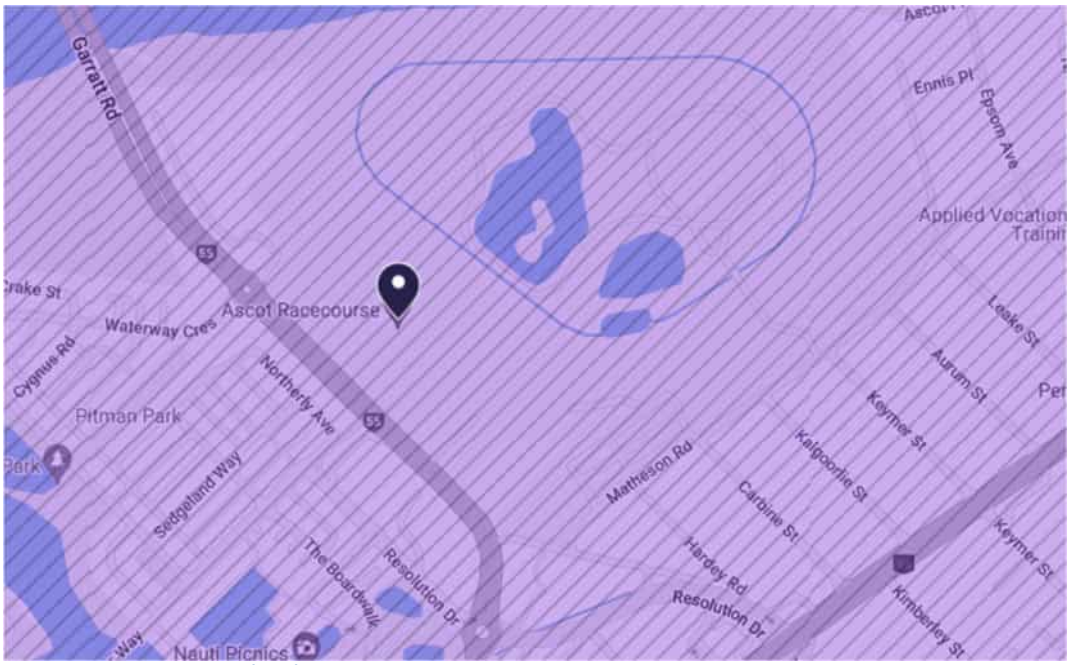


Figure 17 - NBN Rollout Map (NBN) – Fixed Line available

The Dial Before you Dig information shows Precinct D has existing Optus fibre optic assets within the site, which have been installed within the north west boundary of the lot. Precinct D also has Telstra and Vocus assets entering the lot from Grandstand Road and from Resolution Drive respectively.

Further discussion will required with the communication providers to determine whether these existing comms assets will impede the proposed development at this site, and whether relocation or removal of this asset is required.

11 GAS SUPPLY

There is existing medium pressure 155 PVC 1.5 (MAOP 70kPa) gas mains located along Matheson Road and up Grandstand Road until Precinct D which are available for connection to Precinct C, Precinct D and Precinct E if required.

ATCO has completed high level modelling based on similar business connection types as those nominated developments within each precinct. The modelling was based on:

- Connection to MAOP 70kPa network
- MP Metro 25 – Severe Winter
- Full load at 350scmh (≈12000MJ/hr)
- Full connection by 2025
- Potential mains extension required for connections to Precinct A and B

Based on this modelling, the existing gas mains adjacent to Precinct D and Precinct E should be sufficient to service these residential and commercial developments.

Precinct A will require a gas mains extension to the retirement village if this development is to utilise gas, however, ATCO have not expressed any concerns with servicing capacity issues.

The supply of gas is not a WAPC subdivision condition and there is no obligation on the developer to install gas as part of the development.



Figure 18 – Existing ATCO Gas Network map (ATCO Gas)

In reviewing the Dial Before You Dig information, an existing 150 PVC gas main traverse through Precinct D, along the south east boundary. From the information available, this pipe does not look to be

operational, however, further discussions with ATCO Gas are required on whether this needs to be relocated, or removed.

12 CONCLUSION

Based on the infrastructure review, there does not appear to be engineering-related constraints preventing the development of the five precincts. Notwithstanding, there are a number of design issues and construction challenges to be resolved in further detail within the next phases of development.

The advice received from servicing authorities and investigations to date indicate each aspect can be resolved to support the development proposal.

13 RECOMMENDATIONS

Since this report is based on preliminary servicing advice and investigations, it is recommended that each Authority be kept informed as the planning progresses and concept engineering designs are refined. Communicating the proposed time frames for the precinct development is also important.

There are a number of project-related issues and challenges that require further consideration, with some of these to be assessed as part of the next phase, such as:

- further investigation and discussion on the preferred Precinct A sewer servicing methodology;
- the upgrade/relocation requirements of existing water mains if deemed necessary for Precinct E or to provide adequate servicing to Precinct B or C. If required, early engagement with Water Corporation is recommended to coordinate scope within Water Corporations capital works program;
- bio-retention locations within the centre racecourse for Precincts A, and C;
- drainage basin/storage location at Precinct D;
- existing communications assets removal or relocation within Precinct D;
- power servicing to each development sites with overlapping lots and boundaries
- understanding development timeframes for precincts, due to the limited power capacity within the existing network prior to additional HV feeders being required to the site.

The information contained within the report is preliminary in nature, has been completed based on a high-level desktop assessment, and has relied on preliminary planning advice from servicing authorities where appropriate. There are no site investigations, reports or other consultants' input unless stated within the report, which would ordinarily provide a more substantial servicing review for the purpose of supporting subdivision applications.

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Mainroad WA, online map viewer, Roach Hierarchy, 2024

MNG Access, online map viewer. April 2024

NBN Rollout Map, online Map Viewer. April 2024

Water Corporation, emails: Ascot race course LSP - Engineering Service Report - Water Corporation Services. March 2024

Water Corporation, ESInet mapping. April 2024

Western Power, Network Capacity Mapping Tool. April 2024

15 APPENDIX A – DBYD INFORMATION

Job No 36962243

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
Precinct E	2 Raconteur Drive Ascot WA 6104	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900614	ATCO Gas Australia	1300 926 755	NOTIFIED
240900610	NBN Co (WA)	1800 687 626	NOTIFIED
240900607	Optus (WA)	1800 505 777	NOTIFIED
240900612	Telstra (WA)	1800 653 935	NOTIFIED
240900609	TPG Telecom (WA)	1800 786 306	NOTIFIED
240900608	Vocus (WA)	1800 262 663	NOTIFIED
240900613	Water Corporation	13 13 95	NOTIFIED
240900611	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

ATCO UNDERGROUND ASSET DETAILS ASSETS AFFECTED
GAS DIVISION

ASSETS AFFECTED – see accompanying Plan

Job No: **36962243**
Sequence No: **240900614**
Date of Issue: 21 June 2024
Phone: **1300 926 755**

Justin Zielinski
ATCO Gas Australia
54 Havelock Street
West Perth
WA 6005

BYDA Utility Registration Name: Private
BYDA Location: **2 Raconteur Drive Ascot WA 6104**

ATTENTION: This response to your enquiry has been interpreted from details in your requested DBYD picture location request only (not any street address you gave). It is your duty to ensure the accompanying plan/s match your geographical area of works.

IF YOU SEE, HEAR, SMELL OR OTHERWISE DETECT GAS,
LEAVE THE IMMEDIATE AREA AND THEN CALL 13 13 52

Our records indicate that ATCO gas infrastructure ***IS PRESENT*** in the vicinity of and/or surrounding area of the above enquiry. This response relates only to ATCO assets. Your Duty of Care requires that personnel **Must** at all times comply with, and have on site, this information sheet and the accompanying plan(s). All plans are subject to this information sheet. You should refer to the ATCO Self-service Portal (Link Here) or if unsure, contact ATCO on **1300 926 755** during business hours.

All information provided is to be used as a guide only (see Disclaimer item **5**). It does not absolve you or third parties from your Duty of Care obligations, including to take additional precautions where work has the potential to impact on gas assets, public safety or the environment, or from your duties at law (including Reg 3.21 of the Occupational Safety and Health Regulations 1996).

WARNINGS

- No works of any type within 15 metres of any **CRITICAL GAS ASSET** infrastructure without prior approval from ATCO
- **NO HOT WORK** within 15 metres of any gas infrastructure except in compliance with applicable laws & *Australian Standard 1674.* **Do Not** let heat sources or hot works impact on any gas infrastructure and take into consideration that the ground or adjacent structures may also be capable of transmitting heat so as to circumvent protection afforded by a heat shield or barrier
- **DANGER** - Gas can cause asphyxiation and is flammable. Keep all ignition sources well away (e.g., flames, matches/ lighters, sparks, electrical devices, vehicles or engines, mobile phones, cameras)
- Gas pipes **Must Not** be unsupported or left without adequate cover or protection without prior approval from ATCO
- Damage to the pipe coating or pipe itself can be very dangerous if not given immediate attention. Report any damage to ATCO immediately on **13 13 52**. **Do Not** attempt to repair any damaged gas infrastructure
- No alteration or removal of live or abandoned gas infrastructure without prior written approval from ATCO
- Any abandoned or proposed gas infrastructure indicated on the gas plans **Must** be treated as live
- Never assume the location or depth of any gas infrastructure. Pipes may not follow straight lines or maintain a constant depth. Always check carefully (e.g., by careful hand digging of potholes)
- Unauthorised repairs or tampering with gas infrastructure may result in prosecution under the *Energy Operators (Powers) Act 1979*. ATCO Gas Australia reserves all rights to recover compensation for loss or damage to its gas infrastructure or other property including for indirect or consequential losses.

PLANS:

Plans provided are current for **30 days only** from date of request. You must use current plans at all times.

Plans do not show all gas service lines (which connect gas mains to individual meter positions). See condition **3.c)** below.

If plan shows **additional detail** symbols (*) or ( ) in the area of proposed works it is **your duty** to obtain that further detail from the number below.

Plans (including the location of pipes, services, infrastructure and boundaries) are **approximate only**. You **Must** use safe and proper procedures – including **potholing** (see condition **4** below).

Plans are not a guide as to gas availability for connection purposes.

To call ATCO: **Weekdays from 7.30am to 3.30pm, call – 1300 926 755 After hours, weekends and emergencies, call – 13 13 52**

CONDITIONS FOR WORKS IN THE VICINITY OF ATCO ASSETS

1. Compliance with Warnings

You **Must** comply with the Warnings contained in this information sheet and the accompanying plan(s).

2. Compliance with 'Working around Gas Infrastructure' Document (Link Here) applicable laws and duty of care

All work (including but not limited to using Excavator's Augers, Directional, drilling machines, 'Ditch Witch' type trenching machine, Loader, Dozer, Skid Steer (Bob Cat)) **Must** comply with all applicable requirements in the 'Working around Gas Infrastructure' Document and with all applicable laws and Australian Standards. All due care must be exercised to locate any gas infrastructure in the vicinity and when conducting any works near them.

3. All Gas Infrastructure

All work that may have any impact upon any gas infrastructure (see **3.a)**, **b)** and **c)** below for examples) should be carefully planned with notification to ATCO well in advance of commencement. Contact ATCO on **1300 926 755** or visit Atco's online self-service portal (Link Here). Amongst other things, this includes excavation of or near gas pipelines, boring/drilling, crossings of pipelines (including by other underground infrastructure e.g. drains, power cables, etc.), road works and structural installations. In addition:

a) Critical Asset

No works of any type are permitted within 15 meters of these pipelines without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco online Self-service portal (Link Here)

You **Must** ascertain the location of any Critical Asset, in relation to your proposed work by:

- Locating a straight line between two marker danger signs, and
- Assessing the distance from this line to your proposed work area.

ATCO may require stand-by supervision during your works and will advise of attendance requirements.

b) Non Critical Assets

These pipelines are installed in most streets throughout the Perth metro area and several country centers. Main valves, regulator sets, and test points also exist at intervals along these pipelines. Where work may impact upon these pipelines or assets then ATCO **Must** be contacted as per item **3** above.

c) Gas Services and Meters

If a gas meter is installed on a property, an underground gas service pipe will run from the meter position to the gas main in the street. Plans do not show all gas service lines (with the exception of Critical Assets), but their presence must be anticipated. Most gas meter boxes installed since 1996 will include a sticker giving approximate guidelines for the gas service line location. All due care must be exercised to locate any gas services in the vicinity and when conducting any works near them.

4. Compliance with Safe Work Practices

It is your responsibility to have and comply with adequate safe work practices and procedures. Without limiting your obligations:

PLAN The complete & current Before you Dig Australia documentation and plans must always be on site & referred to for the duration of work. Refer to regulation 3.21 of the Occupational Safety and Health Regulations 1996 and the Utility Providers "Code of Practice" for further useful information.

PREPARE Prepare by reviewing the Before you Dig Australia Documentation and contacting ATCO if you need assistance. Look for onsite ATCO asset and infrastructure clues such as pit lids, marker posts and meters. No works of any type are permitted within 15 meters of a **CRITICAL ASSET** without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco website Self Service portal (Link Here) and allow suitable

processing time. Atco recommends engaging a BYDA Certified Locator which includes undertaking electronic location prior to potholing.

POTHOLE Using current Before you Dig Australia plans, all gas pipes should be located (including any deviation in the direction of a gas pipe) by exposing them by careful digging using a HAND SHOVEL. Where the proposed work is parallel to a gas pipeline, pothole every 10 meters along the entire route. Damage to the pipe coating or to the pipe itself can create a very dangerous situation if not given immediate attention. If damage does occur, it **Must** be reported to ATCO immediately on Ph. **13 13 52**.

PROTECT Supervise and monitor all excavations near gas infrastructure using a dedicated spotter. Where any gas infrastructure is required to be exposed, adequate protection of the gas infrastructure is required to prevent potential damage. Also implement appropriate controls when conducting 'hot work' (in accordance with AS 1674) in the vicinity of the ATCO infrastructure such as; isolation; separation distance; the placement of an effective non-combustible barrier of sufficient size and thermal resistance for the intensity, type and duration of heat exposure; gas monitoring; monitoring the environment surrounding the ATCO infrastructure to ensure it is not being impacted by the work, and other controls as necessary.

PROCEED You should **only proceed** with your excavation work after you have planned, prepared, potholed (unless prohibited) and have protective measures in place. All locations markers/pegs are to be removed on completion of works. If you are unsure, **DO NOT** Proceed. Call ATCO on **1300 926 755**

5. Disclaimer and Further Terms

a) Nothing in this document, any accompanying plan or the 'Additional Information for Working around Gas Infrastructure' (AGA-O&M-PR24) (together called "**Documents**") purports to exclude or modify any term, condition or warranty to the extent that by law it cannot lawfully be excluded or modified by agreement or notice, including but not limited to those contained in Schedule 2 of the *Competition and Consumer Act* 2010 (Cth) and corresponding provisions of any state legislation.

b) If any of ATCO, or their respective related entities, officers, employees, agents, contractors or advisers (together called "**Associates**") is liable for a breach of a term, condition or warranty described in paragraph **5.a)** above, its liability is, to the fullest extent permitted by law, limited to any one or more of the following as it determines in its absolute discretion:

i) in relation to goods supplied by them, replacing or repairing the goods, supplying an equivalent item, paying the cost of replacing or repairing the goods or paying the cost of acquiring or hiring an equivalent item; and

ii) in relation to services supplied by them, the re-supply of the services or the payment of the cost of having the services re-supplied.

c) Subject to paragraphs **5.a)** and **b)**, but otherwise despite any other provision in the Documents, no representation or warranty is made or given (whether expressly or by implication) by any of ATCO or their respective Associates in respect of any information contained or referred to in any of the Documents or in any other communication from ATCO concerning any of the Documents or the subject matter of any of the Documents ("Information"). In particular, but without limiting the generality of the foregoing limitation, none of ATCO or their respective Associates makes any warranty or representation as to the truth, accuracy, completeness, reliability, currency, timeliness, quality or fitness for any purpose of or the standard of care taken in the preparation of any Document or Information (including, but not limited to, the accuracy of the scale of, or the location of anything or symbol shown on, any plan or diagram).

d) Subject to paragraphs **5.a)** and **b)**, to the maximum extent permitted by law, none of ATCO or their respective Associates is liable to any person or other body ("**Recipient**") who receives or otherwise obtains access to all or any part or parts of the Documents or Information, in any way (including, but not limited to, liability for negligence, breach of statutory duty or lack of care) in respect of any cost, expense, damages, loss or liability, including, but not limited to:

i) any financial or economic loss, cost, expense or damage, including but not limited to loss of production, loss of profit, loss of revenue, loss of use, loss of contract, loss of goodwill or loss of business opportunity;

ii) any new or increased costs or expenses, including but not limited to financing or operating costs;

iii) any failure to achieve any actual or anticipated saving in respect of any cost or expense;

iv) any cost, expense, damage or loss resulting from any liability of the Recipient to any other person or body howsoever and whensoever arising, suffered or incurred by the Recipient in relation to, or in connection with, the disclosure to them of, or use of, or reliance on, all or any

part or parts of the Documents or Information.

e) By using any Document or Information, each Recipient is taken to represent and warrant to ATCO that the Recipient will comply with the conditions and other terms referred to in the Documents or Information, including but not limited to conditions that:

i) the Recipient **Must** comply with the conditions in numbered paragraphs **1** to **4** above and this paragraph **5**;

ii) as between ATCO and each Recipient, ATCO owns the Information and all rights and title in and to the Information are to remain vested in ATCO;

iii) no Recipient has any right, title or interest in the Information or, except as expressly provided for in the Documents, any license or right to copy, alter, modify, publish or otherwise use or deal with the Information without prior written approval from ATCO;

iv) ATCO makes no representation and gives no warranty as to its right to disclose any Information;

v) the Recipient relies on any Information entirely at its own risk and expense;

vi) the Recipient **Must** undertake its own independent due diligence and investigations in relation to the Information;

vii) none of ATCO or their respective Associates owes the Recipient any duty of care in respect of the Information; and

viii) none of ATCO or their respective Associates is under any obligation to correct, update or revise any Documents or Information.

GAS MAIN AND SERVICE IDENTIFICATION

LEGEND

1. Critical Asset (See **WARNINGS** page 1)
2. Pipe Diameter (millimetres)
3. Pipe Material

   CI = Cast Iron PE = Polyethylene
   GI = Galvanised Iron PVC = PVC
   ST = Steel
4. Alignment (in metres from property line)
5. Pressure in main (MP 70 kPa = Medium Pressure and MAOP (Maximum Allowable Operating Pressure)
6. Off-line Service – service may not be straight line to meter. (**WARNING – OLS may not always be shown on plan**. See item **Error: Reference source not found** above)
7. Service Valve in the vicinity
   (**NOTE:** Service Valve may be **"BURIED"**)
8. Pre-laid Service laid in Common Trench
9. Main Status: (See **WARNINGS** page 1)

   9a. AB = Abandoned Mains

   9b. PROP = Proposed Mains
10. Customer Connection: Does not indicate actual location of Meter Position

    D2 (D = Domestic & 2 = Number of Meters)

    C1 (C = Commercial & 1 = Number of Meters)
11. **Additional detail available and Must be obtained if within area of proposed works – see page 2 above.**
12. Depth of Cover (DOC) in metres.



IF UNSURE, PLEASE CONTACT ATCO ON **1300 926 755**

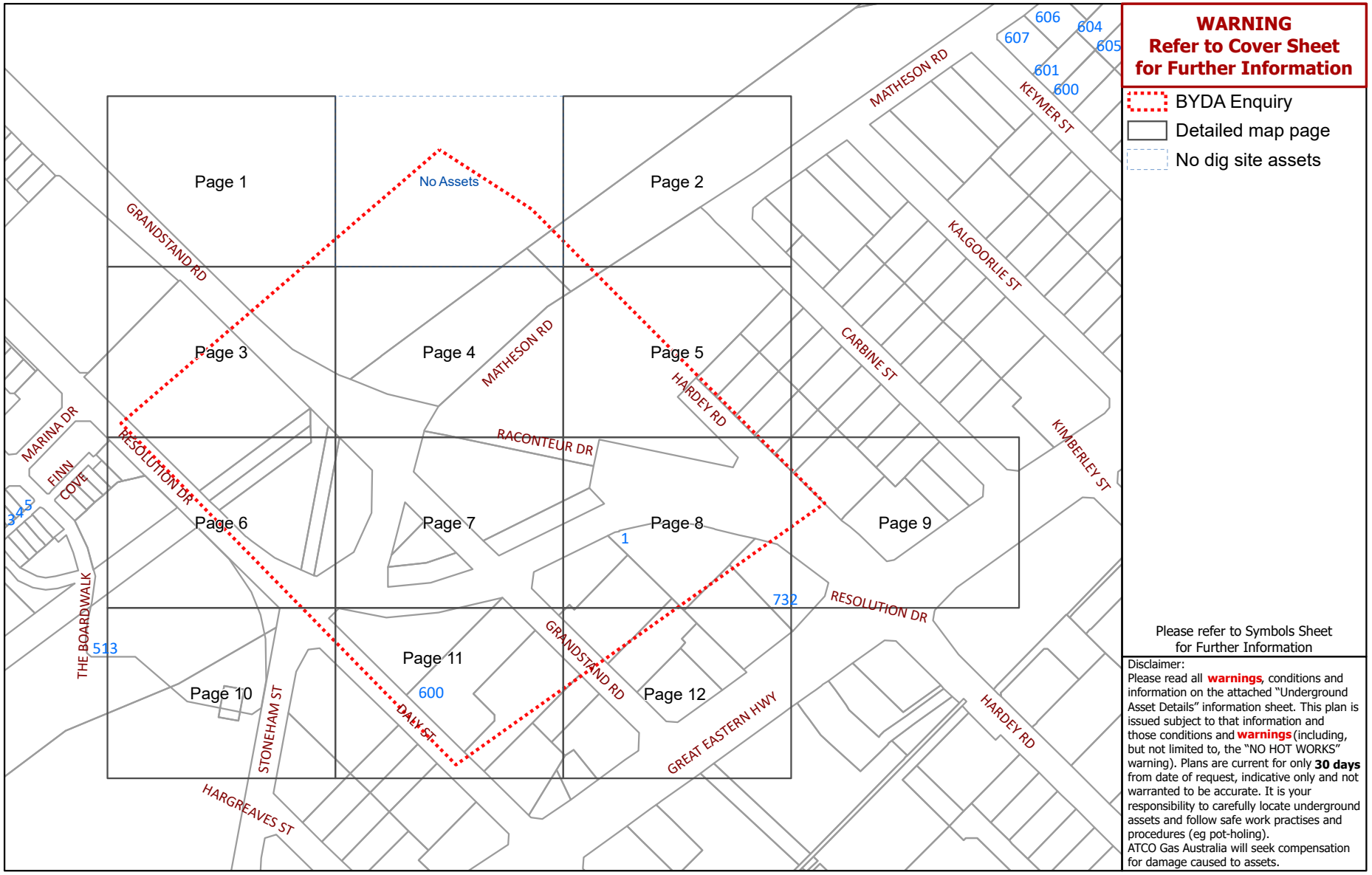
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ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)
Index Sheet

Seq # 240900614
Job # 36962243

BYDA Location: 2 Raconteur Drive Ascot 6104
Scale: 1:3,500



WARNING
Refer to Cover Sheet for Further Information

- BYDA Enquiry
- Detailed map page
- No dig site assets

Please refer to Symbols Sheet for Further Information

Disclaimer:
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ATCO Gas Australia will seek compensation for damage caused to assets.

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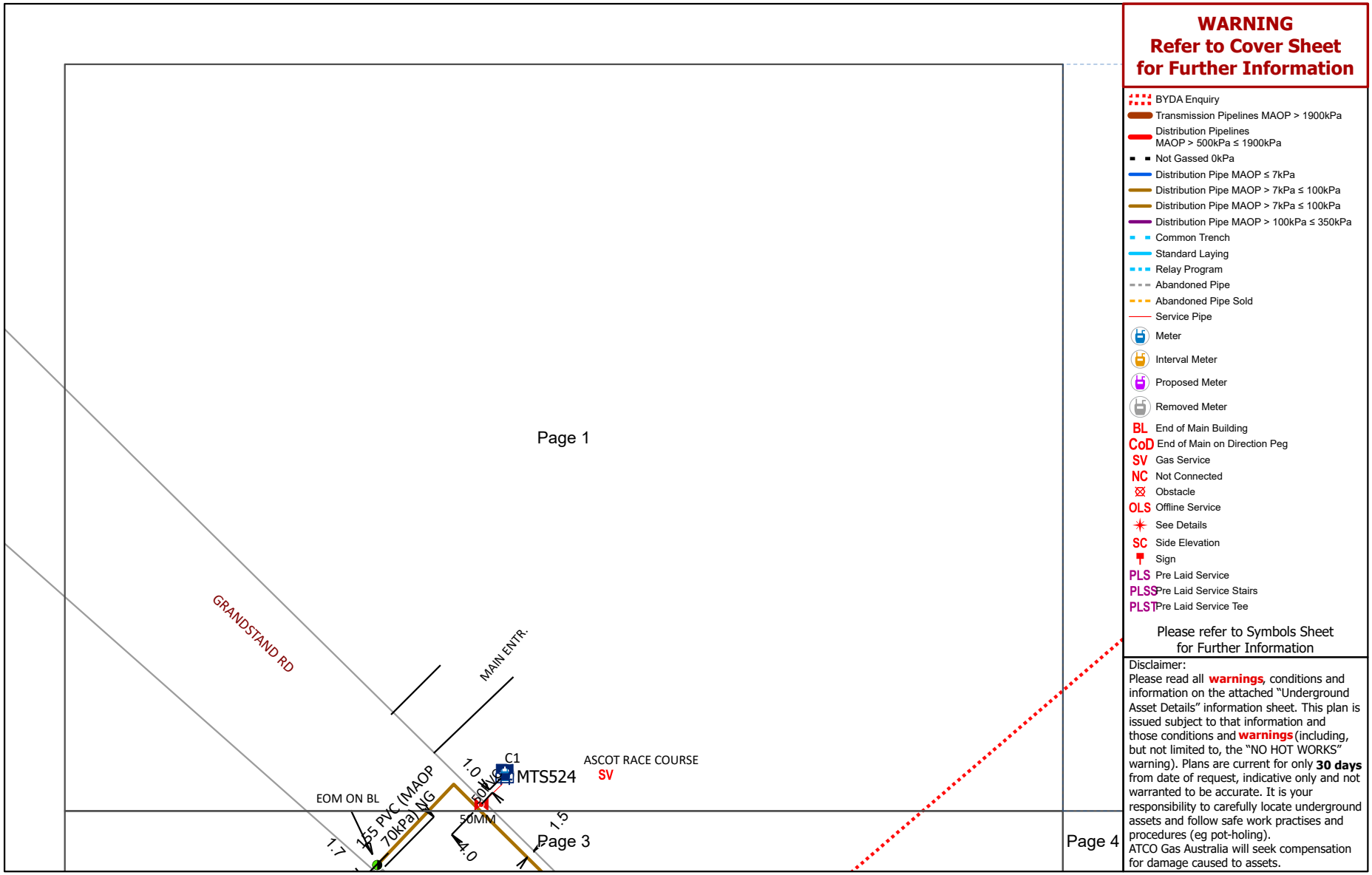
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Seq # 240900614
Job # 36962243

BYDA Location: 2 Raconteur Drive Ascot 6104
Scale: 1:800



WARNING
Refer to Cover Sheet for Further Information

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign
- PLS Pre Laid Service
- PLSS Pre Laid Service Stairs
- PLST Pre Laid Service Tee

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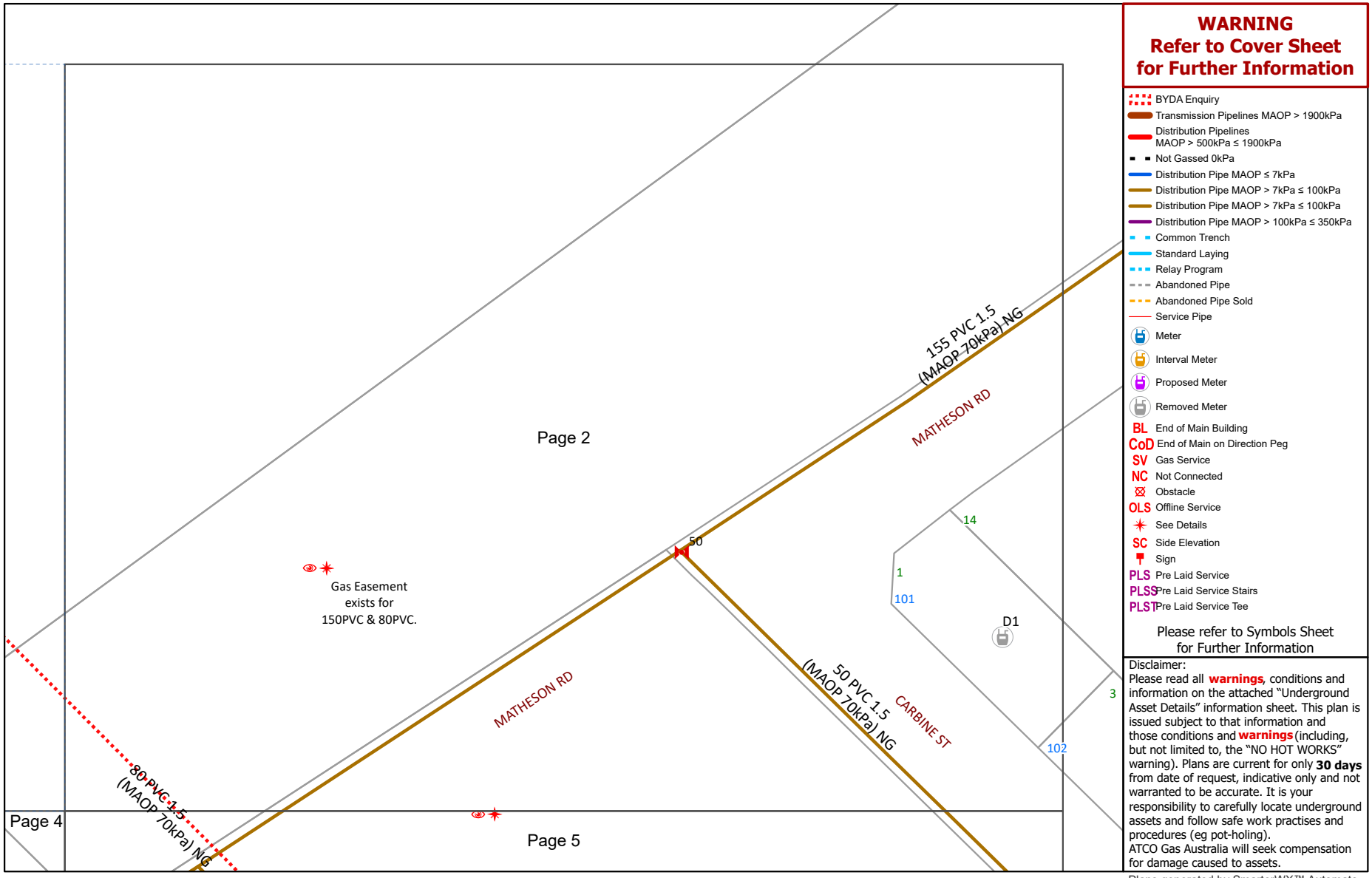
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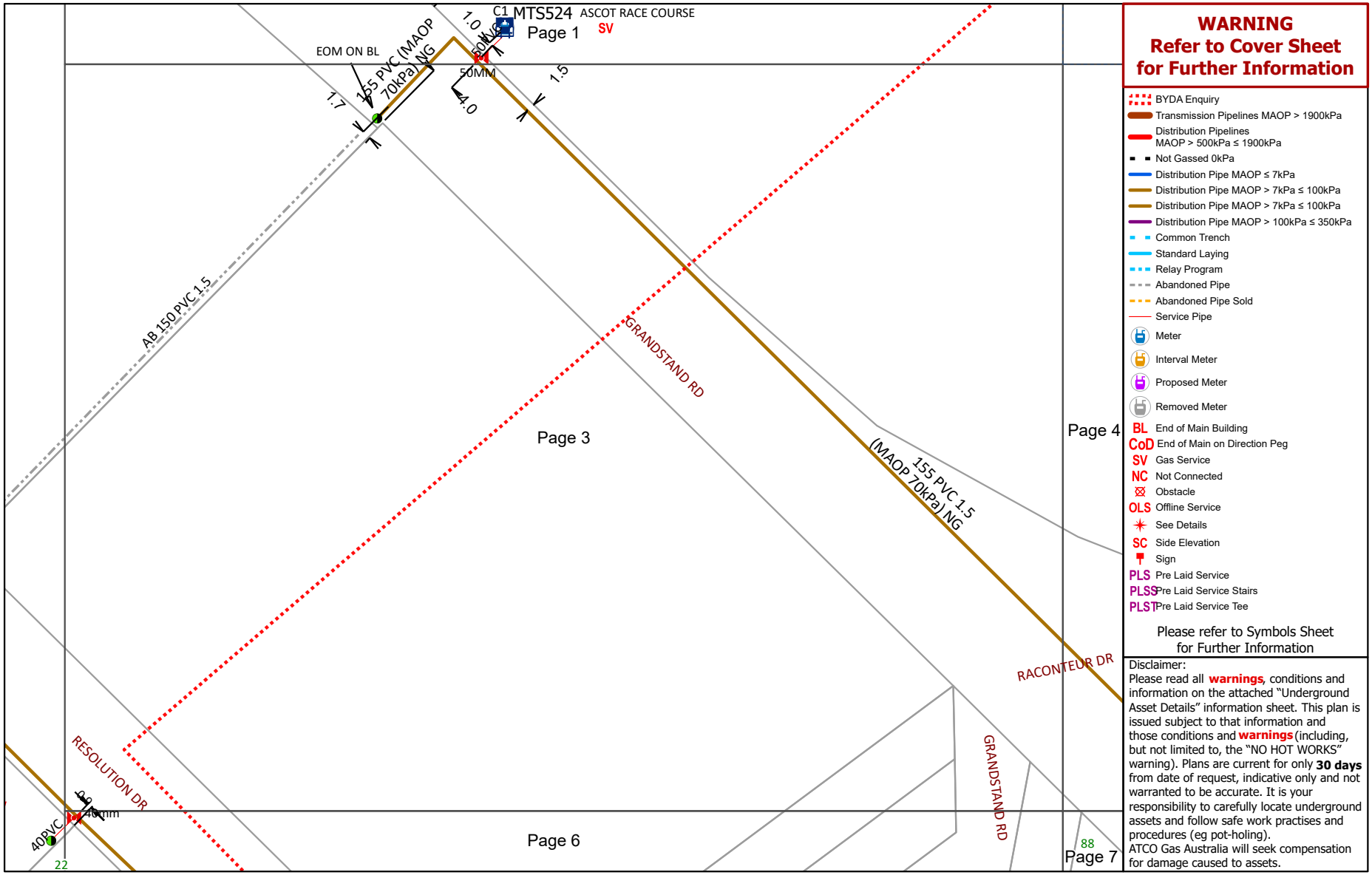
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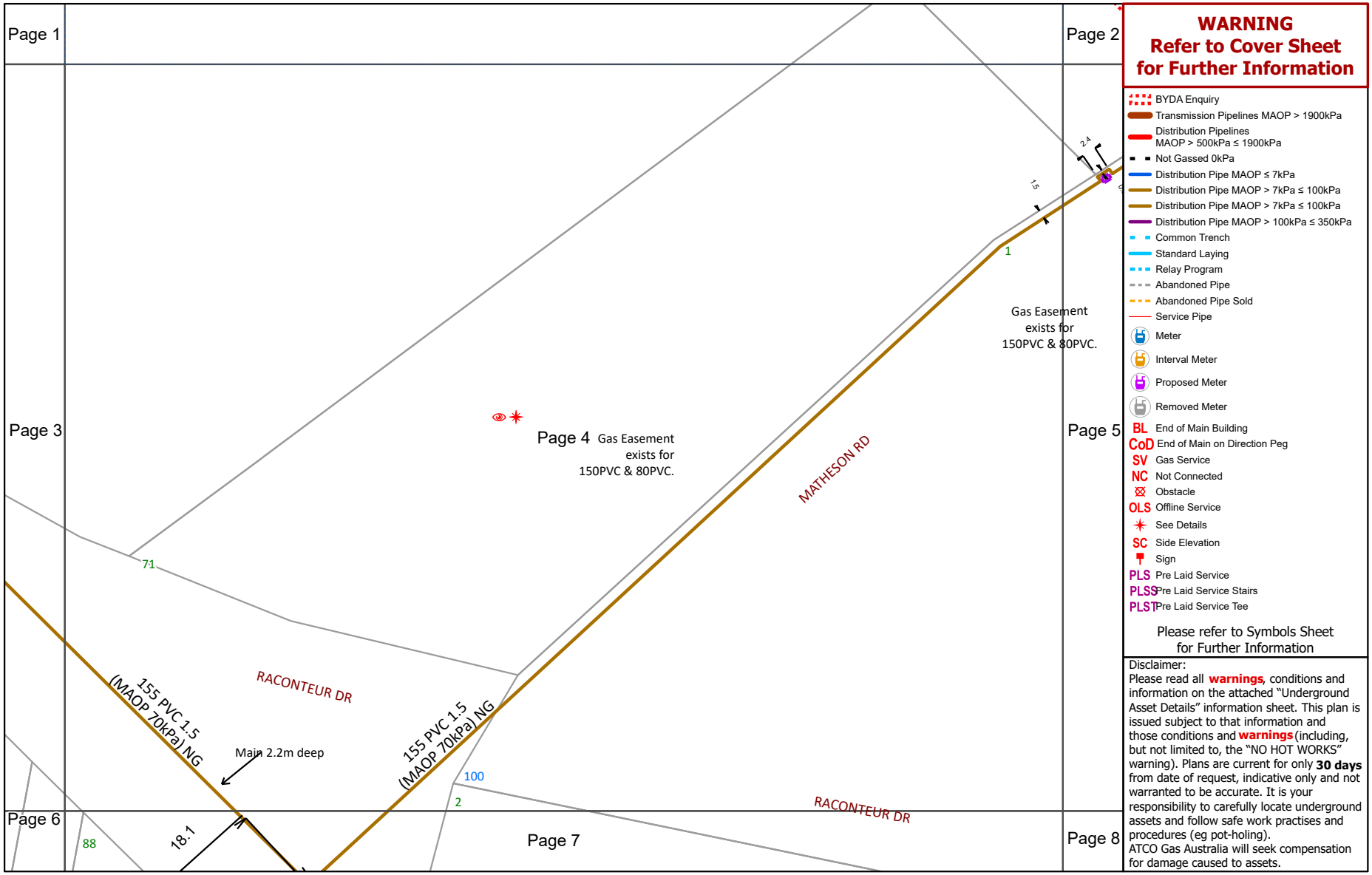
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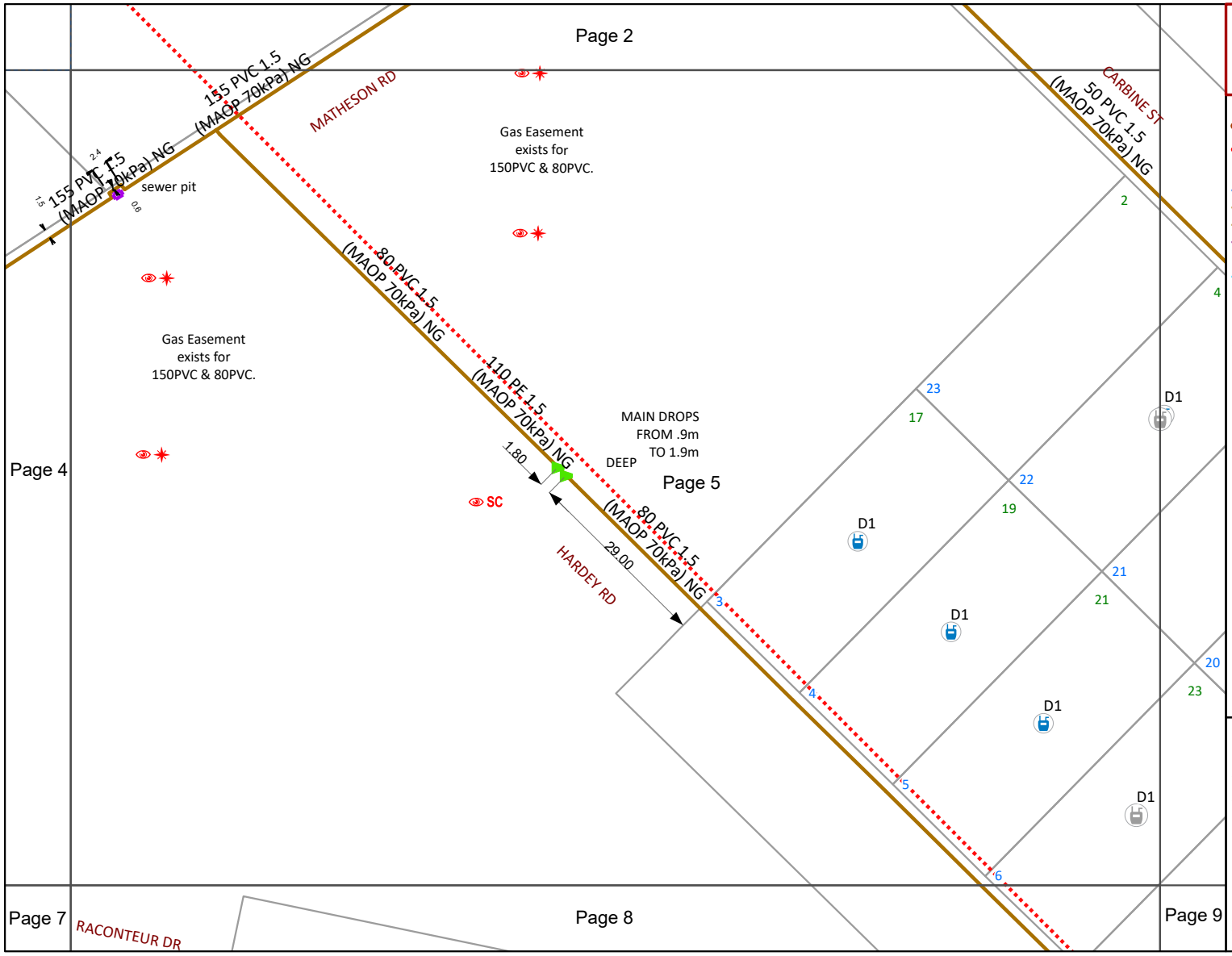
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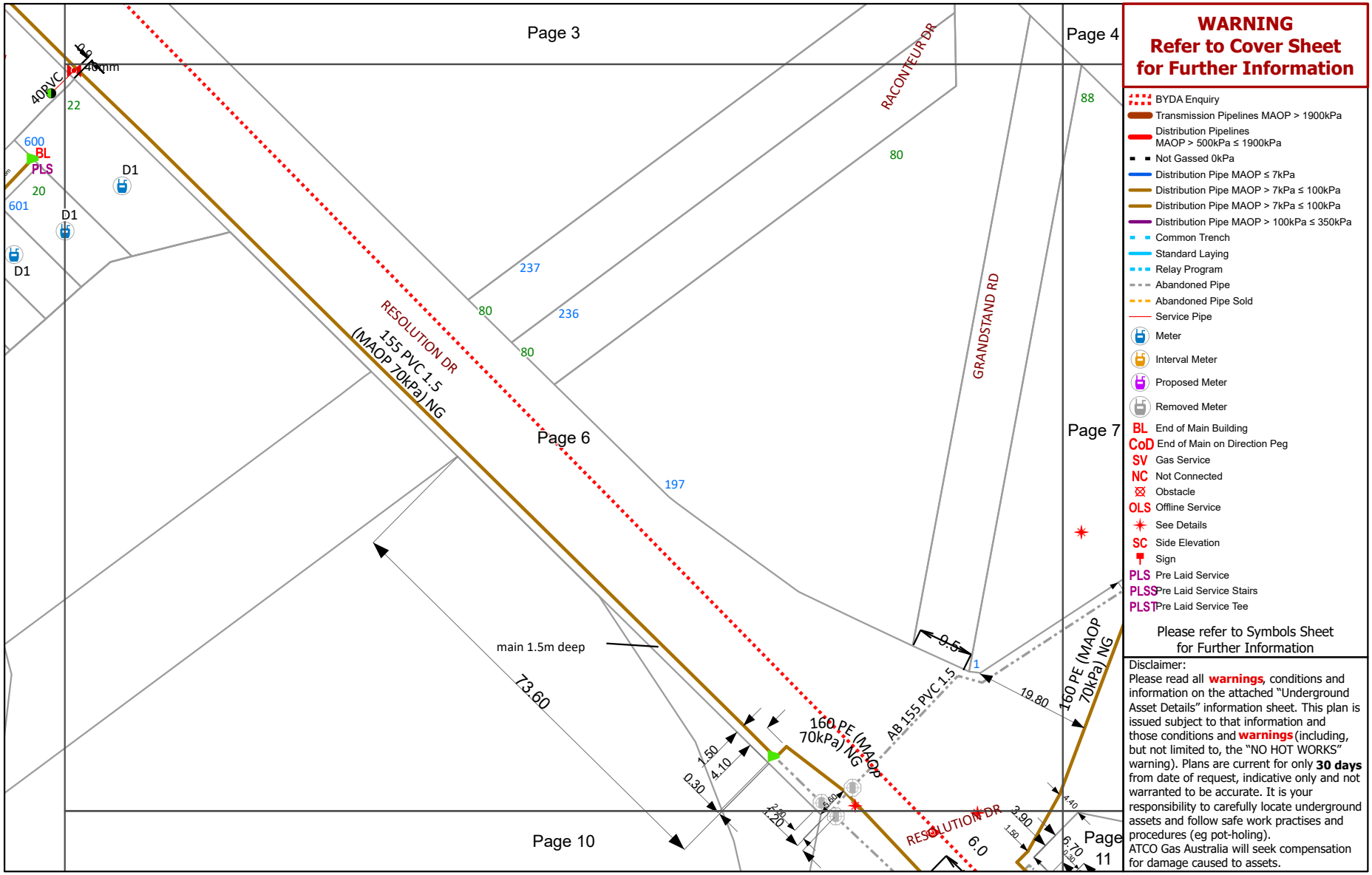
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ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900614
Job # 36962243

BYDA Location: 2 Raconteur Drive Ascot 6104
Scale: 1:800



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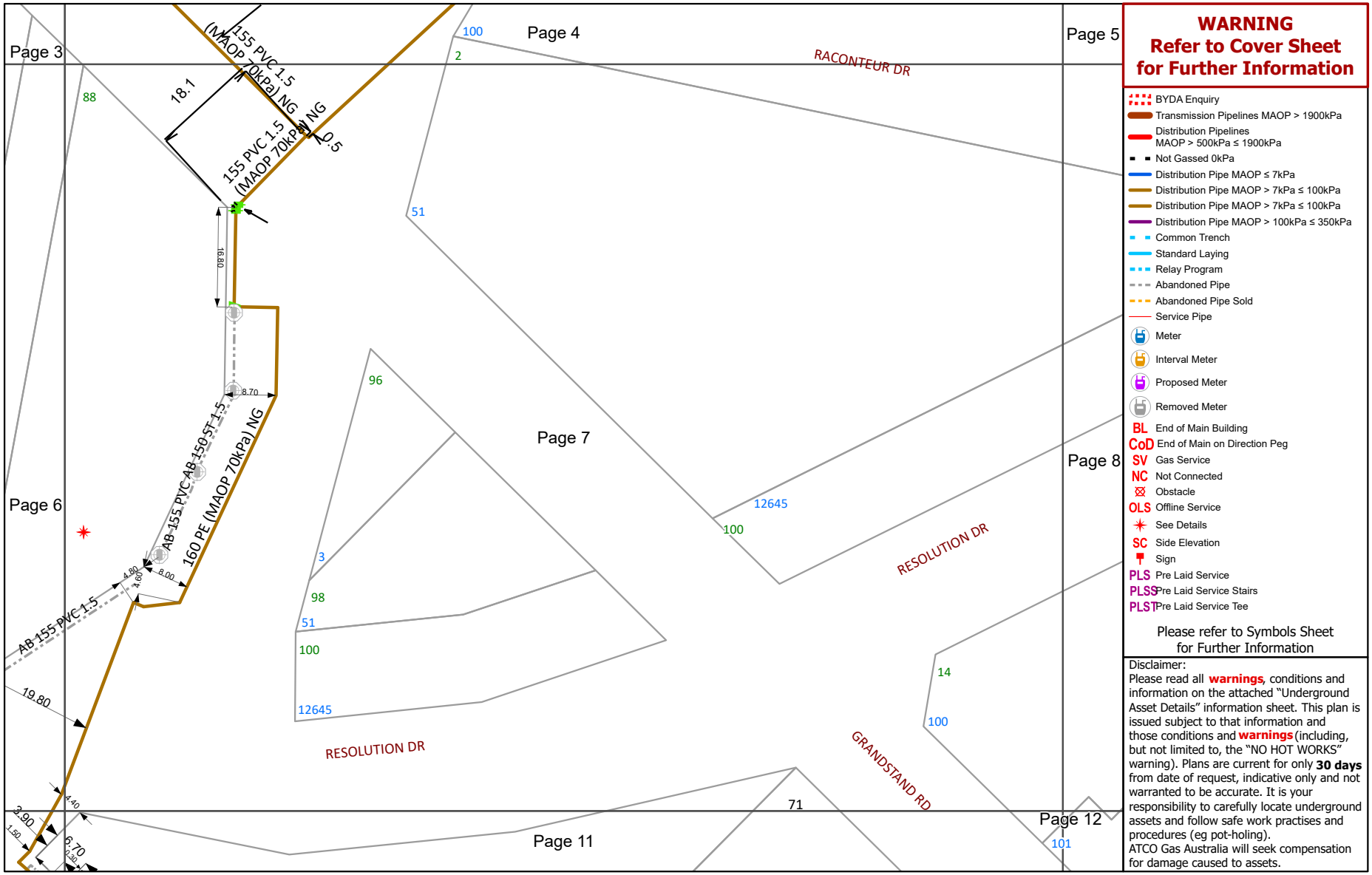
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WARNING
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- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
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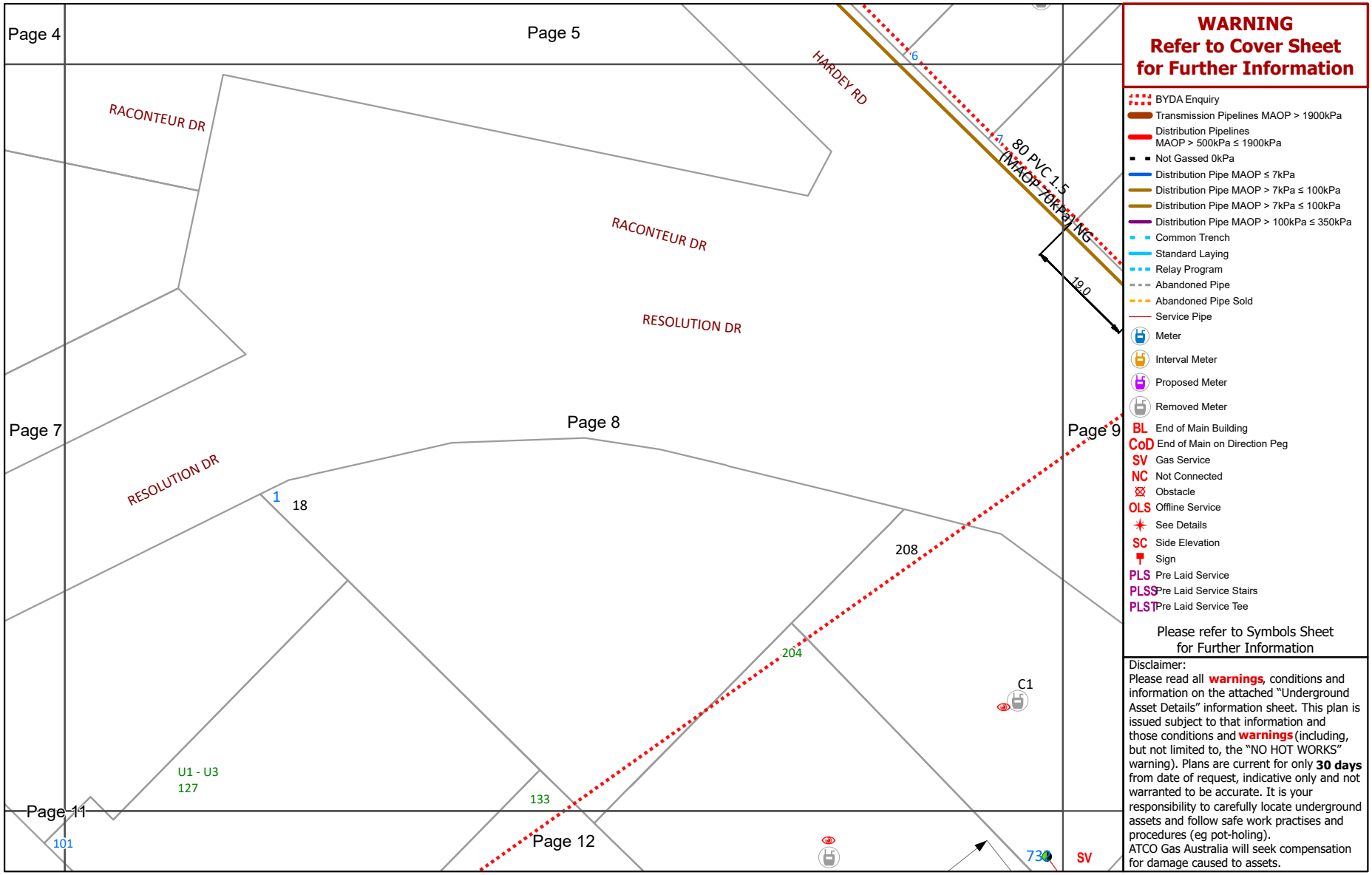
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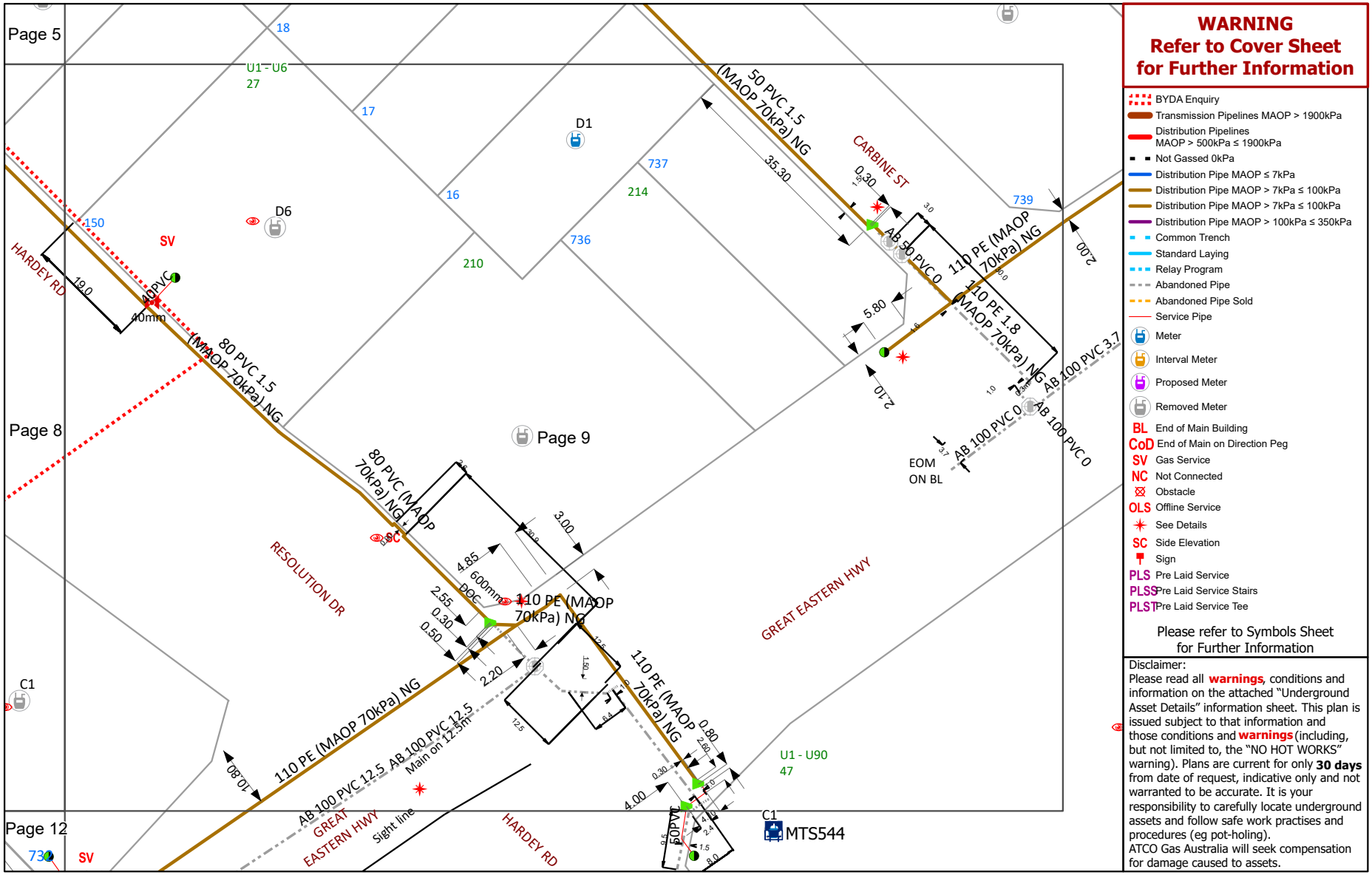
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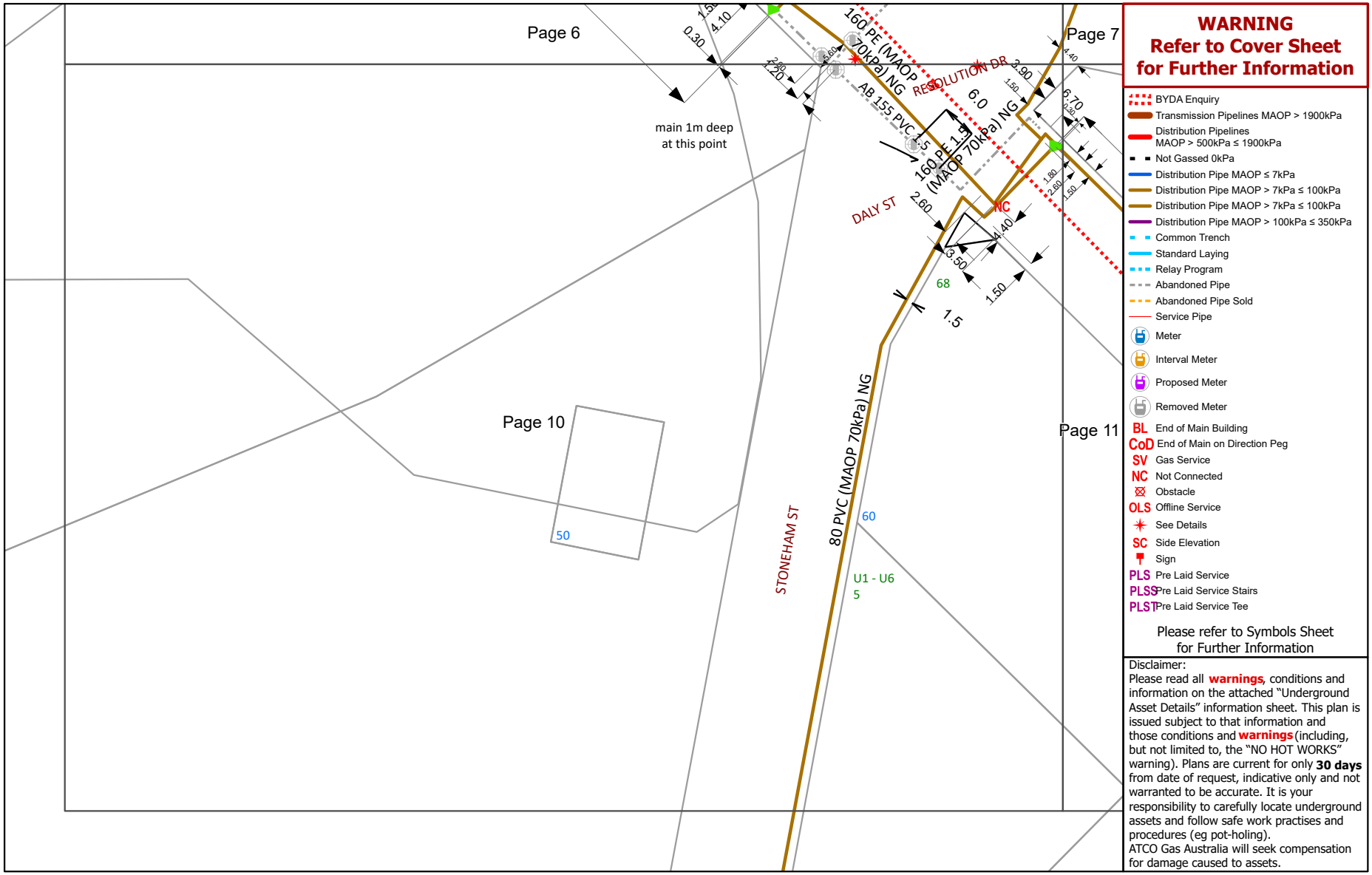
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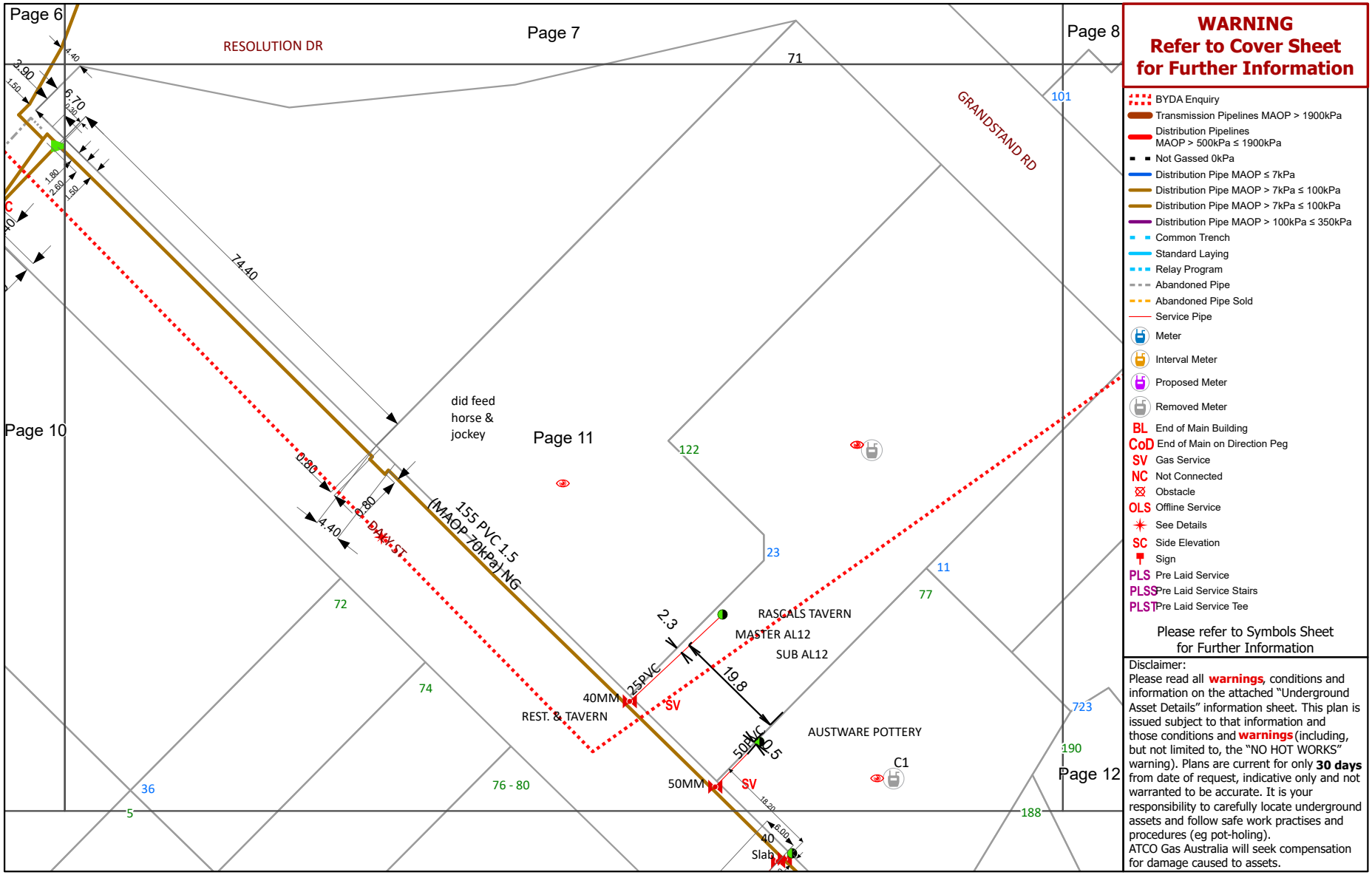
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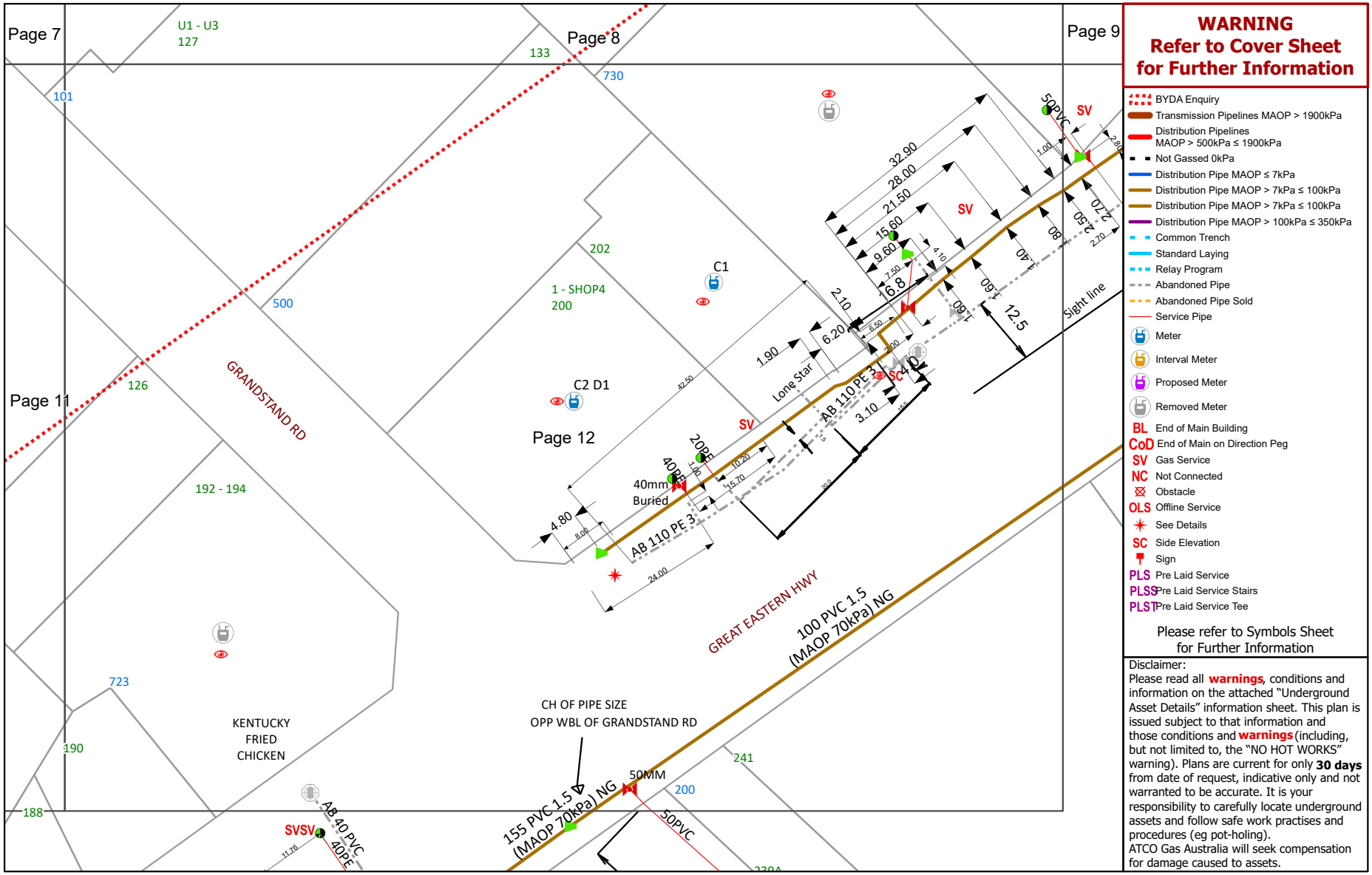
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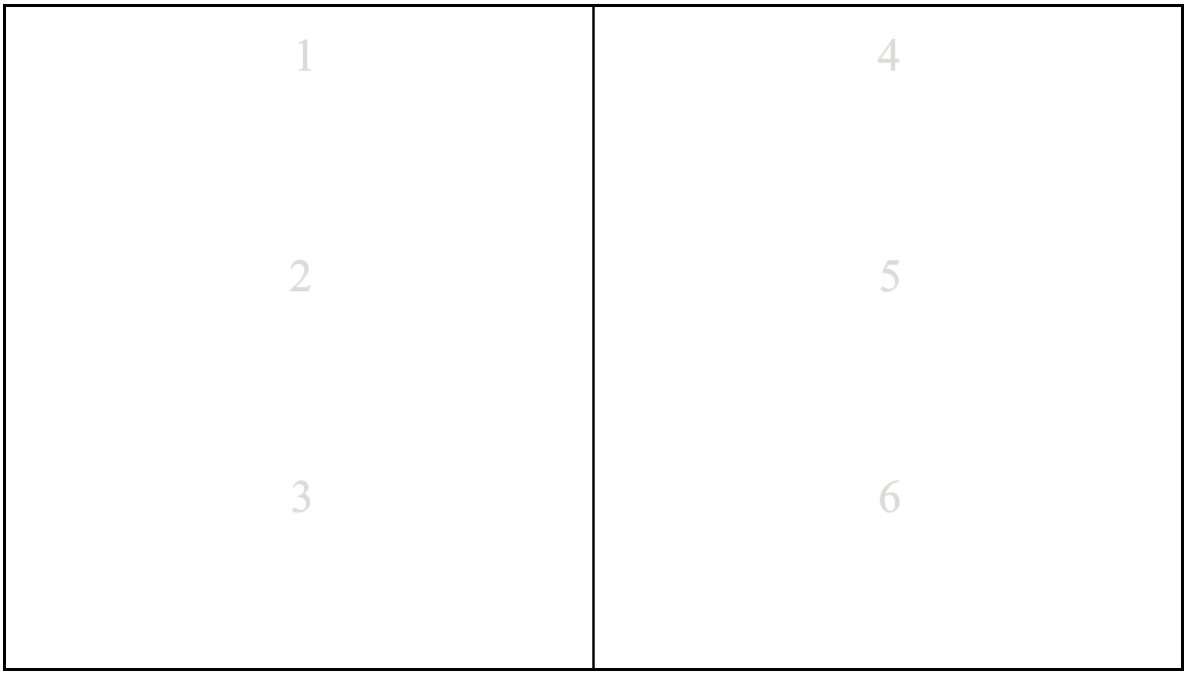
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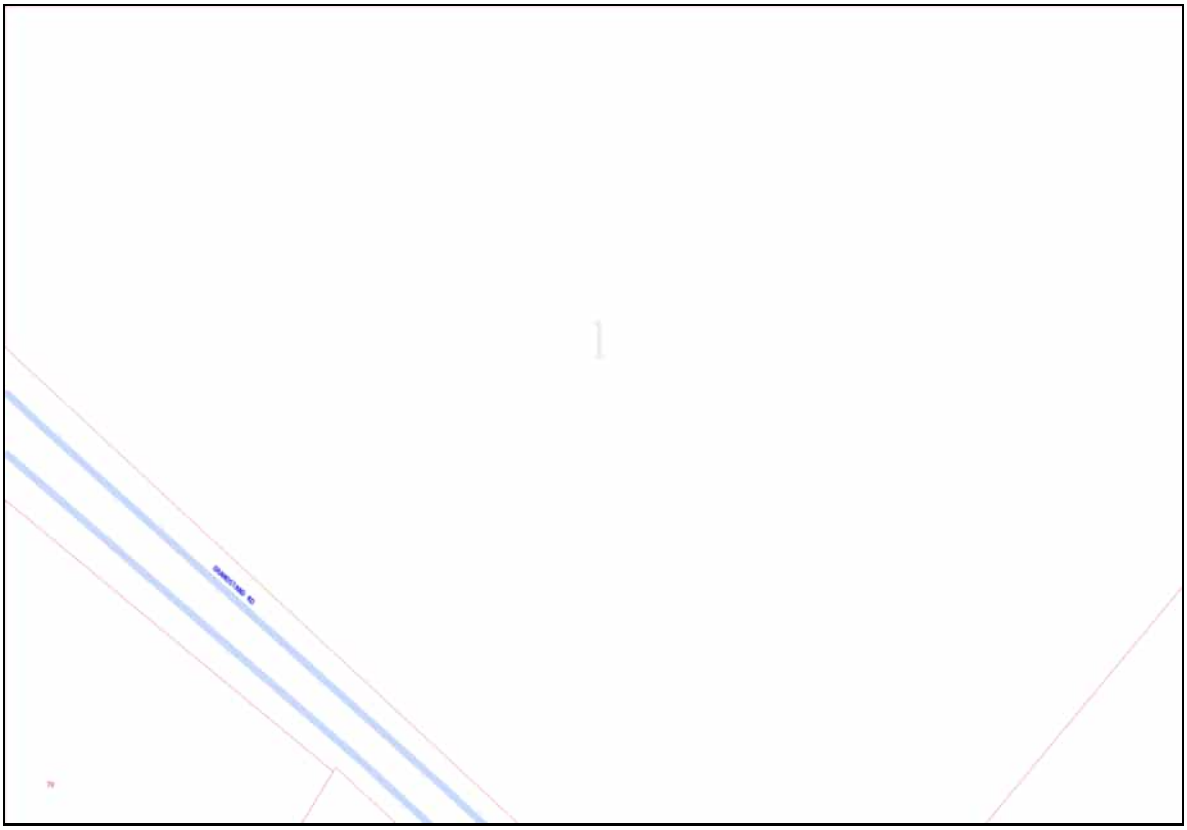
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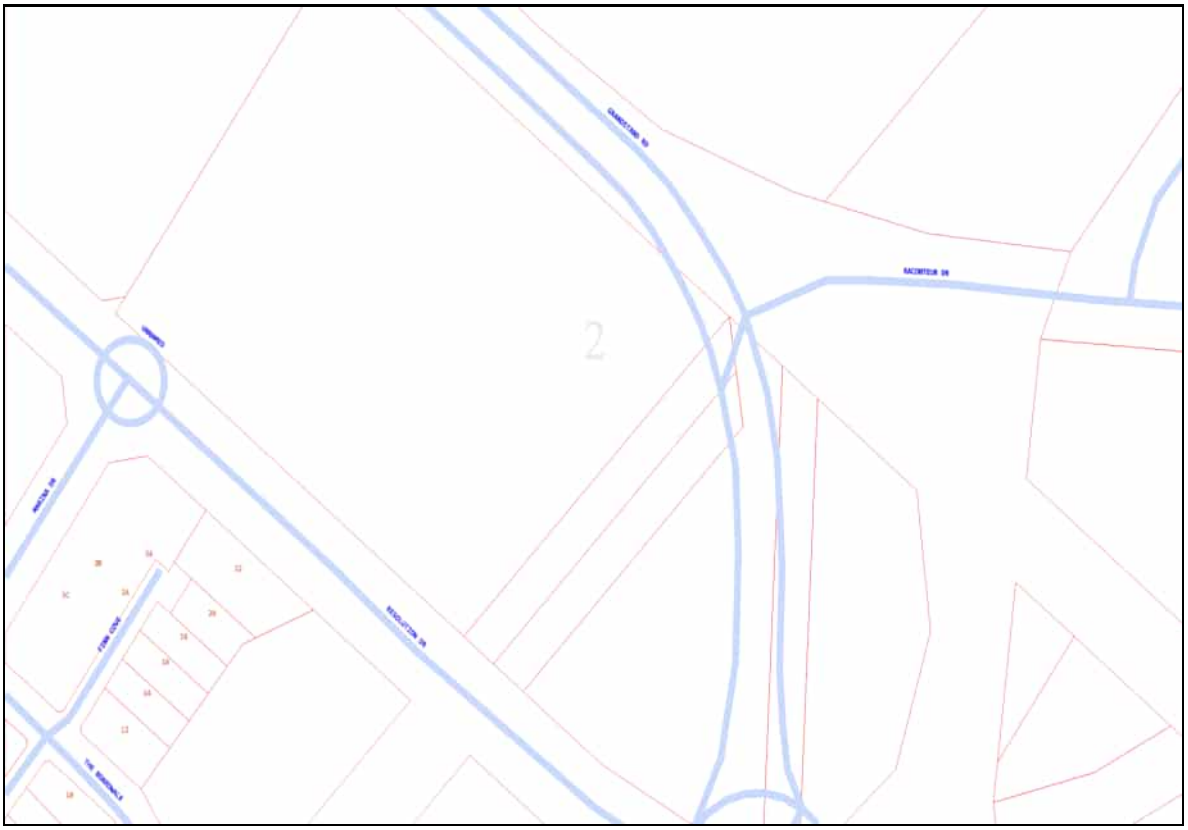
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Phone:	Not Supplied
Fax:	Not Supplied
Email:	jzielinski@tabec.com.au

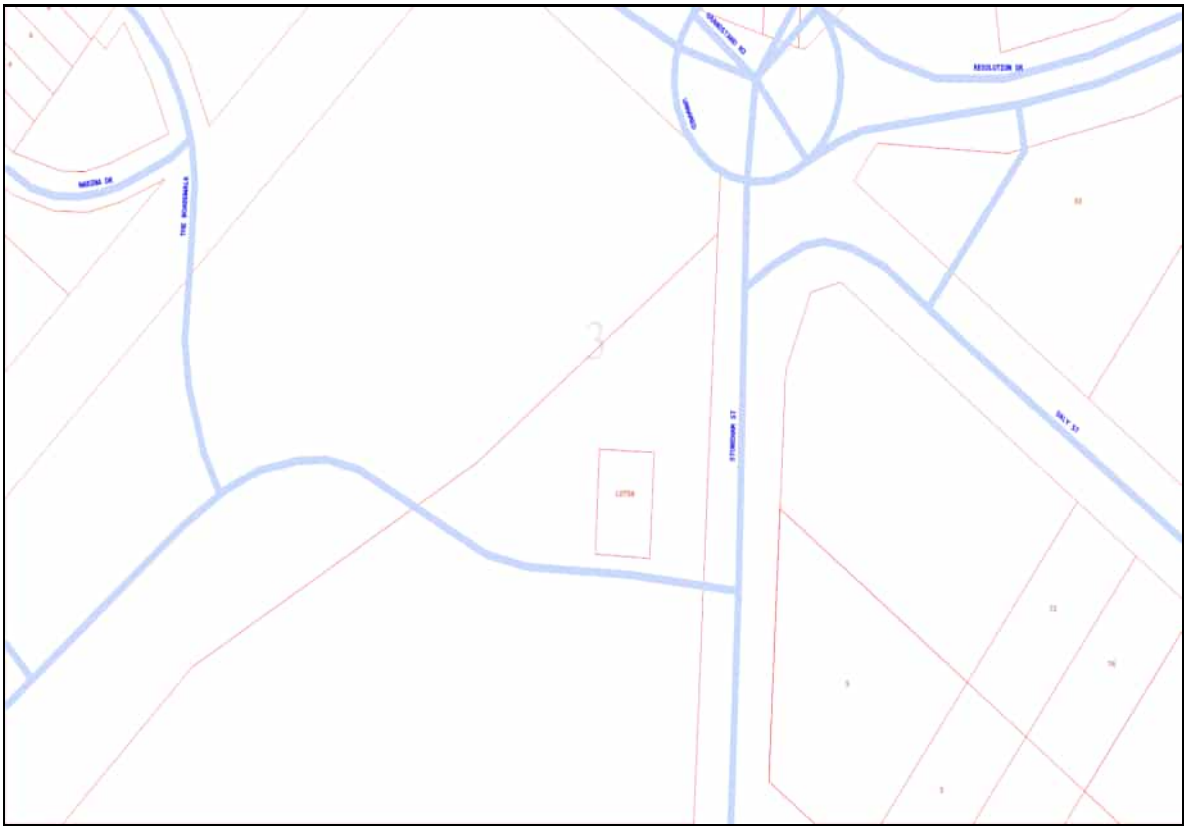
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Sequence #	240900610
Issue Date:	21/06/2024
Location:	2 Raconteur Drive , Ascot , WA , 6104

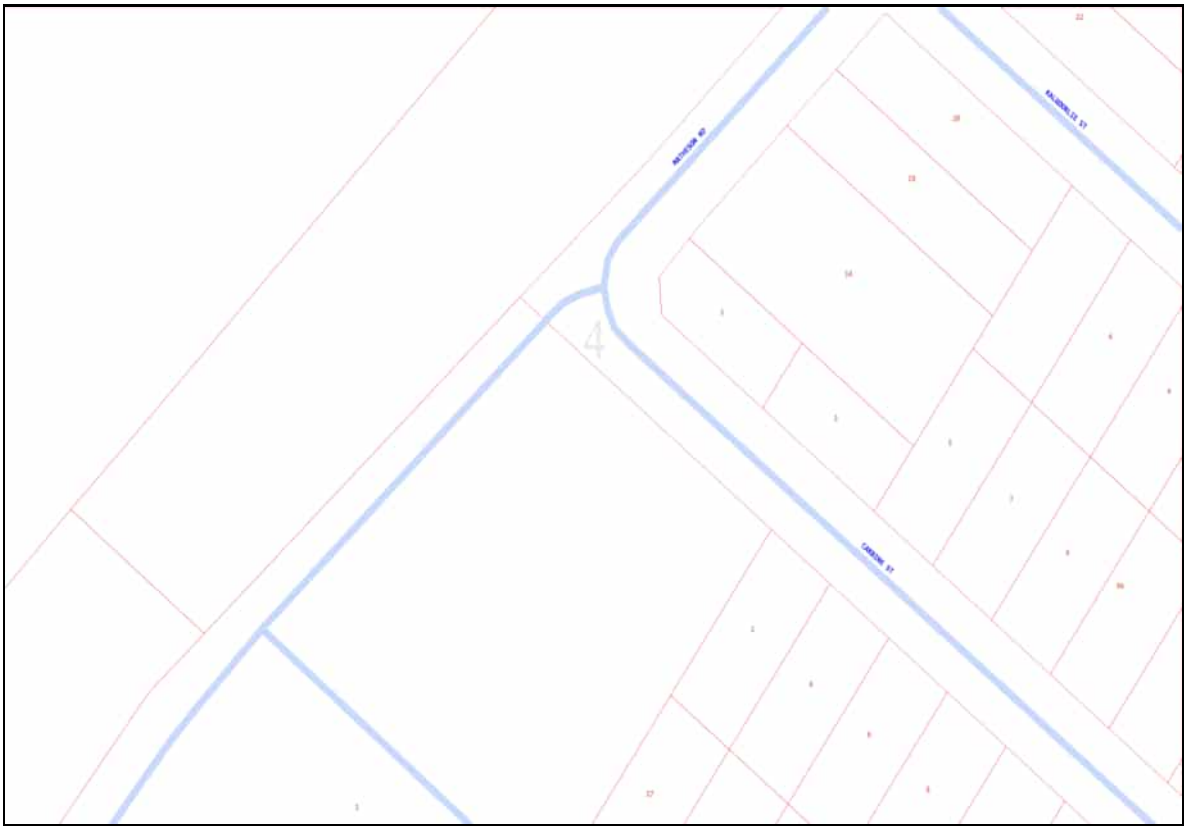
Indicative Plans are tiled below to demonstrate how to layout and read nbn asset plans

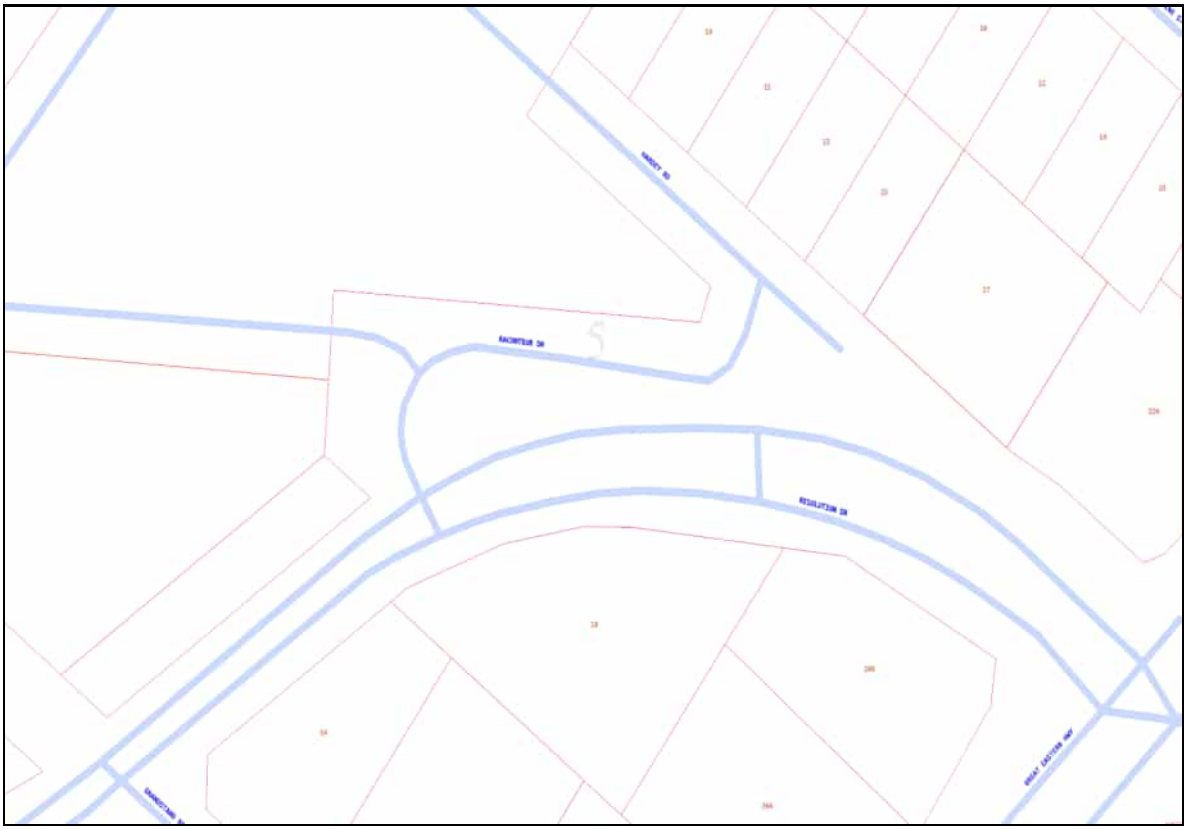


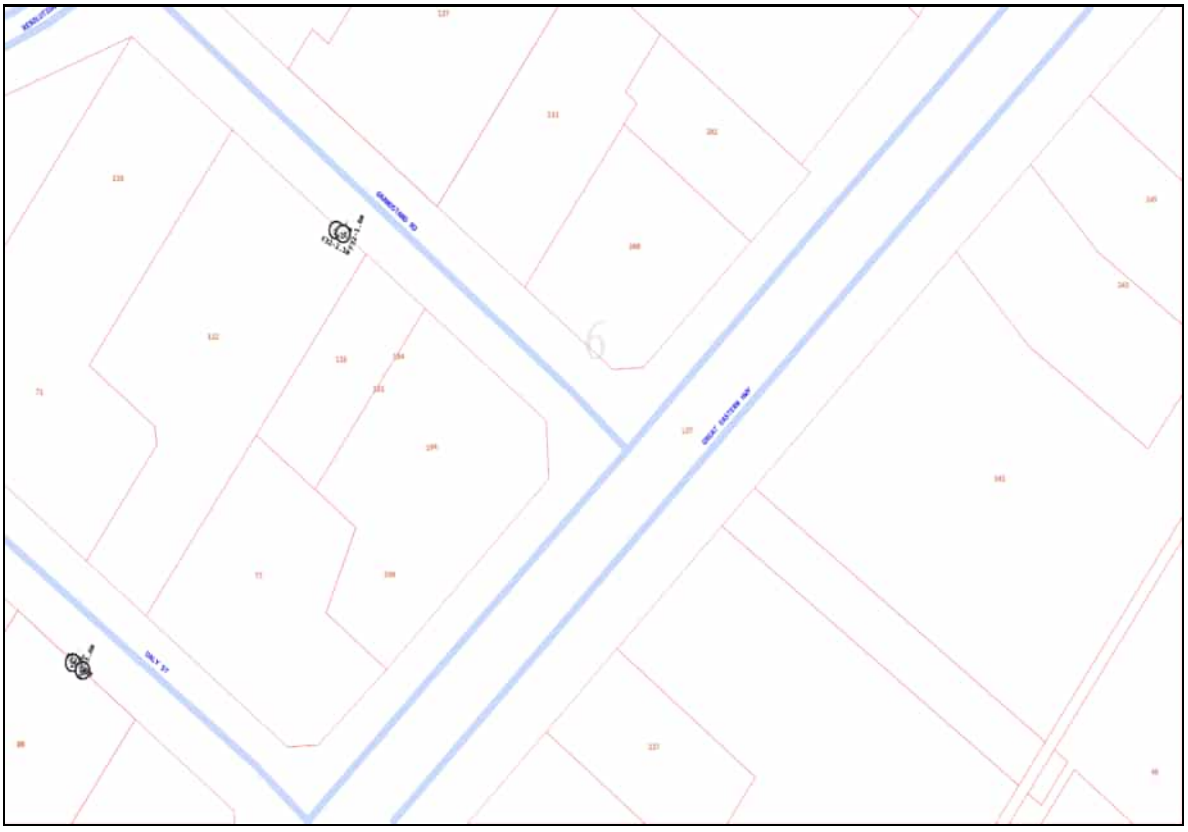












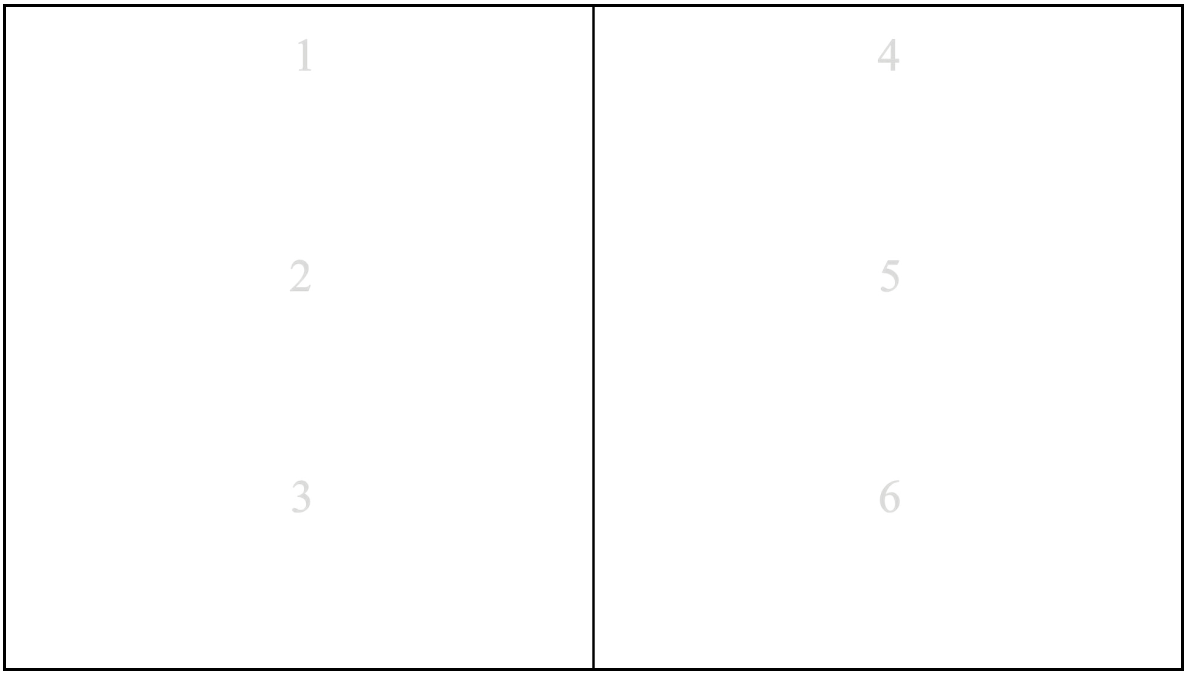
Emergency Contacts

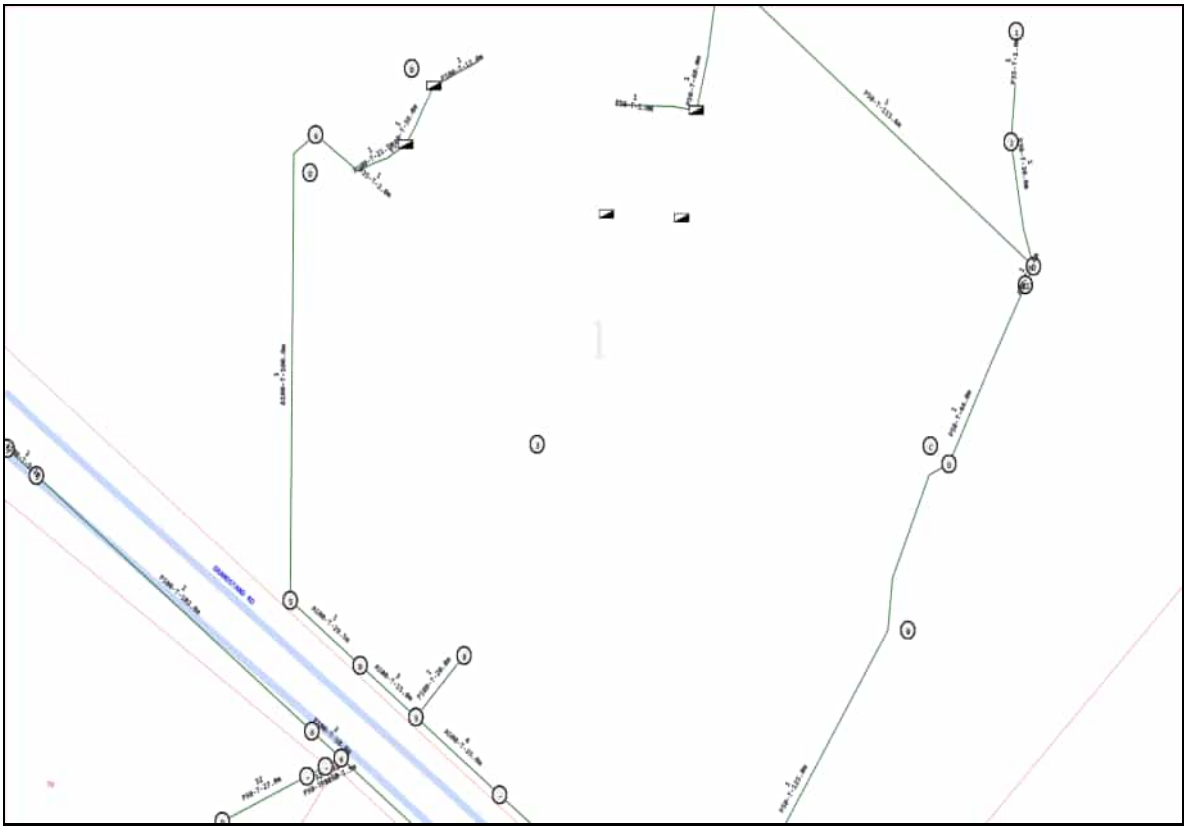
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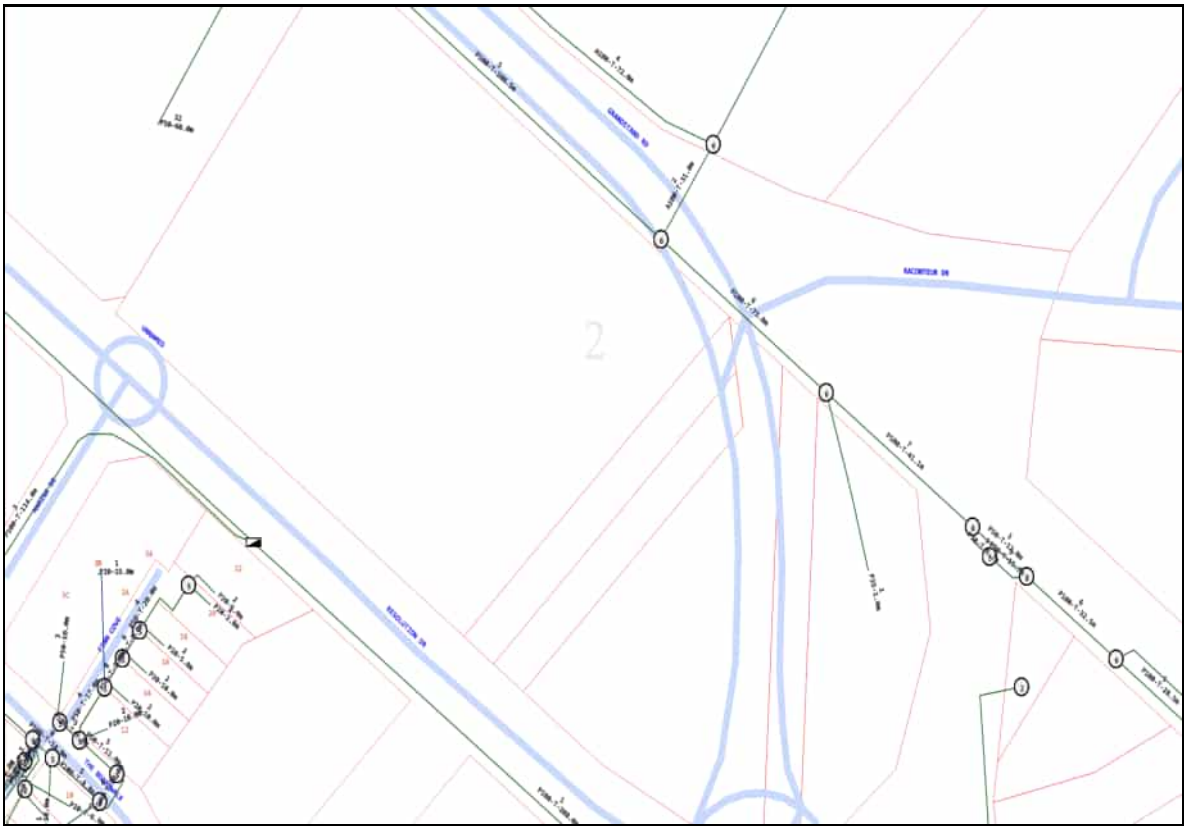
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Fax:	Not Supplied
Email:	jzielinski@tabec.com.au

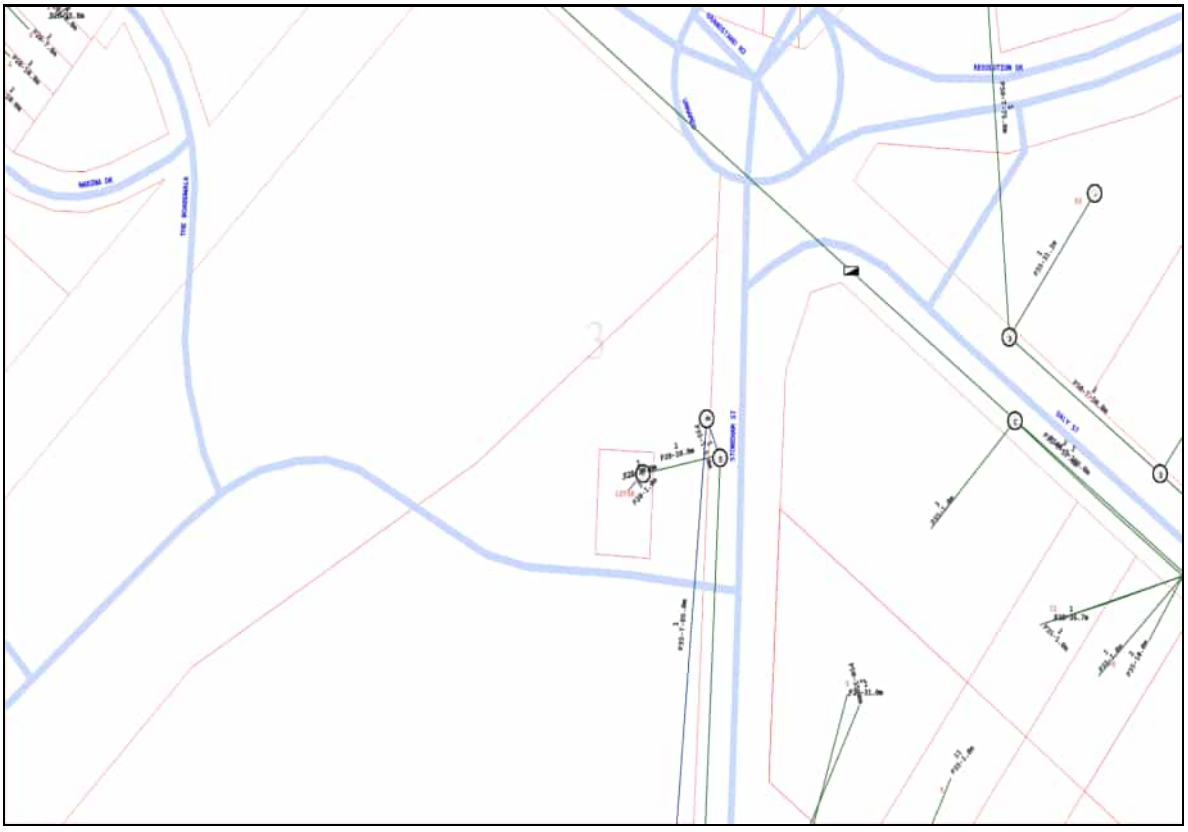
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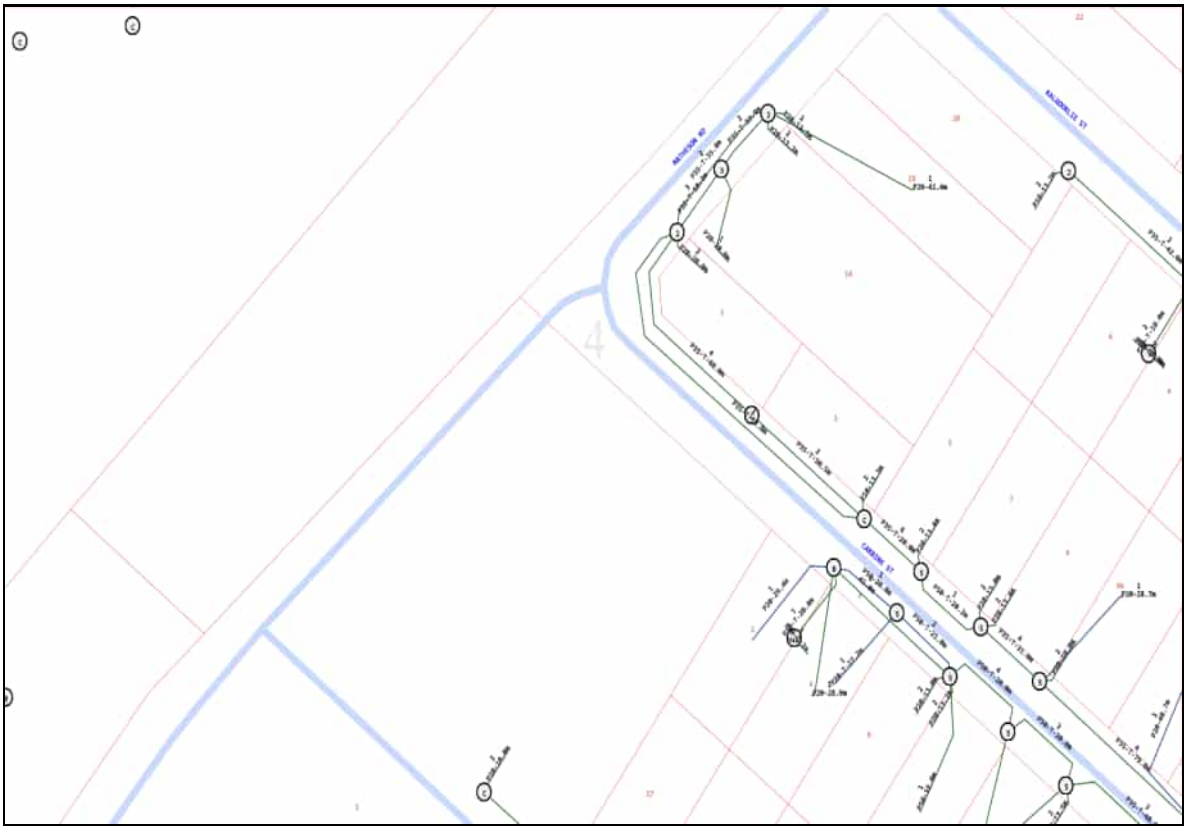
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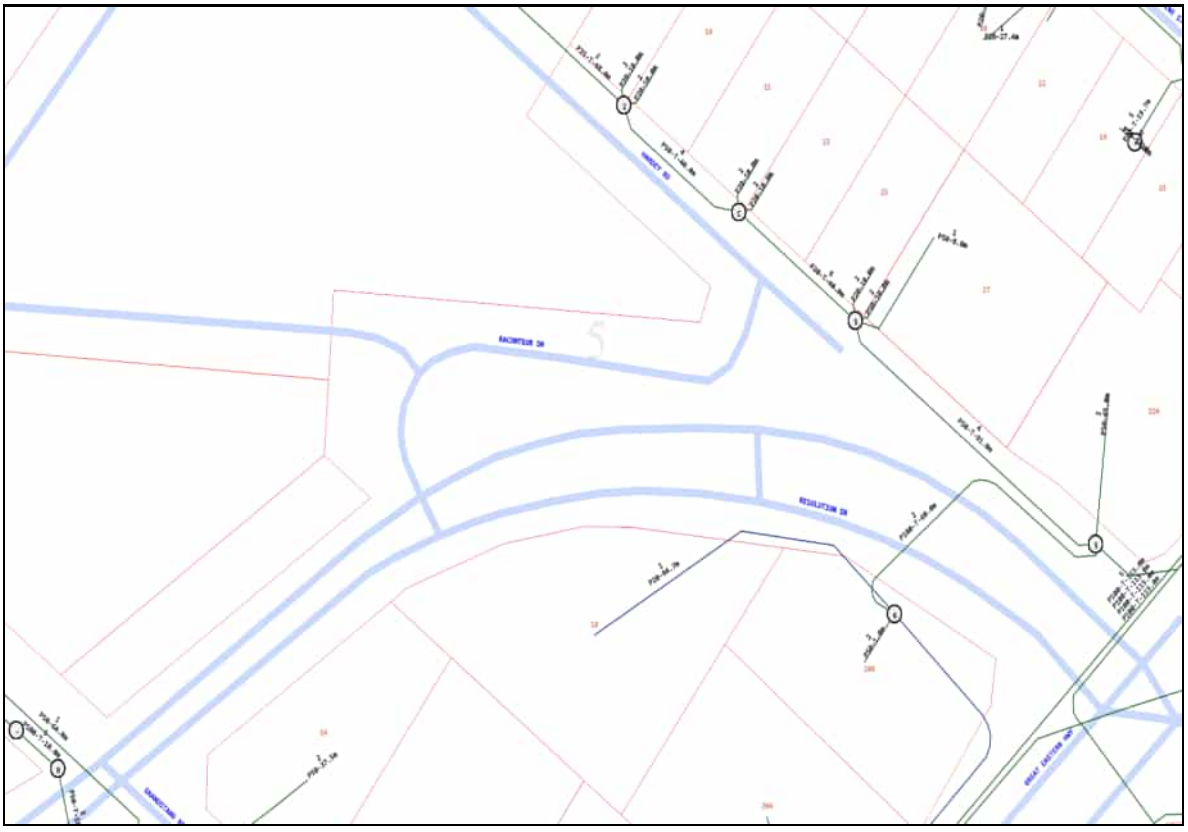


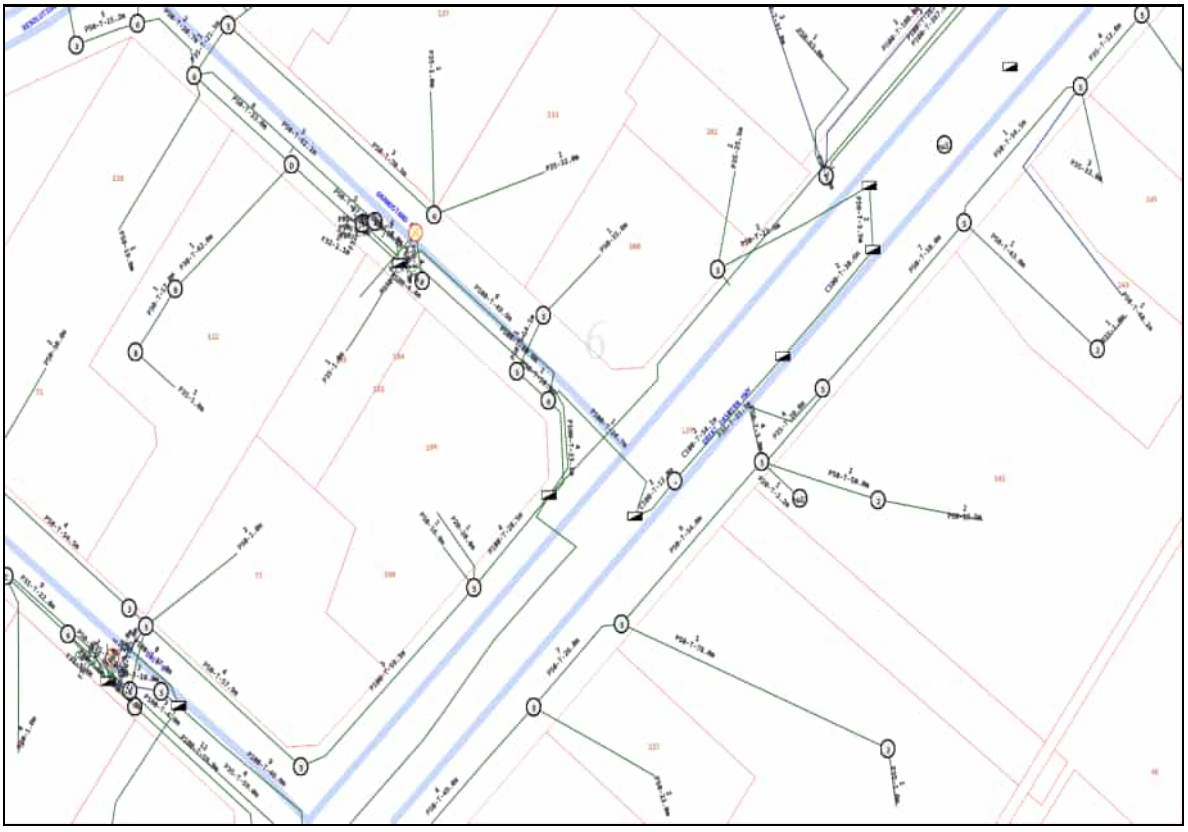






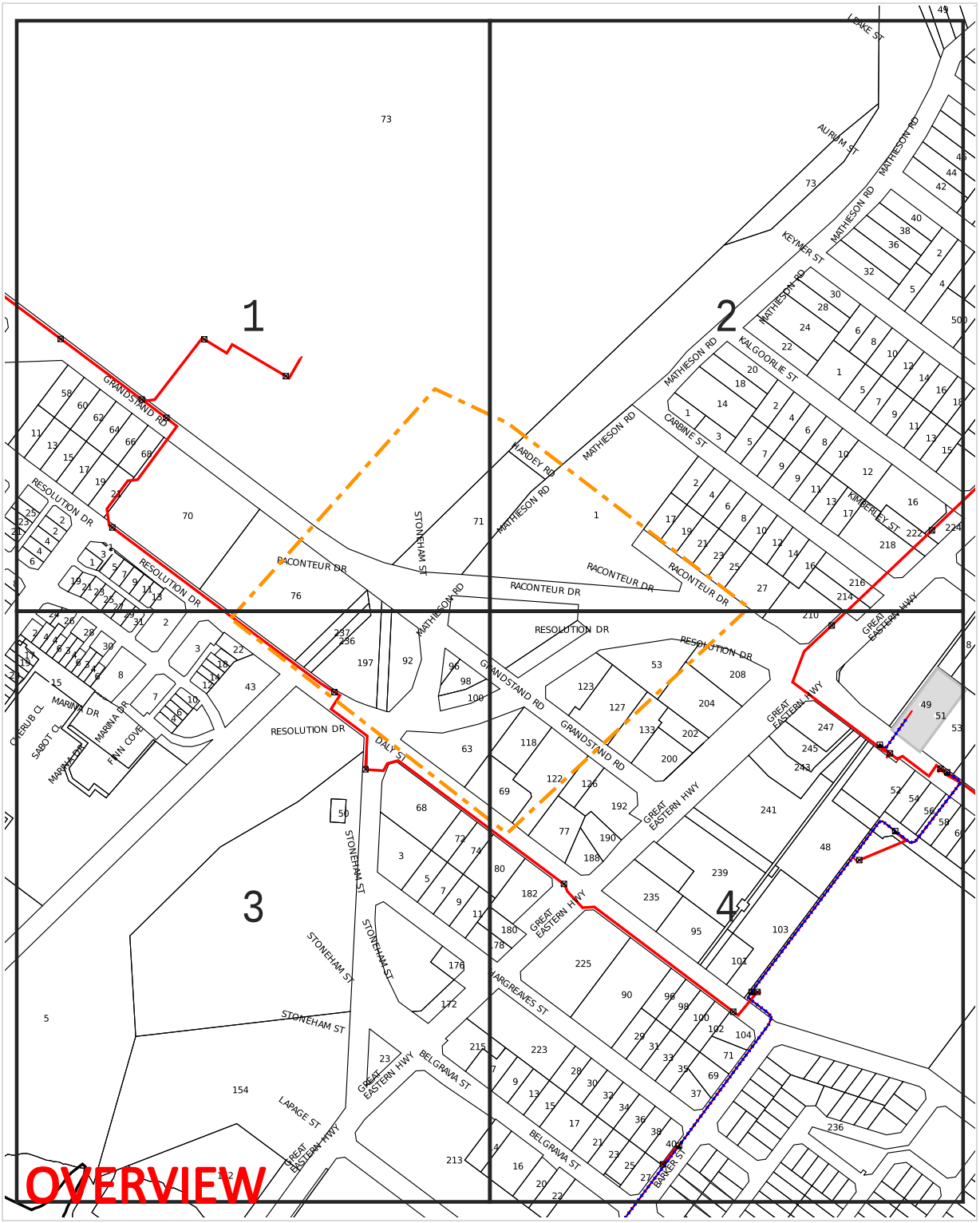






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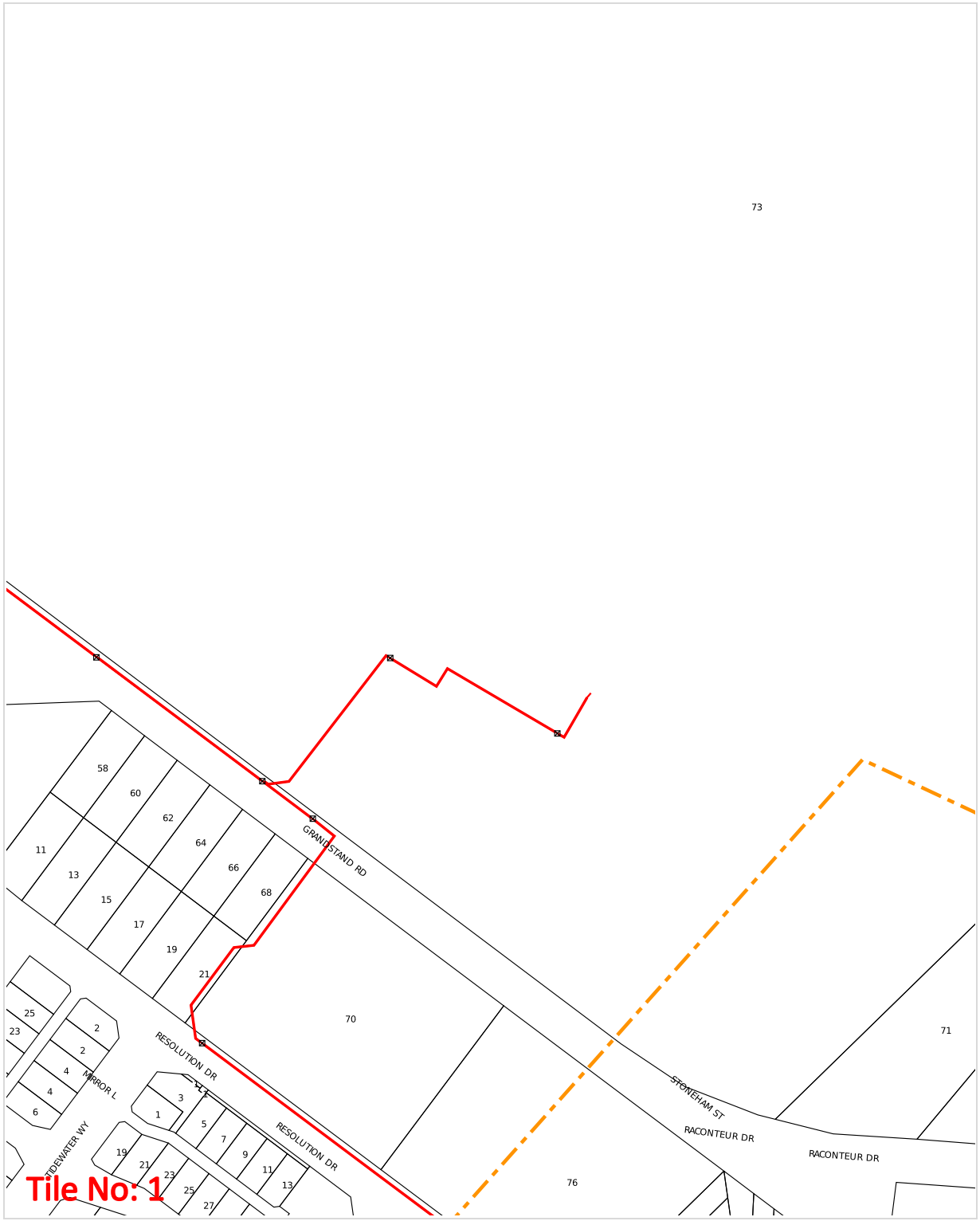
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Sequence Number: 240900607

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For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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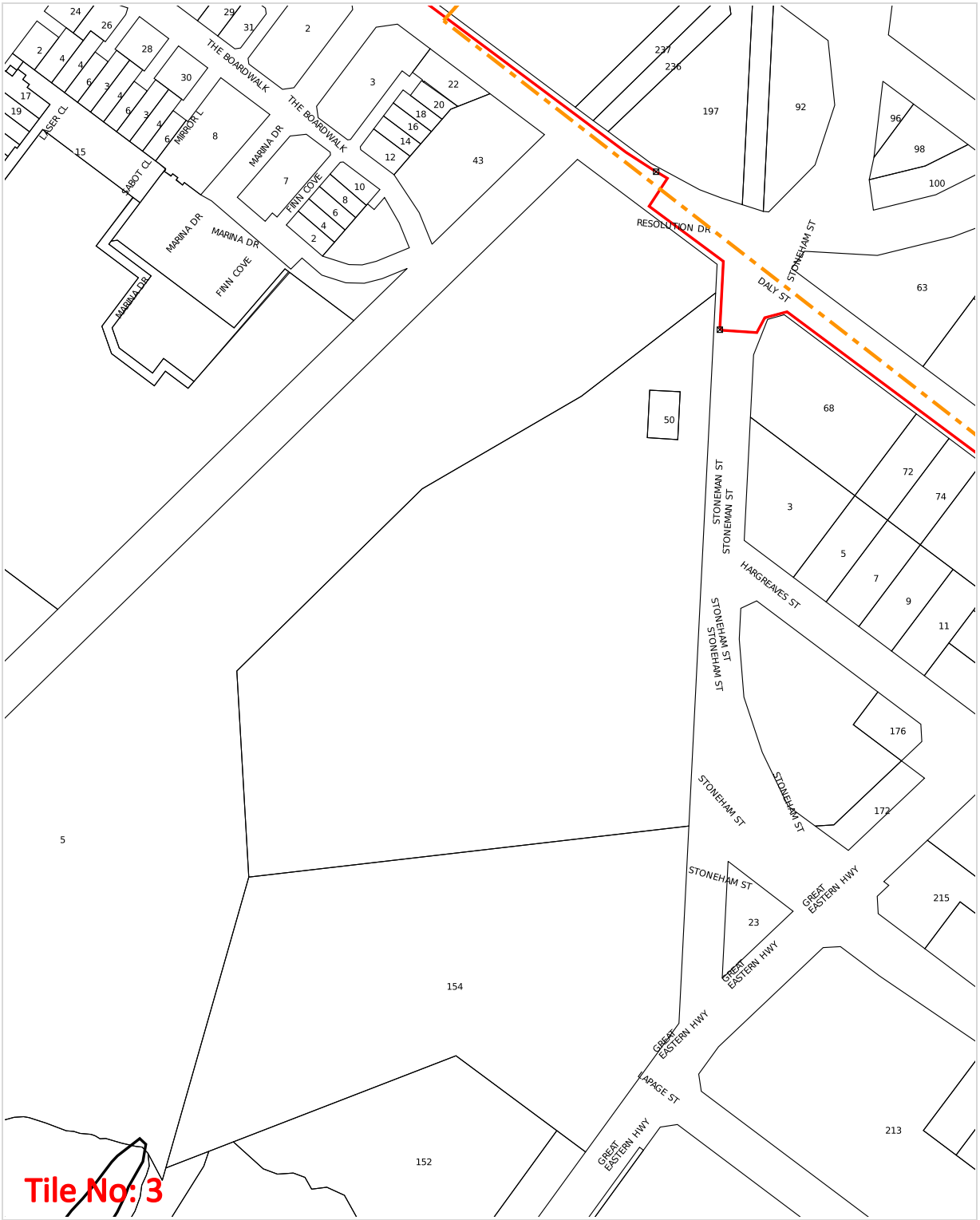
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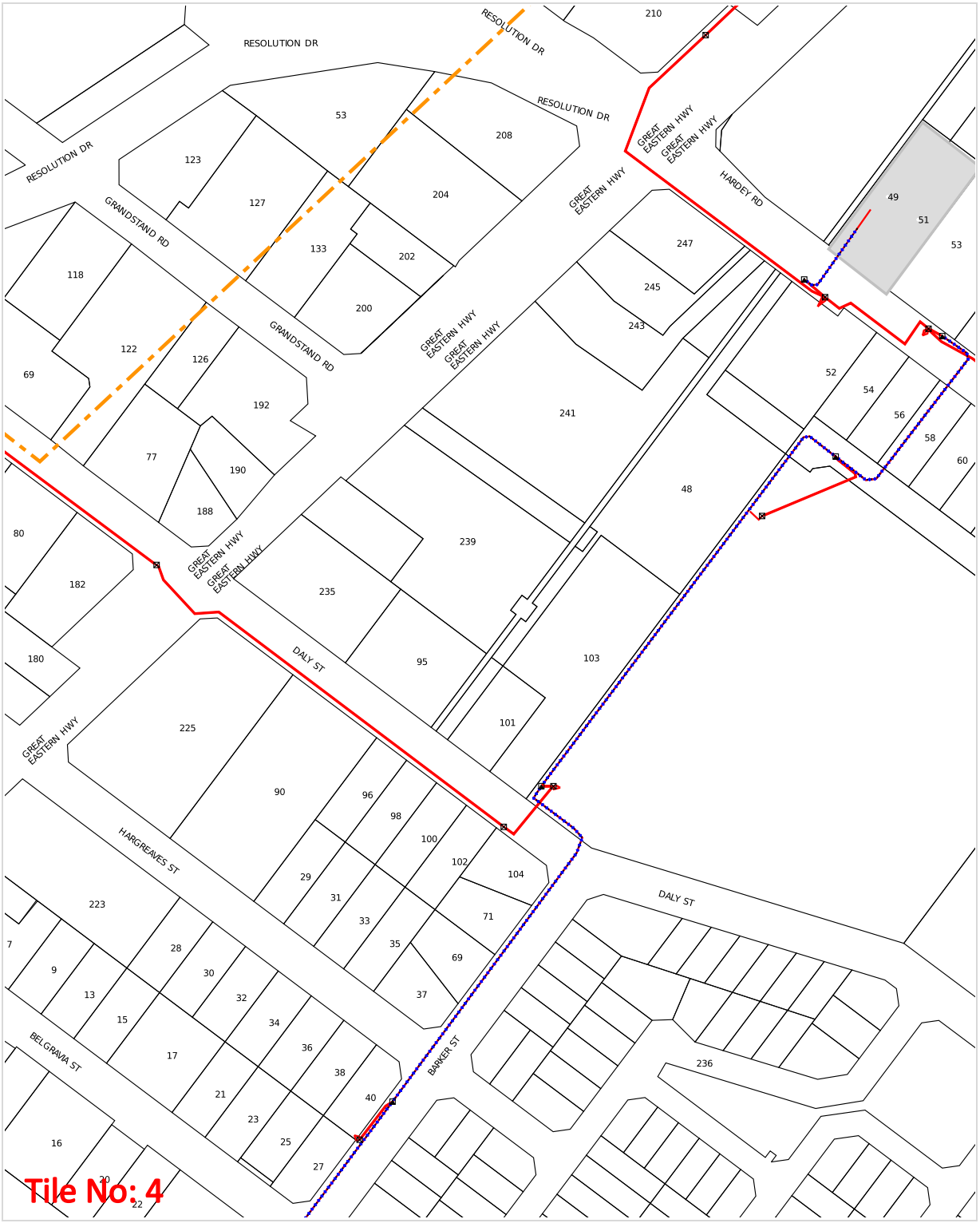
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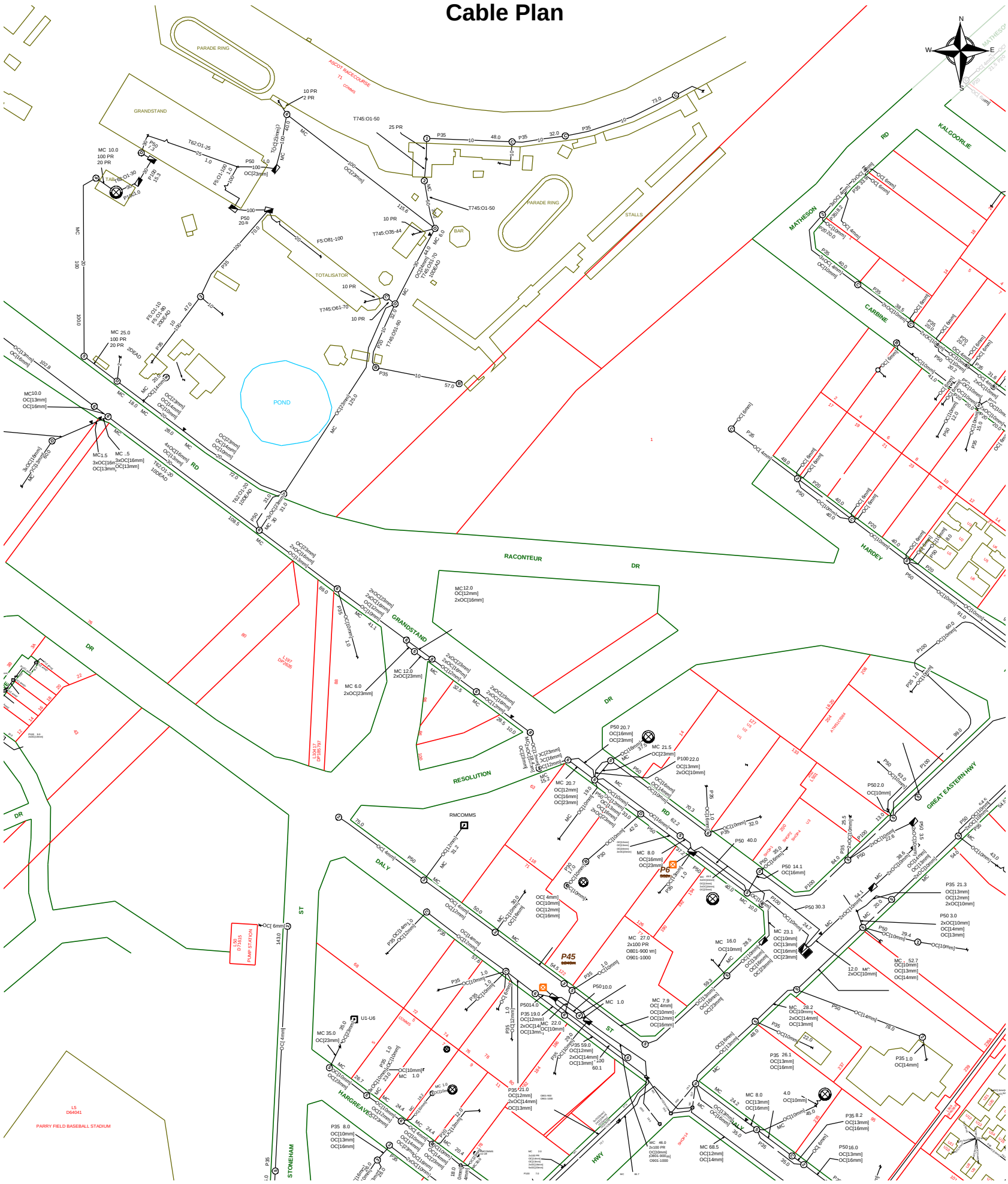
Sequence Number: 240900607

Date Generated: 21 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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Cable Plan



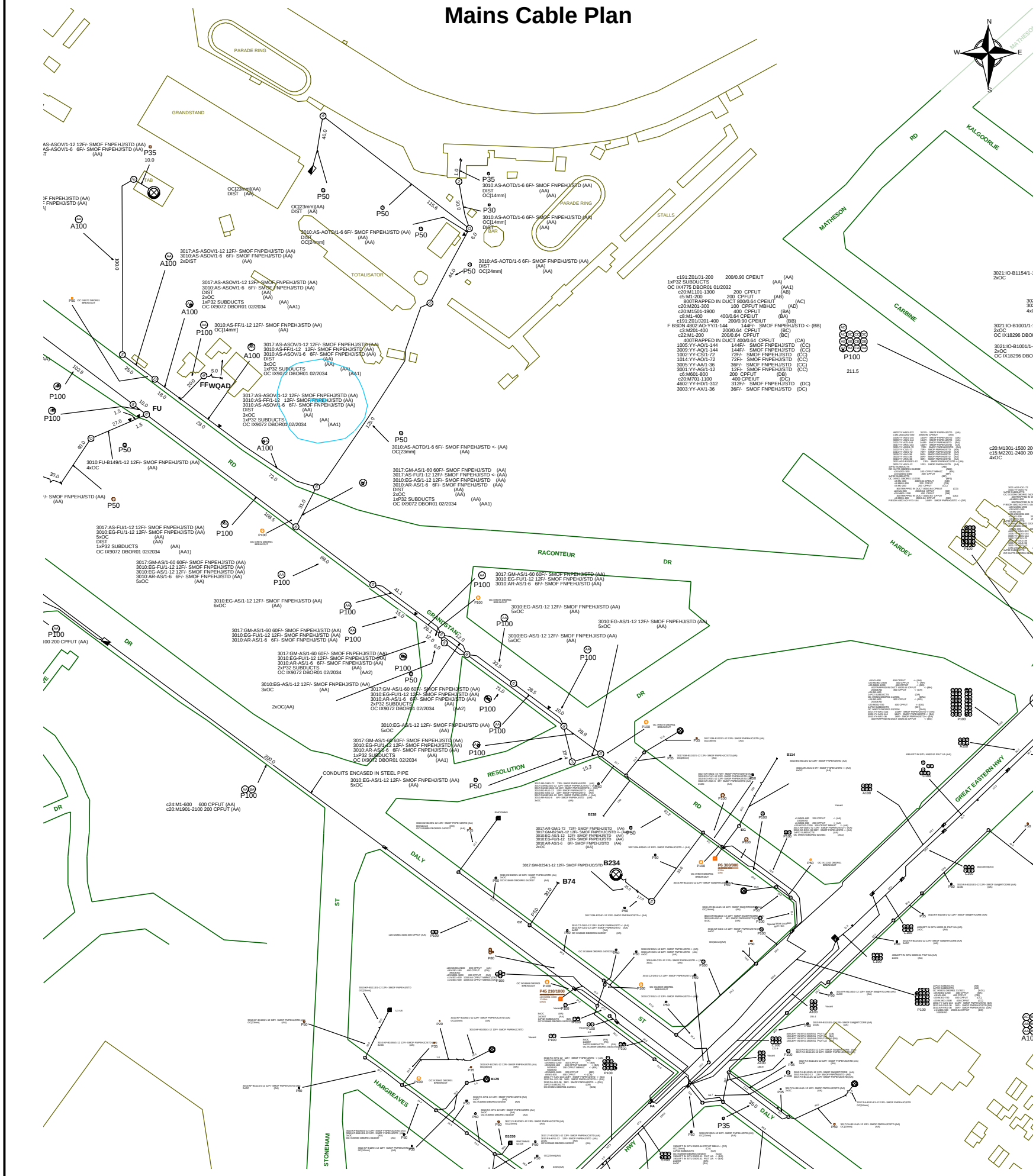
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900612
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:39	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

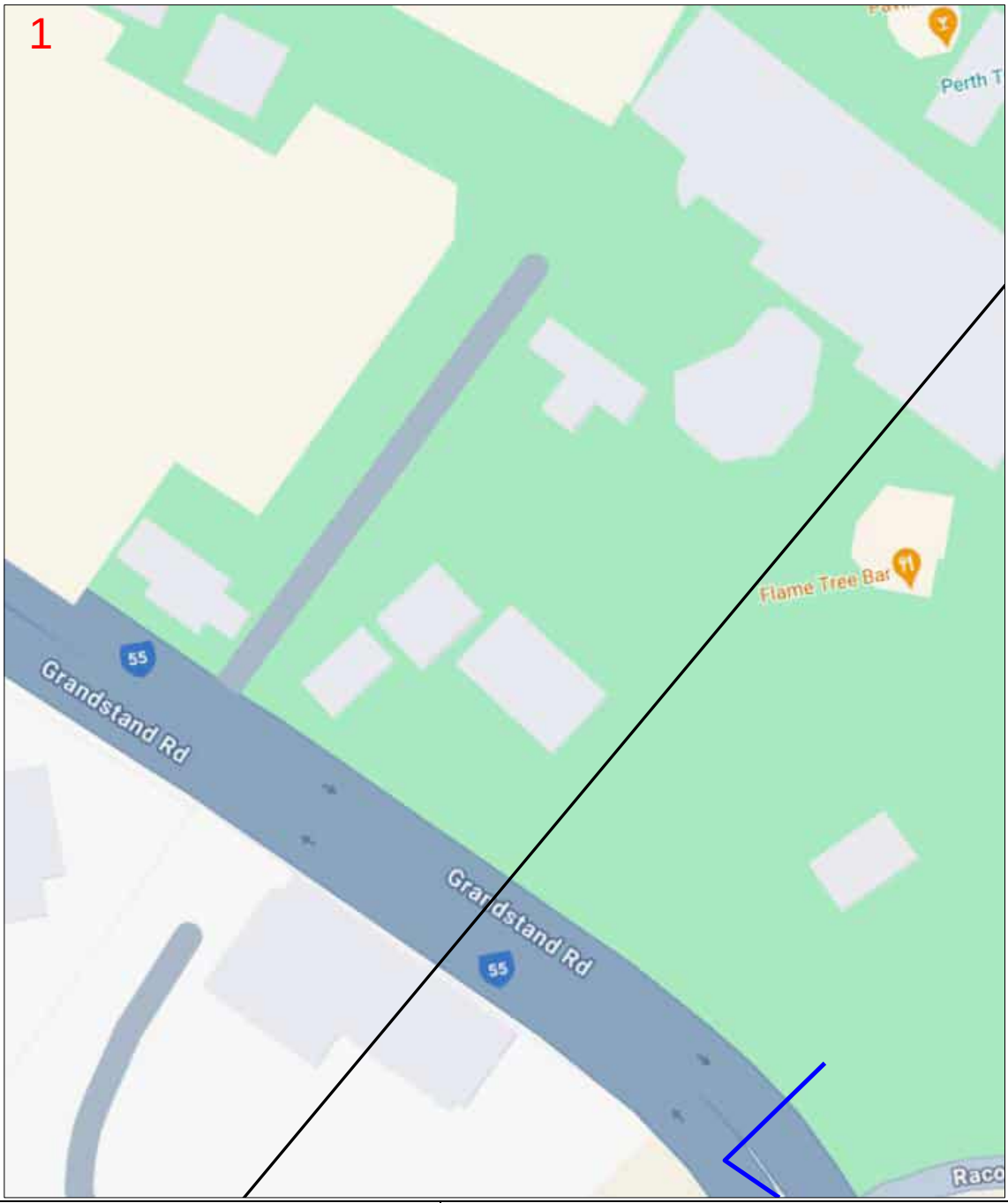
Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900612
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:45	

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
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Enquiry Number: 240900609

Map Sheet: 1

Scale: 1: 750

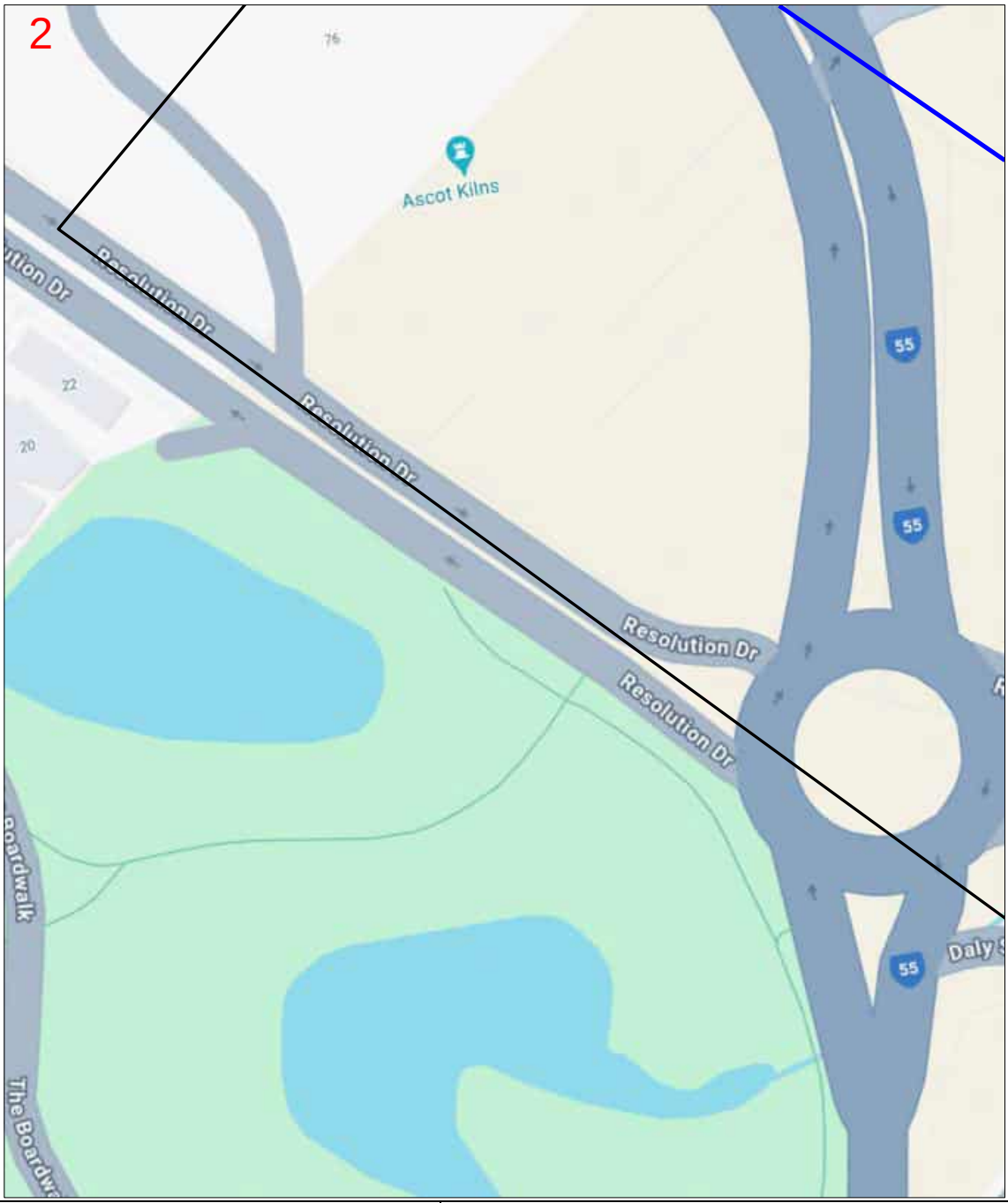
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N

LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900609

Map Sheet: 2

Scale: 1: 750

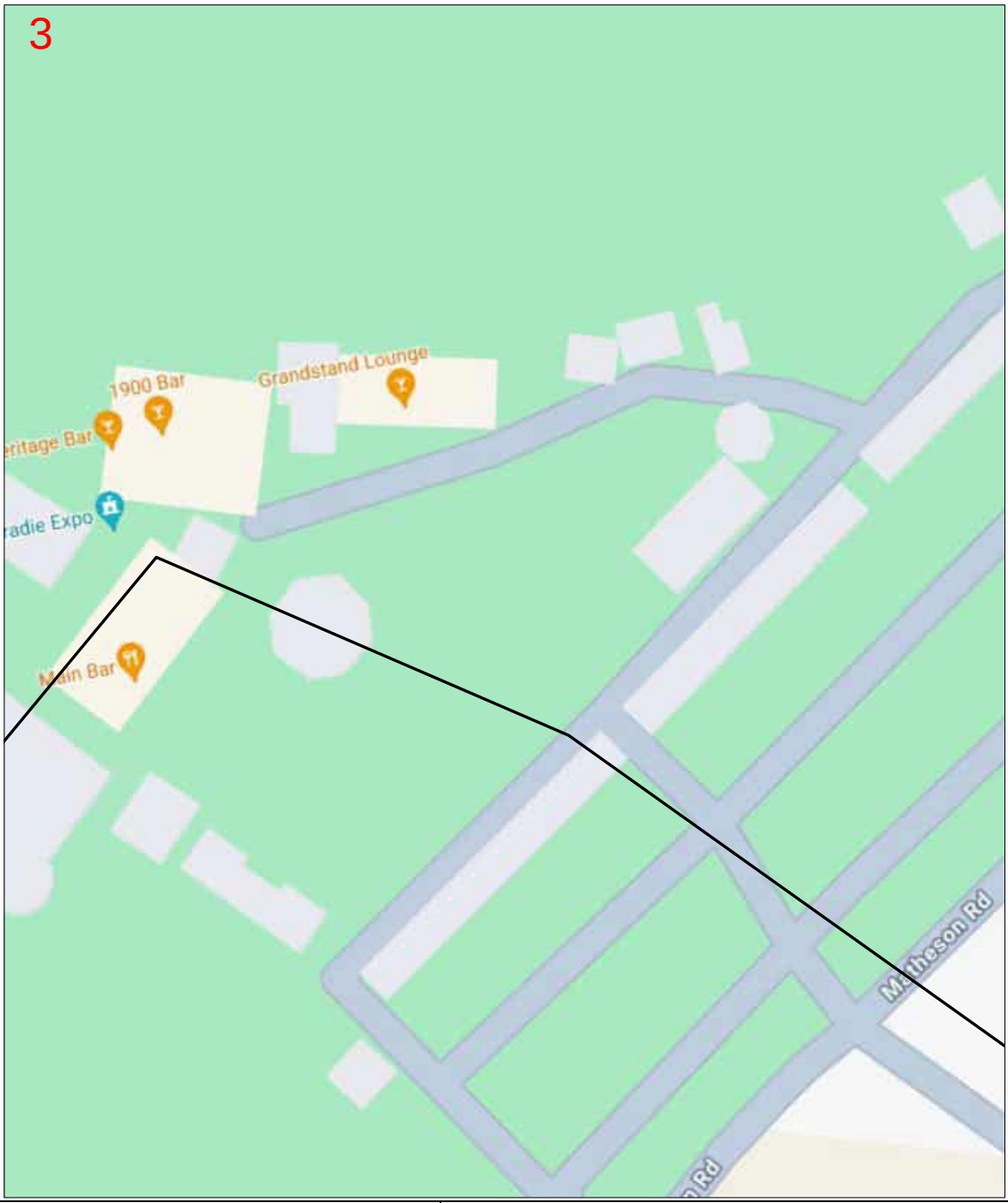
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LEGEND

BYDA Work Area	
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AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900609

Map Sheet: 3

Scale: 1: 750

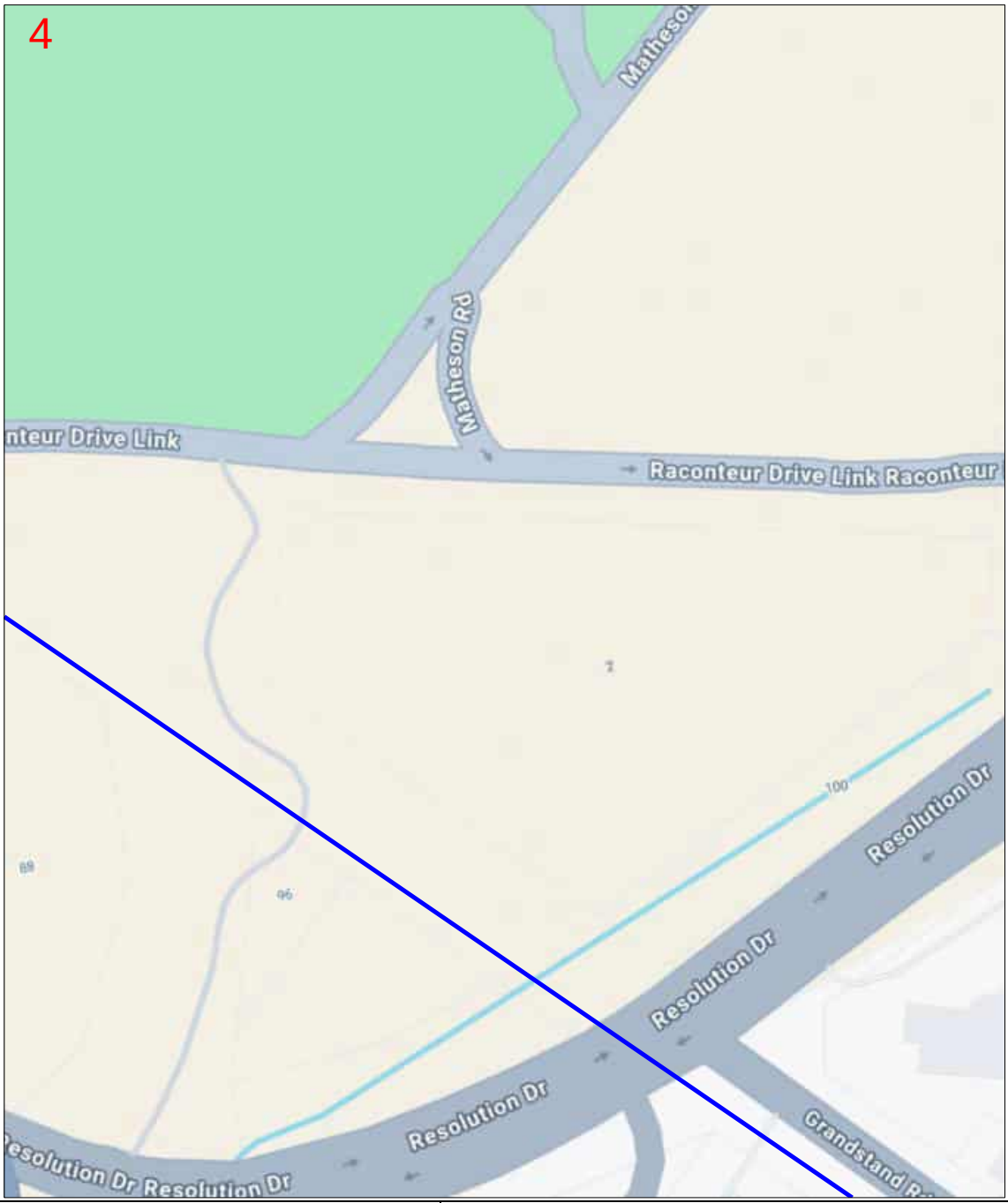
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LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900609

Map Sheet: 4

Scale: 1: 750

0 0.008km

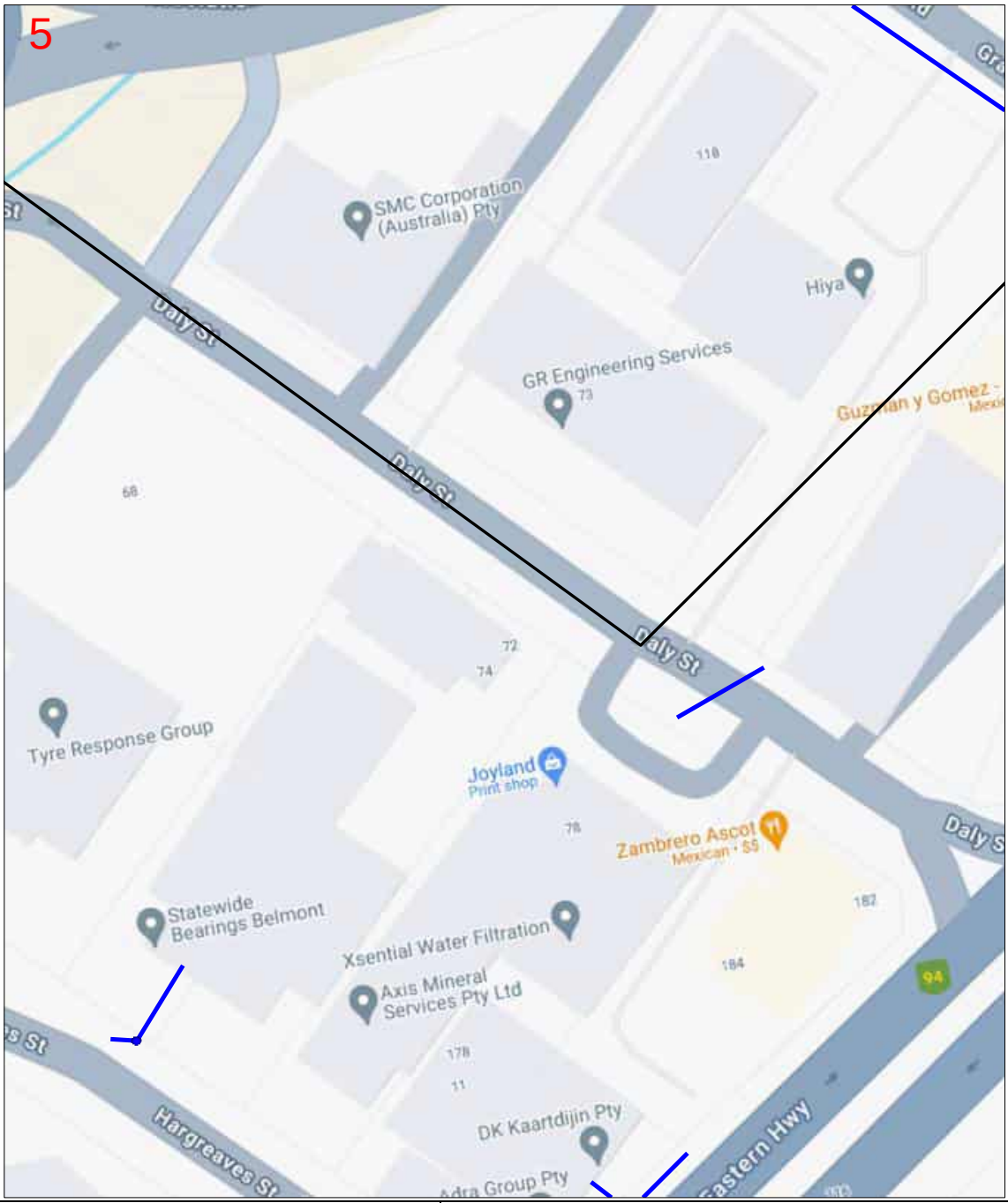
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LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900609

Map Sheet: 5

Scale: 1: 750

0 0.008km

N

LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
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Enquiry Number: 240900609

Map Sheet: 6

Scale: 1: 750

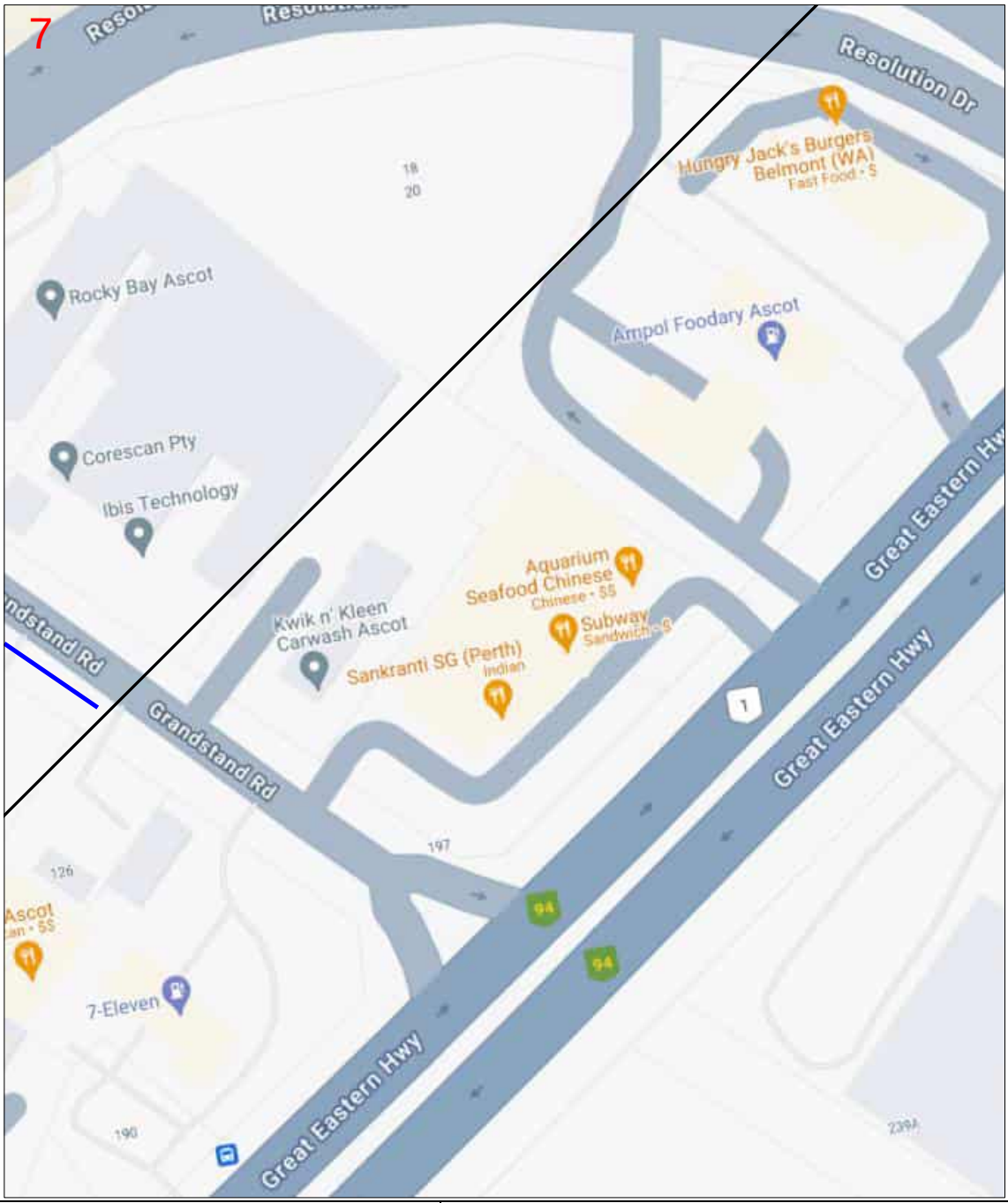
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LEGEND

BYDA Work Area	
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AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900609

Map Sheet: 7

Scale: 1: 750

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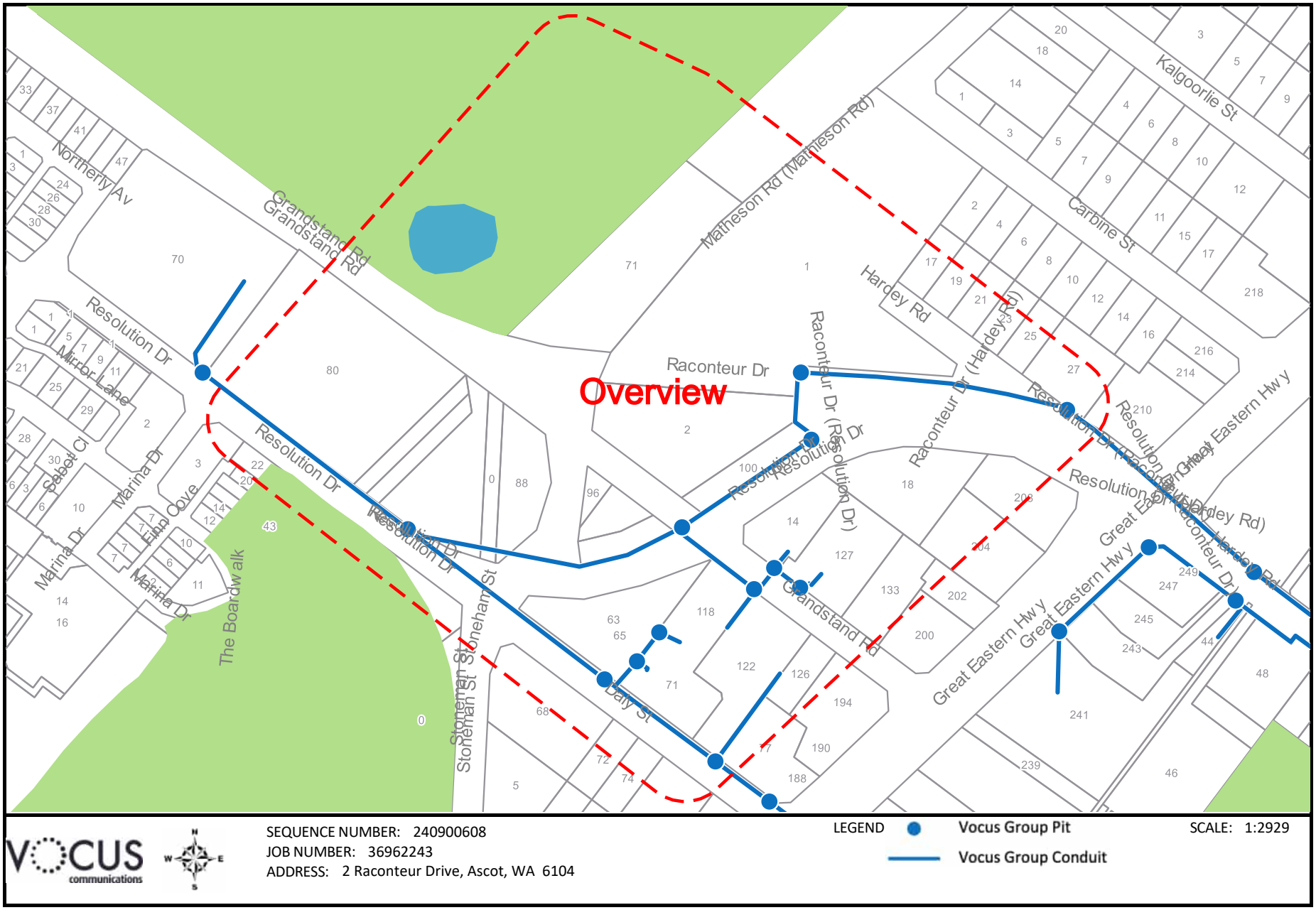
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LEGEND

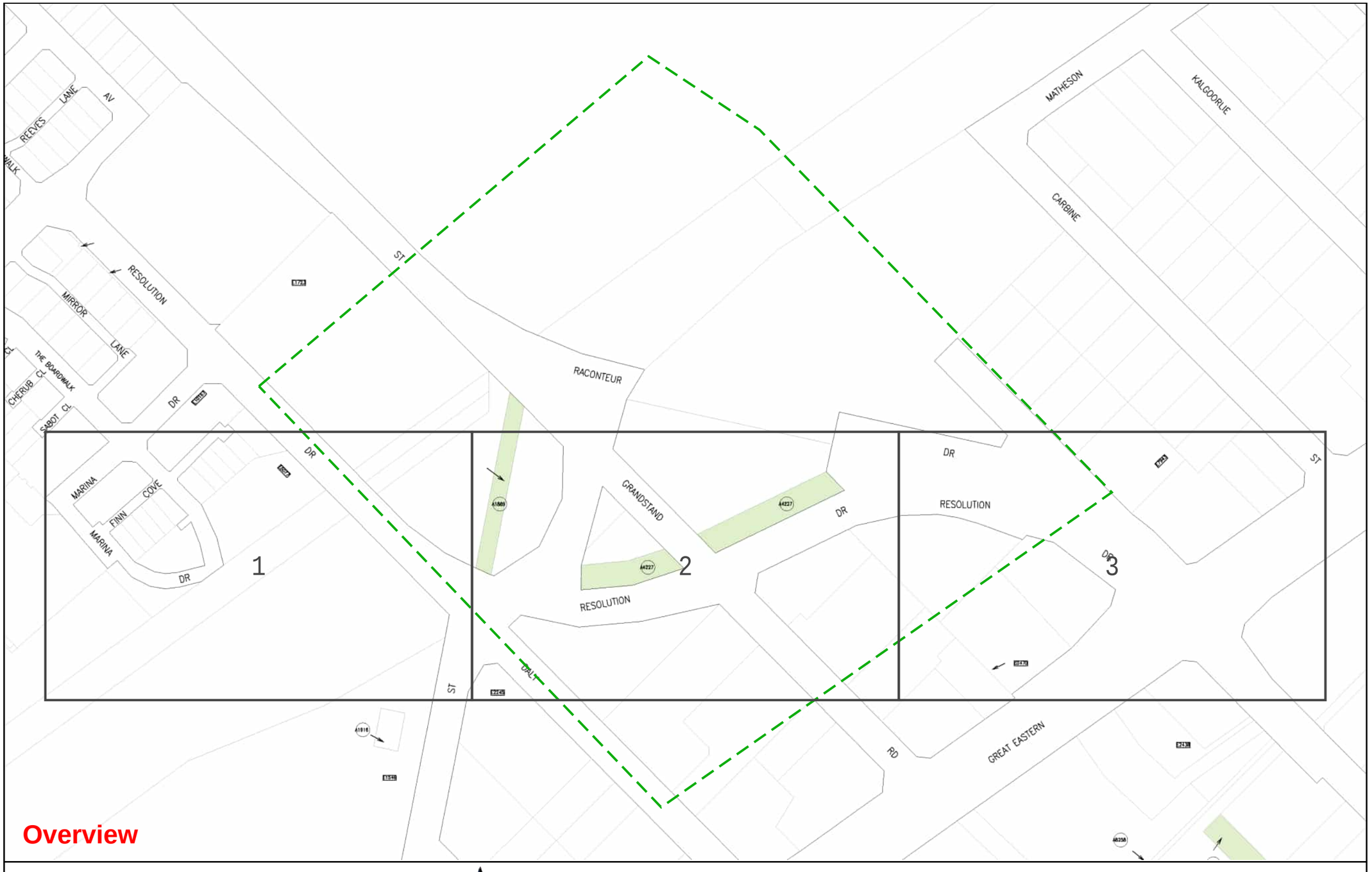
BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
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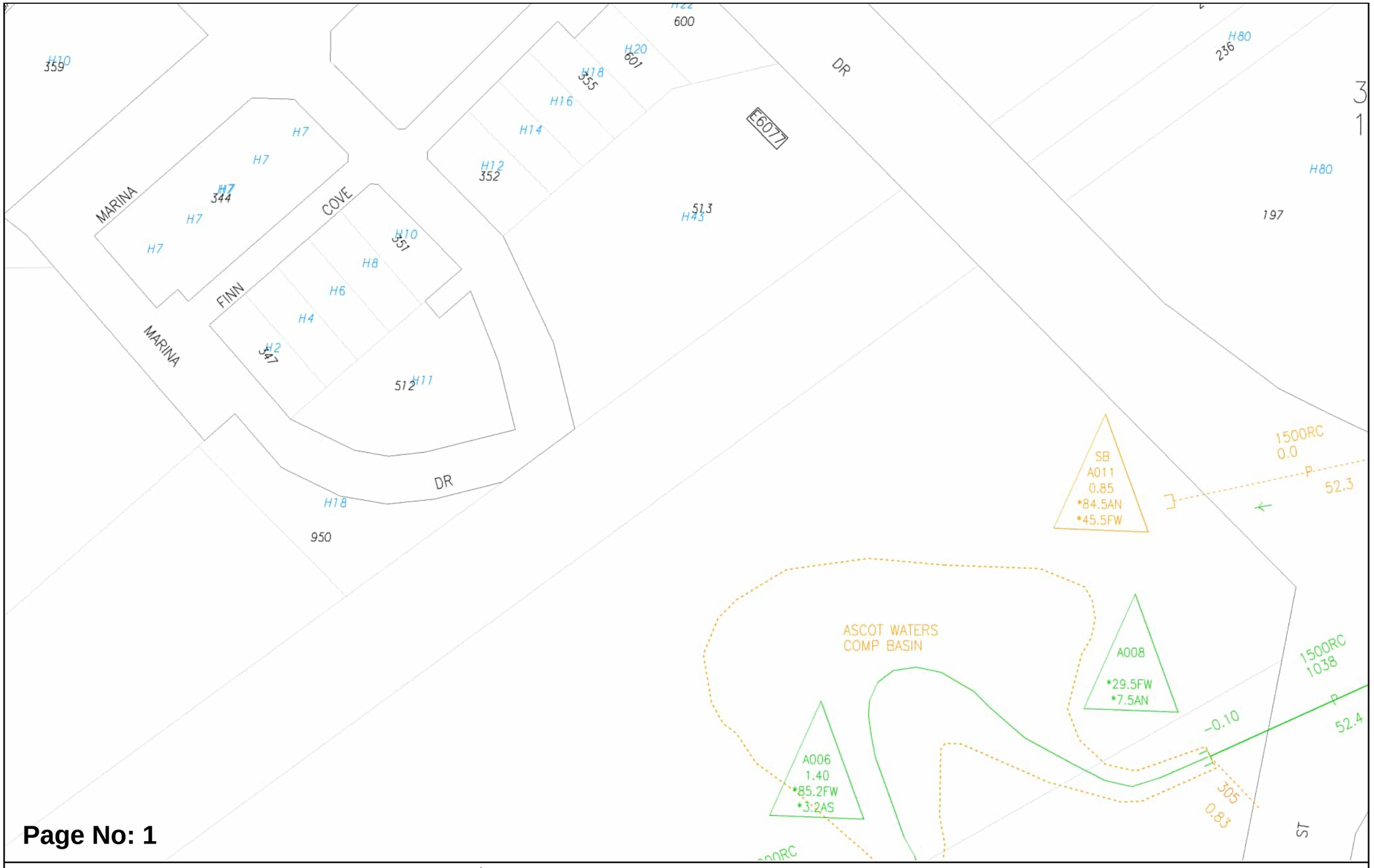


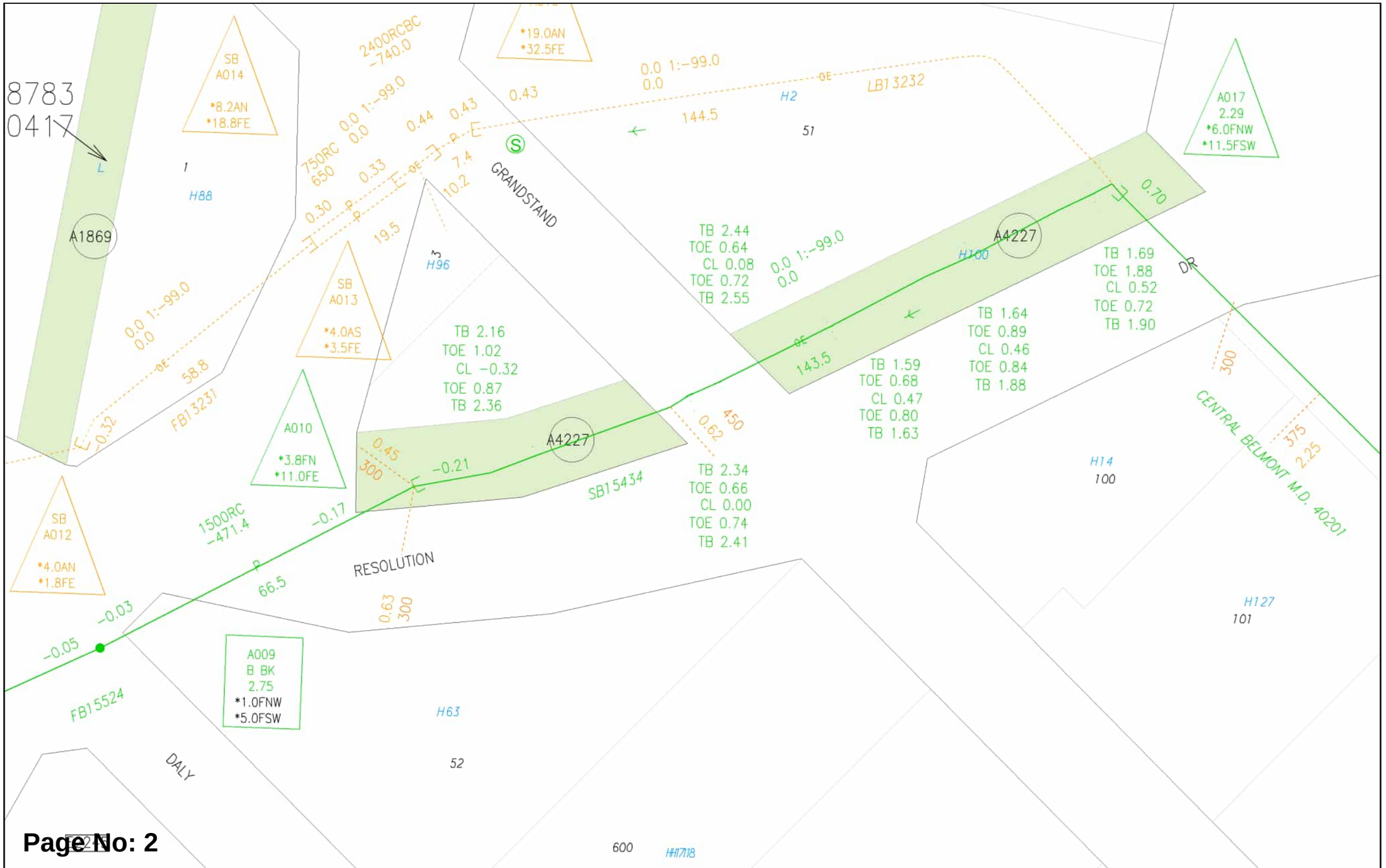
The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.



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MARINA
COVE
FINN
MARINA
DR
DR
H7
H7
H7
H7
H7
344
H10
359
H10
351
H8
H6
H4
H2
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H14
H16
H18
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H20
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H43
H80
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H80
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P
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ASCOT WATERS
COMP BASIN
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*29.5FW
*7.5AN
A006
1.40
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P
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-0.10
305
0.83
ST
Page No: 1
WATER CORPORATION
Scale: 1:750
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024
N
Drainage
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Page No: 2

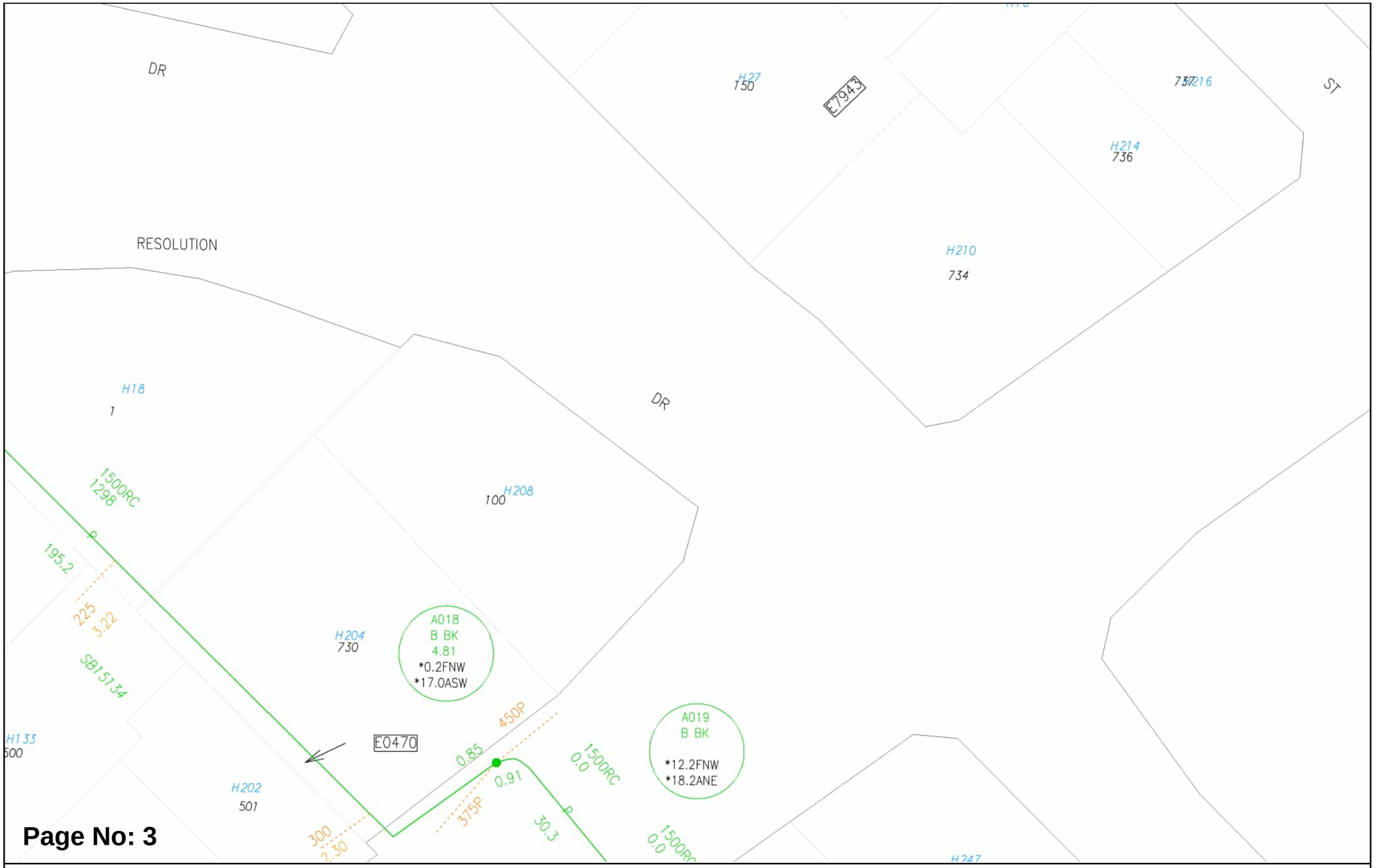
WATER CORPORATION

Scale: 1:750
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024

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Drainage

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WATER CORPORATION

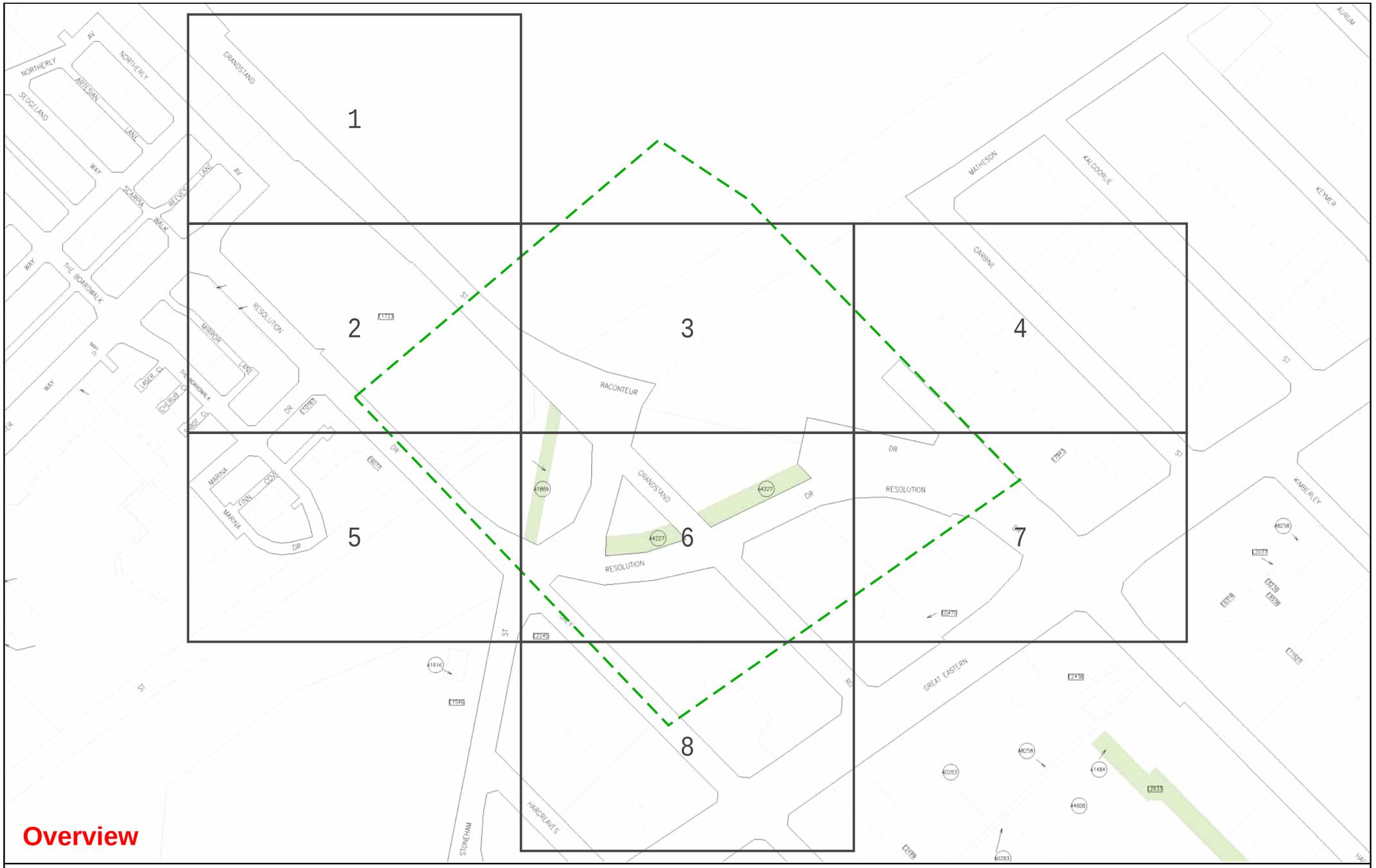
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Print Date:	21 Jun 2024

Drainage

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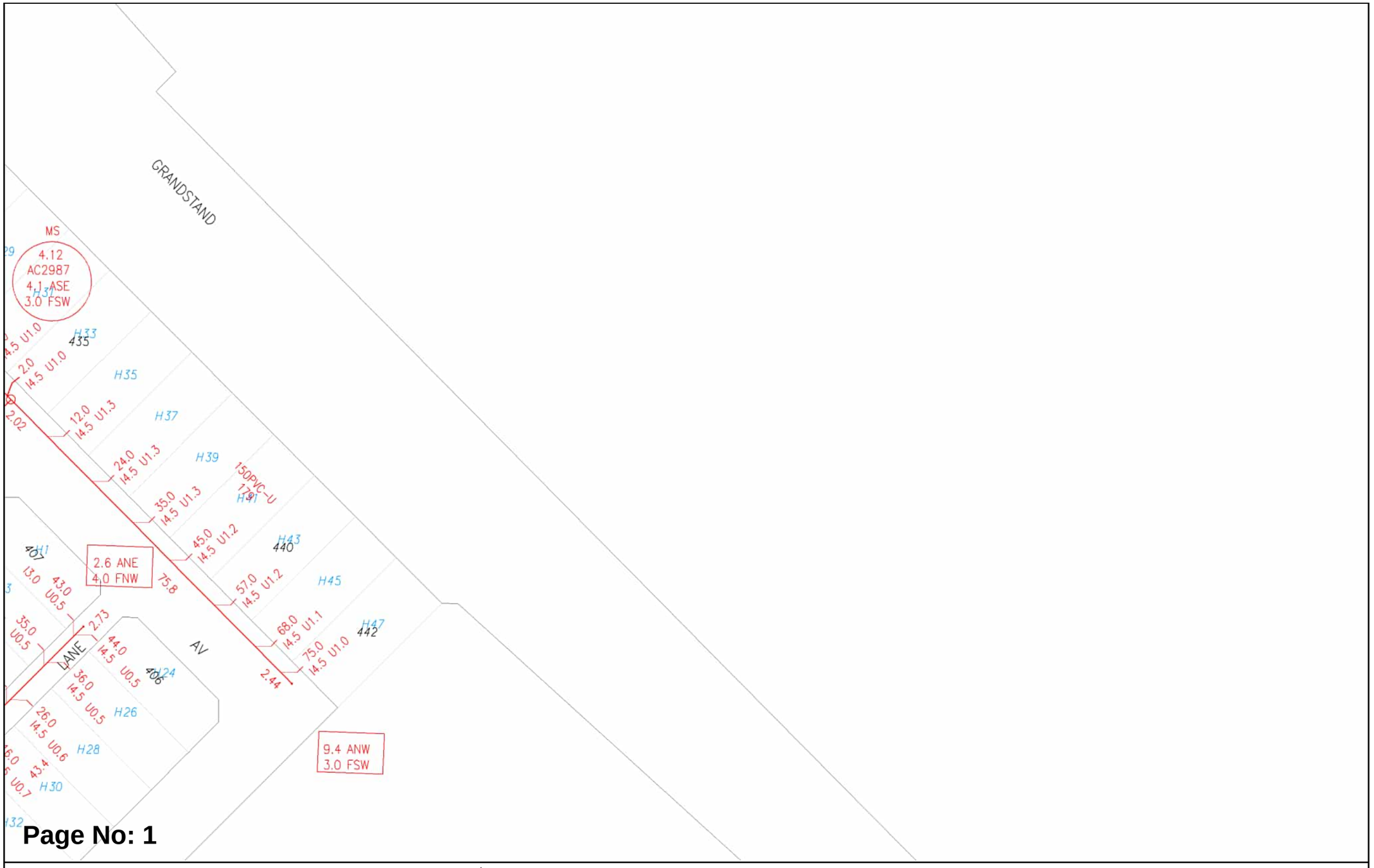
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Job No.:	36962243
Sequence No.:	240900613
Print Date:	21 Jun 2024

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Sewer

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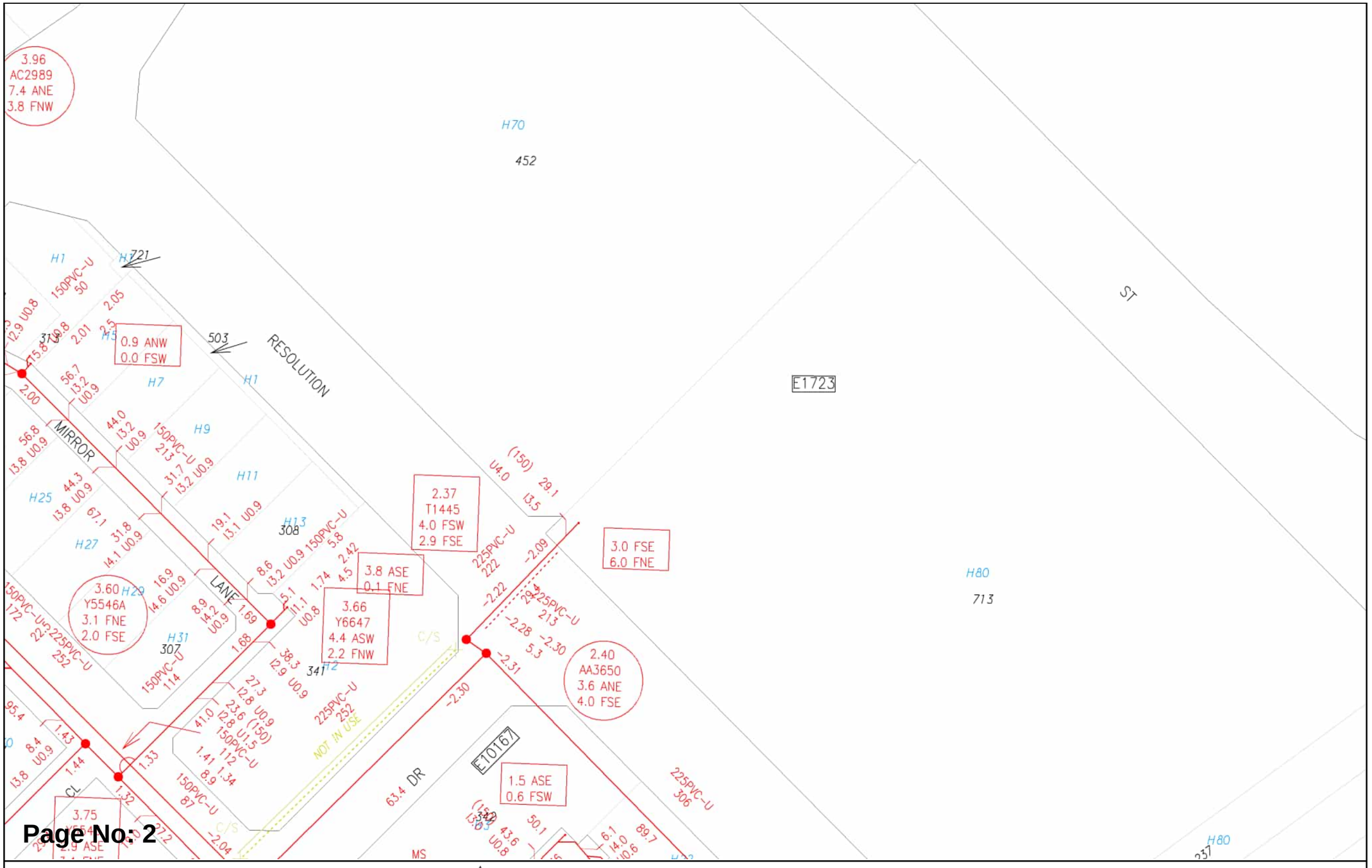
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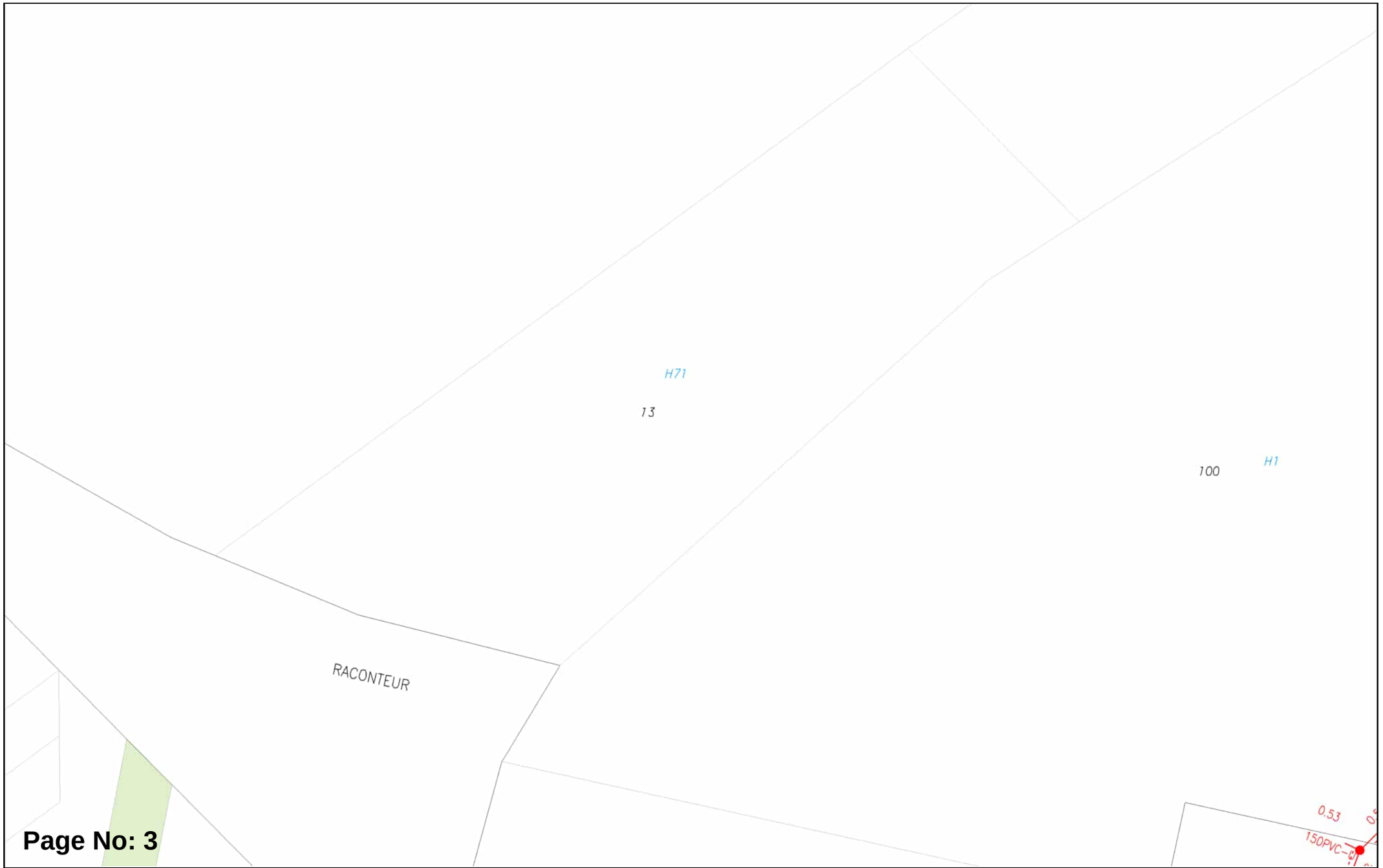


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Print Date:	21 Jun 2024

Sewer

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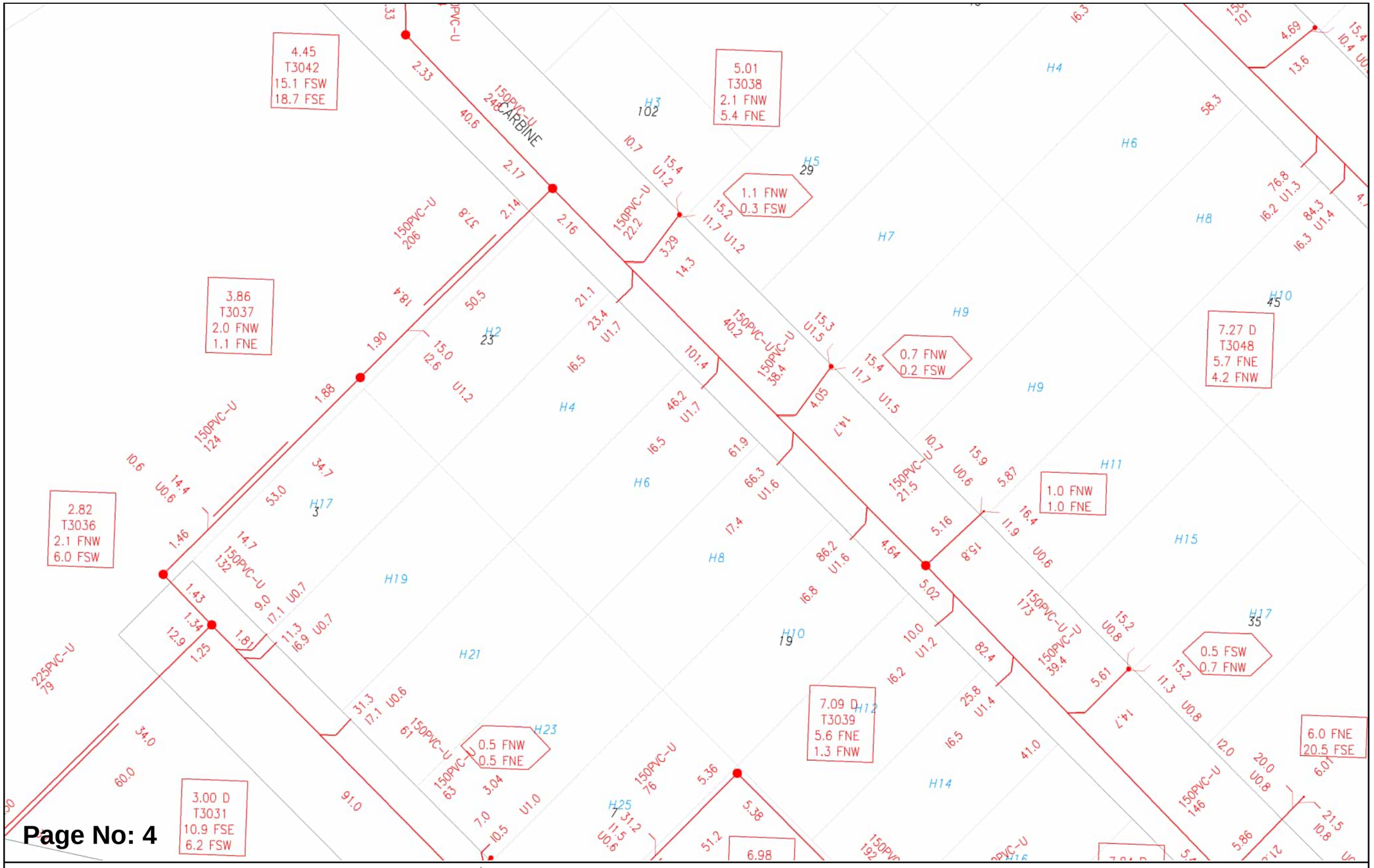
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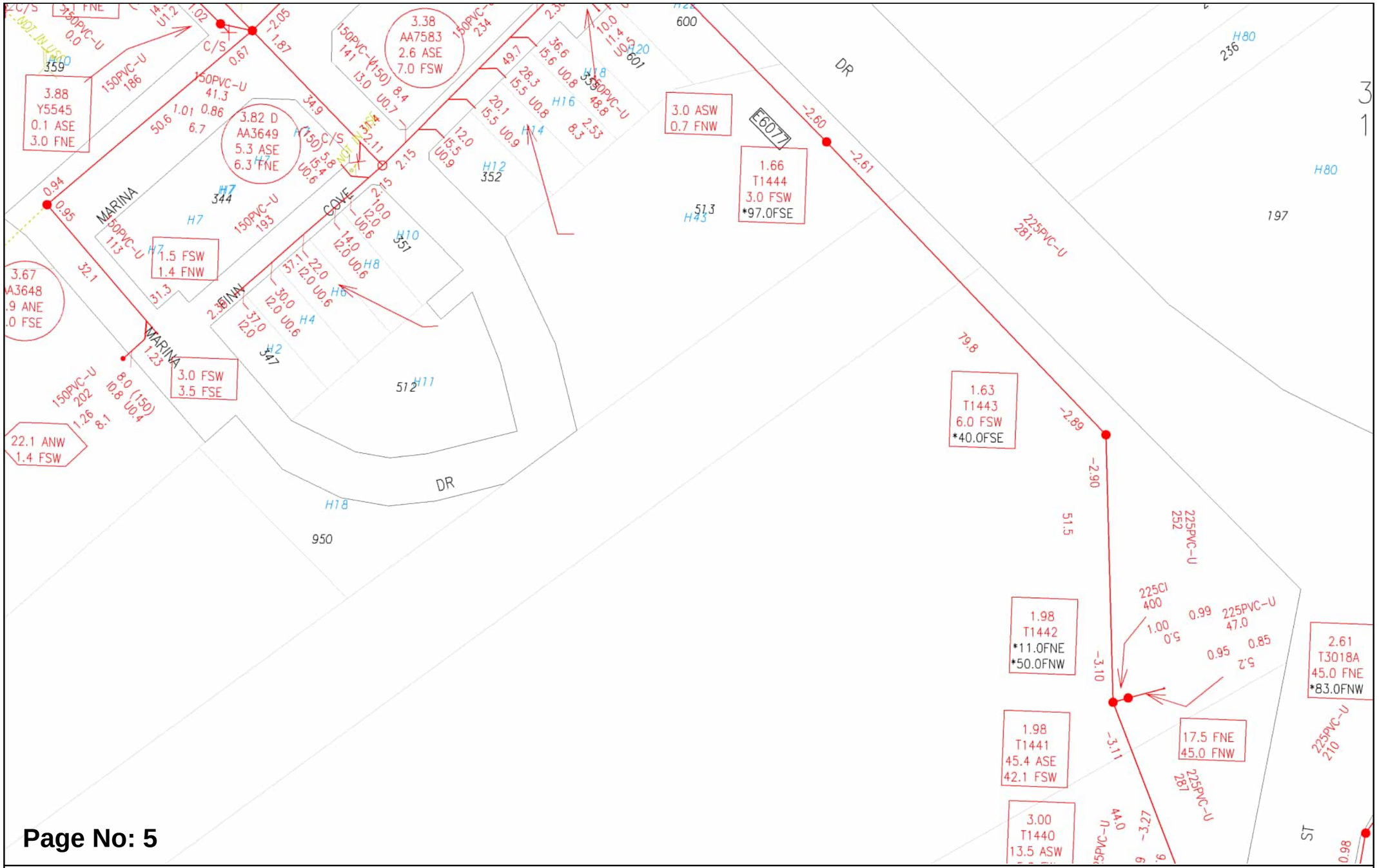
Sewer

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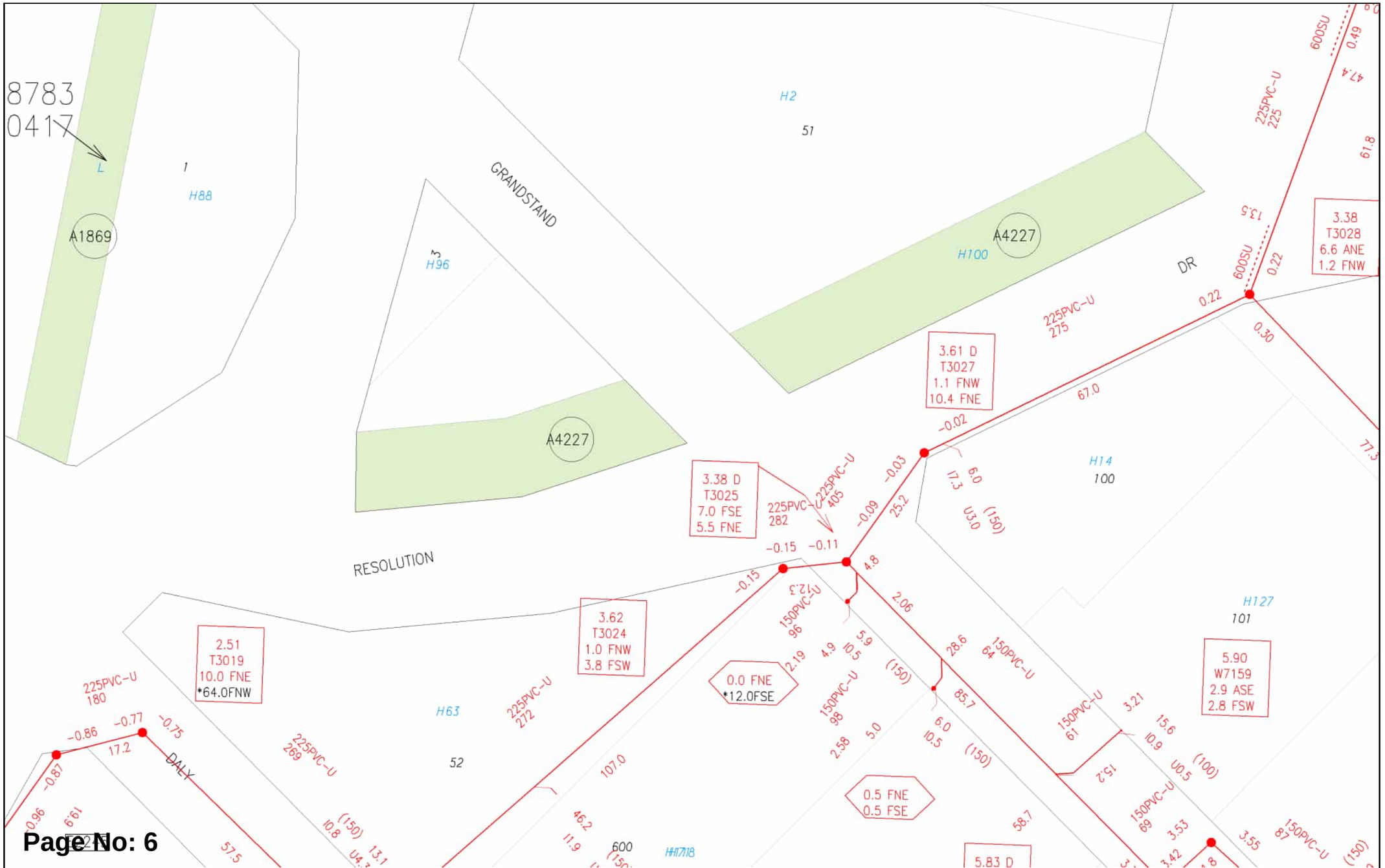


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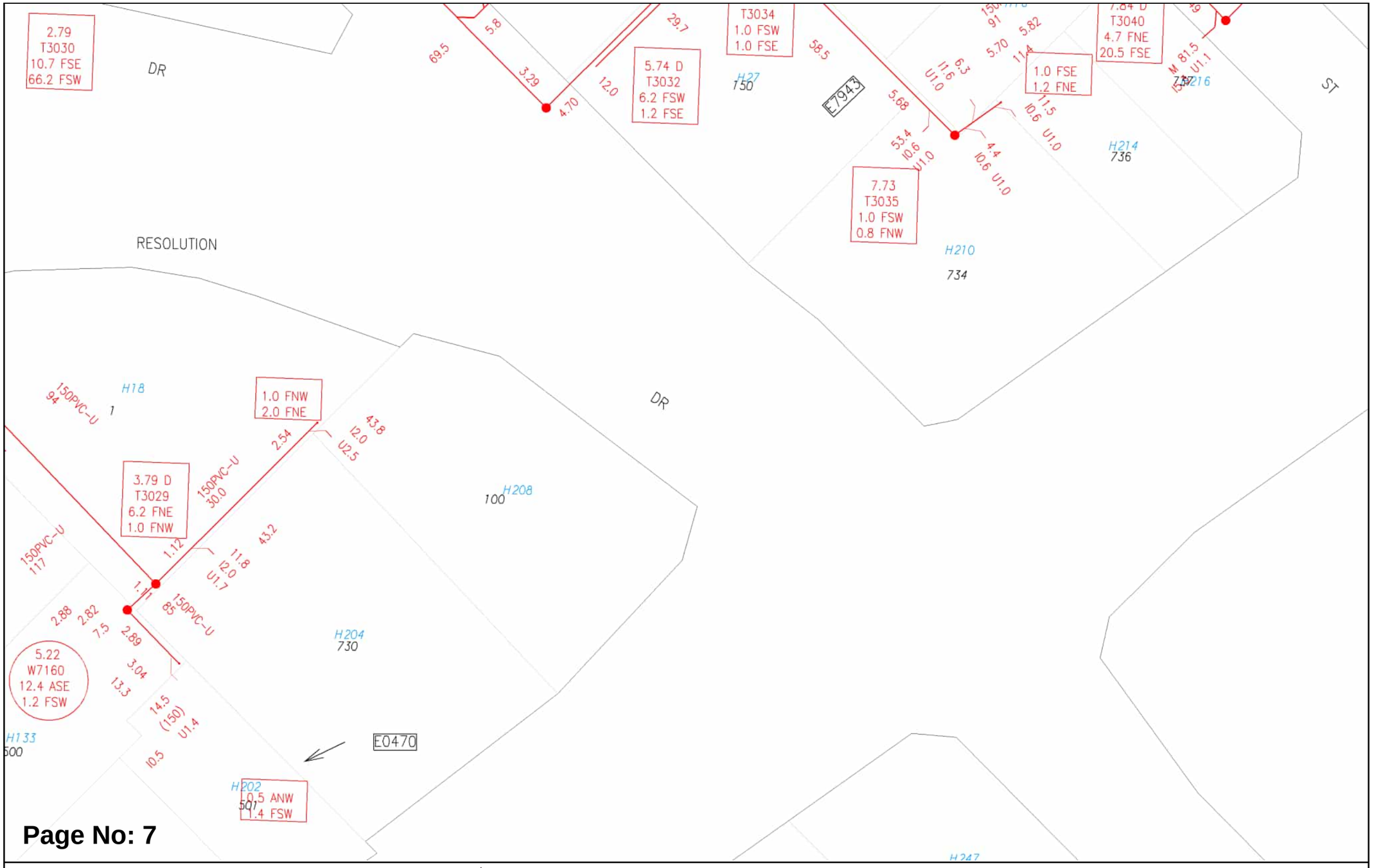
WATER CORPORATION

Scale: 1:750
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024

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Sewer

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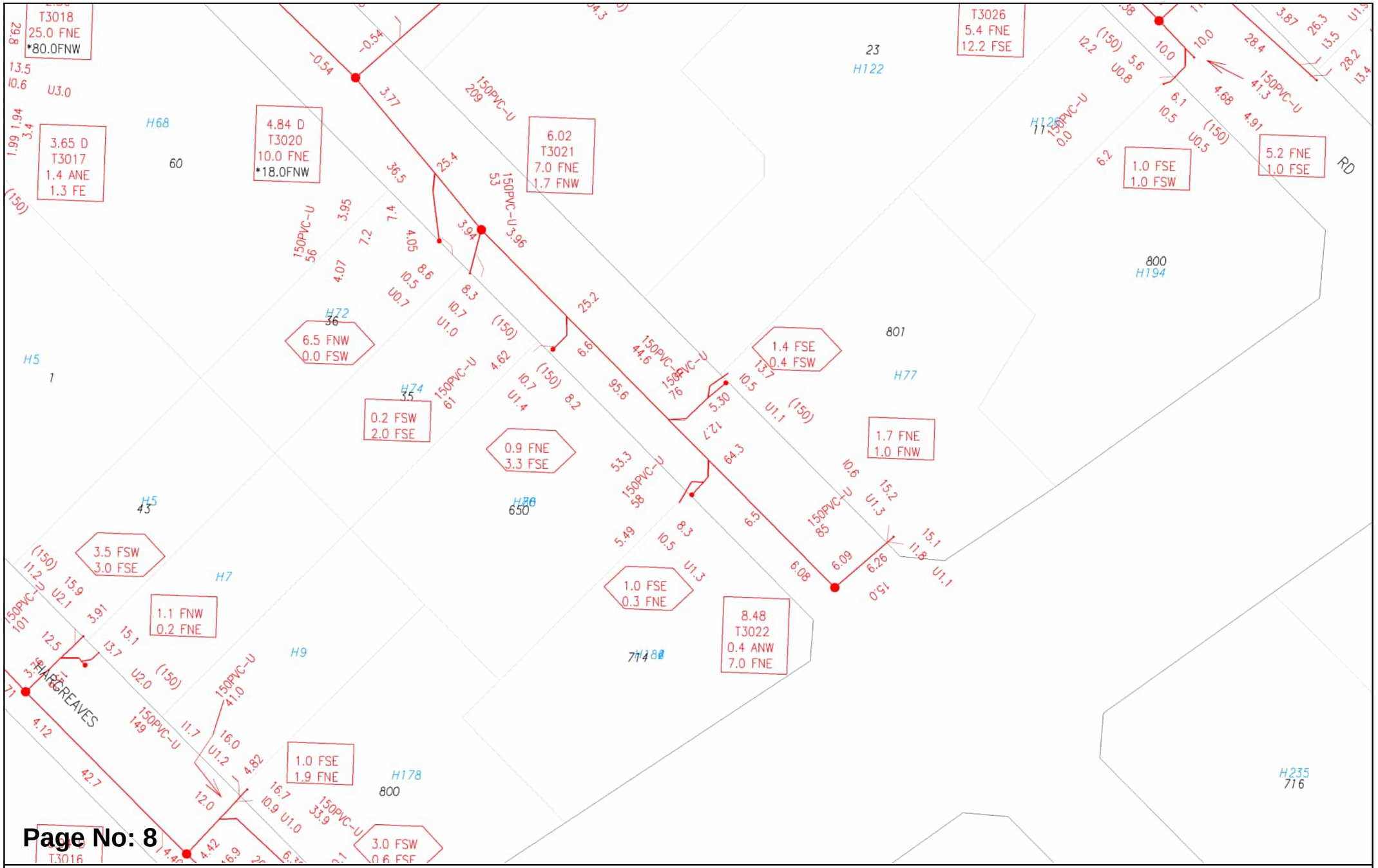
WATER CORPORATION

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Sewer

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Page No: 8

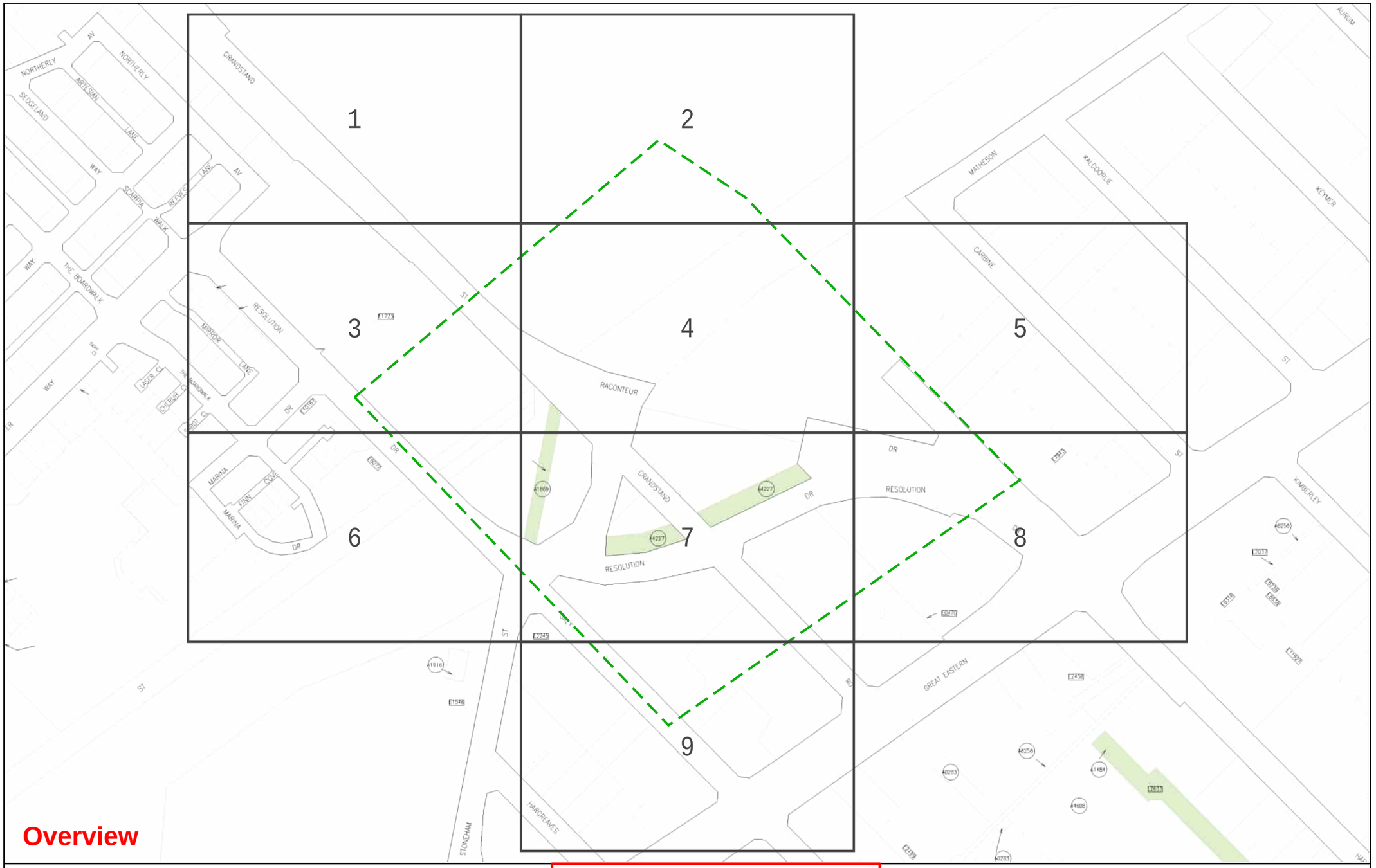
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WATER CORPORATION

Scale: 1:3075
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024

N
Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

Apply for approval to work near our assets at:

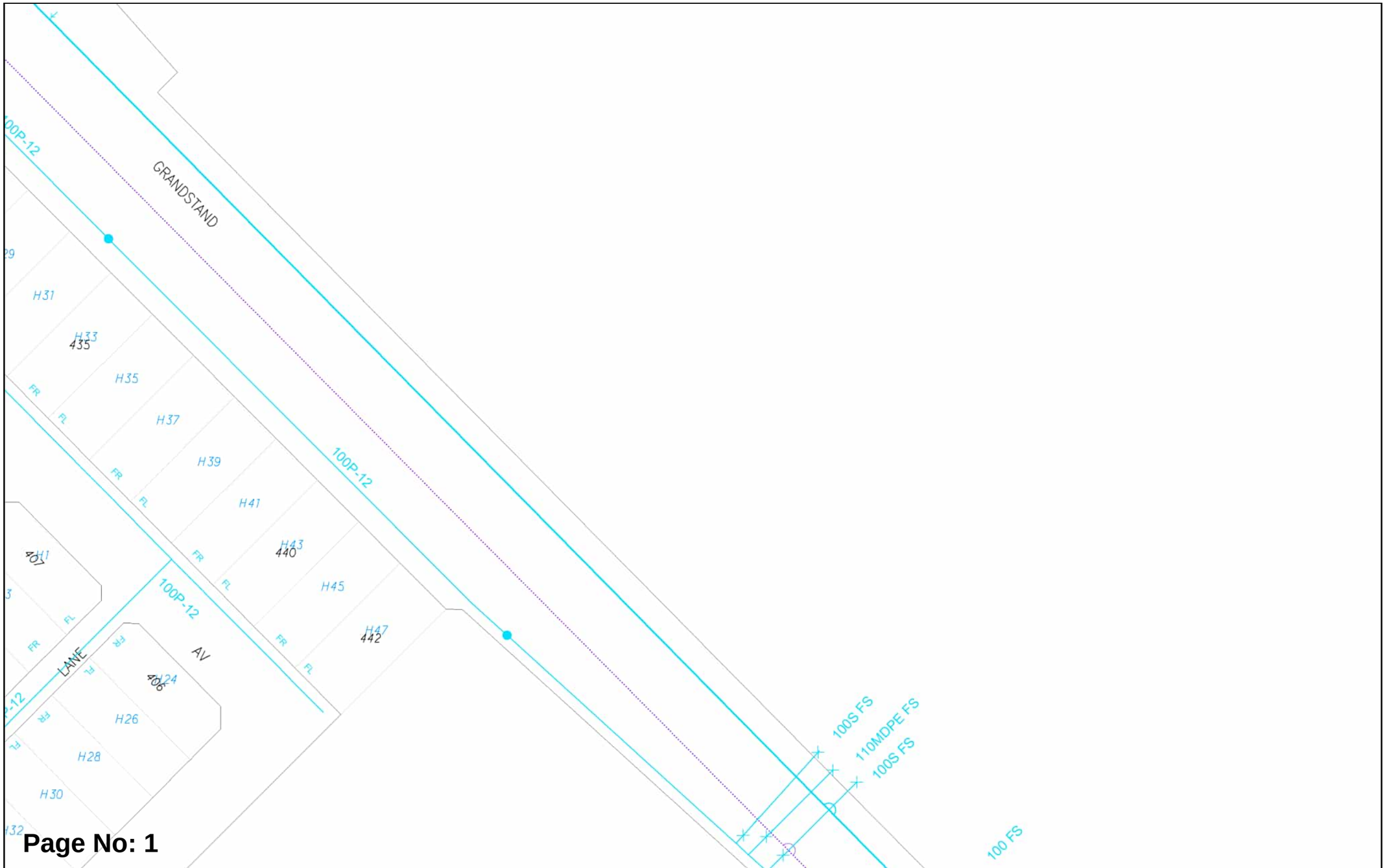
Working near assets (watercorporation.com.au)

Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

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Page No: 1

WATER CORPORATION

Scale:	1:750
Job No.:	36962243
Sequence No.:	240900613
Print Date:	21 Jun 2024

N

Water

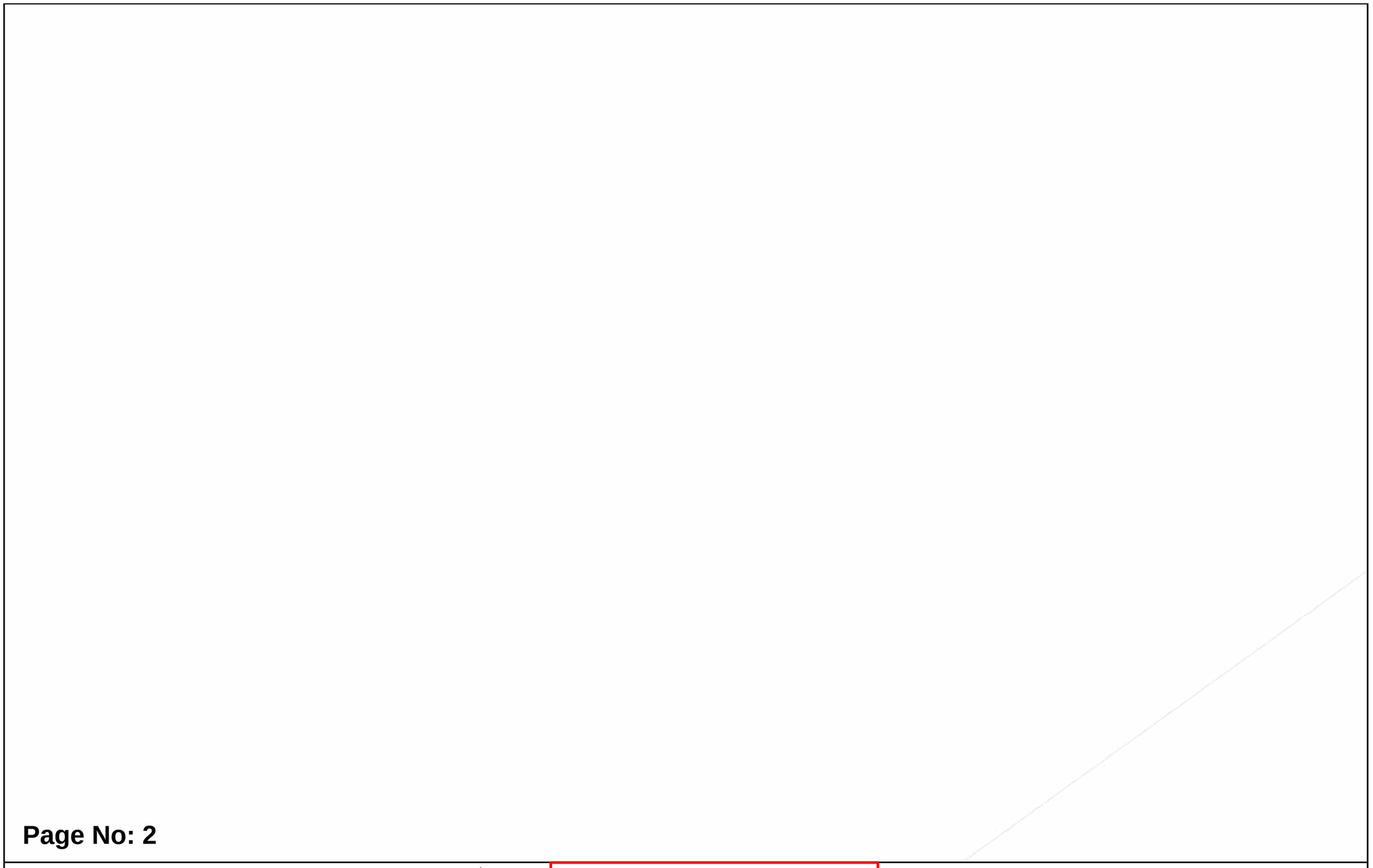
WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

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Page No: 2

WATER CORPORATION

Scale: 1:750
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024

N

Water

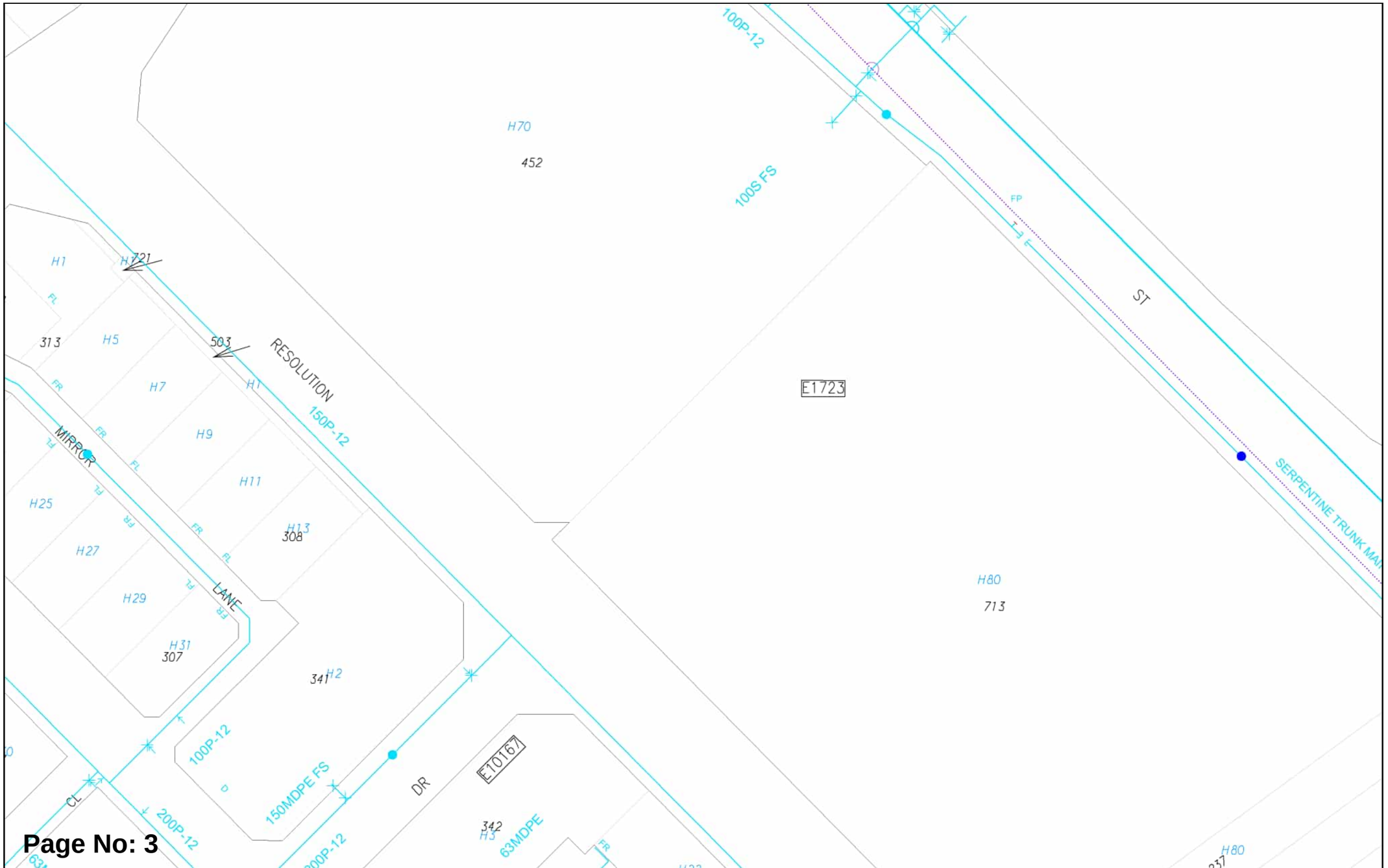
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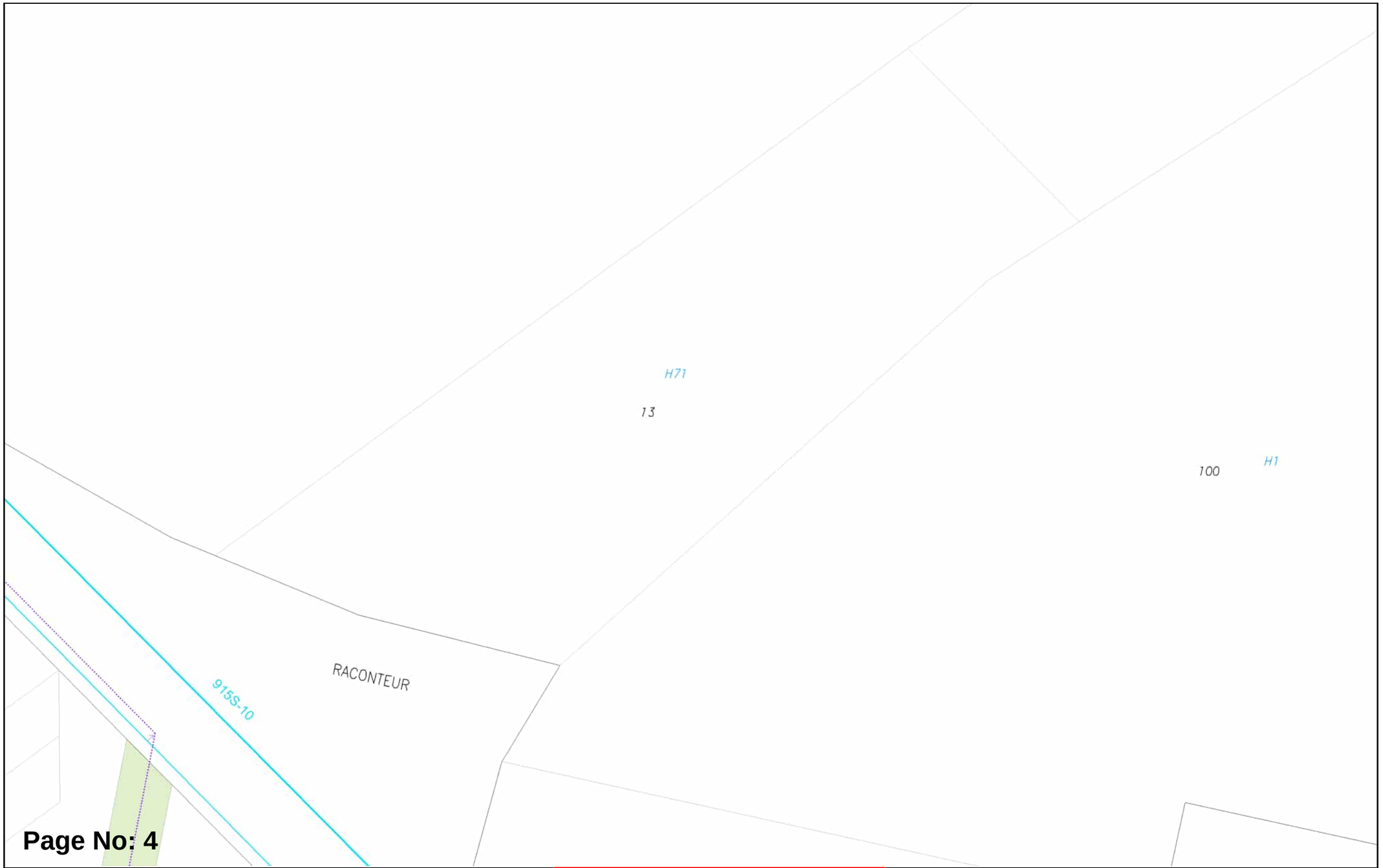
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Plans generated 21 Jun 2024 by PelicanCorp TicketAccess Software | www.pelicancorp.com

Water Corp - Critical Plan.docx (21 May 2024)



WATER CORPORATION

Scale: 1:750
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024

N

Water

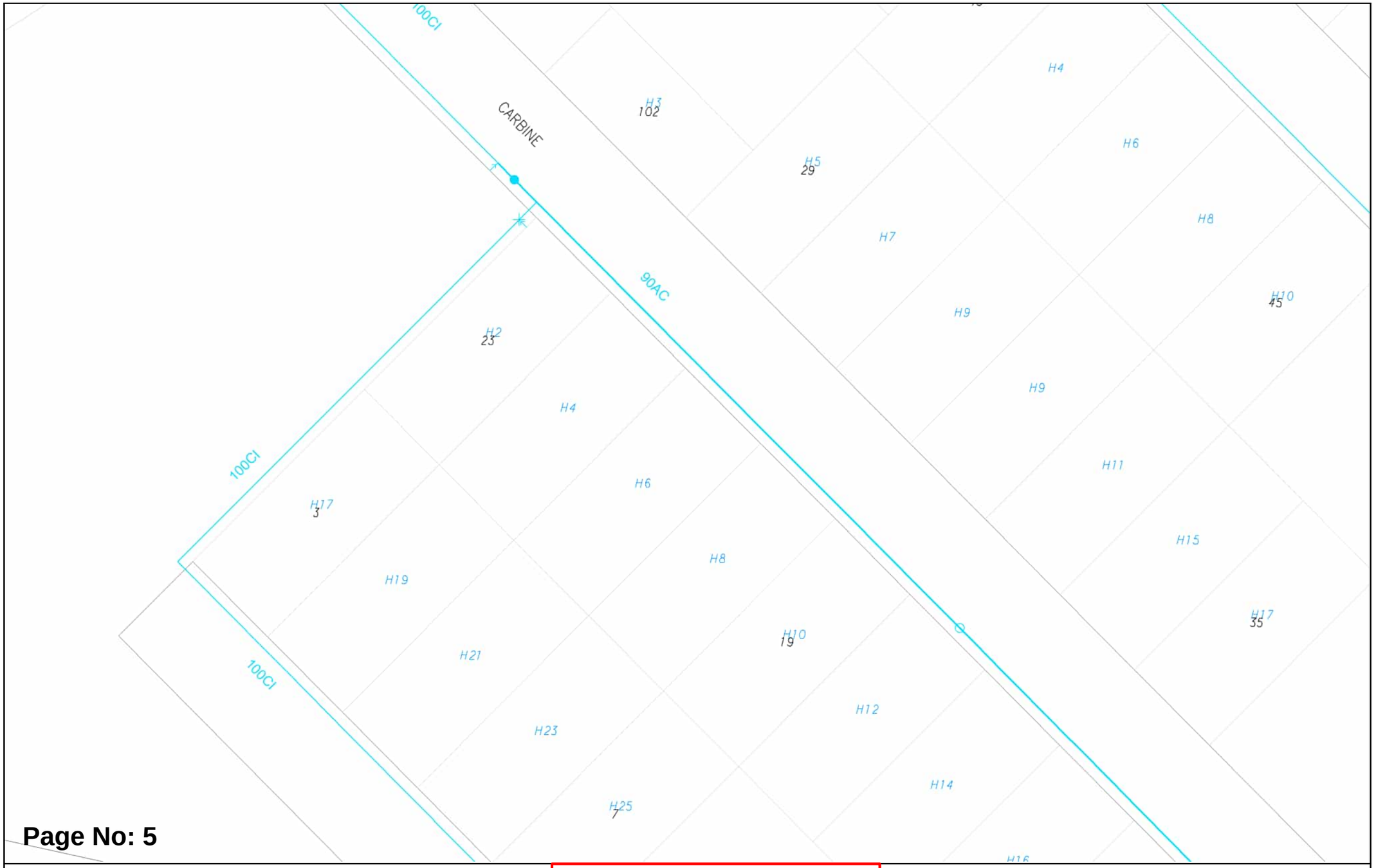
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Page No: 5

WATER CORPORATION

Scale:	1:750
Job No.:	36962243
Sequence No.:	240900613
Print Date:	21 Jun 2024

N

Water

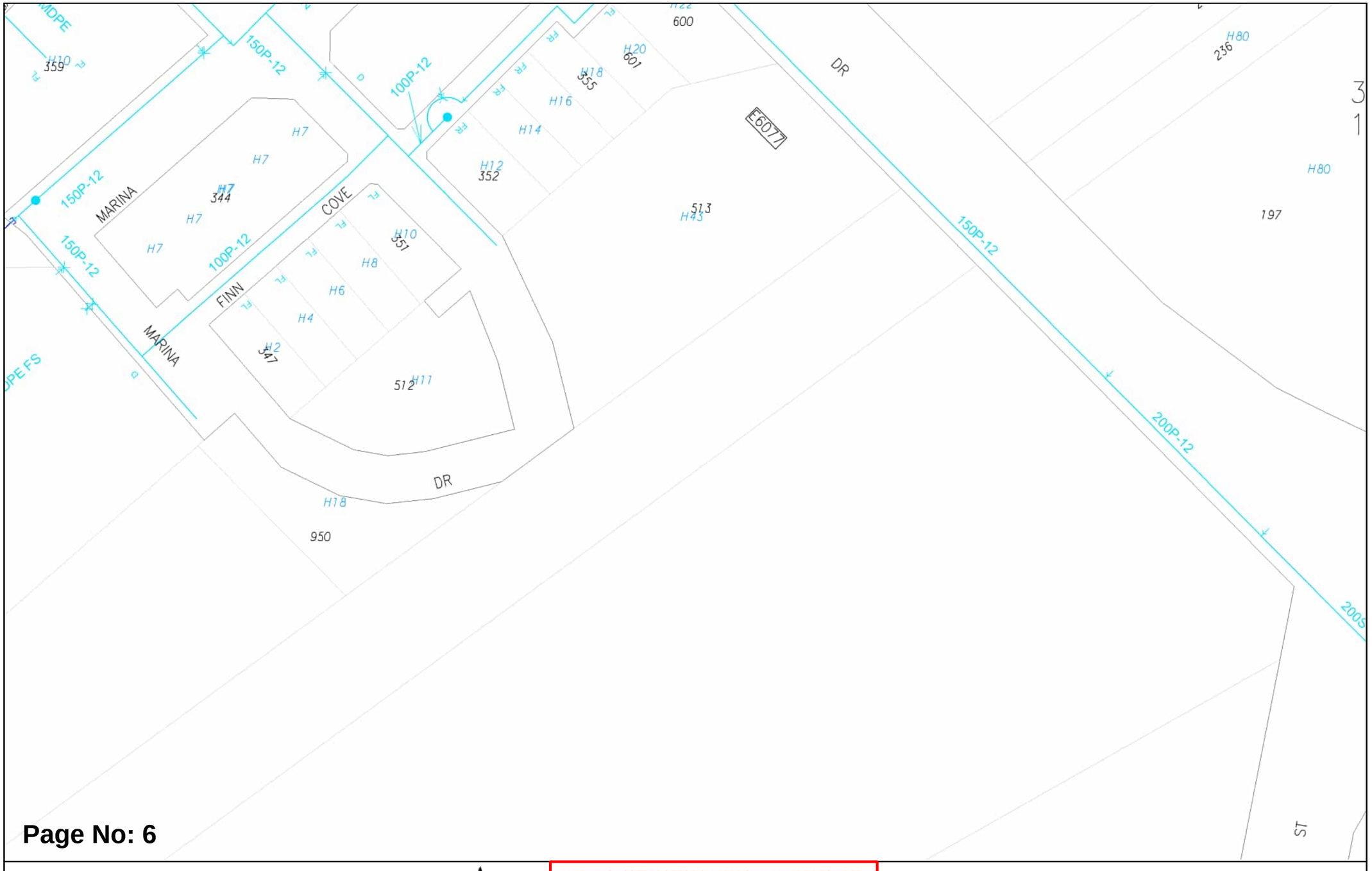
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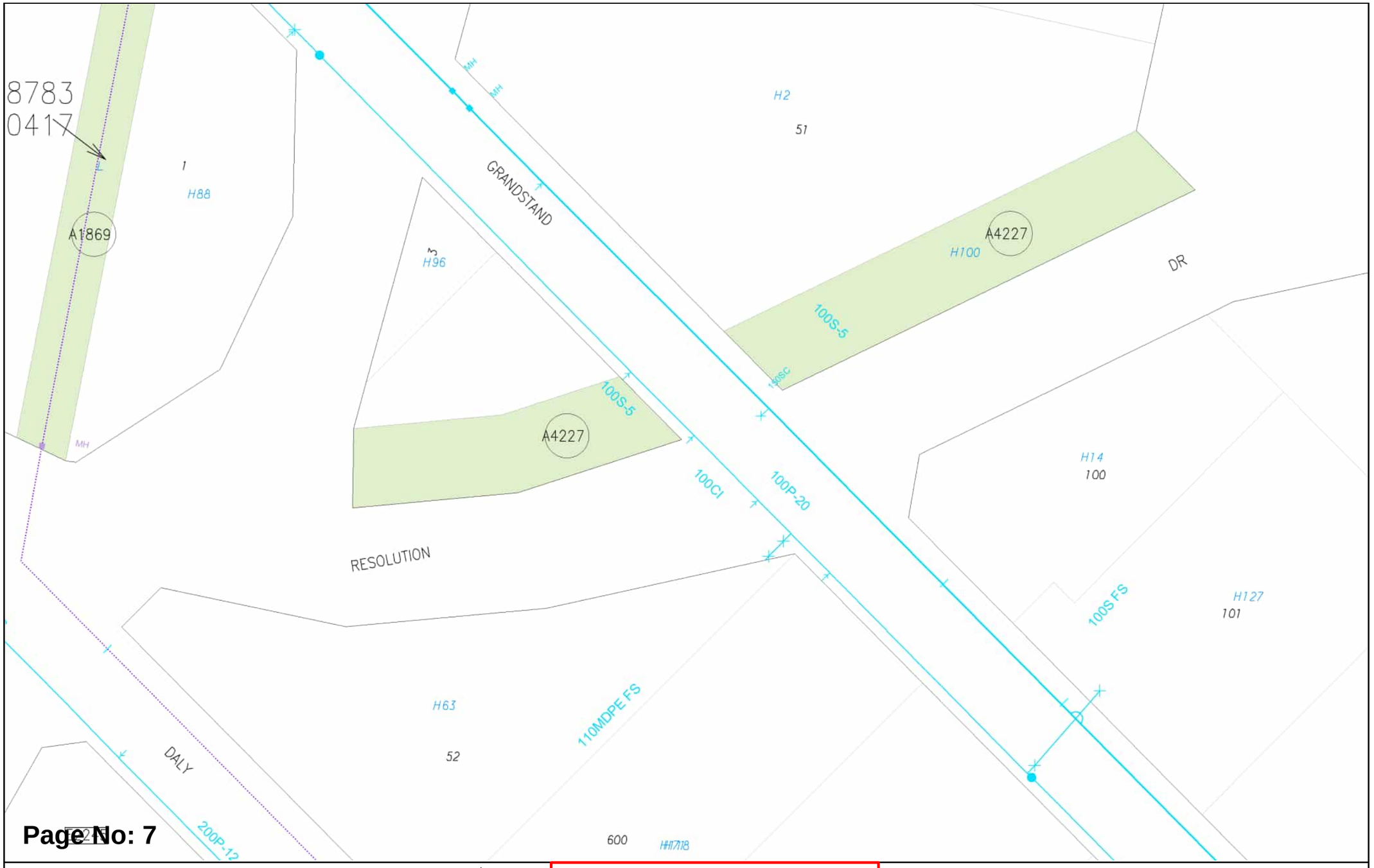
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Water Corp - Critical Plan.docx (21 May 2024)



Page No: 7

WATER CORPORATION

Scale: 1:750
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Water

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Page No: 8

WATER CORPORATION

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Job No.:	36962243
Sequence No.:	240900613
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N

Water

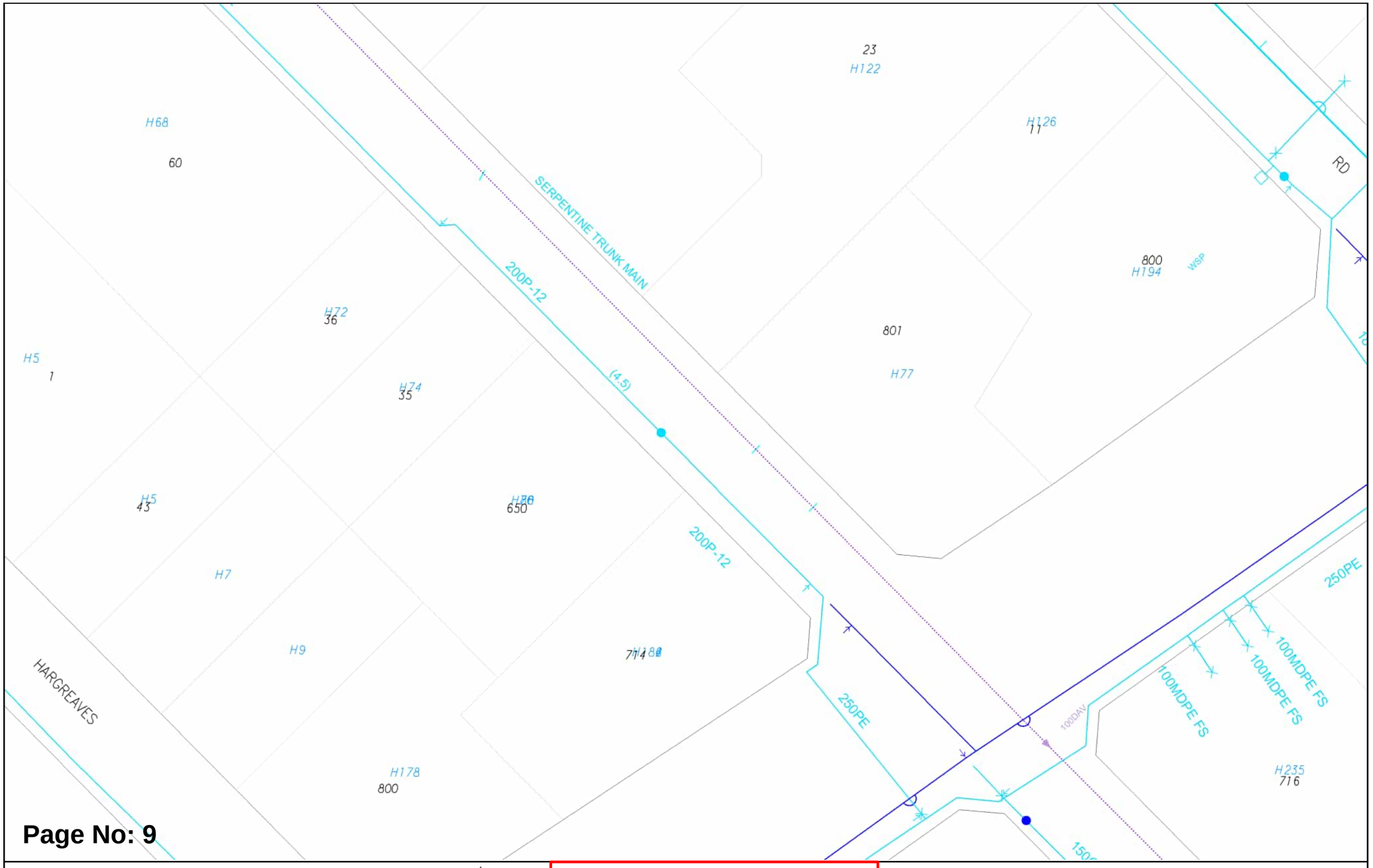
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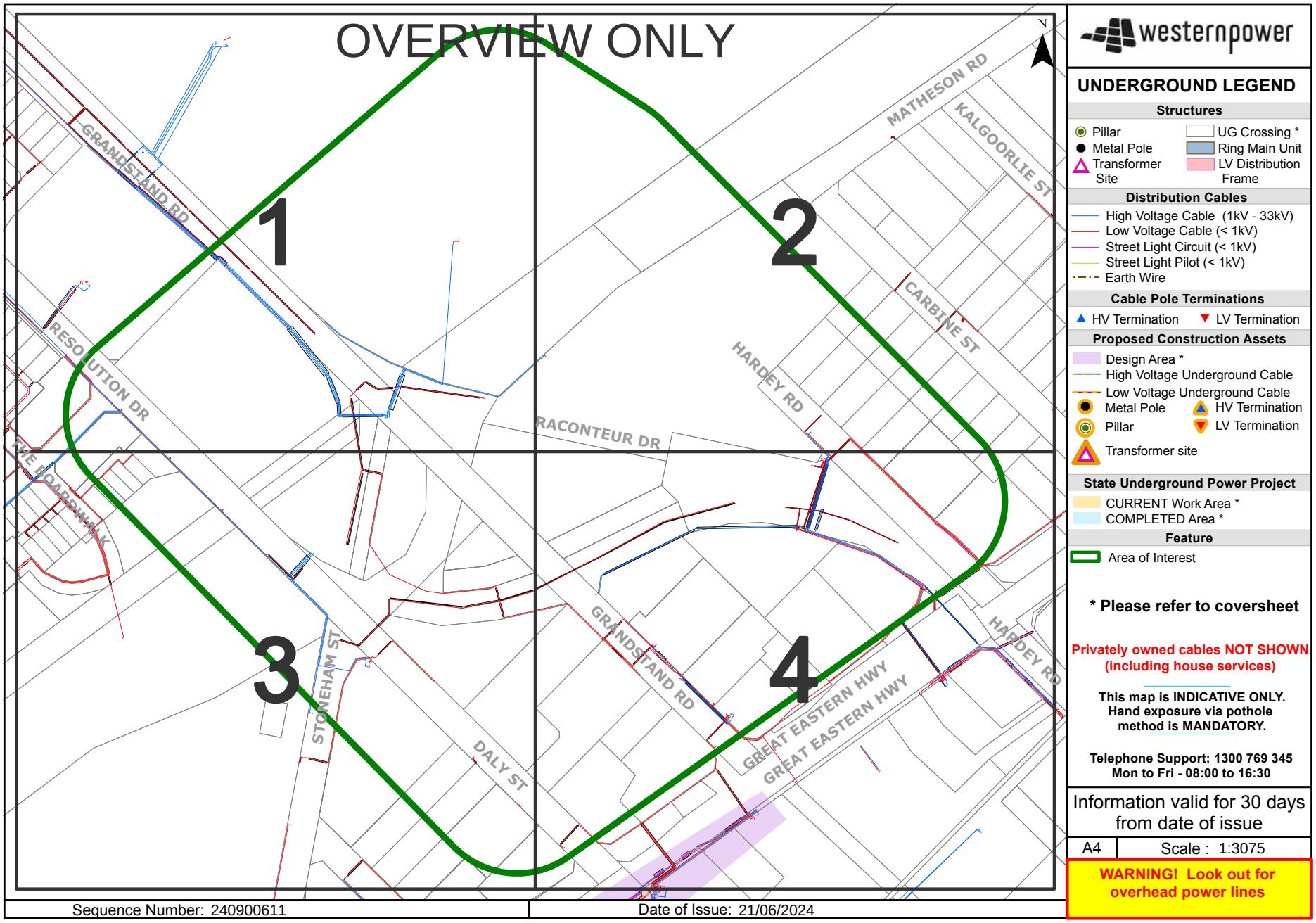
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westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
- Transformer Site
- UG Crossing *
- Ring Main Unit
- LV Distribution Frame

Distribution Cables

- High Voltage Cable (1kV - 33kV)
- Low Voltage Cable (< 1kV)
- Street Light Circuit (< 1kV)
- Street Light Pilot (< 1kV)
- Earth Wire

Cable Pole Terminations

- HV Termination
- LV Termination

Proposed Construction Assets

- Design Area *
- High Voltage Underground Cable
- Low Voltage Underground Cable
- Metal Pole
- Pillar
- Transformer site
- HV Termination
- LV Termination

State Underground Power Project

- CURRENT Work Area *
- COMPLETED Area *

Feature

- Area of Interest

*** Please refer to coversheet**

Privately owned cables NOT SHOWN (including house services)

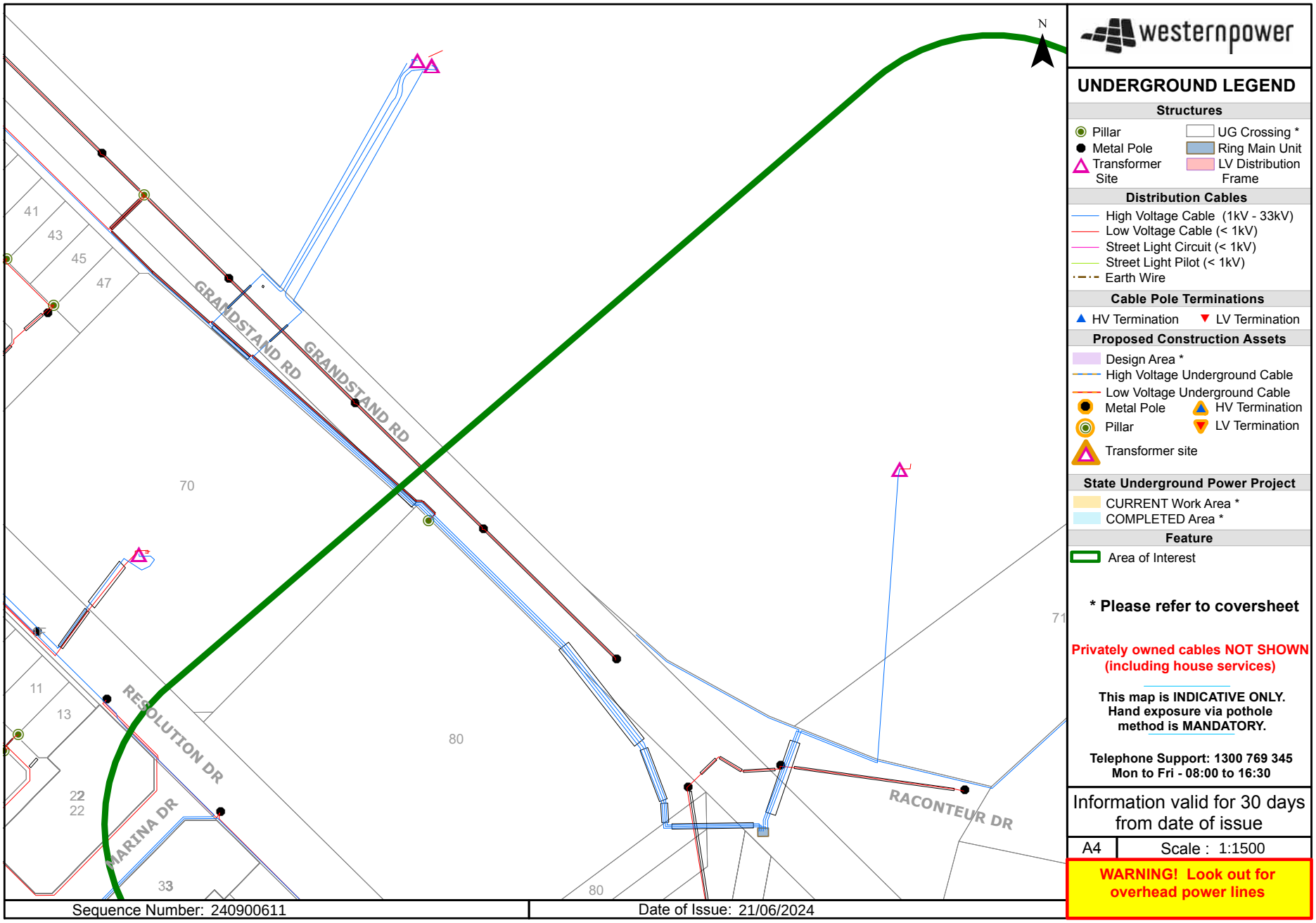
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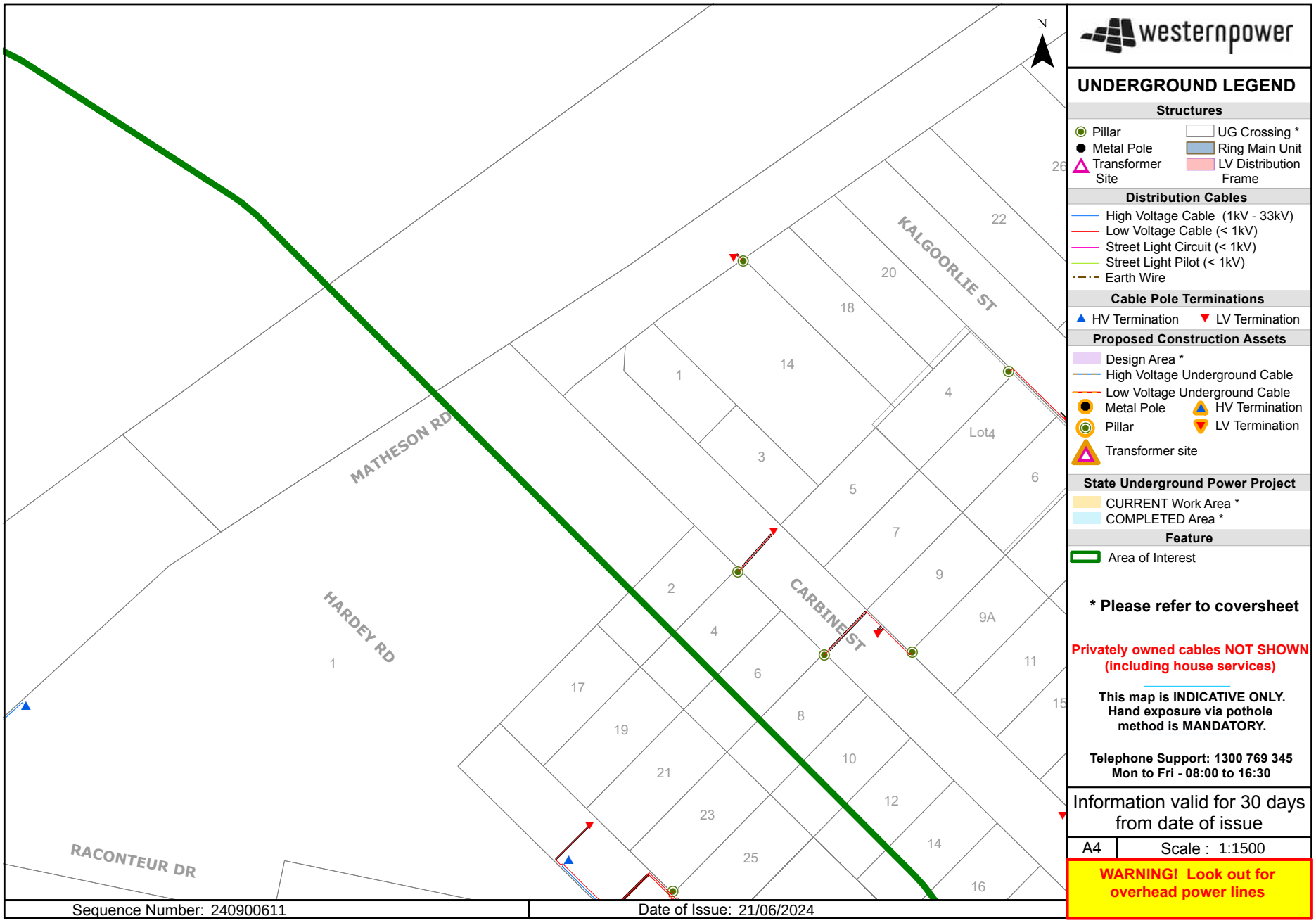
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30

Information valid for 30 days from date of issue

A4 | Scale : 1:3075

WARNING! Look out for overhead power lines


N
GRANDSTAND RD
GRANDSTAND RD
RESOLUTION DR
MARINA DR
RACONTEUR DR
41
43
45
47
70
11
13
22
22
33
80
80
71
Sequence Number: 240900611
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
HV Termination
Pillar
LV Termination
Transformer site
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
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Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines



westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
- Transformer Site
- UG Crossing *
- Ring Main Unit
- LV Distribution Frame

Distribution Cables

- High Voltage Cable (1kV - 33kV)
- Low Voltage Cable (< 1kV)
- Street Light Circuit (< 1kV)
- Street Light Pilot (< 1kV)
- Earth Wire

Cable Pole Terminations

- HV Termination
- LV Termination

Proposed Construction Assets

- Design Area *
- High Voltage Underground Cable
- Low Voltage Underground Cable
- Metal Pole
- Pillar
- Transformer site
- HV Termination
- LV Termination

State Underground Power Project

- CURRENT Work Area *
- COMPLETED Area *

Feature

- Area of Interest

*** Please refer to coversheet**

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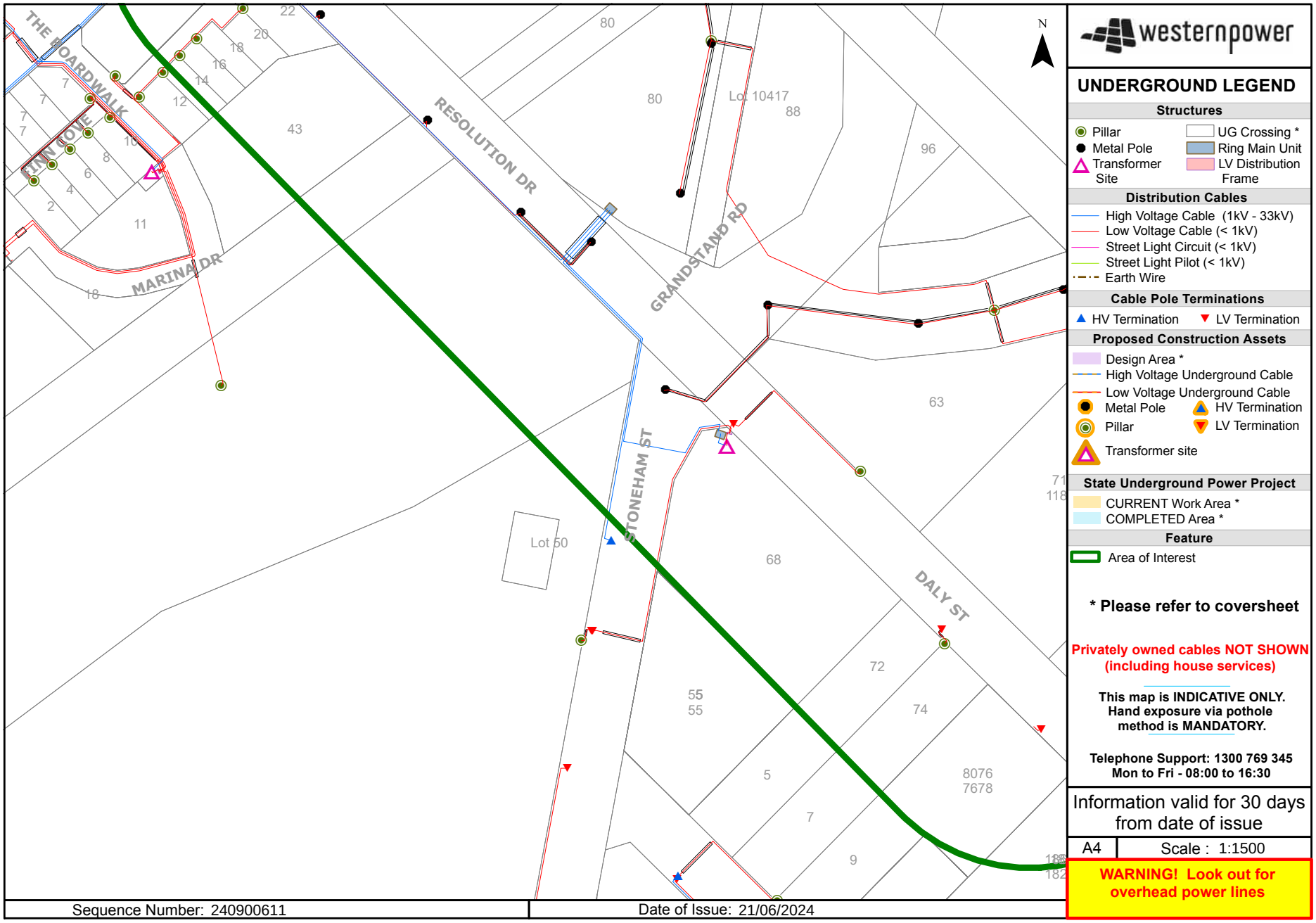
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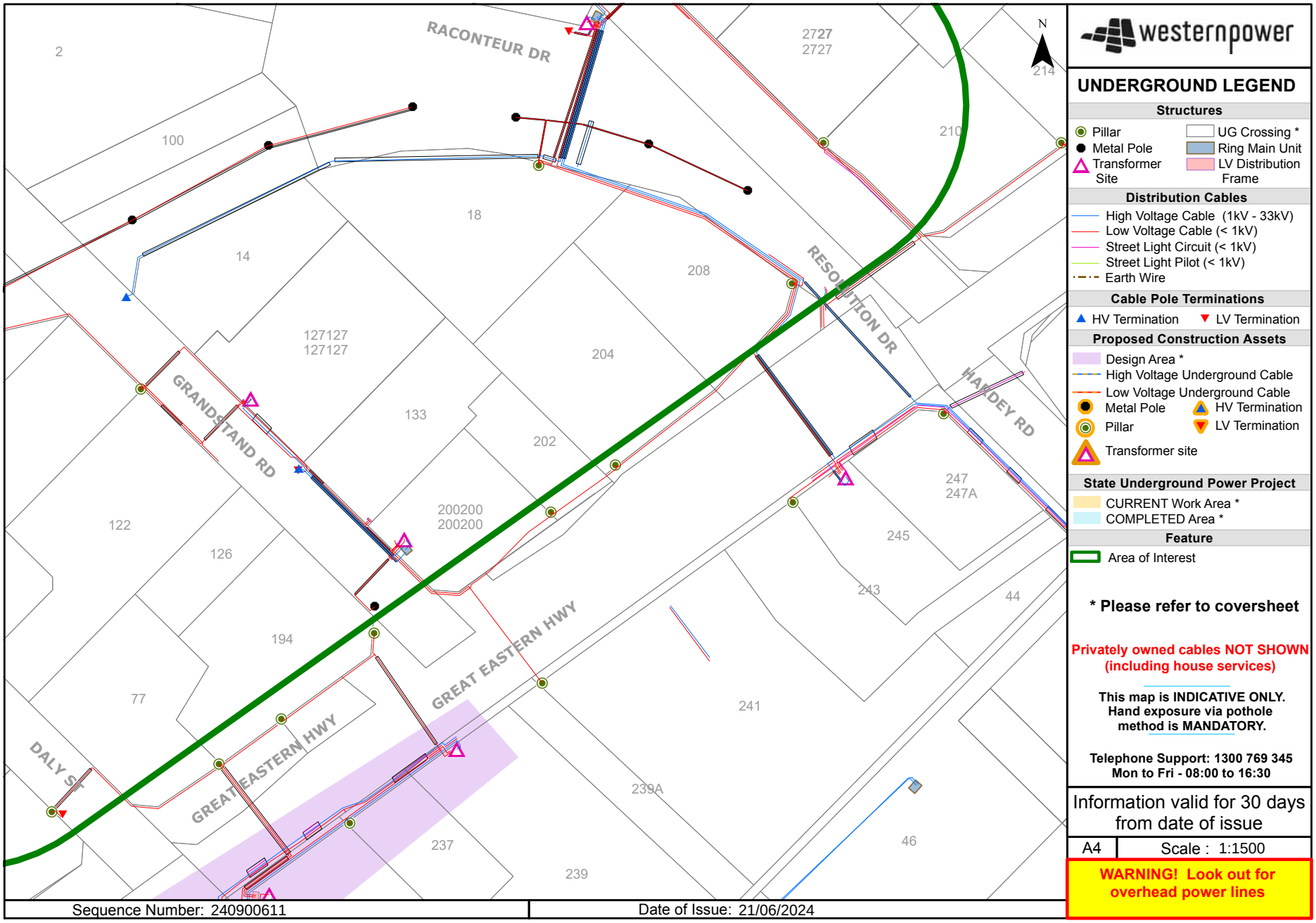
Telephone Support: 1300 769 345
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A4 | Scale : 1:1500

WARNING! Look out for overhead power lines


THE BOARDWALK
FINN COVE
MARINA DR
RESOLUTION DR
GRANDSTAND RD
STONEHAM ST
DALY ST
Lot 10417
Lot 50
N
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
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Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900611
Date of Issue: 21/06/2024



westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
- Transformer Site
- UG Crossing *
- Ring Main Unit
- LV Distribution Frame

Distribution Cables

- High Voltage Cable (1kV - 33kV)
- Low Voltage Cable (< 1kV)
- Street Light Circuit (< 1kV)
- Street Light Pilot (< 1kV)
- Earth Wire

Cable Pole Terminations

- HV Termination
- LV Termination

Proposed Construction Assets

- Design Area *
- High Voltage Underground Cable
- Low Voltage Underground Cable
- Metal Pole
- Pillar
- Transformer site
- HV Termination
- LV Termination

State Underground Power Project

- CURRENT Work Area *
- COMPLETED Area *

Feature

- Area of Interest

*** Please refer to coversheet**

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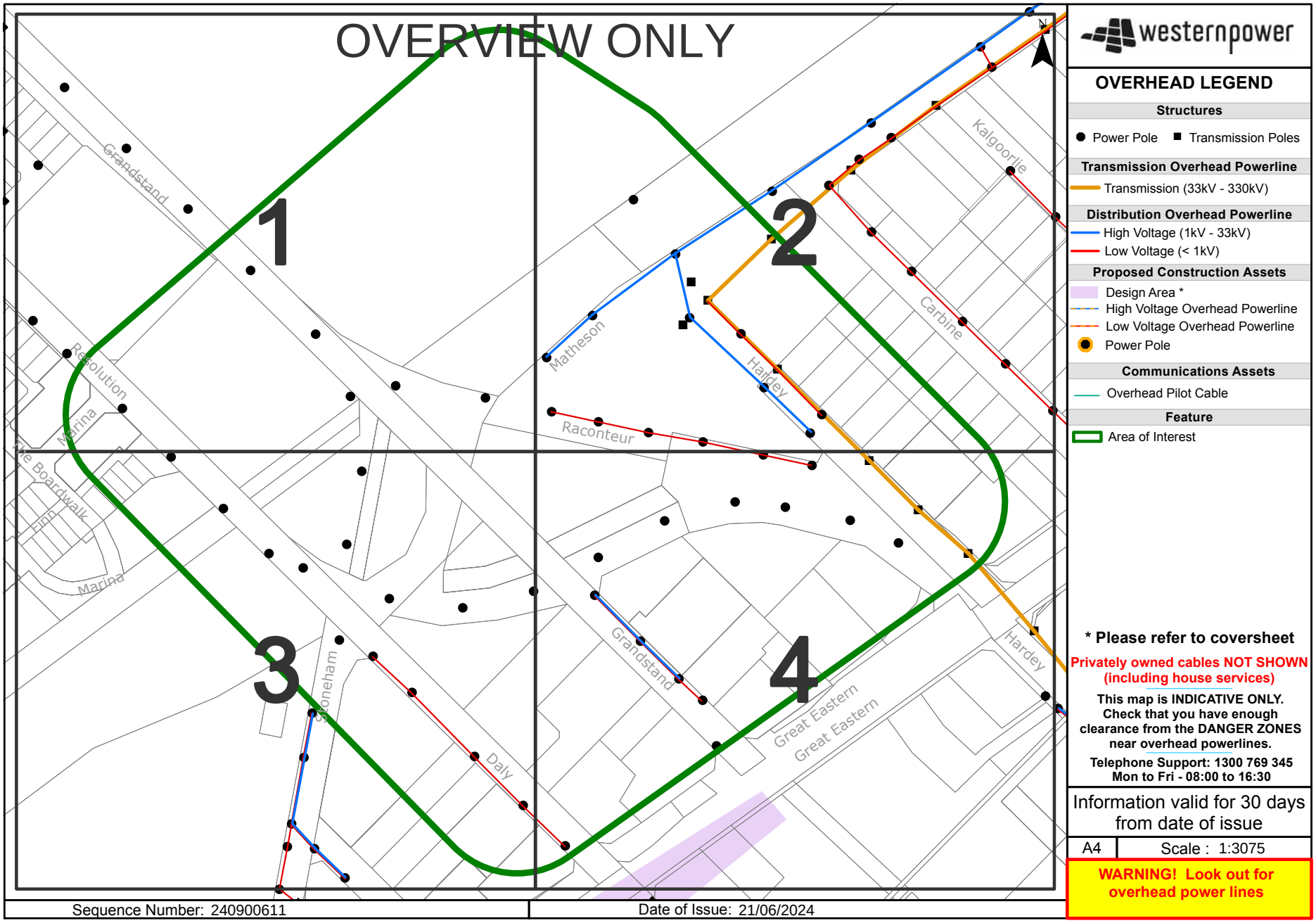
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Information valid for 30 days from date of issue

A4 | Scale : 1:1500

WARNING! Look out for overhead power lines



westernpower

OVERHEAD LEGEND

Structures
- Power Pole
- Transmission Poles

Transmission Overhead Powerline
- Transmission (33kV - 330kV)

Distribution Overhead Powerline
- High Voltage (1kV - 33kV)
- Low Voltage (< 1kV)

Proposed Construction Assets
- Design Area *
- High Voltage Overhead Powerline
- Low Voltage Overhead Powerline
- Power Pole

Communications Assets
- Overhead Pilot Cable

Feature
- Area of Interest

*** Please refer to coversheet**

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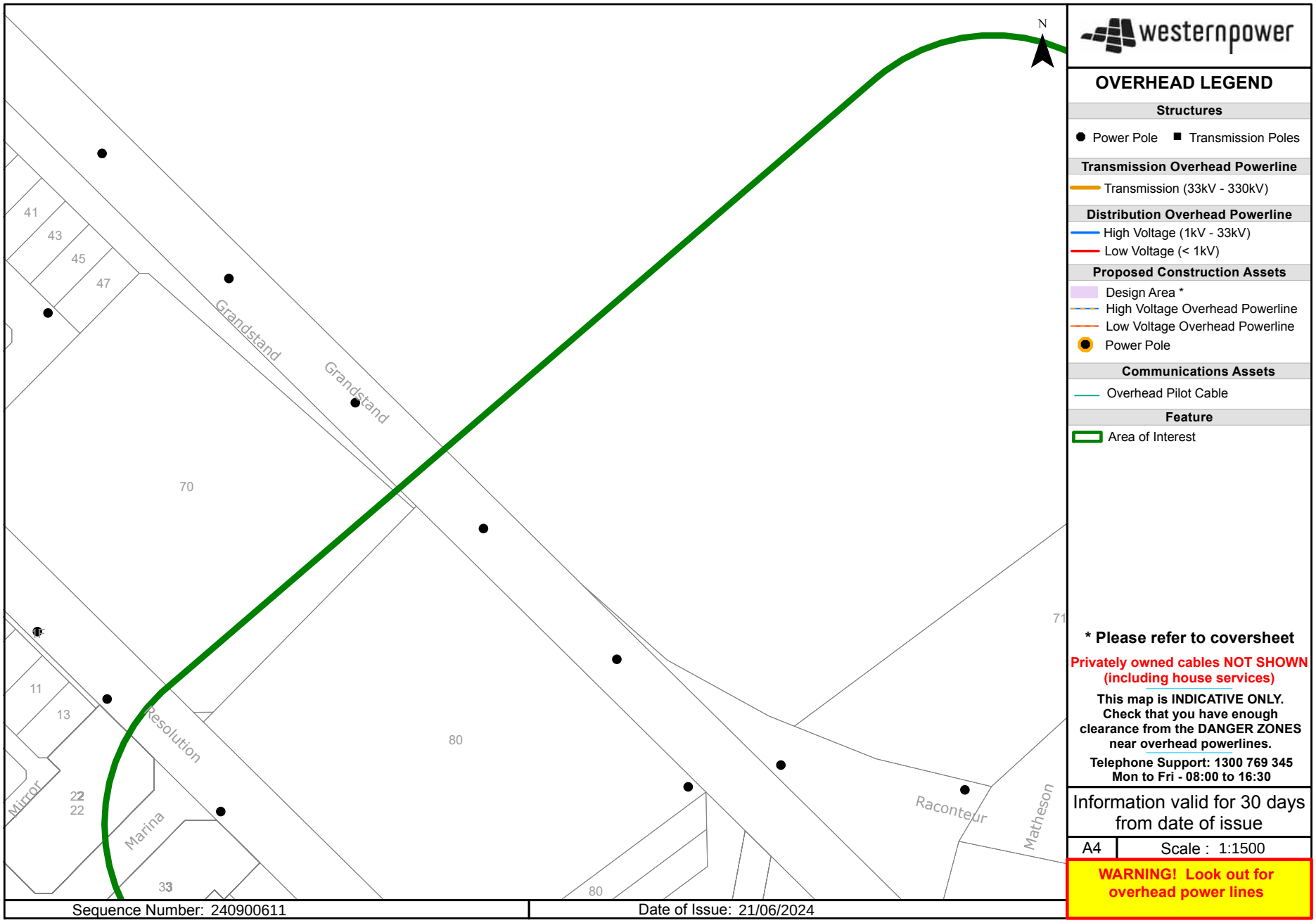
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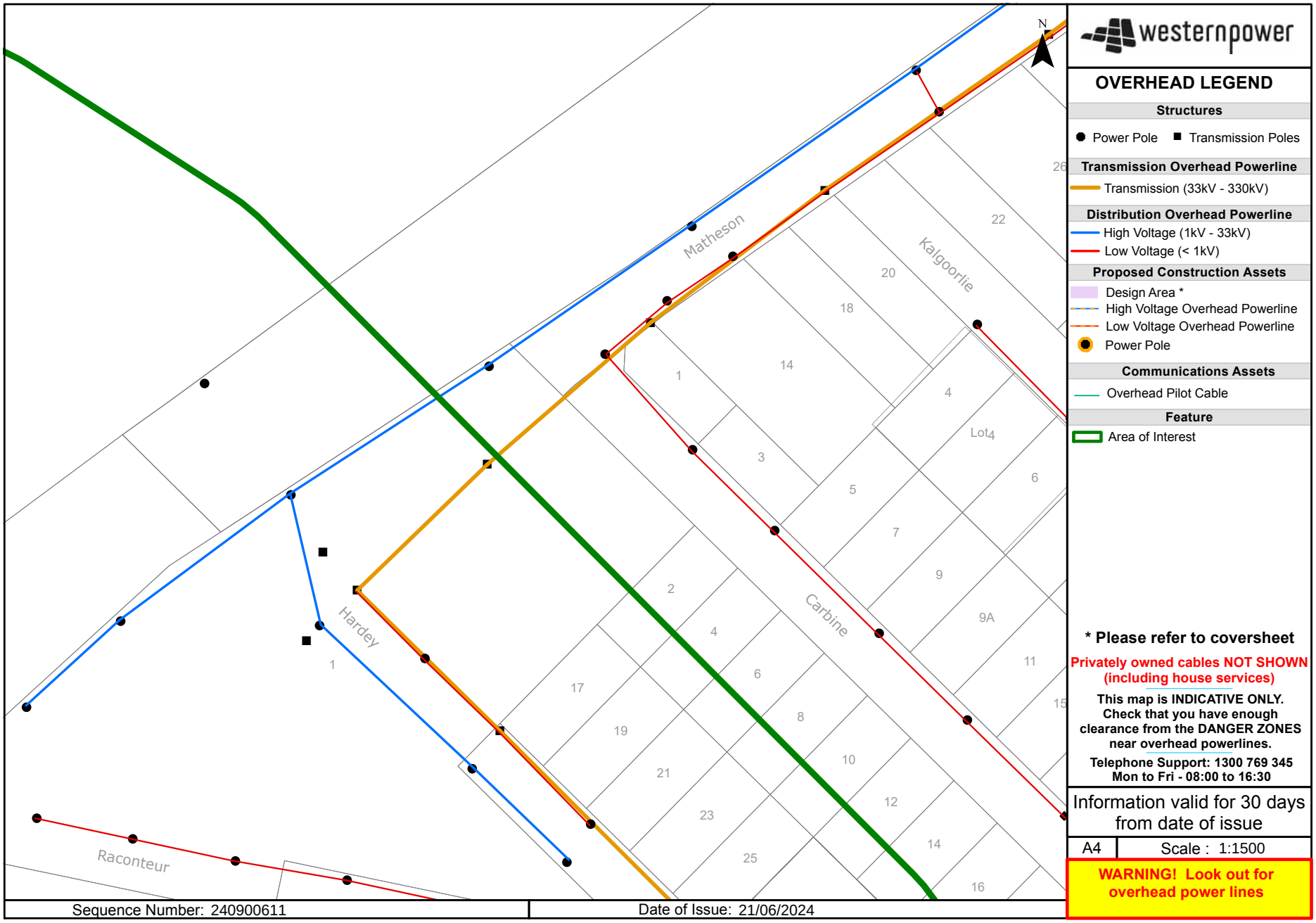
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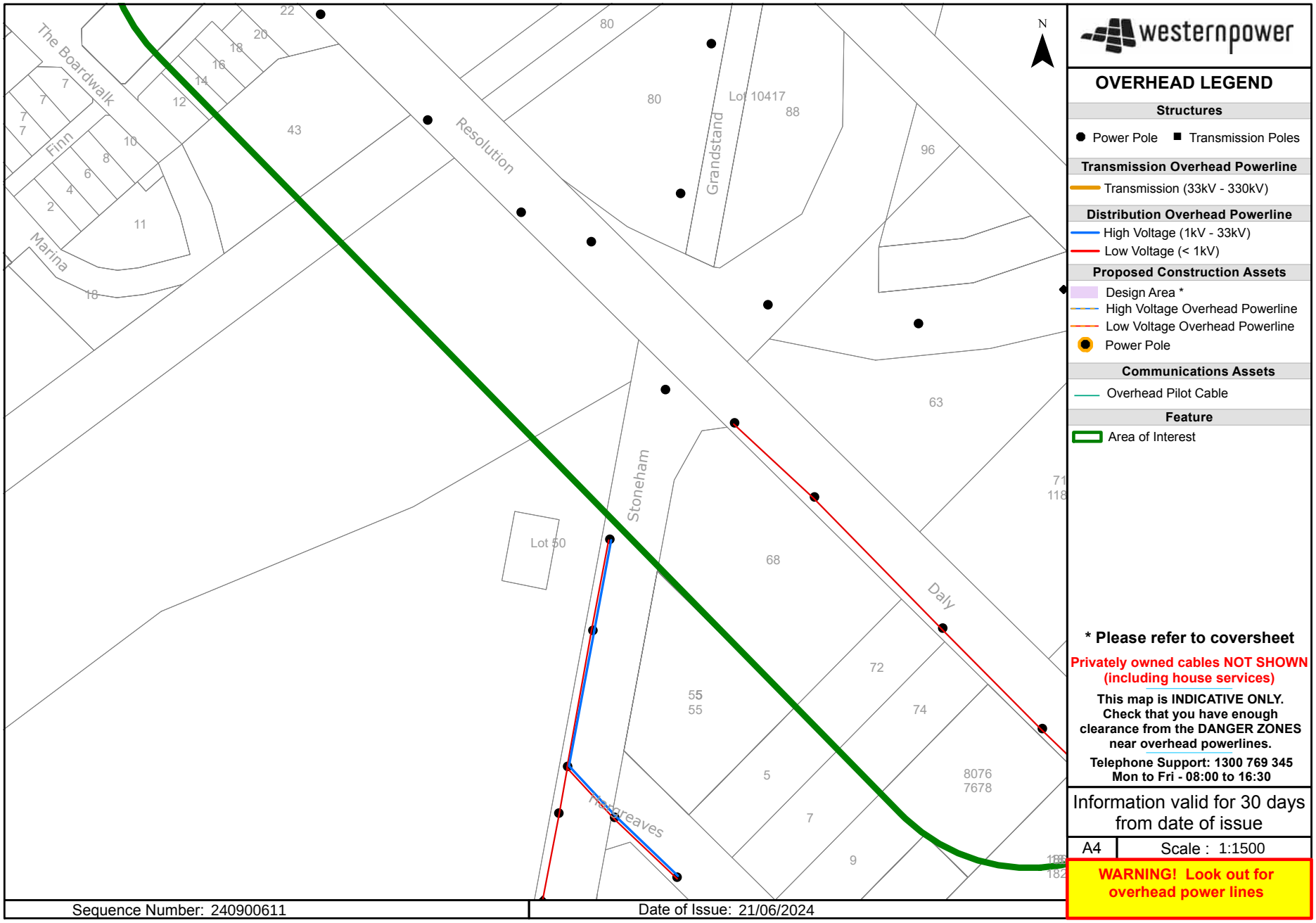
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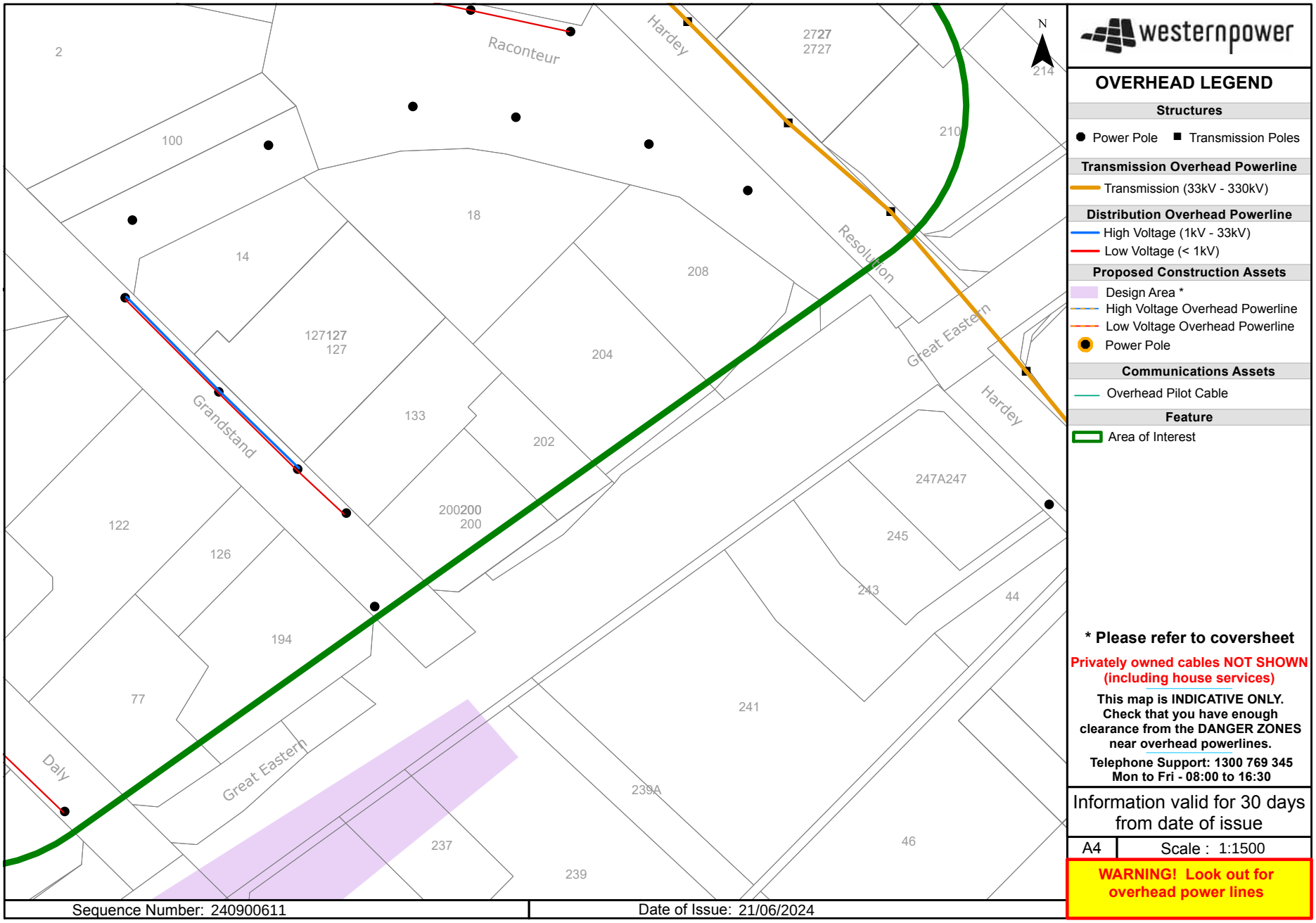
A4 | Scale : 1:3075

WARNING! Look out for overhead power lines


N
41
43
45
47
Grandstand
Grandstand
70
11
13
Resolution
Mirror
22
22
Marina
33
80
80
71
Raconteur
Matheson
Sequence Number: 240900611
Date of Issue: 21/06/2024
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
* Please refer to coversheet
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Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines


N
Matheson
Kalgoorlie
Carbine
Hardey
Raconteur
Lot4
Sequence Number: 240900611
Date of Issue: 21/06/2024
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
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A4
Scale : 1:1500
WARNING! Look out for overhead power lines


The Boardwalk
Finn
Marina
Resolution
Grandstand
Stoneham
Daly
Hargreaves
Lot 10417
Lot 50
N
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
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Power Pole
Communications Assets
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Date of Issue: 21/06/2024


Raconteur
Hardey
Resolution
Great Eastern
Hardey
Grandstand
Daly
Great Eastern
2
100
14
18
208
204
133
202
122
126
194
77
241
239A
237
239
46
214
210
247A247
245
243
44
2727
2727
127127
127
200200
200
N
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
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High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
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WARNING! Look out for overhead power lines
Sequence Number: 240900611
Date of Issue: 21/06/2024

Job ID 36962243

Precinct E

End of document

This document may exclude some files (eg. DWF or ZIP files)

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Job No 36962238

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
Preinct D	70 Grandstand Road Ascot WA 6104	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900580	ATCO Gas Australia	1300 926 755	NOTIFIED
240900576	NBN Co (WA)	1800 687 626	NOTIFIED
240900574	Optus (WA)	1800 505 777	NOTIFIED
240900578	Telstra (WA)	1800 653 935	NOTIFIED
240900575	Vocus (WA)	1800 262 663	NOTIFIED
240900579	Water Corporation	13 13 95	NOTIFIED
240900577	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

ATCO UNDERGROUND ASSET DETAILS ASSETS AFFECTED
GAS DIVISION

ASSETS AFFECTED – see accompanying Plan

Job No: **36962238**
Sequence No: **240900580**
Date of Issue: 21 June 2024
Phone: **1300 926 755**

Justin Zielinski
ATCO Gas Australia
54 Havelock Street
West Perth
WA 6005

BYDA Utility Registration Name: Private
BYDA Location: **70 Grandstand Road Ascot WA 6104**

ATTENTION: This response to your enquiry has been interpreted from details in your requested DBYD picture location request only (not any street address you gave). It is your duty to ensure the accompanying plan/s match your geographical area of works.

IF YOU SEE, HEAR, SMELL OR OTHERWISE DETECT GAS,
LEAVE THE IMMEDIATE AREA AND THEN CALL 13 13 52

Our records indicate that ATCO gas infrastructure ***IS PRESENT*** in the vicinity of and/or surrounding area of the above enquiry. This response relates only to ATCO assets. Your Duty of Care requires that personnel **Must** at all times comply with, and have on site, this information sheet and the accompanying plan(s). All plans are subject to this information sheet. You should refer to the ATCO Self-service Portal (Link Here) or if unsure, contact ATCO on **1300 926 755** during business hours.

All information provided is to be used as a guide only (see Disclaimer item **5**). It does not absolve you or third parties from your Duty of Care obligations, including to take additional precautions where work has the potential to impact on gas assets, public safety or the environment, or from your duties at law (including Reg 3.21 of the Occupational Safety and Health Regulations 1996).

WARNINGS

- No works of any type within 15 metres of any **CRITICAL GAS ASSET** infrastructure without prior approval from ATCO
- **NO HOT WORK** within 15 metres of any gas infrastructure except in compliance with applicable laws & *Australian Standard 1674.* **Do Not** let heat sources or hot works impact on any gas infrastructure and take into consideration that the ground or adjacent structures may also be capable of transmitting heat so as to circumvent protection afforded by a heat shield or barrier
- **DANGER** - Gas can cause asphyxiation and is flammable. Keep all ignition sources well away (e.g., flames, matches/ lighters, sparks, electrical devices, vehicles or engines, mobile phones, cameras)
- Gas pipes **Must Not** be unsupported or left without adequate cover or protection without prior approval from ATCO
- Damage to the pipe coating or pipe itself can be very dangerous if not given immediate attention. Report any damage to ATCO immediately on **13 13 52**. **Do Not** attempt to repair any damaged gas infrastructure
- No alteration or removal of live or abandoned gas infrastructure without prior written approval from ATCO
- Any abandoned or proposed gas infrastructure indicated on the gas plans **Must** be treated as live
- Never assume the location or depth of any gas infrastructure. Pipes may not follow straight lines or maintain a constant depth. Always check carefully (e.g., by careful hand digging of potholes)
- Unauthorised repairs or tampering with gas infrastructure may result in prosecution under the *Energy Operators (Powers) Act 1979*. ATCO Gas Australia reserves all rights to recover compensation for loss or damage to its gas infrastructure or other property including for indirect or consequential losses.

PLANS:

Plans provided are current for **30 days only** from date of request. You must use current plans at all times.

Plans do not show all gas service lines (which connect gas mains to individual meter positions). See condition **3.c)** below.

If plan shows **additional detail** symbols (*) or ( ) in the area of proposed works it is **your duty** to obtain that further detail from the number below.

Plans (including the location of pipes, services, infrastructure and boundaries) are **approximate only**. You **Must** use safe and proper procedures – including **potholing** (see condition **4** below).

Plans are not a guide as to gas availability for connection purposes.

To call ATCO: **Weekdays from 7.30am to 3.30pm, call – 1300 926 755 After hours, weekends and emergencies, call – 13 13 52**

CONDITIONS FOR WORKS IN THE VICINITY OF ATCO ASSETS

1. Compliance with Warnings

You **Must** comply with the Warnings contained in this information sheet and the accompanying plan(s).

2. Compliance with 'Working around Gas Infrastructure' Document (Link Here) applicable laws and duty of care

All work (including but not limited to using Excavator's Augers, Directional, drilling machines, 'Ditch Witch' type trenching machine, Loader, Dozer, Skid Steer (Bob Cat)) **Must** comply with all applicable requirements in the 'Working around Gas Infrastructure' Document and with all applicable laws and Australian Standards. All due care must be exercised to locate any gas infrastructure in the vicinity and when conducting any works near them.

3. All Gas Infrastructure

All work that may have any impact upon any gas infrastructure (see **3.a)**, **b)** and **c)** below for examples) should be carefully planned with notification to ATCO well in advance of commencement. Contact ATCO on **1300 926 755** or visit Atco's online self-service portal (Link Here). Amongst other things, this includes excavation of or near gas pipelines, boring/drilling, crossings of pipelines (including by other underground infrastructure e.g. drains, power cables, etc.), road works and structural installations. In addition:

a) Critical Asset

No works of any type are permitted within 15 meters of these pipelines without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco online Self-service portal (Link Here)

You **Must** ascertain the location of any Critical Asset, in relation to your proposed work by:

- Locating a straight line between two marker danger signs, and
- Assessing the distance from this line to your proposed work area.

ATCO may require stand-by supervision during your works and will advise of attendance requirements.

b) Non Critical Assets

These pipelines are installed in most streets throughout the Perth metro area and several country centers. Main valves, regulator sets, and test points also exist at intervals along these pipelines. Where work may impact upon these pipelines or assets then ATCO **Must** be contacted as per item **3** above.

c) Gas Services and Meters

If a gas meter is installed on a property, an underground gas service pipe will run from the meter position to the gas main in the street. Plans do not show all gas service lines (with the exception of Critical Assets), but their presence must be anticipated. Most gas meter boxes installed since 1996 will include a sticker giving approximate guidelines for the gas service line location. All due care must be exercised to locate any gas services in the vicinity and when conducting any works near them.

4. Compliance with Safe Work Practices

It is your responsibility to have and comply with adequate safe work practices and procedures. Without limiting your obligations:

PLAN The complete & current Before you Dig Australia documentation and plans must always be on site & referred to for the duration of work. Refer to regulation 3.21 of the Occupational Safety and Health Regulations 1996 and the Utility Providers "Code of Practice" for further useful information.

PREPARE Prepare by reviewing the Before you Dig Australia Documentation and contacting ATCO if you need assistance. Look for onsite ATCO asset and infrastructure clues such as pit lids, marker posts and meters. No works of any type are permitted within 15 meters of a **CRITICAL ASSET** without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco website Self Service portal (Link Here) and allow suitable

processing time. Atco recommends engaging a BYDA Certified Locator which includes undertaking electronic location prior to potholing.

POTHOLE Using current Before you Dig Australia plans, all gas pipes should be located (including any deviation in the direction of a gas pipe) by exposing them by careful digging using a HAND SHOVEL. Where the proposed work is parallel to a gas pipeline, pothole every 10 meters along the entire route. Damage to the pipe coating or to the pipe itself can create a very dangerous situation if not given immediate attention. If damage does occur, it **Must** be reported to ATCO immediately on Ph. **13 13 52**.

PROTECT Supervise and monitor all excavations near gas infrastructure using a dedicated spotter. Where any gas infrastructure is required to be exposed, adequate protection of the gas infrastructure is required to prevent potential damage. Also implement appropriate controls when conducting 'hot work' (in accordance with AS 1674) in the vicinity of the ATCO infrastructure such as; isolation; separation distance; the placement of an effective non-combustible barrier of sufficient size and thermal resistance for the intensity, type and duration of heat exposure; gas monitoring; monitoring the environment surrounding the ATCO infrastructure to ensure it is not being impacted by the work, and other controls as necessary.

PROCEED You should **only proceed** with your excavation work after you have planned, prepared, potholed (unless prohibited) and have protective measures in place. All locations markers/pegs are to be removed on completion of works. If you are unsure, **DO NOT** Proceed. Call ATCO on **1300 926 755**

5. Disclaimer and Further Terms

a) Nothing in this document, any accompanying plan or the 'Additional Information for Working around Gas Infrastructure' (AGA-O&M-PR24) (together called "**Documents**") purports to exclude or modify any term, condition or warranty to the extent that by law it cannot lawfully be excluded or modified by agreement or notice, including but not limited to those contained in Schedule 2 of the *Competition and Consumer Act* 2010 (Cth) and corresponding provisions of any state legislation.

b) If any of ATCO, or their respective related entities, officers, employees, agents, contractors or advisers (together called "**Associates**") is liable for a breach of a term, condition or warranty described in paragraph **5.a)** above, its liability is, to the fullest extent permitted by law, limited to any one or more of the
following as it determines in its absolute discretion:

i) in relation to goods supplied by them, replacing or repairing the goods, supplying an equivalent item, paying the cost of replacing or repairing the goods or paying the cost of acquiring or hiring an equivalent item; and

ii) in relation to services supplied by them, the re-supply of the services or the payment of the cost of having the services re-supplied.

c) Subject to paragraphs **5.a)** and **b)**, but otherwise despite any other provision in the Documents, no representation or warranty is made or given (whether expressly or by implication) by any of ATCO or their respective Associates in respect of any information contained or referred to in any of the Documents or in any other communication from ATCO concerning any of the Documents or the subject matter of any of the
Documents ("Information"). In particular, but without limiting the generality of the foregoing limitation, none of ATCO or their respective Associates makes any warranty or representation as to the truth, accuracy, completeness, reliability, currency, timeliness, quality or fitness for any purpose of or the standard of care taken in the preparation of any Document or Information (including, but not limited to, the accuracy of the scale of, or the location of anything or symbol shown on, any plan or diagram).

d) Subject to paragraphs **5.a)** and **b)**, to the maximum extent permitted by law, none of ATCO or their respective Associates is liable to any person or other body ("**Recipient**") who receives or otherwise obtains access to all or any part or parts of the Documents or Information, in any way (including, but not limited to, liability for negligence, breach of statutory duty or lack of care) in respect of any cost, expense, damages, loss or liability, including, but not limited to:

i) any financial or economic loss, cost, expense or damage, including but not limited to loss of production, loss of profit, loss of revenue, loss of use, loss of contract, loss of goodwill or loss of business opportunity;

ii) any new or increased costs or expenses, including but not limited to financing or operating costs;

iii) any failure to achieve any actual or anticipated saving in respect of any cost or expense;

iv) any cost, expense, damage or loss resulting from any liability of the Recipient to any other person or body howsoever and whensoever arising, suffered or incurred by the Recipient in relation to, or in connection with, the disclosure to them of, or use of, or reliance on, all or any

part or parts of the Documents or Information.

e) By using any Document or Information, each Recipient is taken to represent and warrant to ATCO that the Recipient will comply with the conditions and other terms referred to in the Documents or Information, including but not limited to conditions that:

i) the Recipient **Must** comply with the conditions in numbered paragraphs **1** to **4** above and this paragraph **5**;

ii) as between ATCO and each Recipient, ATCO owns the Information and all rights and title in and to the Information are to remain vested in ATCO;

iii) no Recipient has any right, title or interest in the Information or, except as expressly provided for in the Documents, any license or right to copy, alter, modify, publish or otherwise use or deal with the Information without prior written approval from ATCO;

iv) ATCO makes no representation and gives no warranty as to its right to disclose any Information;

v) the Recipient relies on any Information entirely at its own risk and expense;

vi) the Recipient **Must** undertake its own independent due diligence and investigations in relation to the Information;

vii) none of ATCO or their respective Associates owes the Recipient any duty of care in respect of the Information; and

viii) none of ATCO or their respective Associates is under any obligation to correct, update or revise any Documents or Information.

GAS MAIN AND SERVICE IDENTIFICATION

LEGEND

1. Critical Asset (See **WARNINGS** page 1)
2. Pipe Diameter (millimetres)
3. Pipe Material

   CI = Cast Iron PE = Polyethylene
   GI = Galvanised Iron PVC = PVC
   ST = Steel
4. Alignment (in metres from property line)
5. Pressure in main (MP 70 kPa = Medium Pressure and MAOP (Maximum Allowable Operating Pressure)
6. Off-line Service – service may not be straight line to meter. (**WARNING – OLS may not always be shown on plan**. See item **Error: Reference source not found** above)
7. Service Valve in the vicinity
   (**NOTE:** Service Valve may be **"BURIED"**)
8. Pre-laid Service laid in Common Trench
9. Main Status: (See **WARNINGS** page 1)

   9a. AB = Abandoned Mains

   9b. PROP = Proposed Mains
10. Customer Connection: Does not indicate actual location of Meter Position

    D2 (D = Domestic & 2 = Number of Meters)

    C1 (C = Commercial & 1 = Number of Meters)
11. **Additional detail available and Must be obtained if within area of proposed works – see page 2 above.**
12. Depth of Cover (DOC) in metres.



IF UNSURE, PLEASE CONTACT ATCO ON **1300 926 755**

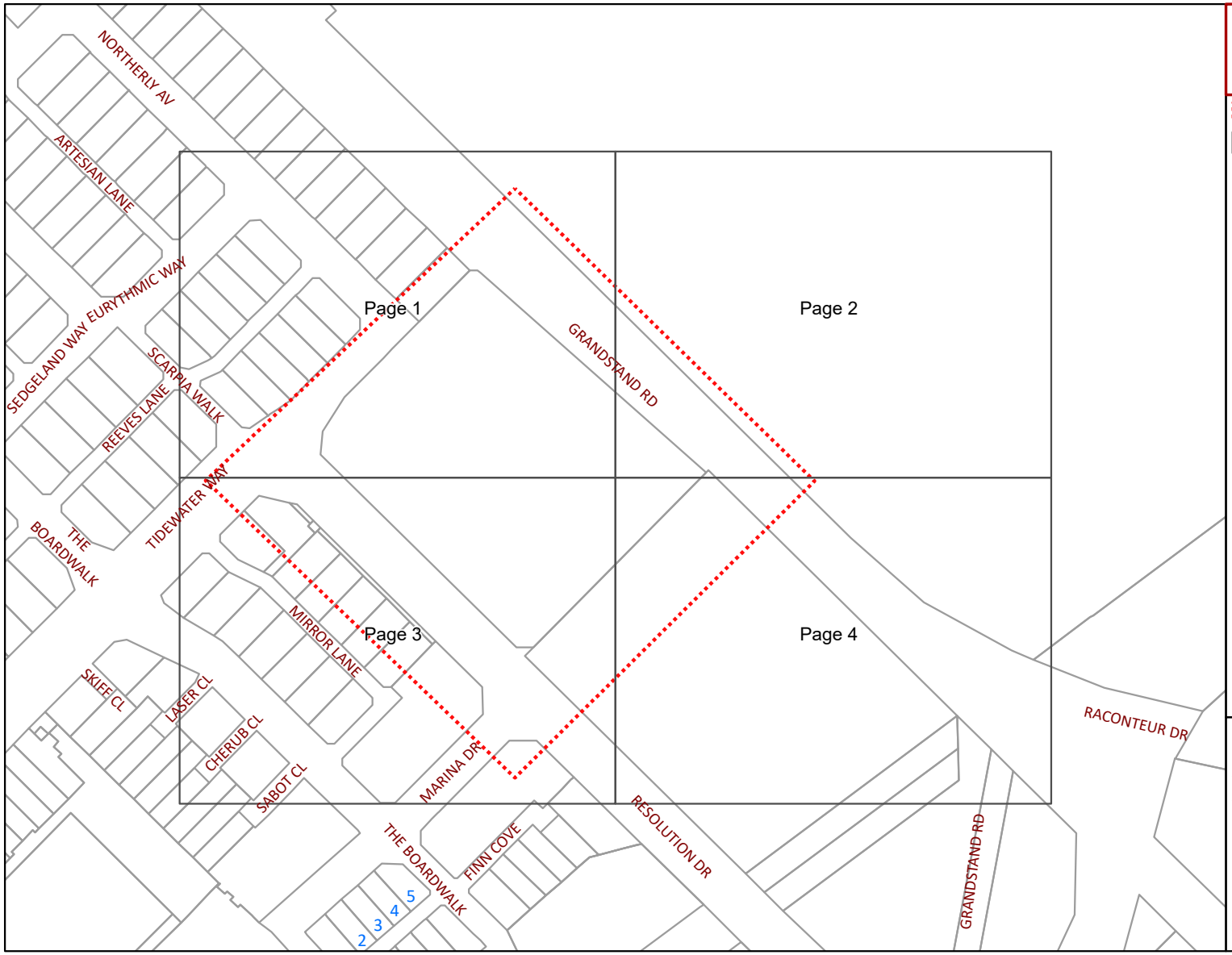
ATCO

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ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)
Index Sheet

Seq # 240900580
Job # 36962238

BYDA Location: 70 Grandstand Road Ascot 6104
Scale: 1:2,000



WARNING
Refer to Cover Sheet for Further Information

BYDA Enquiry

Detailed map page

Please refer to Symbols Sheet for Further Information

Disclaimer:
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ATCO Gas Australia will seek compensation for damage caused to assets.

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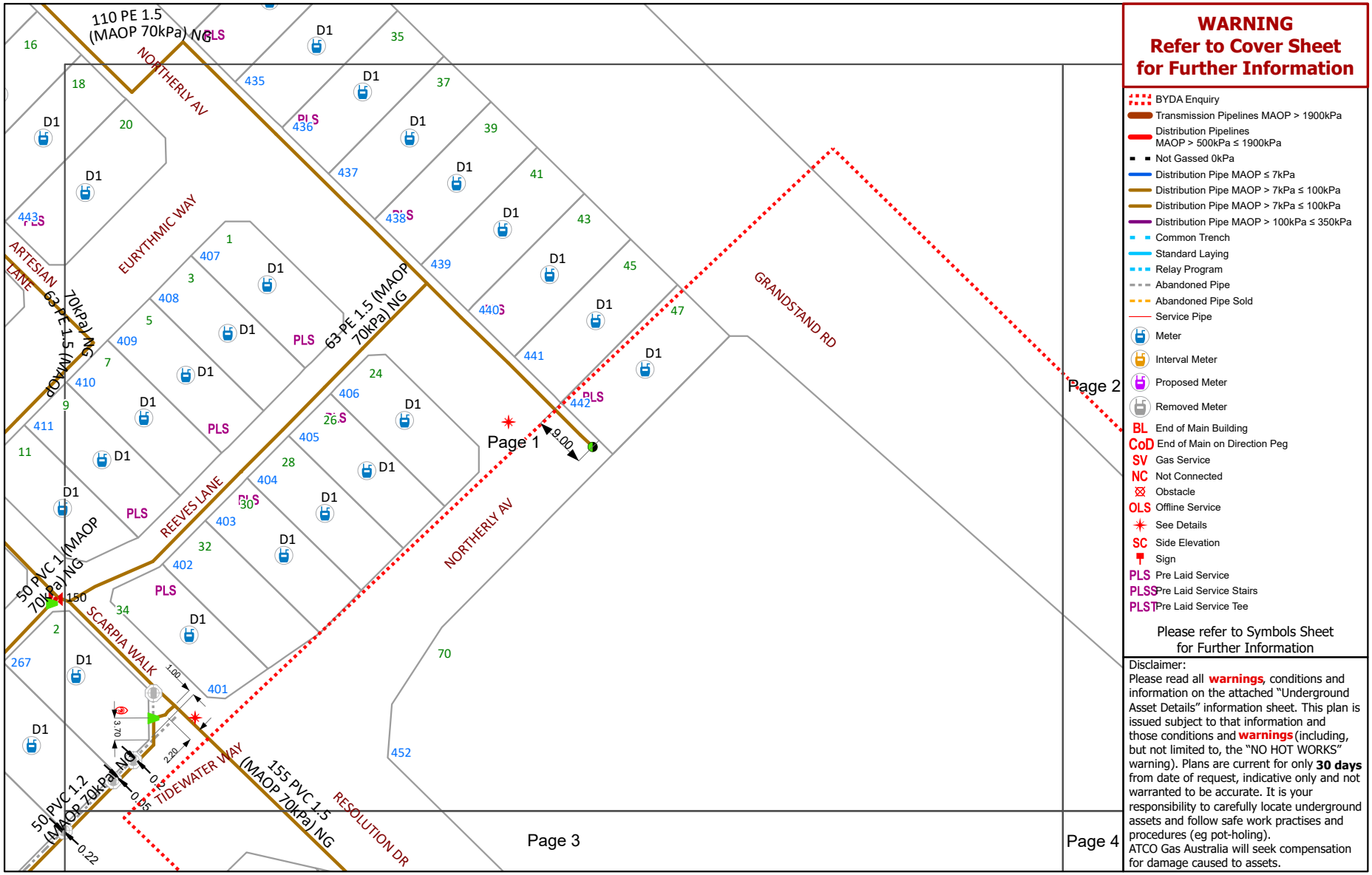
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Seq # 240900580
Job # 36962238

BYDA Location: 70 Grandstand Road Ascot 6104
Scale: 1:800



WARNING
Refer to Cover Sheet for Further Information

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign
- PLS Pre Laid Service
- PLSS Pre Laid Service Stairs
- PLST Pre Laid Service Tee

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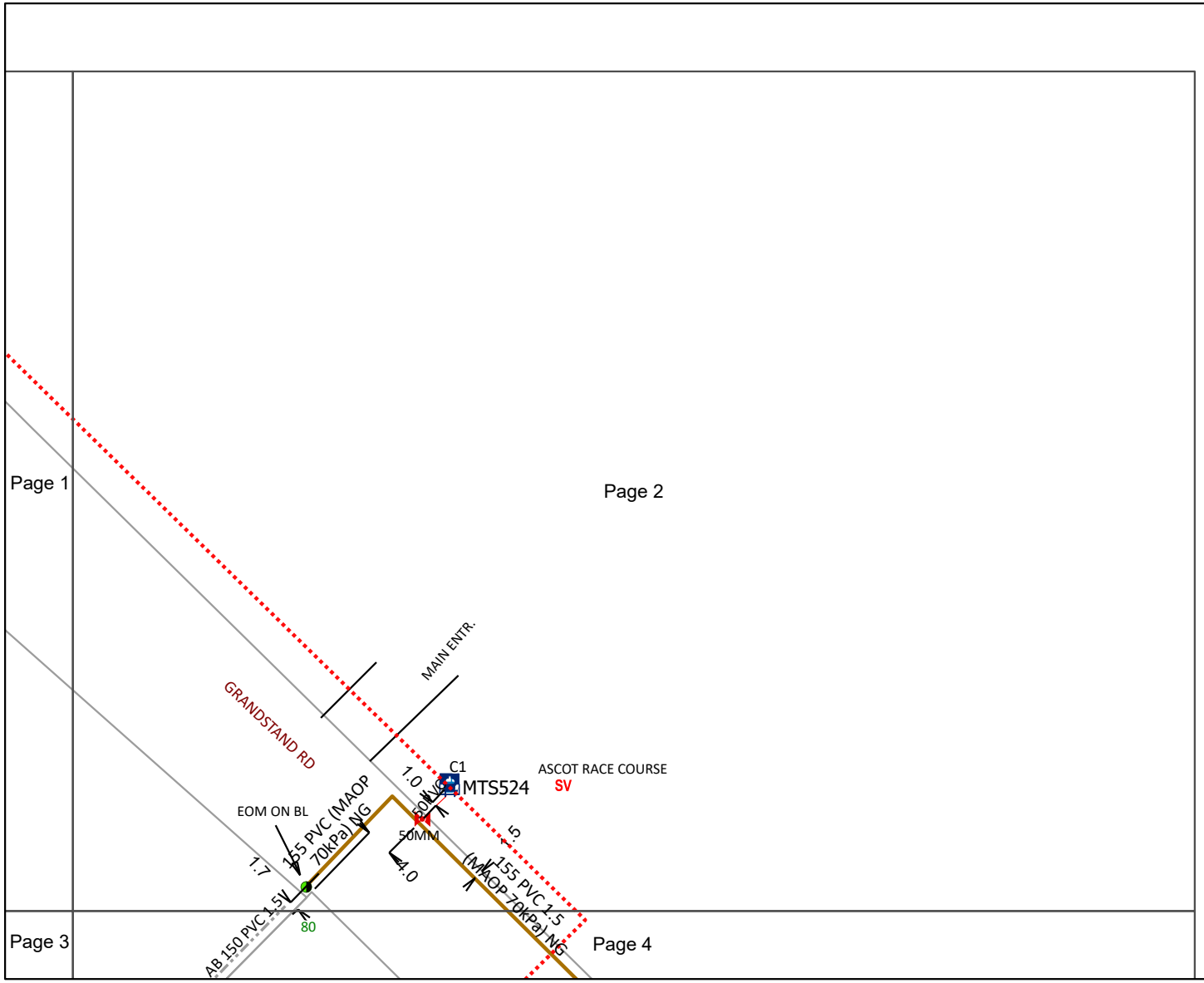
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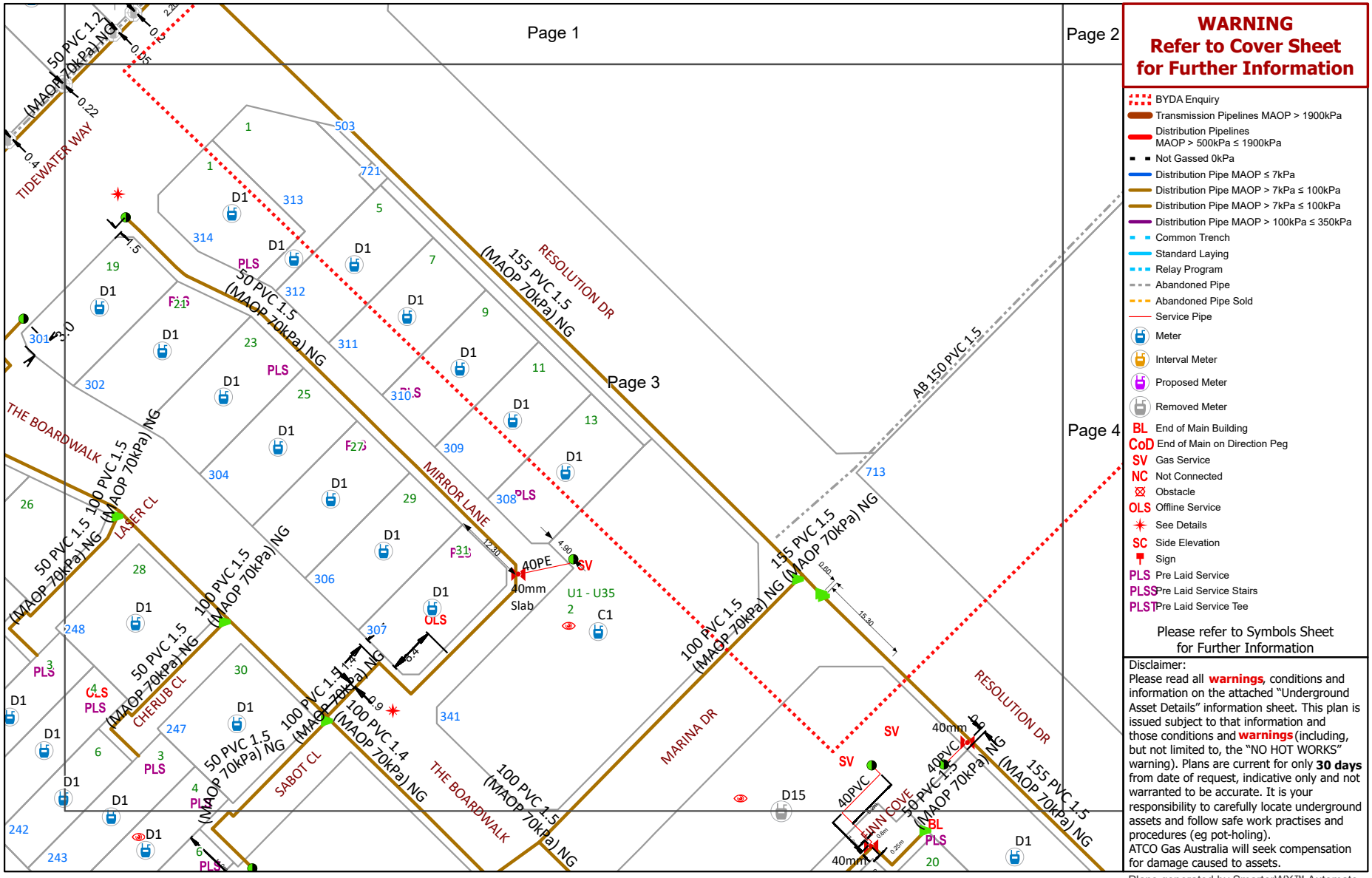
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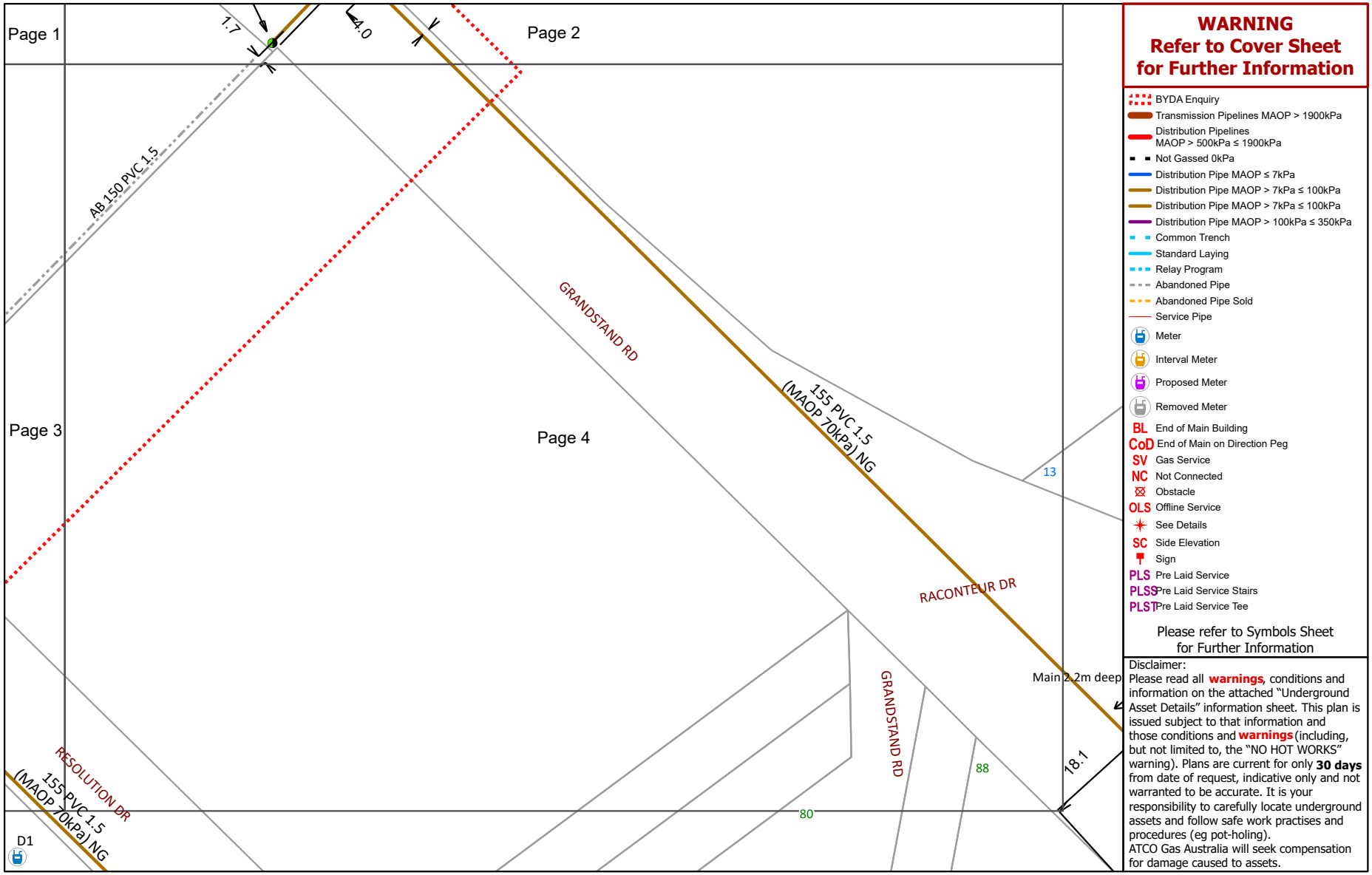
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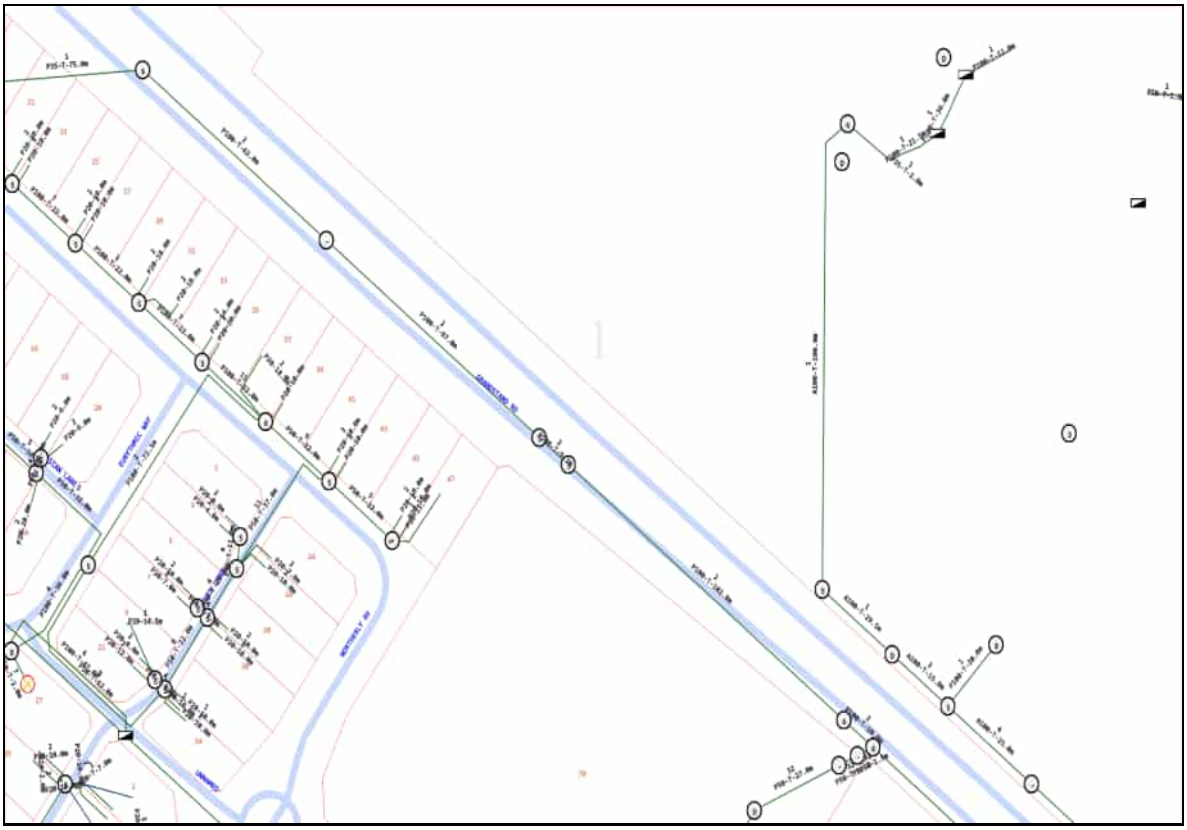
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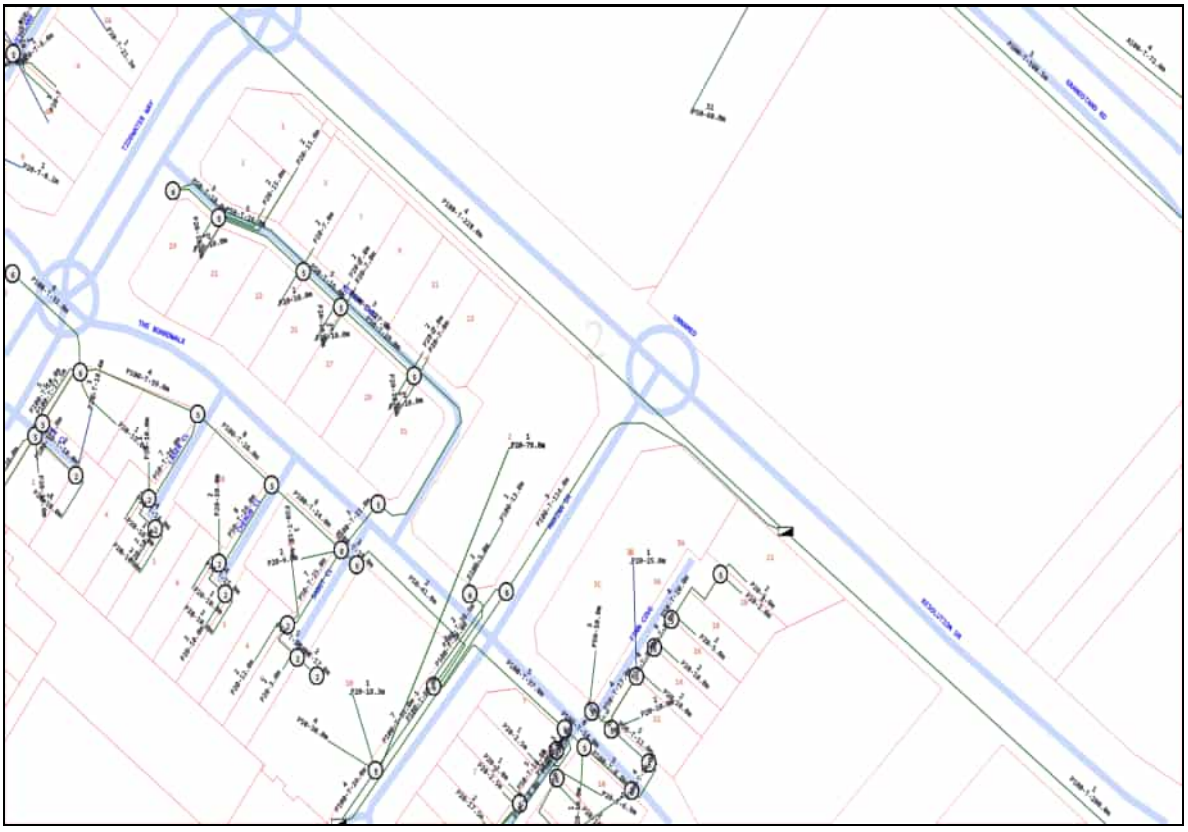
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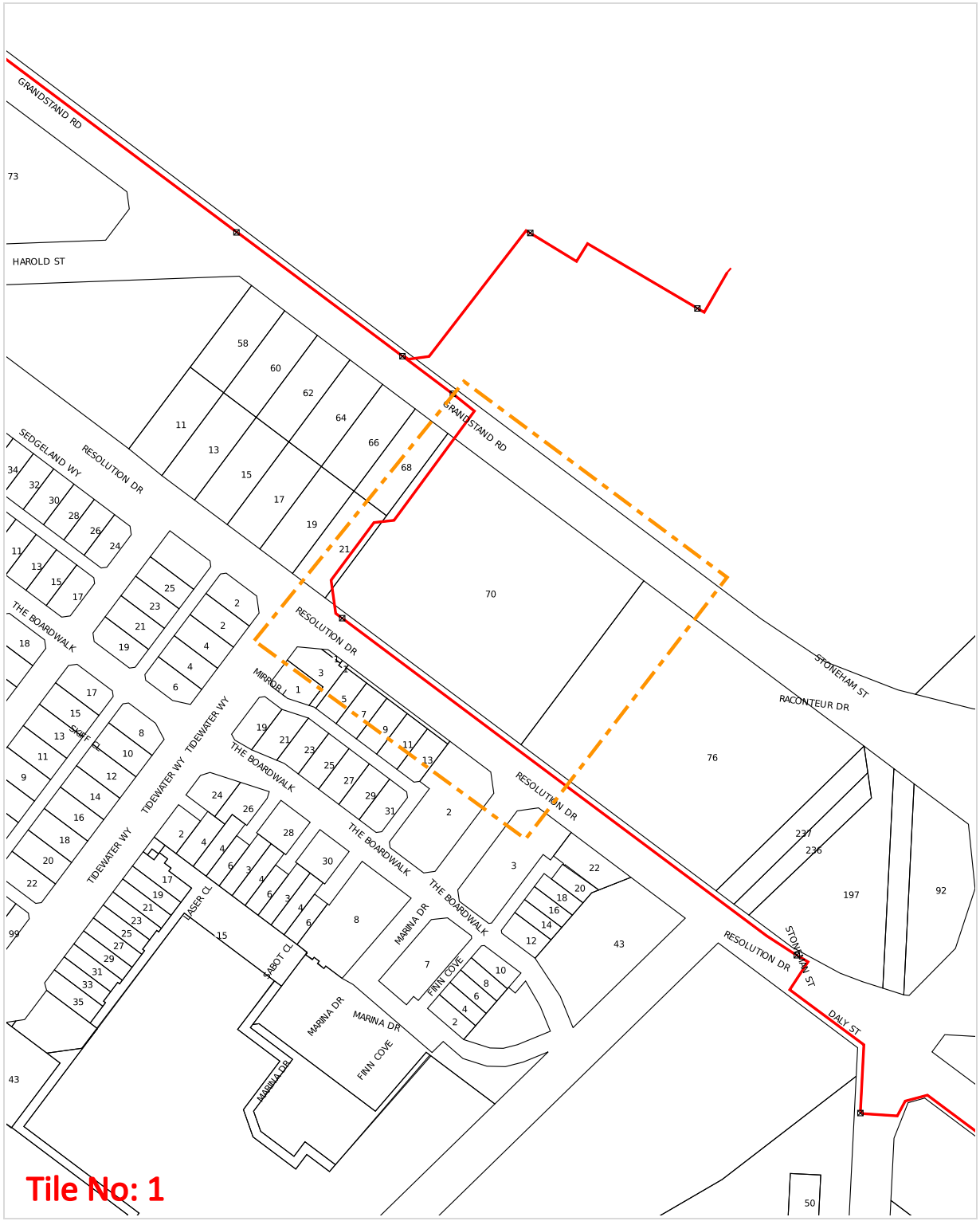
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Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.



WARNING: This document is confidential and may also be privileged. Confidentiality nor privilege is not waived or destroyed by virtue of it being transmitted to an incorrect addressee. Unauthorised use of the contents is therefore strictly prohibited. Any information contained in this document that has been extracted from our records is believed to be accurate, but no responsibility is assumed for any error or omission. Optus Plans and information supplied are valid for 30 days from the date of issue. If this timeline has elapsed, please raise a new enquiry.

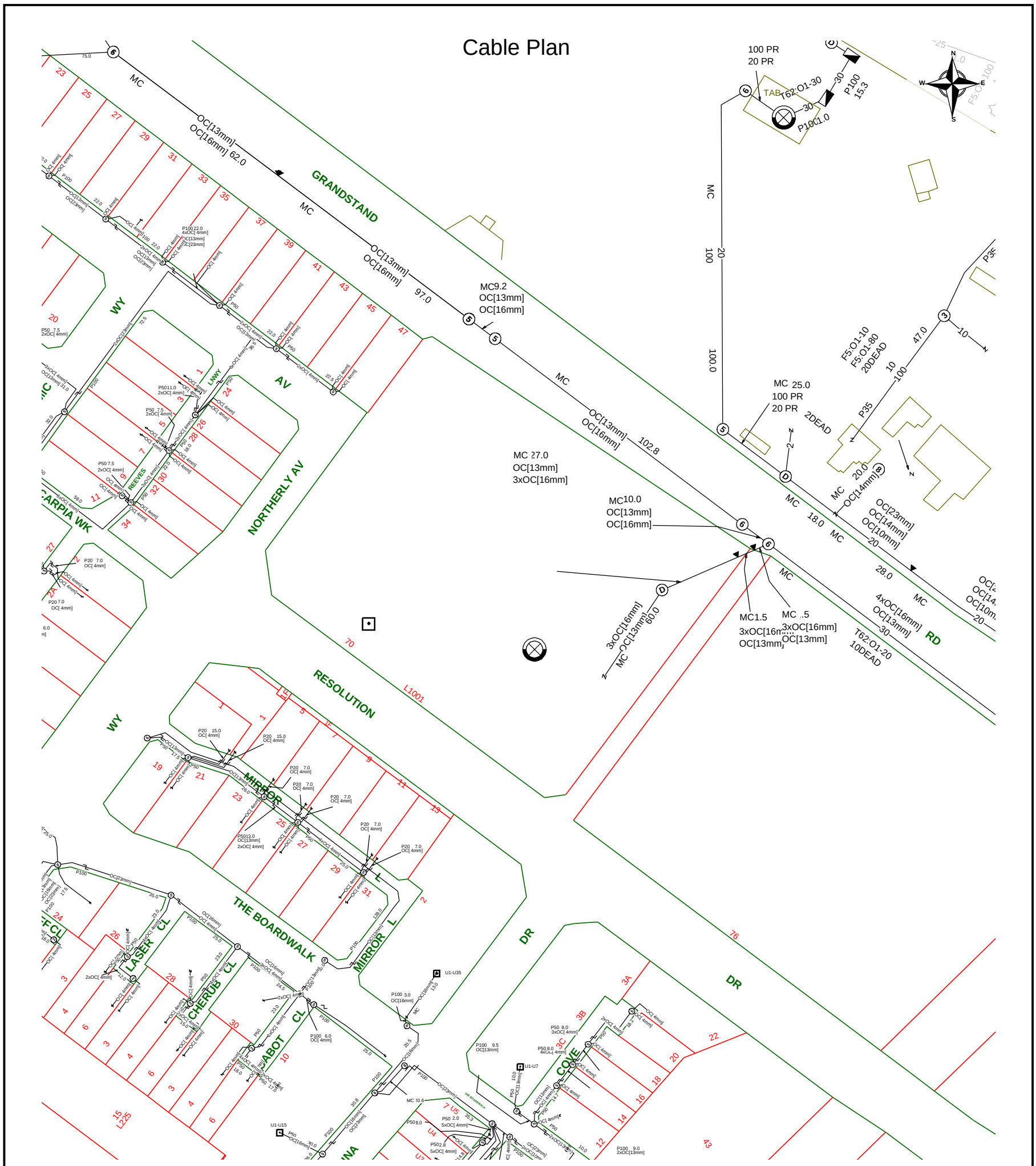
Sequence Number: 240900574

Date Generated: 21 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

Plans generated 21 Jun 2024 by Pelicancorp TicketAccess Software | www.pelicancorp.com

Cable Plan



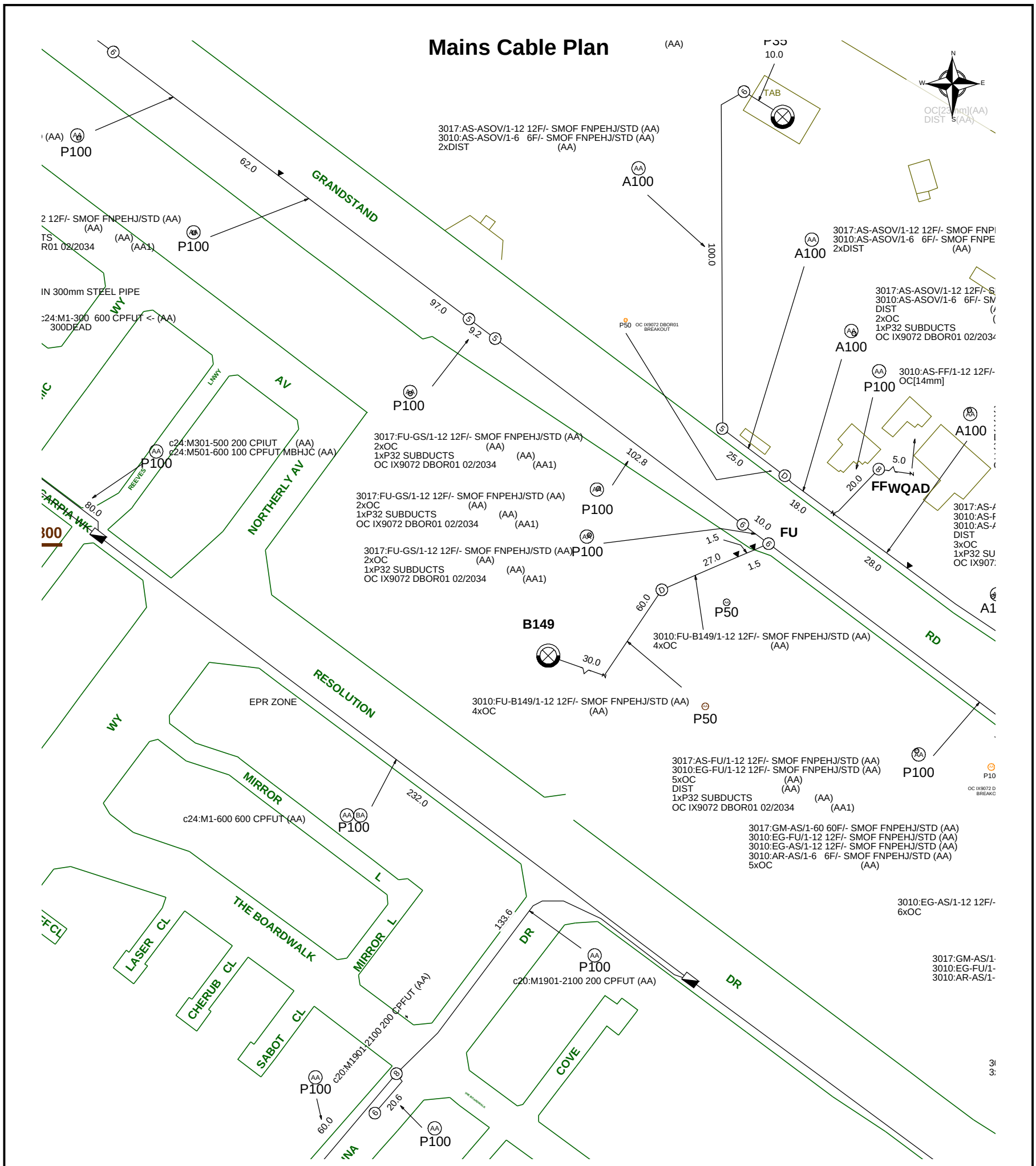
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900578
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:32	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

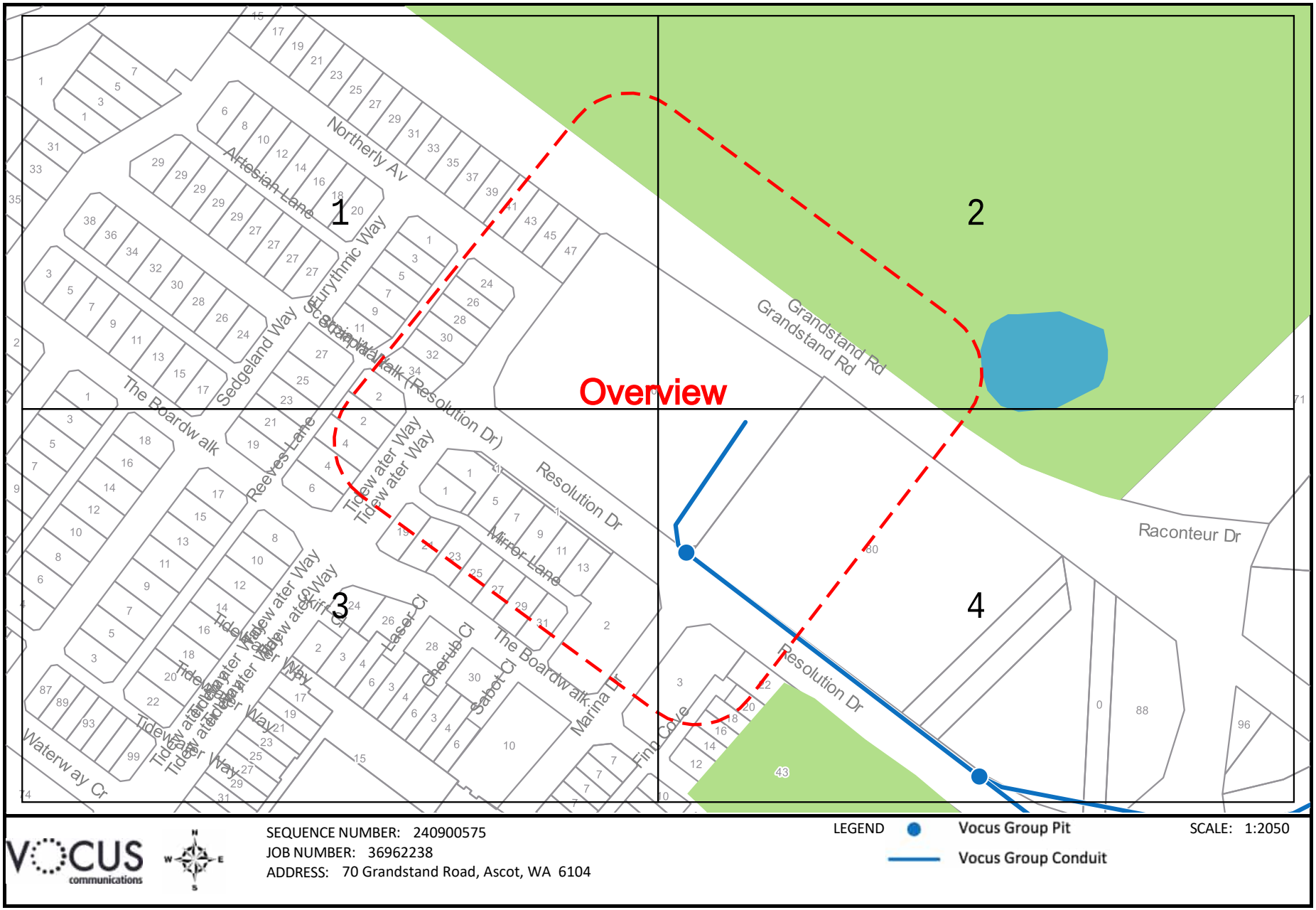
Page 1 of 2



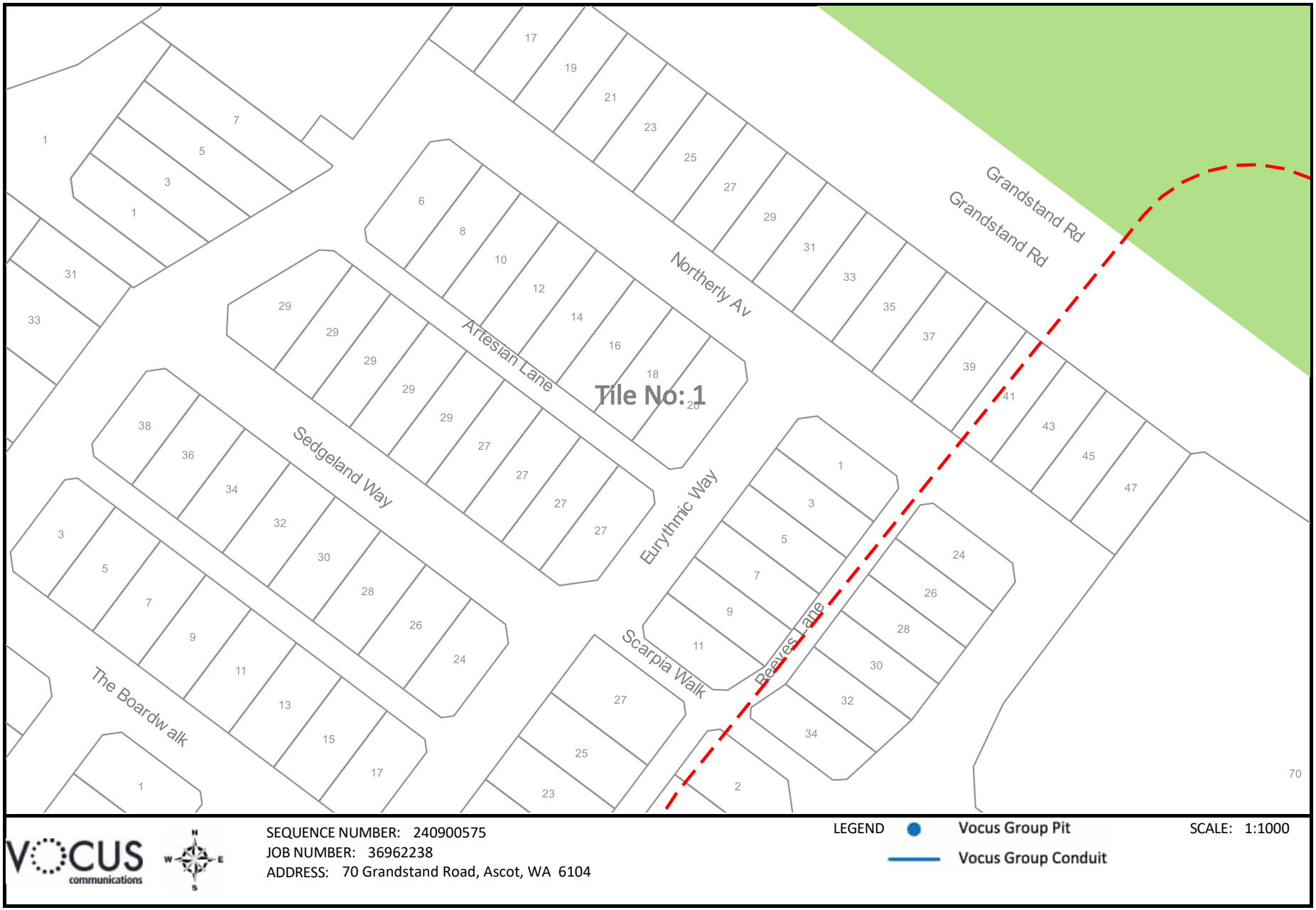
	Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900578
	TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
	Generated On 21/06/2024 19:05:34	

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

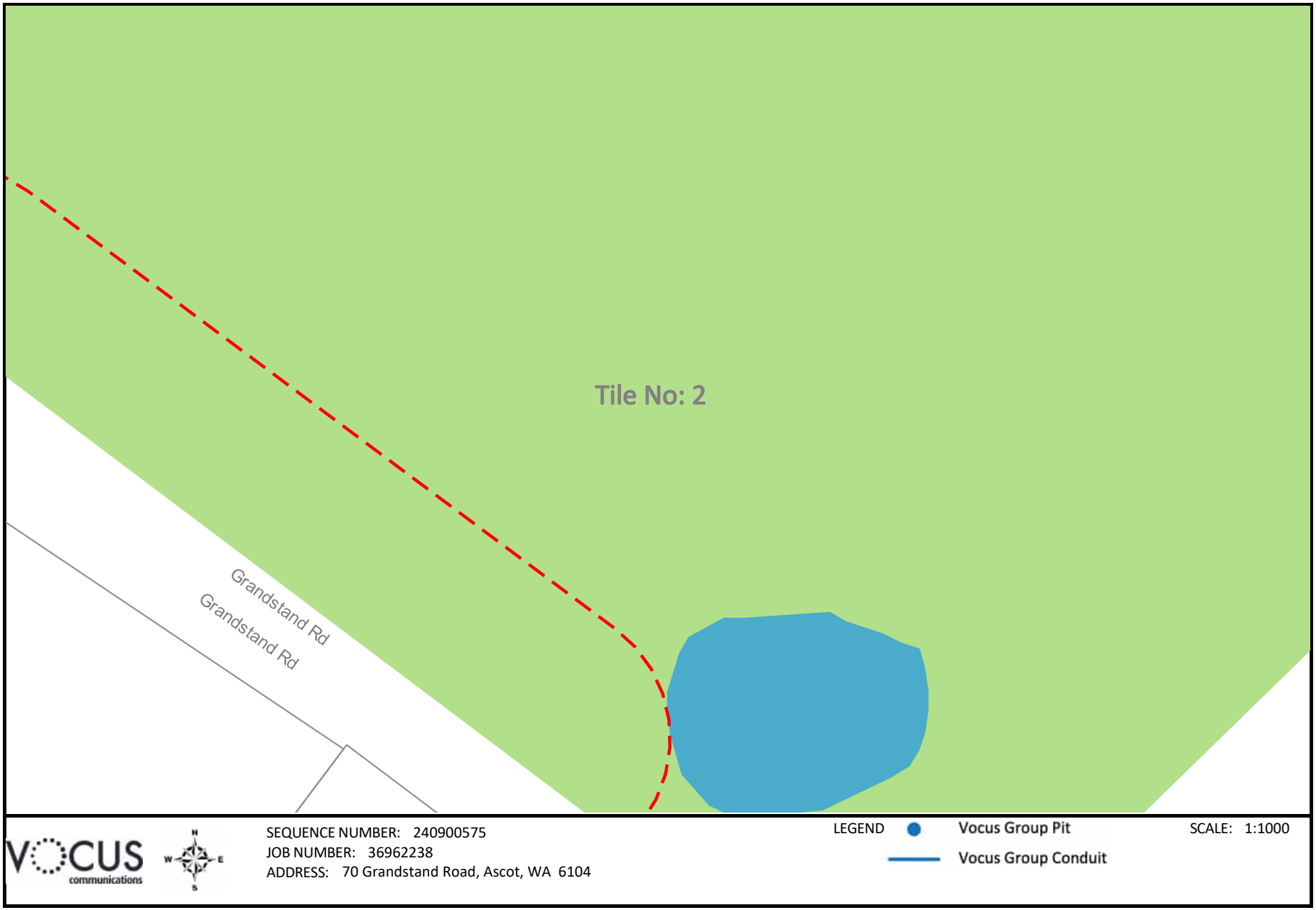
See the Steps- Telstra Duty of Care that was provided in the email response.



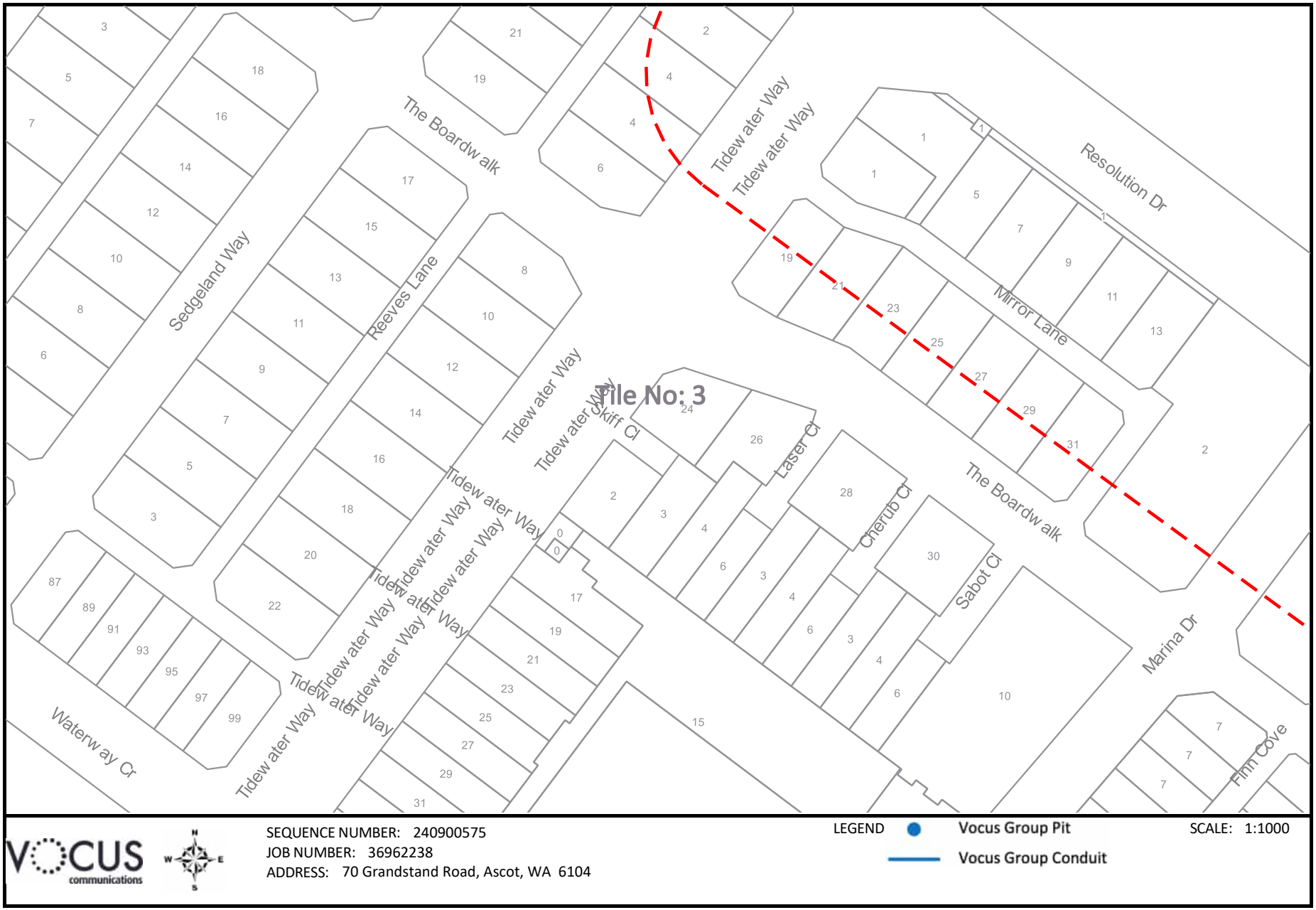
The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.



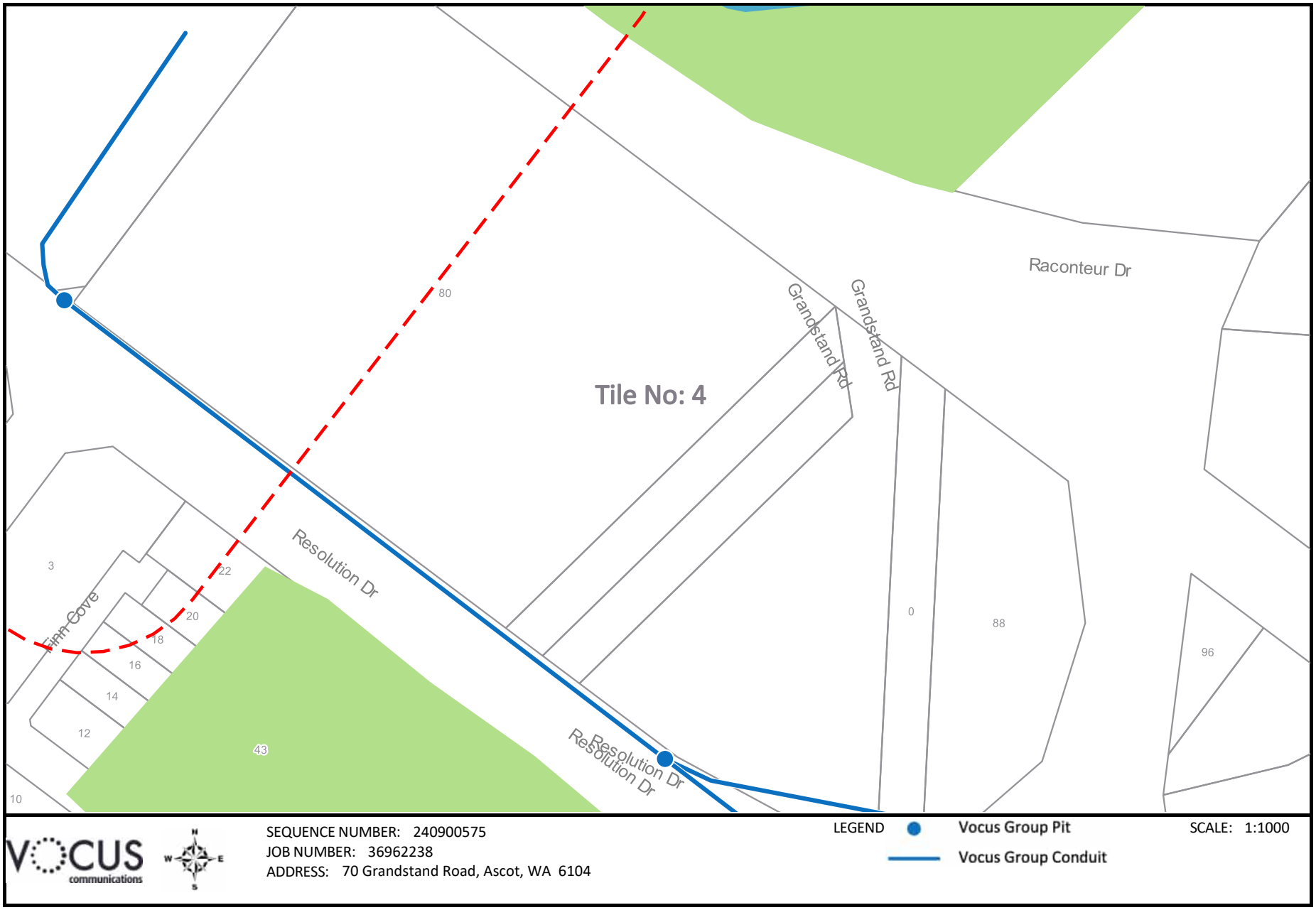
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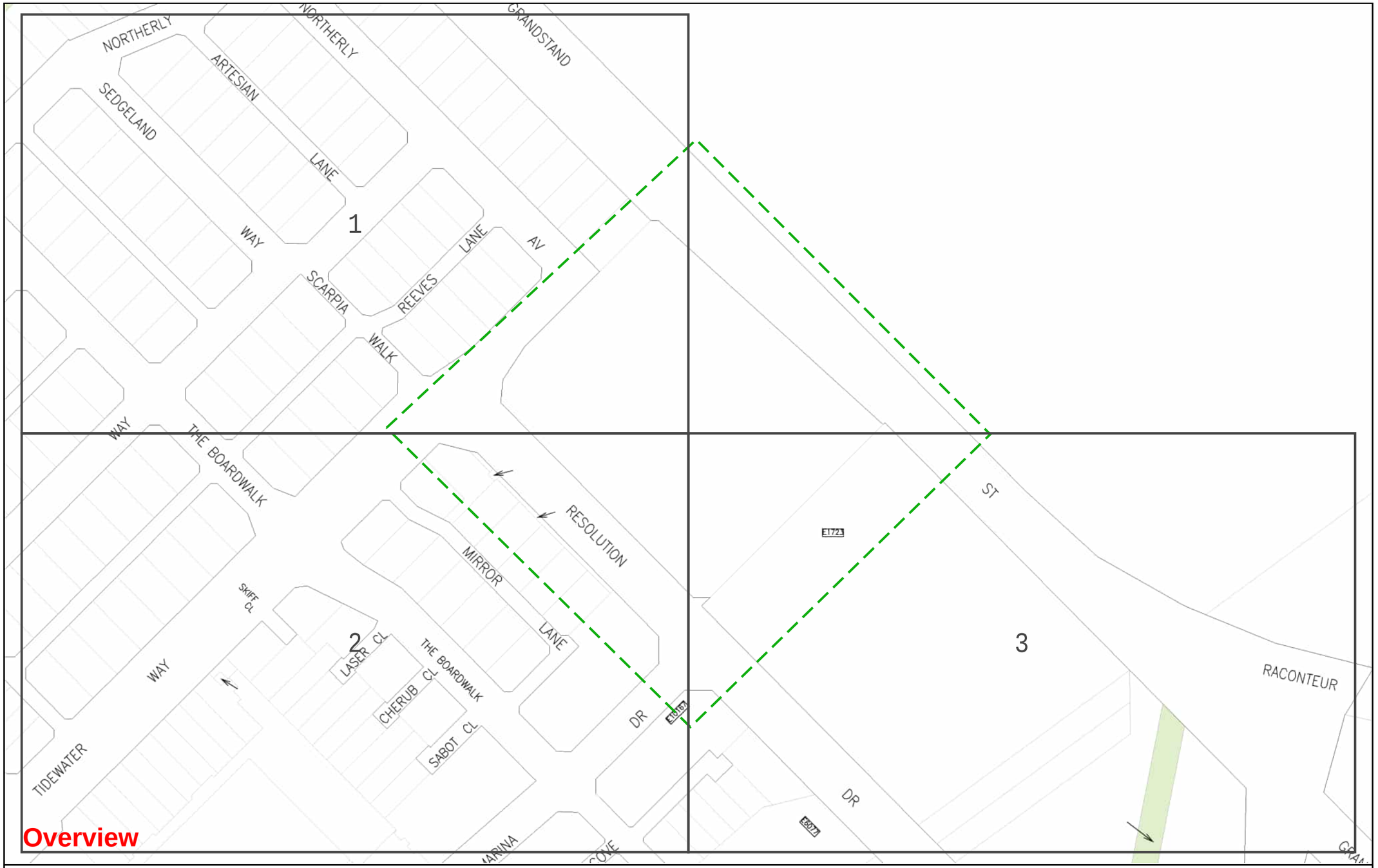
The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.



The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.



The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.



Scale:	1:1538
Job No.:	36962238
Sequence No.:	240900579
Print Date:	21 Jun 2024

N

Sewer

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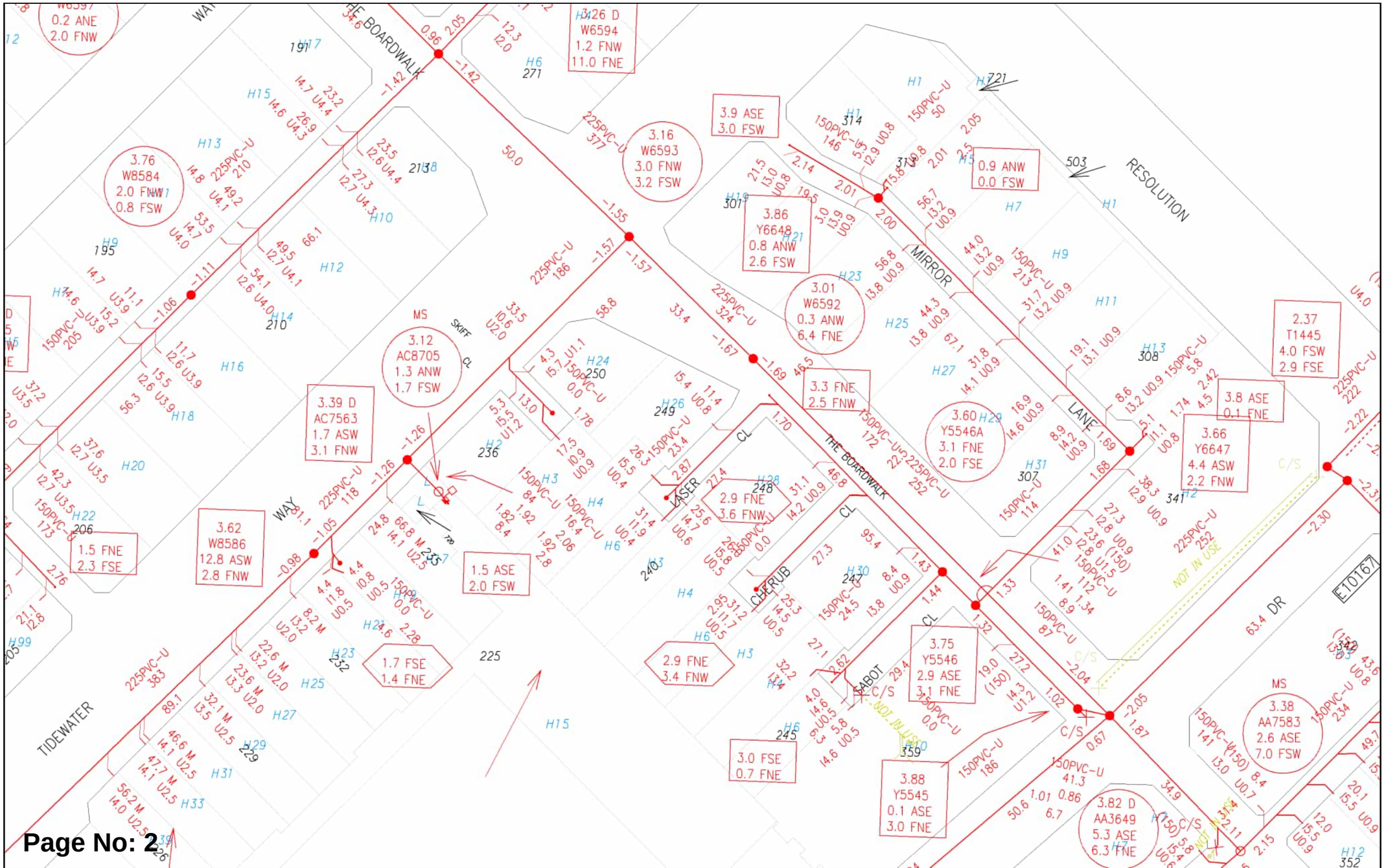


Scale:	1:750
Job No.:	36962238
Sequence No.:	240900579
Print Date:	21 Jun 2024

N

Sewer

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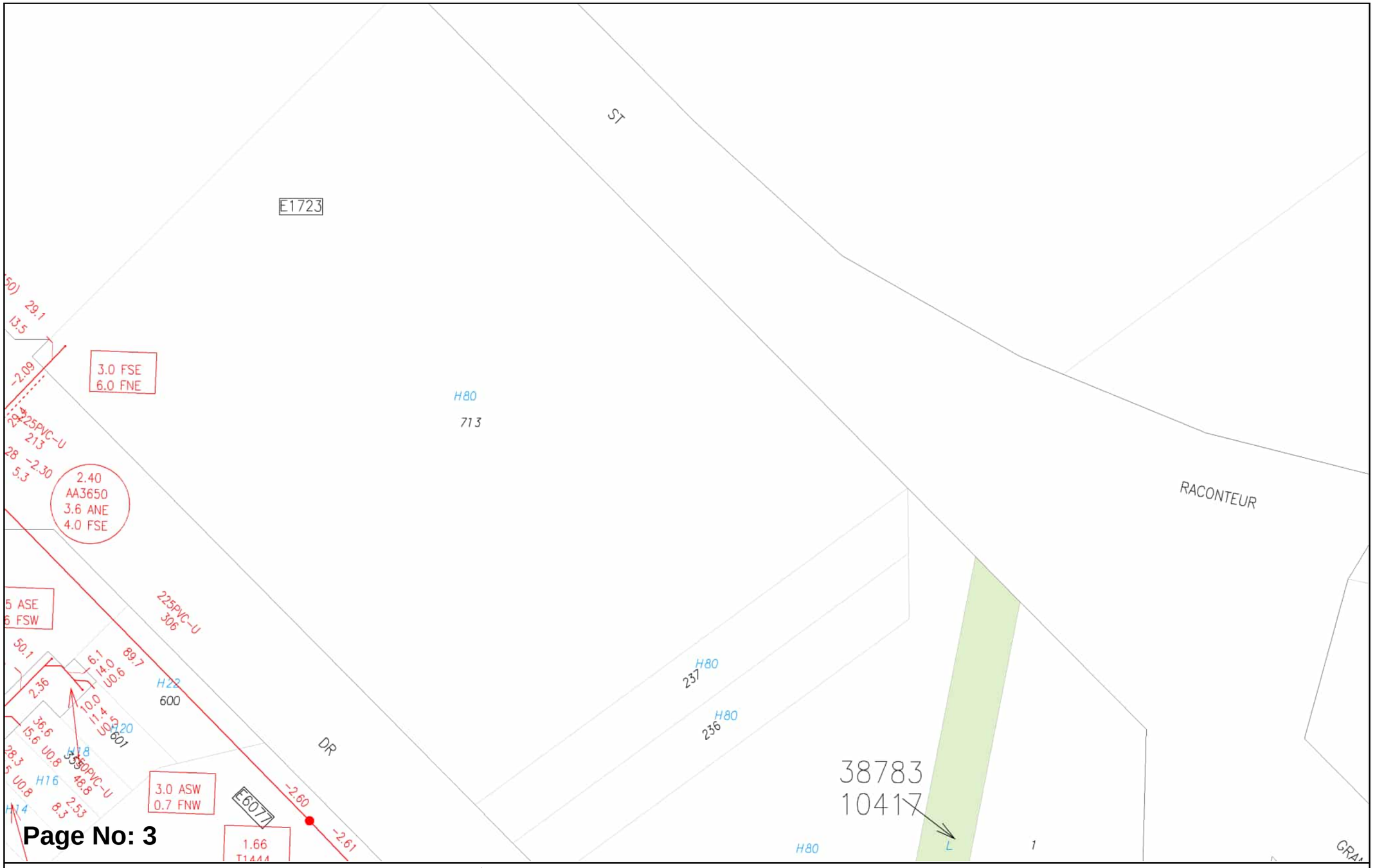
WATER CORPORATION

Scale:	1:750
Job No.:	36962238
Sequence No.:	240900579
Print Date:	21 Jun 2024

N

Sewer

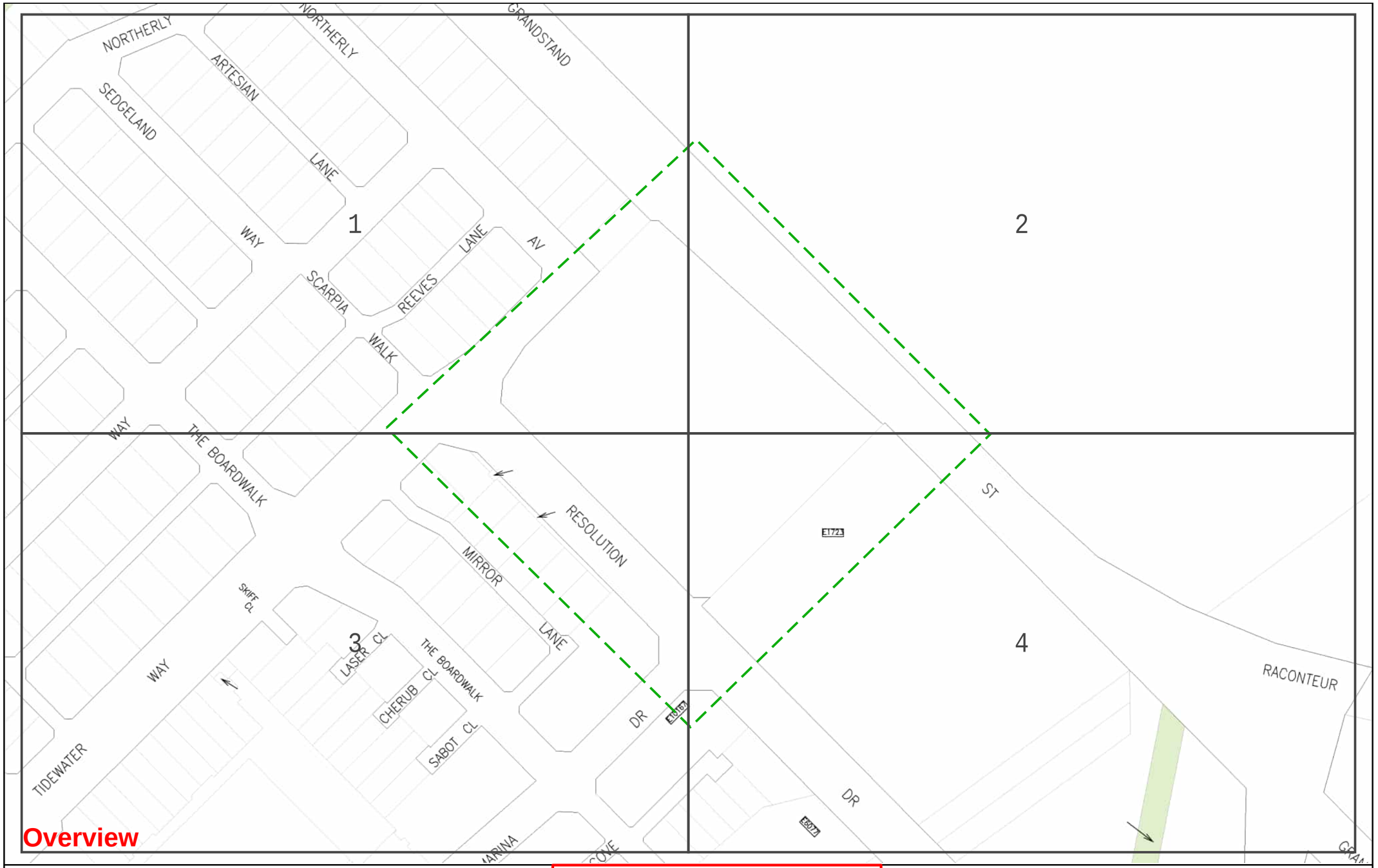
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WATER CORPORATION

Scale: 1:1538
Job No.: 36962238
Sequence No.: 240900579
Print Date: 21 Jun 2024

N

Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

Apply for approval to work near our assets at:

Working near assets (watercorporation.com.au)

Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

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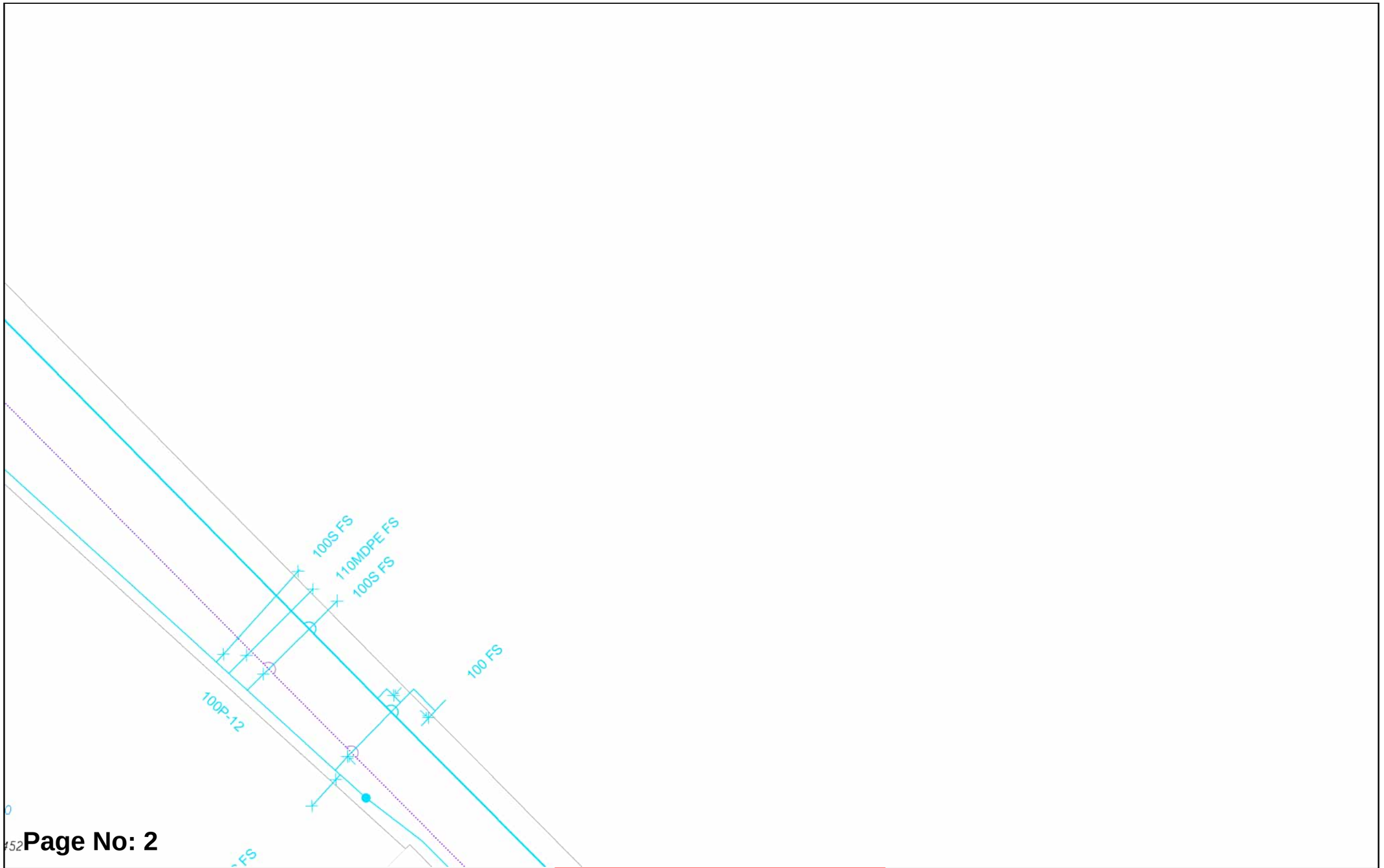
WATER CORPORATION

Scale: 1:750
Job No.: 36962238
Sequence No.: 240900579
Print Date: 21 Jun 2024

N
Water

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WATER CORPORATION

Scale: 1:750
Job No.: 36962238
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Water

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Page No: 3

WATER CORPORATION

Scale:	1:750
Job No.:	36962238
Sequence No.:	240900579
Print Date:	21 Jun 2024

N

Water

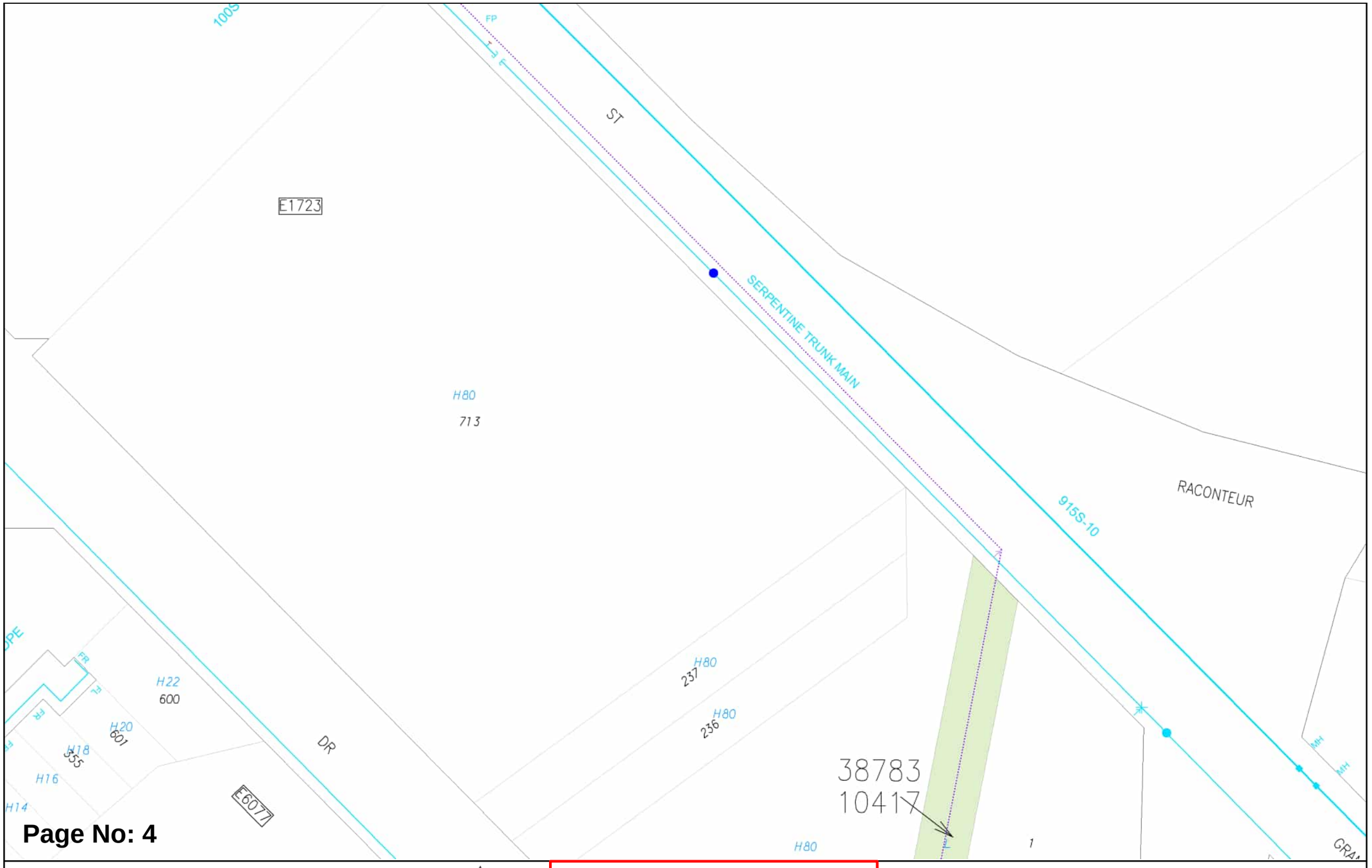
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WATER CORPORATION	Scale:	1:750	
	Job No.:	36962238	
	Sequence No.:	240900579	
	Print Date:	21 Jun 2024	

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Water

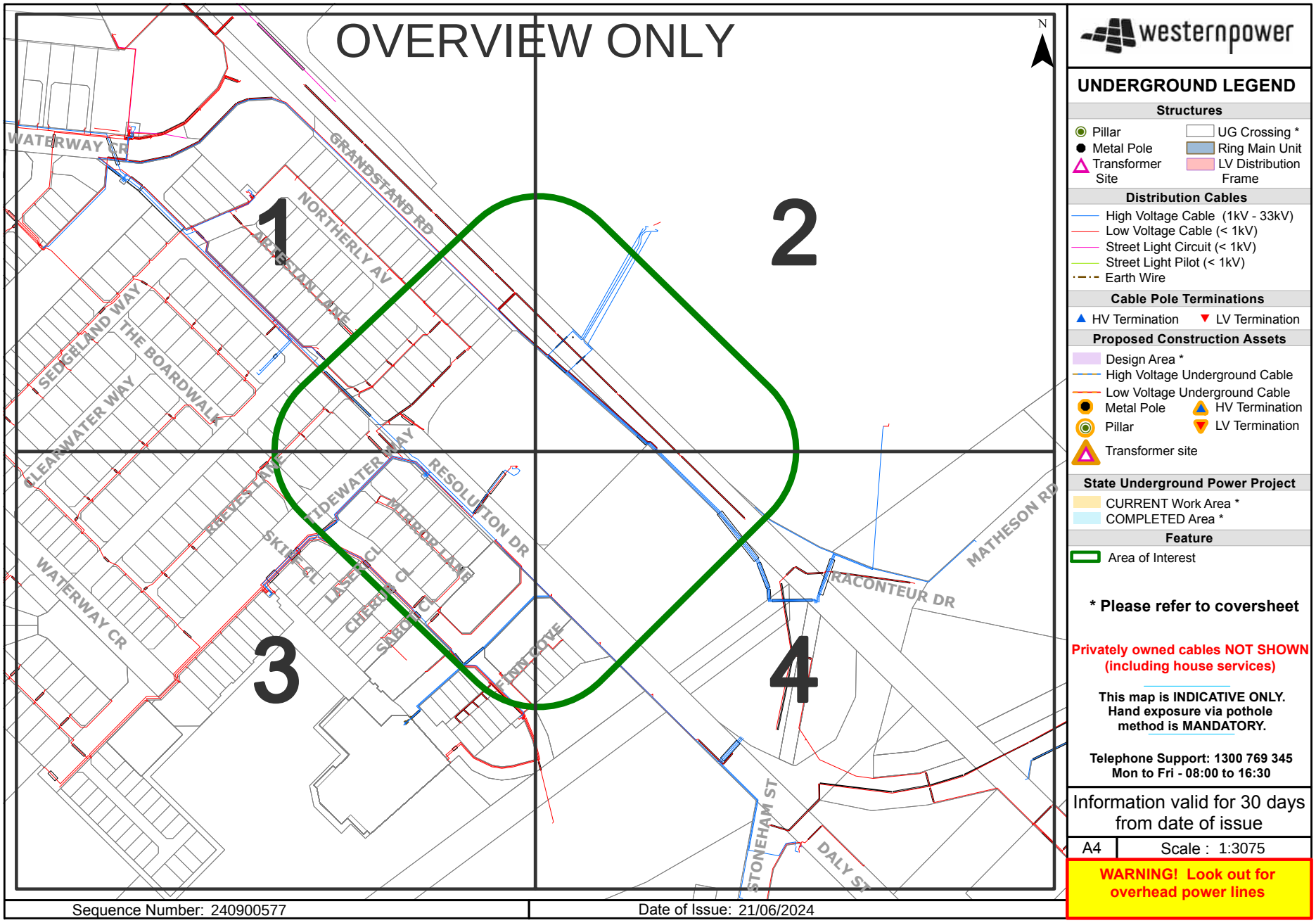
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westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
- Transformer Site
- UG Crossing *
- Ring Main Unit
- LV Distribution Frame

Distribution Cables

- High Voltage Cable (1kV - 33kV)
- Low Voltage Cable (< 1kV)
- Street Light Circuit (< 1kV)
- Street Light Pilot (< 1kV)
- Earth Wire

Cable Pole Terminations

- HV Termination
- LV Termination

Proposed Construction Assets

- Design Area *
- High Voltage Underground Cable
- Low Voltage Underground Cable
- Metal Pole
- Pillar
- Transformer site
- HV Termination
- LV Termination

State Underground Power Project

- CURRENT Work Area *
- COMPLETED Area *

Feature

- Area of Interest

*** Please refer to coversheet**

Privately owned cables NOT SHOWN (including house services)

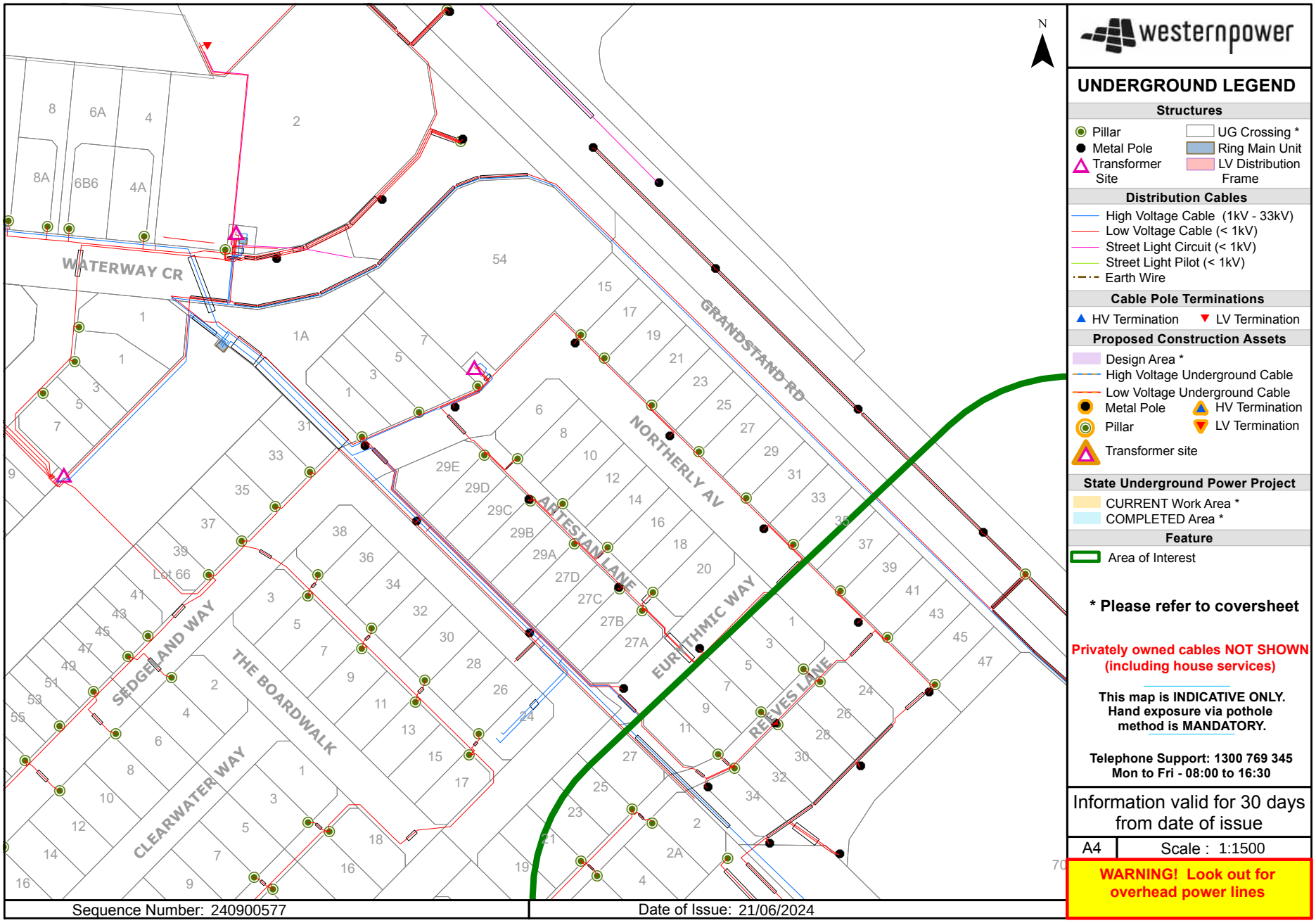
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.

Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30

Information valid for 30 days from date of issue

A4 | Scale : 1:3075

WARNING! Look out for overhead power lines



westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
- Transformer Site
- UG Crossing *
- Ring Main Unit
- LV Distribution Frame

Distribution Cables

- High Voltage Cable (1kV - 33kV)
- Low Voltage Cable (< 1kV)
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Cable Pole Terminations

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Proposed Construction Assets

- Design Area *
- High Voltage Underground Cable
- Low Voltage Underground Cable
- Metal Pole
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- LV Termination

State Underground Power Project

- CURRENT Work Area *
- COMPLETED Area *

Feature

- Area of Interest

*** Please refer to coversheet**

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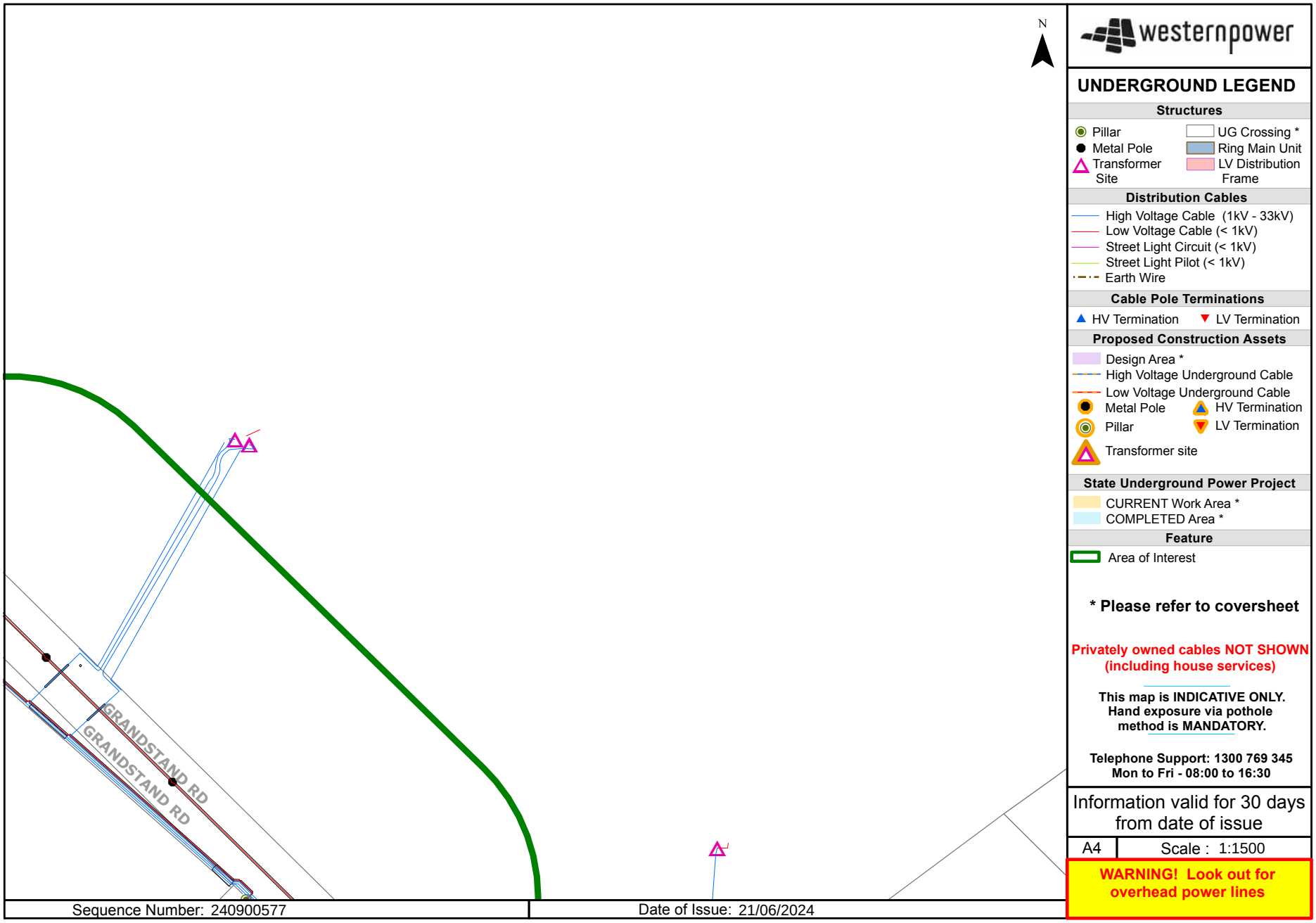
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.

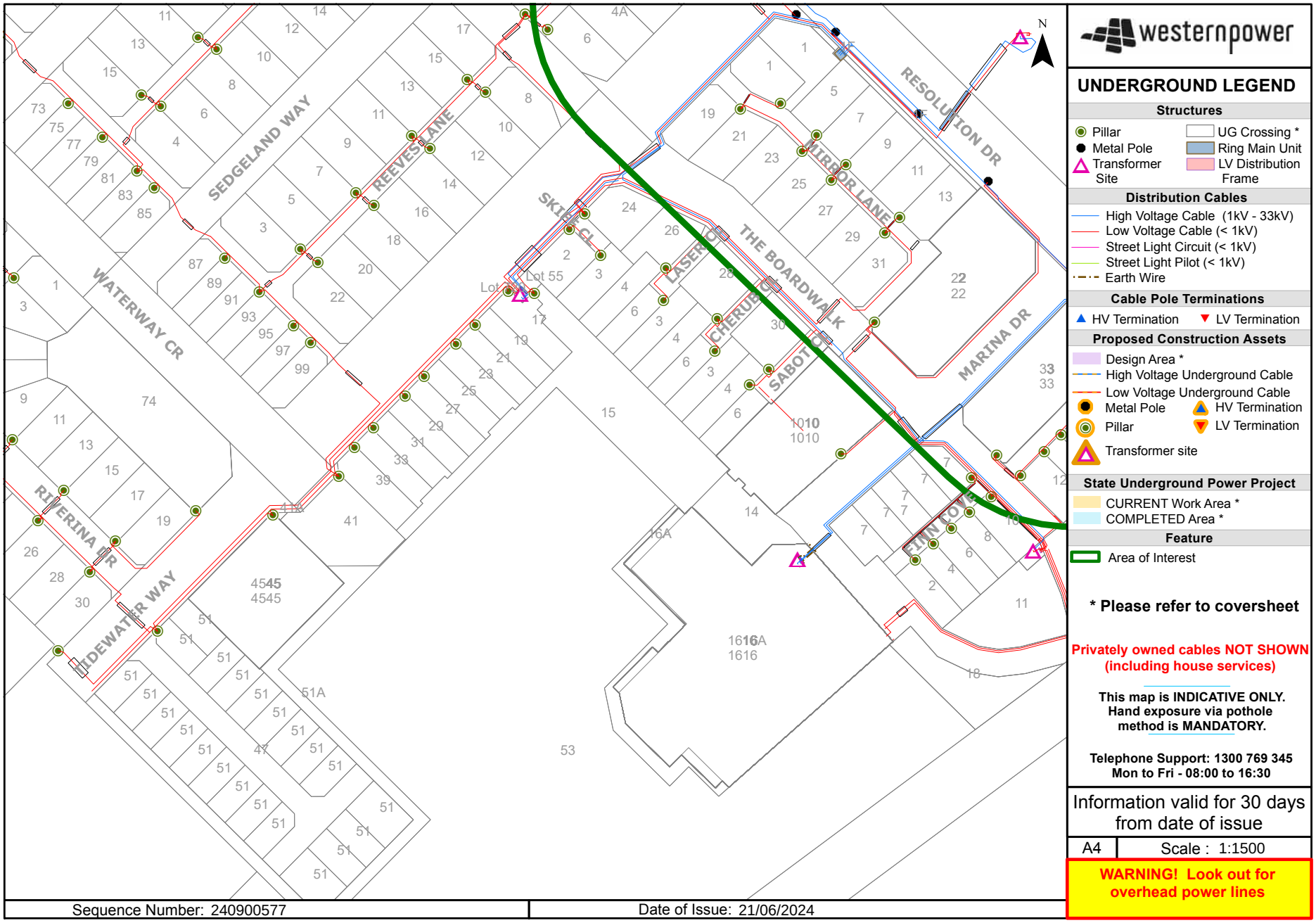
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30

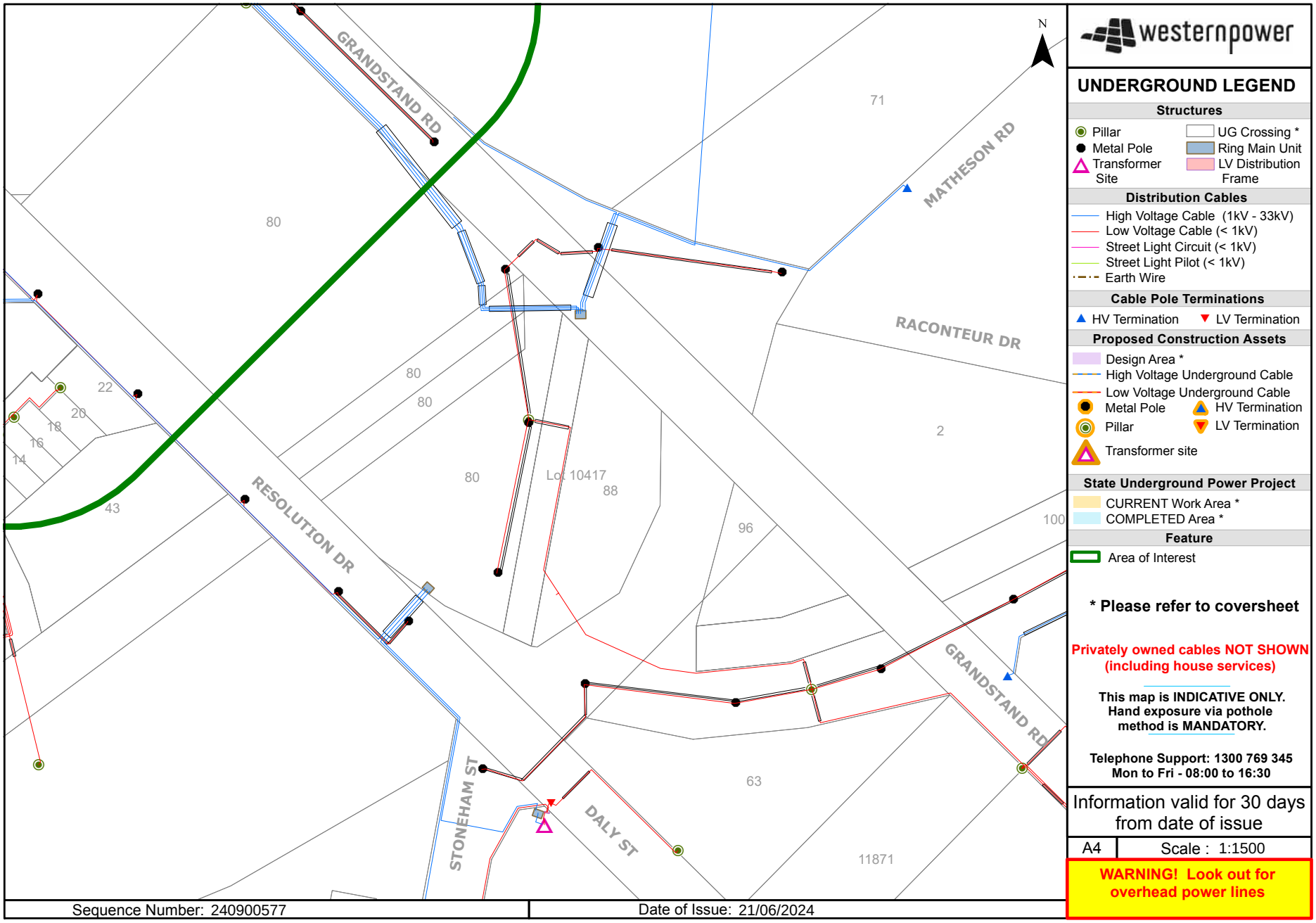
Information valid for 30 days from date of issue

A4 | Scale : 1:1500

WARNING! Look out for overhead power lines


N
GRANDSTAND RD
GRANDSTAND RD
Sequence Number: 240900577
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines


westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
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Transformer site
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LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
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Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900577
Date of Issue: 21/06/2024
SEDGELAND WAY
REEVES LANE
WATERWAY CR
RIVERINA DR
TIDEWATER WAY
SKIFF CL
LASER CL
CHERUB CL
SABOT CL
THE BOARDWALK
MIRROR LANE
RESOLUTION DR
MARINA DR
TIN LOVE
Lot 55
Lot 56
4545
1010
1616
1616A


GRANDSTAND RD
MATHESON RD
RACONTEUR DR
RESOLUTION DR
STONEHAM ST
DALY ST
GRANDSTAND RD
Lot 10417
80
71
2
96
100
63
11871
43
88
22
20
18
16
14
N
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
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COMPLETED Area *
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A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900577
Date of Issue: 21/06/2024

Job ID 36962238

Preinct D

End of document

This document may exclude some files (eg. DWF or ZIP files)

This document was automatically generated at a point-in-time. Be aware that the source information from which this document was created may have changed since it was produced. This document may contain incomplete or out-of-date information. Always check your enquiry details in the BYDA Referral Service for the most recent information. For copyright information refer to individual responses.

Job No 36962250

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
Precinct C - 2	71 Matheson Road Ascot WA 6104	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900653	ATCO Gas Australia	1300 926 755	NOTIFIED
240900649	NBN Co (WA)	1800 687 626	NOTIFIED
240900651	Telstra (WA)	1800 653 935	NOTIFIED
240900652	Water Corporation	13 13 95	NOTIFIED
240900650	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

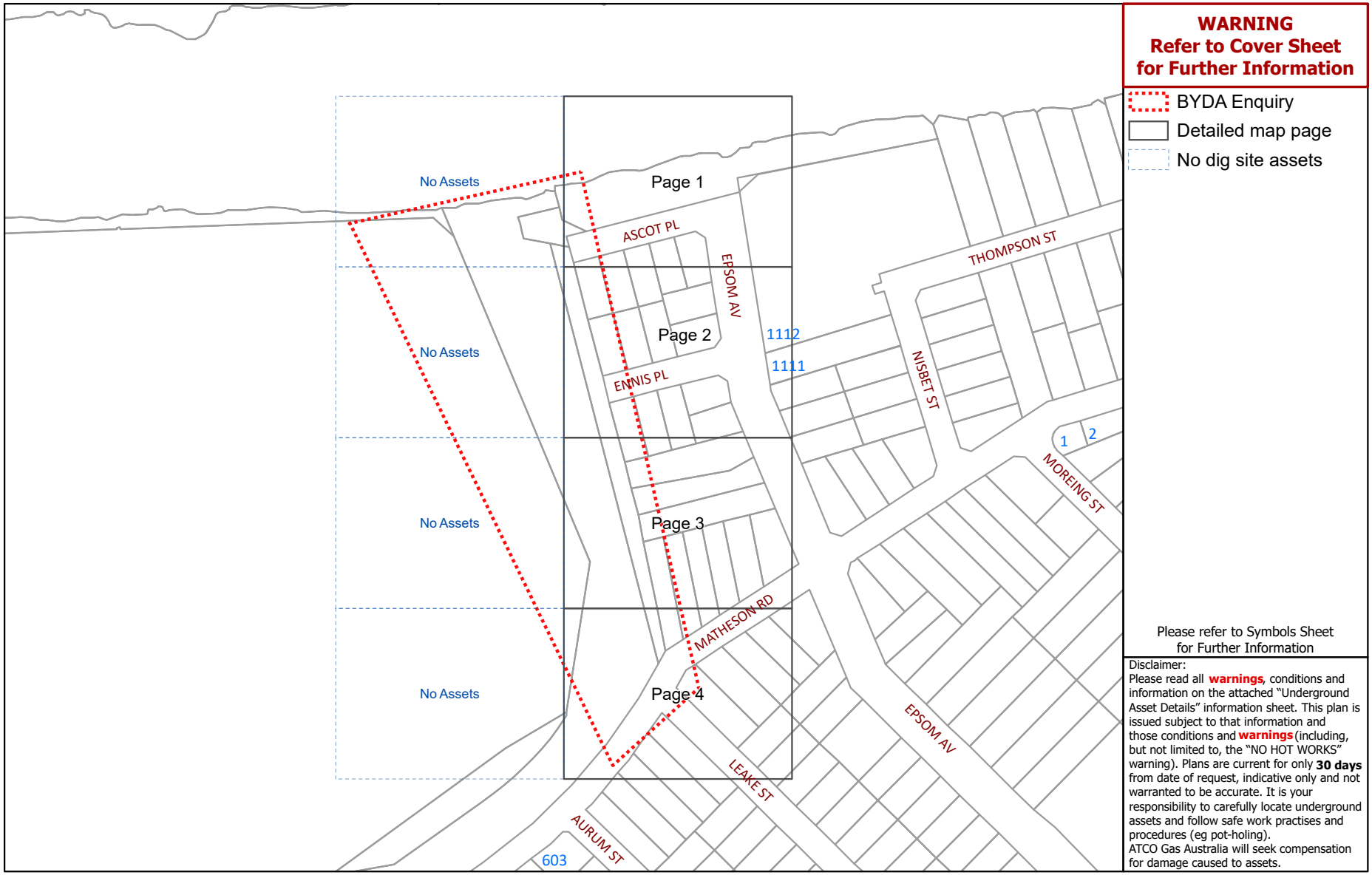
Lodge your FREE enquiry online any time at byda.com.au

ATCO
©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)
Index Sheet

Seq # 240900653
Job # 36962250

BYDA Location: 71 Matheson Road Ascot 6104
Scale: 1:3,500



WARNING
Refer to Cover Sheet for Further Information

BYDA Enquiry
Detailed map page
No dig site assets

Please refer to Symbols Sheet for Further Information

Disclaimer:
Please read all **warnings**, conditions and information on the attached "Underground Asset Details" information sheet. This plan is issued subject to that information and those conditions and **warnings** (including, but not limited to, the "NO HOT WORKS" warning). Plans are current for only **30 days** from date of request, indicative only and not warranted to be accurate. It is your responsibility to carefully locate underground assets and follow safe work practises and procedures (eg pot-holing).
ATCO Gas Australia will seek compensation for damage caused to assets.

© Western Australian Land Information Authority trading as Landgate. Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate

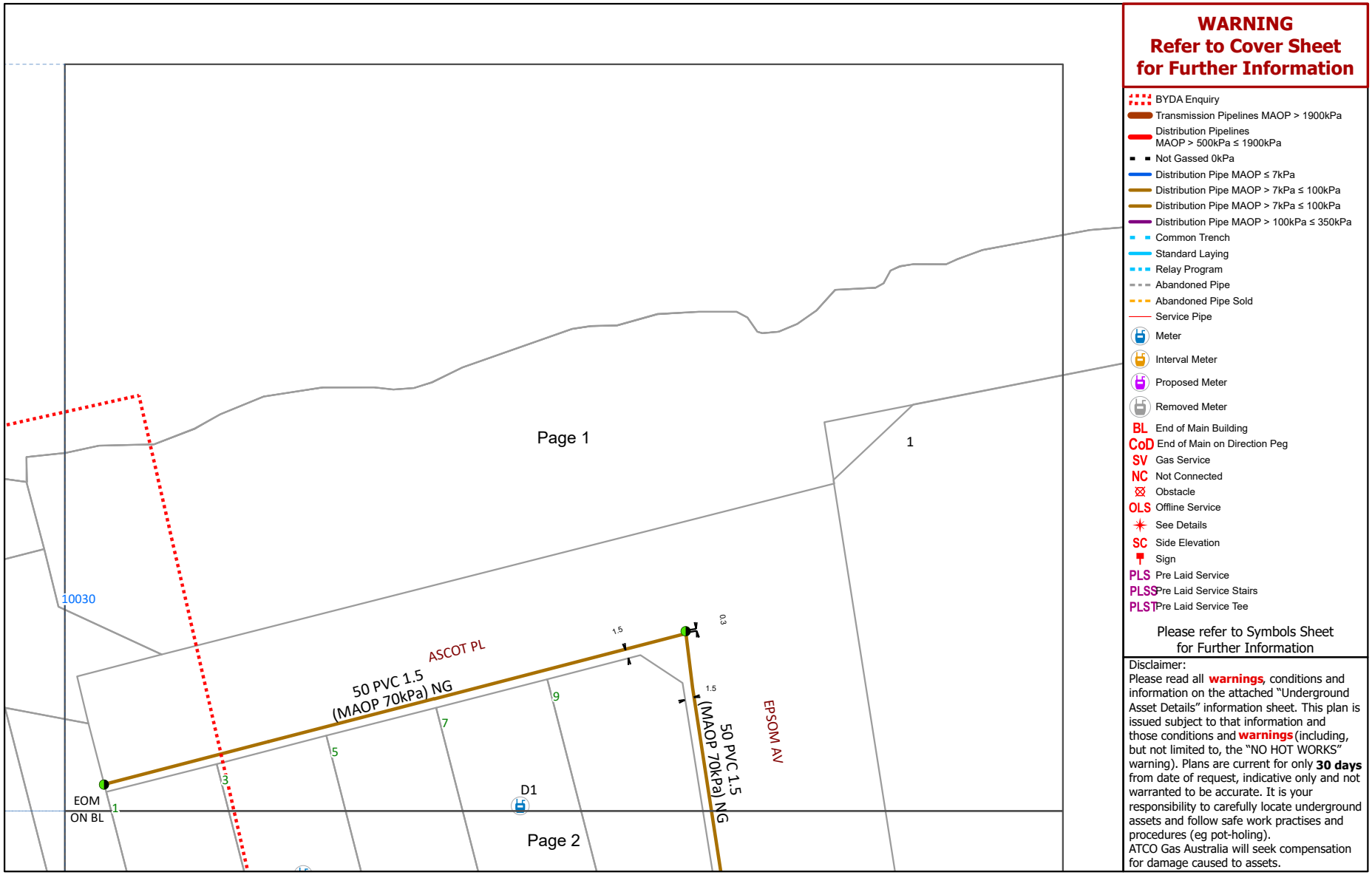
ATCO

©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900653
Job # 36962250

BYDA Location: 71 Matheson Road Ascot 6104
Scale: 1:800



WARNING
Refer to Cover Sheet for Further Information

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign
- PLS Pre Laid Service
- PLSS Pre Laid Service Stairs
- PLST Pre Laid Service Tee

Please refer to Symbols Sheet for Further Information

Disclaimer:
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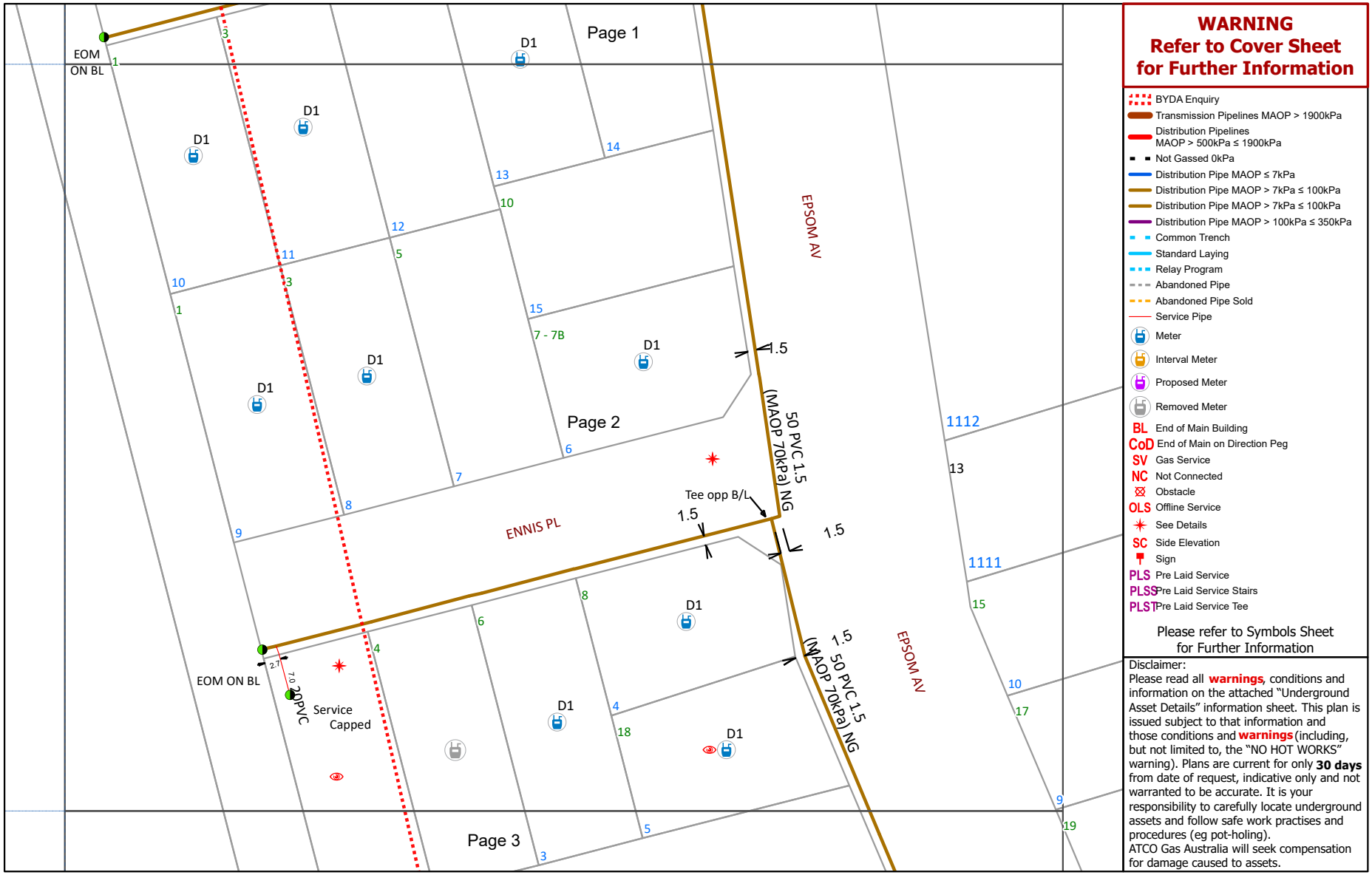
ATCO

©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900653
Job # 36962250

BYDA Location: 71 Matheson Road Ascot 6104
Scale: 1:800



WARNING
Refer to Cover Sheet for Further Information

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign
- PLS Pre Laid Service
- PLSS Pre Laid Service Stairs
- PLST Pre Laid Service Tee

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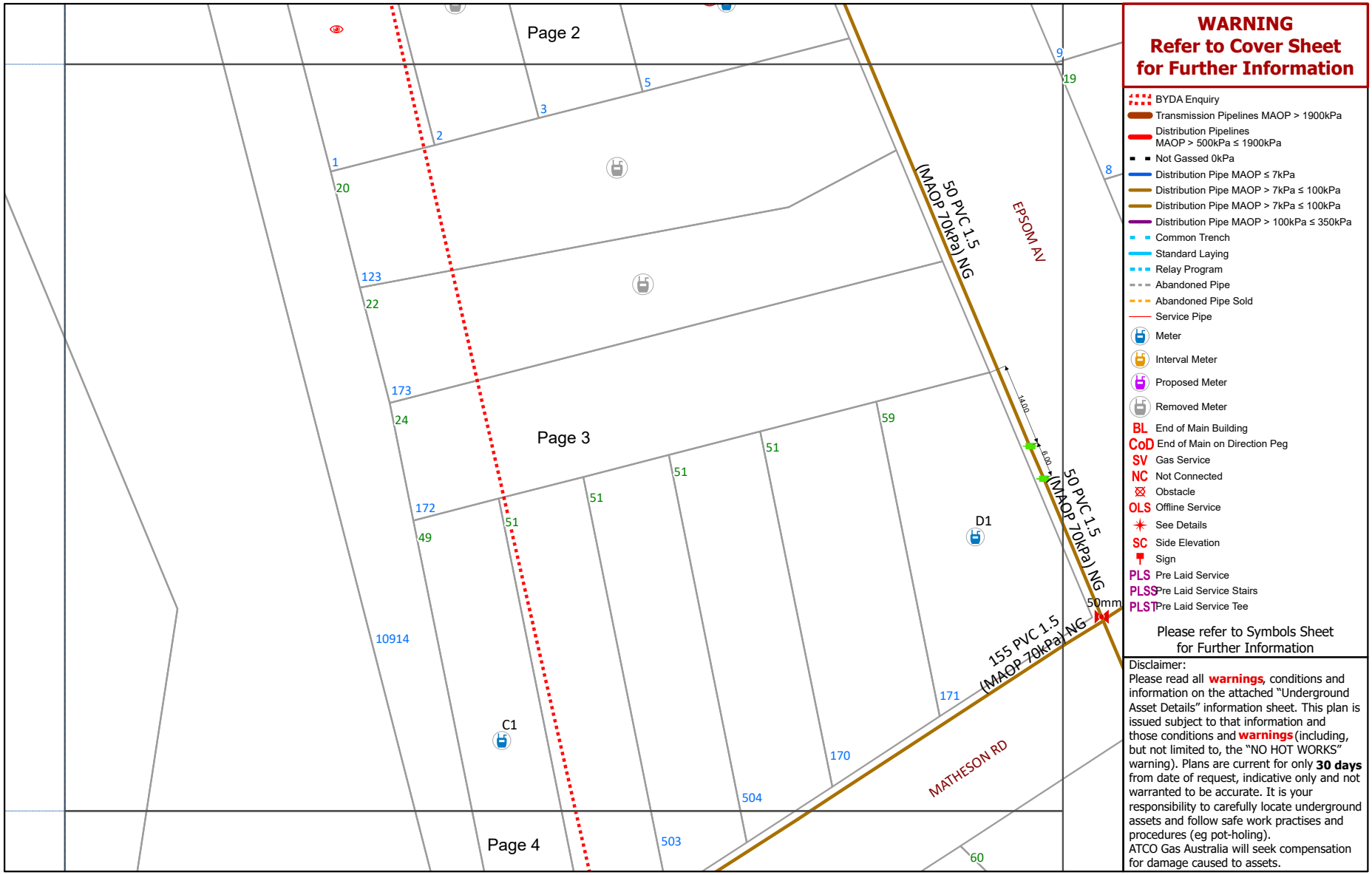
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Seq # 240900653
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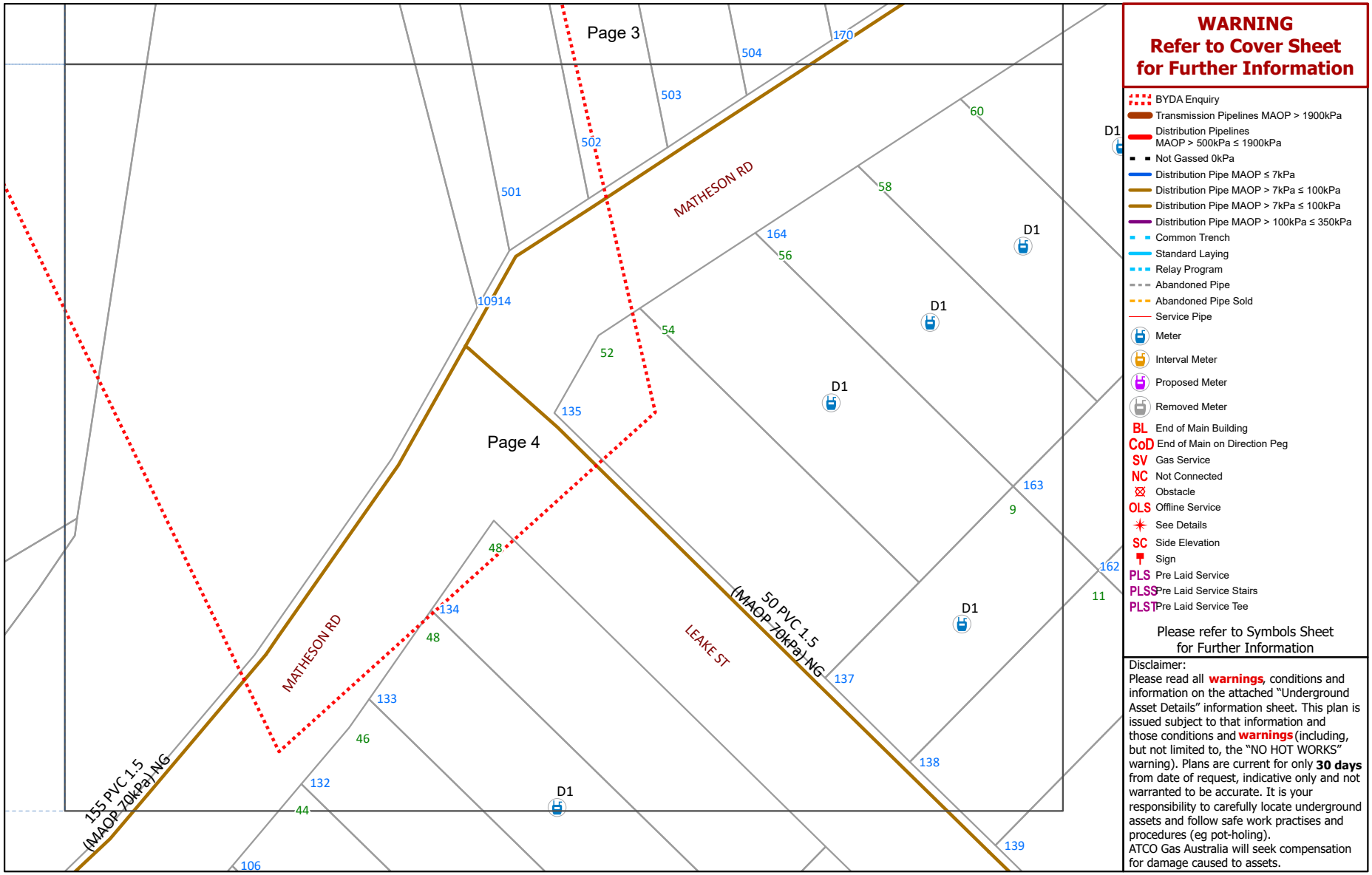
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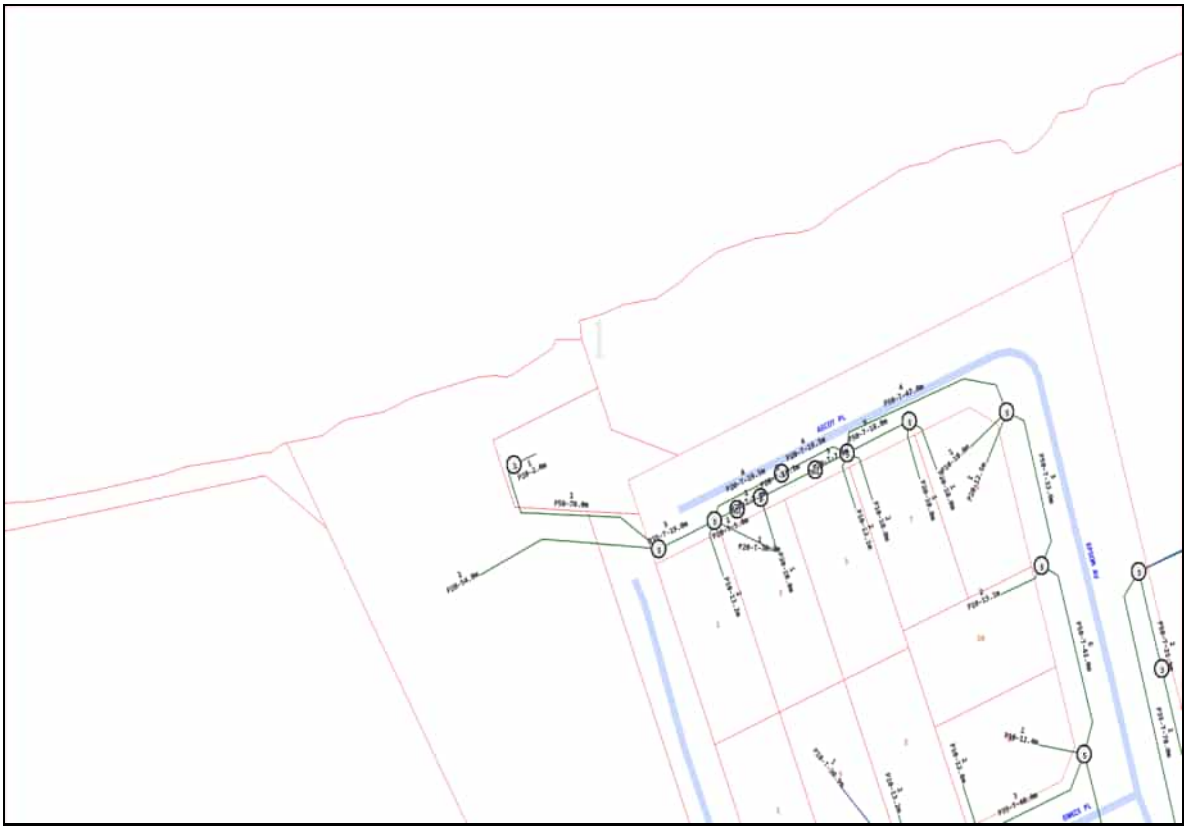
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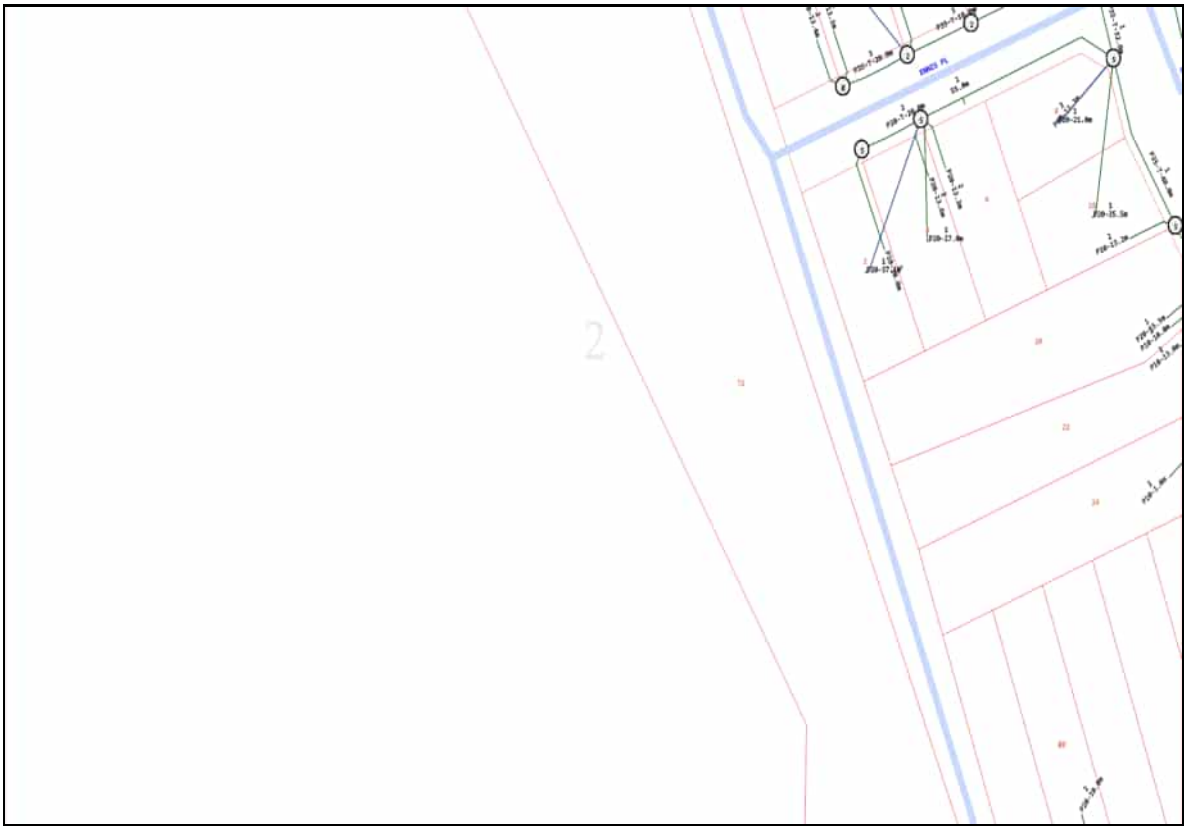
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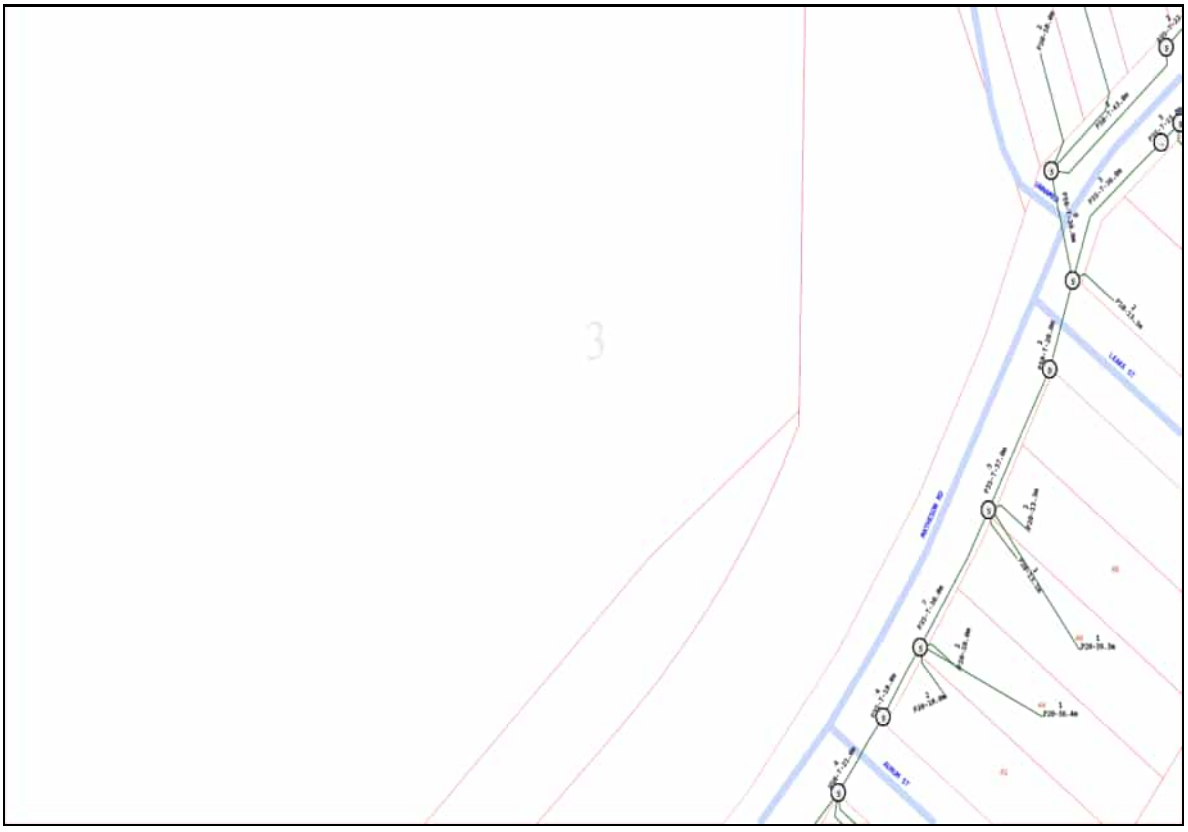
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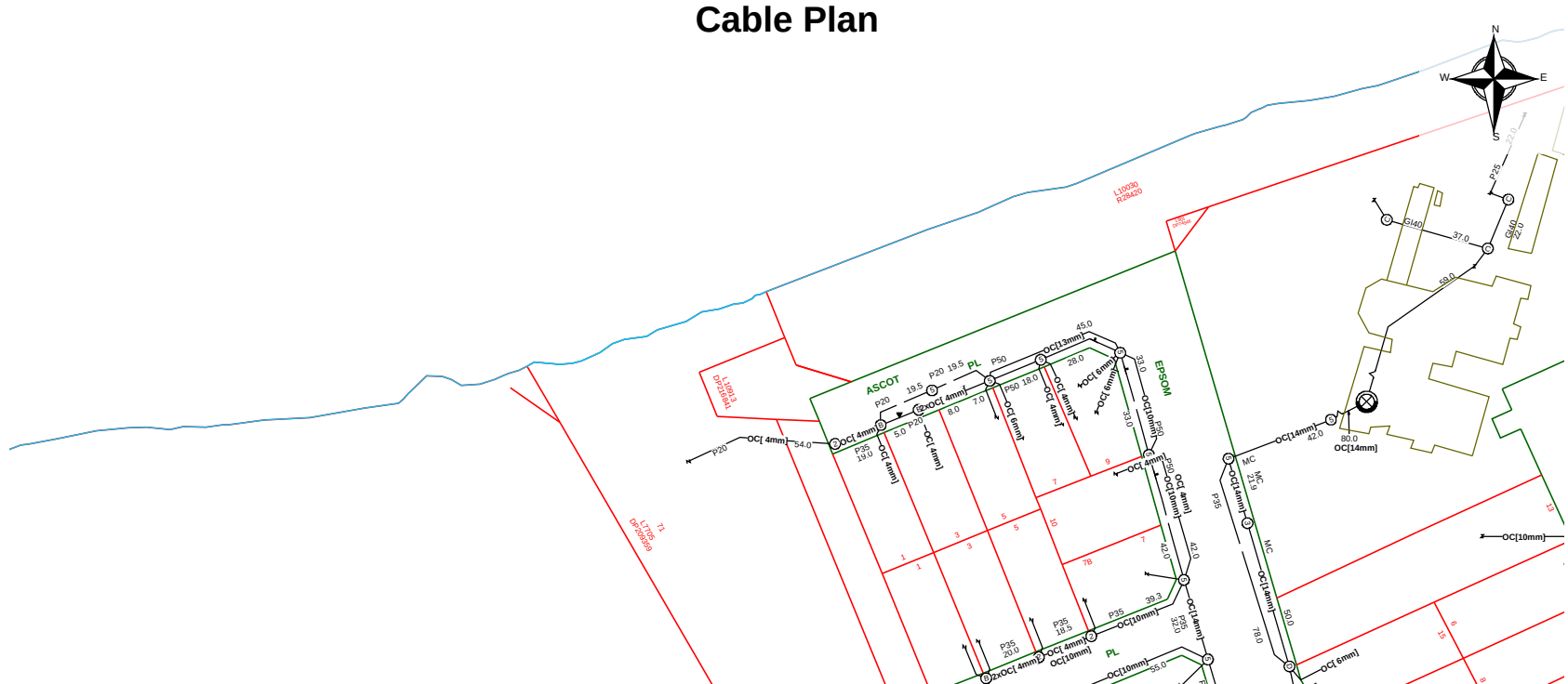




Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

Cable Plan



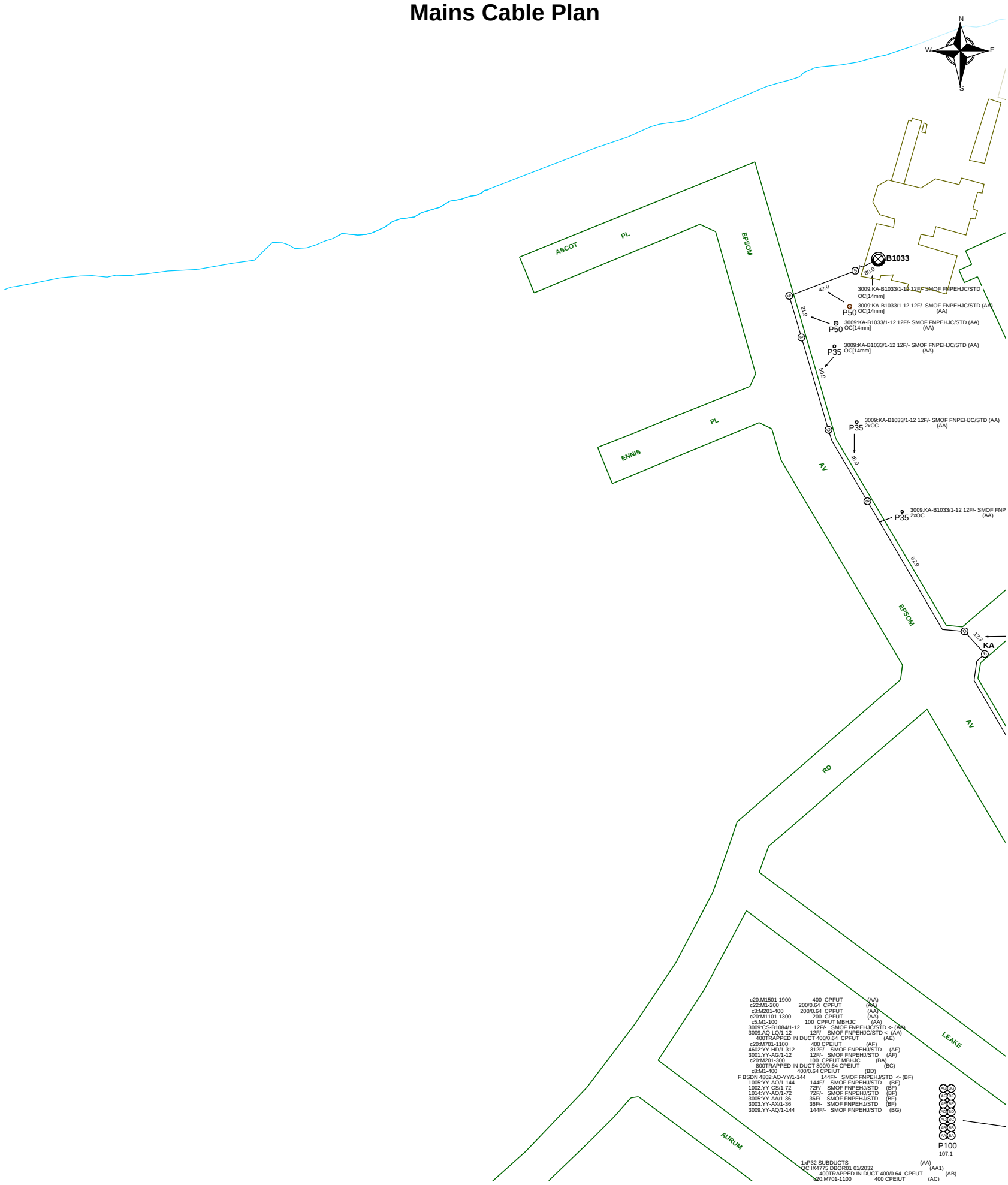
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900651
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:09:58	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900651
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:09:59	

WARNING
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Overview

WATER CORPORATION

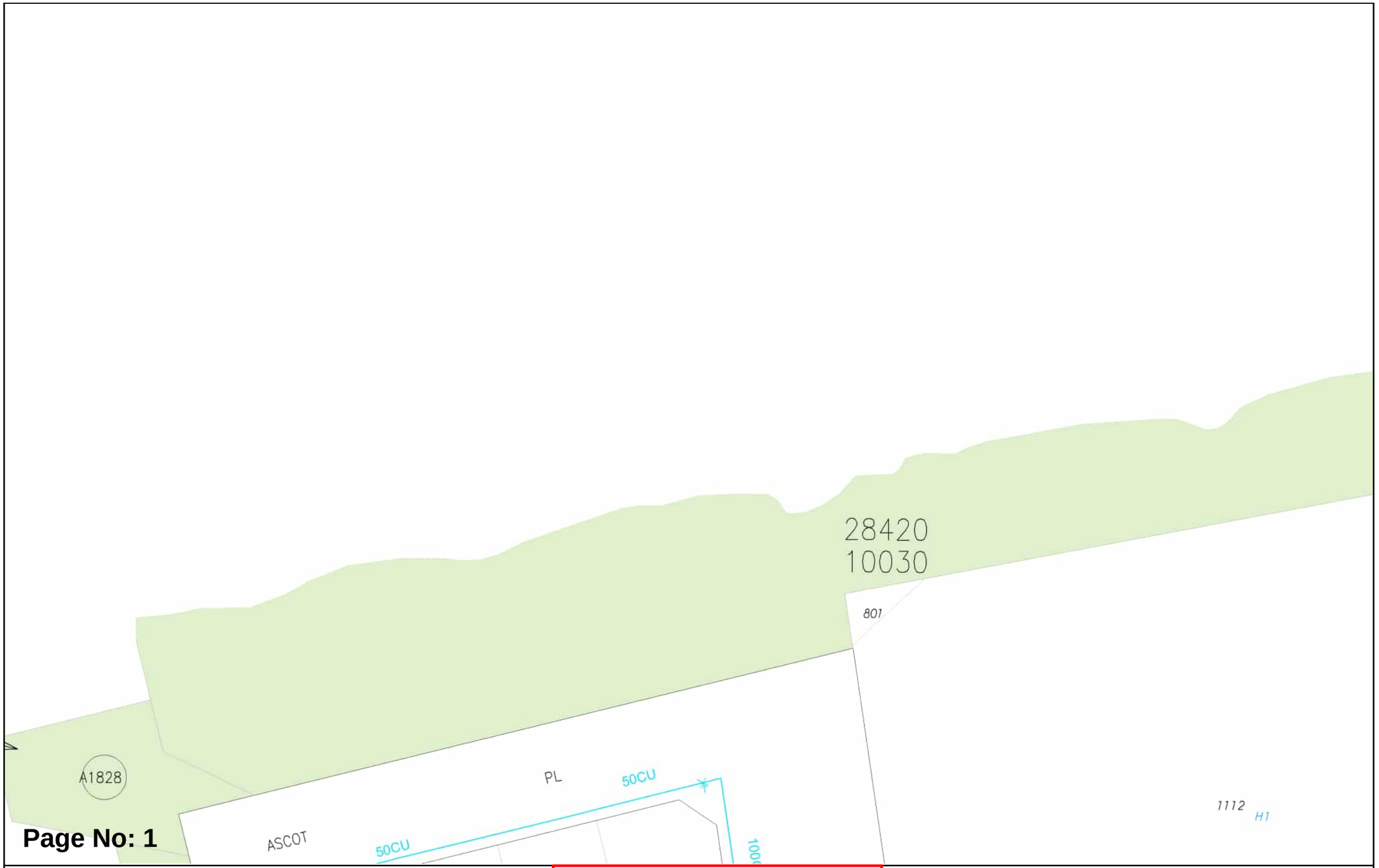
Scale: 1:3075
Job No.: 36962250
Sequence No.: 240900652
Print Date: 21 Jun 2024

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED
Apply for approval to work near our assets at:
Working near assets (watercorporation.com.au)
Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

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Plans generated 21 Jun 2024 by PelicanCorp TicketAccess Software | www.pelicancorp.com

Water Corp - Critical Plan.docx (21 May 2024)



WATER CORPORATION

Scale: 1:750
Job No.: 36962250
Sequence No.: 240900652
Print Date: 21 Jun 2024

N

Water

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Page No: 2

WATER CORPORATION

Scale:	1:750
Job No.:	36962250
Sequence No.:	240900652
Print Date:	21 Jun 2024

N

Water

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Page No: 3

Scale:	1:750
Job No.:	36962250
Sequence No.:	240900652
Print Date:	21 Jun 2024

Water

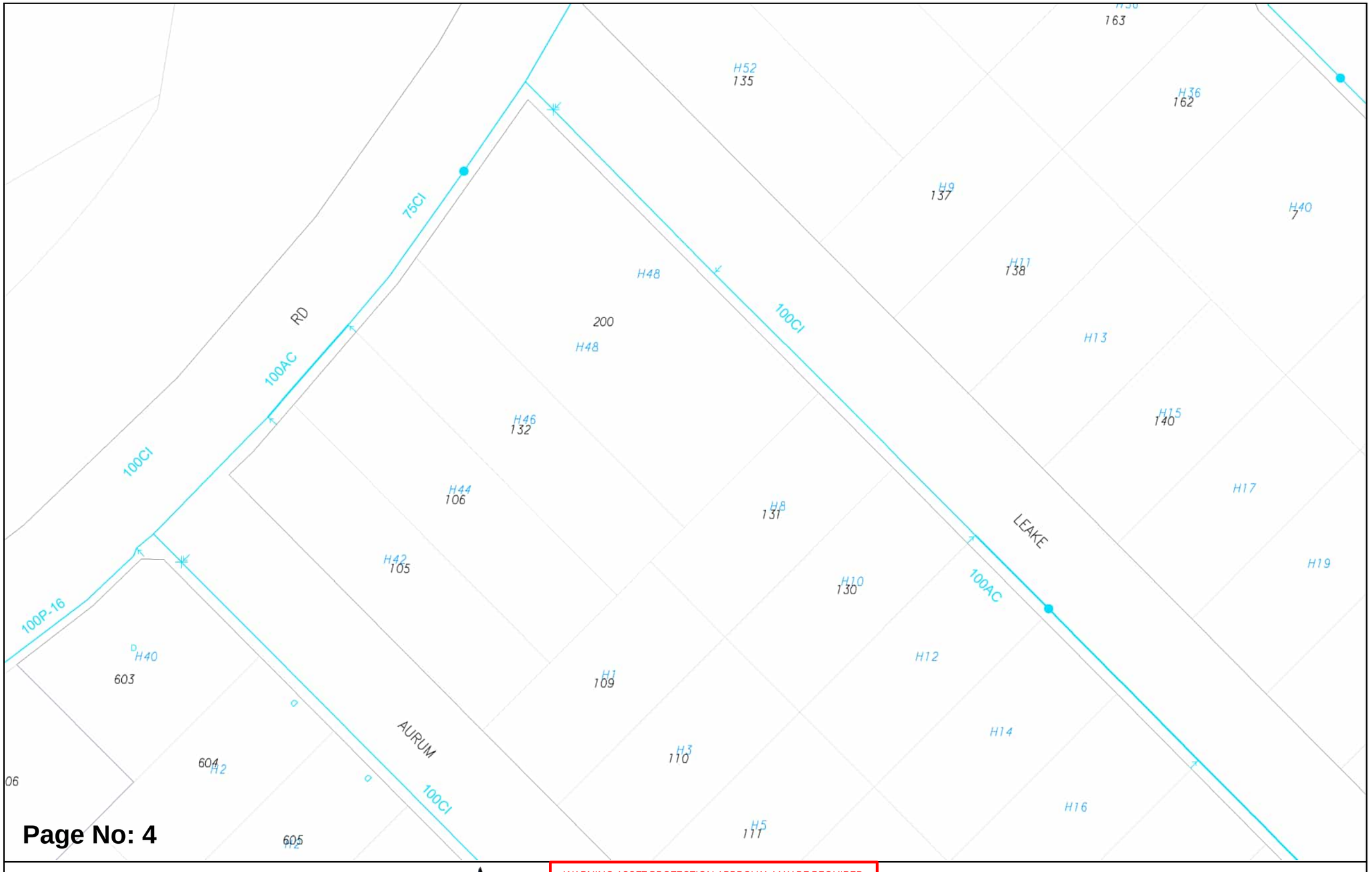
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WATER CORPORATION

Scale: 1:750
Job No.: 36962250
Sequence No.: 240900652
Print Date: 21 Jun 2024

N

Water

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Overview

WATER CORPORATION

Scale: 1:3075
Job No.: 36962250
Sequence No.: 240900652
Print Date: 21 Jun 2024

N

Sewer

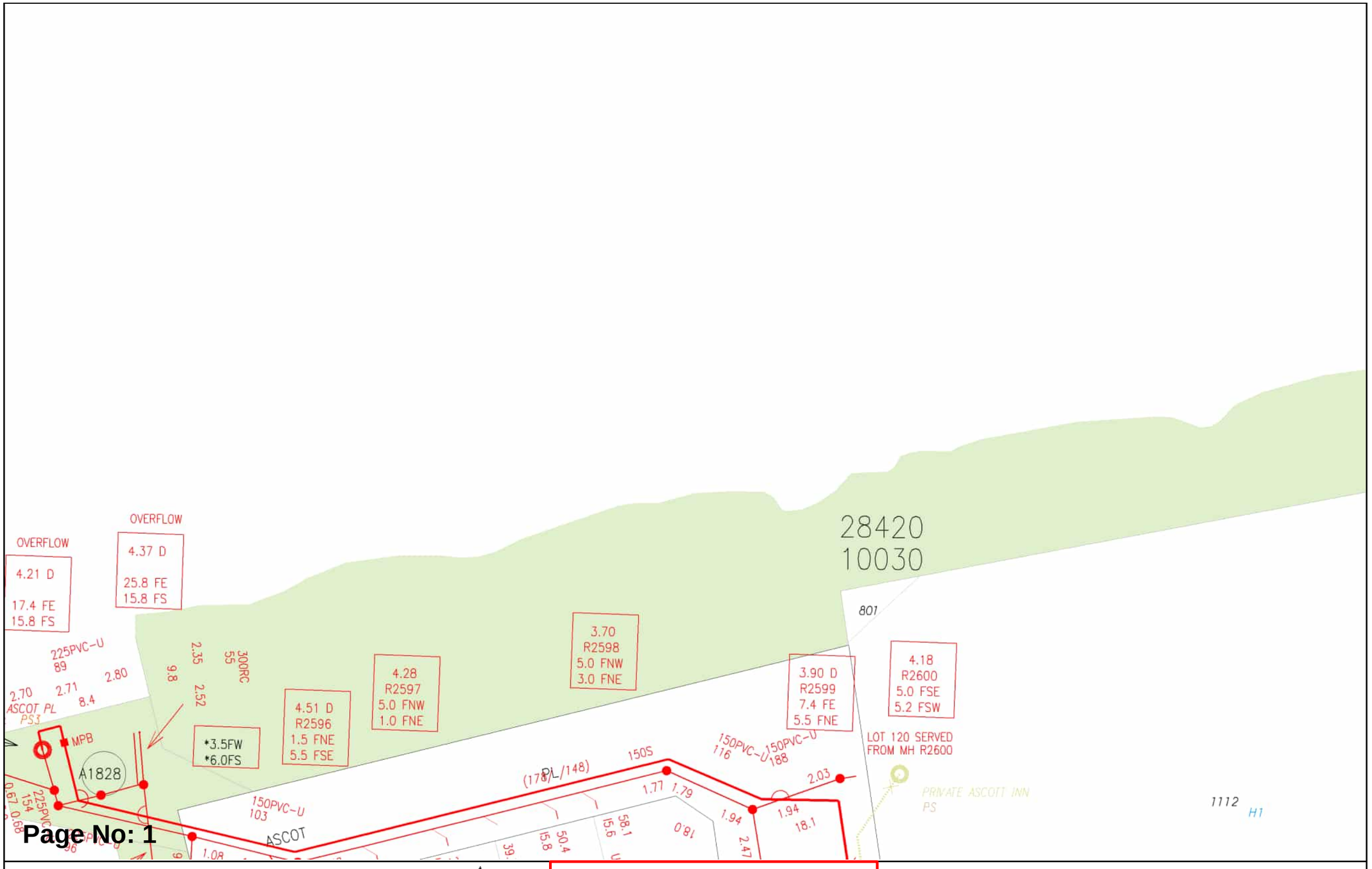
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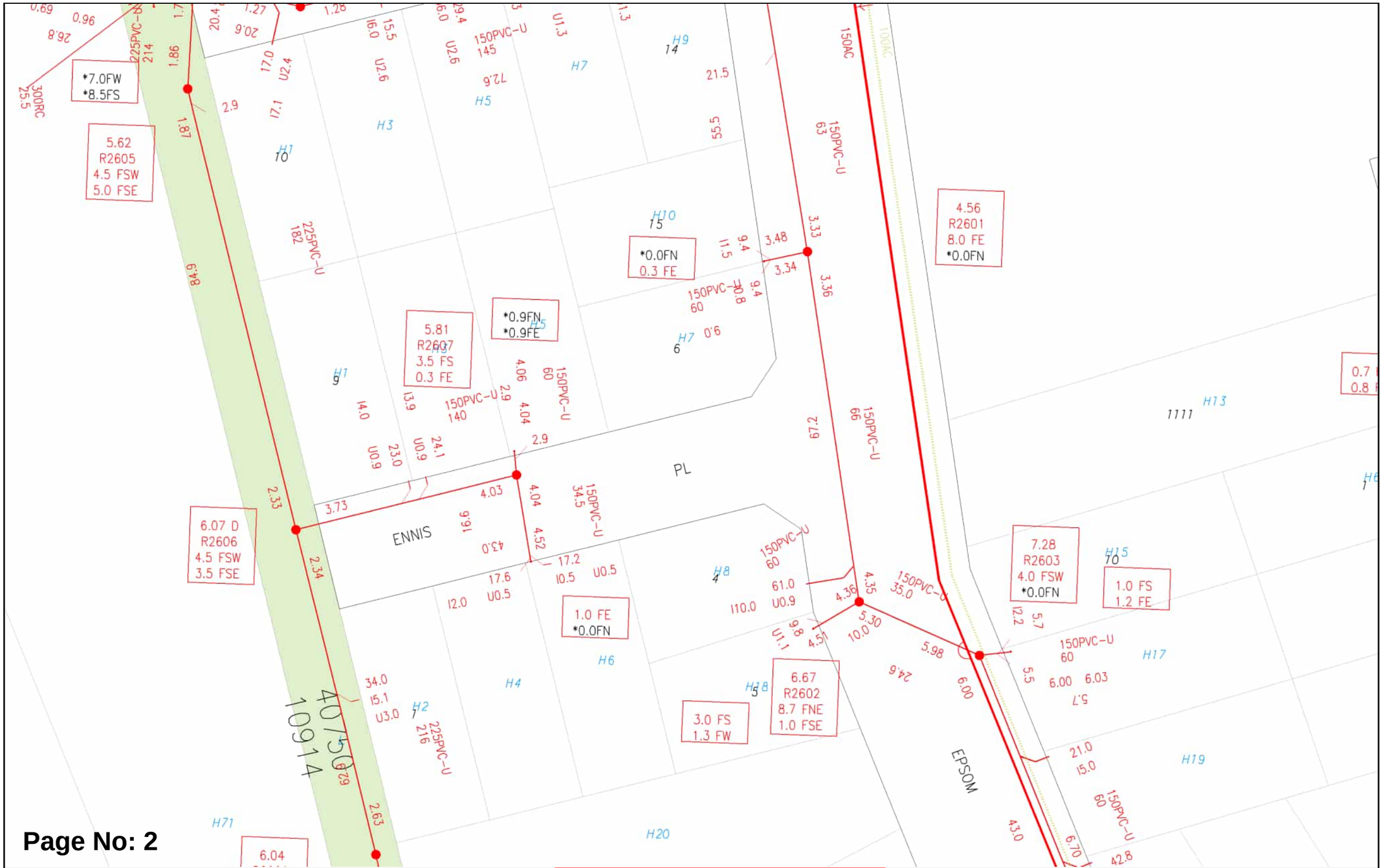
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Sewer

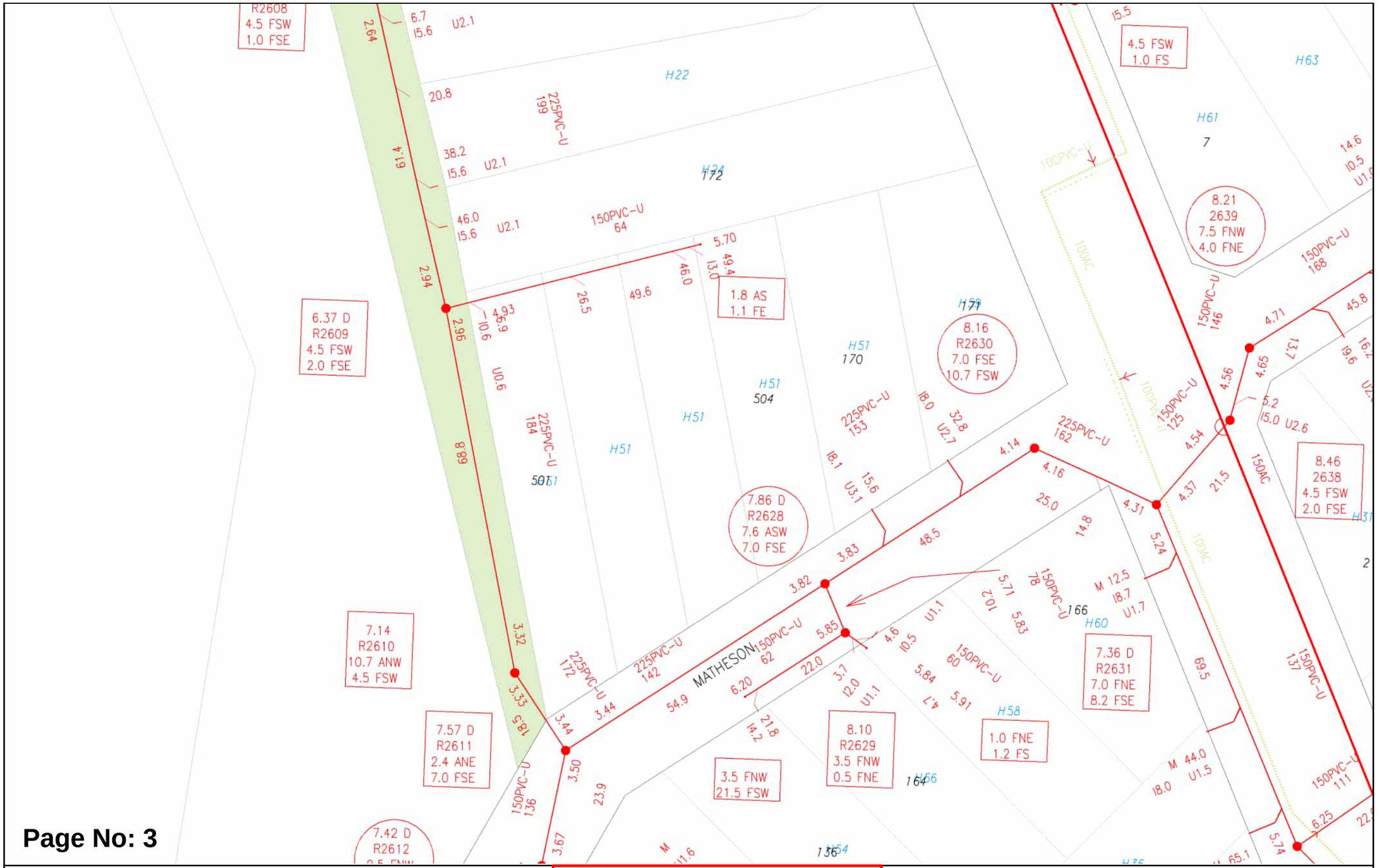
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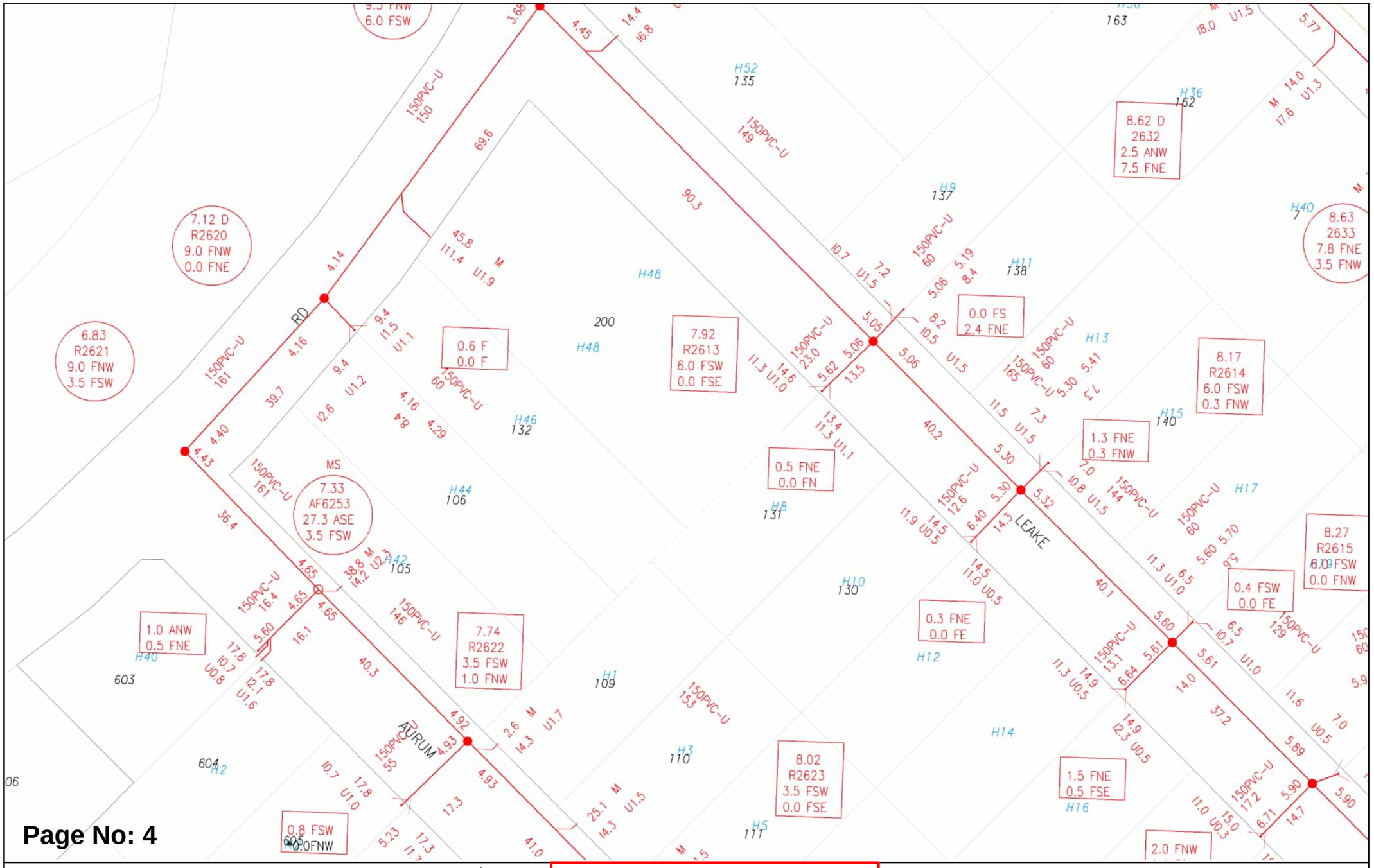
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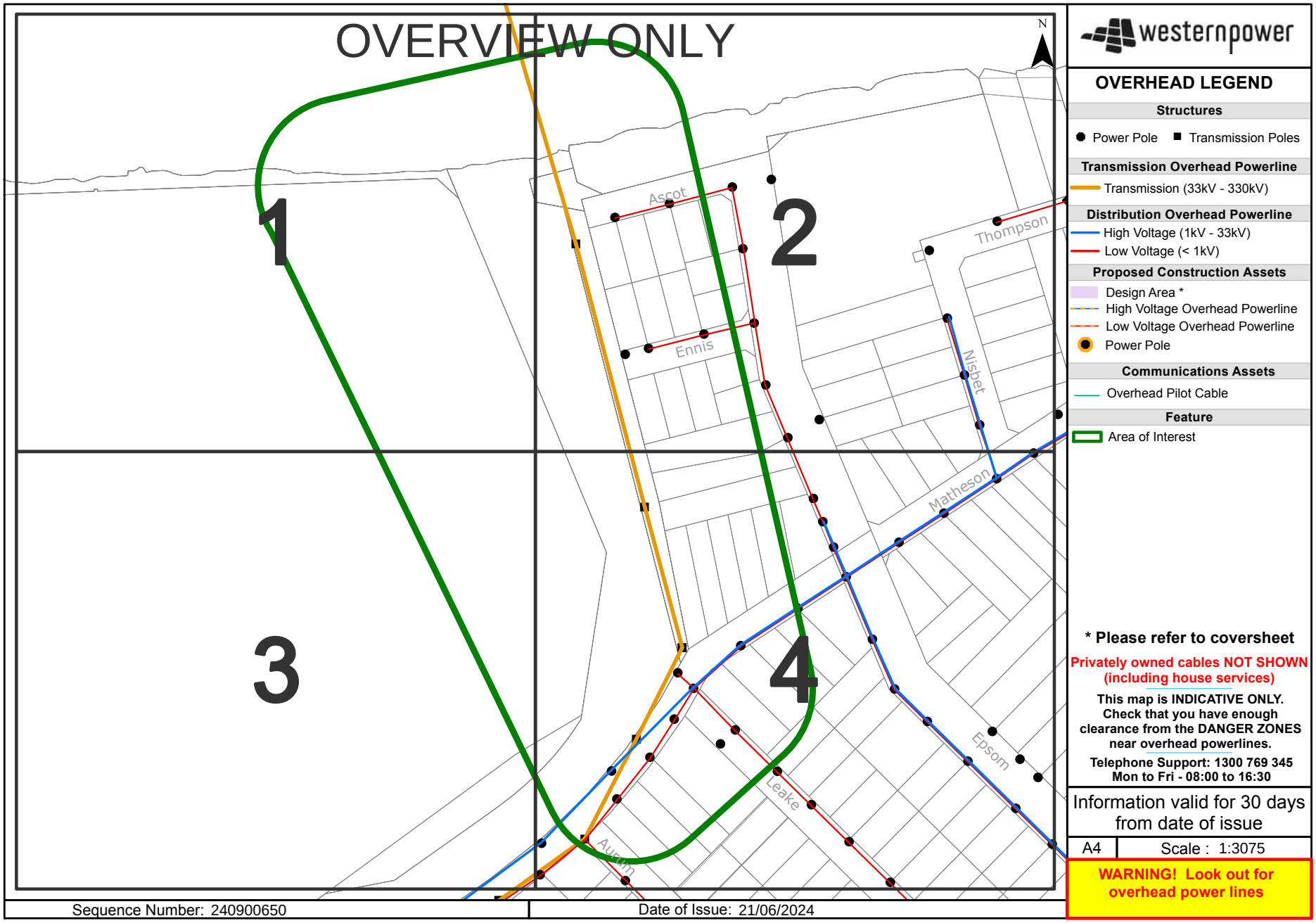
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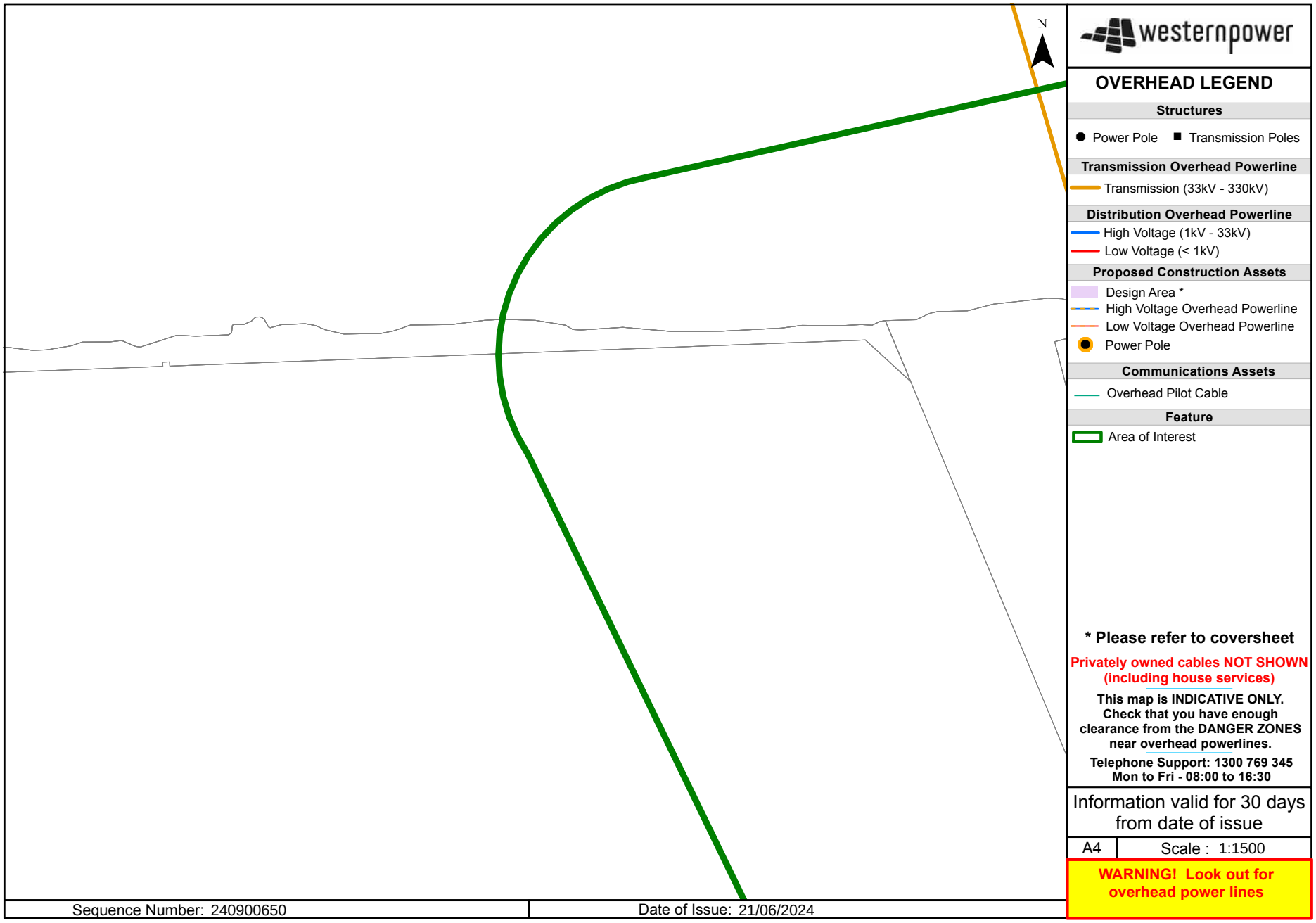
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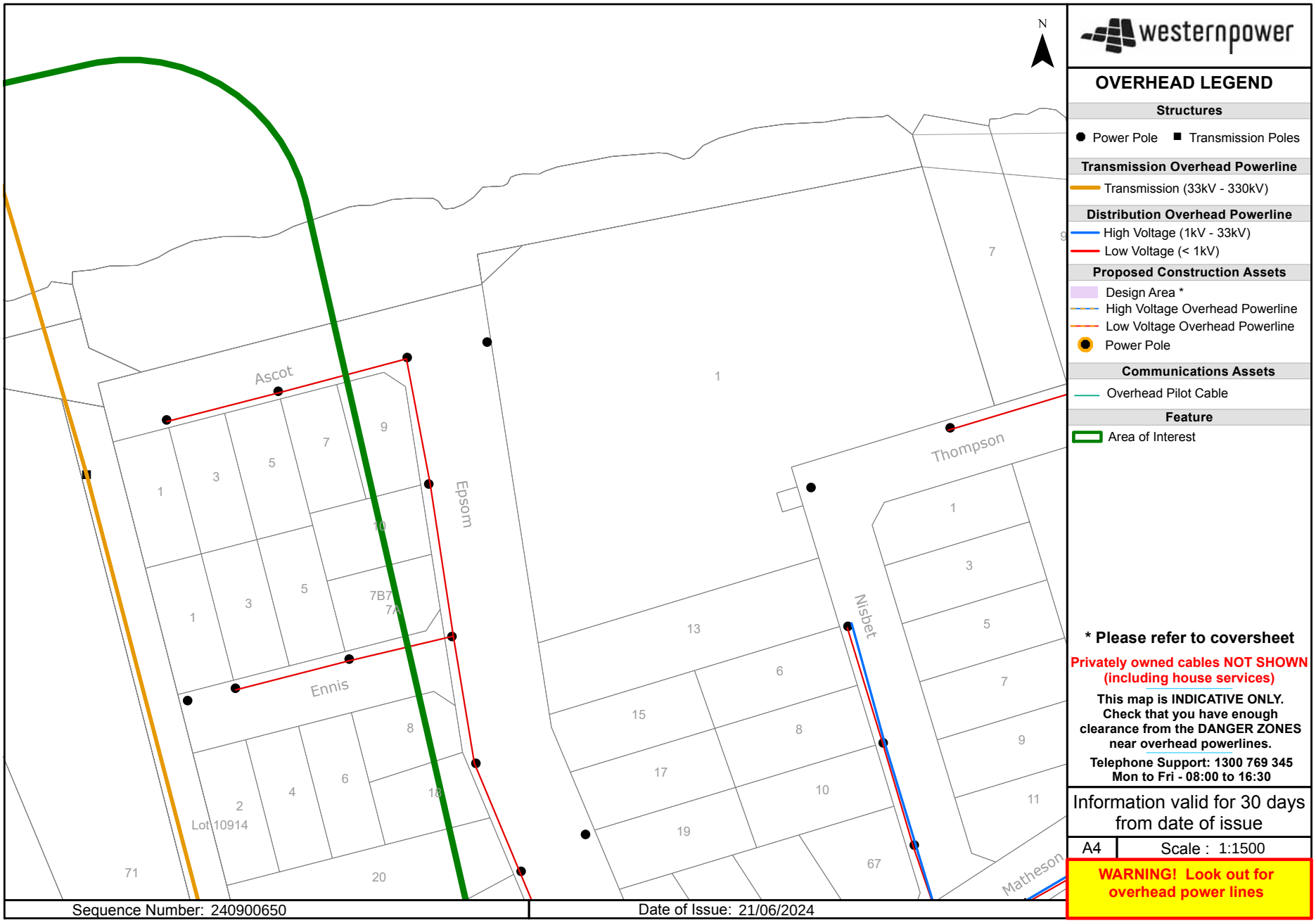
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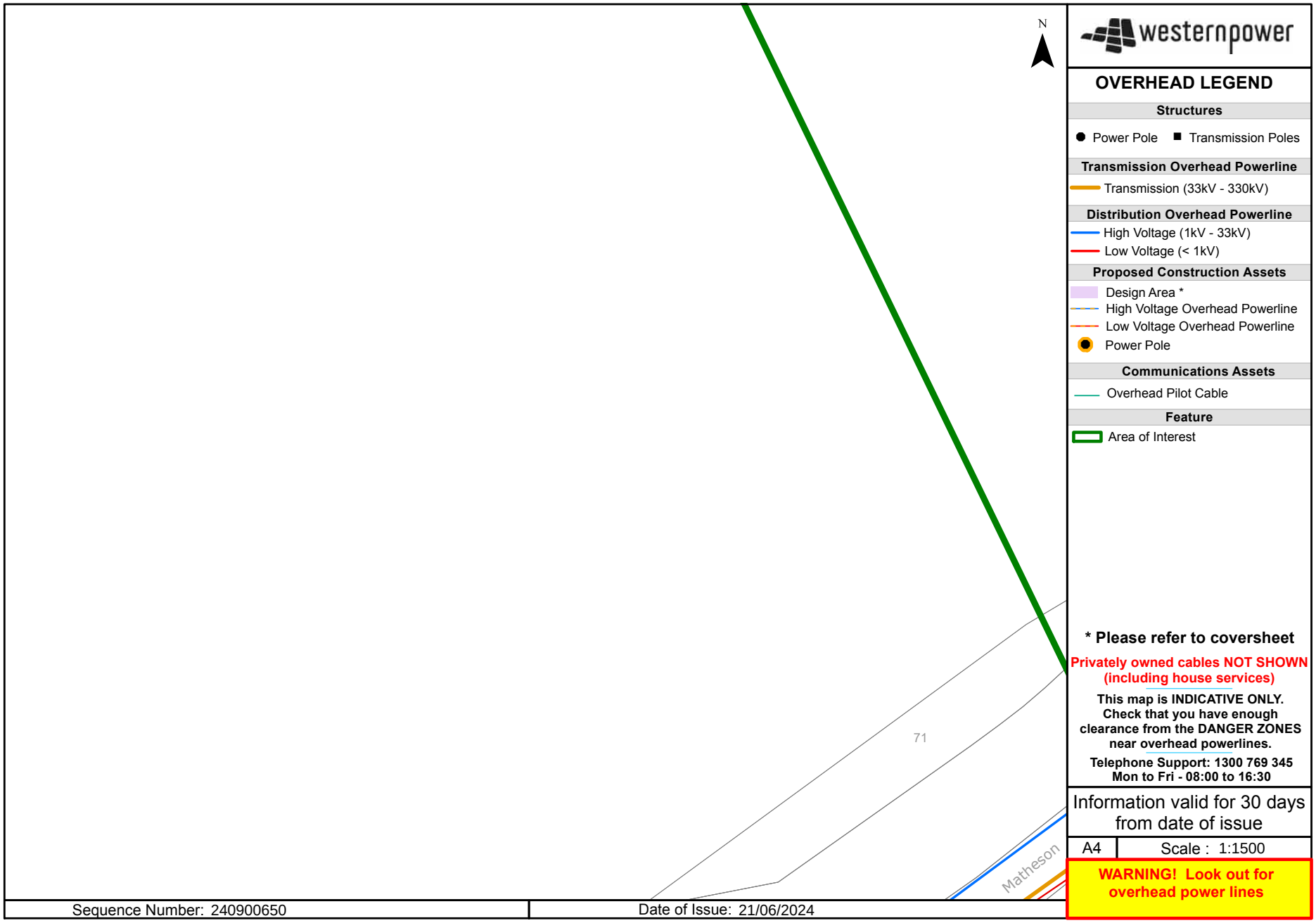
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OVERVIEW ONLY
N
1
2
3
4
Ascot
Ennis
Thompson
Nisbet
Matheson
Epsom
Leake
Aurum
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:3075
WARNING! Look out for overhead power lines
Sequence Number: 240900650
Date of Issue: 21/06/2024


N
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
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Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900650
Date of Issue: 21/06/2024


N
Ascot
Epsom
Ennis
Nisbet
Thompson
Matheson
Lot 10914
Sequence Number: 240900650
Date of Issue: 21/06/2024
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
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Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines



westernpower

OVERHEAD LEGEND

Structures
- Power Pole
- Transmission Poles

Transmission Overhead Powerline
- Transmission (33kV - 330kV)

Distribution Overhead Powerline
- High Voltage (1kV - 33kV)
- Low Voltage (< 1kV)

Proposed Construction Assets
- Design Area *
- High Voltage Overhead Powerline
- Low Voltage Overhead Powerline
- Power Pole

Communications Assets
- Overhead Pilot Cable

Feature
- Area of Interest

*** Please refer to coversheet**

Privately owned cables NOT SHOWN (including house services)

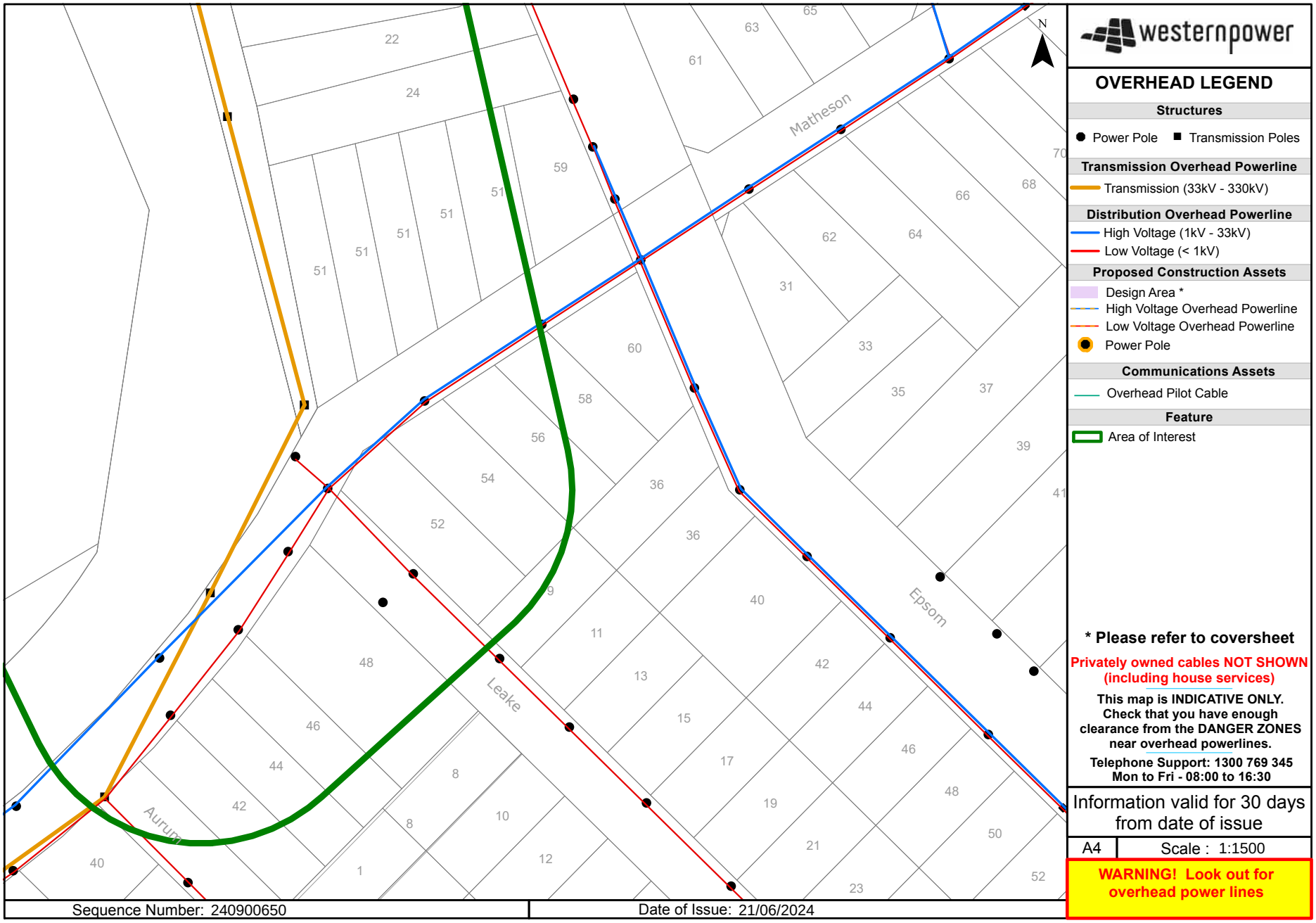
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.

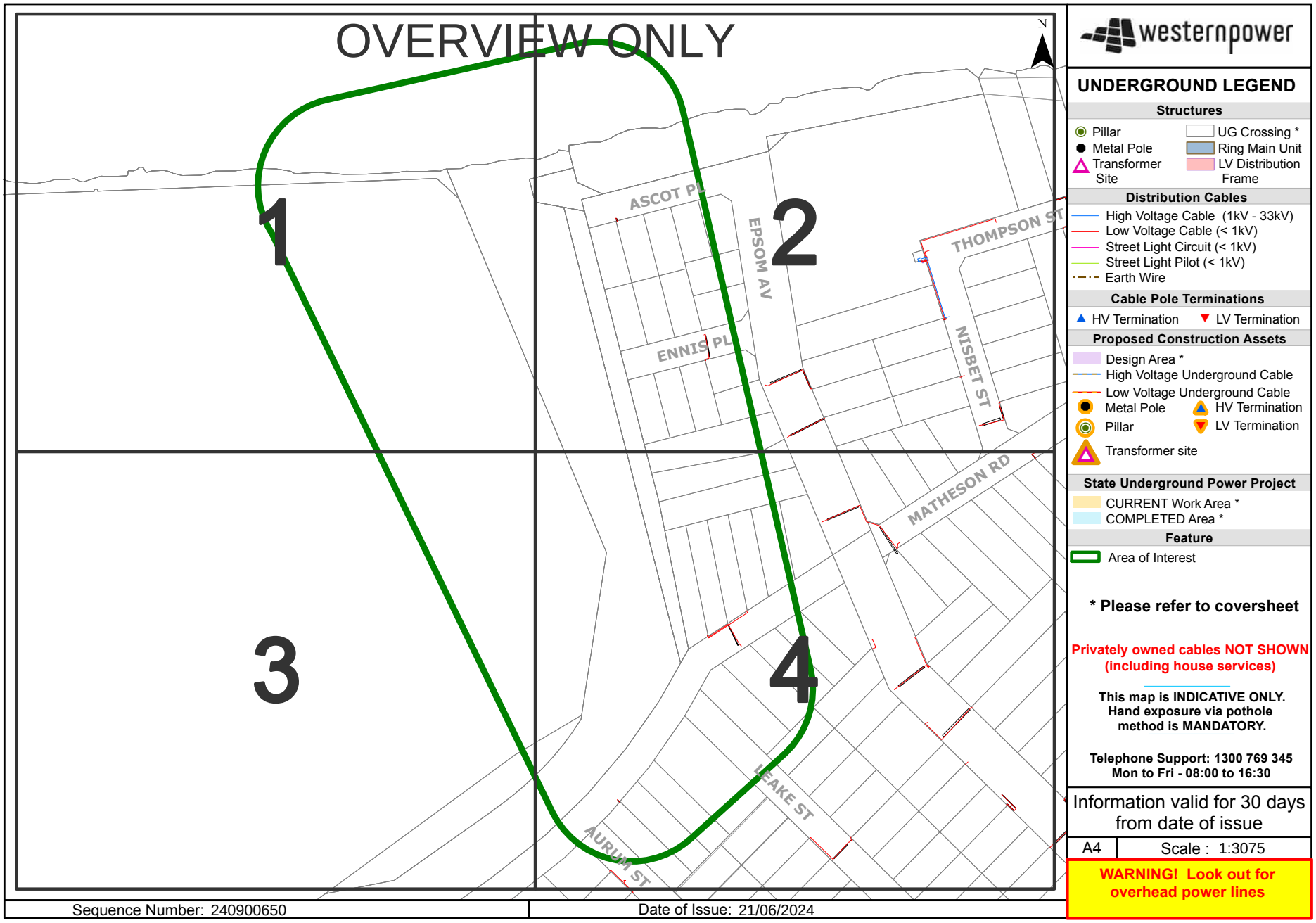
Telephone Support: 1300 769 345
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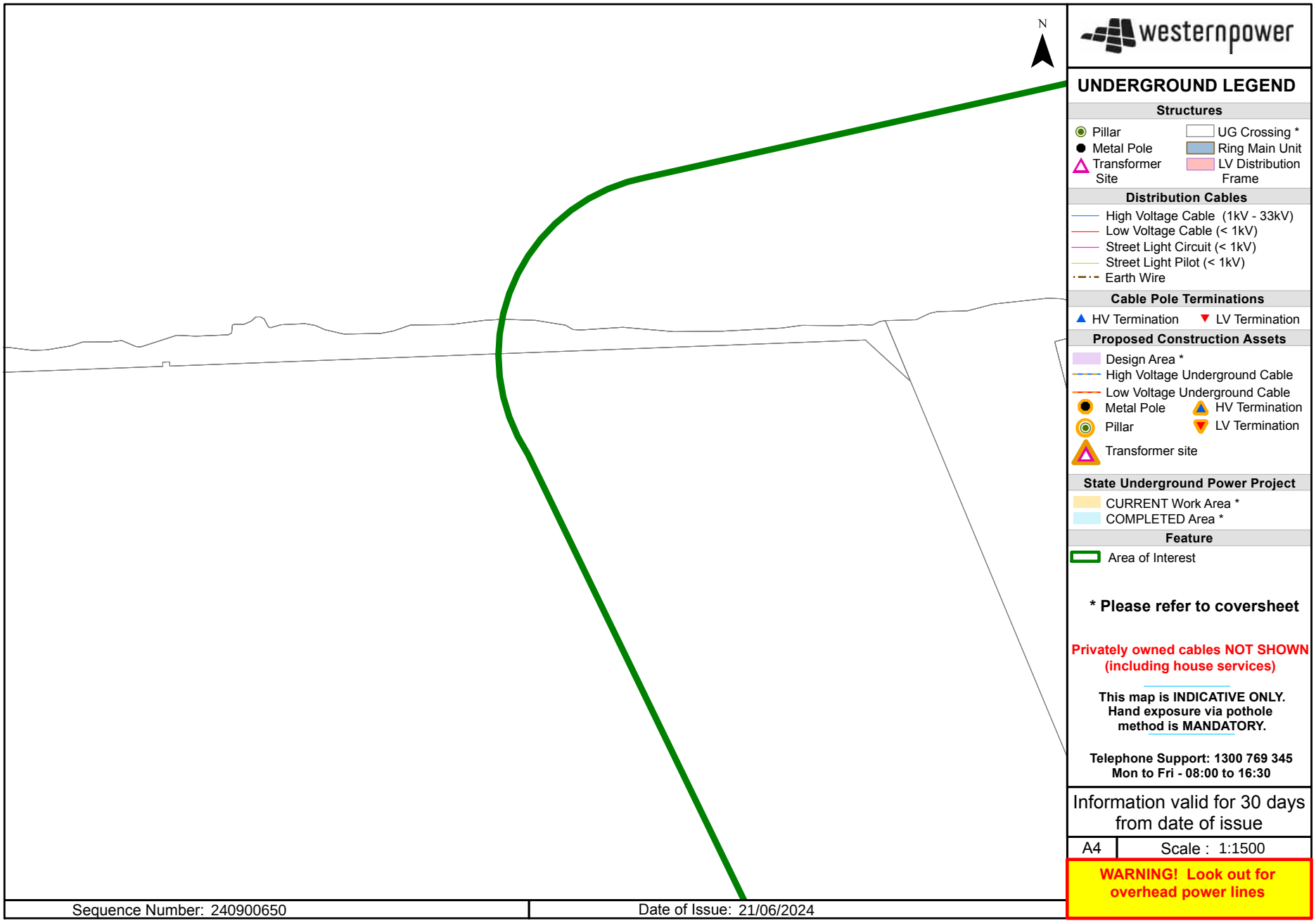
Information valid for 30 days from date of issue

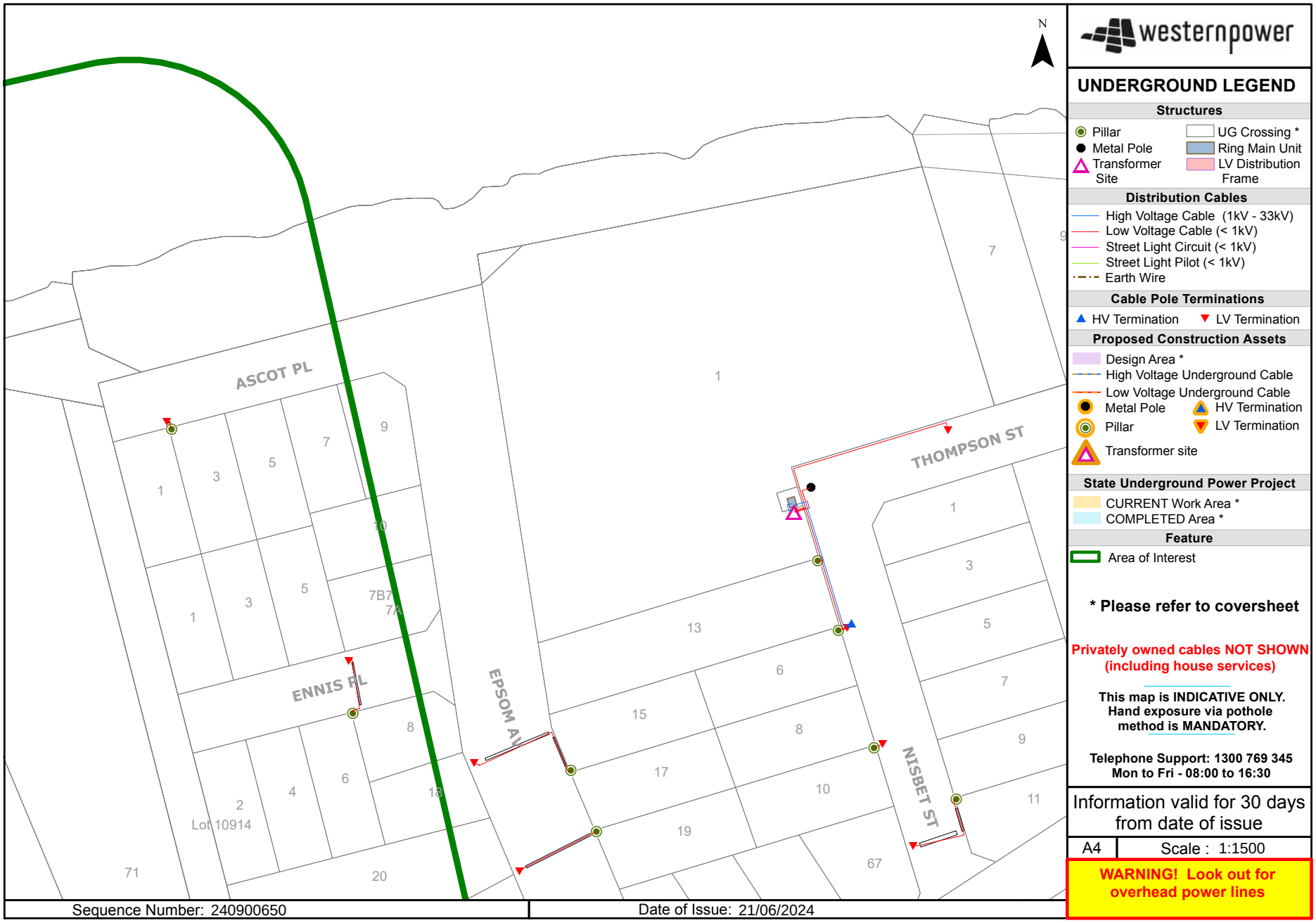
A4 | Scale : 1:1500

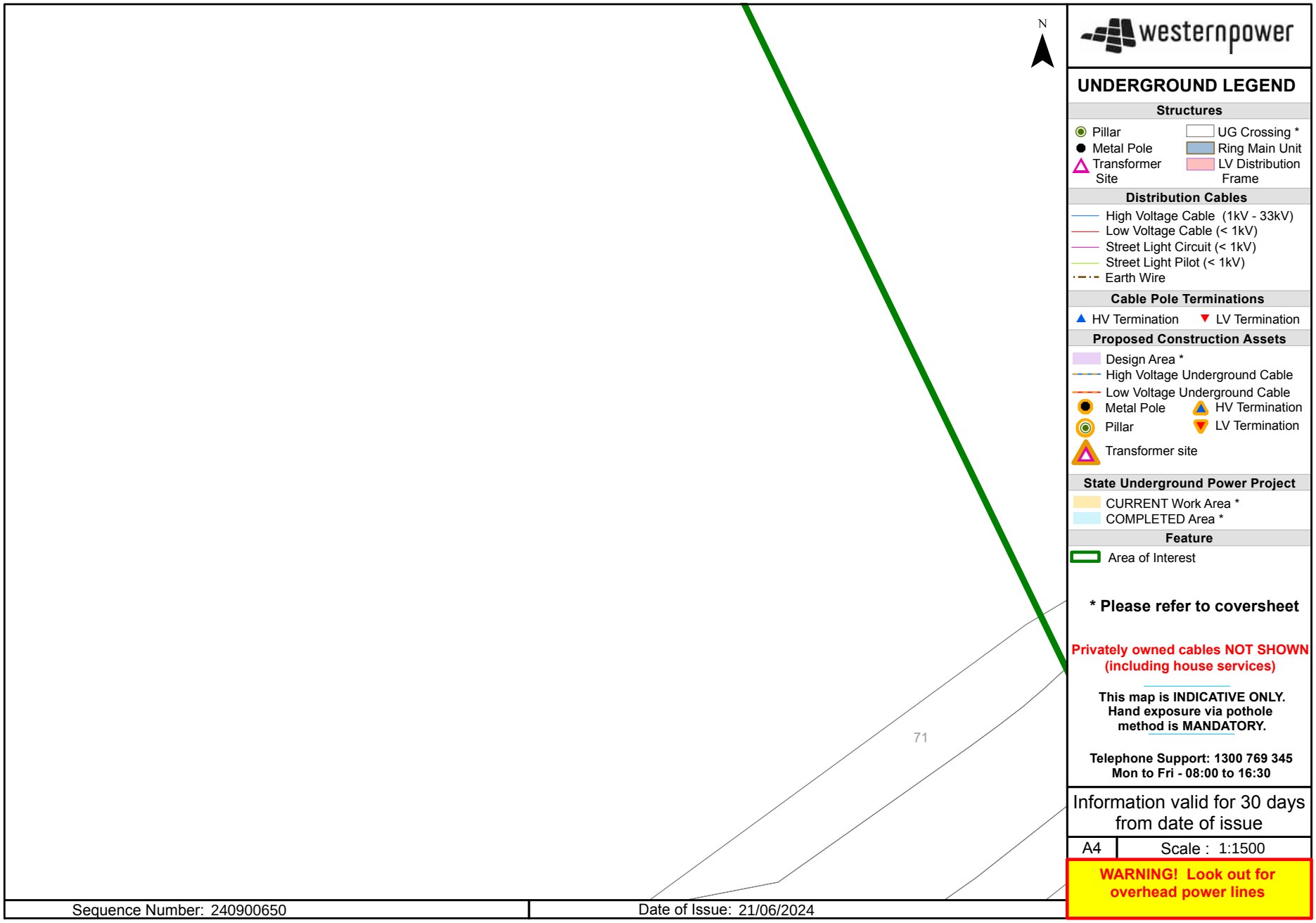
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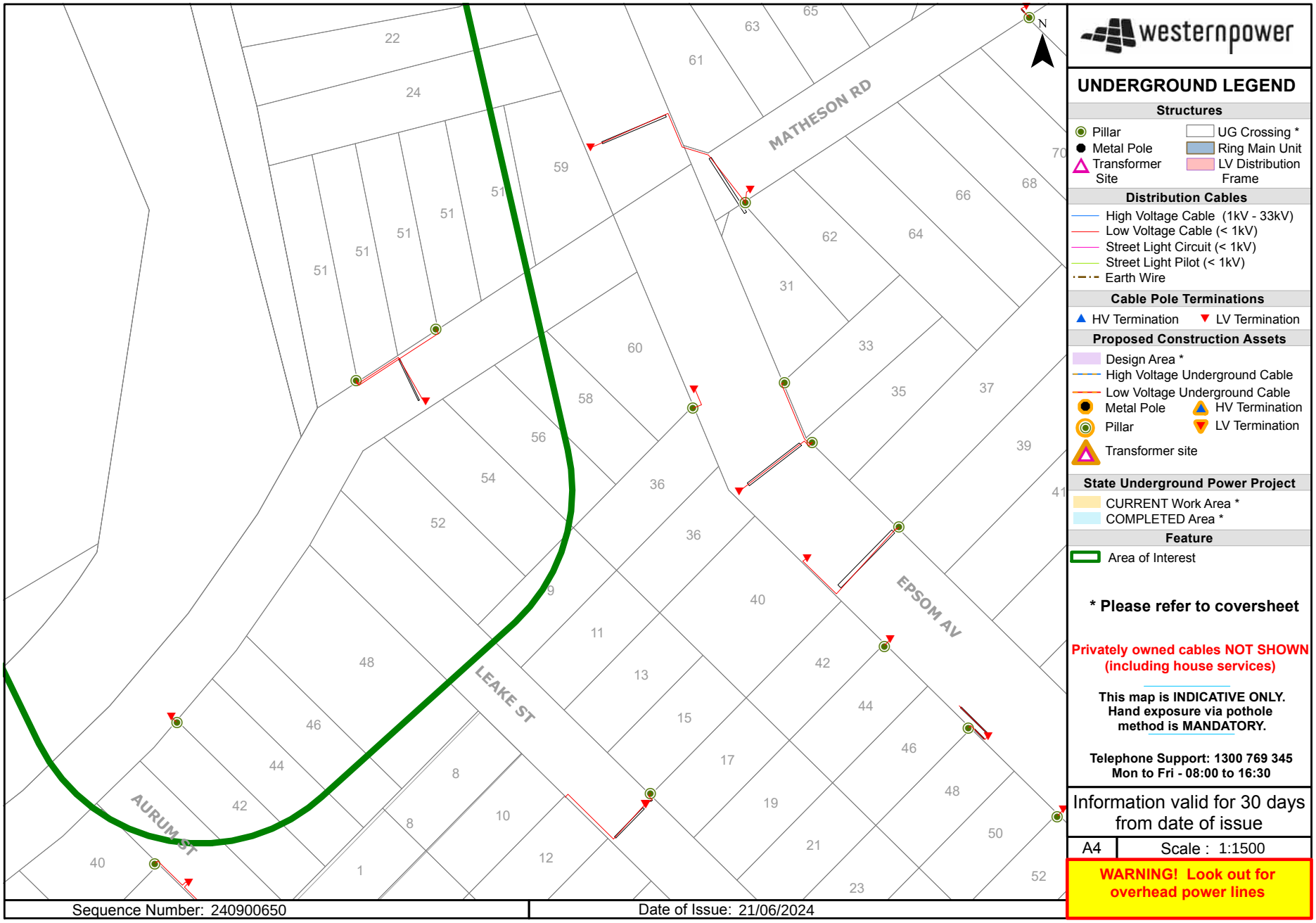

N
Matheson
Epsom
Leake
Aurum
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17
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21
23
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
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Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900650
Date of Issue: 21/06/2024


OVERVIEW ONLY
N
1
2
3
4
ASCOT PL
EPSOM AV
ENNIS PL
THOMPSON ST
NISBET ST
MATHESON RD
LEAKE ST
AURUM ST
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.
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Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:3075
WARNING! Look out for overhead power lines
Sequence Number: 240900650
Date of Issue: 21/06/2024


N
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
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WARNING! Look out for overhead power lines
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Date of Issue: 21/06/2024


N
ASCOT PL
ENNIS PL
EPSOM AV
THOMPSON ST
NISBET ST
Lot 10914
Sequence Number: 240900650
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
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Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines


N
71
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
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HV Termination
LV Termination
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Design Area *
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Low Voltage Underground Cable
Metal Pole
HV Termination
Pillar
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COMPLETED Area *
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Date of Issue: 21/06/2024


MATHESON RD
LEAKE ST
EPSOM AV
AURUM ST
N
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
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A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900650
Date of Issue: 21/06/2024

Job No 36962248

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
Precinct C - 1	30 Matheson Road Ascot WA 6104	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900641	ATCO Gas Australia	1300 926 755	NOTIFIED
240900637	NBN Co (WA)	1800 687 626	NOTIFIED
240900639	Telstra (WA)	1800 653 935	NOTIFIED
240900640	Water Corporation	13 13 95	NOTIFIED
240900638	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

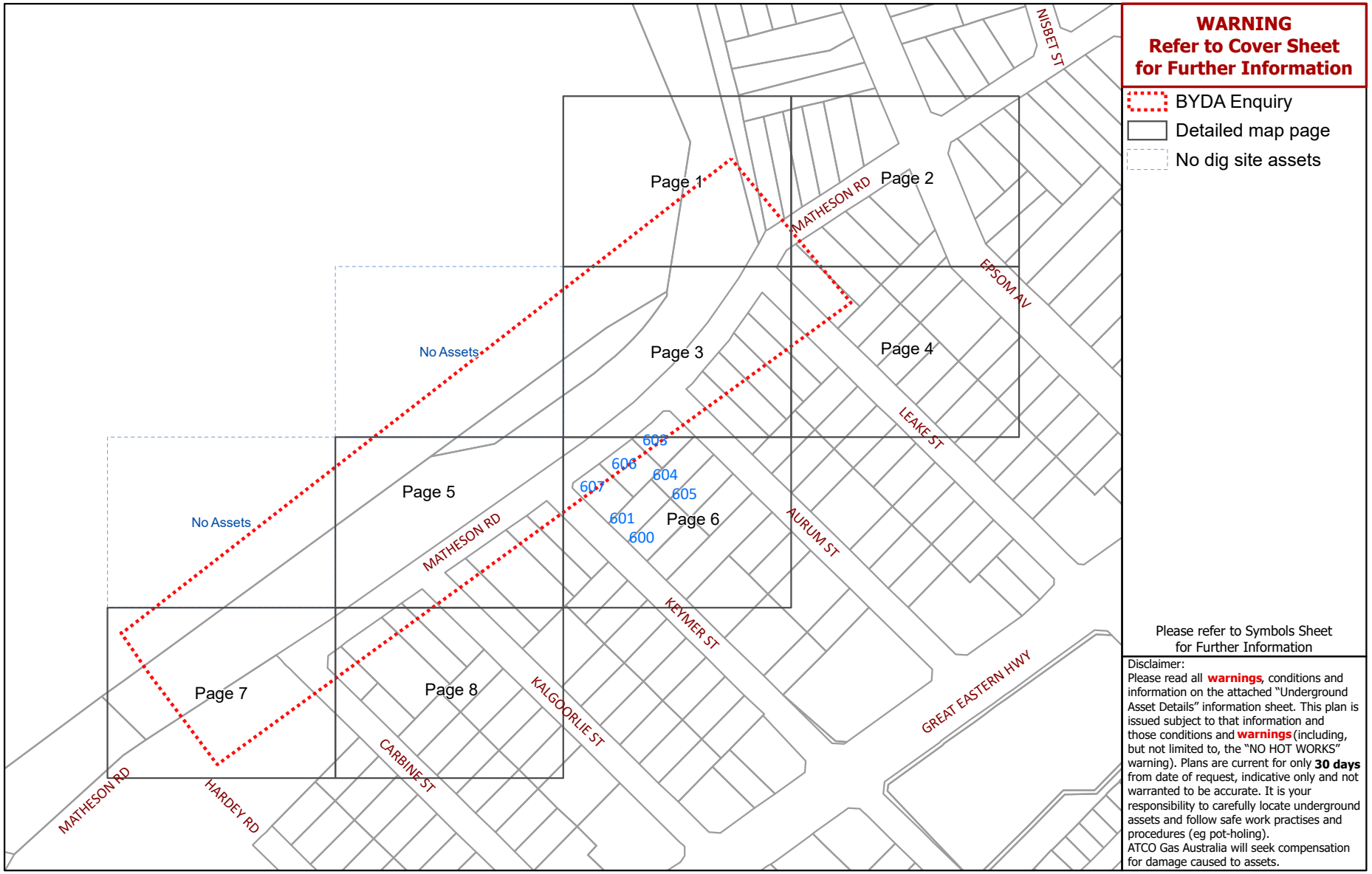
Lodge your FREE enquiry online any time at byda.com.au

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ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)
Index Sheet

Seq # 240900641
Job # 36962248

BYDA Location: 30 Matheson Road Ascot 6104
Scale: 1:3,500



WARNING
Refer to Cover Sheet for Further Information

BYDA Enquiry
Detailed map page
No dig site assets

Please refer to Symbols Sheet for Further Information

Disclaimer:
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ATCO Gas Australia will seek compensation for damage caused to assets.

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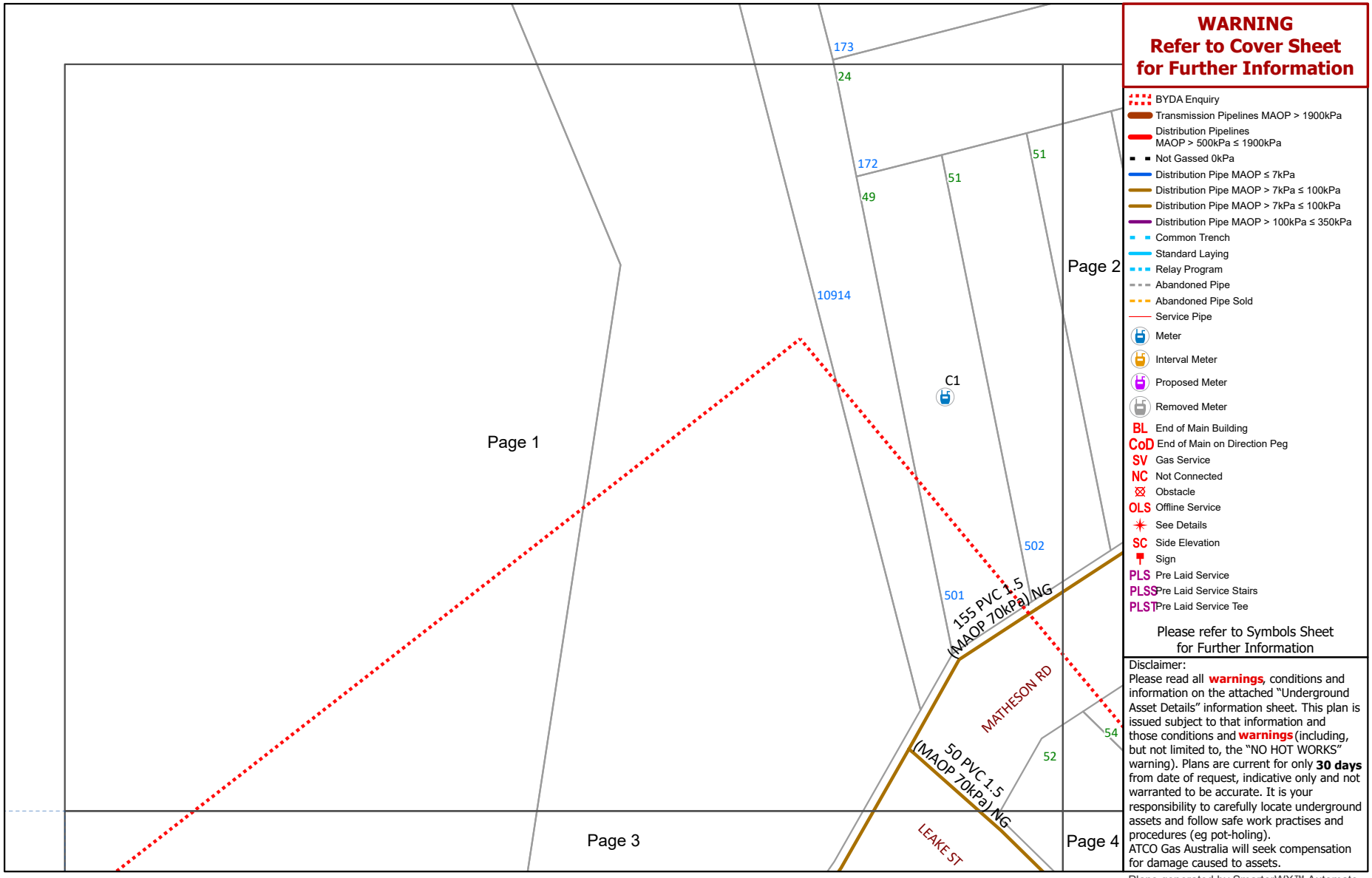
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ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900641
Job # 36962248

BYDA Location: 30 Matheson Road Ascot 6104
Scale: 1:800



WARNING
Refer to Cover Sheet for Further Information

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign
- PLS Pre Laid Service
- PLSS Pre Laid Service Stairs
- PLST Pre Laid Service Tee

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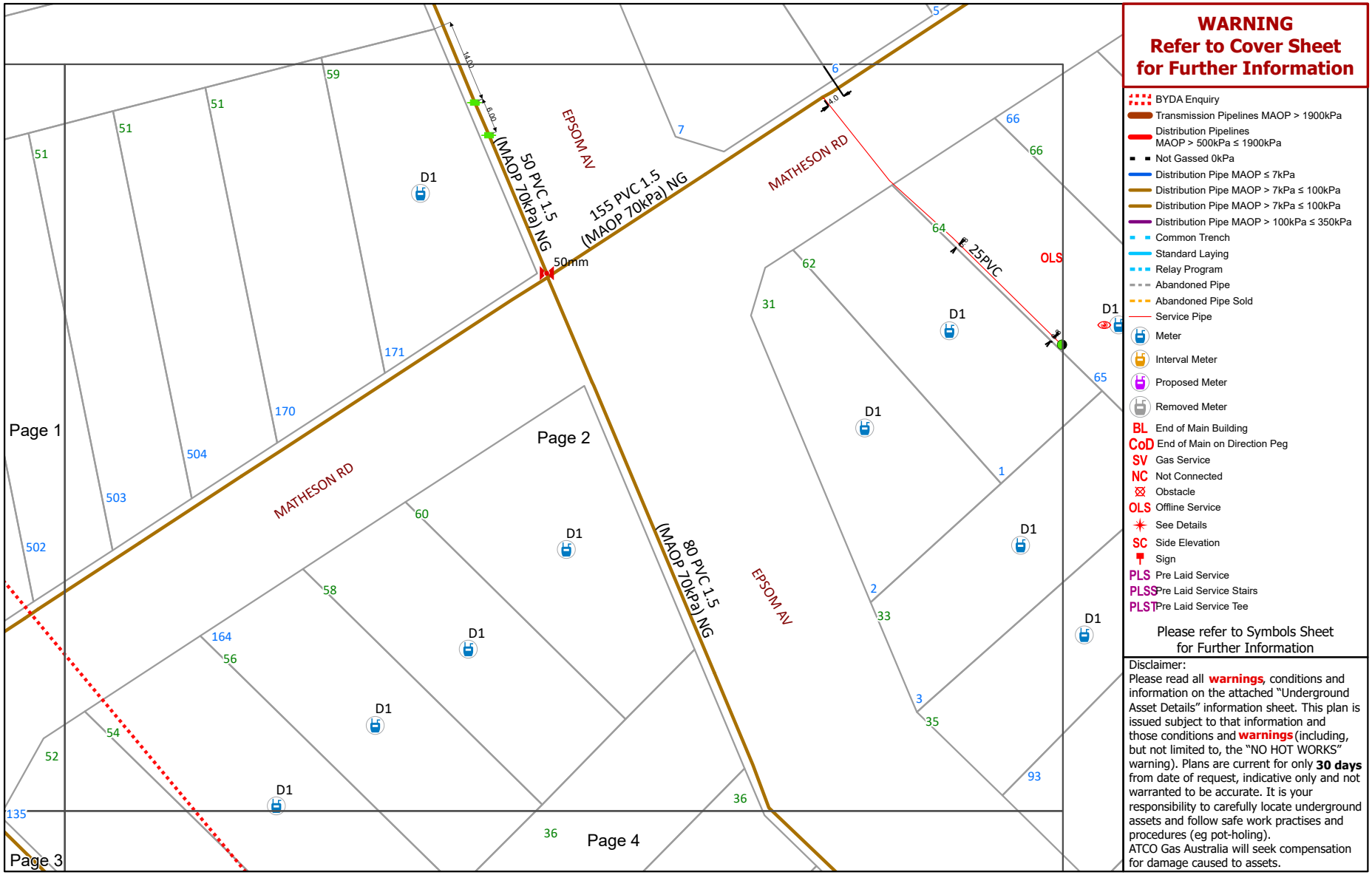
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Job # 36962248

BYDA Location: 30 Matheson Road Ascot 6104
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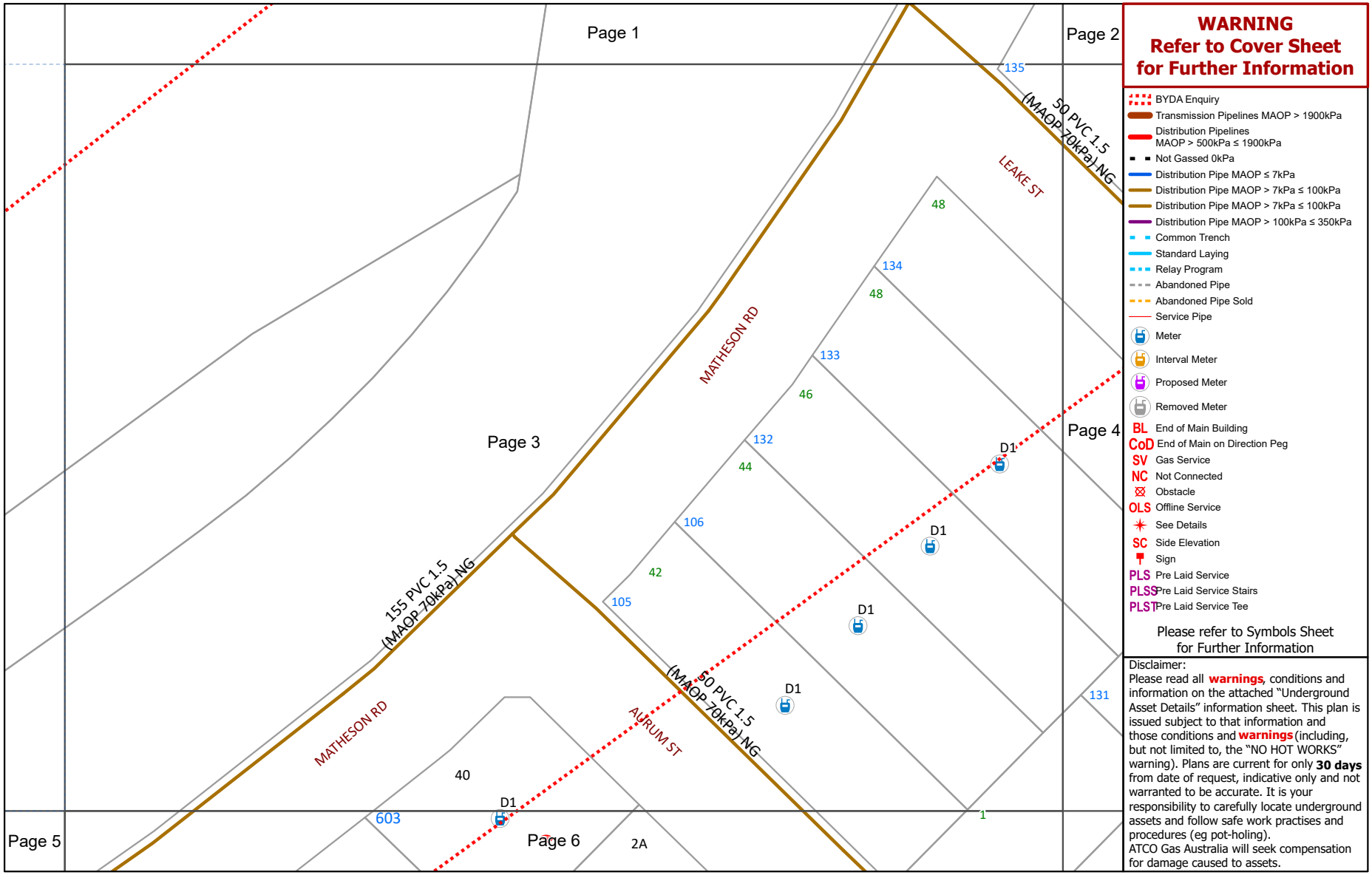
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BYDA Location: 30 Matheson Road Ascot 6104
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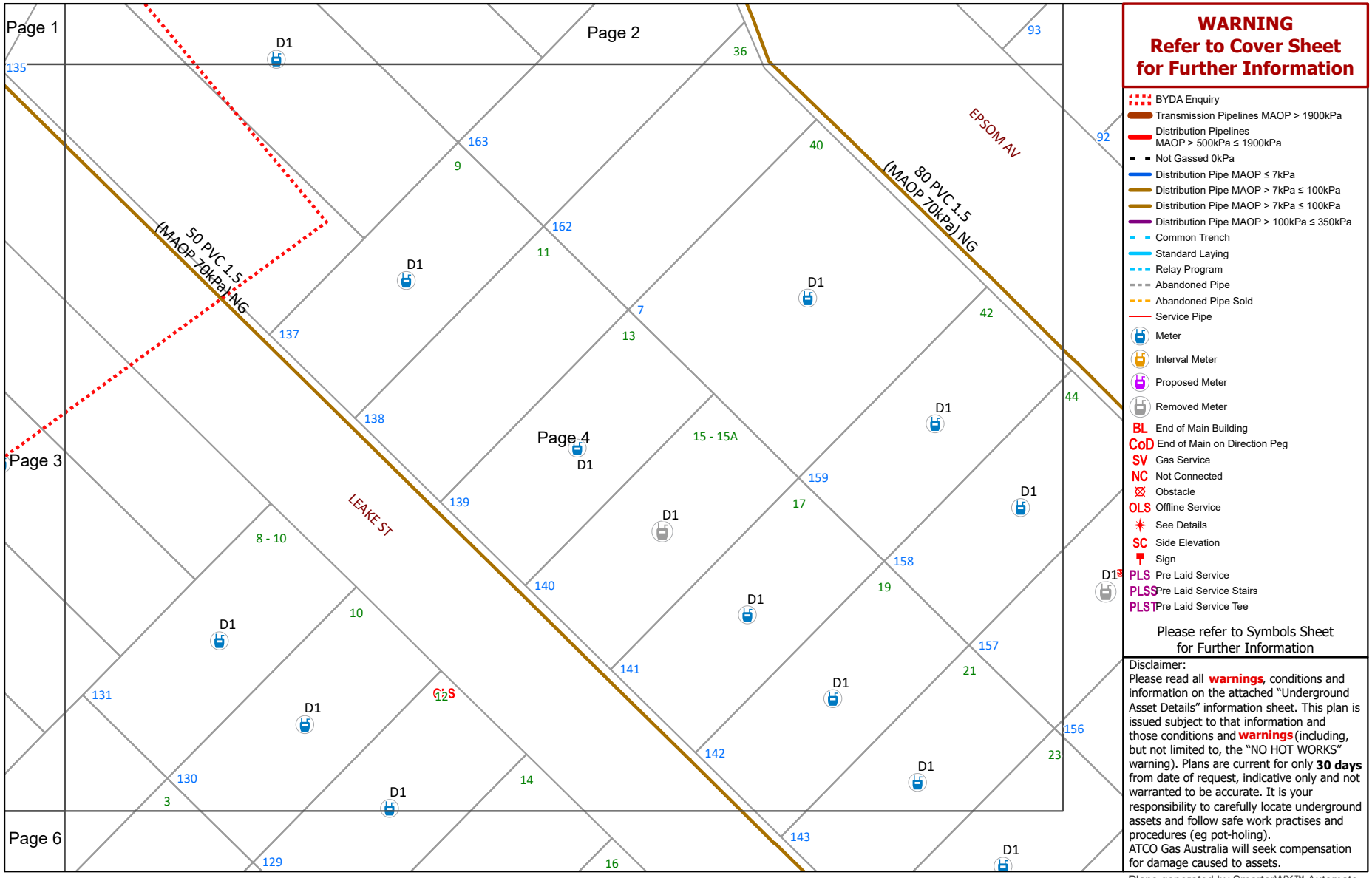
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Seq # 240900641
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BYDA Location: 30 Matheson Road Ascot 6104
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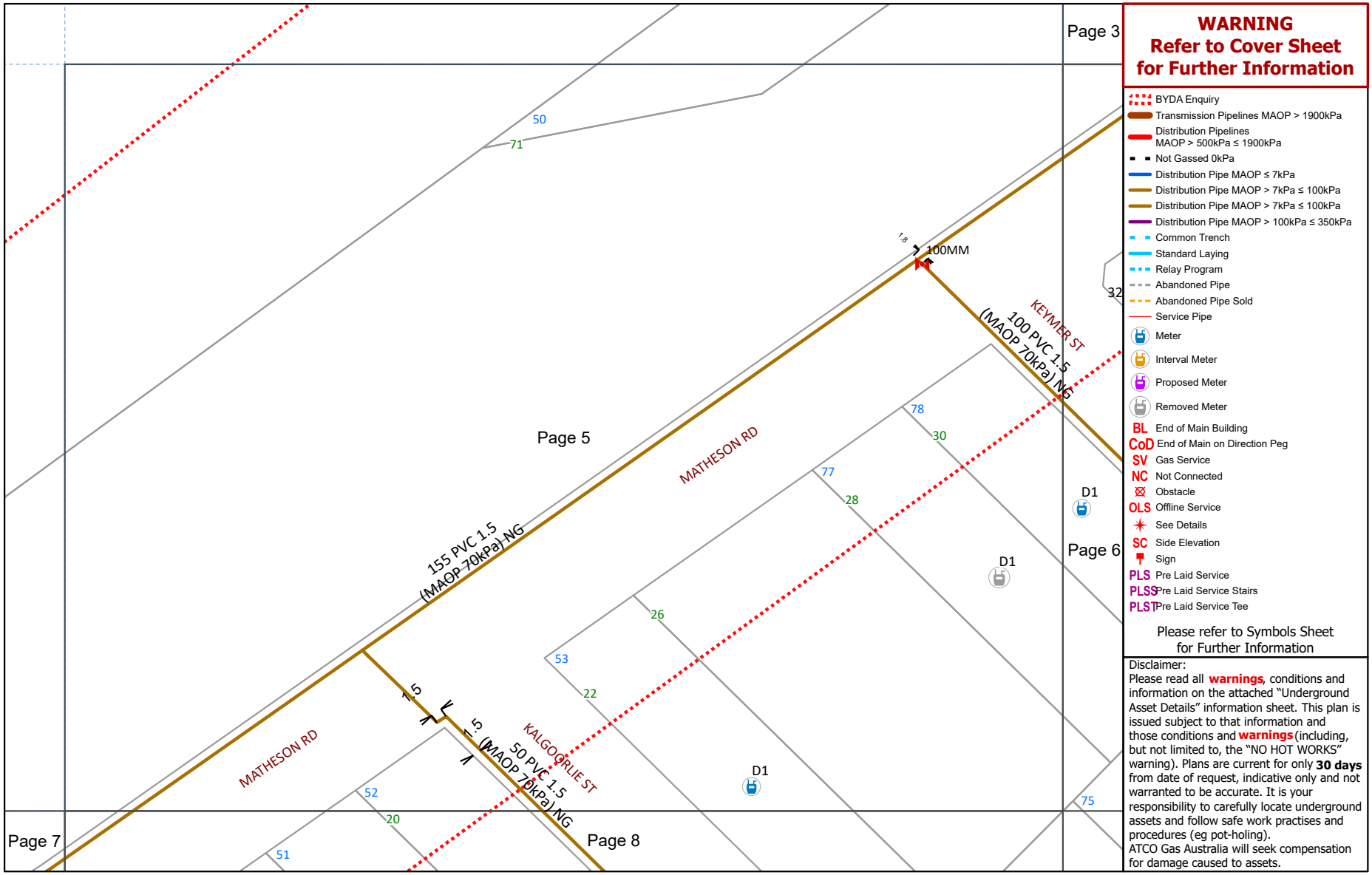
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Seq # 240900641
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BYDA Location: 30 Matheson Road Ascot 6104
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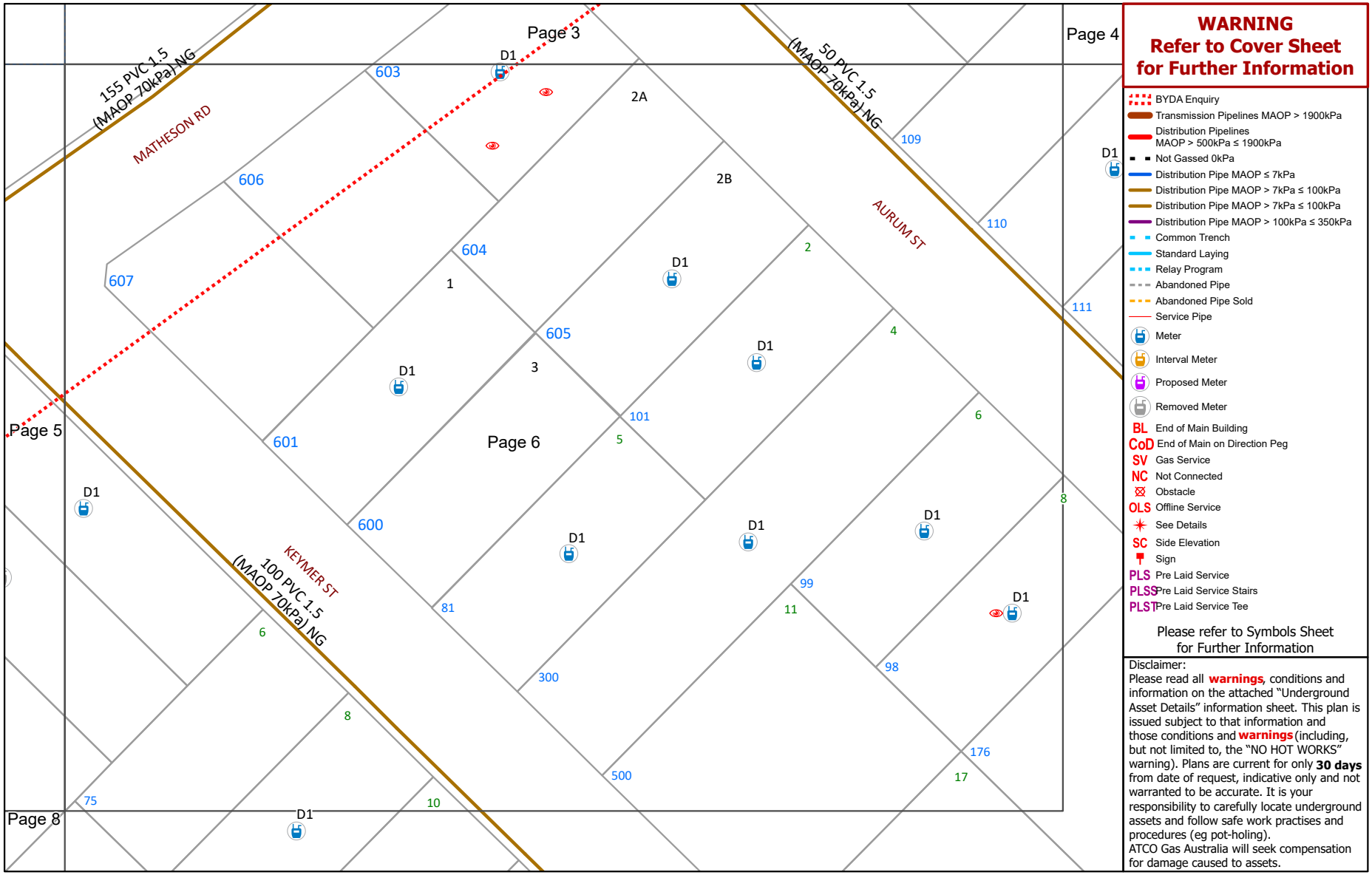
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- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign
- PLS Pre Laid Service
- PLSS Pre Laid Service Stairs
- PLST Pre Laid Service Tee

Please refer to Symbols Sheet for Further Information

Disclaimer:
Please read all **warnings**, conditions and information on the attached "Underground Asset Details" information sheet. This plan is issued subject to that information and those conditions and **warnings** (including, but not limited to, the "NO HOT WORKS" warning). Plans are current for only **30 days** from date of request, indicative only and not warranted to be accurate. It is your responsibility to carefully locate underground assets and follow safe work practises and procedures (eg pot-holing).
ATCO Gas Australia will seek compensation for damage caused to assets.

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Plans generated by SmarterWX™ Automate

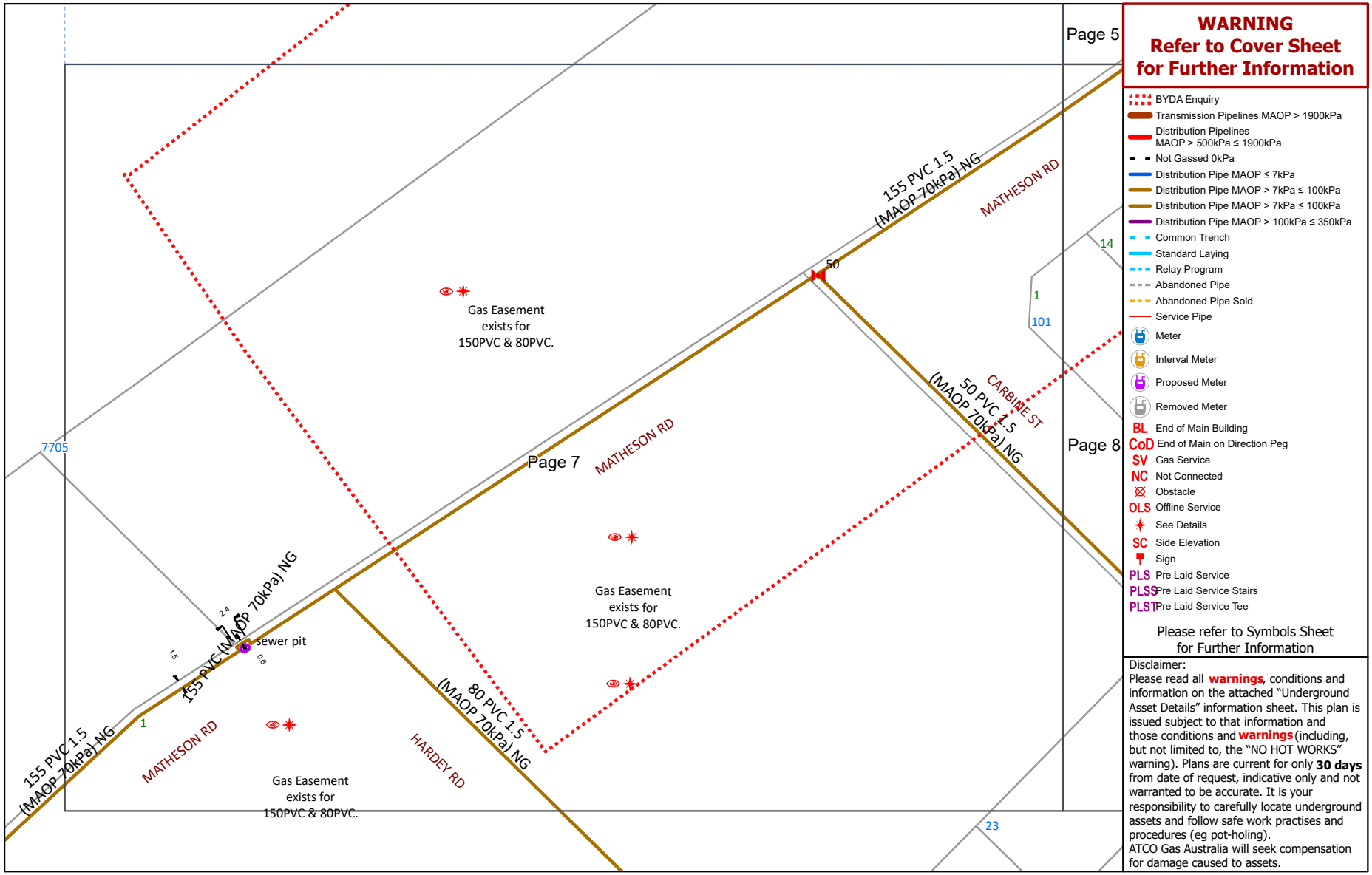
ATCO

©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900641
Job # 36962248

BYDA Location: 30 Matheson Road Ascot 6104
Scale: 1:800



WARNING
Refer to Cover Sheet for Further Information

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
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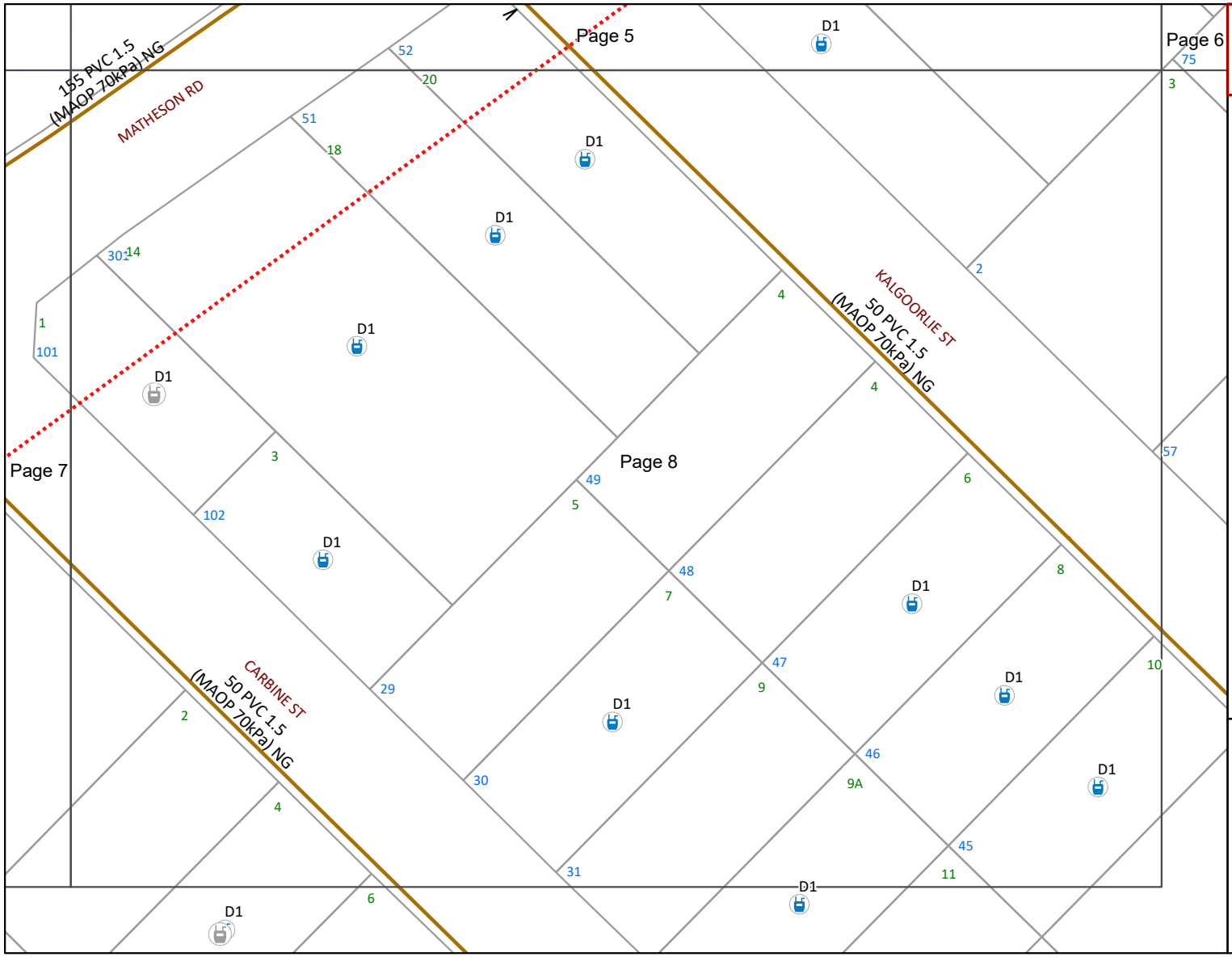
ATCO

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Plans generated by SmarterWX™ Automate

ATCO UNDERGROUND ASSET DETAILS ASSETS AFFECTED
GAS DIVISION

ASSETS AFFECTED – see accompanying Plan

Job No: **36962248**
Sequence No: **240900641**
Date of Issue: 21 June 2024
Phone: **1300 926 755**

Justin Zielinski
ATCO Gas Australia
54 Havelock Street
West Perth
WA 6005

BYDA Utility Registration Name: Private
BYDA Location: **30 Matheson Road Ascot WA 6104**

ATTENTION: This response to your enquiry has been interpreted from details in your requested DBYD picture location request only (not any street address you gave). It is your duty to ensure the accompanying plan/s match your geographical area of works.

IF YOU SEE, HEAR, SMELL OR OTHERWISE DETECT GAS,
LEAVE THE IMMEDIATE AREA AND THEN CALL 13 13 52

Our records indicate that ATCO gas infrastructure ***IS PRESENT*** in the vicinity of and/or surrounding area of the above enquiry. This response relates only to ATCO assets. Your Duty of Care requires that personnel **Must** at all times comply with, and have on site, this information sheet and the accompanying plan(s). All plans are subject to this information sheet. You should refer to the ATCO Self-service Portal (Link Here) or if unsure, contact ATCO on **1300 926 755** during business hours.

All information provided is to be used as a guide only (see Disclaimer item **5**). It does not absolve you or third parties from your Duty of Care obligations, including to take additional precautions where work has the potential to impact on gas assets, public safety or the environment, or from your duties at law (including Reg 3.21 of the Occupational Safety and Health Regulations 1996).

WARNINGS

- No works of any type within 15 metres of any **CRITICAL GAS ASSET** infrastructure without prior approval from ATCO
- **NO HOT WORK** within 15 metres of any gas infrastructure except in compliance with applicable laws & *Australian Standard 1674.* **Do Not** let heat sources or hot works impact on any gas infrastructure and take into consideration that the ground or adjacent structures may also be capable of transmitting heat so as to circumvent protection afforded by a heat shield or barrier
- **DANGER** - Gas can cause asphyxiation and is flammable. Keep all ignition sources well away (e.g., flames, matches/ lighters, sparks, electrical devices, vehicles or engines, mobile phones, cameras)
- Gas pipes **Must Not** be unsupported or left without adequate cover or protection without prior approval from ATCO
- Damage to the pipe coating or pipe itself can be very dangerous if not given immediate attention. Report any damage to ATCO immediately on **13 13 52**. **Do Not** attempt to repair any damaged gas infrastructure
- No alteration or removal of live or abandoned gas infrastructure without prior written approval from ATCO
- Any abandoned or proposed gas infrastructure indicated on the gas plans **Must** be treated as live
- Never assume the location or depth of any gas infrastructure. Pipes may not follow straight lines or maintain a constant depth. Always check carefully (e.g., by careful hand digging of potholes)
- Unauthorised repairs or tampering with gas infrastructure may result in prosecution under the *Energy Operators (Powers) Act 1979*. ATCO Gas Australia reserves all rights to recover compensation for loss or damage to its gas infrastructure or other property including for indirect or consequential losses.

PLANS:

Plans provided are current for **30 days only** from date of request. You must use current plans at all times.

Plans do not show all gas service lines (which connect gas mains to individual meter positions). See condition **3.c)** below.

If plan shows **additional detail** symbols (*) or ( ) in the area of proposed works it is **your duty** to obtain that further detail from the number below.

Plans (including the location of pipes, services, infrastructure and boundaries) are **approximate only**. You **Must** use safe and proper procedures – including **potholing** (see condition **4** below).

Plans are not a guide as to gas availability for connection purposes.

To call ATCO: **Weekdays from 7.30am to 3.30pm, call – 1300 926 755 After hours, weekends and emergencies, call – 13 13 52**

CONDITIONS FOR WORKS IN THE VICINITY OF ATCO ASSETS

1. Compliance with Warnings

You **Must** comply with the Warnings contained in this information sheet and the accompanying plan(s).

2. Compliance with 'Working around Gas Infrastructure' Document (Link Here) applicable laws and duty of care

All work (including but not limited to using Excavator's Augers, Directional, drilling machines, 'Ditch Witch' type trenching machine, Loader, Dozer, Skid Steer (Bob Cat)) **Must** comply with all applicable requirements in the 'Working around Gas Infrastructure' Document and with all applicable laws and Australian Standards. All due care must be exercised to locate any gas infrastructure in the vicinity and when conducting any works near them.

3. All Gas Infrastructure

All work that may have any impact upon any gas infrastructure (see **3.a)**, **b)** and **c)** below for examples) should be carefully planned with notification to ATCO well in advance of commencement. Contact ATCO on **1300 926 755** or visit Atco's online self-service portal (Link Here). Amongst other things, this includes excavation of or near gas pipelines, boring/drilling, crossings of pipelines (including by other underground infrastructure e.g. drains, power cables, etc.), road works and structural installations. In addition:

a) Critical Asset

No works of any type are permitted within 15 meters of these pipelines without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco online Self-service portal (Link Here)

You **Must** ascertain the location of any Critical Asset, in relation to your proposed work by:

- Locating a straight line between two marker danger signs, and
- Assessing the distance from this line to your proposed work area.

ATCO may require stand-by supervision during your works and will advise of attendance requirements.

b) Non Critical Assets

These pipelines are installed in most streets throughout the Perth metro area and several country centers. Main valves, regulator sets, and test points also exist at intervals along these pipelines. Where work may impact upon these pipelines or assets then ATCO **Must** be contacted as per item **3** above.

c) Gas Services and Meters

If a gas meter is installed on a property, an underground gas service pipe will run from the meter position to the gas main in the street. Plans do not show all gas service lines (with the exception of Critical Assets), but their presence must be anticipated. Most gas meter boxes installed since 1996 will include a sticker giving approximate guidelines for the gas service line location. All due care must be exercised to locate any gas services in the vicinity and when conducting any works near them.

4. Compliance with Safe Work Practices

It is your responsibility to have and comply with adequate safe work practices and procedures. Without limiting your obligations:

PLAN The complete & current Before you Dig Australia documentation and plans must always be on site & referred to for the duration of work. Refer to regulation 3.21 of the Occupational Safety and Health Regulations 1996 and the Utility Providers "Code of Practice" for further useful information.

PREPARE Prepare by reviewing the Before you Dig Australia Documentation and contacting ATCO if you need assistance. Look for onsite ATCO asset and infrastructure clues such as pit lids, marker posts and meters. No works of any type are permitted within 15 meters of a **CRITICAL ASSET** without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco website Self Service portal (Link Here) and allow suitable

processing time. Atco recommends engaging a BYDA Certified Locator which includes undertaking electronic location prior to potholing.

POTHOLE Using current Before you Dig Australia plans, all gas pipes should be located (including any deviation in the direction of a gas pipe) by exposing them by careful digging using a HAND SHOVEL. Where the proposed work is parallel to a gas pipeline, pothole every 10 meters along the entire route. Damage to the pipe coating or to the pipe itself can create a very dangerous situation if not given immediate attention. If damage does occur, it **Must** be reported to ATCO immediately on Ph. **13 13 52**.

PROTECT Supervise and monitor all excavations near gas infrastructure using a dedicated spotter. Where any gas infrastructure is required to be exposed, adequate protection of the gas infrastructure is required to prevent potential damage. Also implement appropriate controls when conducting 'hot work' (in accordance with AS 1674) in the vicinity of the ATCO infrastructure such as; isolation; separation distance; the placement of an effective non-combustible barrier of sufficient size and thermal resistance for the intensity, type and duration of heat exposure; gas monitoring; monitoring the environment surrounding the ATCO infrastructure to ensure it is not being impacted by the work, and other controls as necessary.

PROCEED You should **only proceed** with your excavation work after you have planned, prepared, potholed (unless prohibited) and have protective measures in place. All locations markers/pegs are to be removed on completion of works. If you are unsure, **DO NOT** Proceed. Call ATCO on **1300 926 755**

5. Disclaimer and Further Terms

a) Nothing in this document, any accompanying plan or the 'Additional Information for Working around Gas Infrastructure' (AGA-O&M-PR24) (together called "**Documents**") purports to exclude or modify any term, condition or warranty to the extent that by law it cannot lawfully be excluded or modified by agreement or notice, including but not limited to those contained in Schedule 2 of the *Competition and Consumer Act* 2010 (Cth) and corresponding provisions of any state legislation.

b) If any of ATCO, or their respective related entities, officers, employees, agents, contractors or advisers (together called "**Associates**") is liable for a breach of a term, condition or warranty described in paragraph **5.a)** above, its liability is, to the fullest extent permitted by law, limited to any one or more of the
following as it determines in its absolute discretion:

i) in relation to goods supplied by them, replacing or repairing the goods, supplying an equivalent item, paying the cost of replacing or repairing the goods or paying the cost of acquiring or hiring an equivalent item; and

ii) in relation to services supplied by them, the re-supply of the services or the payment of the cost of having the services re-supplied.

c) Subject to paragraphs **5.a)** and **b)**, but otherwise despite any other provision in the Documents, no representation or warranty is made or given (whether expressly or by implication) by any of ATCO or their respective Associates in respect of any information contained or referred to in any of the Documents or in any other communication from ATCO concerning any of the Documents or the subject matter of any of the
Documents ("Information"). In particular, but without limiting the generality of the foregoing limitation, none of ATCO or their respective Associates makes any warranty or representation as to the truth, accuracy, completeness, reliability, currency, timeliness, quality or fitness for any purpose of or the standard of care taken in the preparation of any Document or Information (including, but not limited to, the accuracy of the scale of, or the location of anything or symbol shown on, any plan or diagram).

d) Subject to paragraphs **5.a)** and **b)**, to the maximum extent permitted by law, none of ATCO or their respective Associates is liable to any person or other body ("**Recipient**") who receives or otherwise obtains access to all or any part or parts of the Documents or Information, in any way (including, but not limited to, liability for negligence, breach of statutory duty or lack of care) in respect of any cost, expense, damages, loss or liability, including, but not limited to:

i) any financial or economic loss, cost, expense or damage, including but not limited to loss of production, loss of profit, loss of revenue, loss of use, loss of contract, loss of goodwill or loss of business opportunity;

ii) any new or increased costs or expenses, including but not limited to financing or operating costs;

iii) any failure to achieve any actual or anticipated saving in respect of any cost or expense;

iv) any cost, expense, damage or loss resulting from any liability of the Recipient to any other person or body howsoever and whensoever arising, suffered or incurred by the Recipient in relation to, or in connection with, the disclosure to them of, or use of, or reliance on, all or any

part or parts of the Documents or Information.

e) By using any Document or Information, each Recipient is taken to represent and warrant to ATCO that the Recipient will comply with the conditions and other terms referred to in the Documents or Information, including but not limited to conditions that:

i) the Recipient **Must** comply with the conditions in numbered paragraphs **1** to **4** above and this paragraph **5**;

ii) as between ATCO and each Recipient, ATCO owns the Information and all rights and title in and to the Information are to remain vested in ATCO;

iii) no Recipient has any right, title or interest in the Information or, except as expressly provided for in the Documents, any license or right to copy, alter, modify, publish or otherwise use or deal with the Information without prior written approval from ATCO;

iv) ATCO makes no representation and gives no warranty as to its right to disclose any Information;

v) the Recipient relies on any Information entirely at its own risk and expense;

vi) the Recipient **Must** undertake its own independent due diligence and investigations in relation to the Information;

vii) none of ATCO or their respective Associates owes the Recipient any duty of care in respect of the Information; and

viii) none of ATCO or their respective Associates is under any obligation to correct, update or revise any Documents or Information.

GAS MAIN AND SERVICE IDENTIFICATION

LEGEND

1. Critical Asset (See **WARNINGS** page 1)
2. Pipe Diameter (millimetres)
3. Pipe Material

   CI = Cast Iron PE = Polyethylene
   GI = Galvanised Iron PVC = PVC
   ST = Steel
4. Alignment (in metres from property line)
5. Pressure in main (MP 70 kPa = Medium Pressure and MAOP (Maximum Allowable Operating Pressure)
6. Off-line Service – service may not be straight line to meter. (**WARNING – OLS may not always be shown on plan**. See item **Error: Reference source not found** above)
7. Service Valve in the vicinity
   (**NOTE:** Service Valve may be **"BURIED"**)
8. Pre-laid Service laid in Common Trench
9. Main Status: (See **WARNINGS** page 1)

   9a. AB = Abandoned Mains

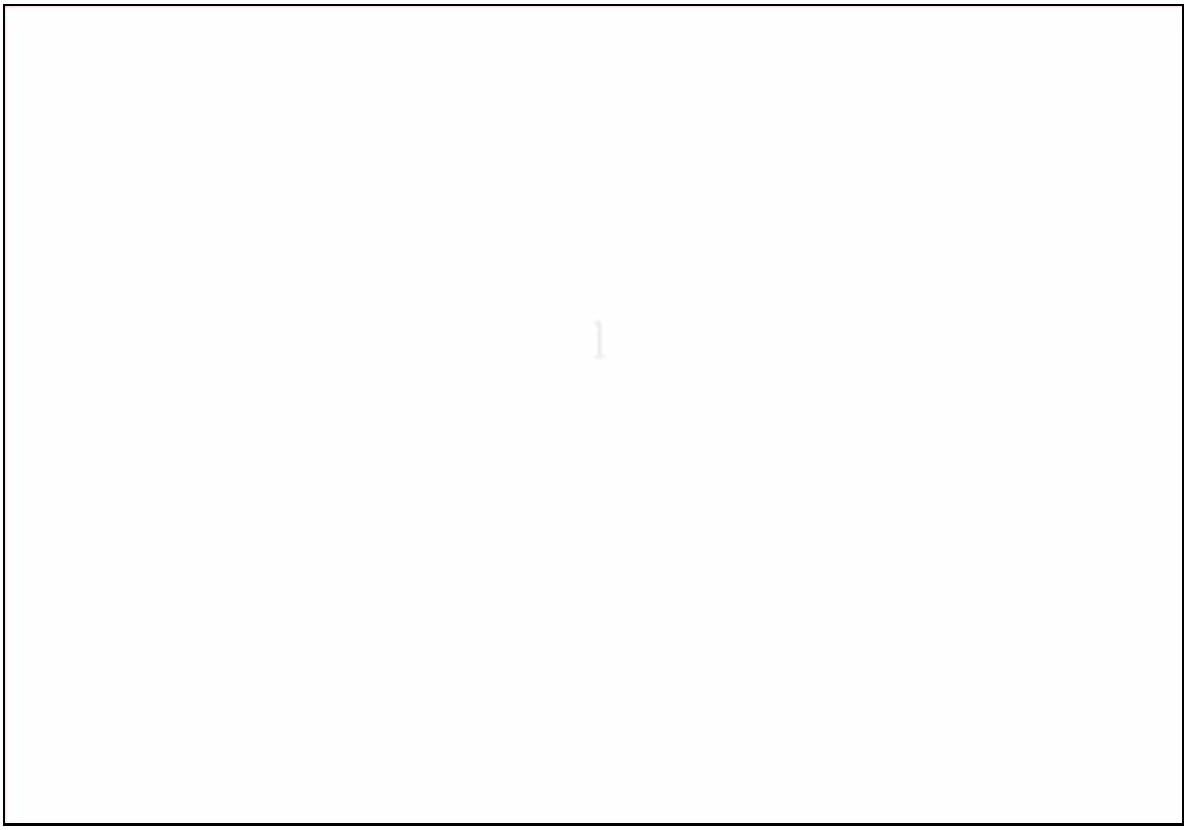
   9b. PROP = Proposed Mains
10. Customer Connection: Does not indicate actual location of Meter Position

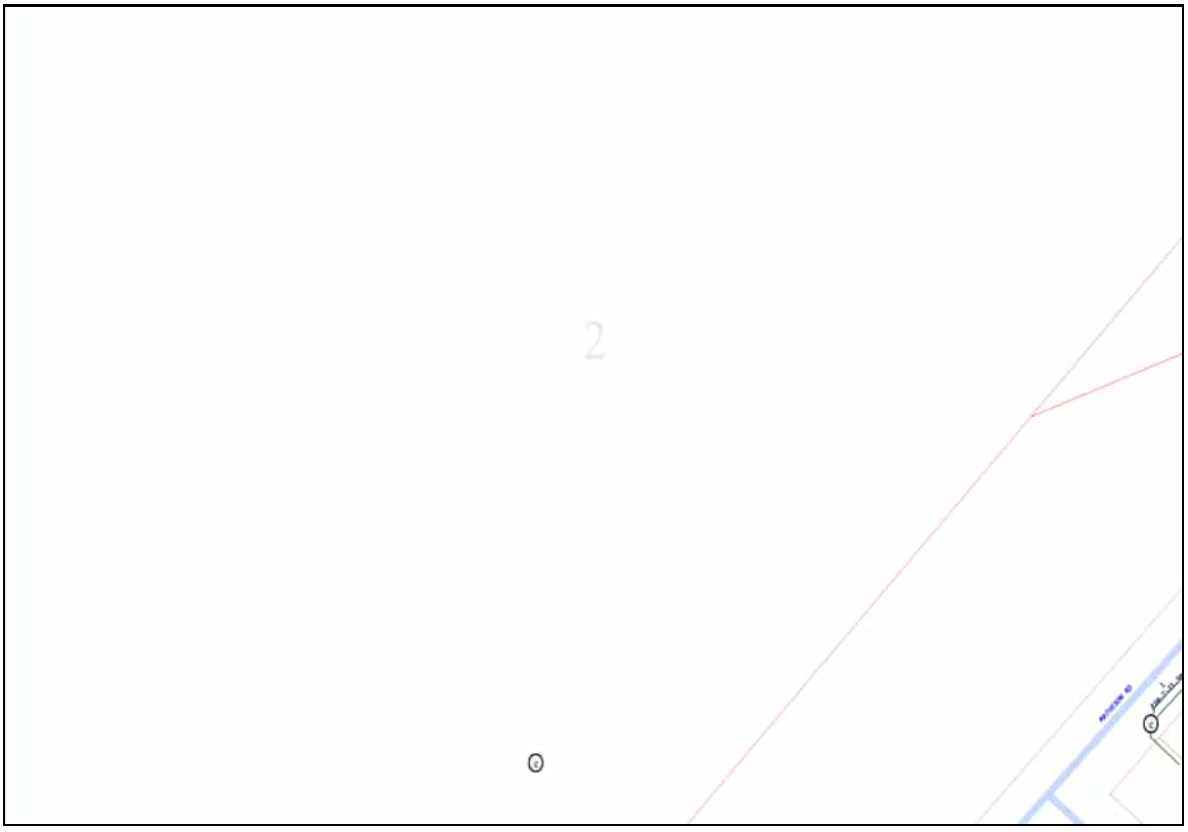
    D2 (D = Domestic & 2 = Number of Meters)

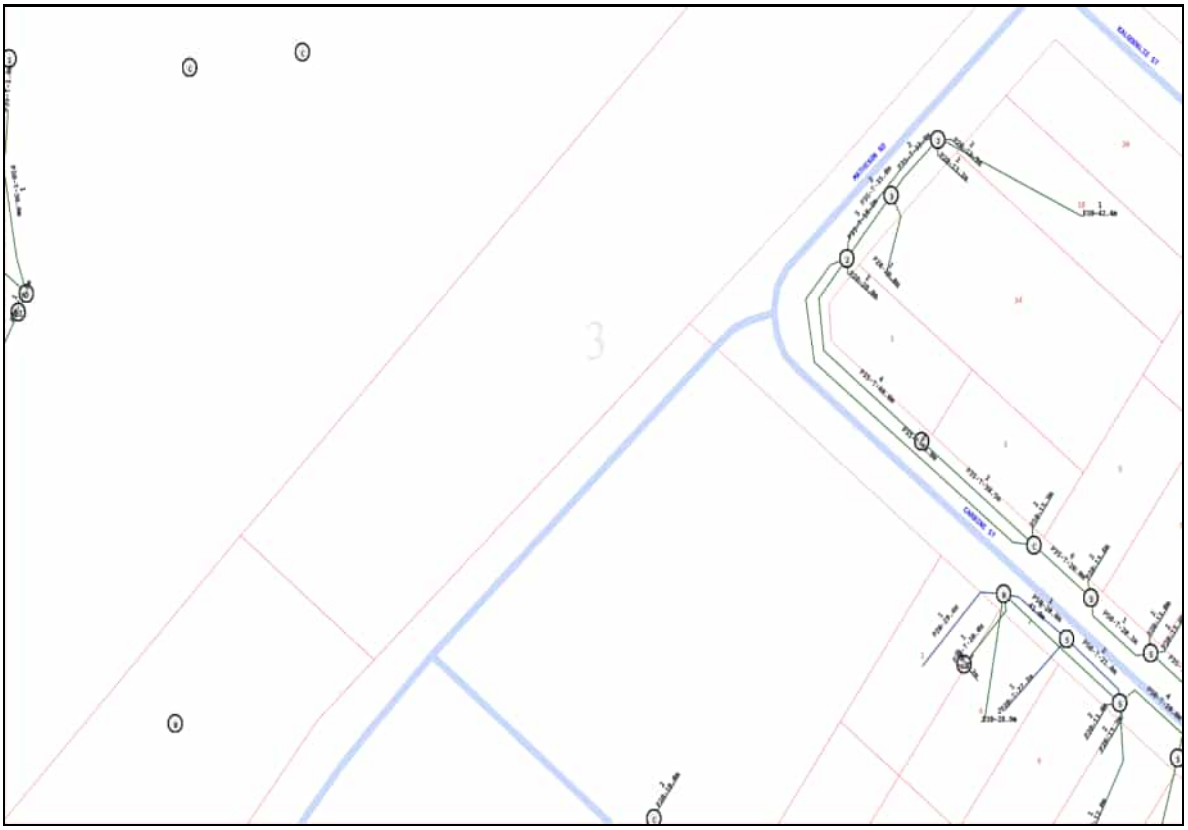
    C1 (C = Commercial & 1 = Number of Meters)
11. **Additional detail available and Must be obtained if within area of proposed works – see page 2 above.**
12. Depth of Cover (DOC) in metres.

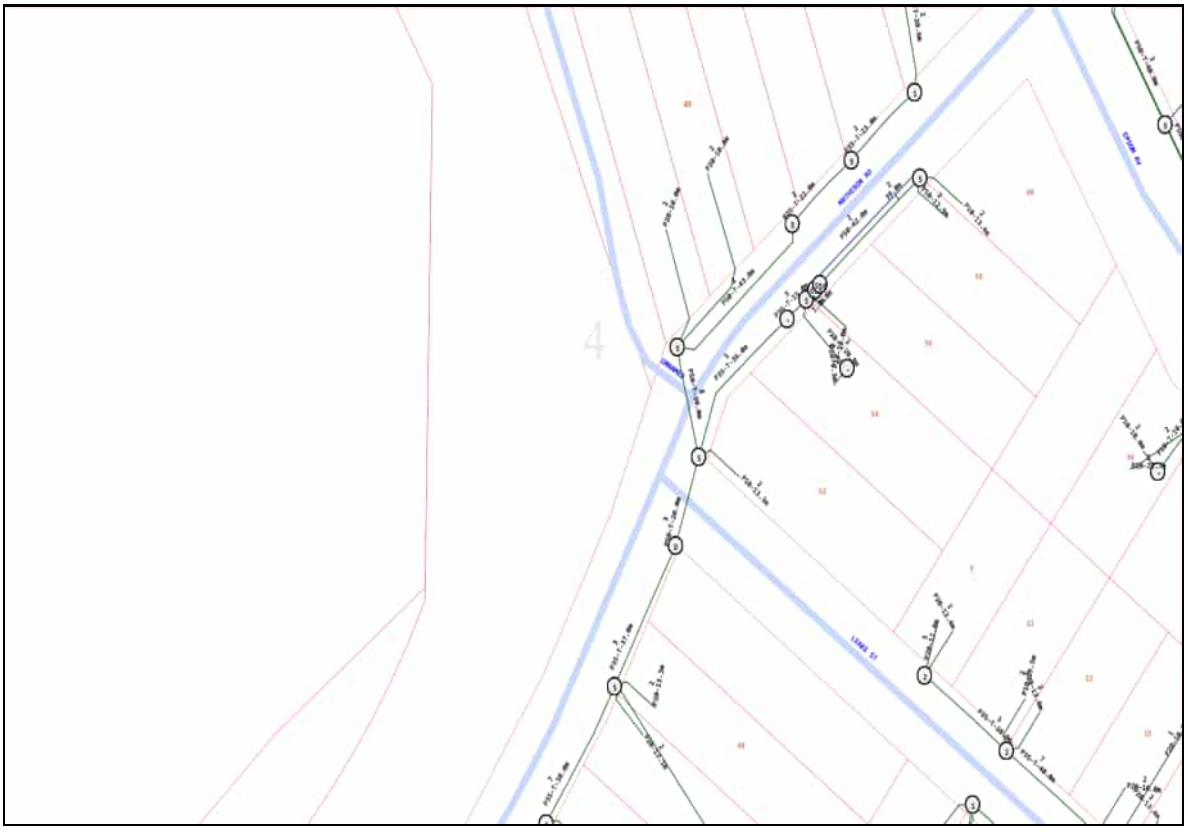


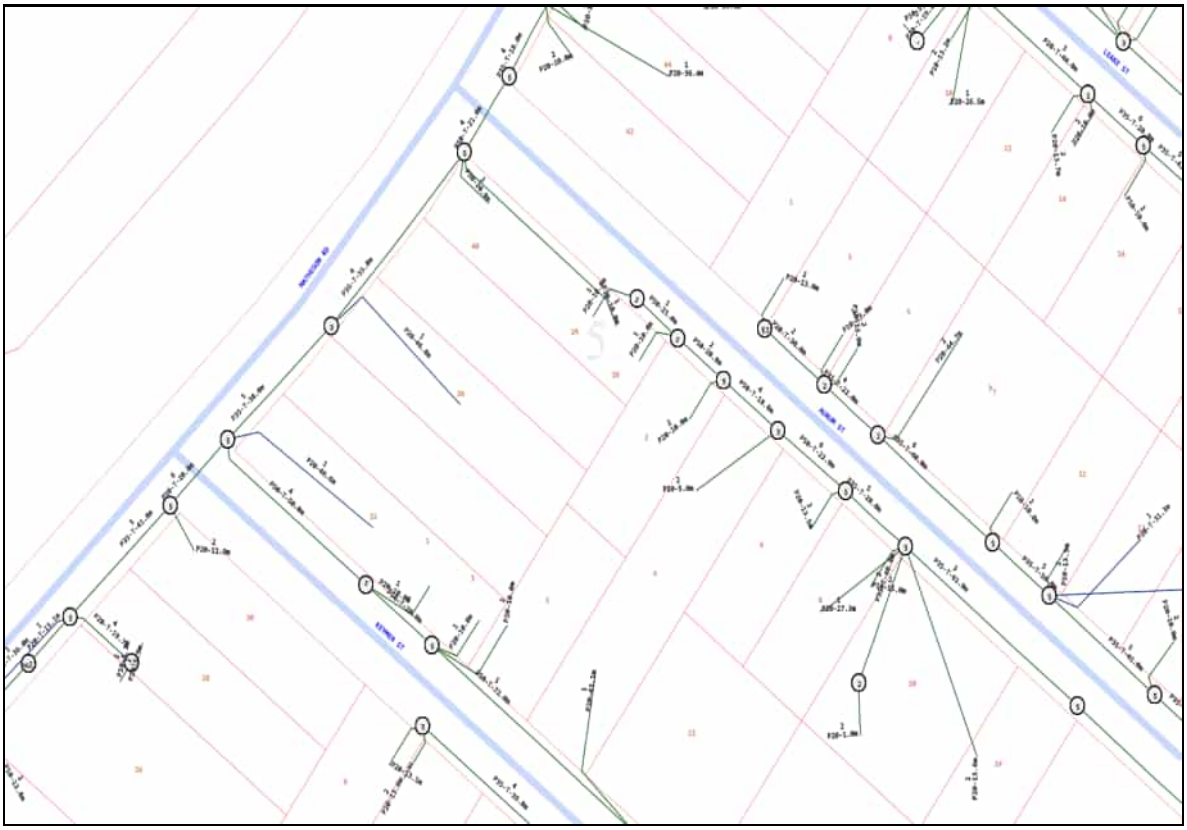
IF UNSURE, PLEASE CONTACT ATCO ON **1300 926 755**

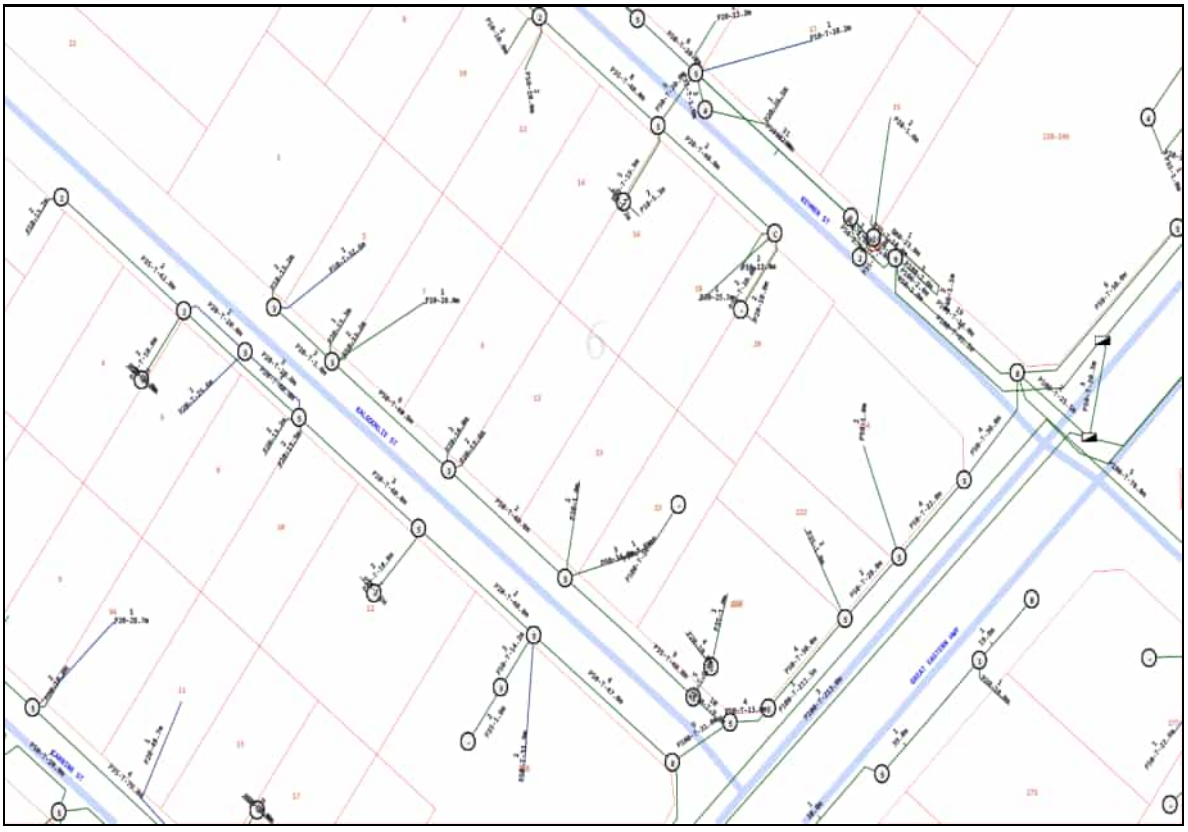






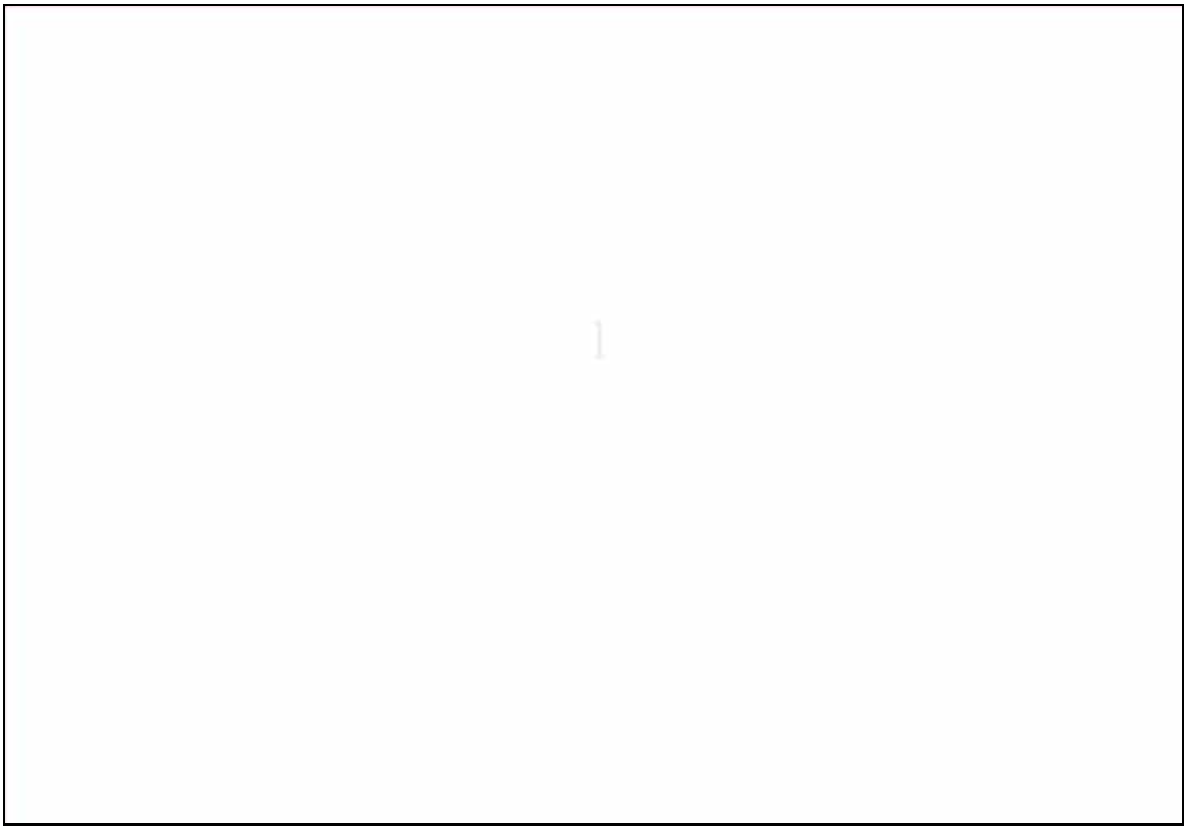


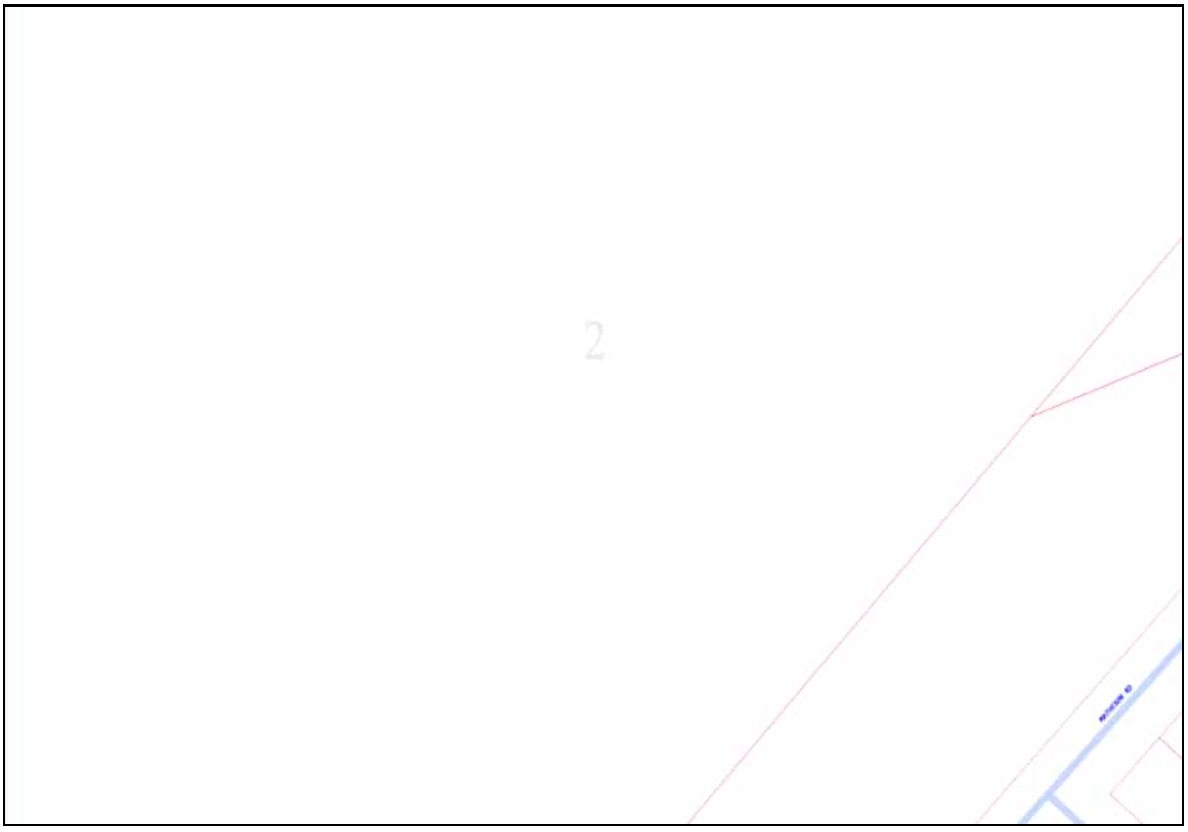


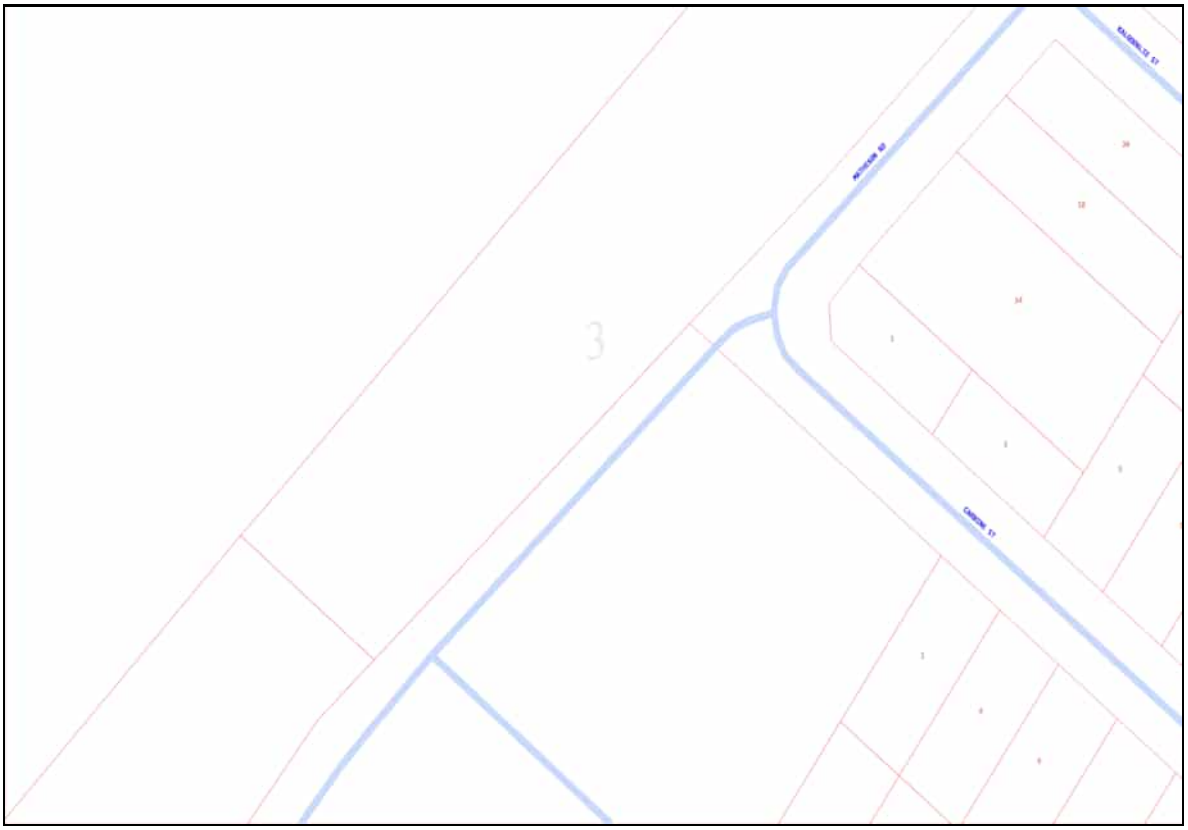


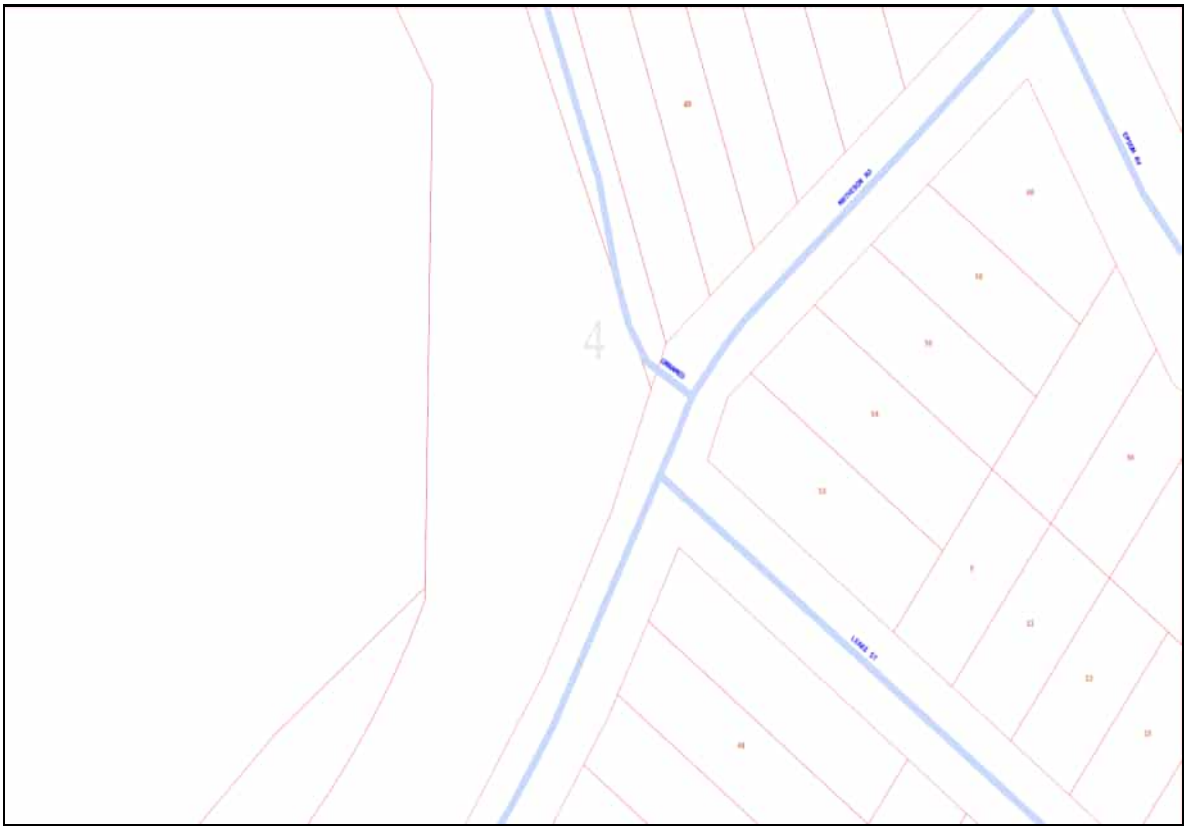
Emergency Contacts

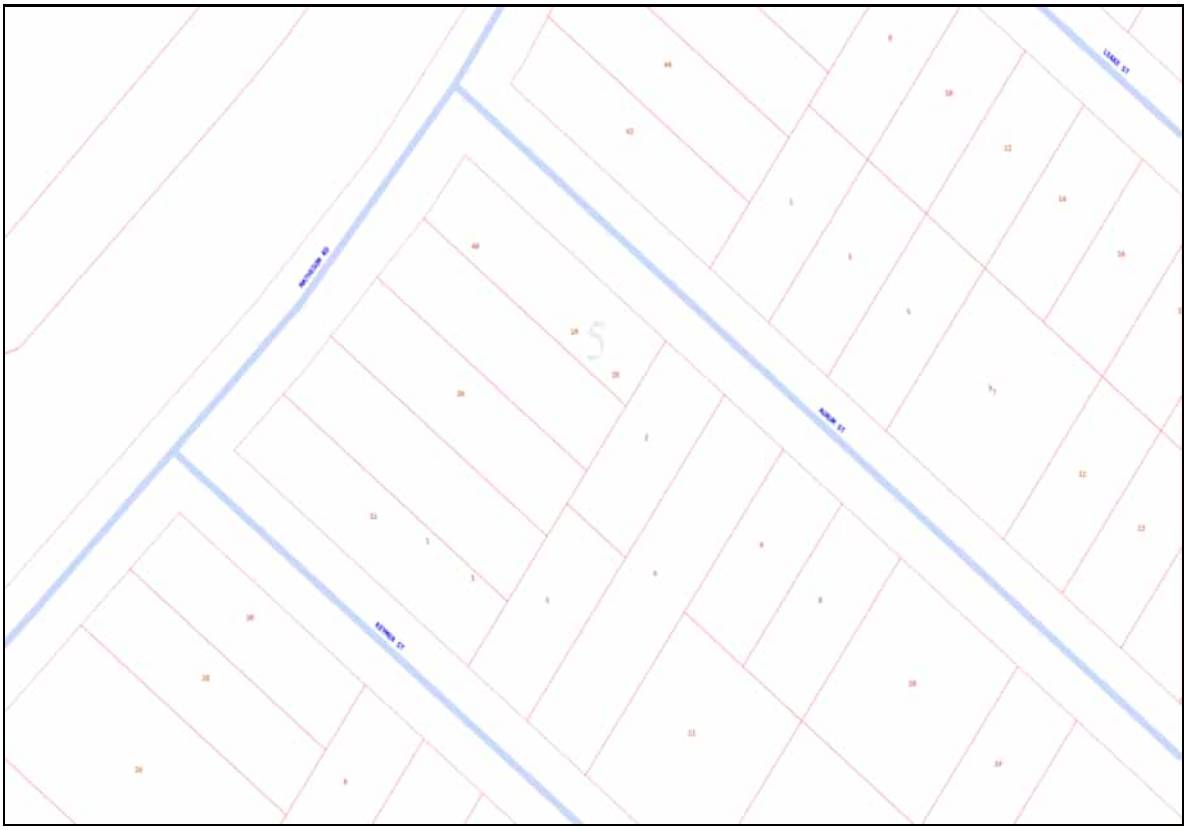
You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

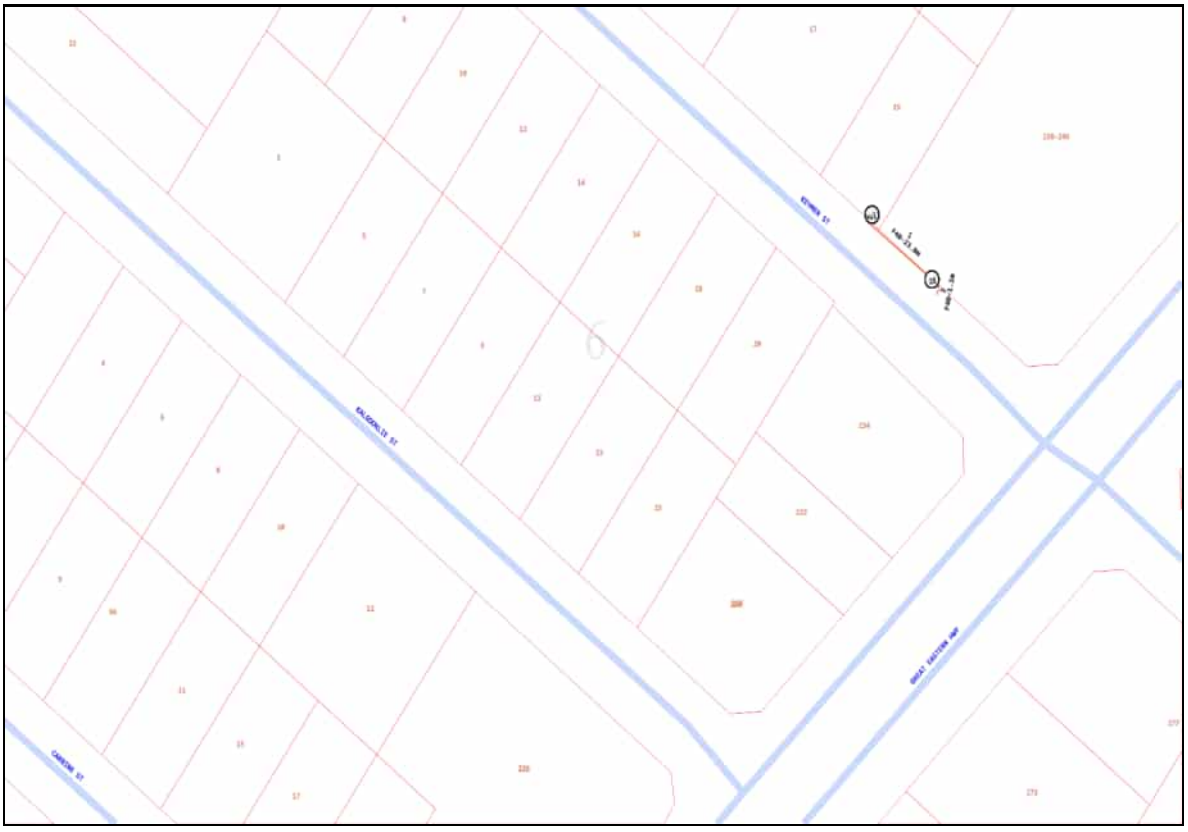








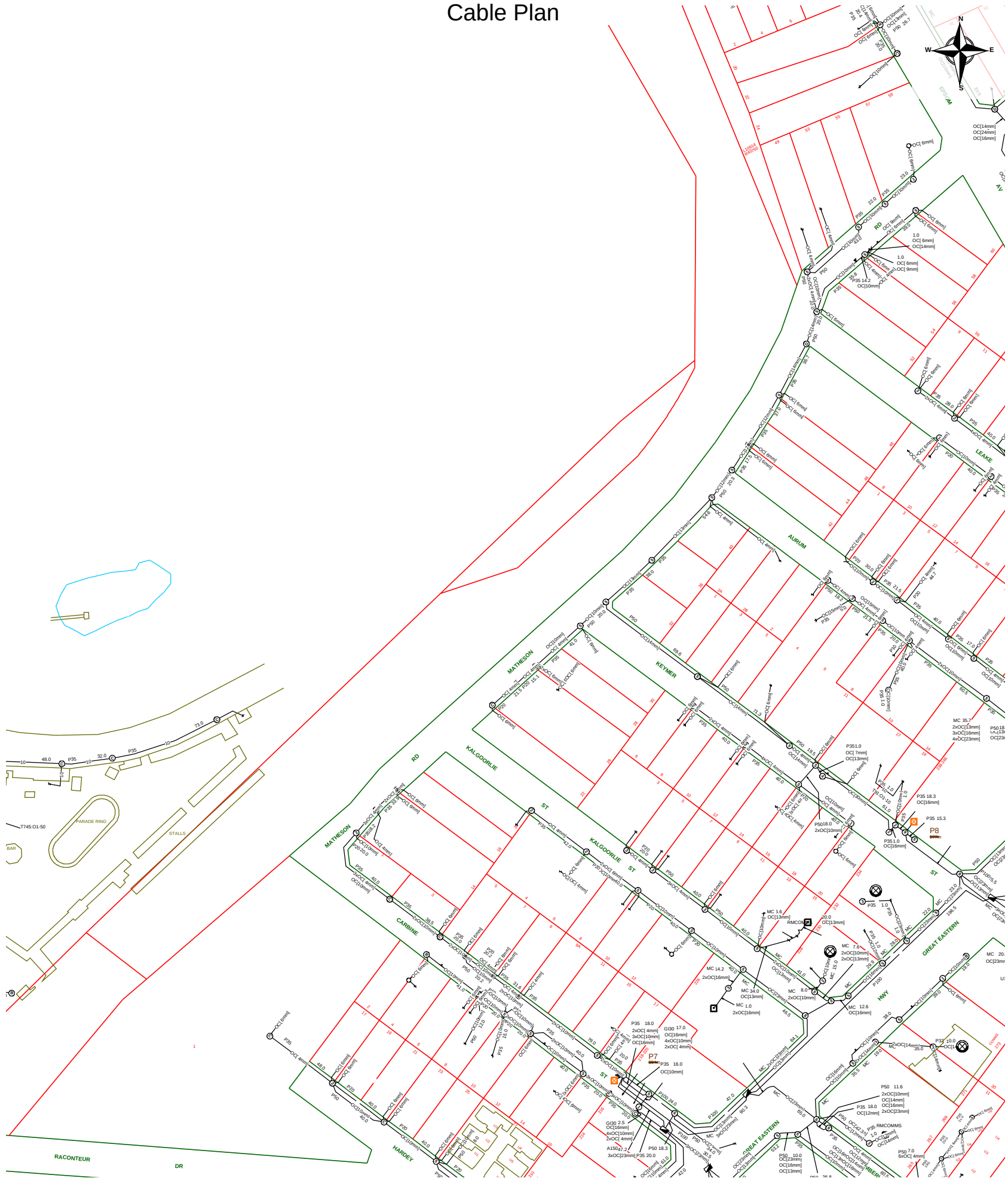




Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900639
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:09:59	

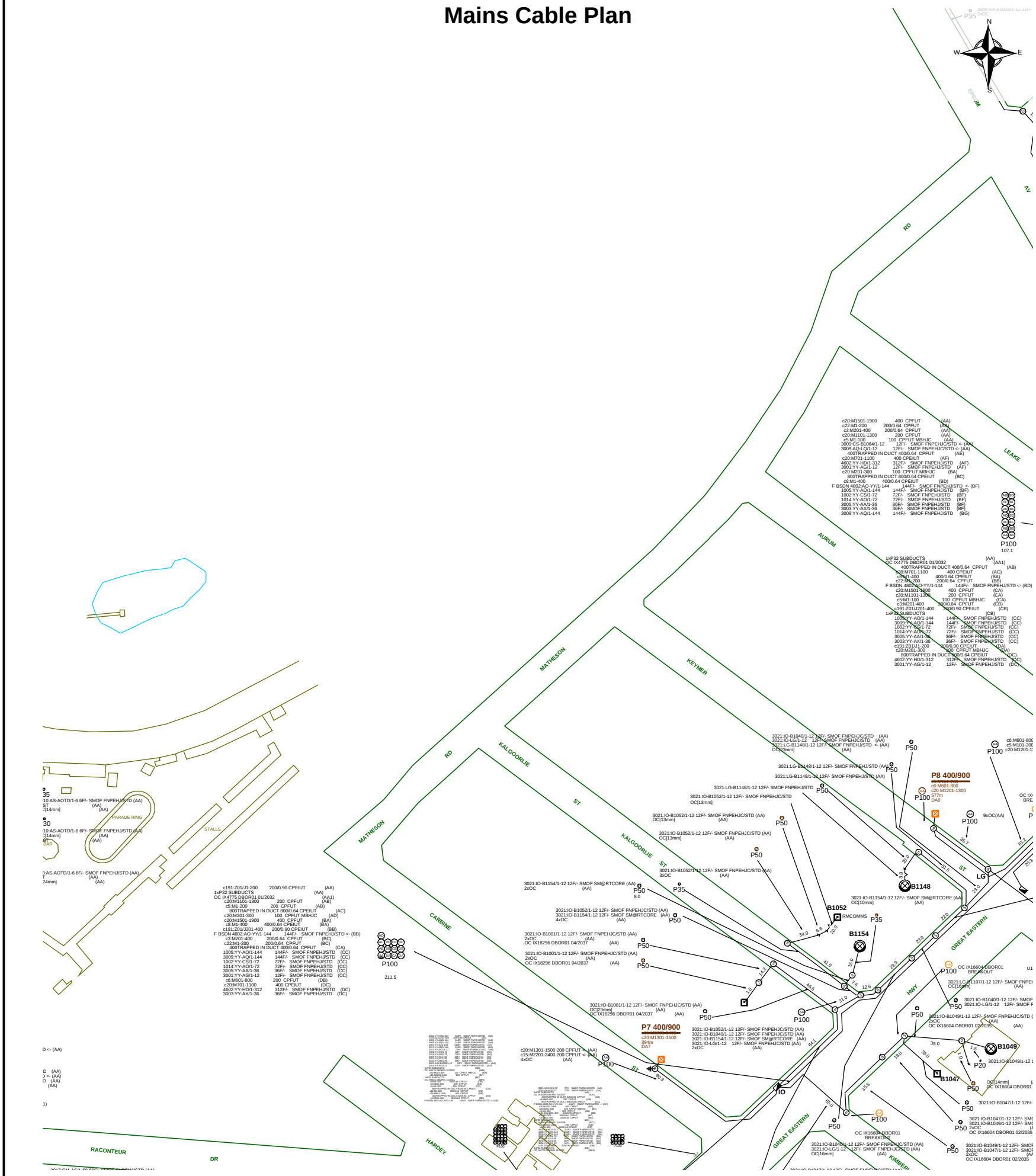
The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900639
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:10:01	

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WATER CORPORATION

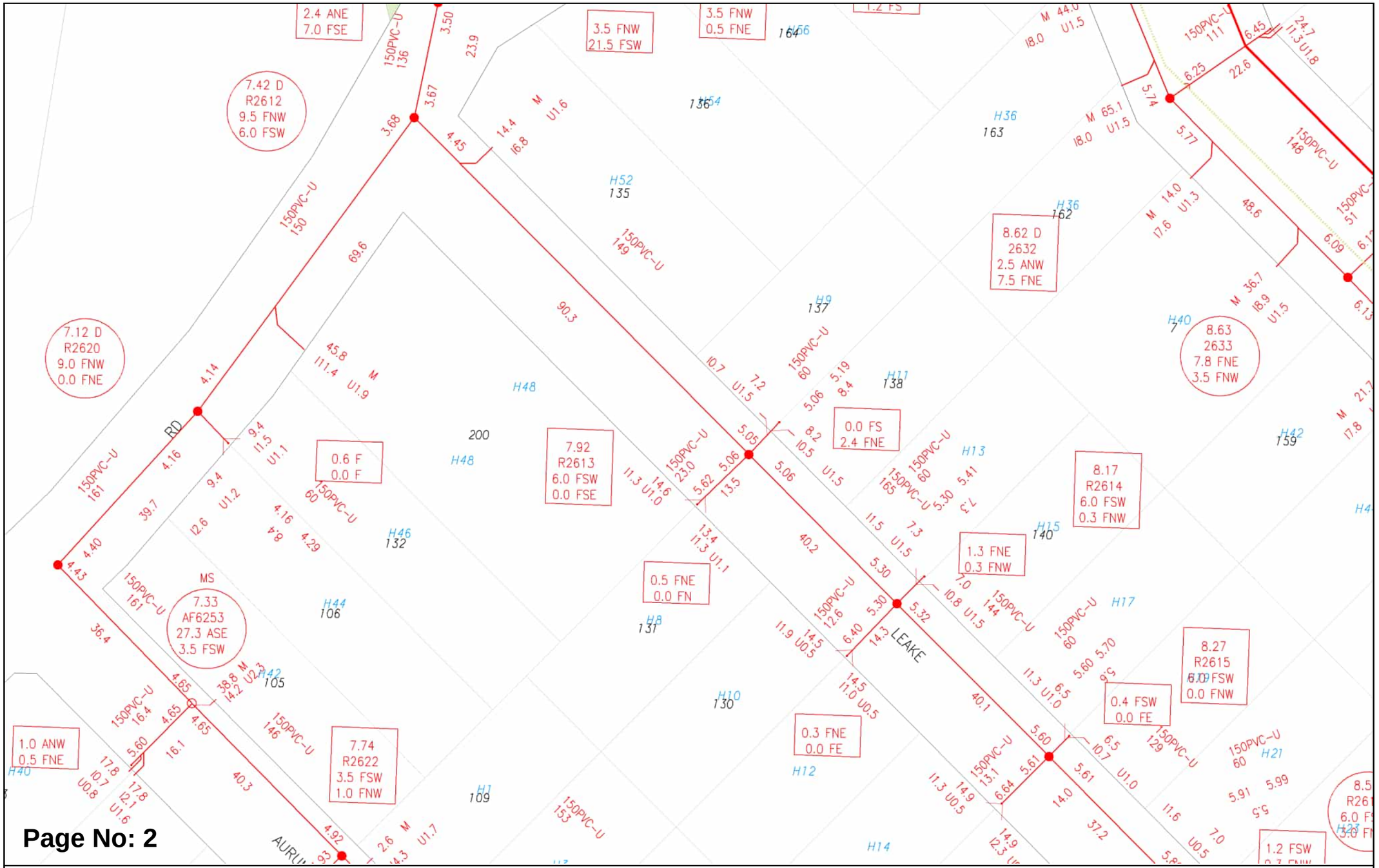
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Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024

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Sewer

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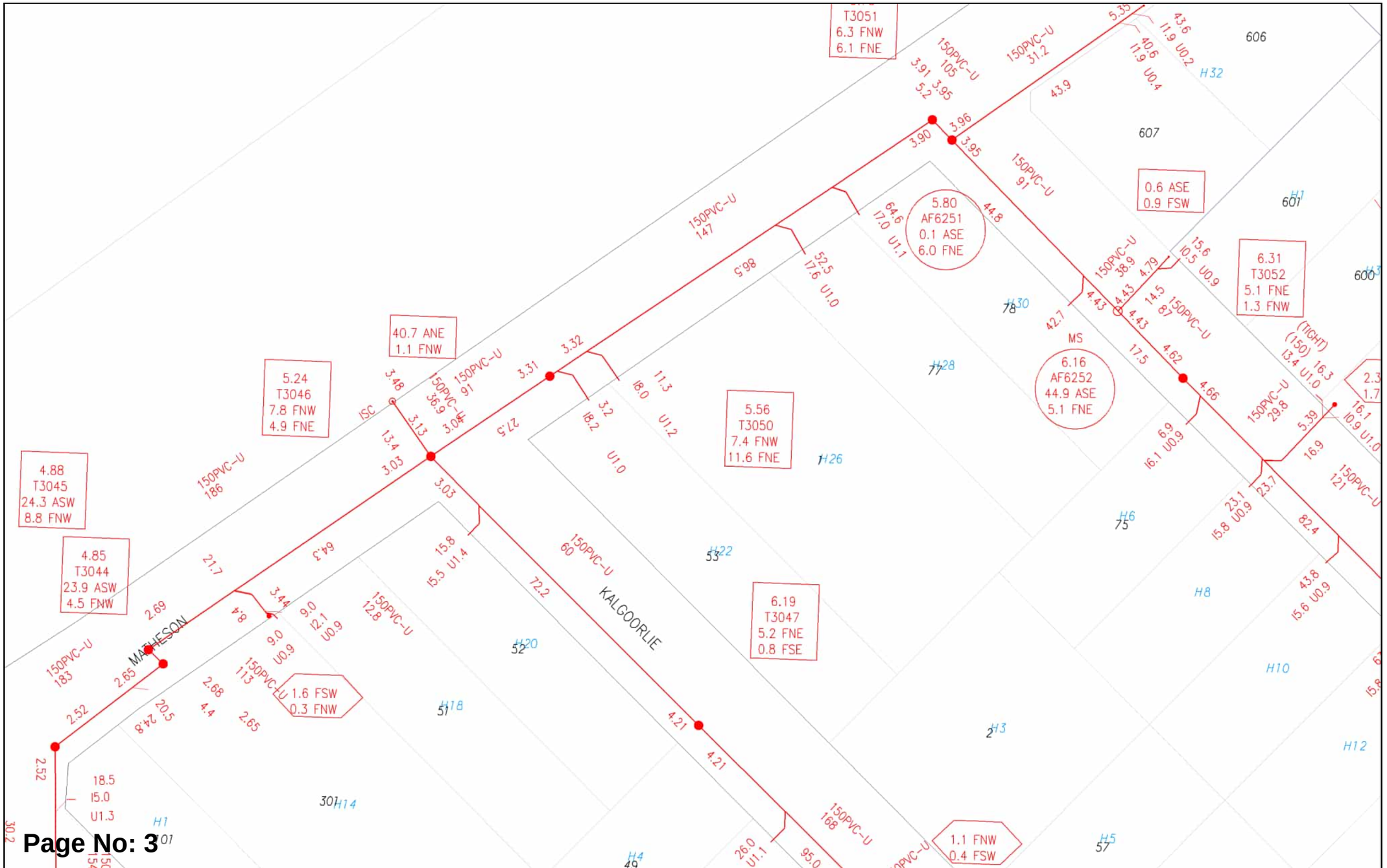

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2.0 FSE
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R2610
10.7 ANW
4.5 FSW
7.57 D
R2611
7.86 D
R2628
7.6 ASW
7.0 FSE
8.16
R2630
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10.7 FSW
1.8 AS
1.1 FE
8.10
R2629
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Page No: 1
WATER CORPORATION
Scale: 1:750
Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024
N
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Page No: 3

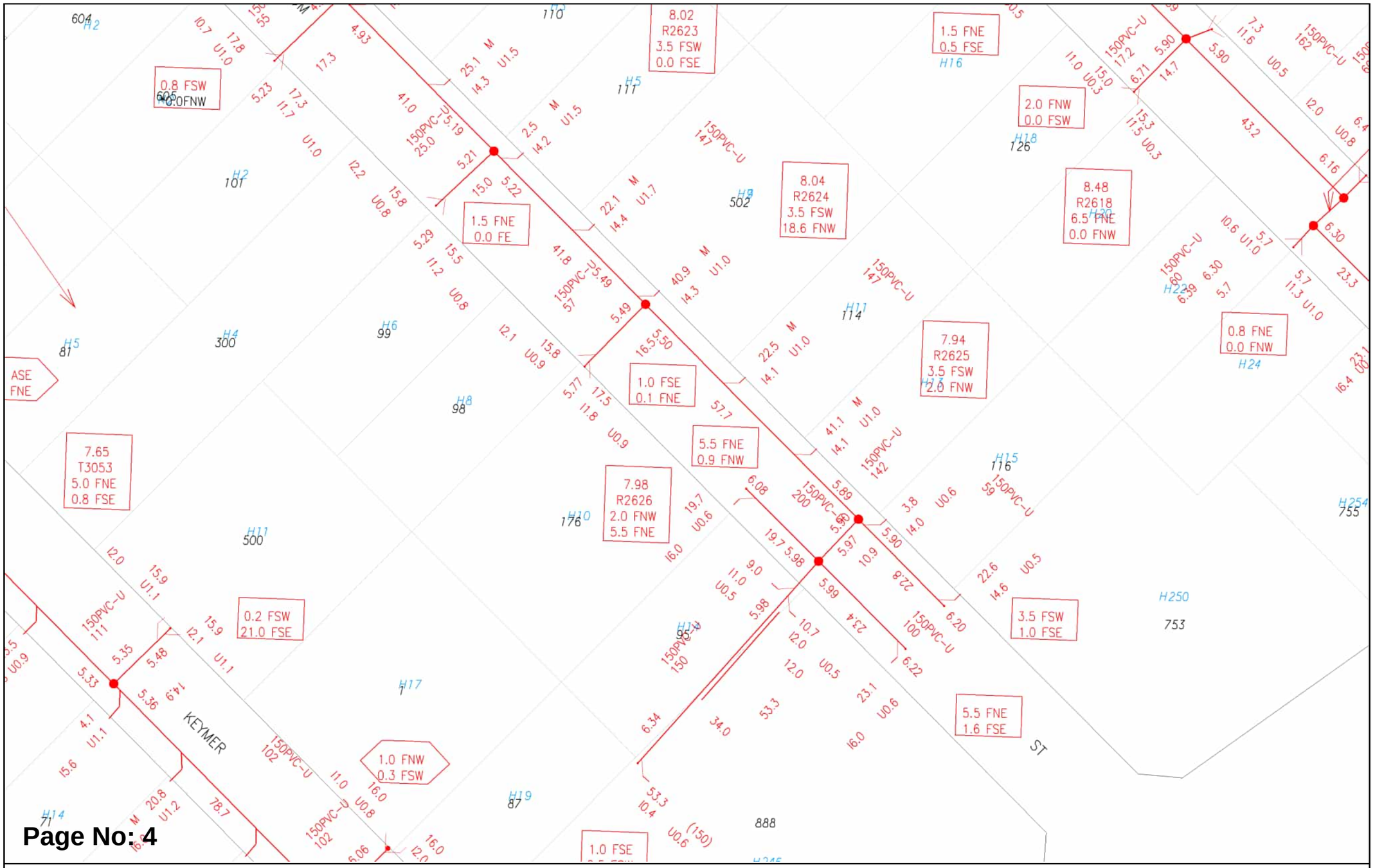
WATER CORPORATION

Scale:	1:750
Job No.:	36962248
Sequence No.:	240900640
Print Date:	21 Jun 2024

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Sewer

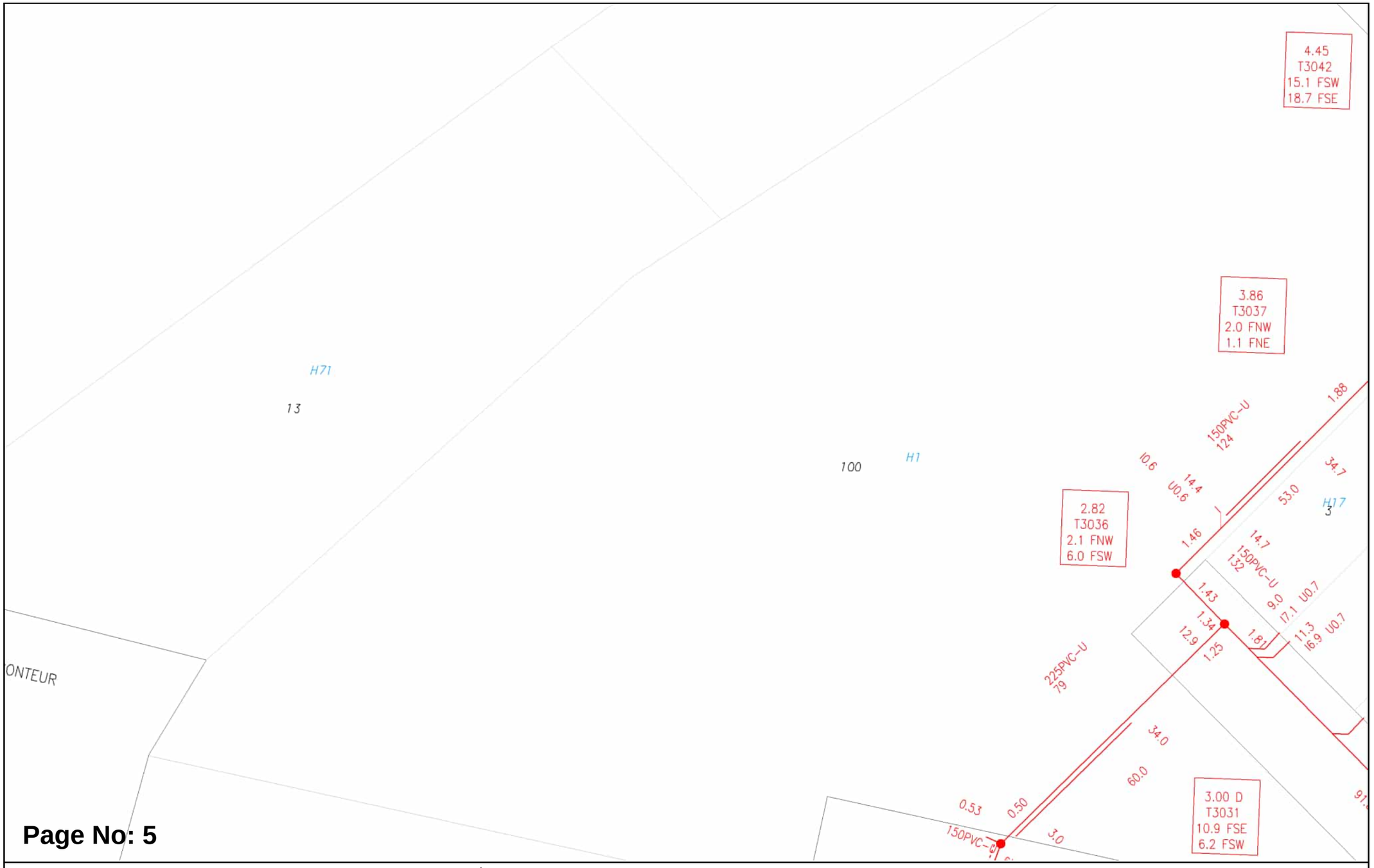
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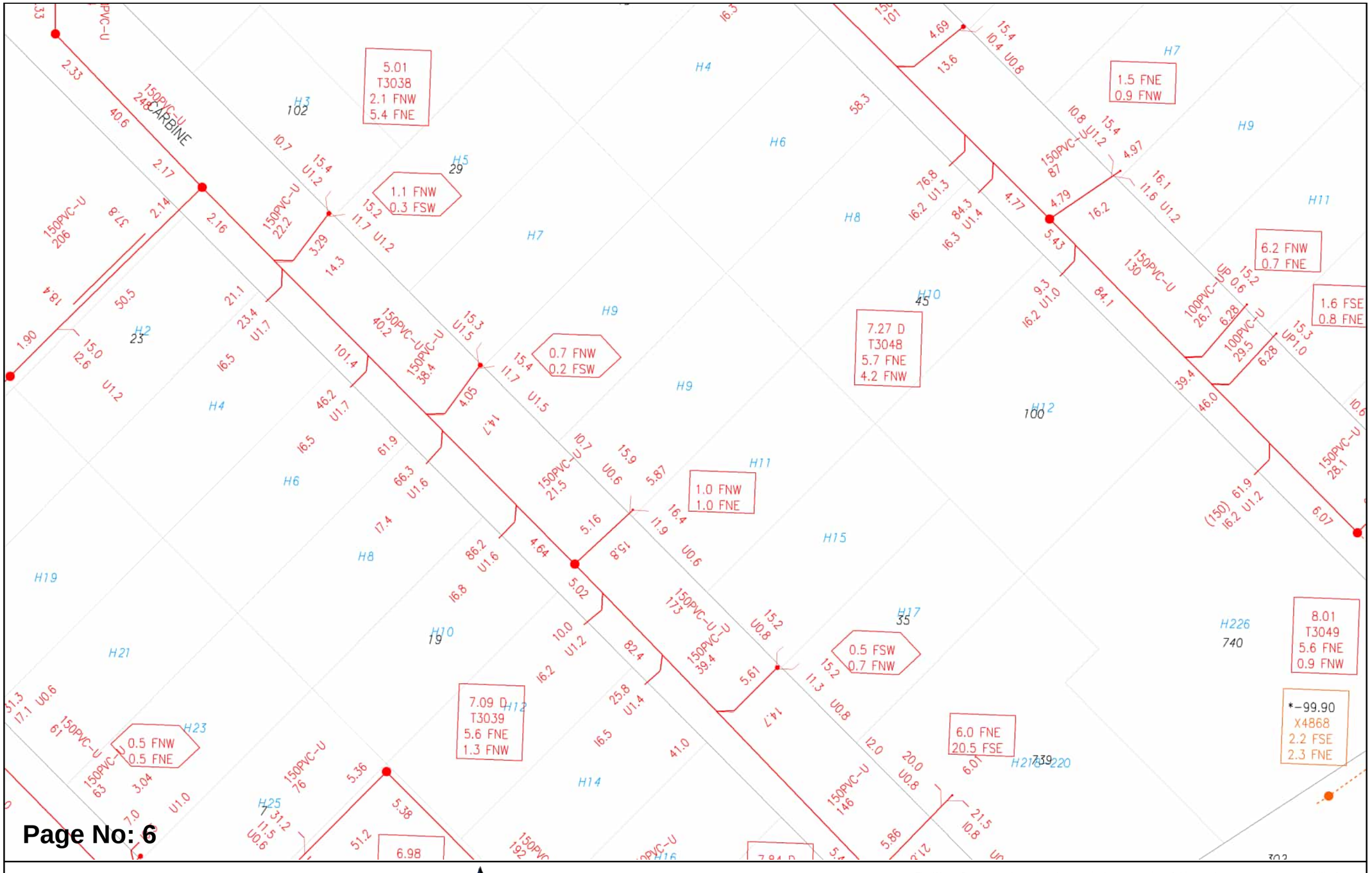
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Water Corp - Non-critical Plan.docx (21 May 2024)



Scale: 1:750
Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024

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WATER CORPORATION

Scale: 1:3075
Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024

N

Water

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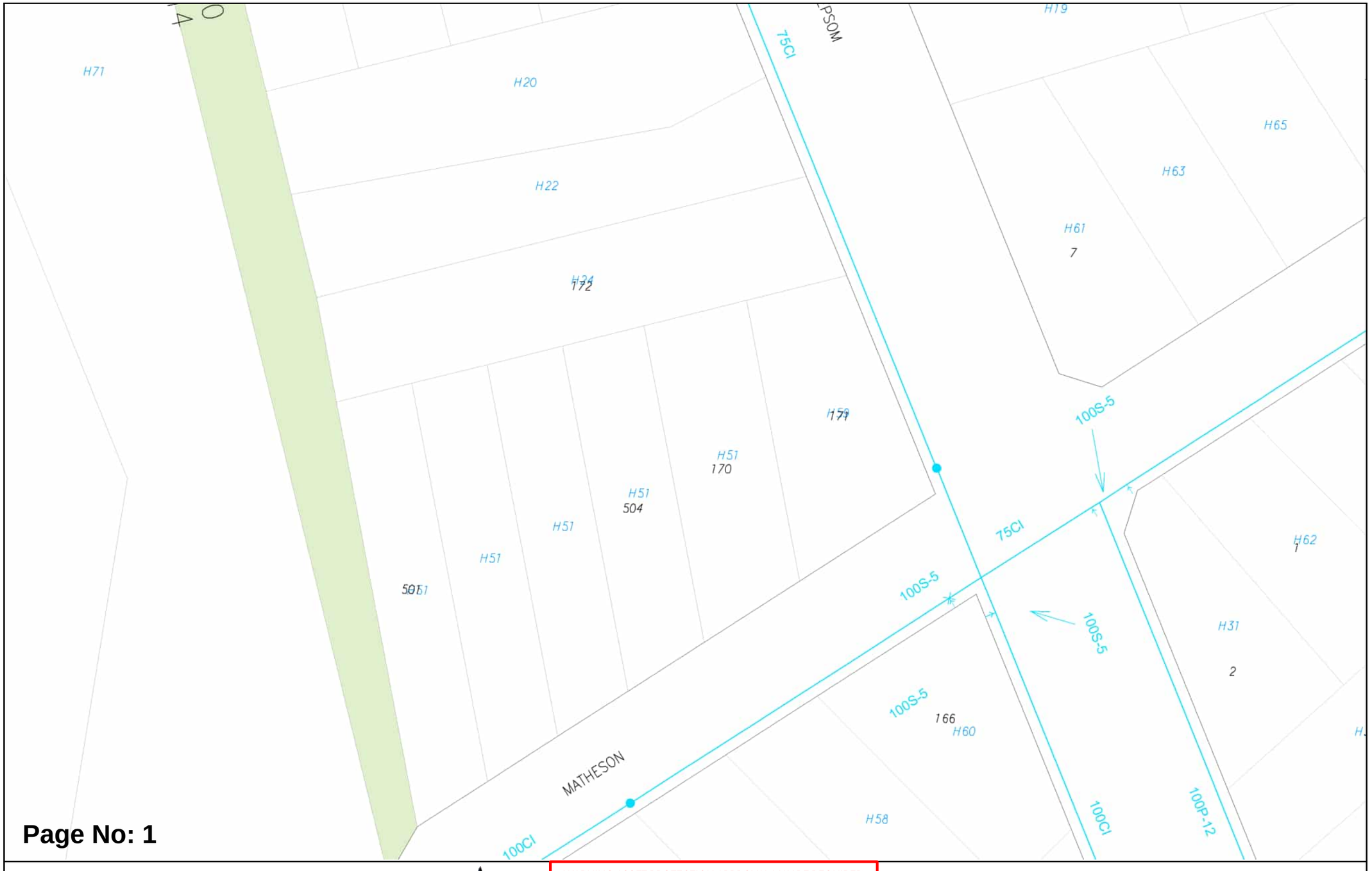
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Water Corp - Critical Plan.docx (21 May 2024)



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Water

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9002

Page No: 2

WATER CORPORATION

Scale: 1:750
Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024

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Water

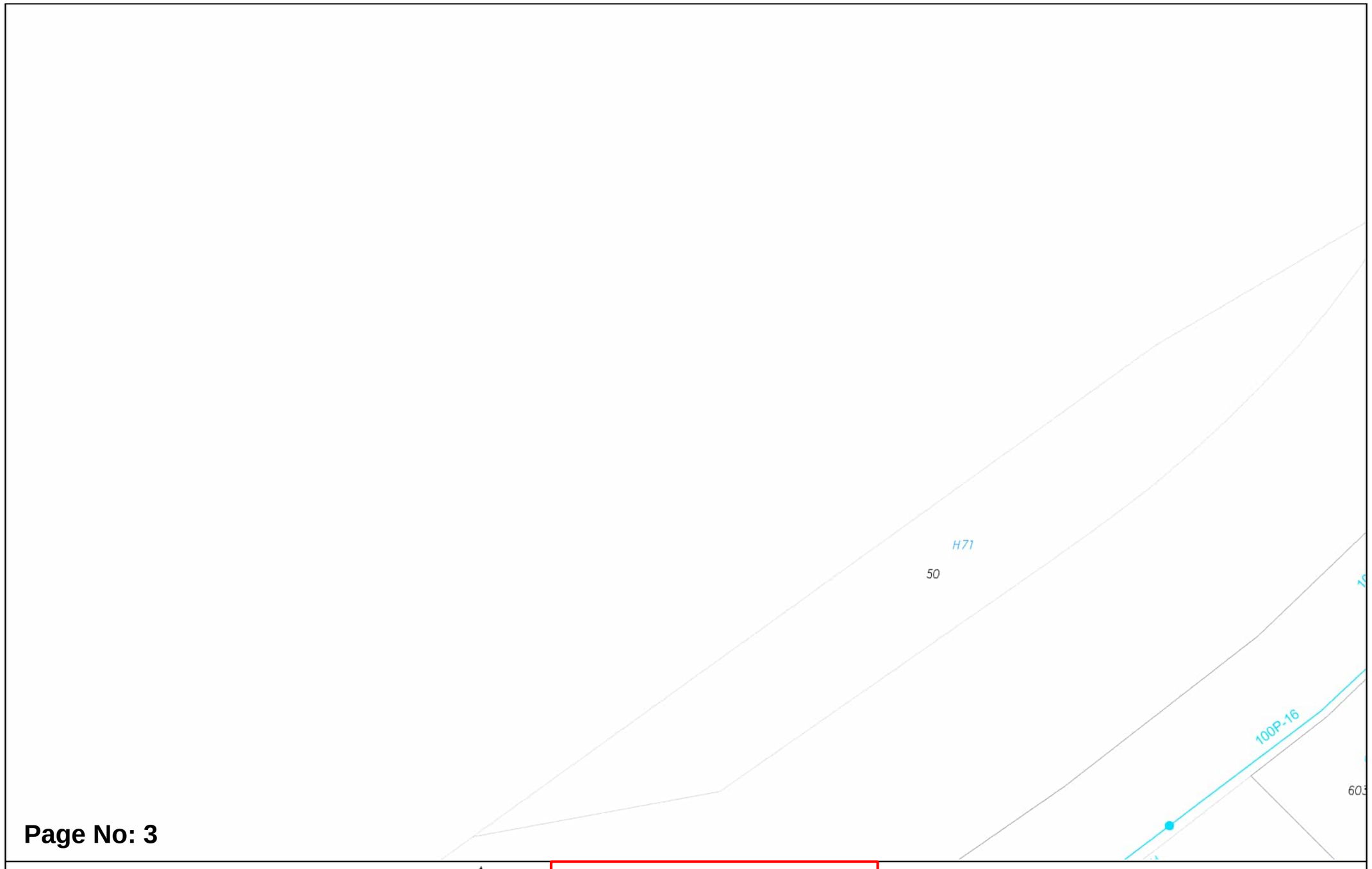
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WATER CORPORATION

Scale: 1:750
Job No.: 36962248
Sequence No.: 240900640
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Water

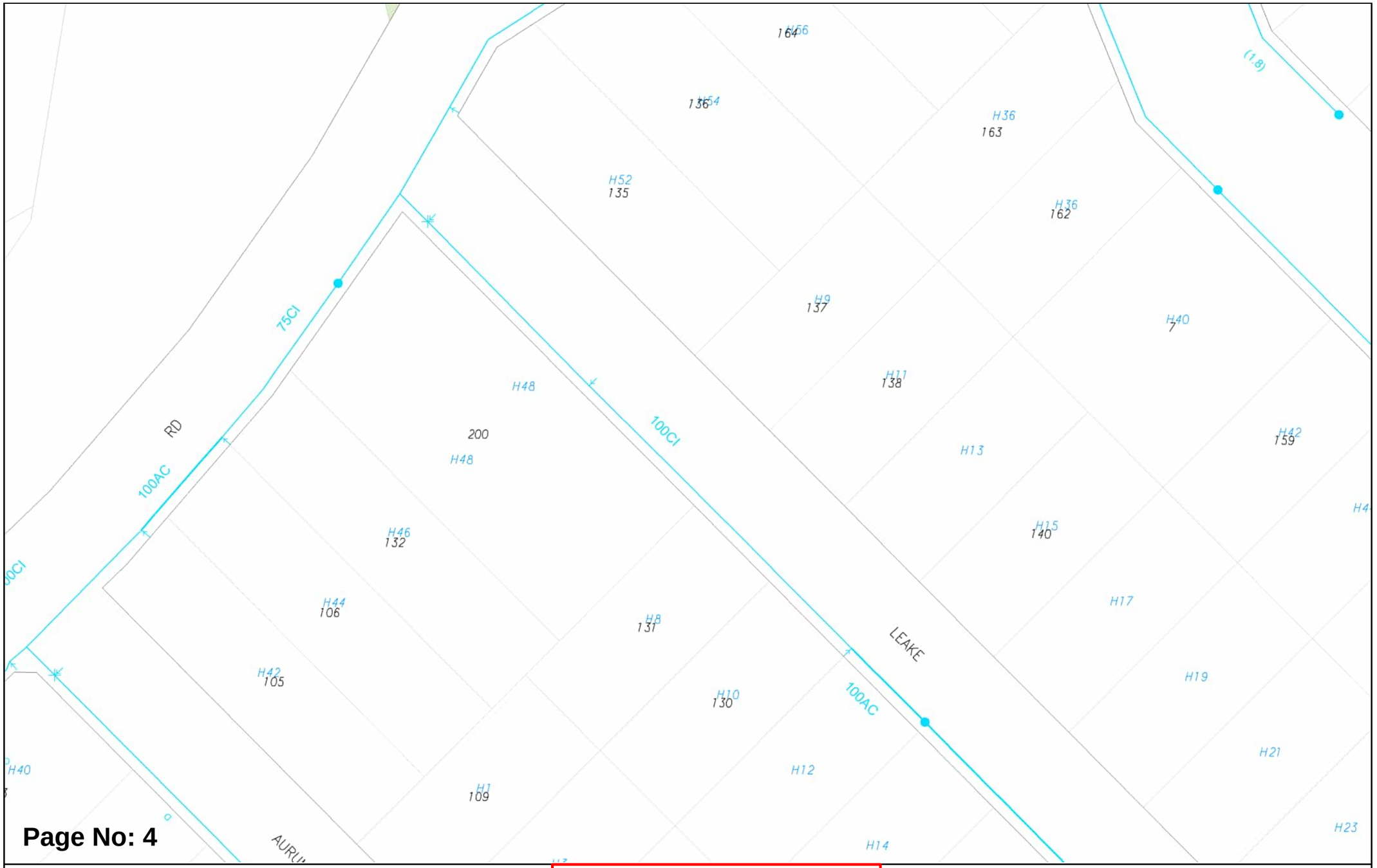
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Water

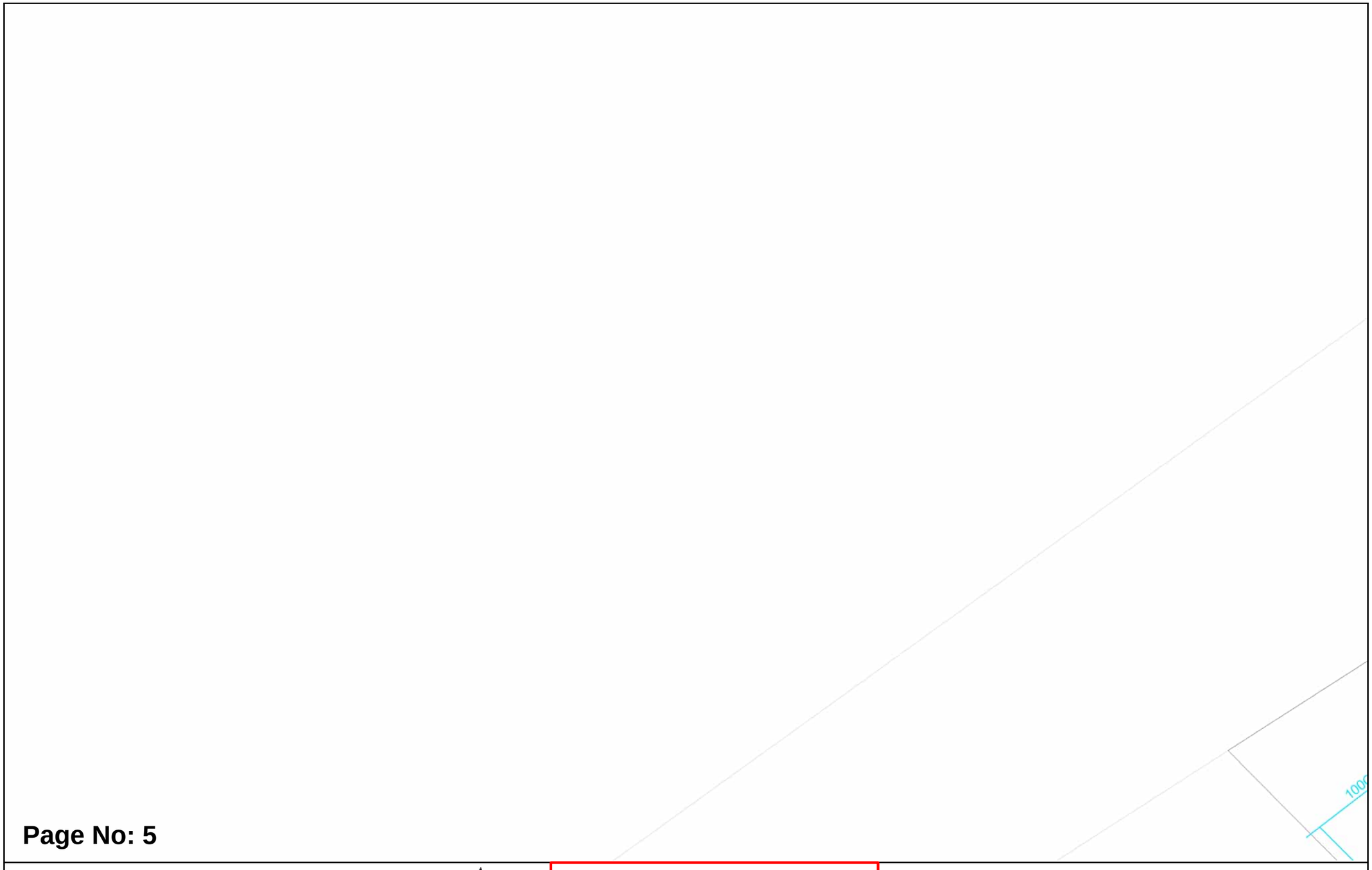
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Page No: 5

WATER CORPORATION

Scale: 1:750
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Water

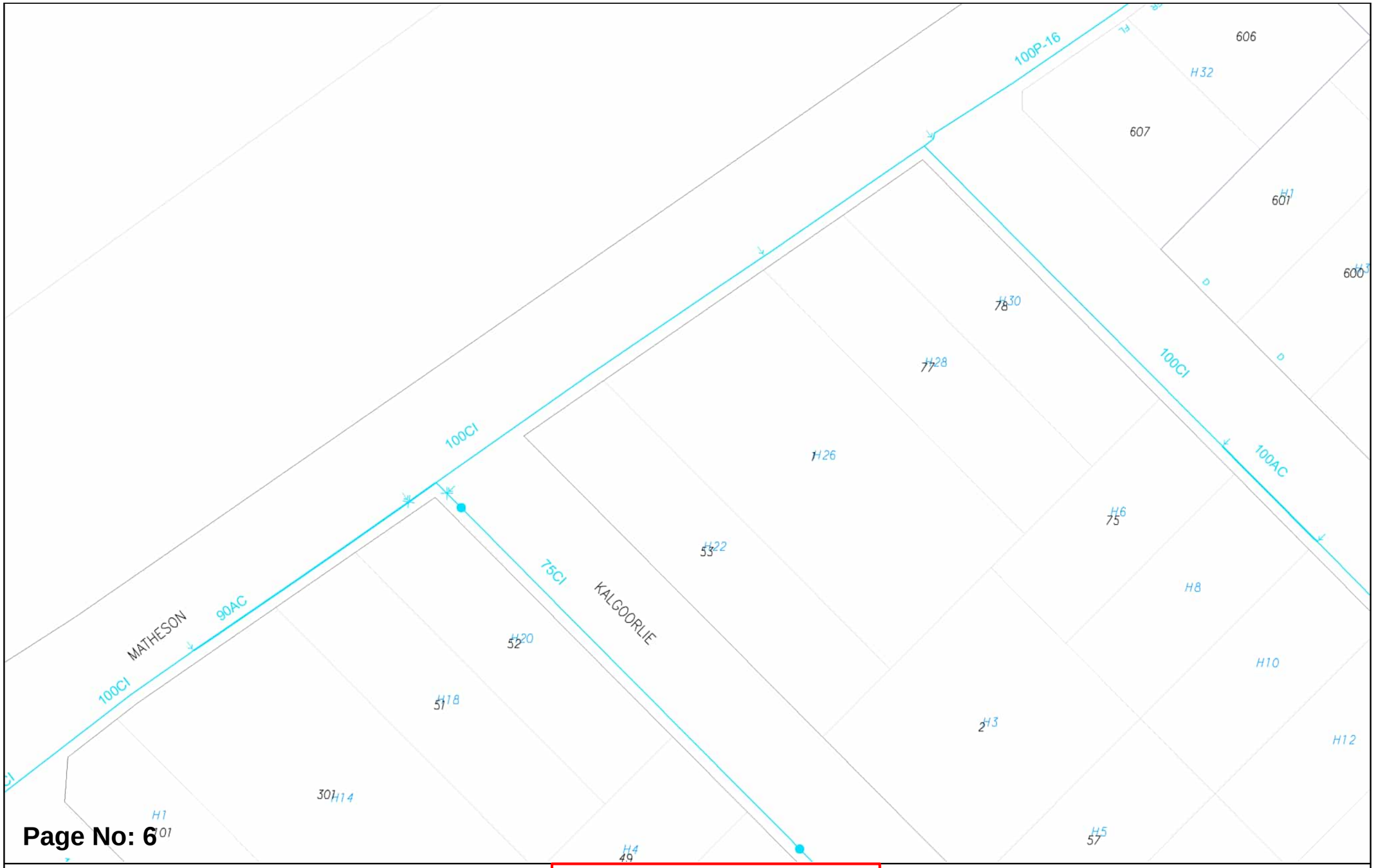
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WATER CORPORATION

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Water

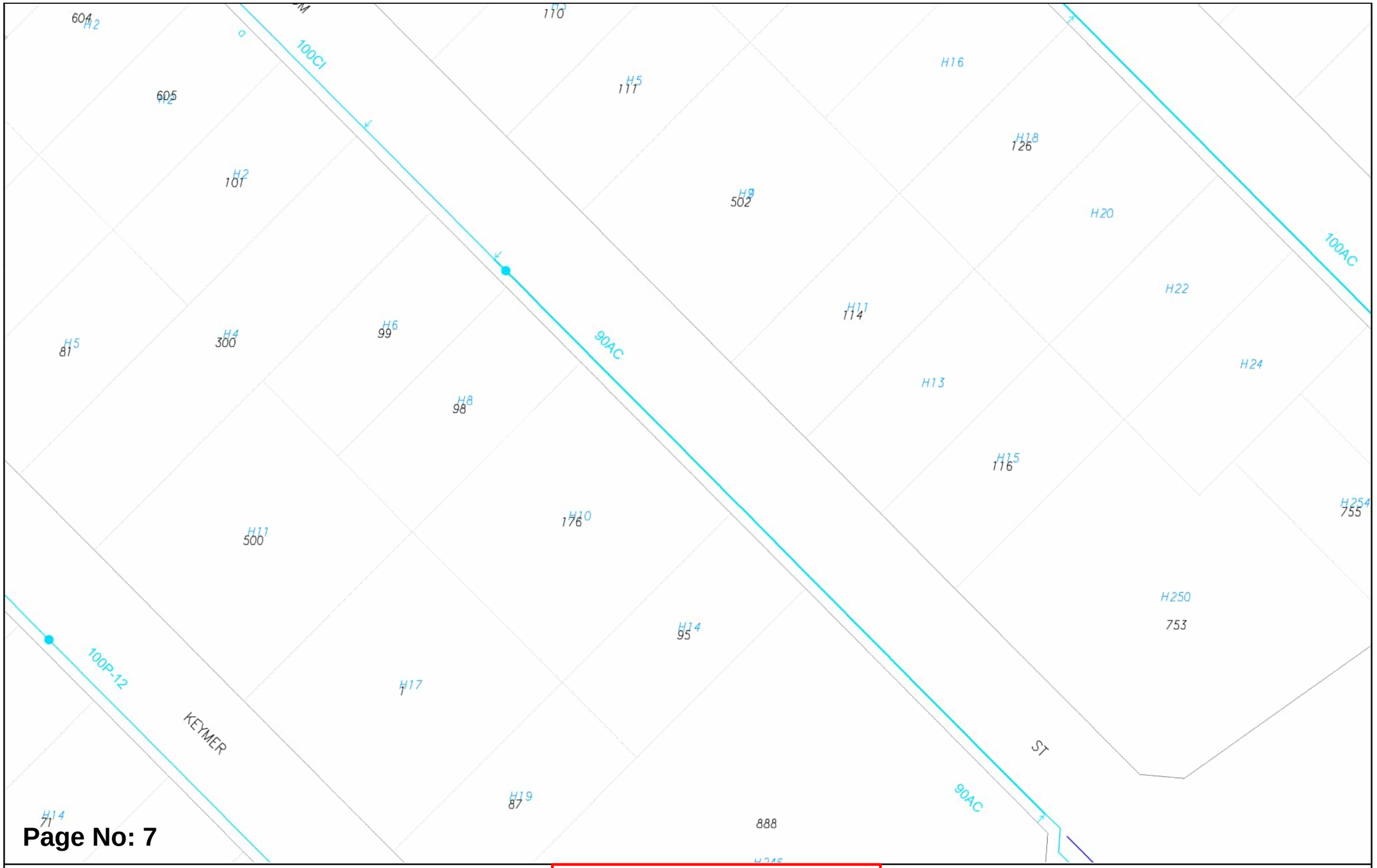
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Page No: 7

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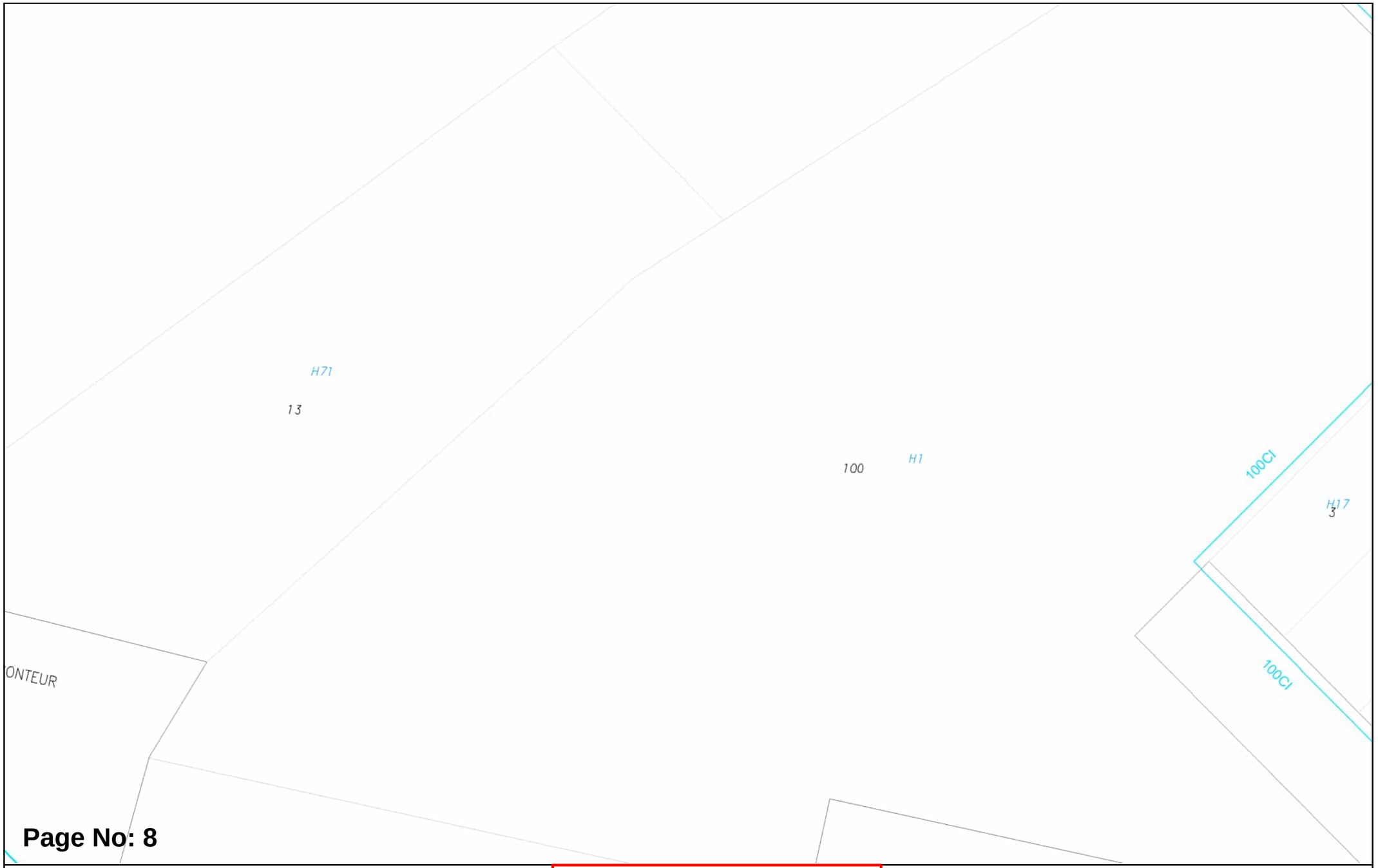
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WATER CORPORATION

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Water

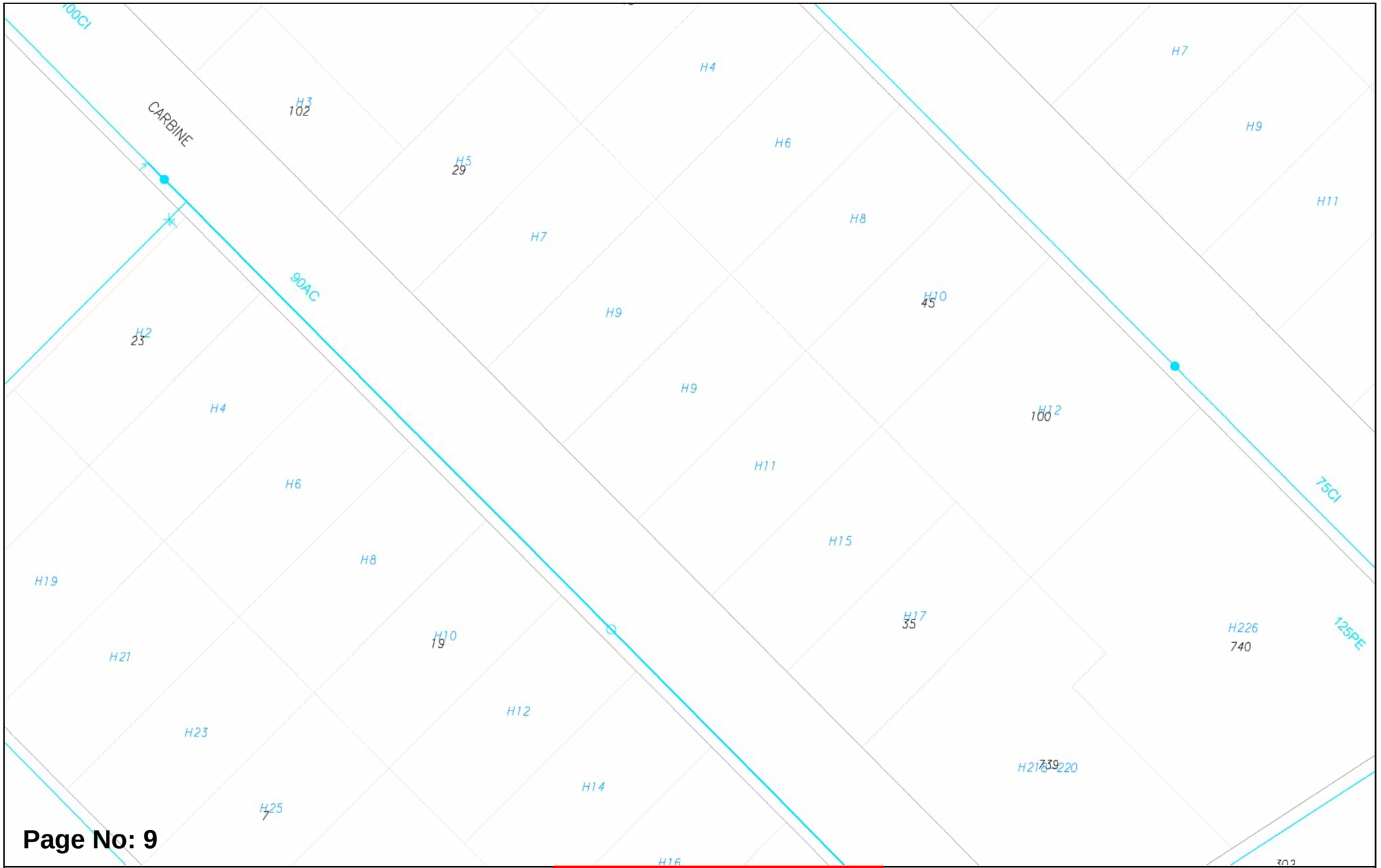
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Sequence No.: 240900640
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Water

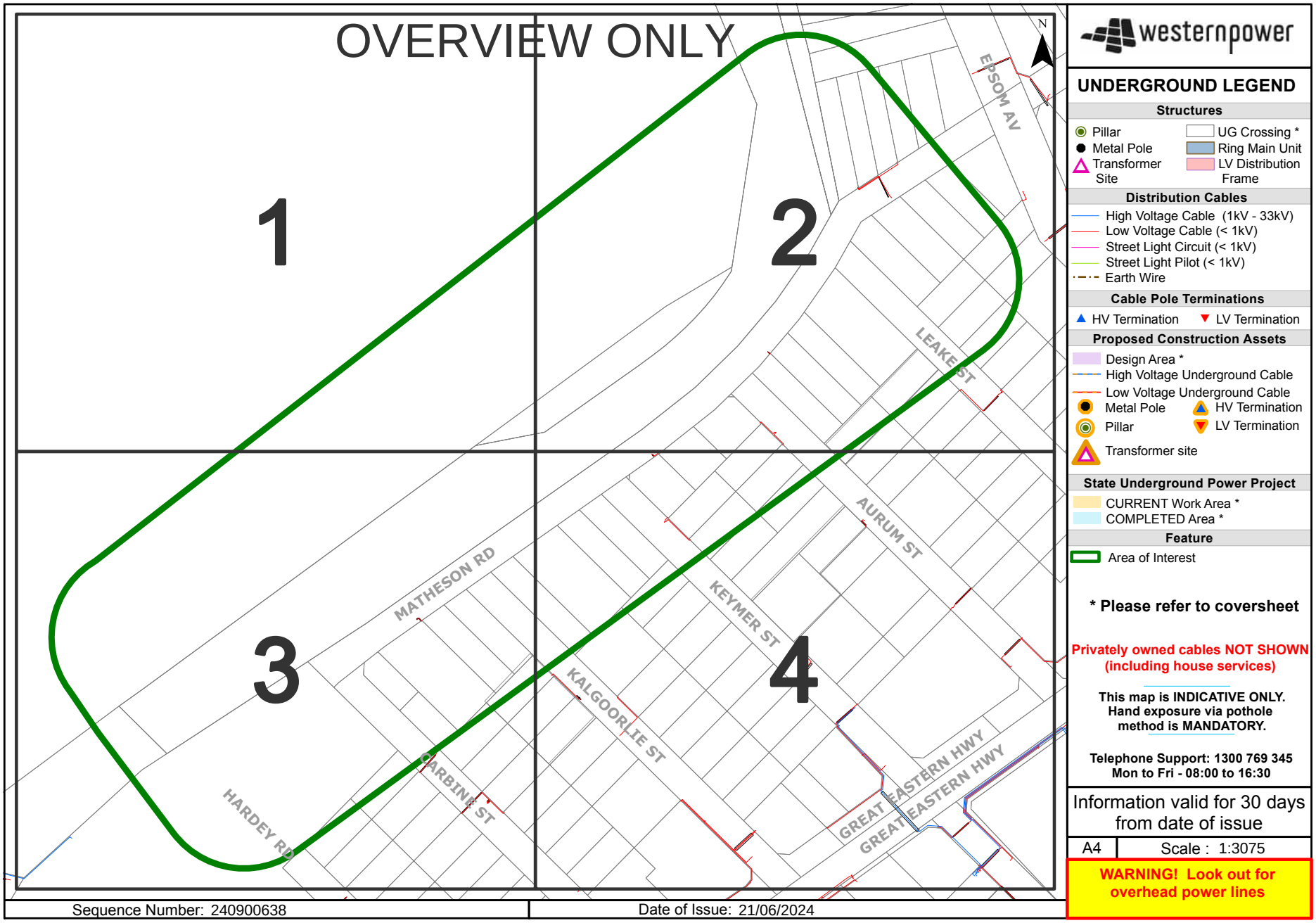
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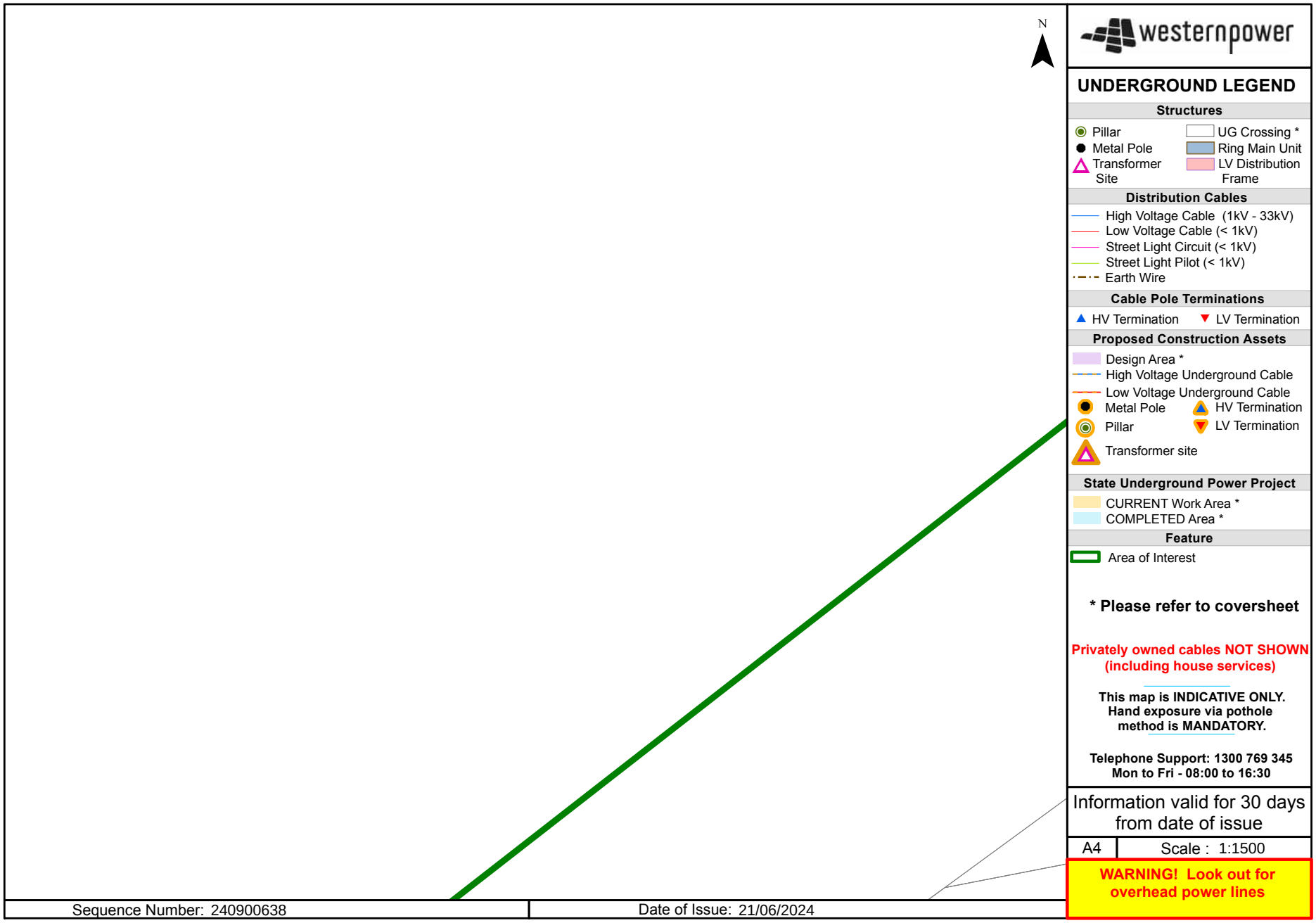
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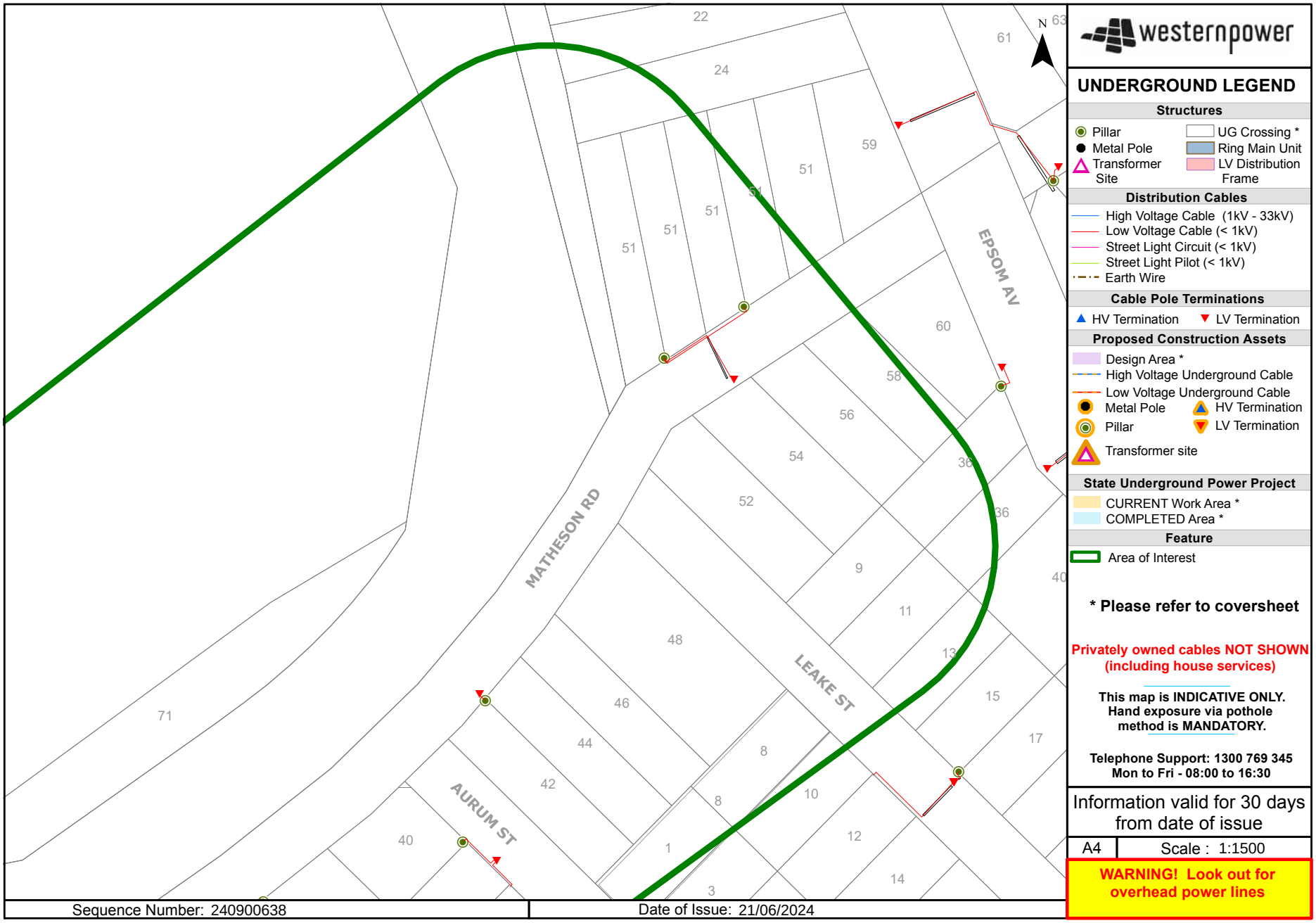
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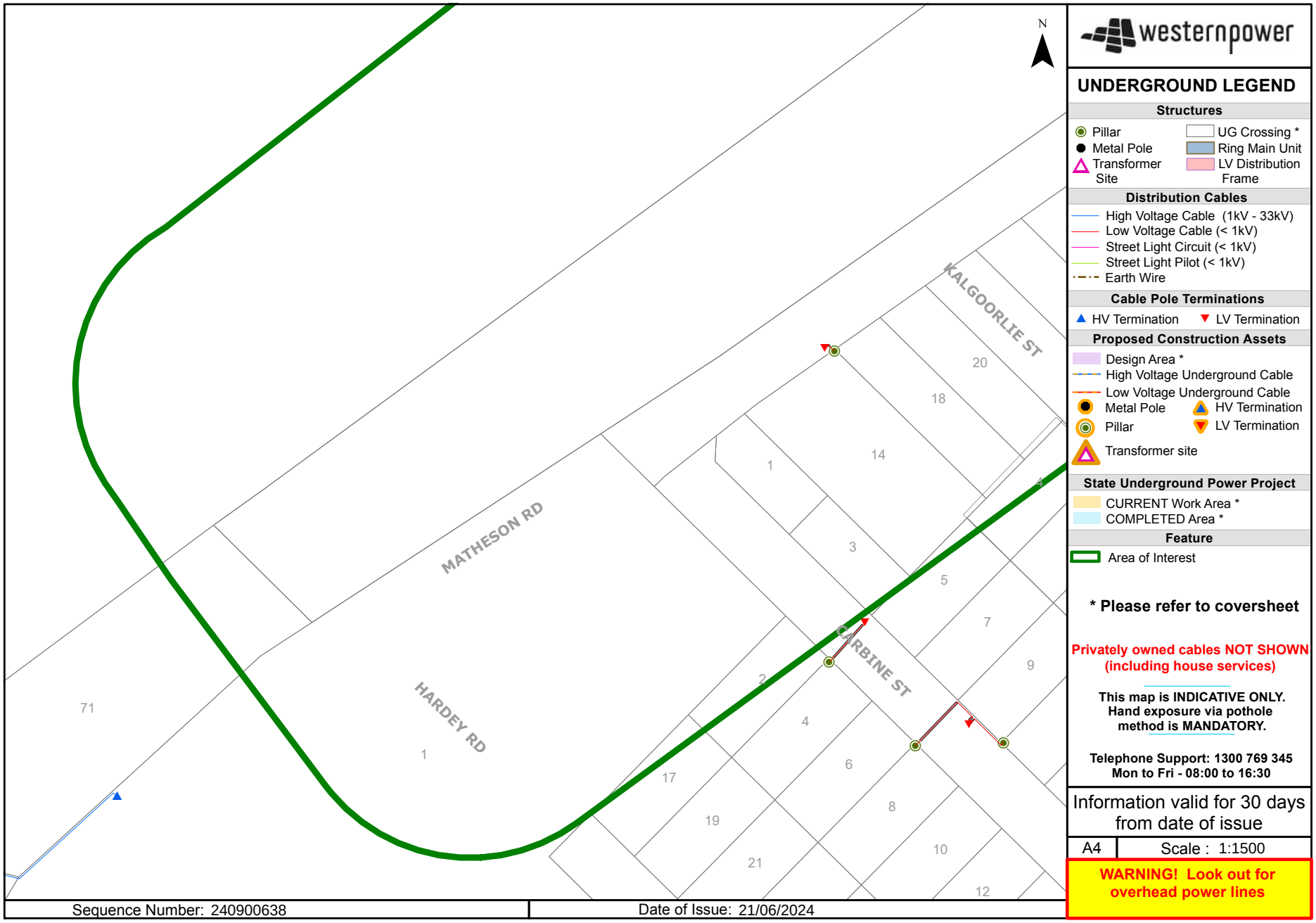
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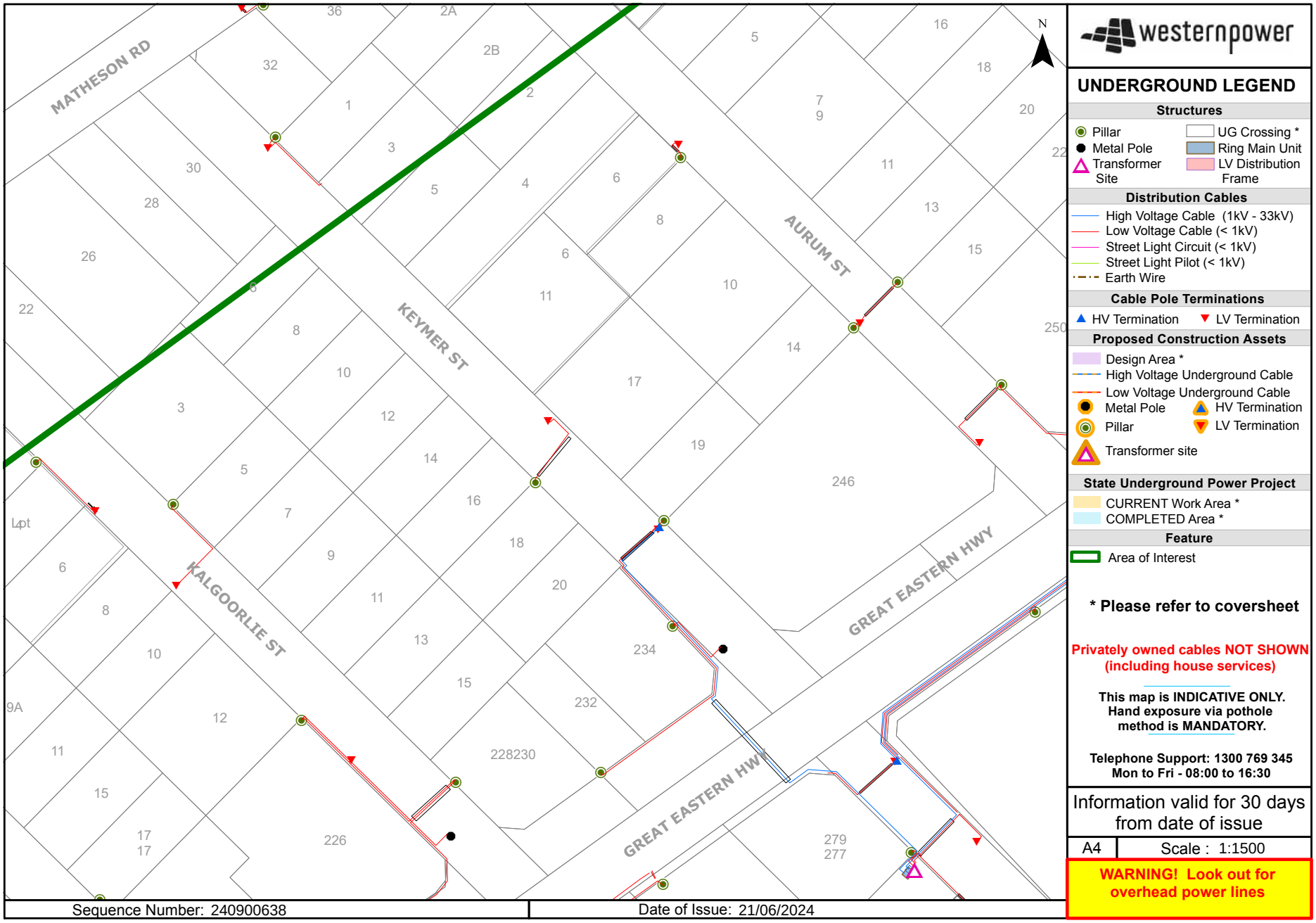
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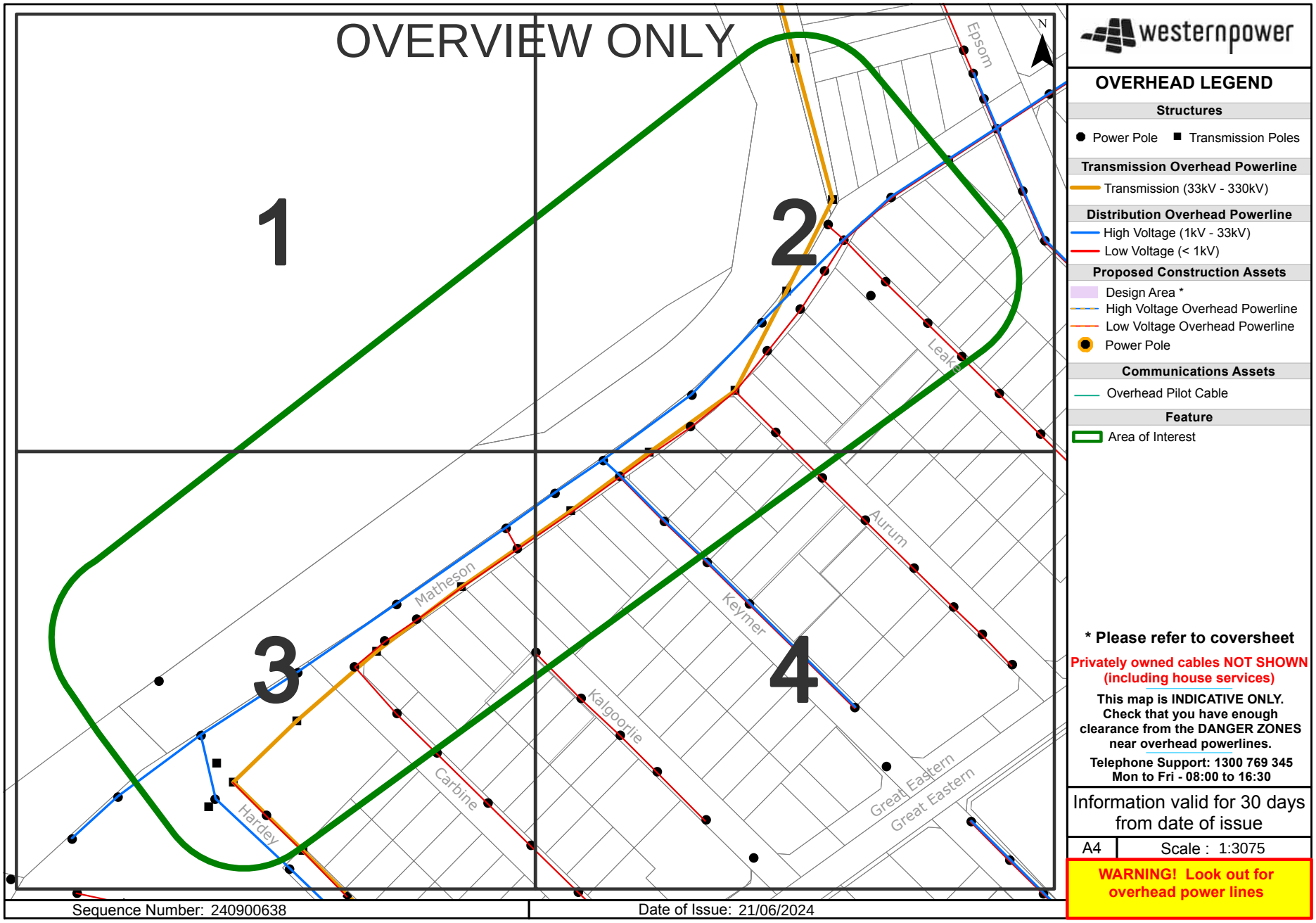

OVERVIEW ONLY
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EPSOM AV
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AURUM ST
KEYMER ST
MATHESON RD
KALGOORLIE ST
CARBINE ST
HARDEY RD
GREAT EASTERN HWY
GREAT EASTERN HWY
Sequence Number: 240900638
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
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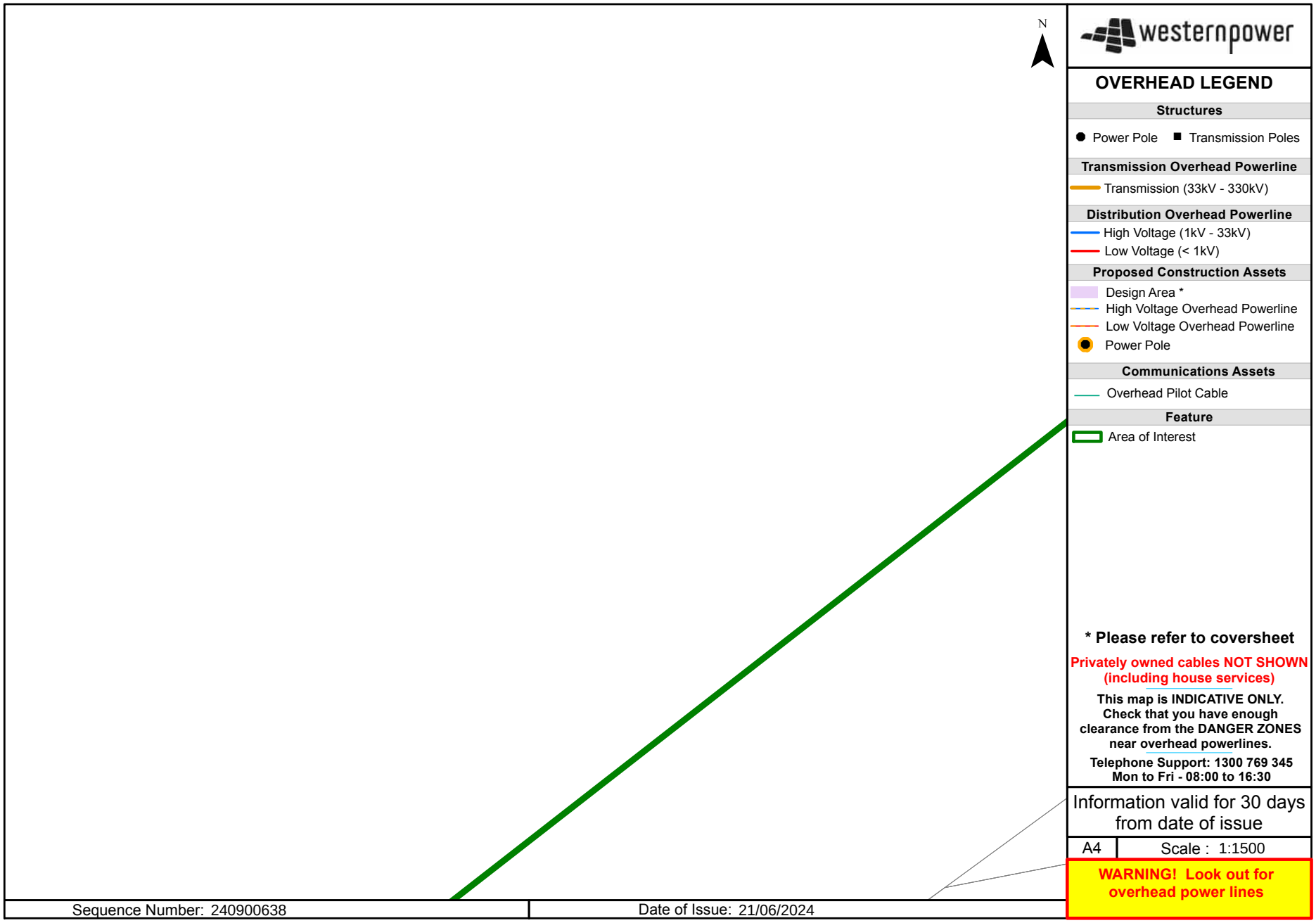

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westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
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Cable Pole Terminations
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Mon to Fri - 08:00 to 16:30
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Date of Issue: 21/06/2024

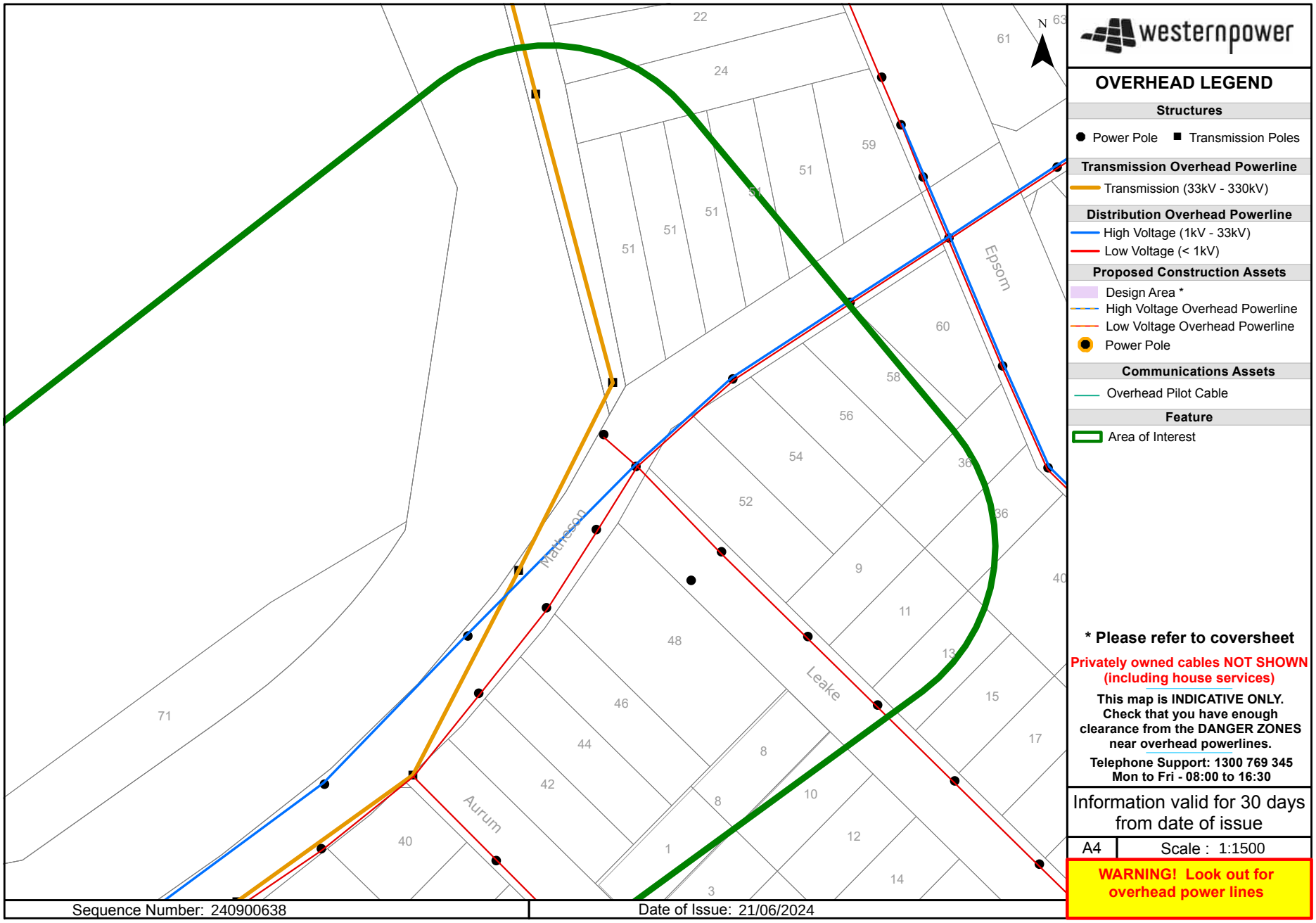

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AURUM ST
EPSOM AV
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Sequence Number: 240900638
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
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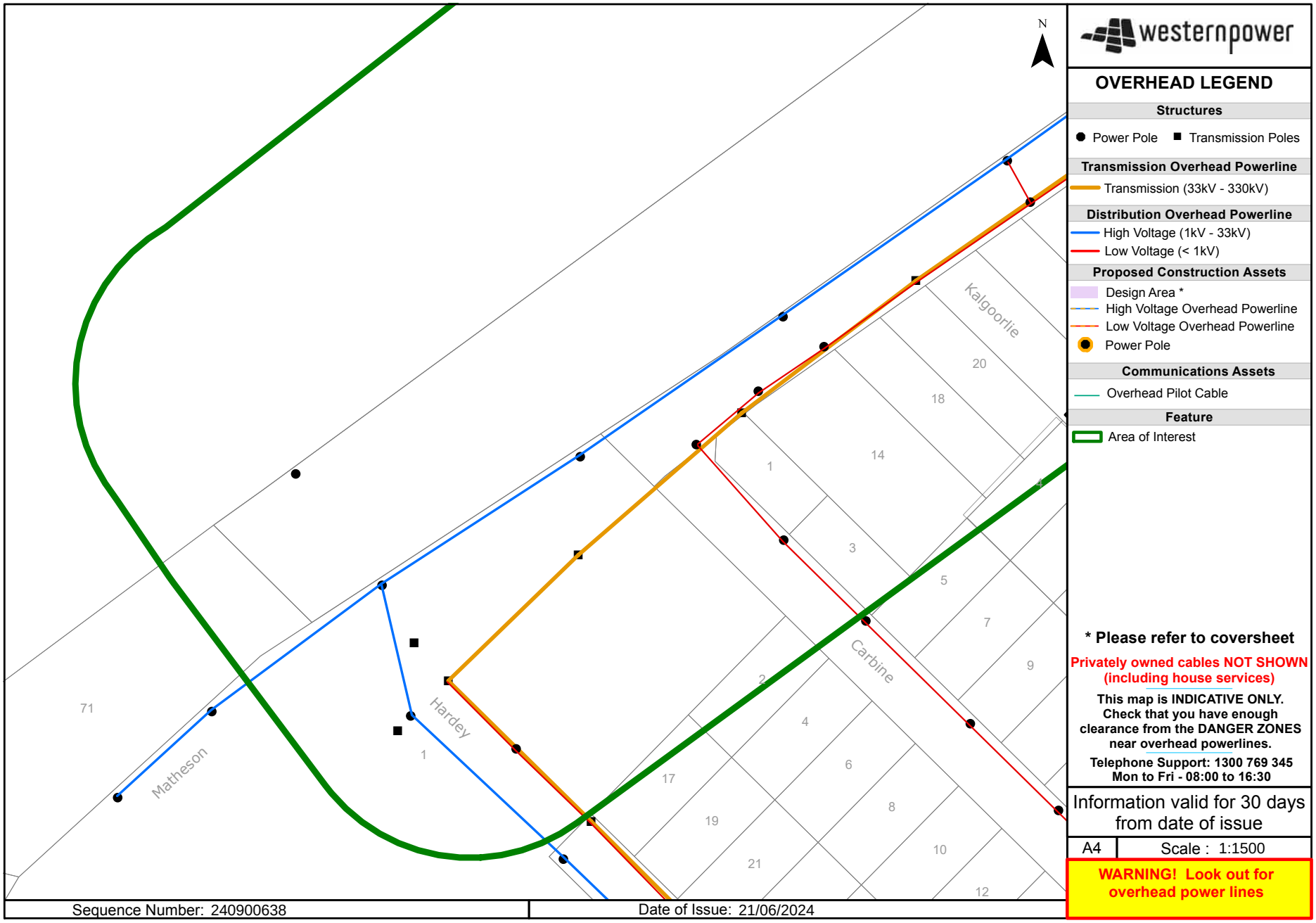

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HARDEY RD
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Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines


MATHESON RD
KEYMER ST
AURUM ST
KALGOORLIE ST
GREAT EASTERN HWY
GREAT EASTERN HWY
N
Lpt
Sequence Number: 240900638
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
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OVERVIEW ONLY
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Leake
Aurum
Keymer
Matheson
Kalgoorlie
Carbine
Hardey
Great Eastern
Great Eastern
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
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Information valid for 30 days from date of issue
A4
Scale : 1:3075
WARNING! Look out for overhead power lines
Sequence Number: 240900638
Date of Issue: 21/06/2024


N
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
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Sequence Number: 240900638
Date of Issue: 21/06/2024


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Matheson
Leake
Aurum
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
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westernpower

OVERHEAD LEGEND

Structures
- Power Pole
- Transmission Poles

Transmission Overhead Powerline
- Transmission (33kV - 330kV)

Distribution Overhead Powerline
- High Voltage (1kV - 33kV)
- Low Voltage (< 1kV)

Proposed Construction Assets
- Design Area *
- High Voltage Overhead Powerline
- Low Voltage Overhead Powerline
- Power Pole

Communications Assets
- Overhead Pilot Cable

Feature
- Area of Interest

*** Please refer to coversheet**

Privately owned cables NOT SHOWN (including house services)

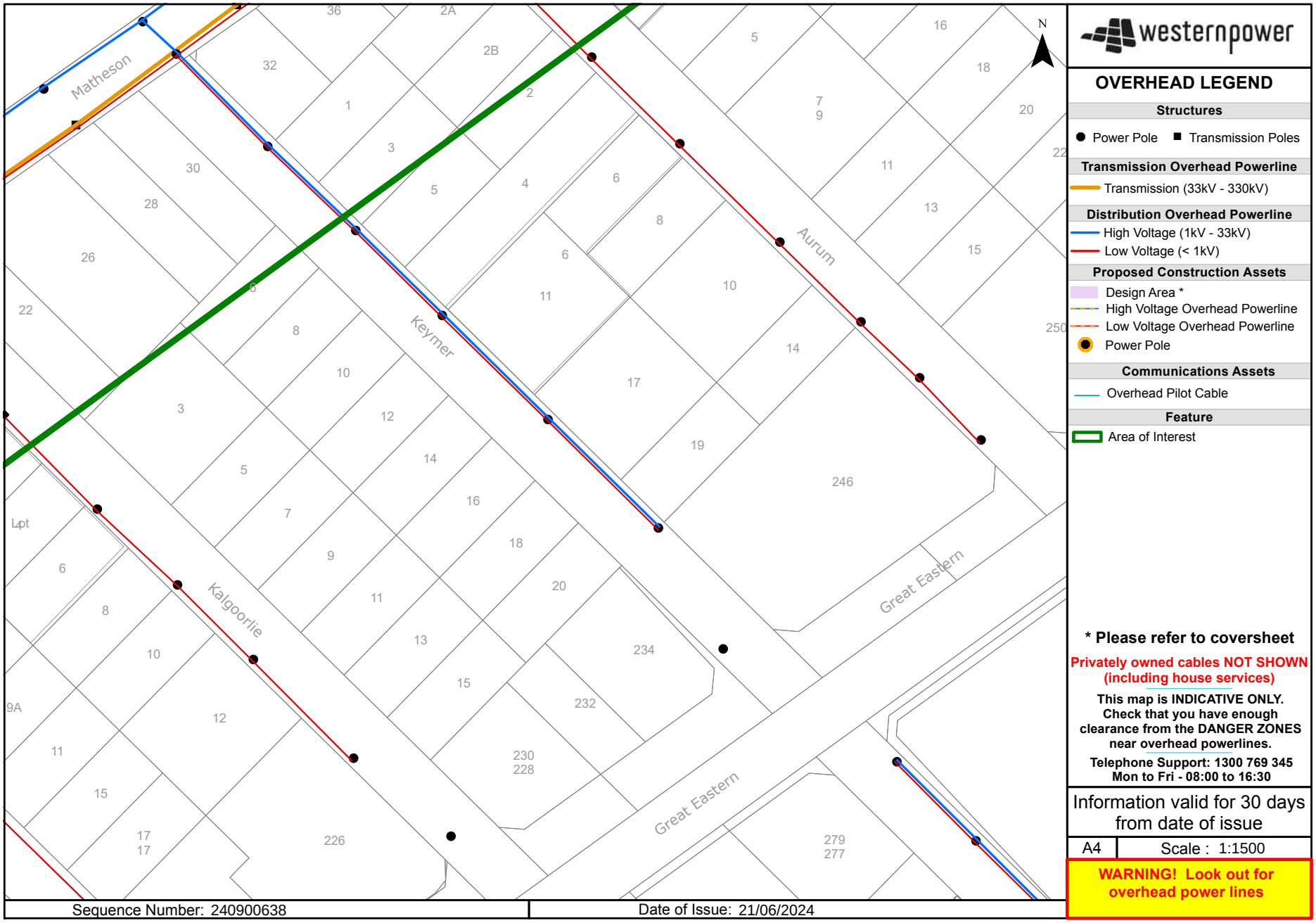
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WARNING! Look out for overhead power lines


Matheson
Keymer
Aurum
Kalgoorlie
Great Eastern
Great Eastern
Lpt
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westernpower
OVERHEAD LEGEND
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Sequence Number: 240900638
Date of Issue: 21/06/2024

Job No 36968397

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
24/06/2024	25/06/2024	25/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
Precinct B	39 Northerly Avenue Ascot WA 6104	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240936716	ATCO Gas Australia	1300 926 755	NOTIFIED
240936712	NBN Co (WA)	1800 687 626	NOTIFIED
240936708	Optus (WA)	1800 505 777	NOTIFIED
240936709	Public Transport Authority - Bus Stops	13 62 13	NOTIFIED
240936714	Telstra (WA)	1800 653 935	NOTIFIED
240936711	TPG Telecom (WA)	1800 786 306	NOTIFIED
240936710	Vocus (WA)	1800 262 663	NOTIFIED
240936715	Water Corporation	13 13 95	NOTIFIED
240936713	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

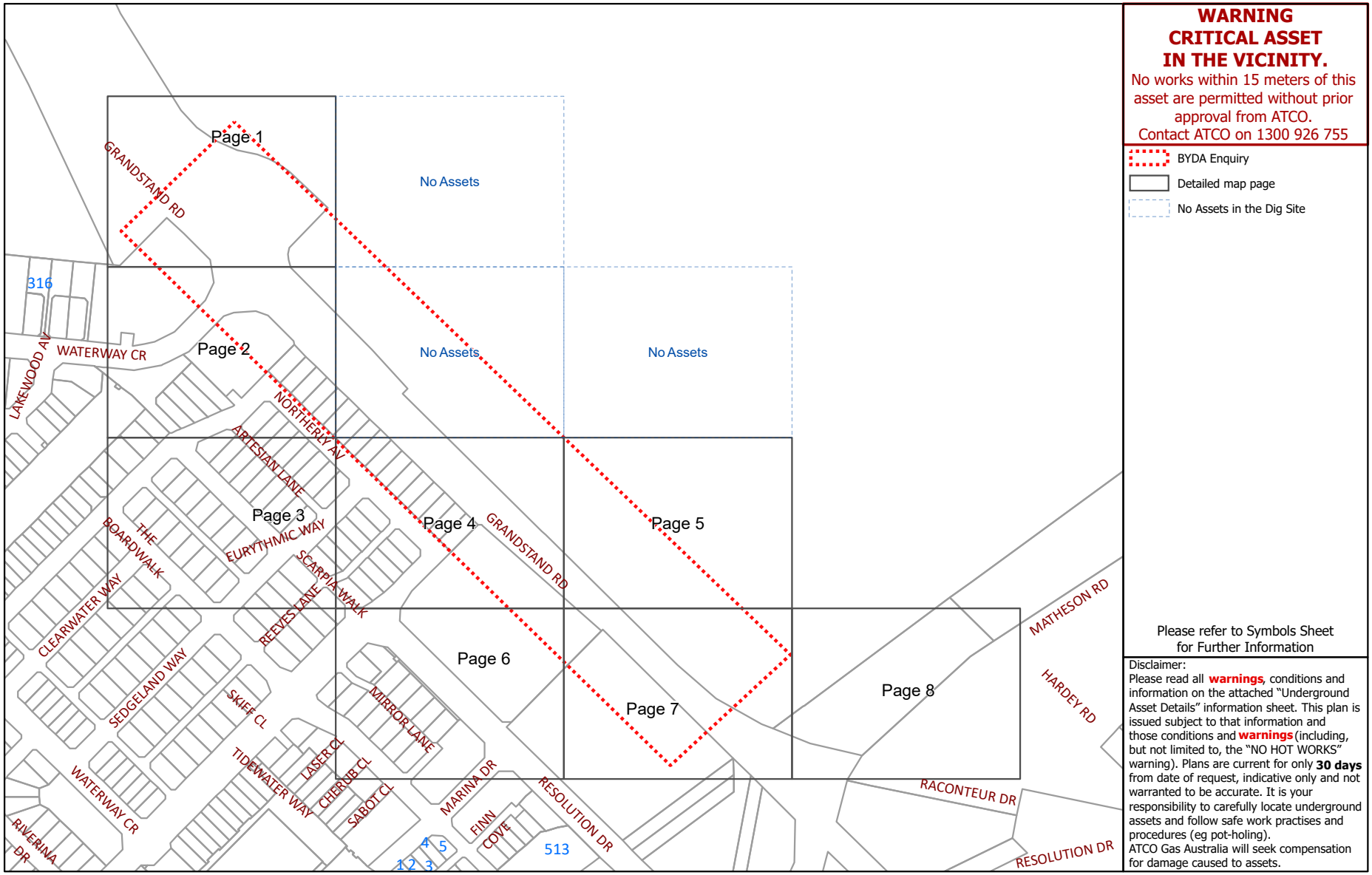
ATCO

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ABN: 90 089 531 975

Date: 24/06/24 (valid for 30 days)
Index Sheet

Seq # 240936716
Job # 36968397

BYDA Location: 39 Northerly Avenue Ascot 6104
Scale: 1:3,500



WARNING
CRITICAL ASSET
IN THE VICINITY.
No works within 15 meters of this asset are permitted without prior approval from ATCO.
Contact ATCO on 1300 926 755

BYDA Enquiry
Detailed map page
No Assets in the Dig Site

Please refer to Symbols Sheet for Further Information

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ATCO Gas Australia will seek compensation for damage caused to assets.

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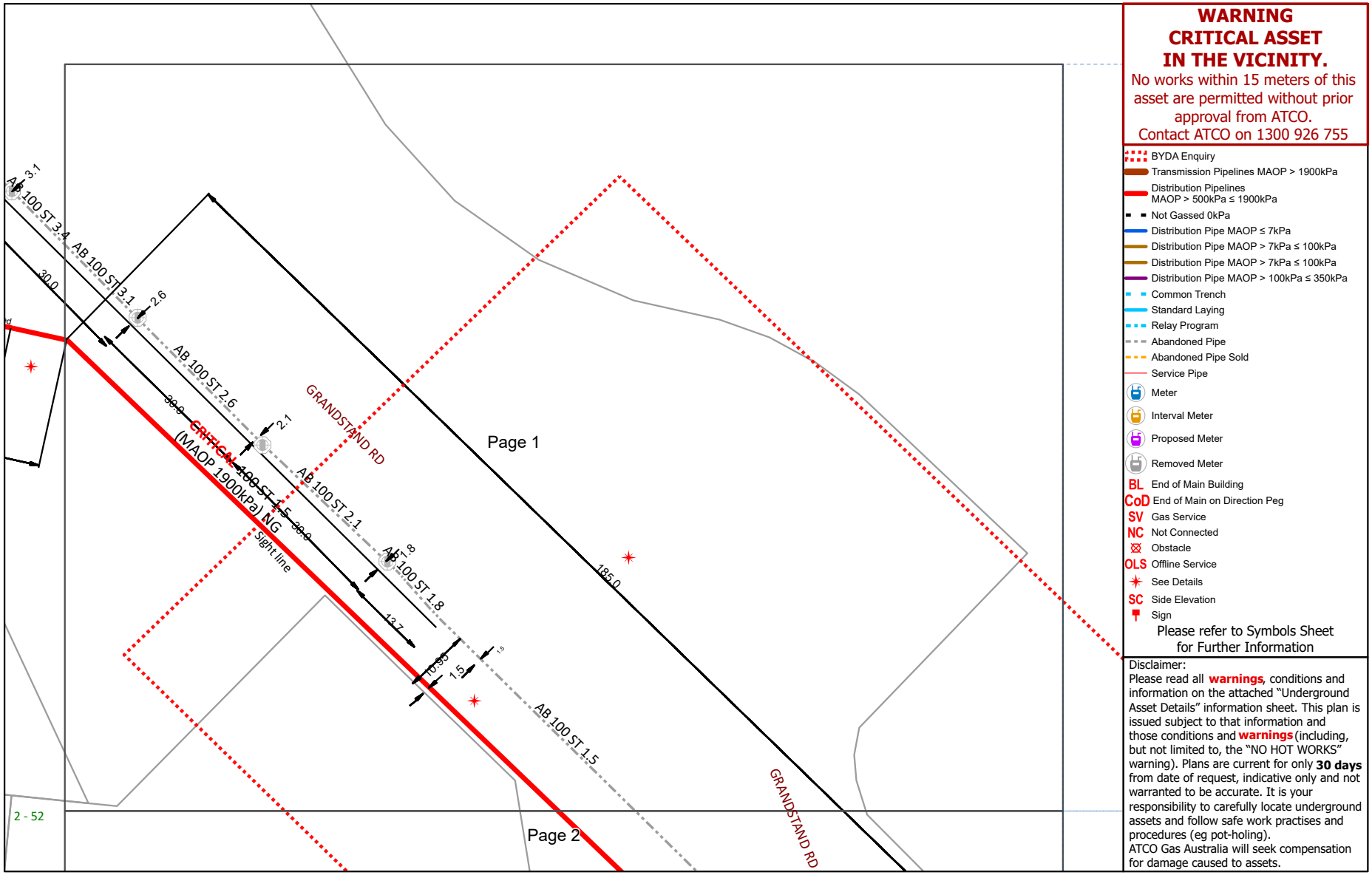
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Date: 24/06/24 (valid for 30 days)

Seq # 240936716
Job # 36968397

BYDA Location: 39 Northerly Avenue Ascot 6104
Scale: 1:800



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- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign

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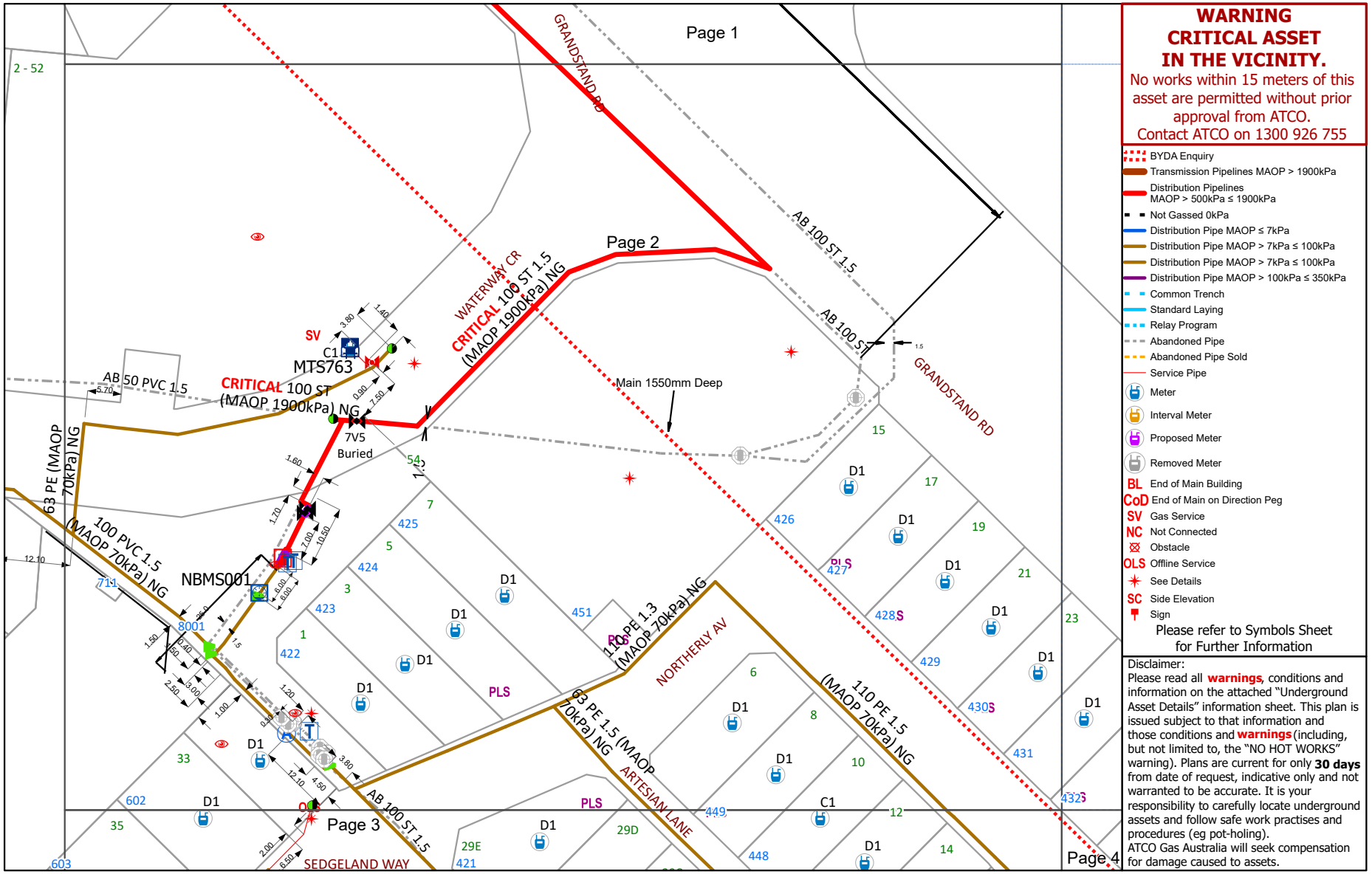
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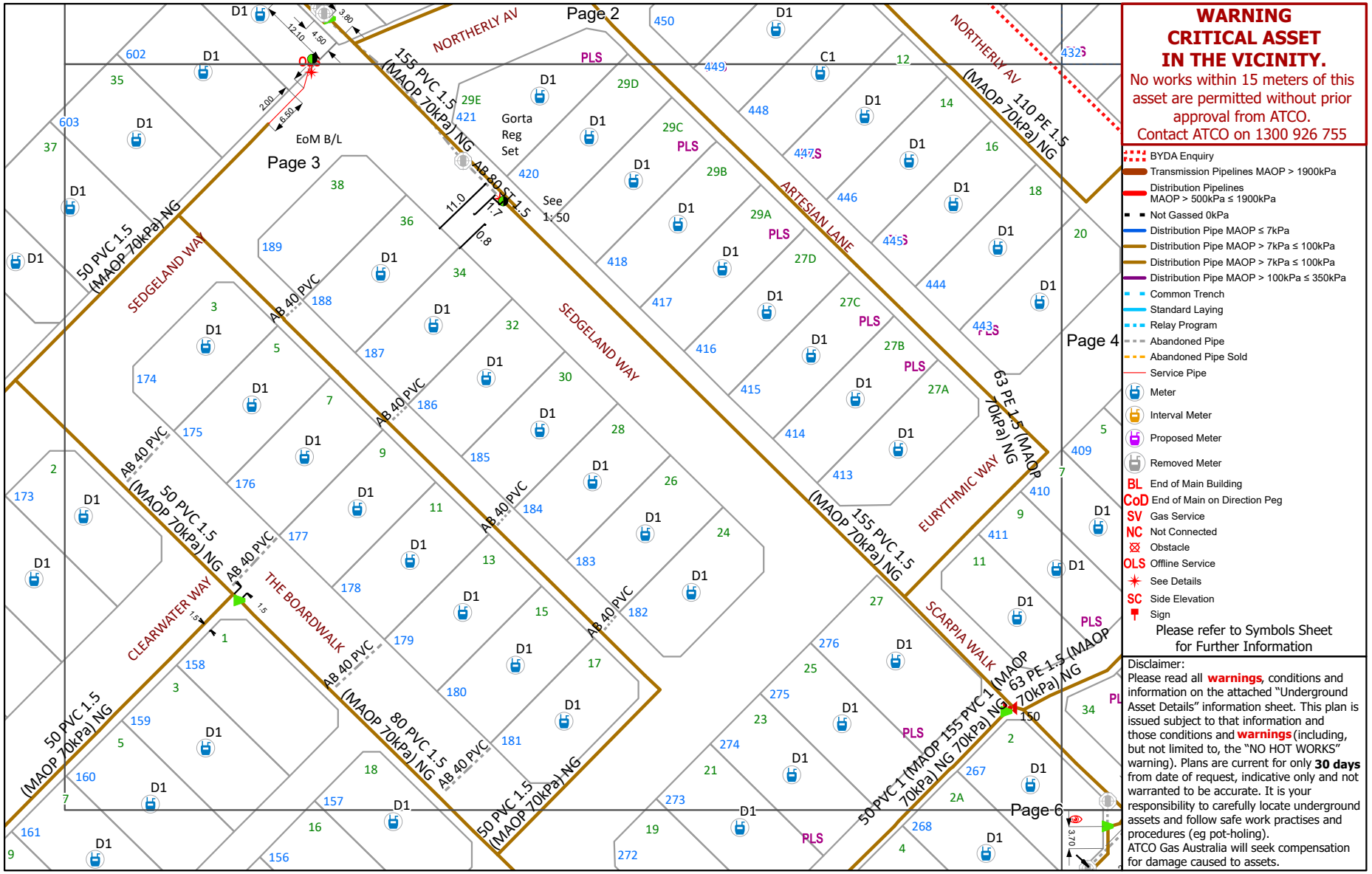
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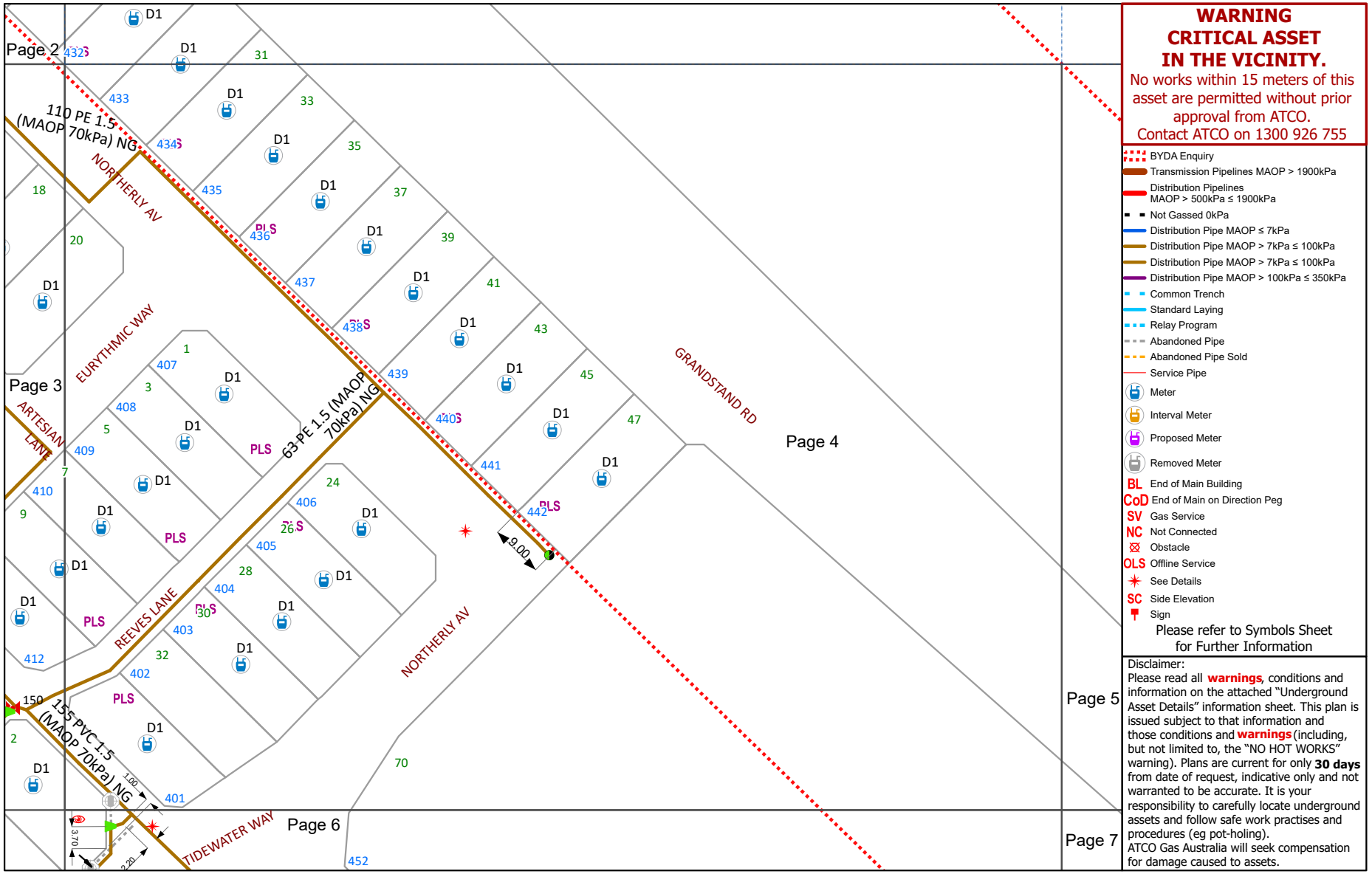
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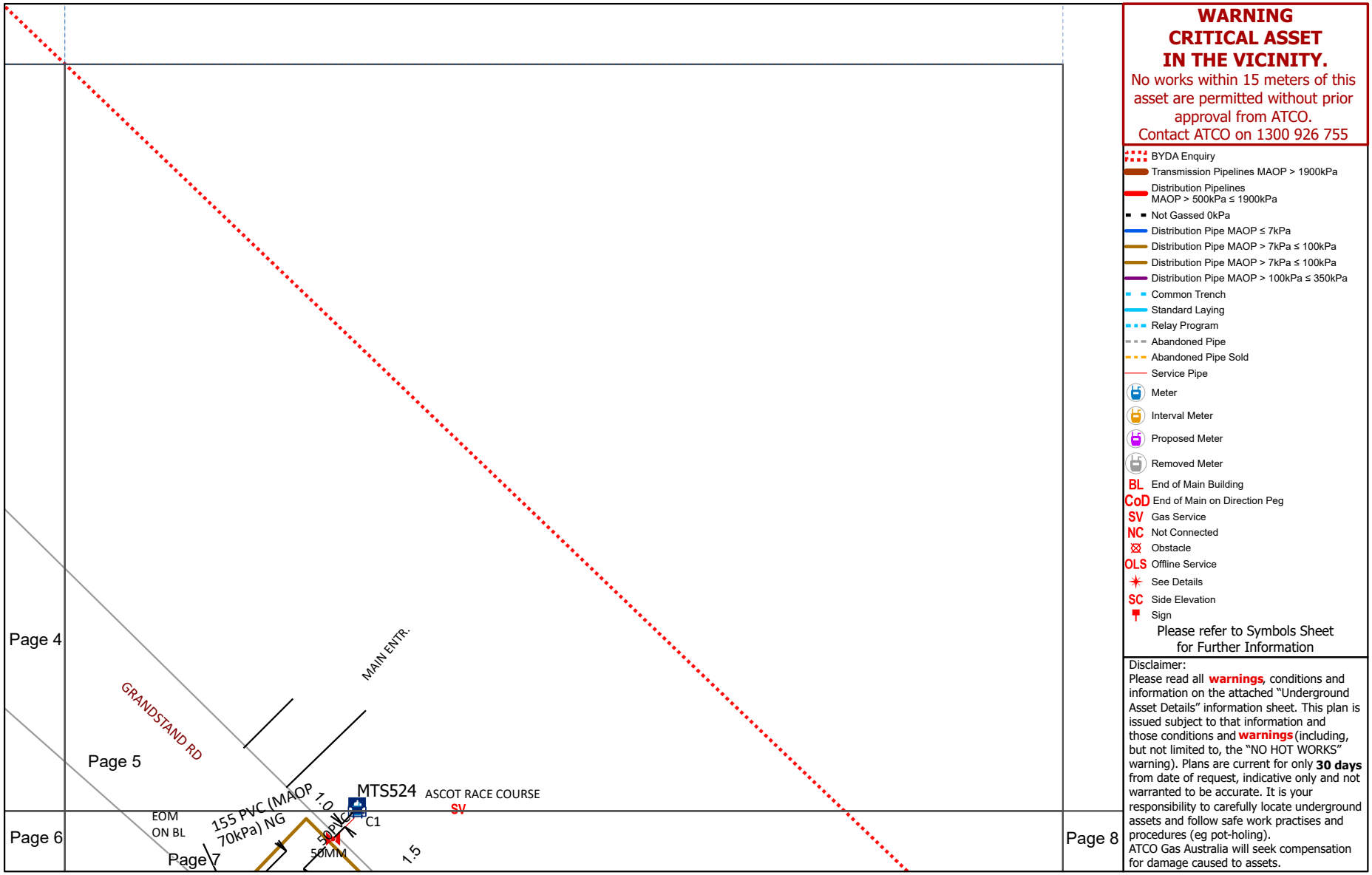
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BYDA Location: 39 Northerly Avenue Ascot 6104
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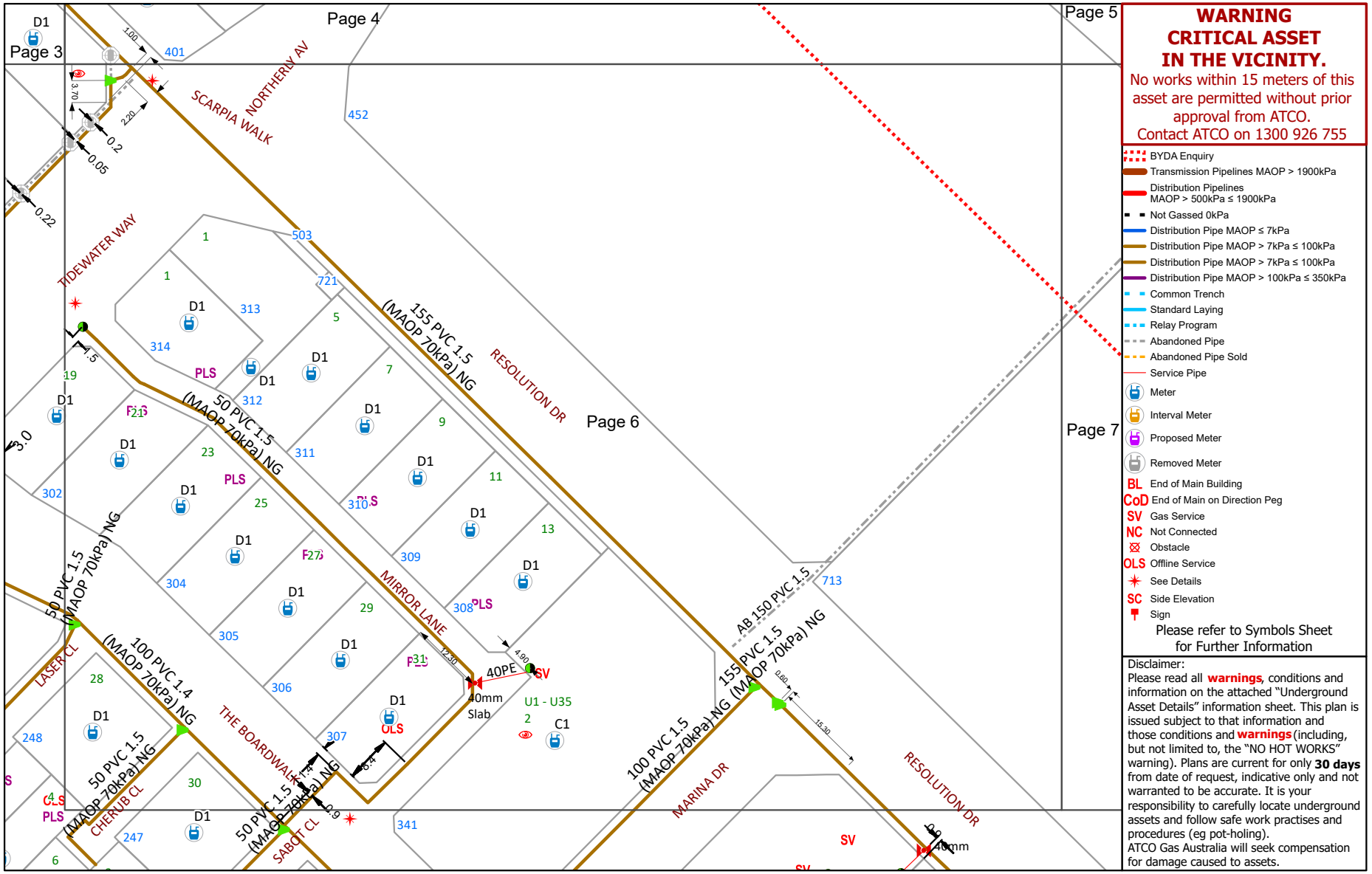
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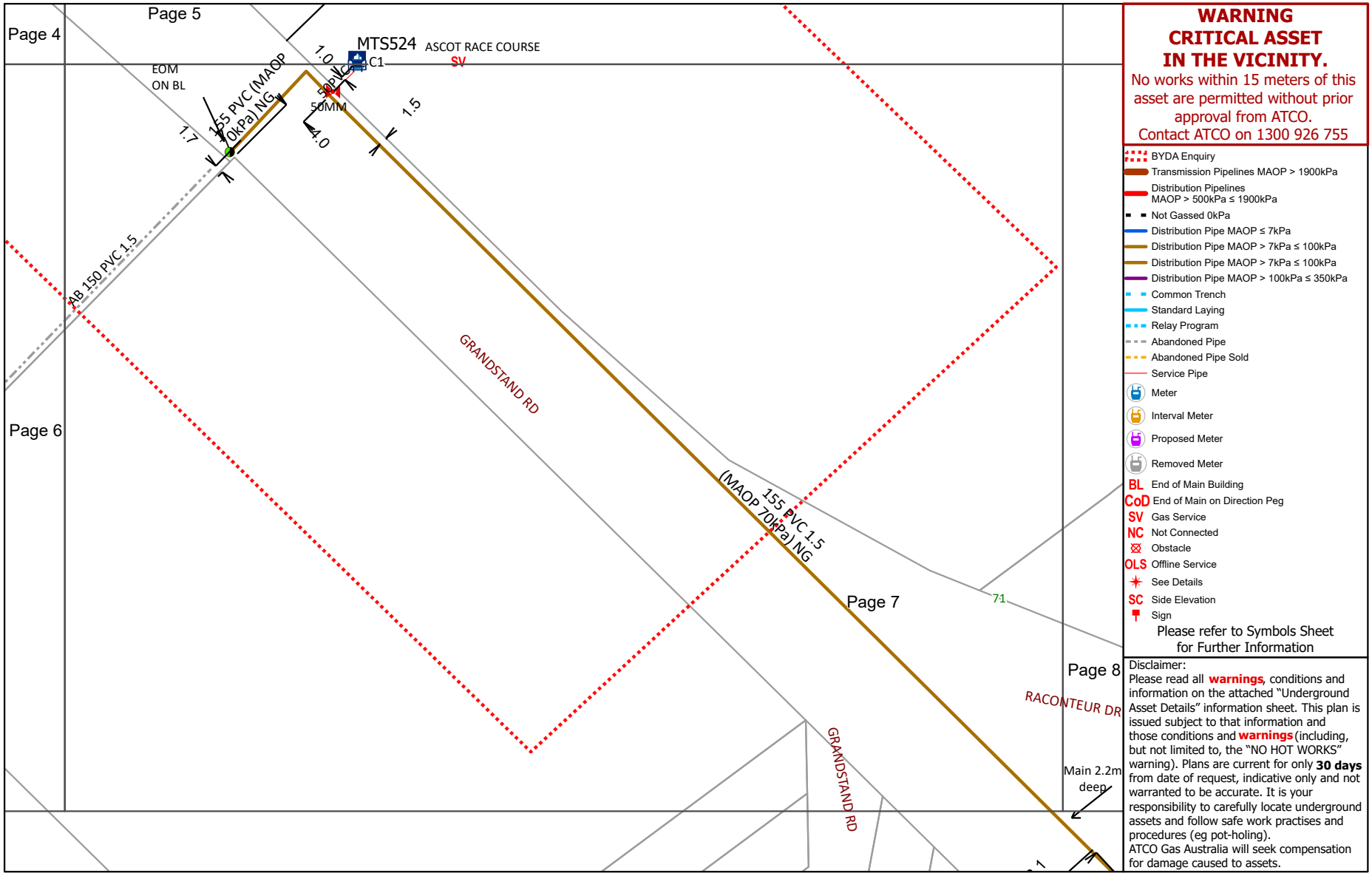
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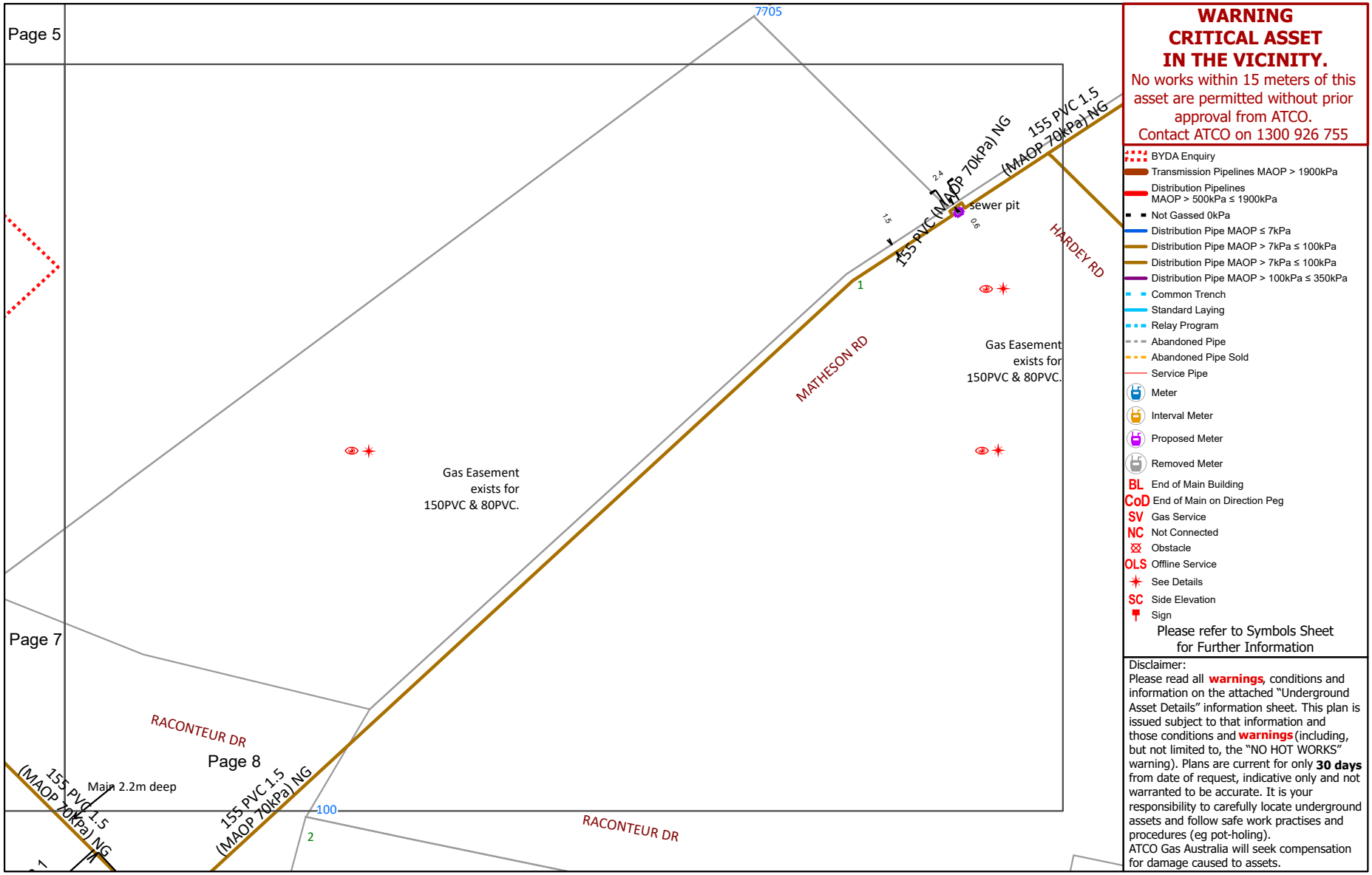
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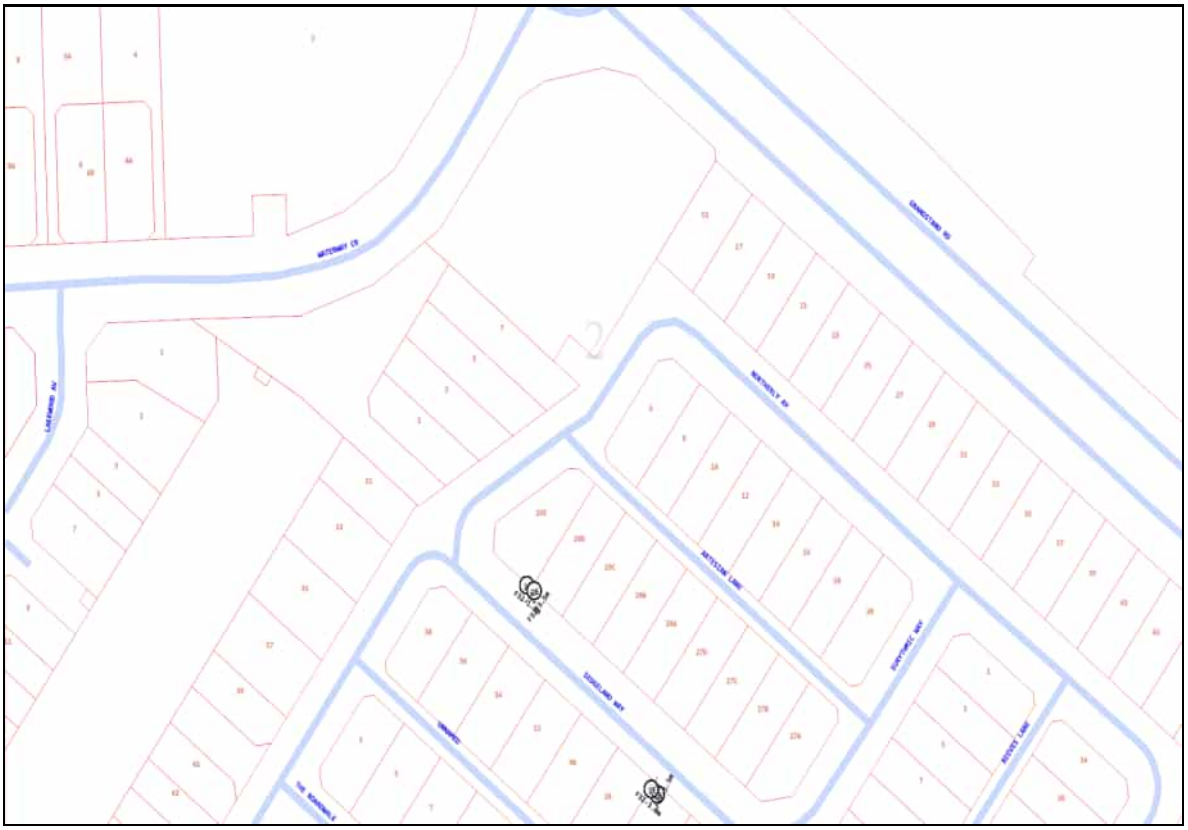
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- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign

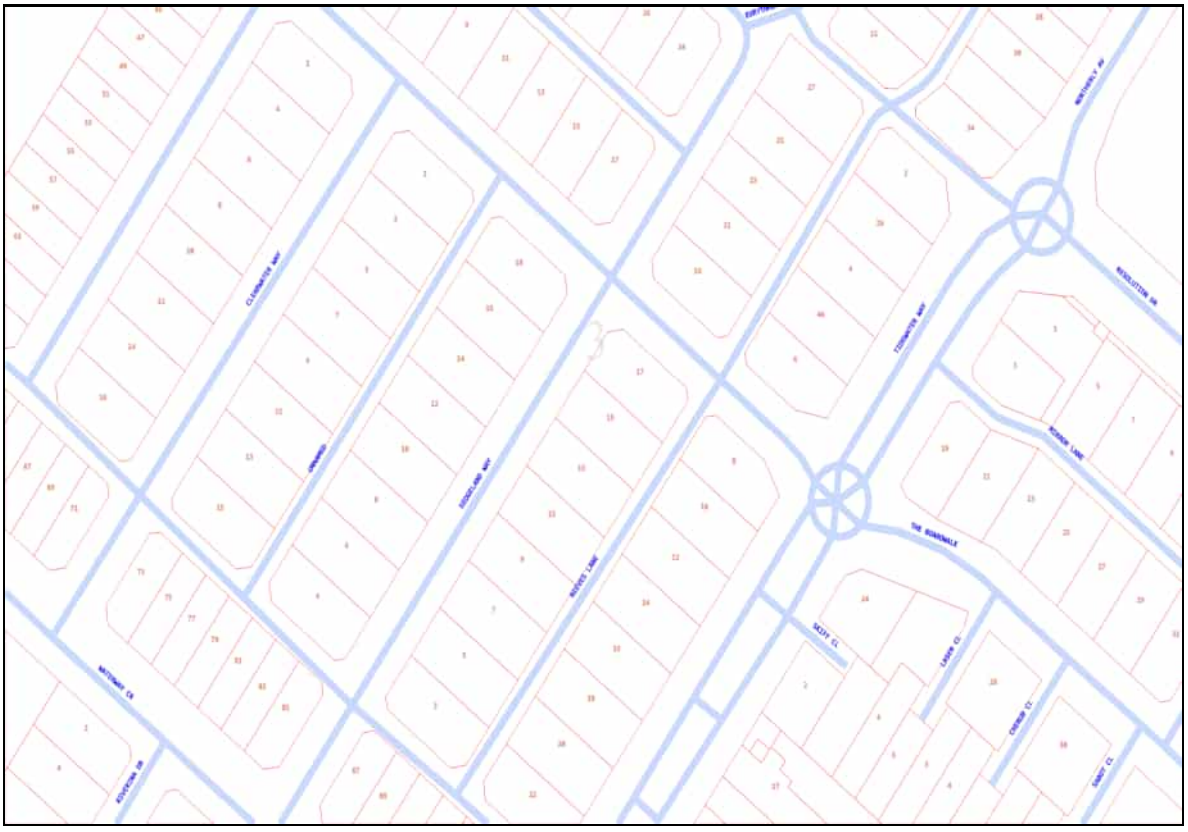
Please refer to Symbols Sheet for Further Information

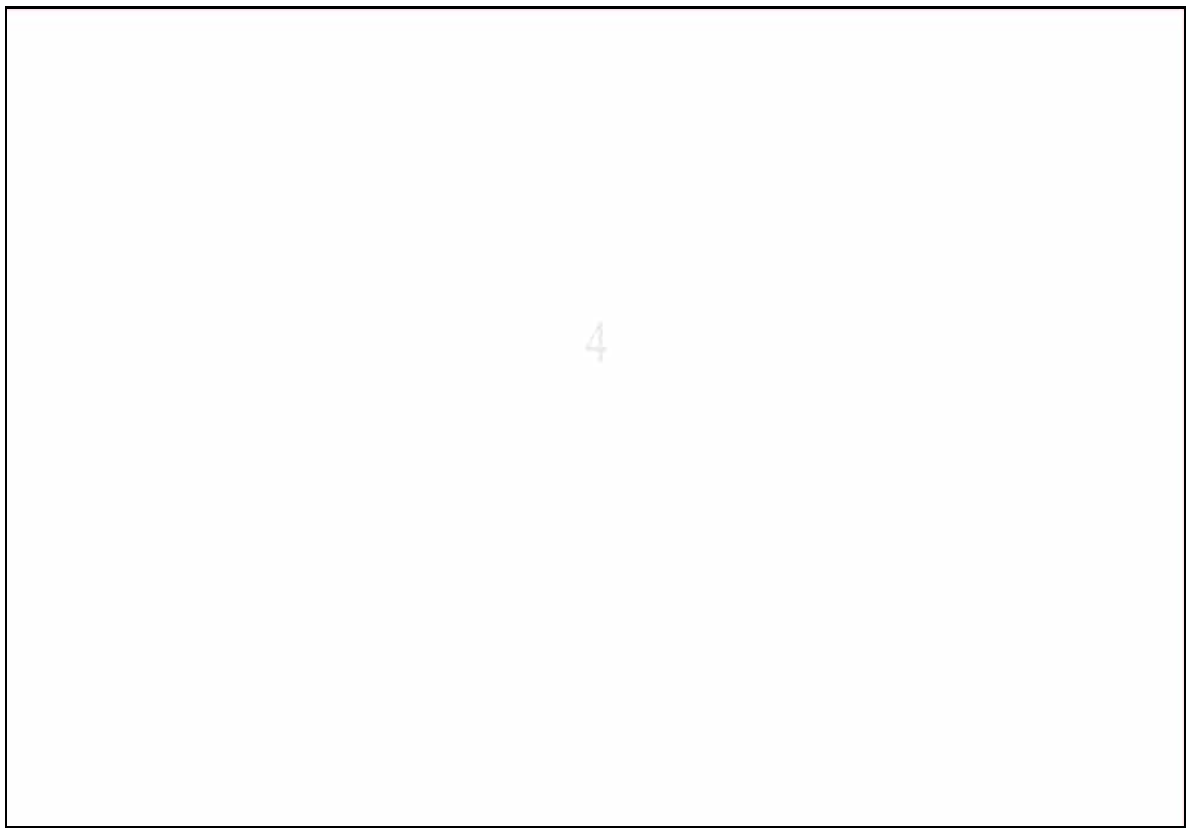
Disclaimer:
Please read all **warnings**, conditions and information on the attached "Underground Asset Details" information sheet. This plan is issued subject to that information and those conditions and **warnings** (including, but not limited to, the "NO HOT WORKS" warning). Plans are current for only **30 days** from date of request, indicative only and not warranted to be accurate. It is your responsibility to carefully locate underground assets and follow safe work practises and procedures (eg pot-holing).
ATCO Gas Australia will seek compensation for damage caused to assets.

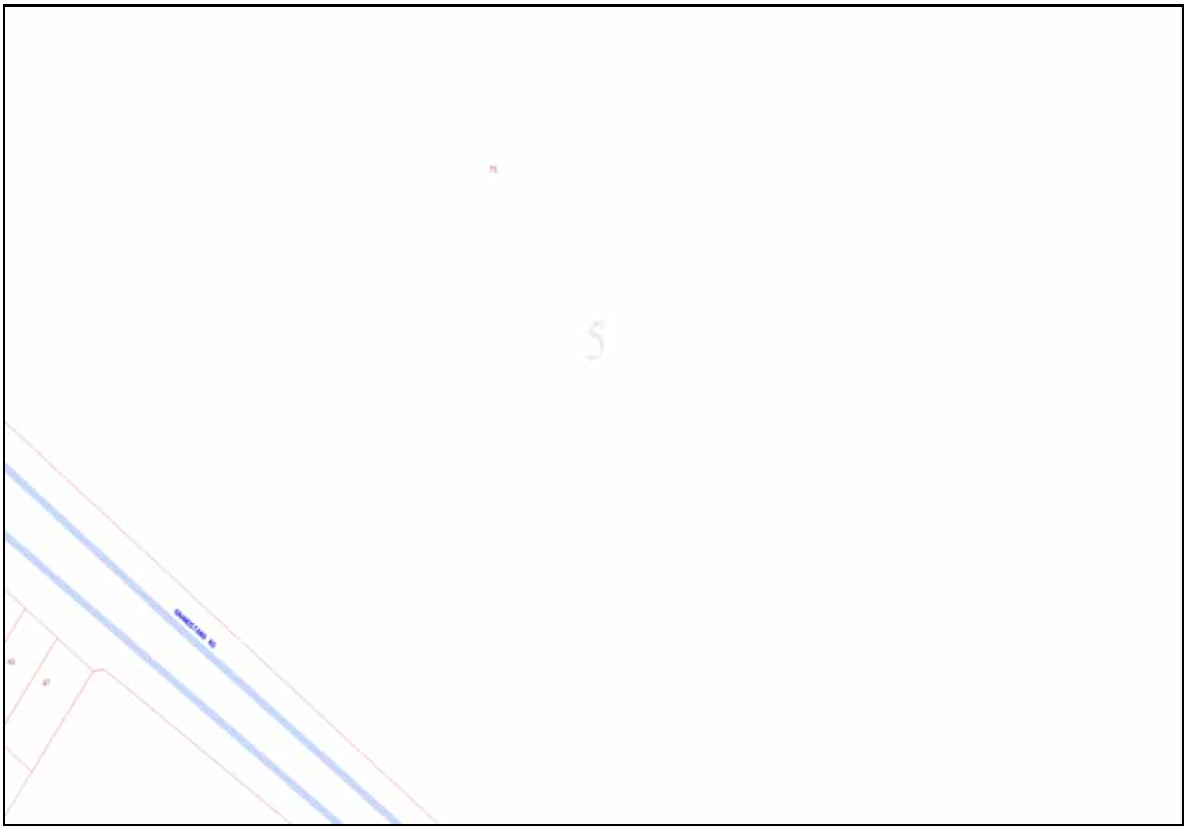
© Western Australian Land Information Authority trading as Landgate. Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate









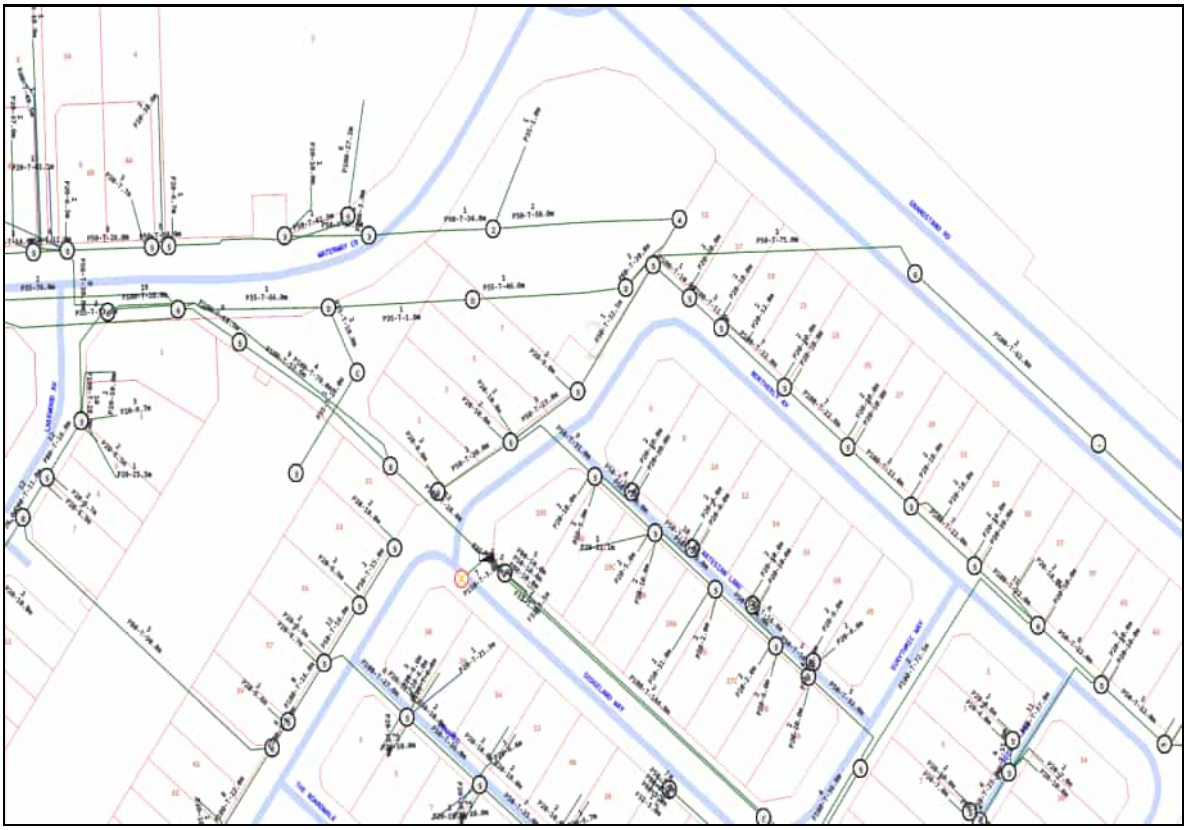


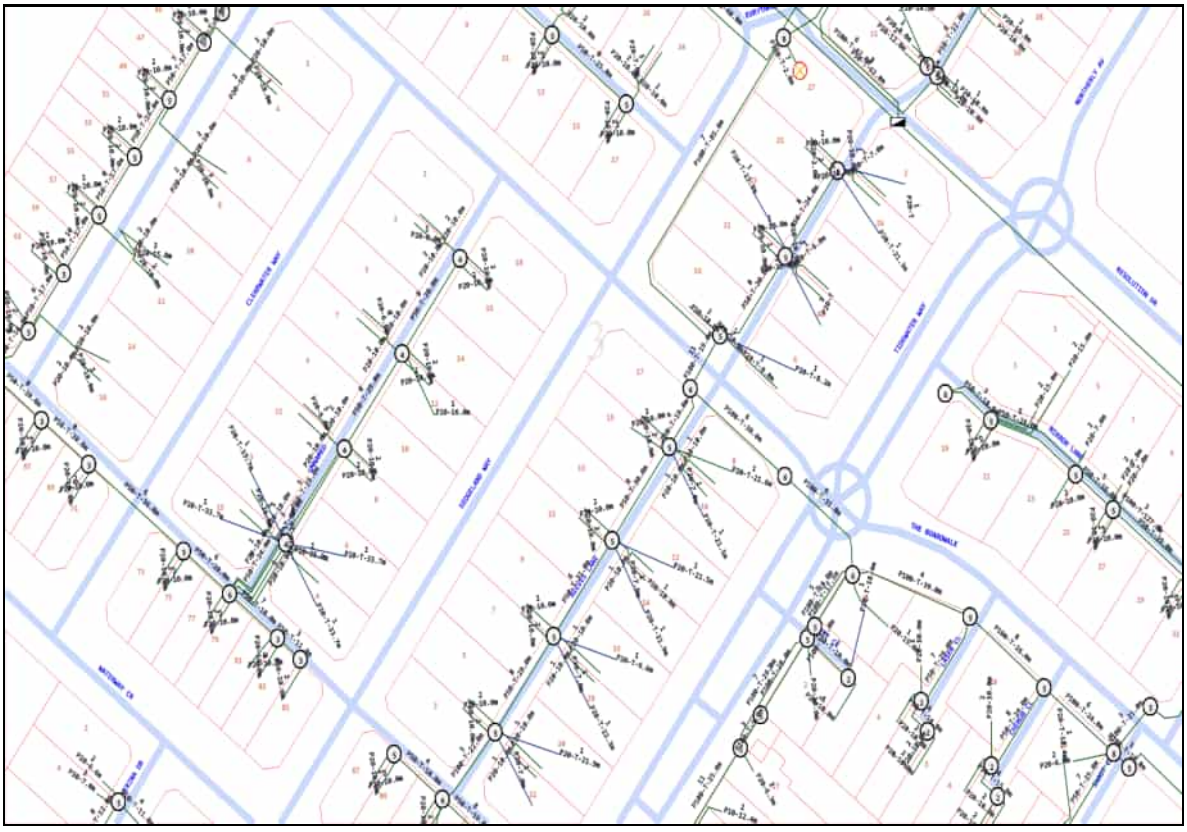


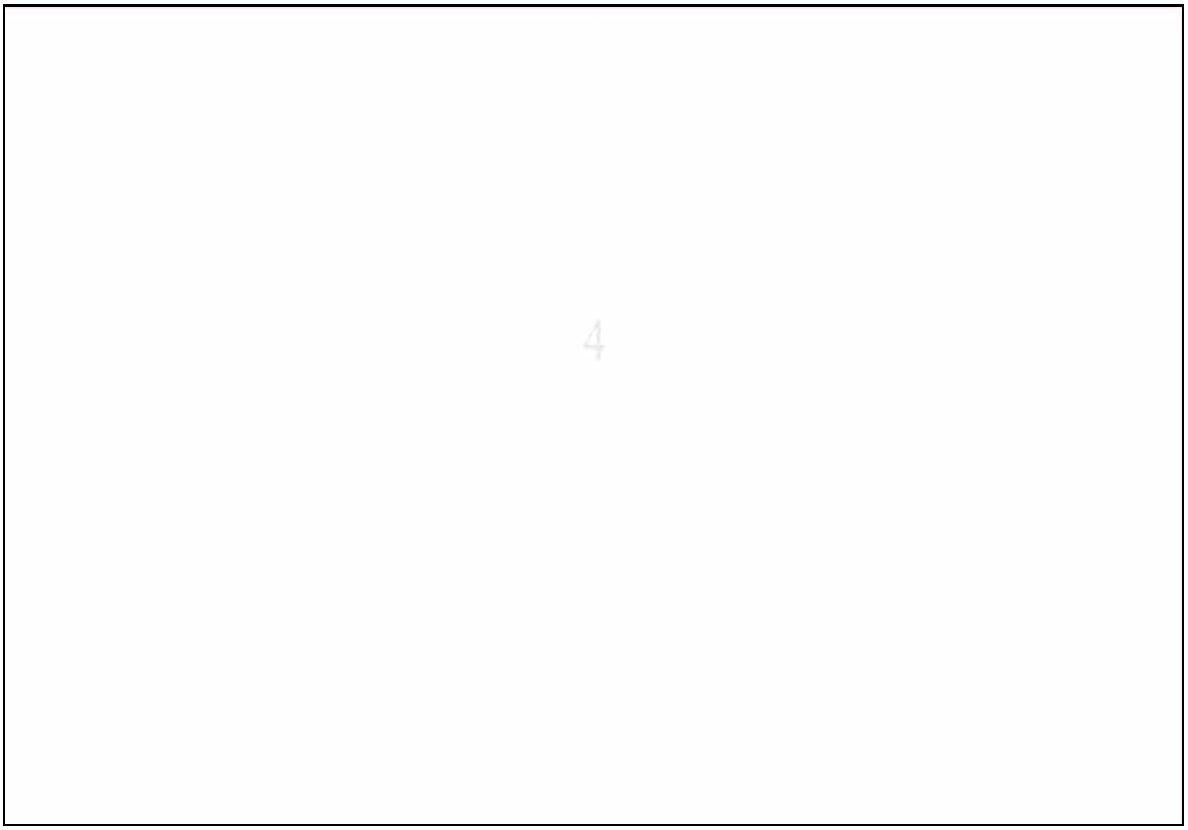
Emergency Contacts

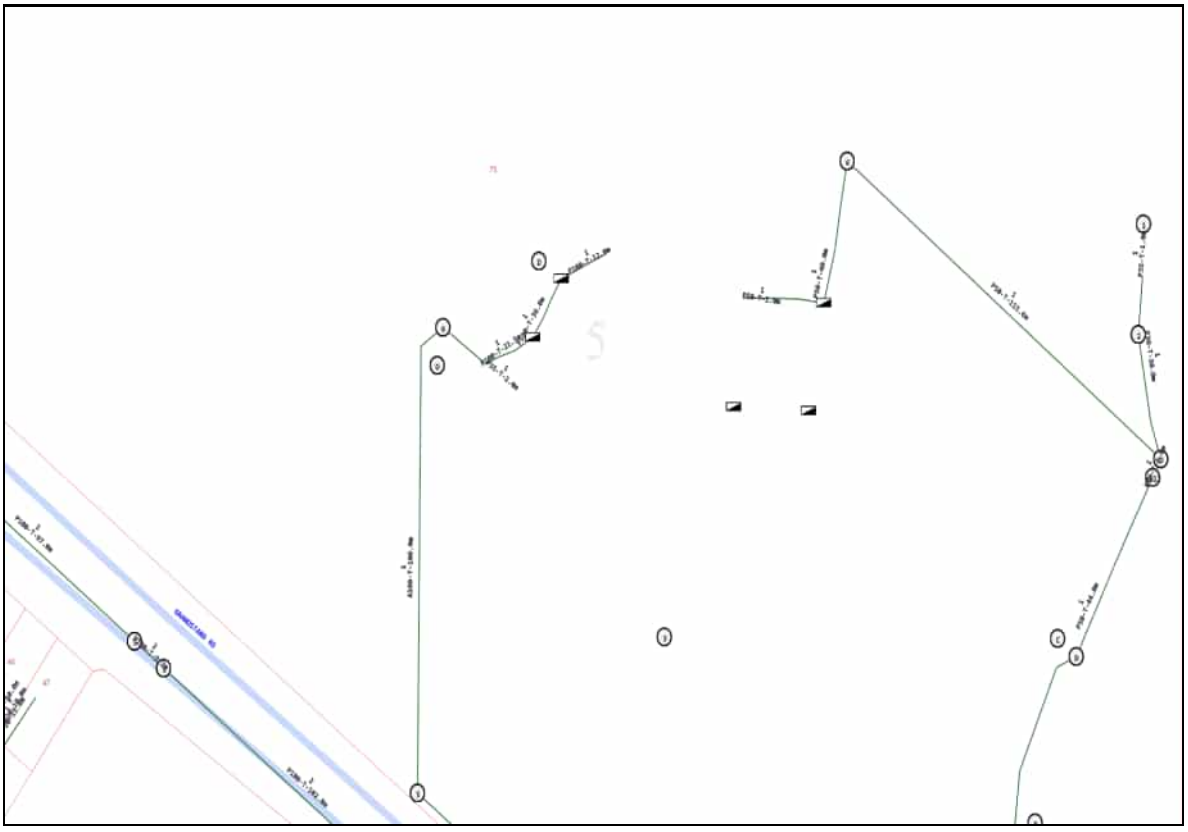
You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

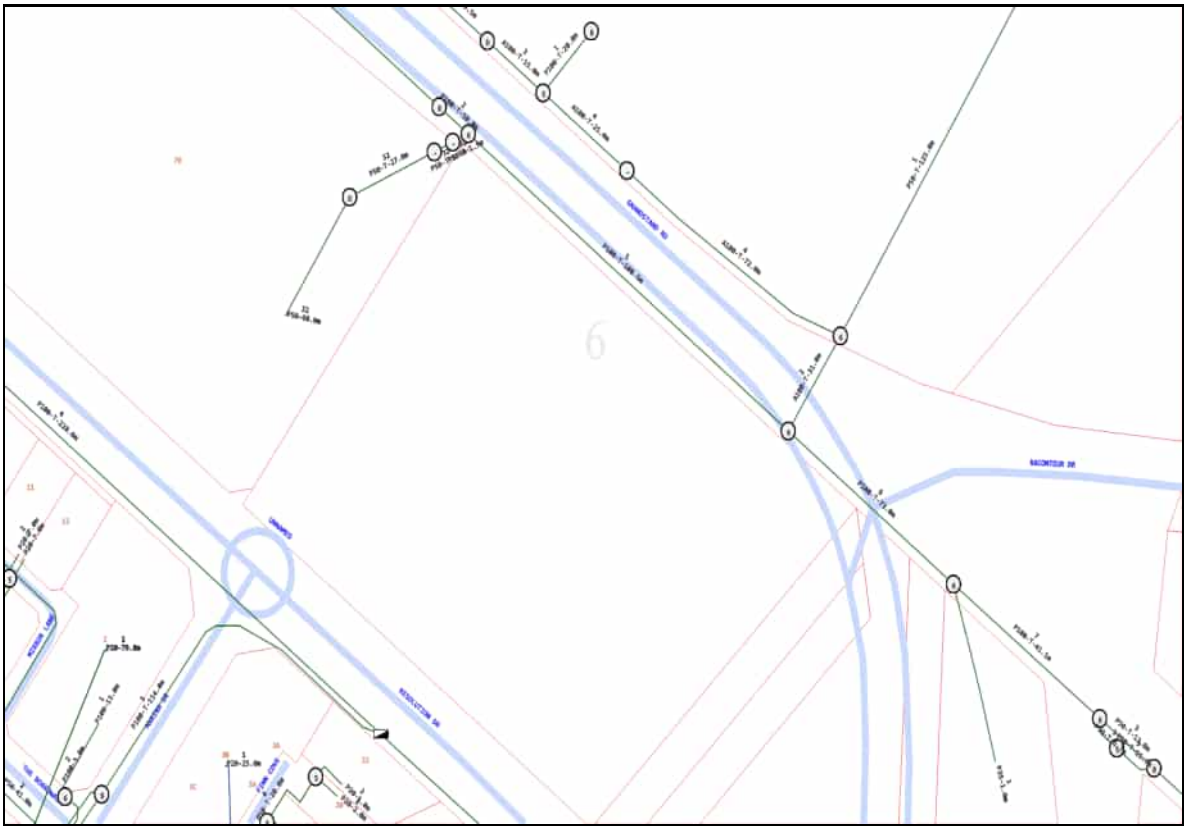






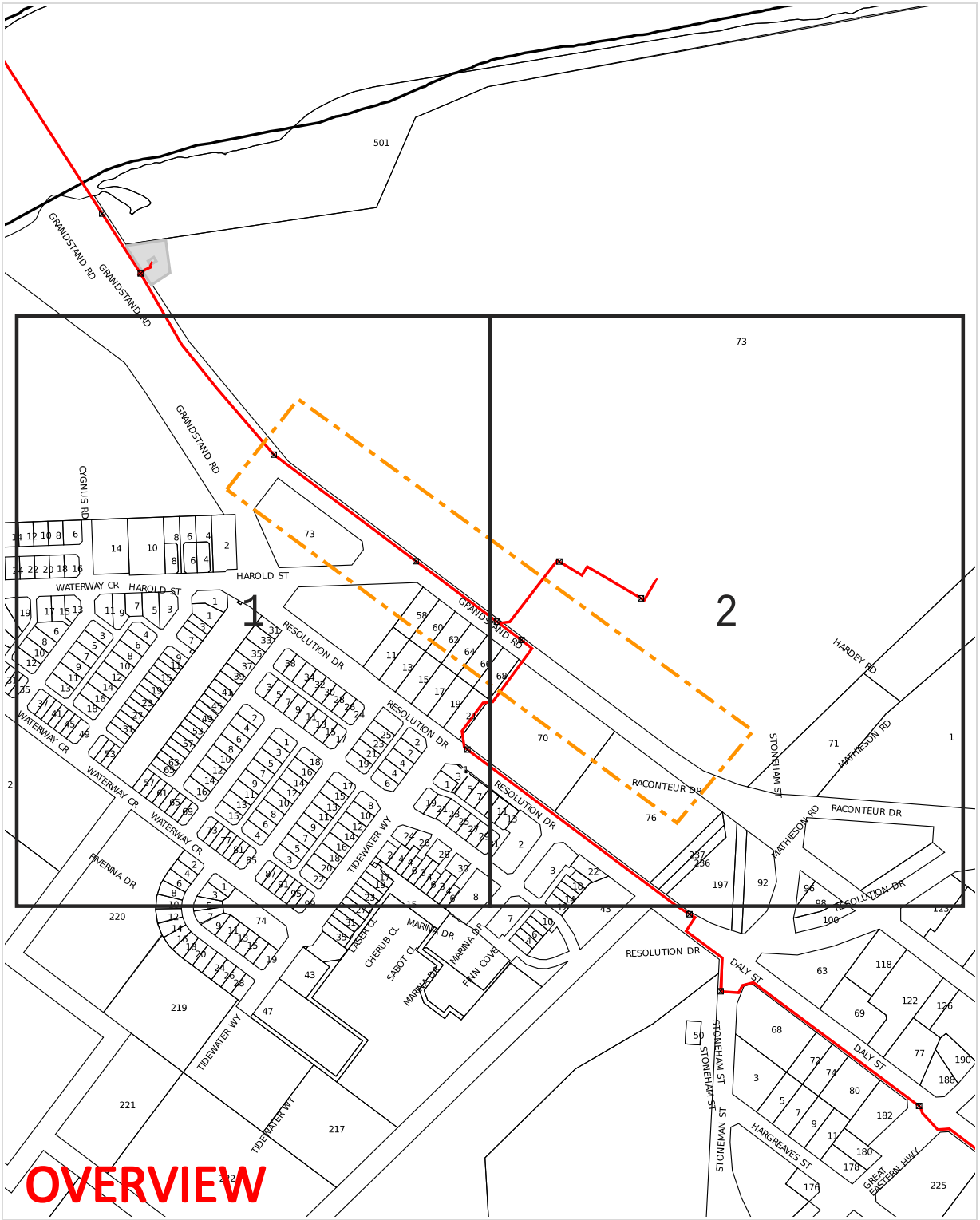






Emergency Contacts

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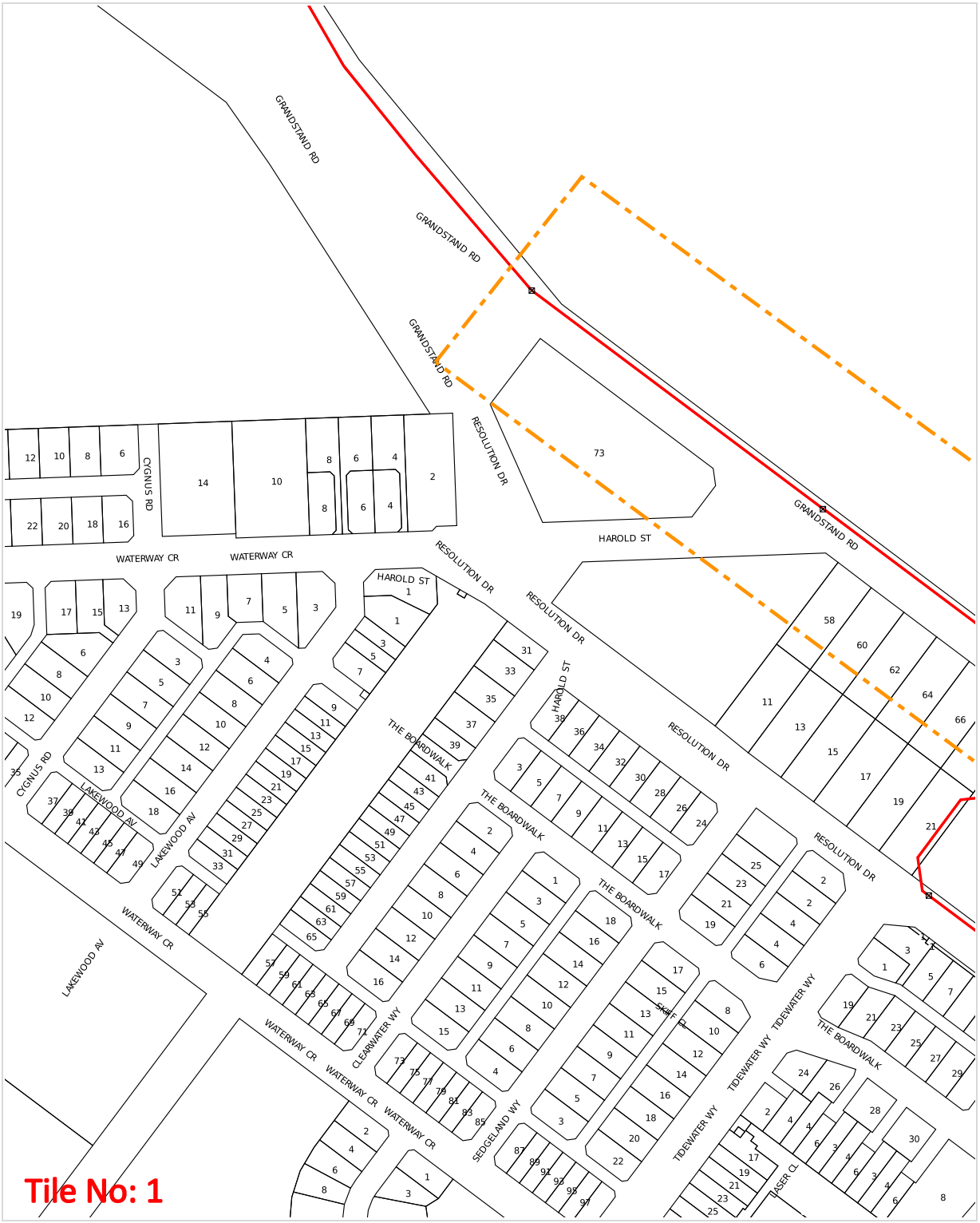
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Sequence Number: 240936708

Date Generated: 24 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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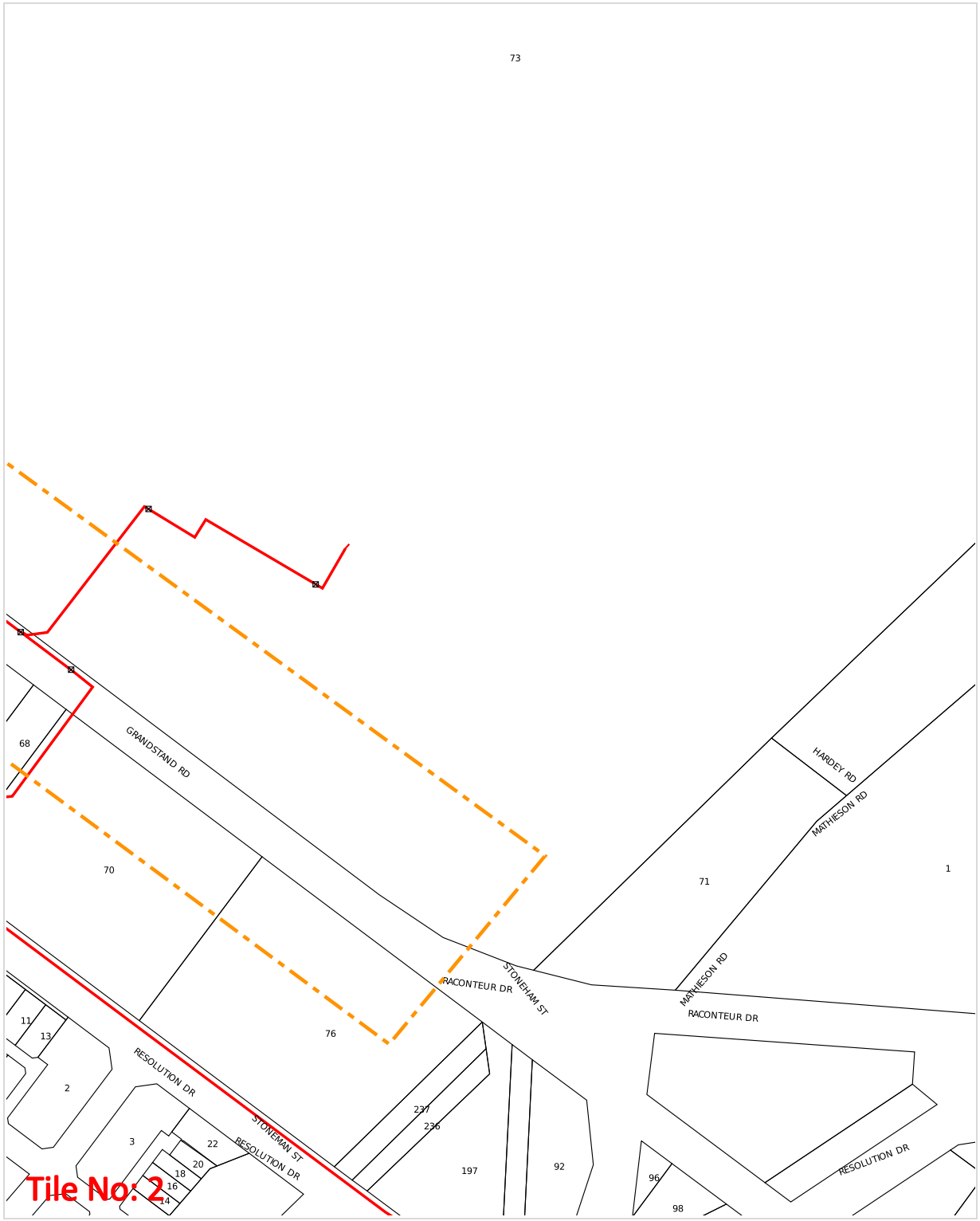
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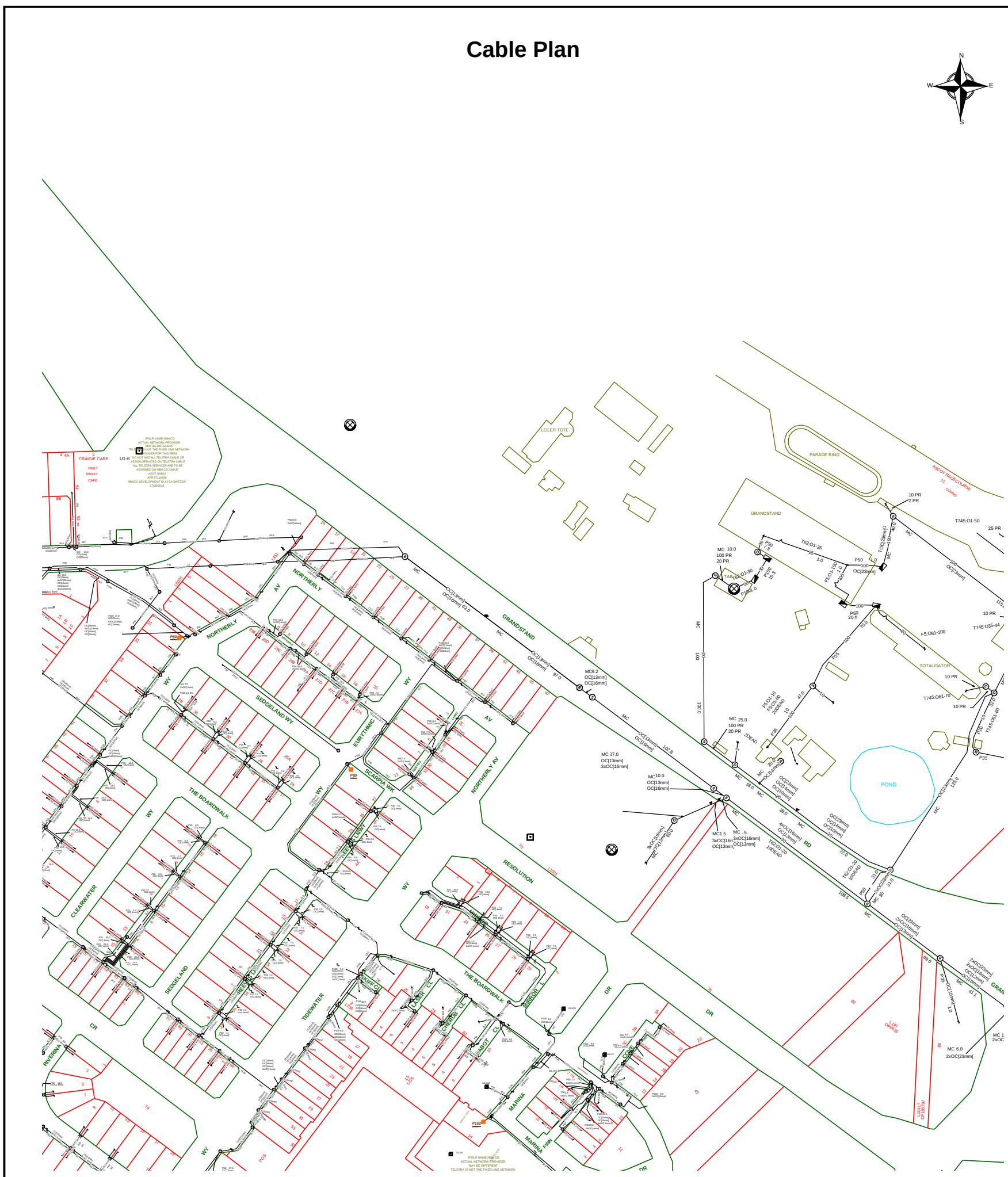
Sequence Number: 240936708

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Optus Limited ACN 052 833 208

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Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240936714
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 24/06/2024 09:36:36	

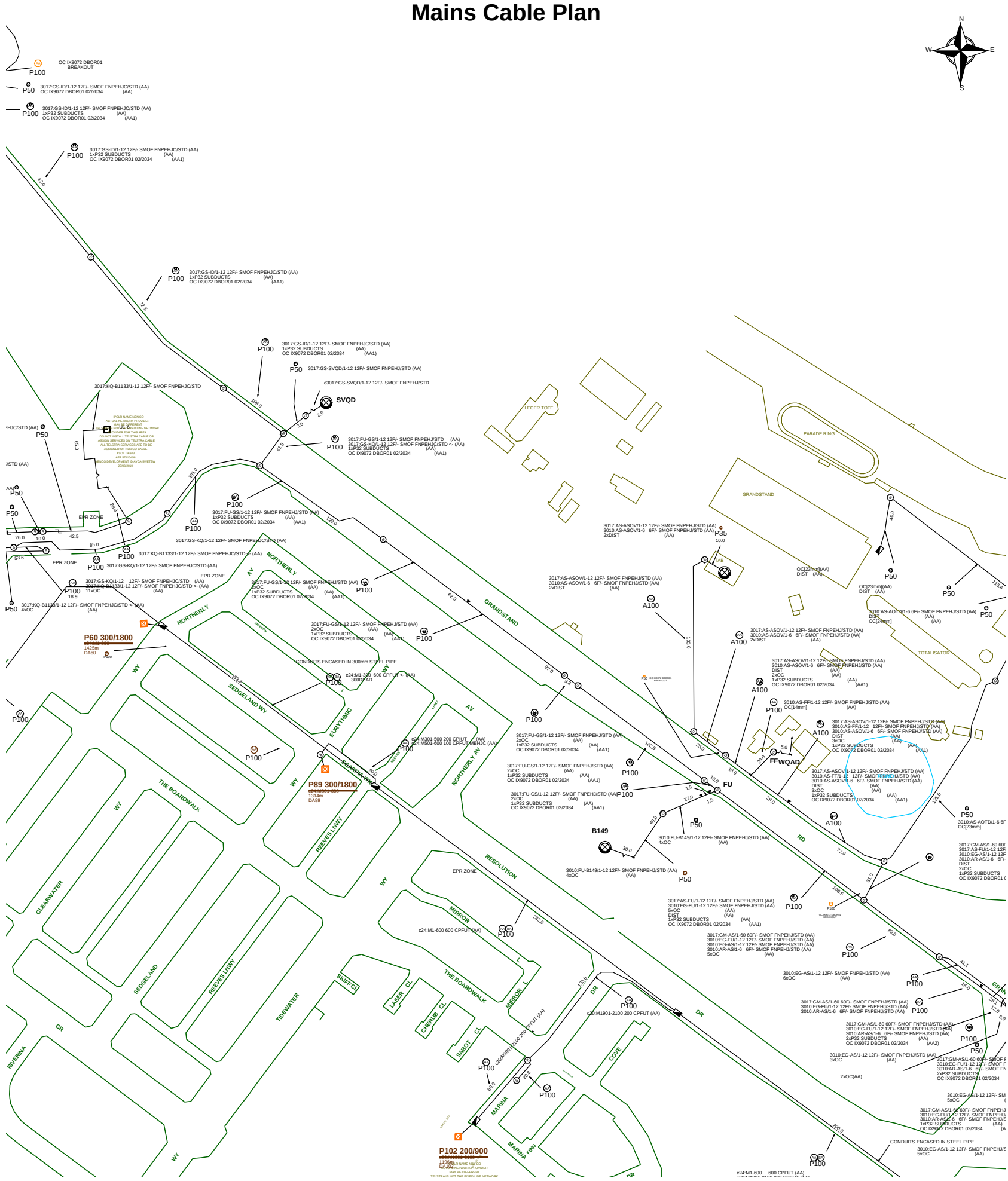
The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

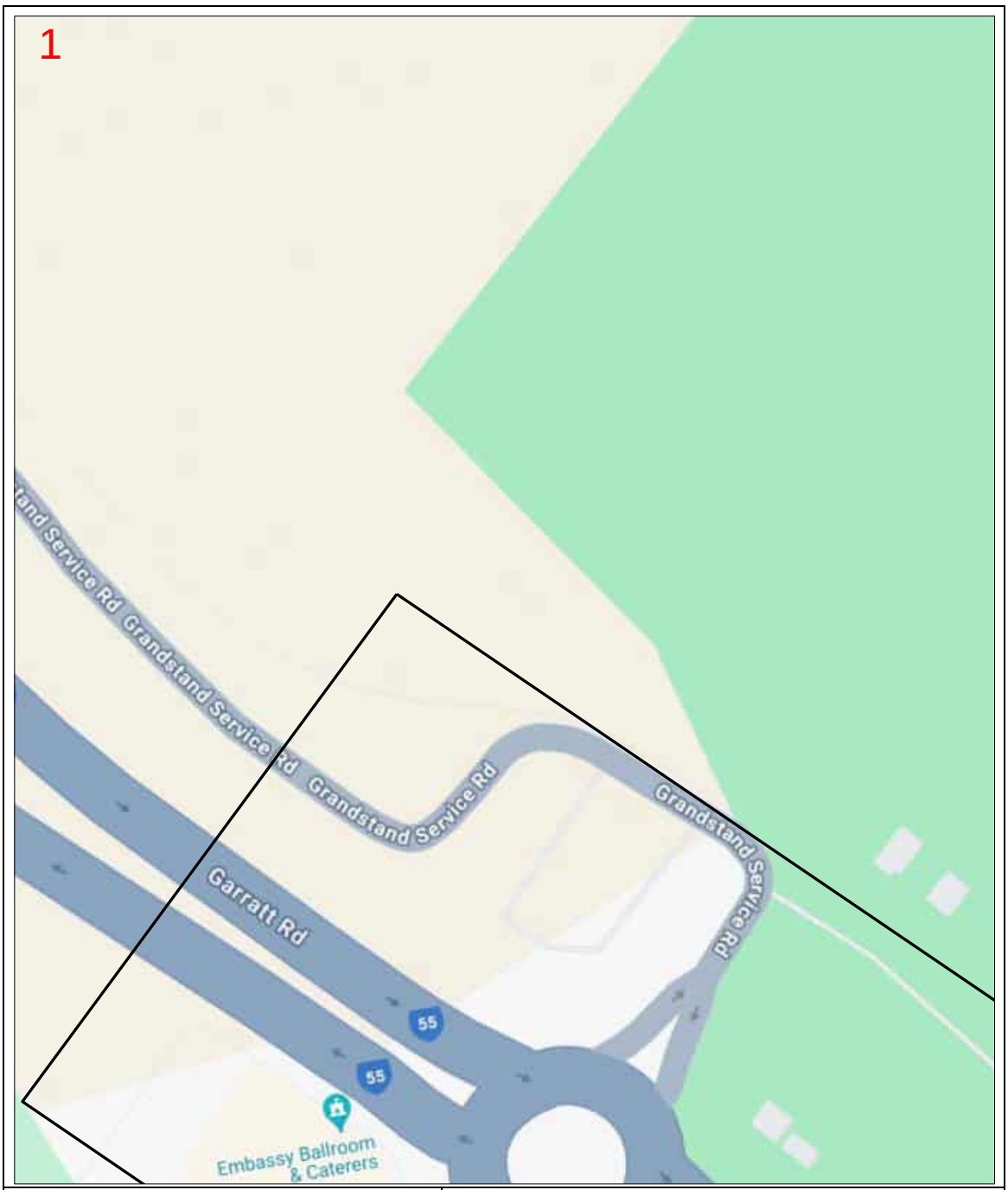
Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240936714
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 24/06/2024 09:36:39	

WARNING
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See the Steps- Telstra Duty of Care that was provided in the email response.



Enquiry Number: 240936711

Map Sheet: 1

Scale: 1: 750

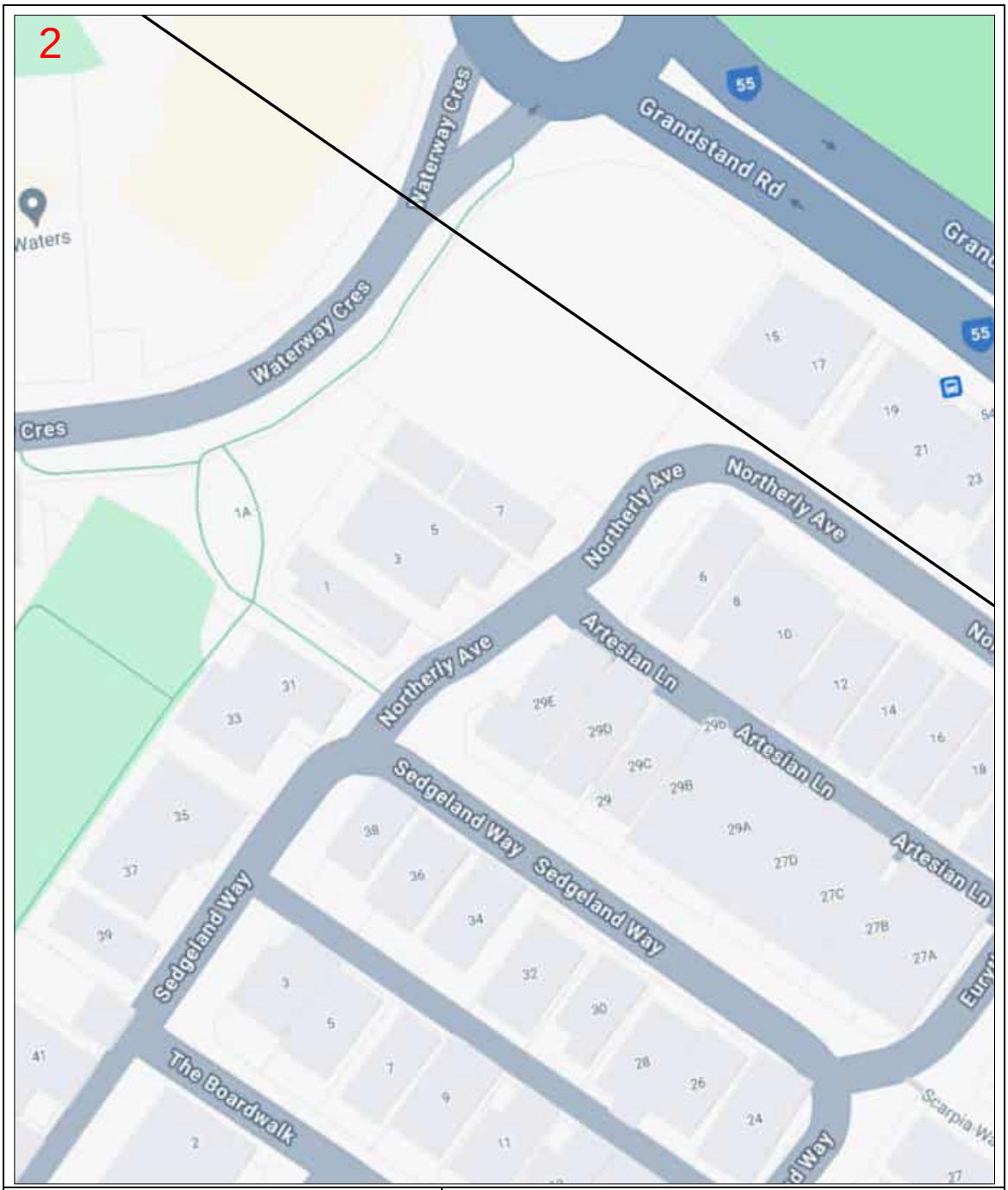
0 0.008km

N

LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240936711

Map Sheet: 2

Scale: 1: 750

0 0.008km

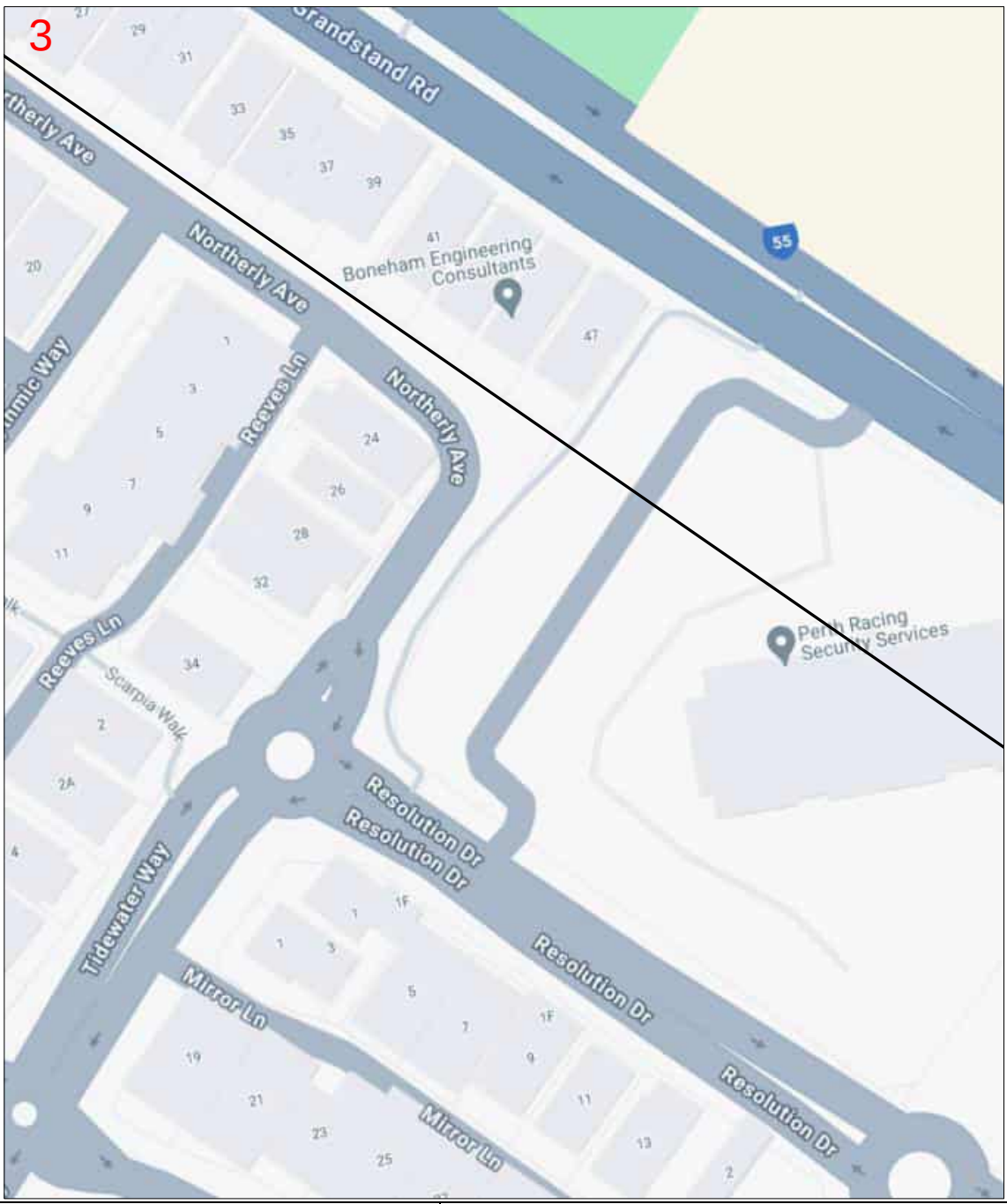
N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240936711

Map Sheet: 3

Scale: 1: 750

0 0.008km

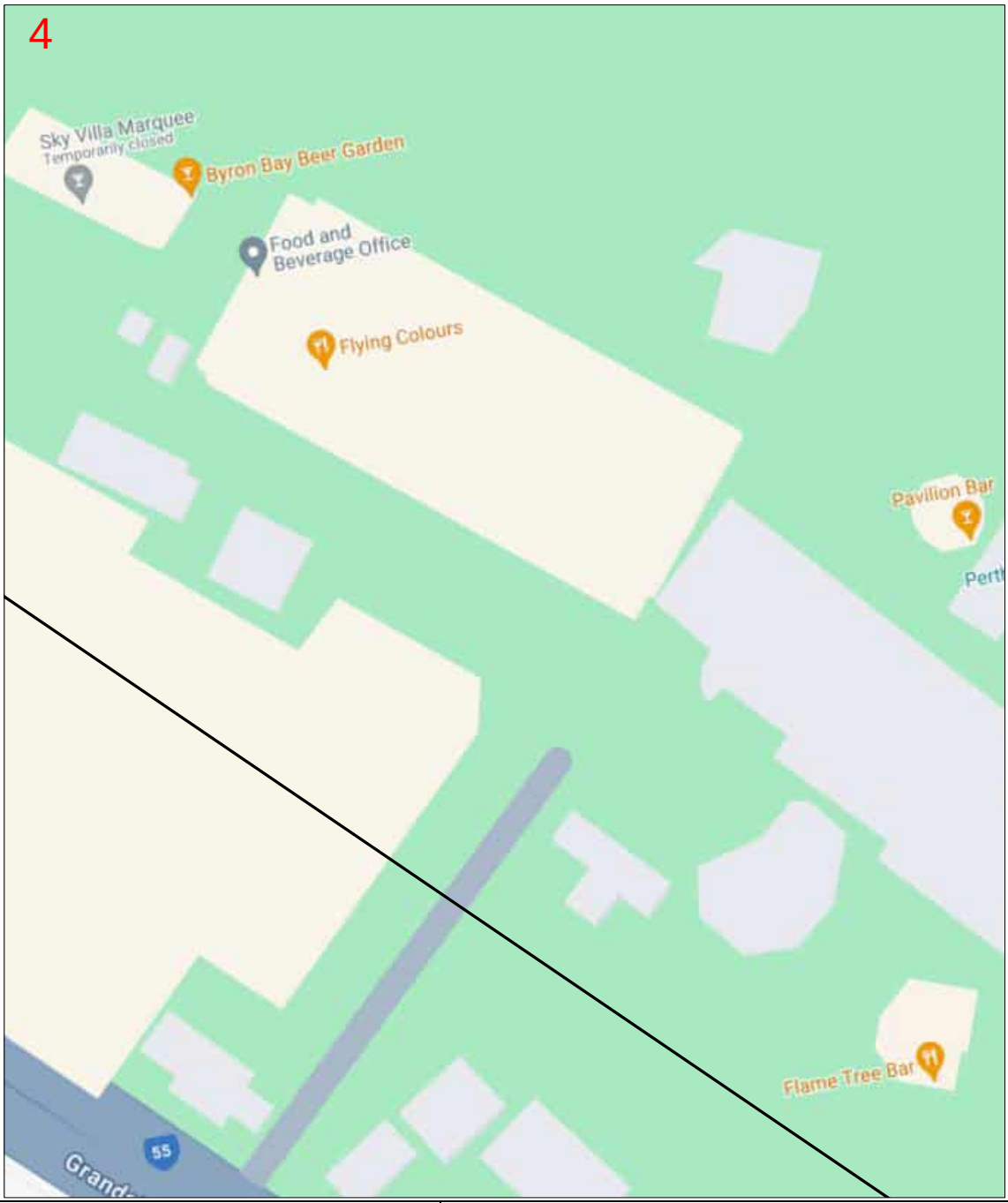
N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240936711

Map Sheet: 4

Scale: 1: 750

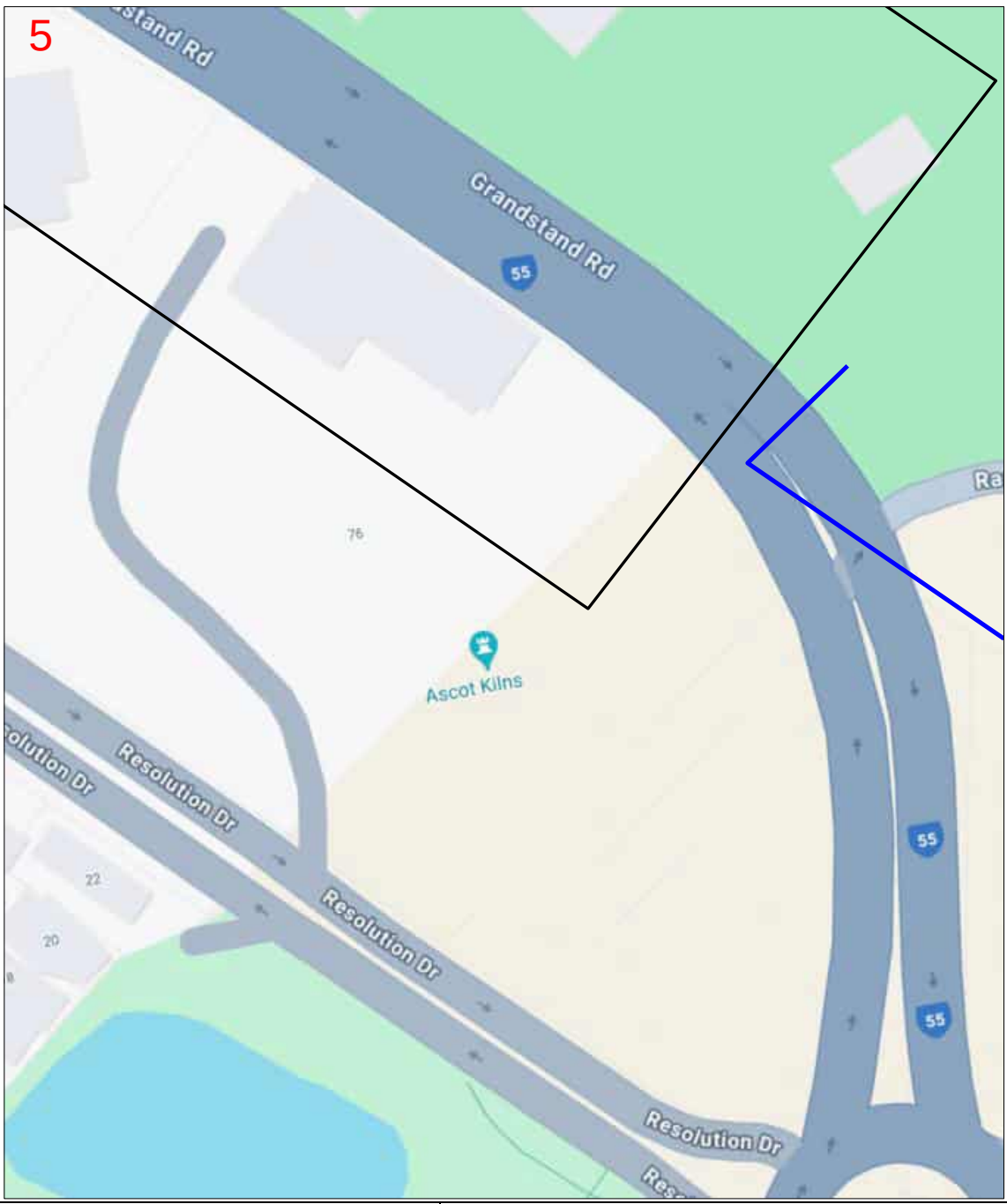
0 0.008km

N

LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240936711

Map Sheet: 5

Scale: 1: 750

0 0.008km

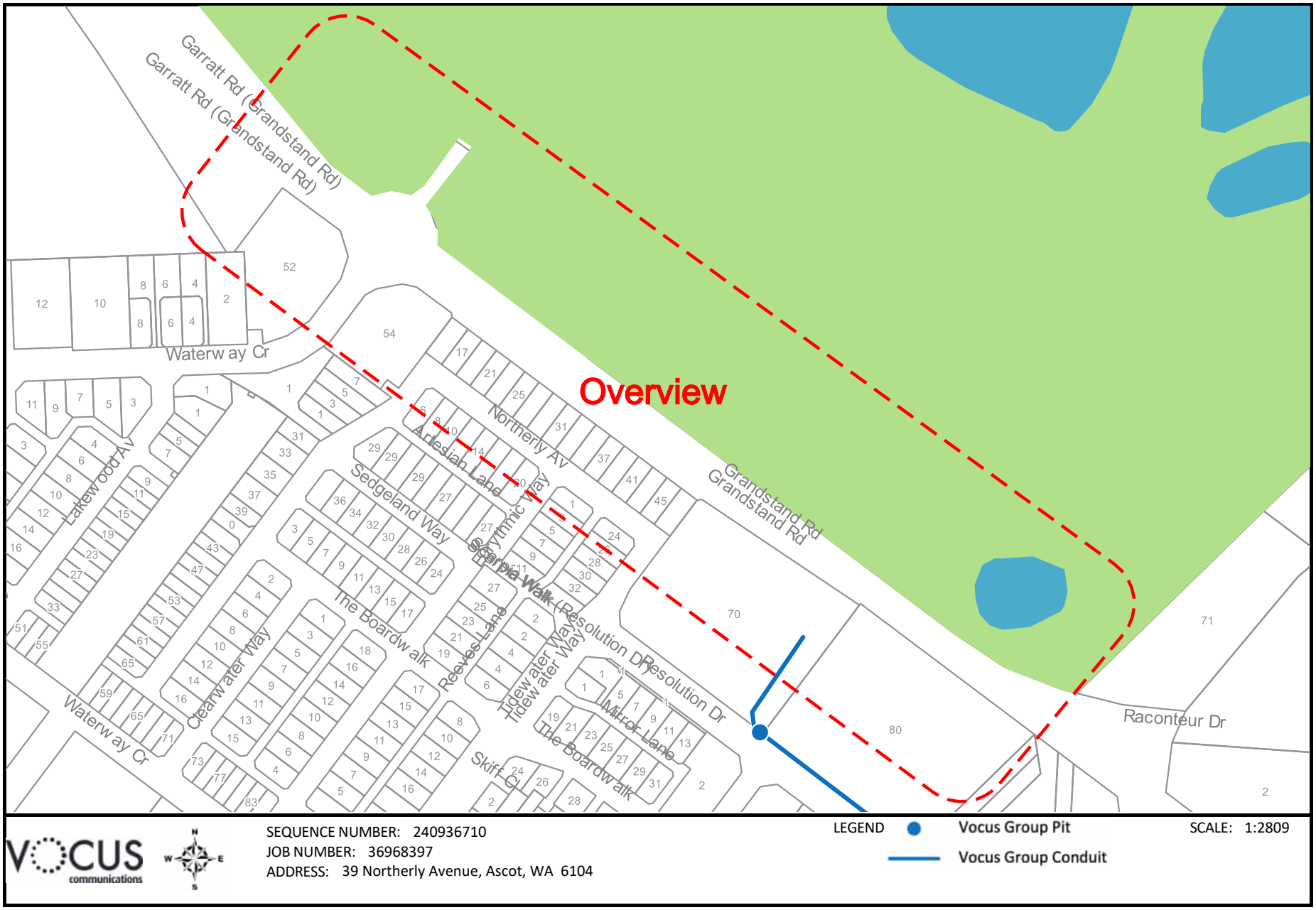
N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.



WATER CORPORATION

Scale:	1:3075
Job No.:	36968397
Sequence No.:	240936715
Print Date:	24 Jun 2024

N

Water

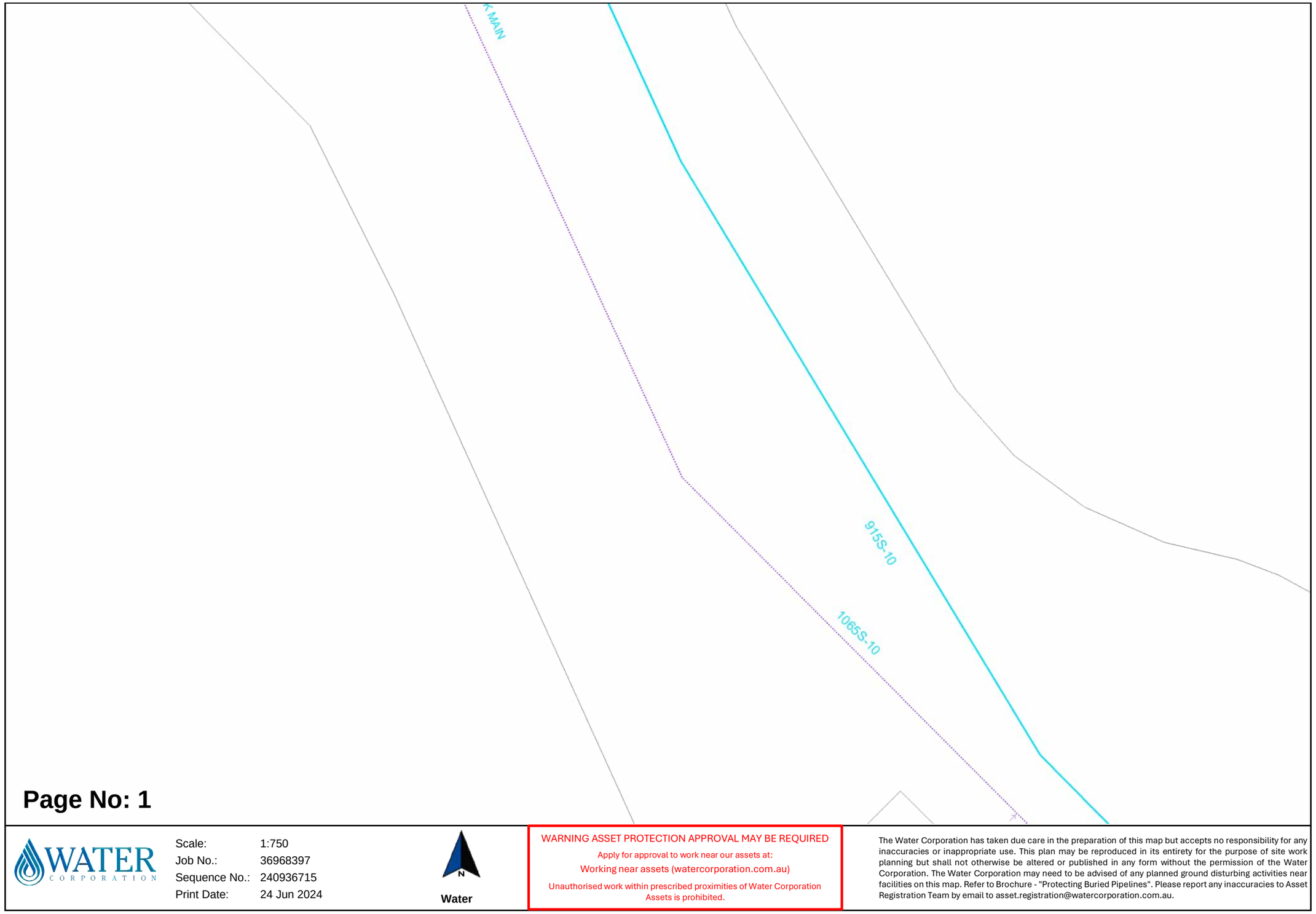
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Page No: 1

WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N

Water

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Page No: 2

WATER CORPORATION

Scale:	1:750
Job No.:	36968397
Sequence No.:	240936715
Print Date:	24 Jun 2024

N

Water

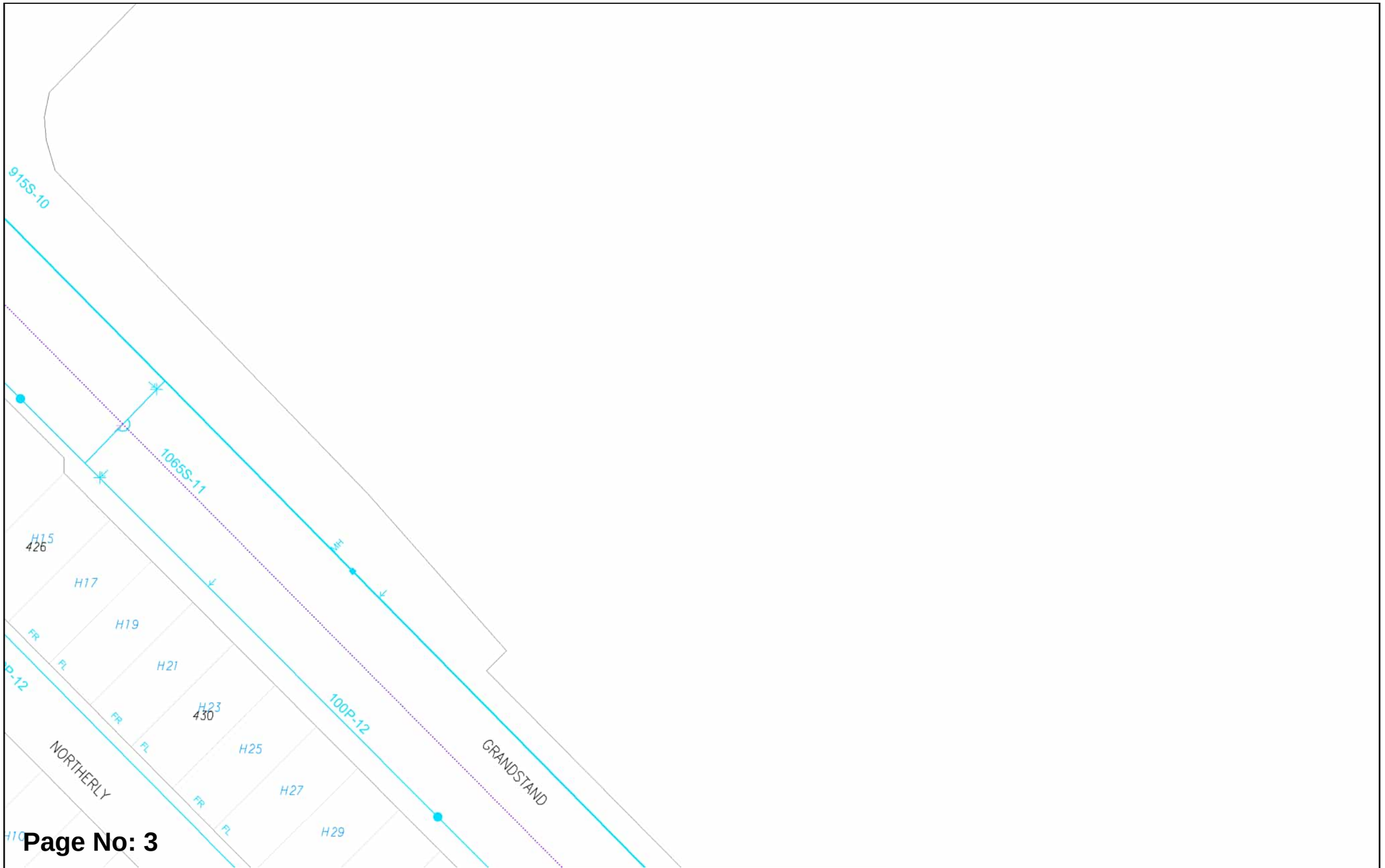
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Page No: 3

WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N

Water

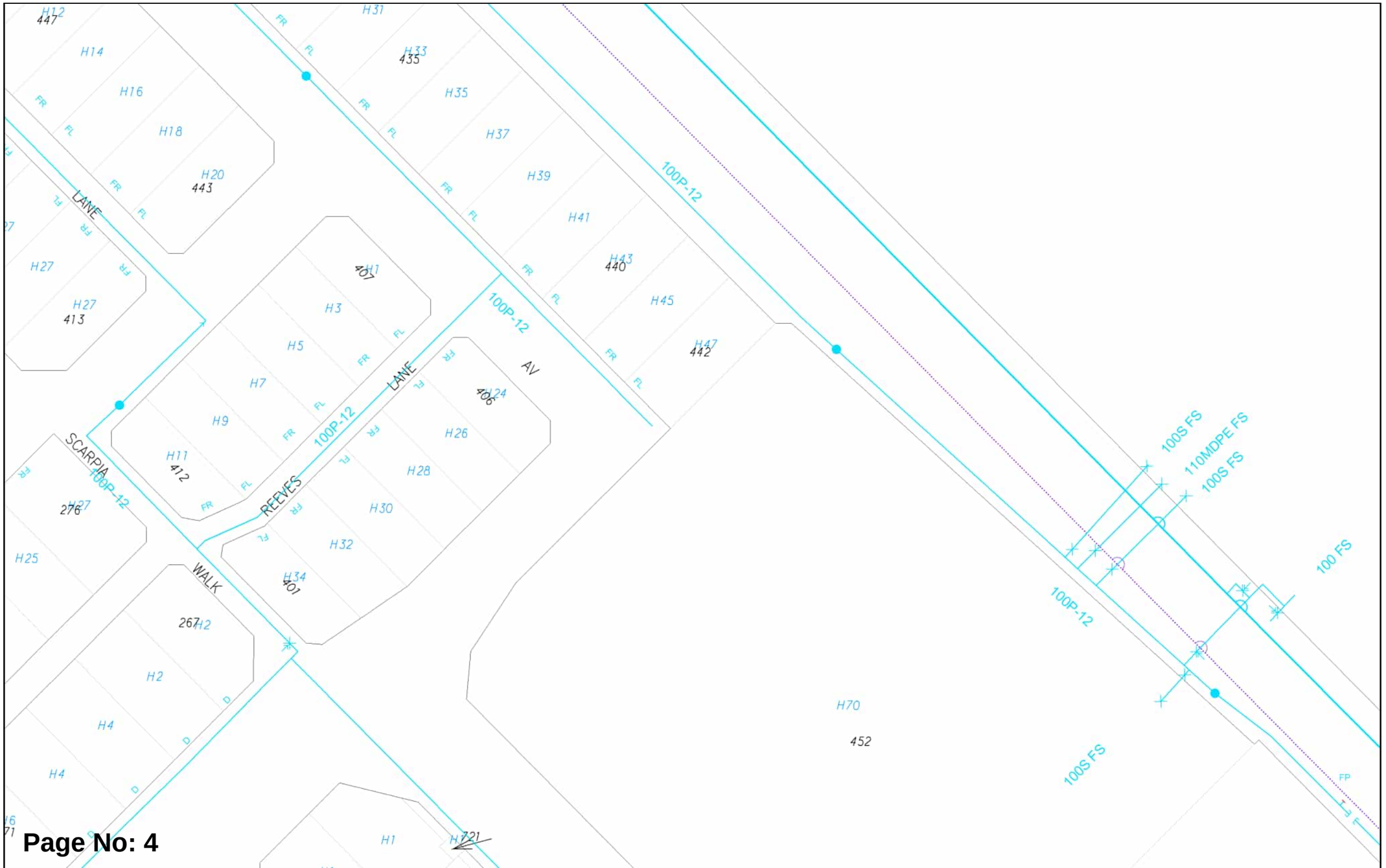
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Page No: 4

WATER CORPORATION

Scale:	1:750
Job No.:	36968397
Sequence No.:	240936715
Print Date:	24 Jun 2024

N

Water

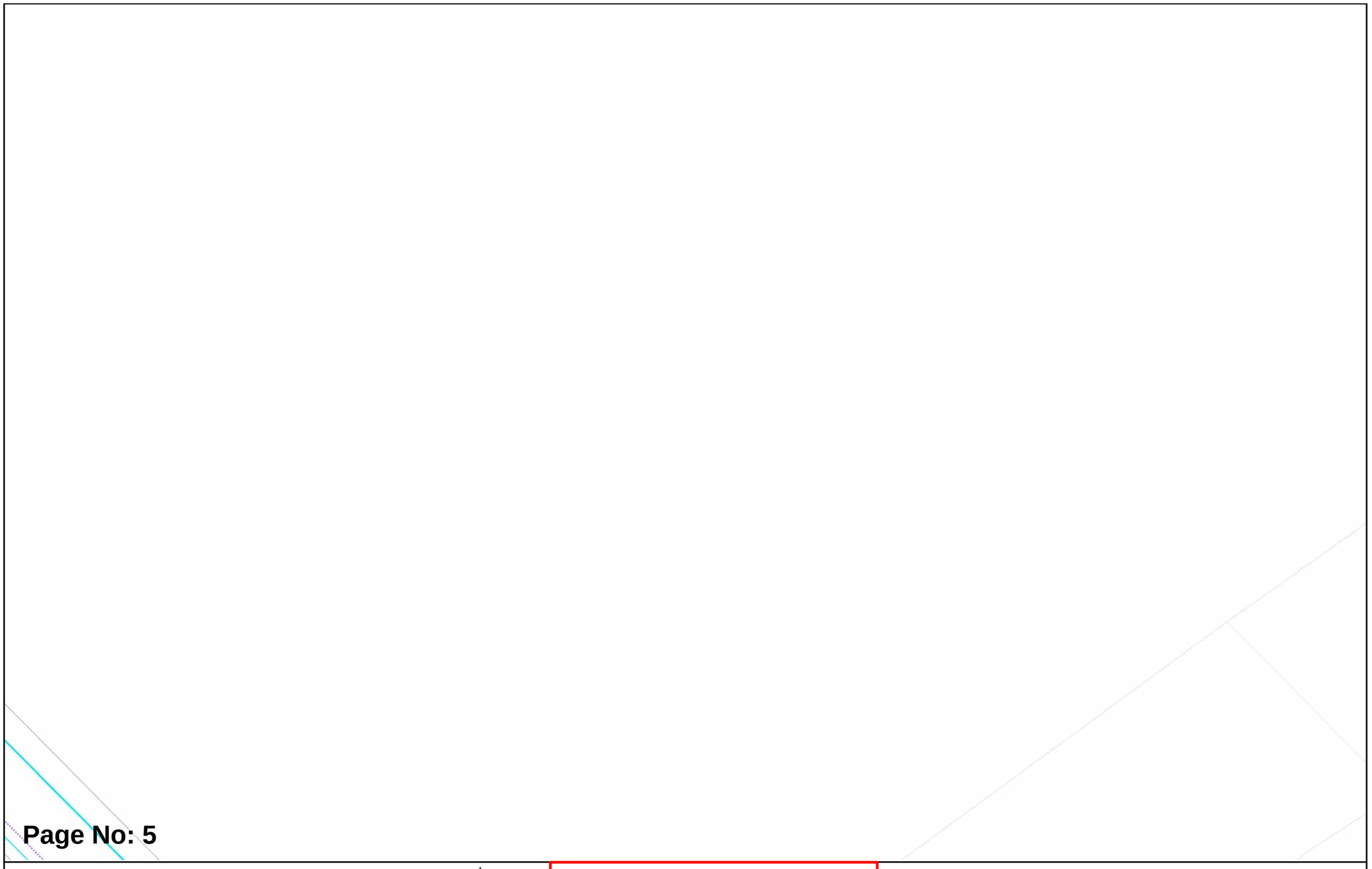
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Page No: 5

WATER CORPORATION

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Page No: 6

WATER CORPORATION

Scale:	1:750
Job No.:	36968397
Sequence No.:	240936715
Print Date:	24 Jun 2024

N

Water

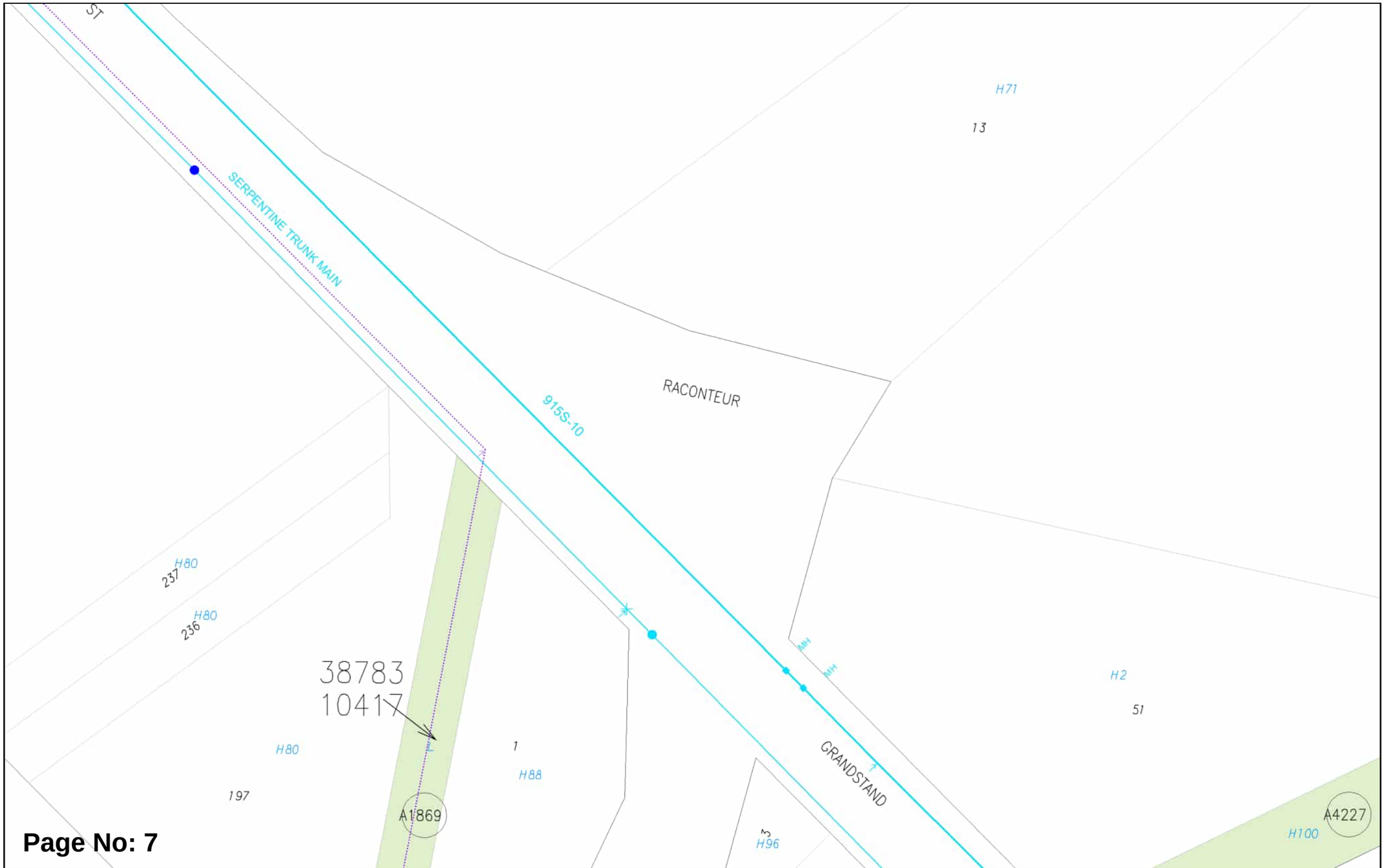
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Page No: 7

WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N
Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED
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WATER CORPORATION

Scale:	1:2790
Job No.:	36968397
Sequence No.:	240936715
Print Date:	24 Jun 2024

N

Sewer

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Water Corp - Non-critical Plan.docx (21 May 2024)



Page No: 1

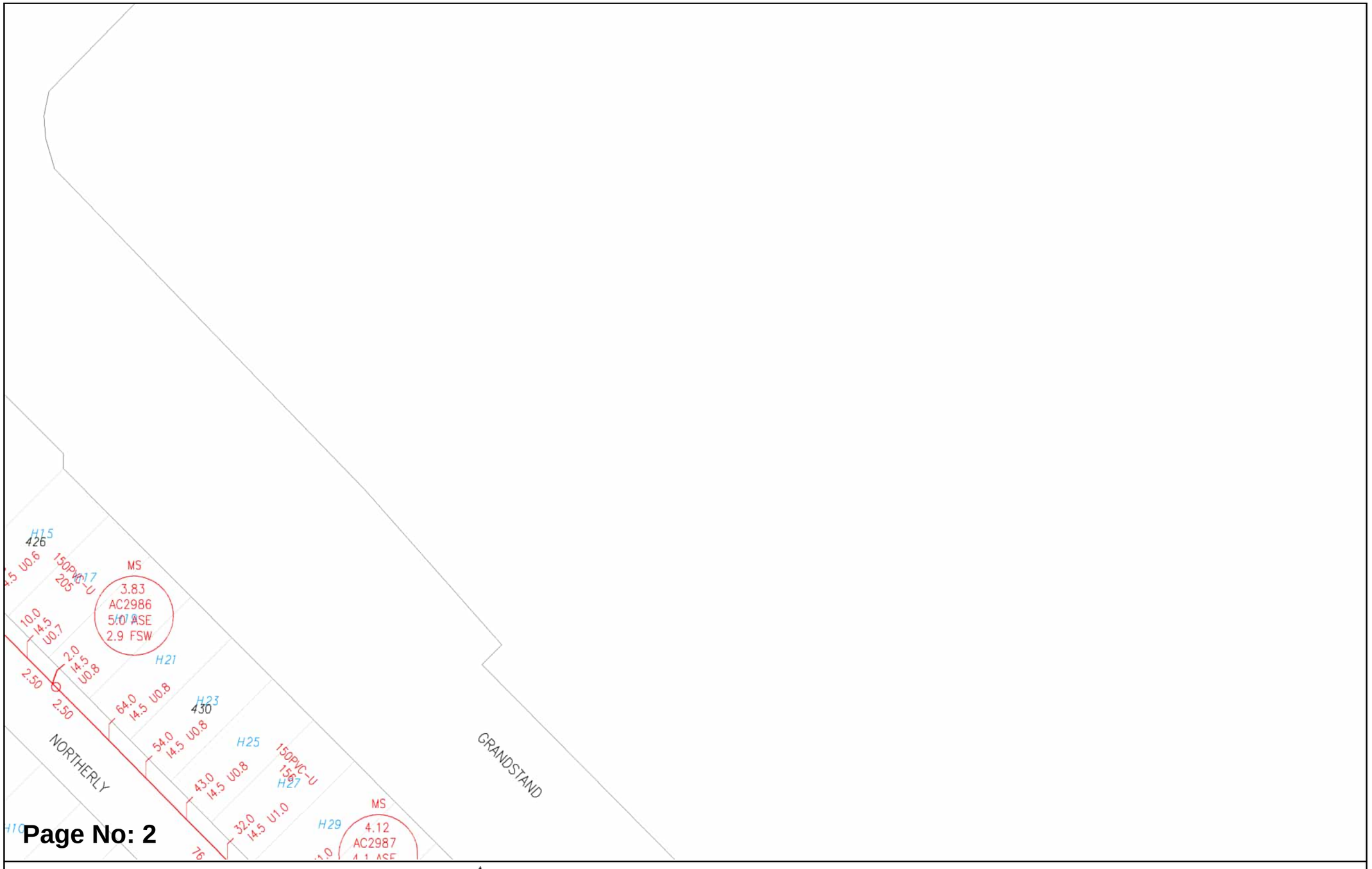
WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N

Sewer

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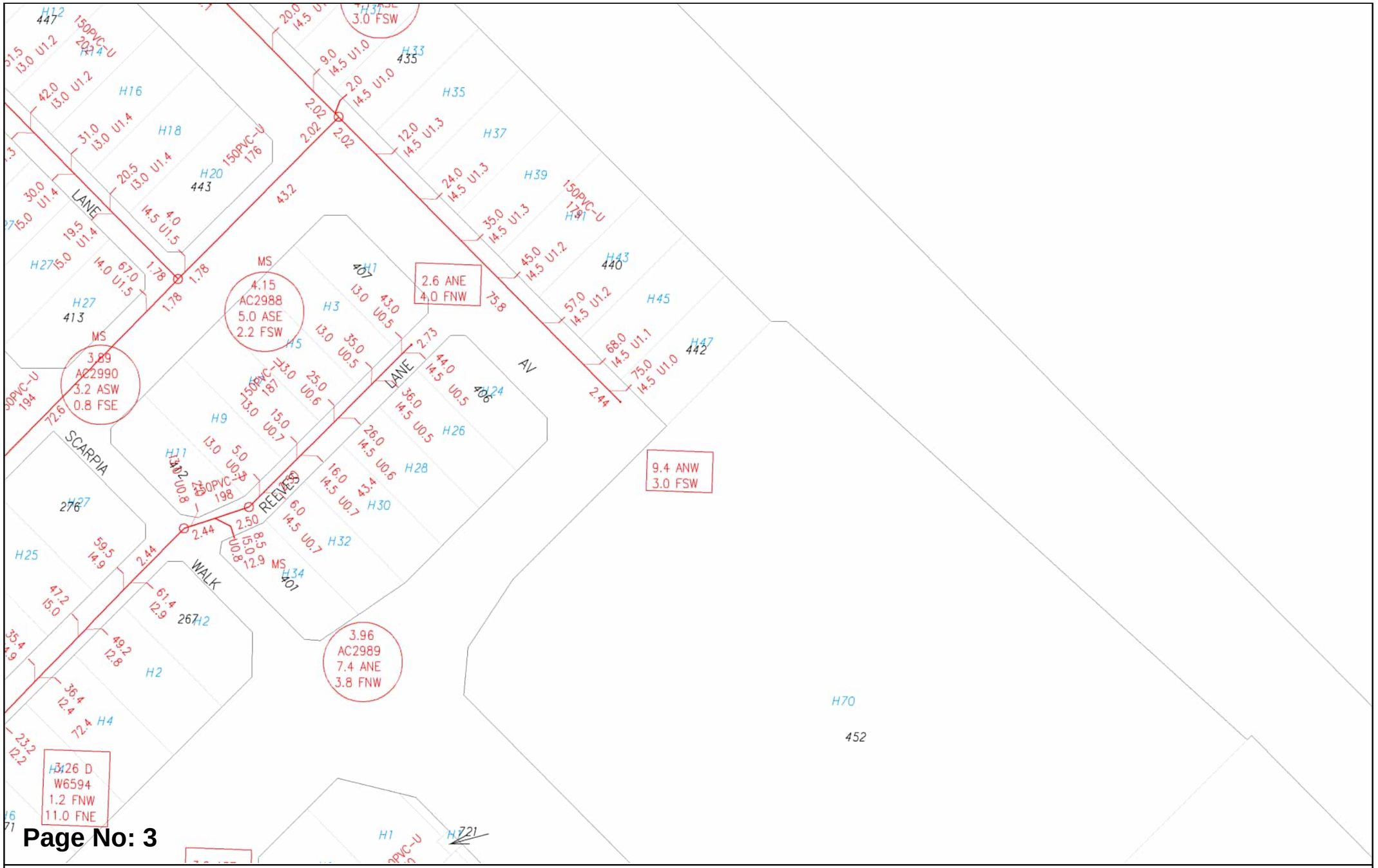
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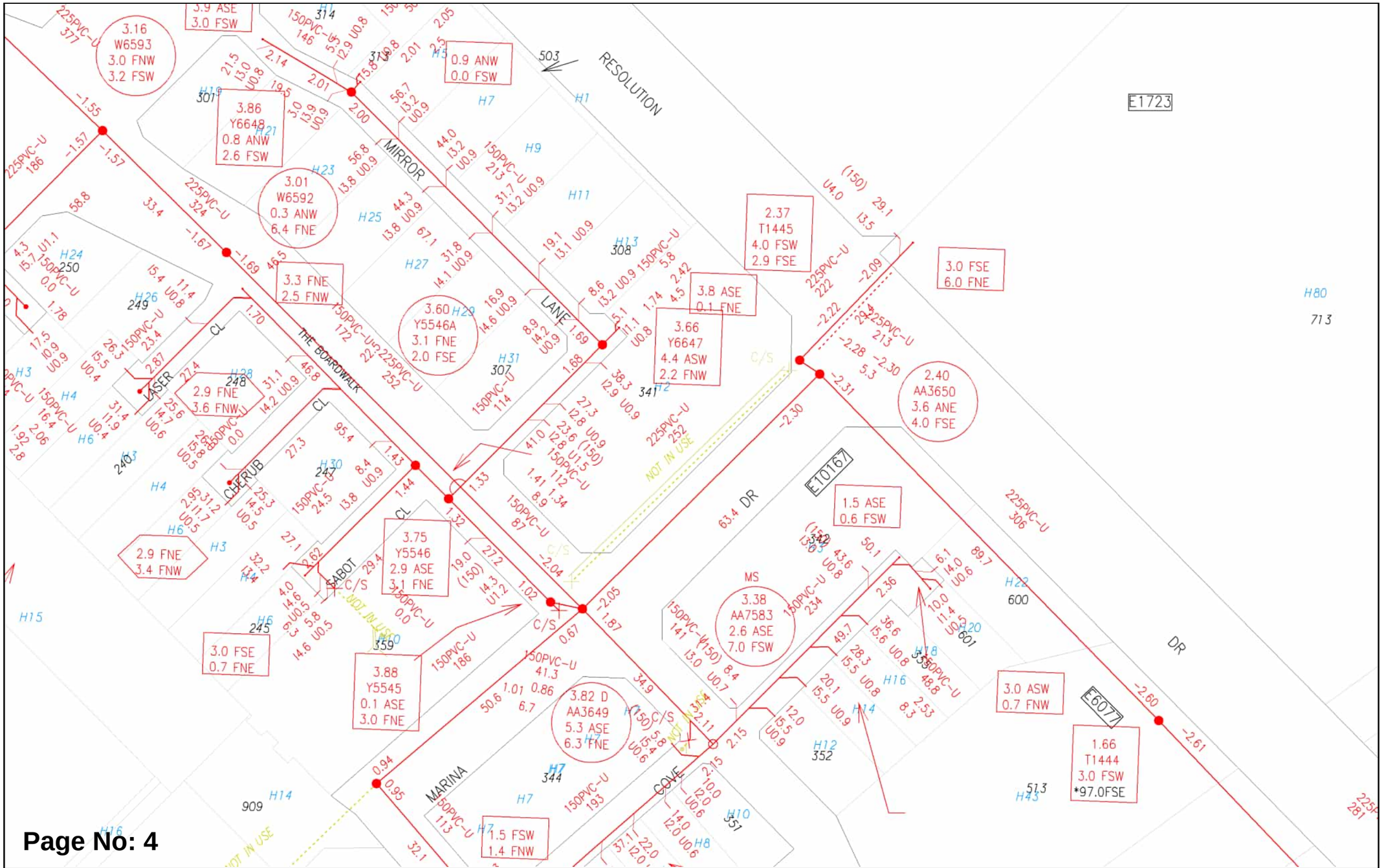


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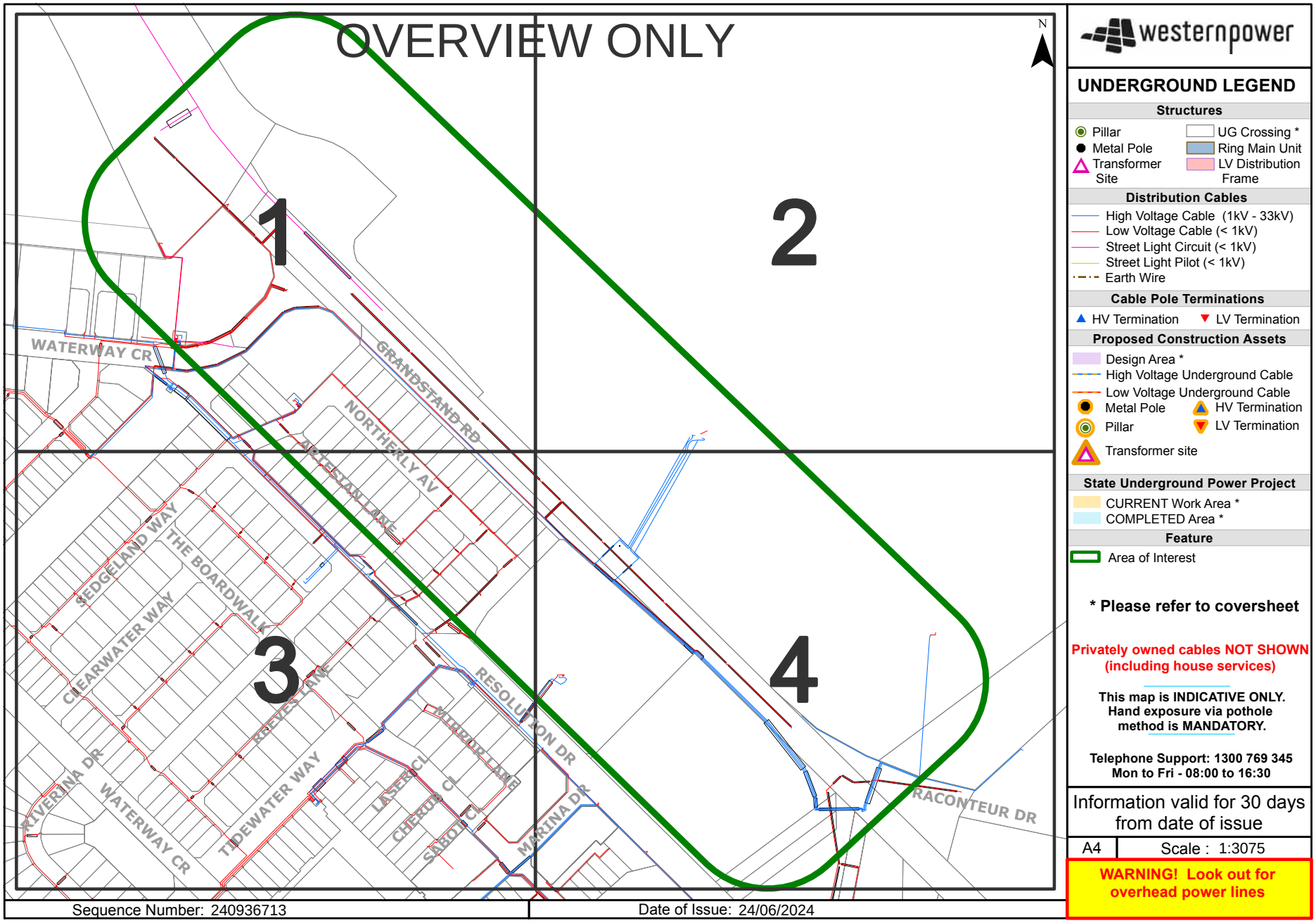
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WATER CORPORATION

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westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
- Transformer Site
- UG Crossing *
- Ring Main Unit
- LV Distribution Frame

Distribution Cables

- High Voltage Cable (1kV - 33kV)
- Low Voltage Cable (< 1kV)
- Street Light Circuit (< 1kV)
- Street Light Pilot (< 1kV)
- Earth Wire

Cable Pole Terminations

- HV Termination
- LV Termination

Proposed Construction Assets

- Design Area *
- High Voltage Underground Cable
- Low Voltage Underground Cable
- Metal Pole
- Pillar
- Transformer site
- HV Termination
- LV Termination

State Underground Power Project

- CURRENT Work Area *
- COMPLETED Area *

Feature

- Area of Interest

*** Please refer to coversheet**

Privately owned cables NOT SHOWN (including house services)

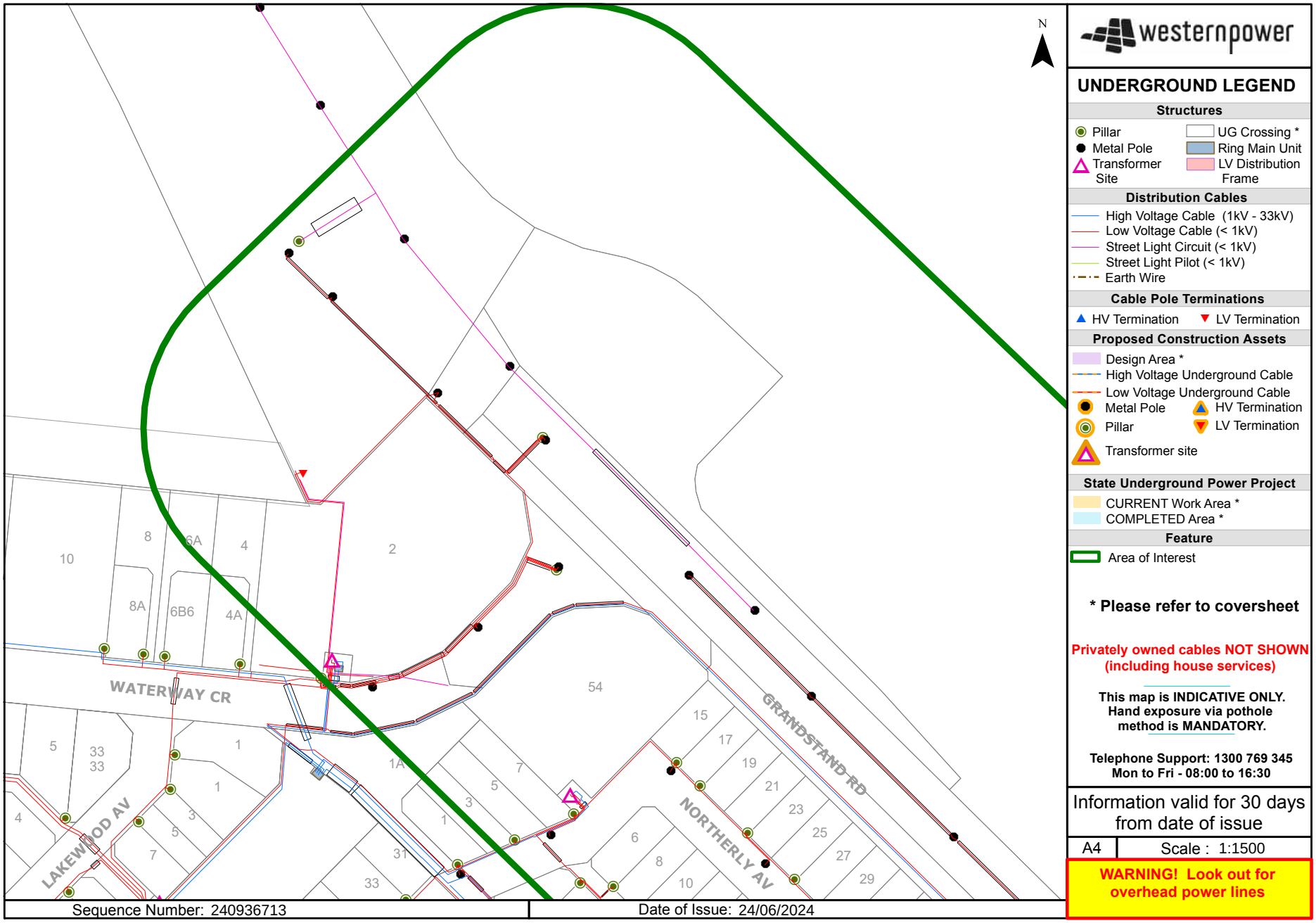
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Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30

Information valid for 30 days from date of issue

A4 | Scale : 1:3075

WARNING! Look out for overhead power lines



westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
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- UG Crossing *
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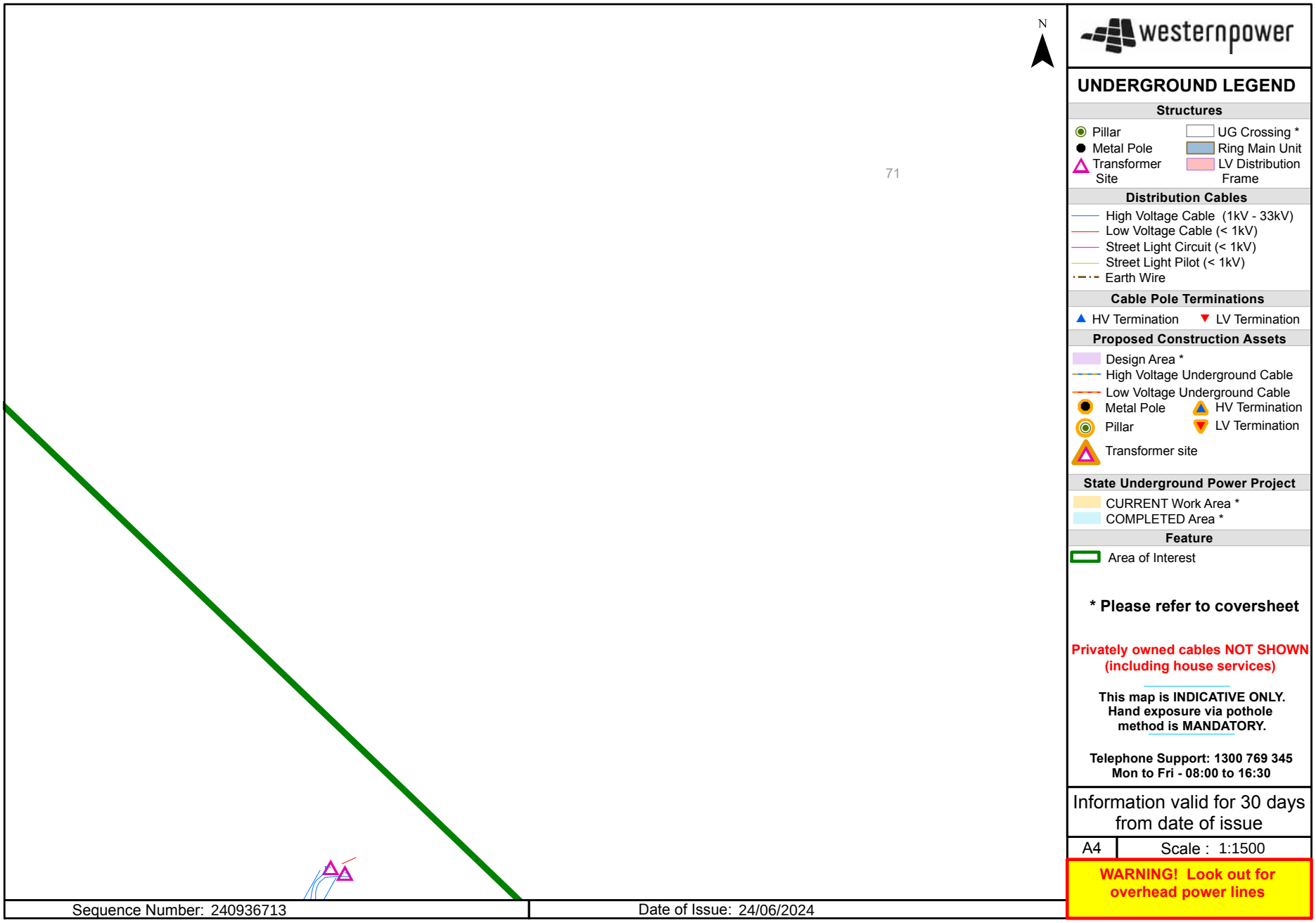
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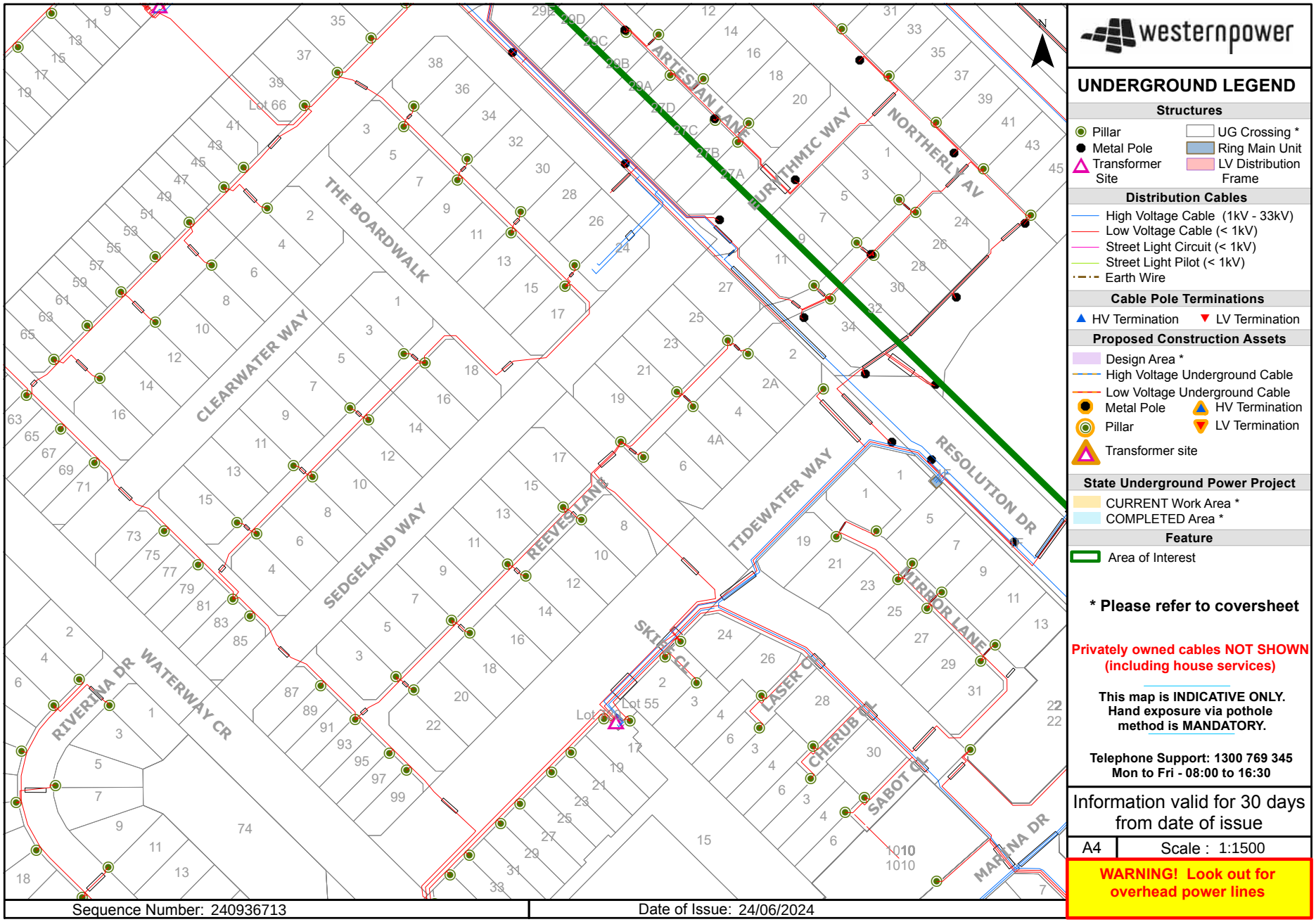
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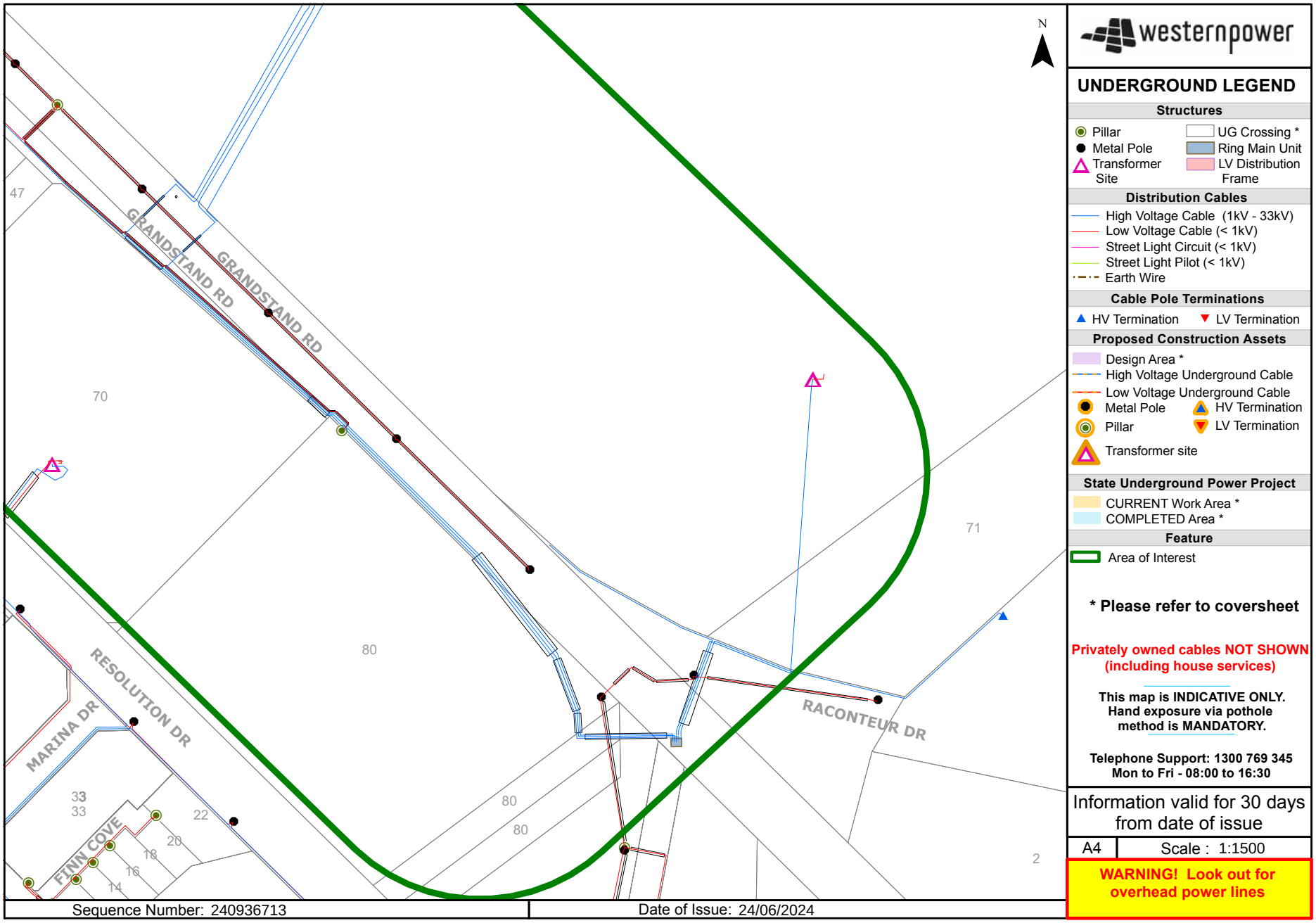
A4 | Scale : 1:1500

WARNING! Look out for overhead power lines

Sequence Number: 240936713 | Date of Issue: 24/06/2024


N
71
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
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Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
HV Termination
Pillar
LV Termination
Transformer site
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
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westernpower
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Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines
THE BOARDWALK
CLEARWATER WAY
SEDGELAND WAY
WATERWAY CR
RIVERINA DR
REEVES LANE
TIDEWATER WAY
RESOLUTION DR
HARBOR LANE
ARTESIAN LANE
RHYTHMIC WAY
NORTHERLY AV
SKETCH CL
LASER CL
CHERUB CT
SABOT CT
MARINA DR
Lot 66
Lot 55
Sequence Number: 240936713
Date of Issue: 24/06/2024



westernpower

UNDERGROUND LEGEND

Structures

- Pillar
- Metal Pole
- Transformer Site
- UG Crossing *
- Ring Main Unit
- LV Distribution Frame

Distribution Cables

- High Voltage Cable (1kV - 33kV)
- Low Voltage Cable (< 1kV)
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- LV Termination

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- COMPLETED Area *

Feature

- Area of Interest

*** Please refer to coversheet**

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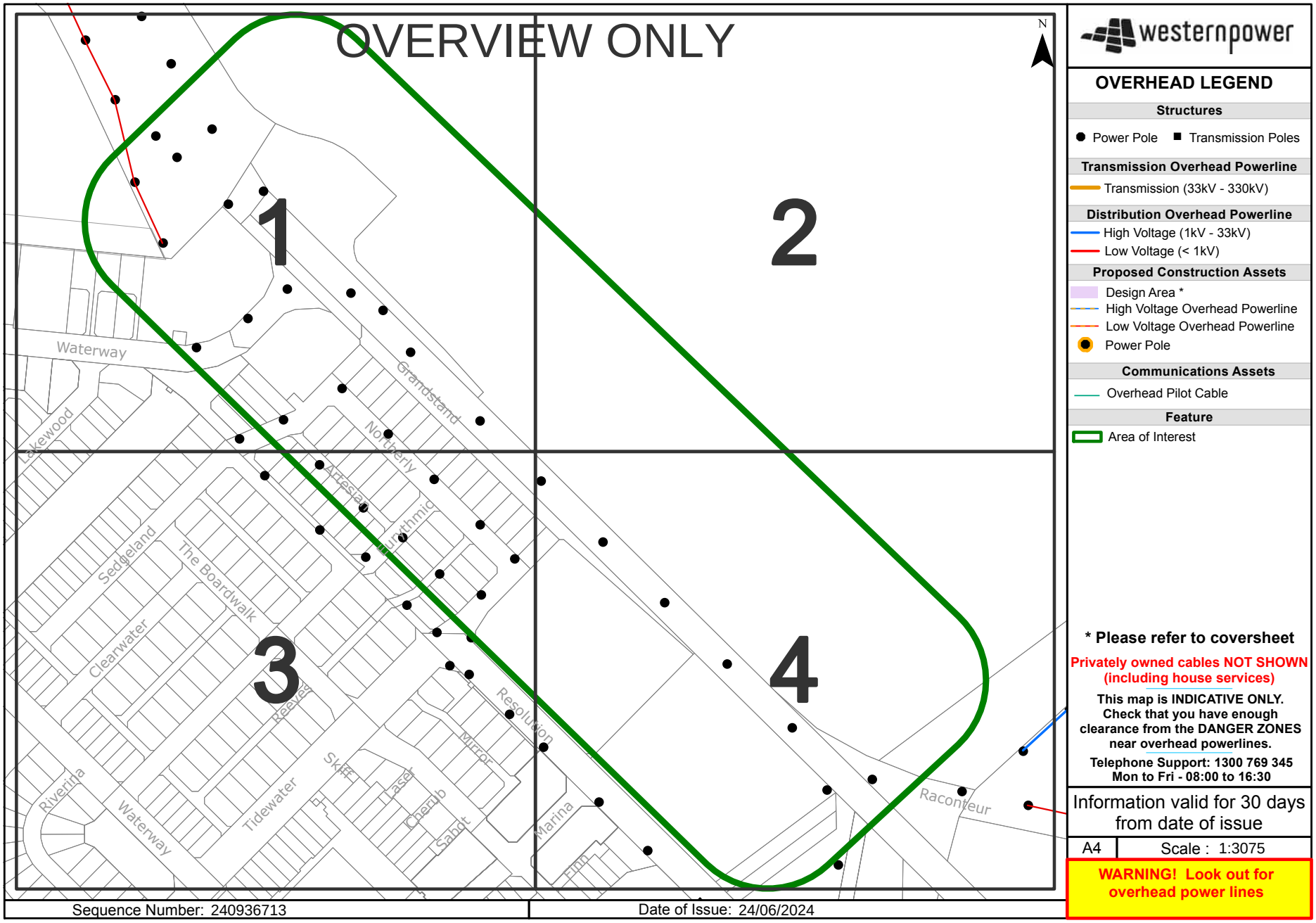
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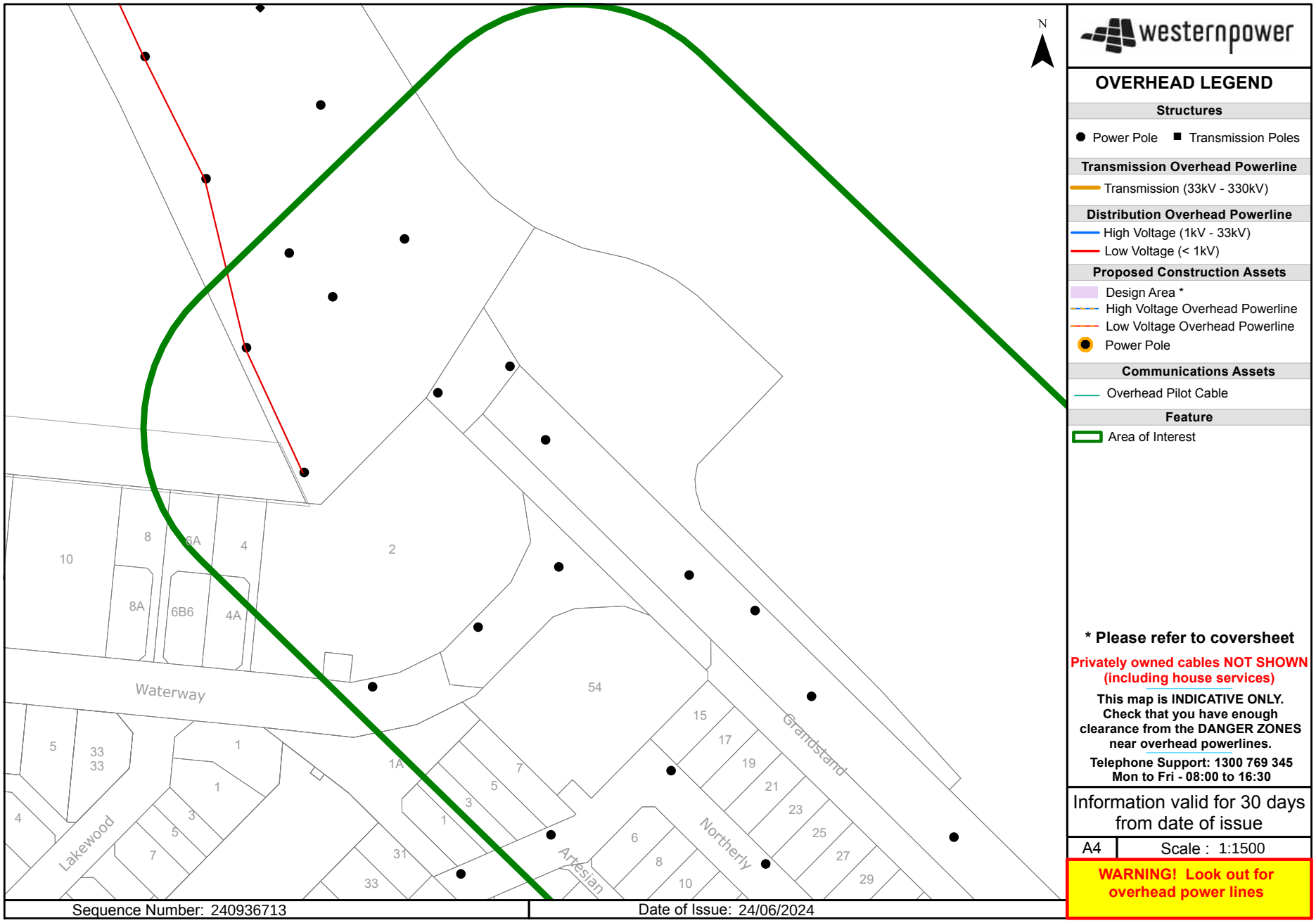
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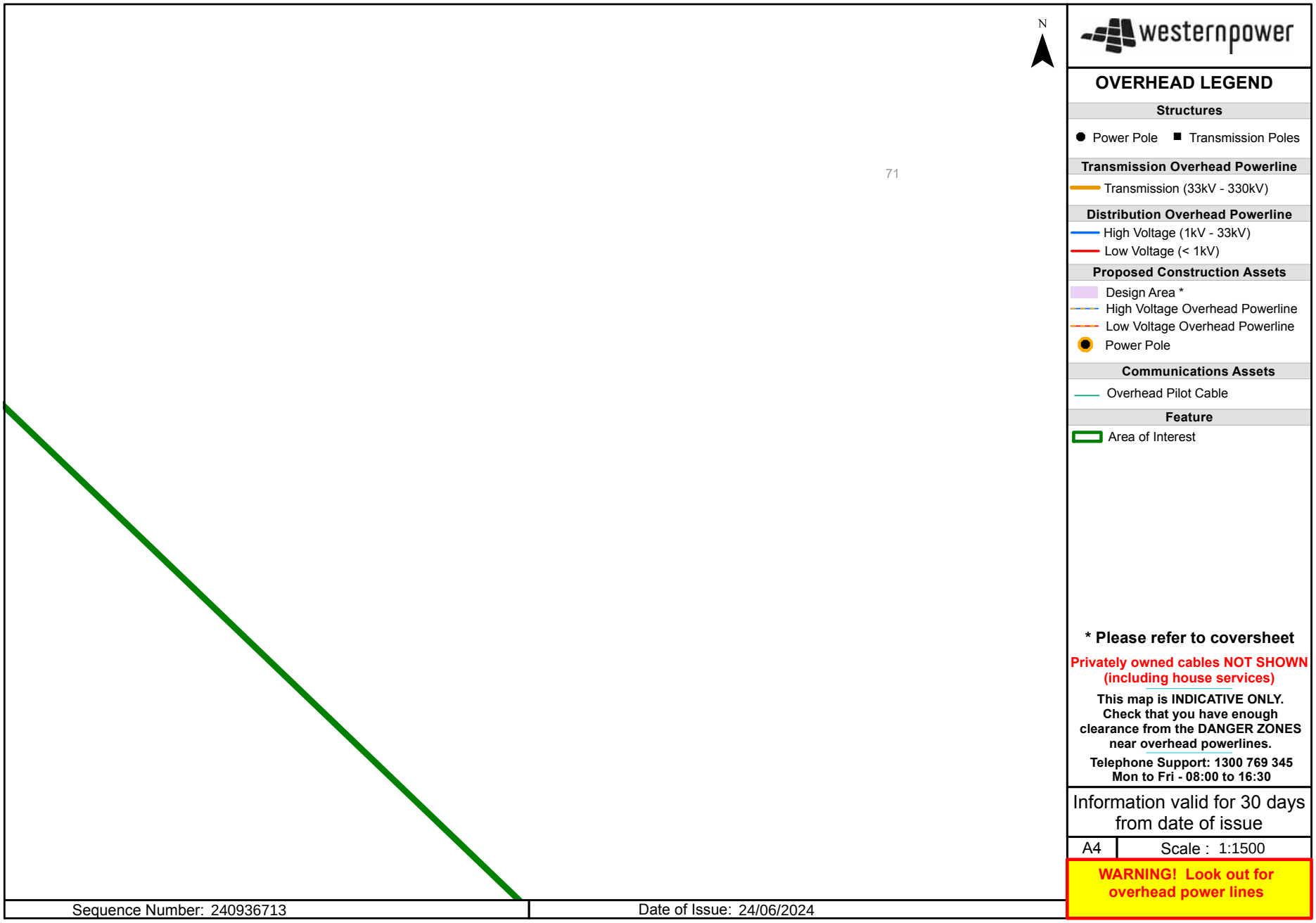
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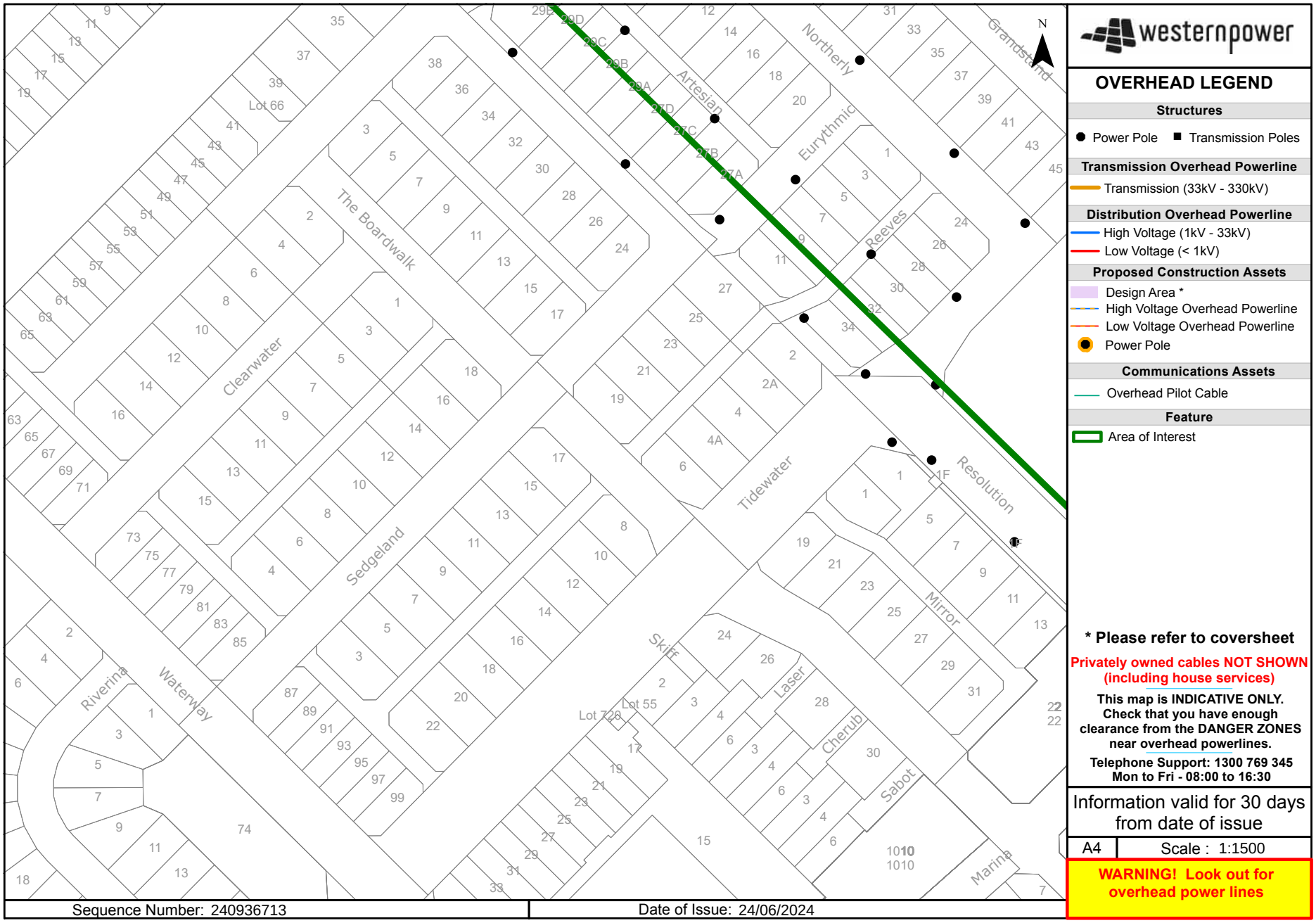
A4 | Scale : 1:1500

WARNING! Look out for overhead power lines


OVERVIEW ONLY
N
1
2
3
4
Waterway
Grandstand
Lakewood
Northerly
Arrestal
Sedgeland
The Boardwalk
Clearwater
Riverina
Waterway
Tidewater
Reeves
Skeg
Laser
Cherub
Sabot
Mirror
Resolution
Marina
Finn
Raconteur
Sequence Number: 240936713
Date of Issue: 24/06/2024
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:3075
WARNING! Look out for overhead power lines


N
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
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A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Waterway
Lakewood
Artesian
Northerly
Grandstand
Sequence Number: 240936713
Date of Issue: 24/06/2024


N
71
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
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A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240936713
Date of Issue: 24/06/2024



westernpower

OVERHEAD LEGEND

Structures

- Power Pole
- Transmission Poles

Transmission Overhead Powerline

- Transmission (33kV - 330kV)

Distribution Overhead Powerline

- High Voltage (1kV - 33kV)
- Low Voltage (< 1kV)

Proposed Construction Assets

- Design Area *
- High Voltage Overhead Powerline
- Low Voltage Overhead Powerline
- Power Pole

Communications Assets

- Overhead Pilot Cable

Feature

- Area of Interest

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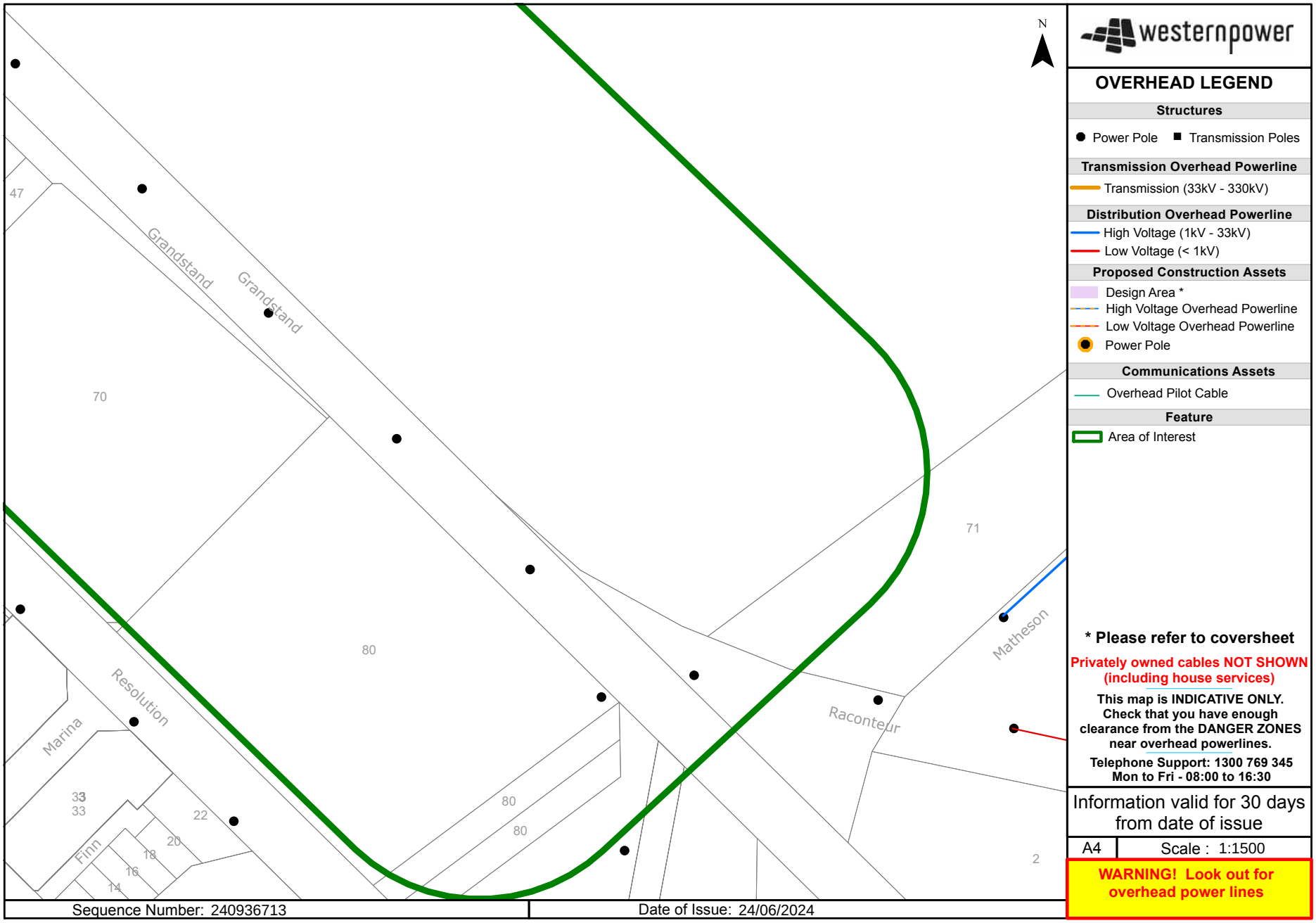
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Information valid for 30 days from date of issue

A4	Scale : 1:1500

WARNING! Look out for overhead power lines


N
47
Grandstand
Grandstand
70
80
71
Resolution
Marina
Raconteur
Matheson
33
33
22
20
18
16
14
80
80
2
Finn
Sequence Number: 240936713
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westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
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Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines

Job No 36962214

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Subdivision



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
Precinct A	75 Grandstand Road Ascot WA 6104	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900419	ATCO Gas Australia	1300 926 755	NOTIFIED
240900415	NBN Co (WA)	1800 687 626	NOTIFIED
240900413	Optus (WA)	1800 505 777	NOTIFIED
240900417	Telstra (WA)	1800 653 935	NOTIFIED
240900414	TPG Telecom (WA)	1800 786 306	NOTIFIED
240900418	Water Corporation	13 13 95	NOTIFIED
240900416	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

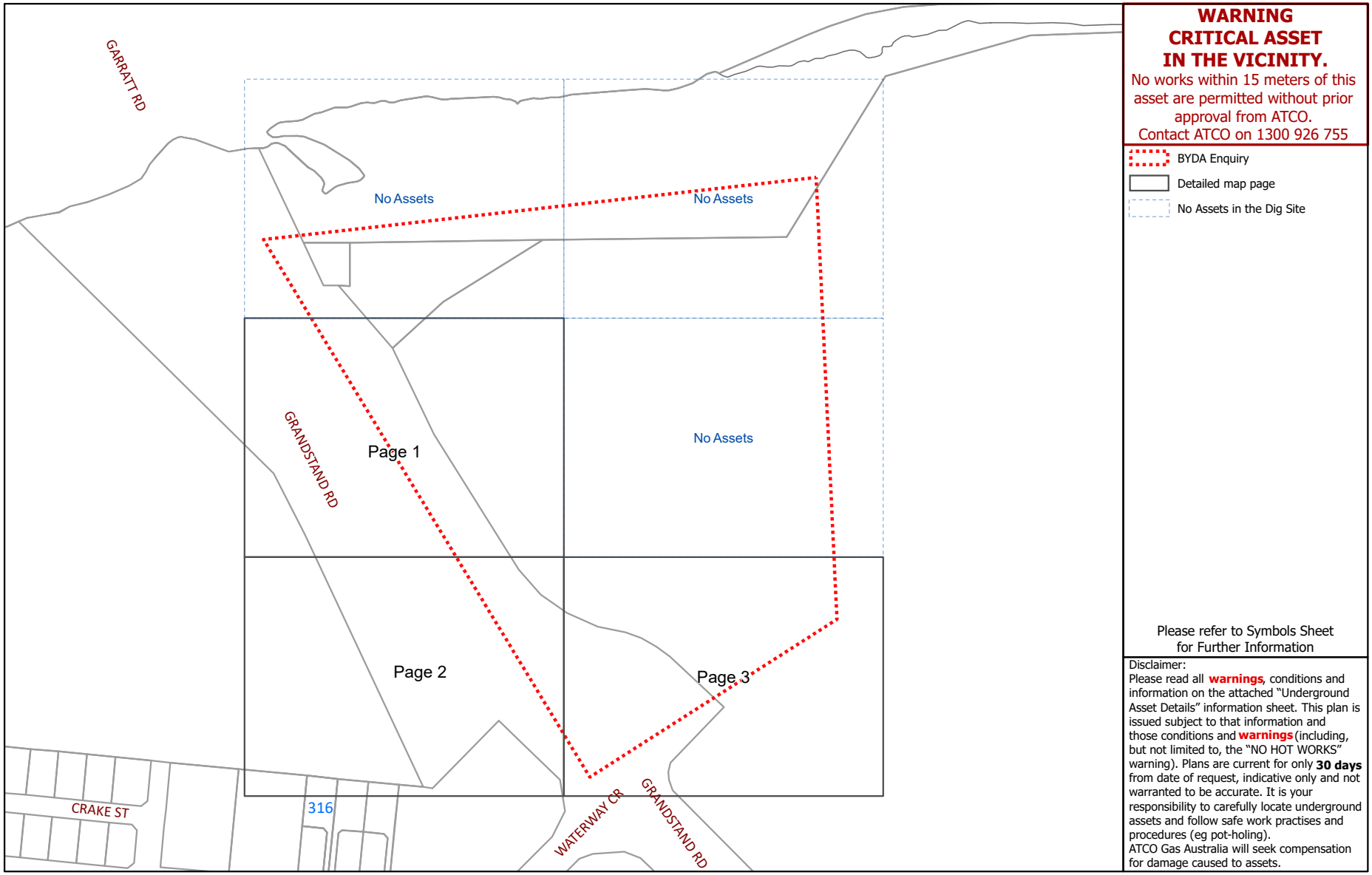
ATCO
©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)
Index Sheet

Seq # 240900419
Job # 36962214

BYDA Location: 75 Grandstand Road Ascot 6104
Scale: 1:2,500

BEFORE YOU DIG www.byda.com.au



WARNING
CRITICAL ASSET
IN THE VICINITY.
No works within 15 meters of this asset are permitted without prior approval from ATCO.
Contact ATCO on 1300 926 755

- BYDA Enquiry
- Detailed map page
- No Assets in the Dig Site

Please refer to Symbols Sheet for Further Information

Disclaimer:
Please read all **warnings**, conditions and information on the attached "Underground Asset Details" information sheet. This plan is issued subject to that information and those conditions and **warnings** (including, but not limited to, the "NO HOT WORKS" warning). Plans are current for only **30 days** from date of request, indicative only and not warranted to be accurate. It is your responsibility to carefully locate underground assets and follow safe work practises and procedures (eg pot-holing).
ATCO Gas Australia will seek compensation for damage caused to assets.

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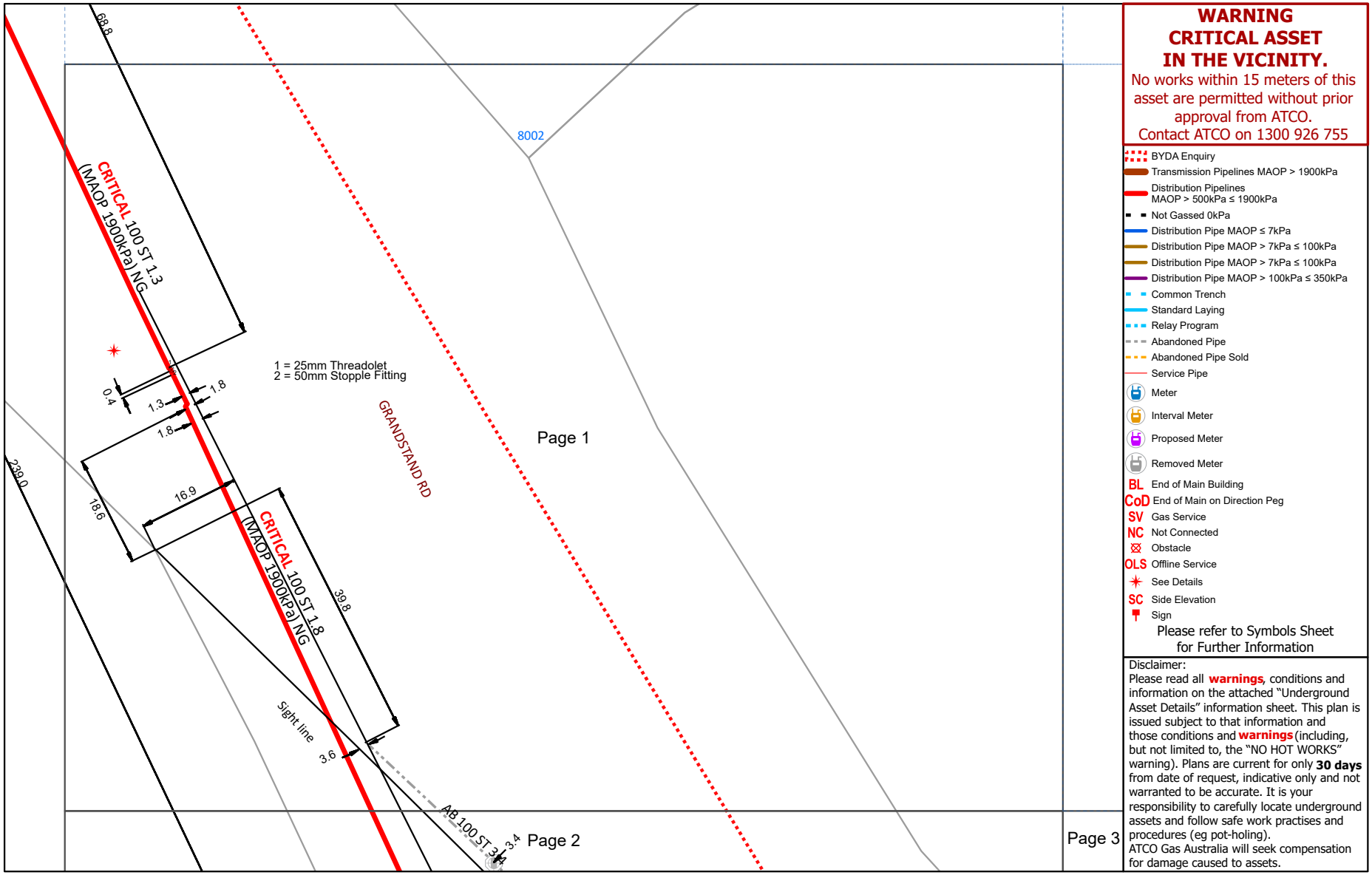
ATCO

©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900419
Job # 36962214

BYDA Location: 75 Grandstand Road Ascot 6104
Scale: 1:800



WARNING
CRITICAL ASSET
IN THE VICINITY.
No works within 15 meters of this asset are permitted without prior approval from ATCO.
Contact ATCO on 1300 926 755

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign

Please refer to Symbols Sheet for Further Information

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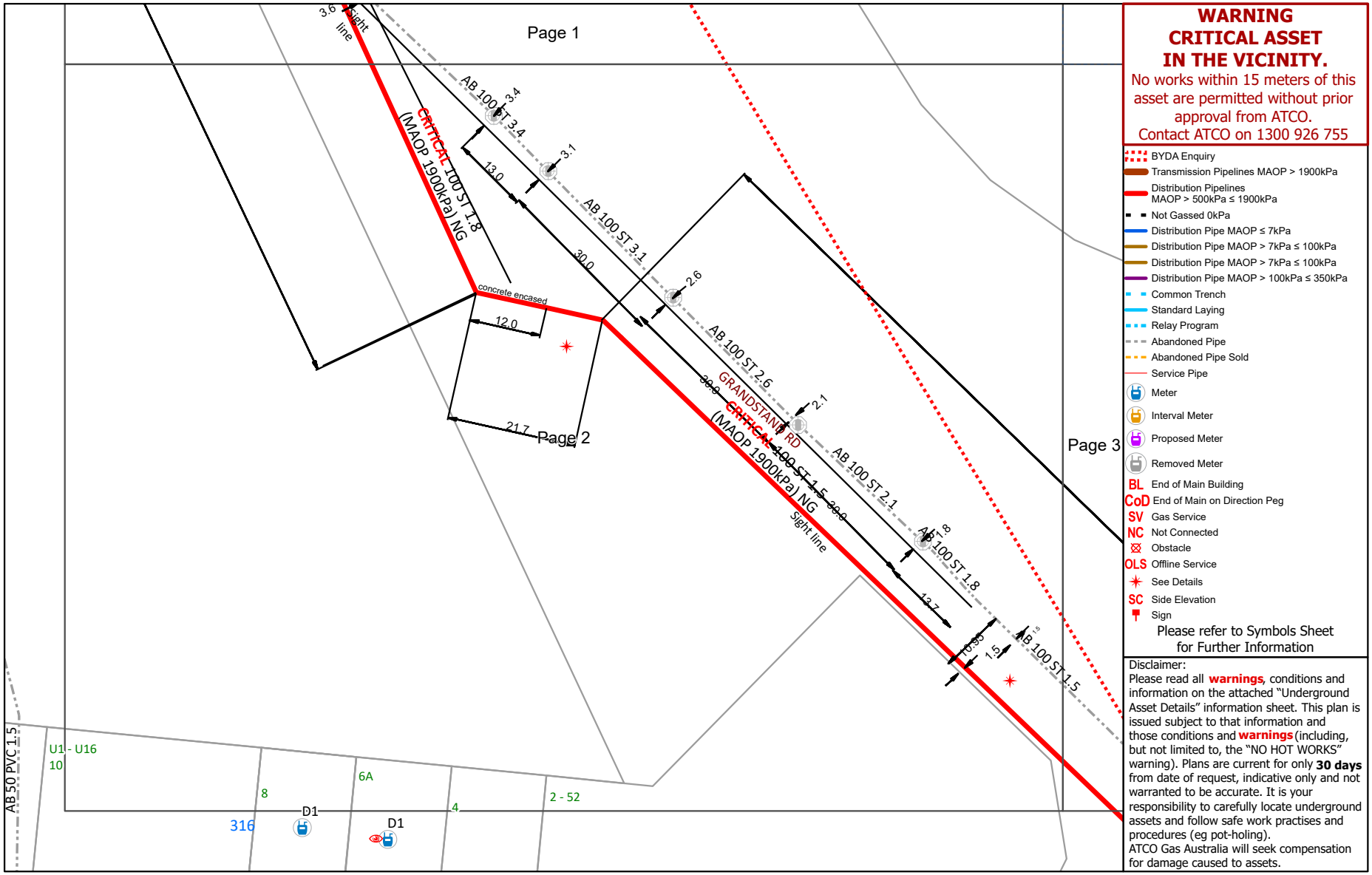
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Seq # 240900419
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BYDA Location: 75 Grandstand Road Ascot 6104
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- SC Side Elevation
- Sign

Please refer to Symbols Sheet for Further Information

Disclaimer:
Please read all **warnings**, conditions and information on the attached "Underground Asset Details" information sheet. This plan is issued subject to that information and those conditions and **warnings** (including, but not limited to, the "NO HOT WORKS" warning). Plans are current for only **30 days** from date of request, indicative only and not warranted to be accurate. It is your responsibility to carefully locate underground assets and follow safe work practises and procedures (eg pot-holing).
ATCO Gas Australia will seek compensation for damage caused to assets.

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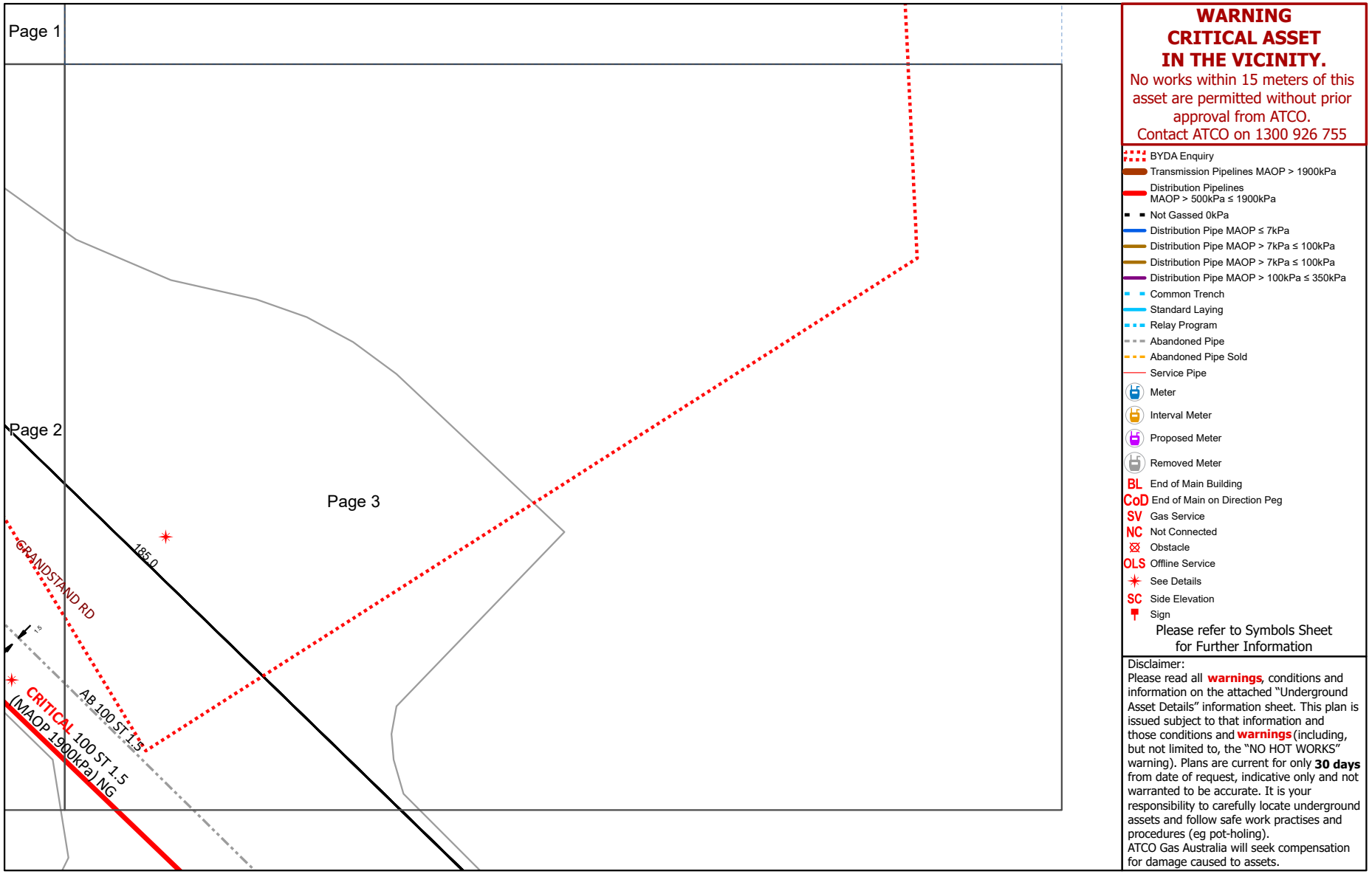
ATCO

©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900419
Job # 36962214

BYDA Location: 75 Grandstand Road Ascot 6104
Scale: 1:800



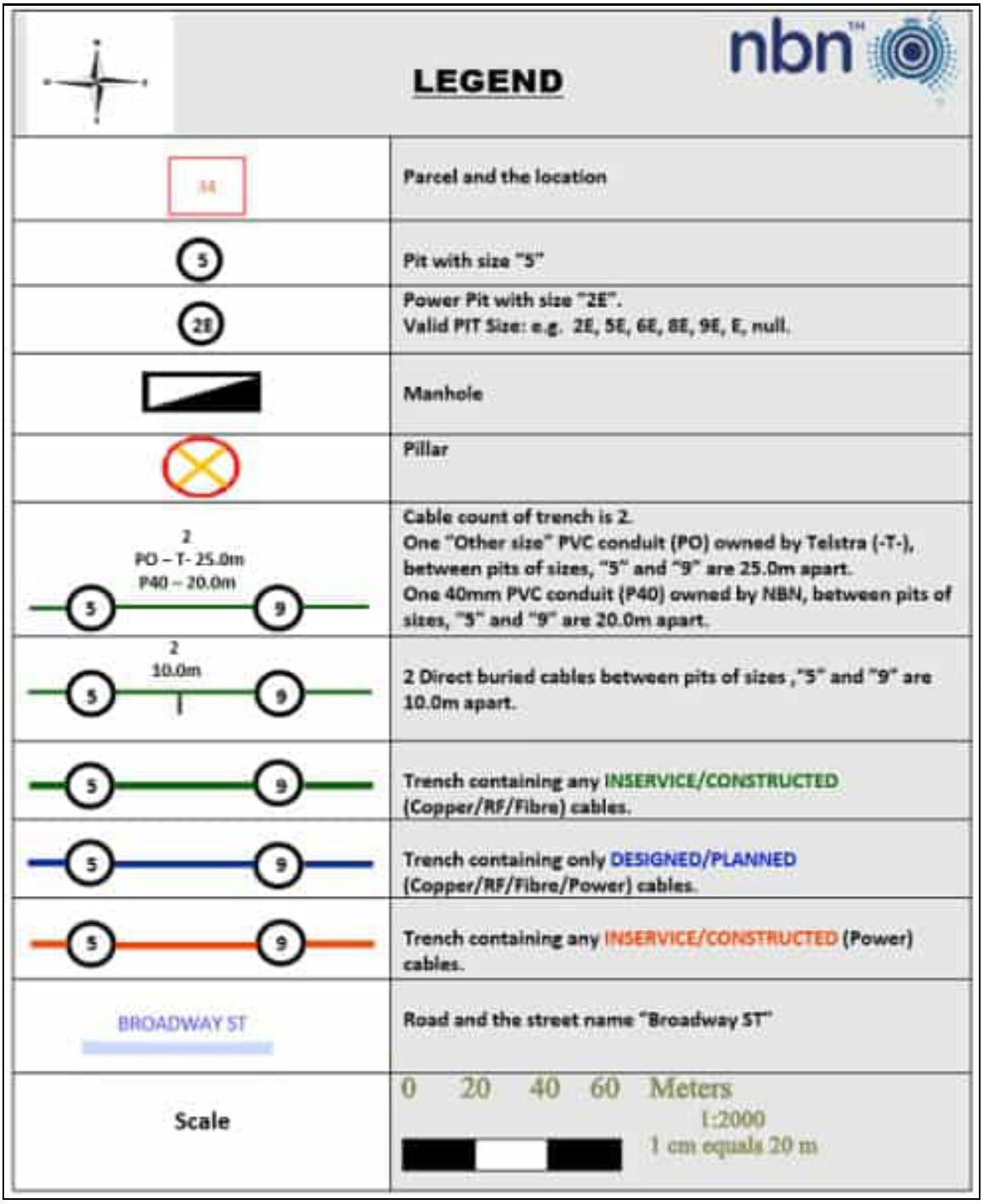
WARNING
CRITICAL ASSET
IN THE VICINITY.
No works within 15 meters of this asset are permitted without prior approval from ATCO.
Contact ATCO on 1300 926 755

- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign

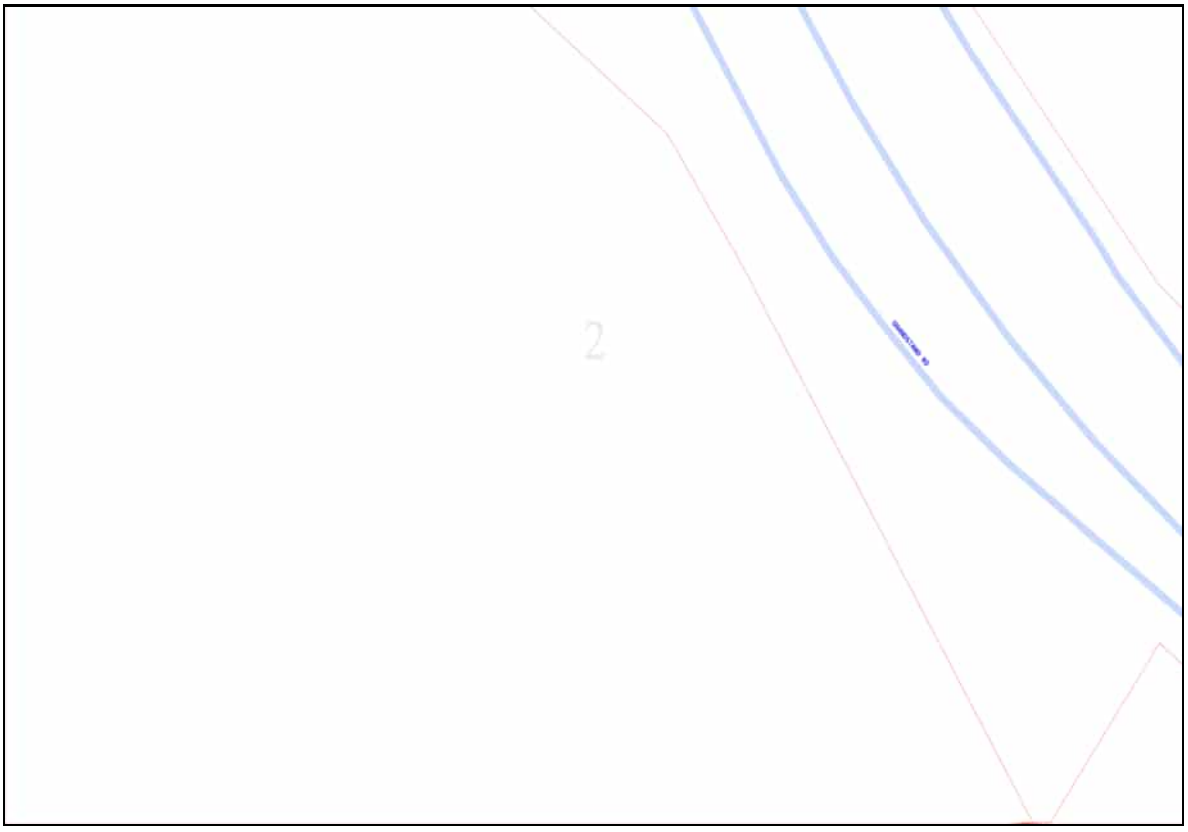
Please refer to Symbols Sheet for Further Information

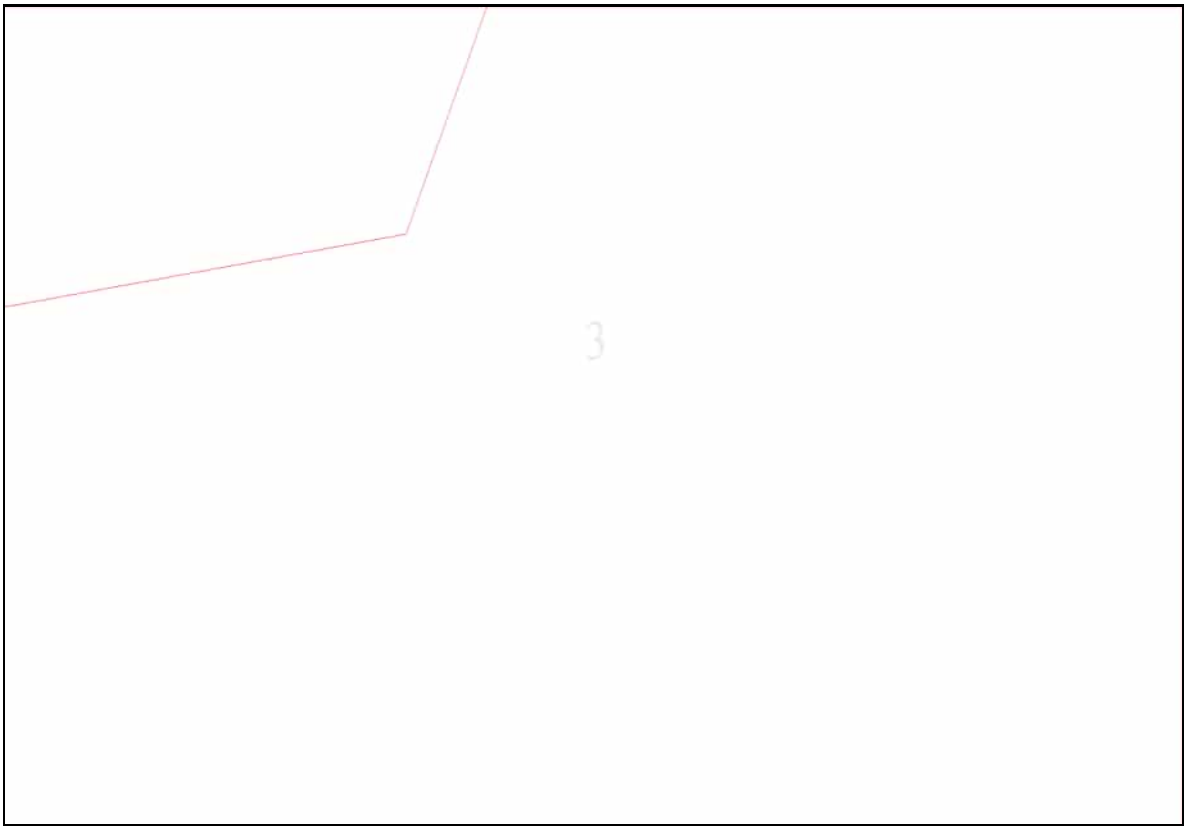
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ATCO Gas Australia will seek compensation for damage caused to assets.

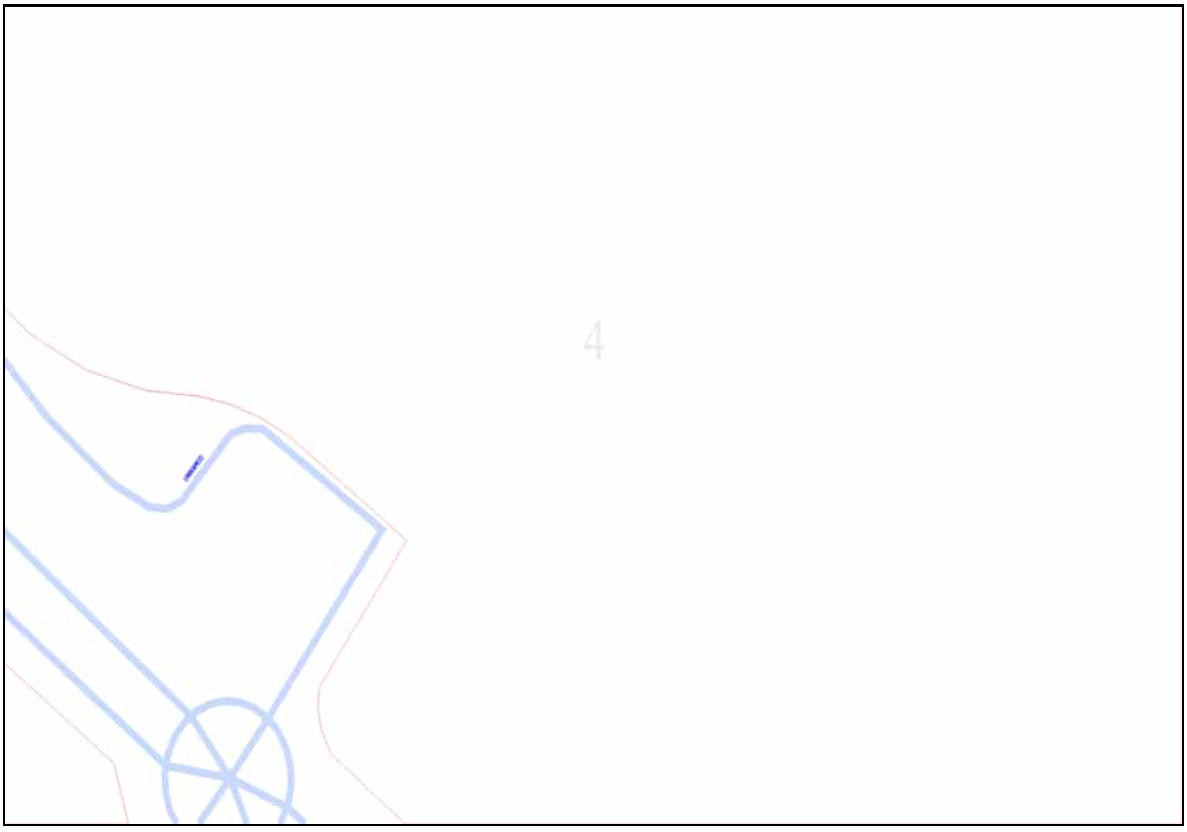
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LEGEND
nbn
Parcel and the location
5
Pit with size "5"
2E
Power Pit with size "2E".
Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
Manhole
Pillar
2
PO – T- 25.0m
P40 – 20.0m
5
9
Cable count of trench is 2.
One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart.
One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2
10.0m
2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST
Road and the street name "Broadway ST"
Scale
0 20 40 60 Meters
1:2000
1 cm equals 20 m



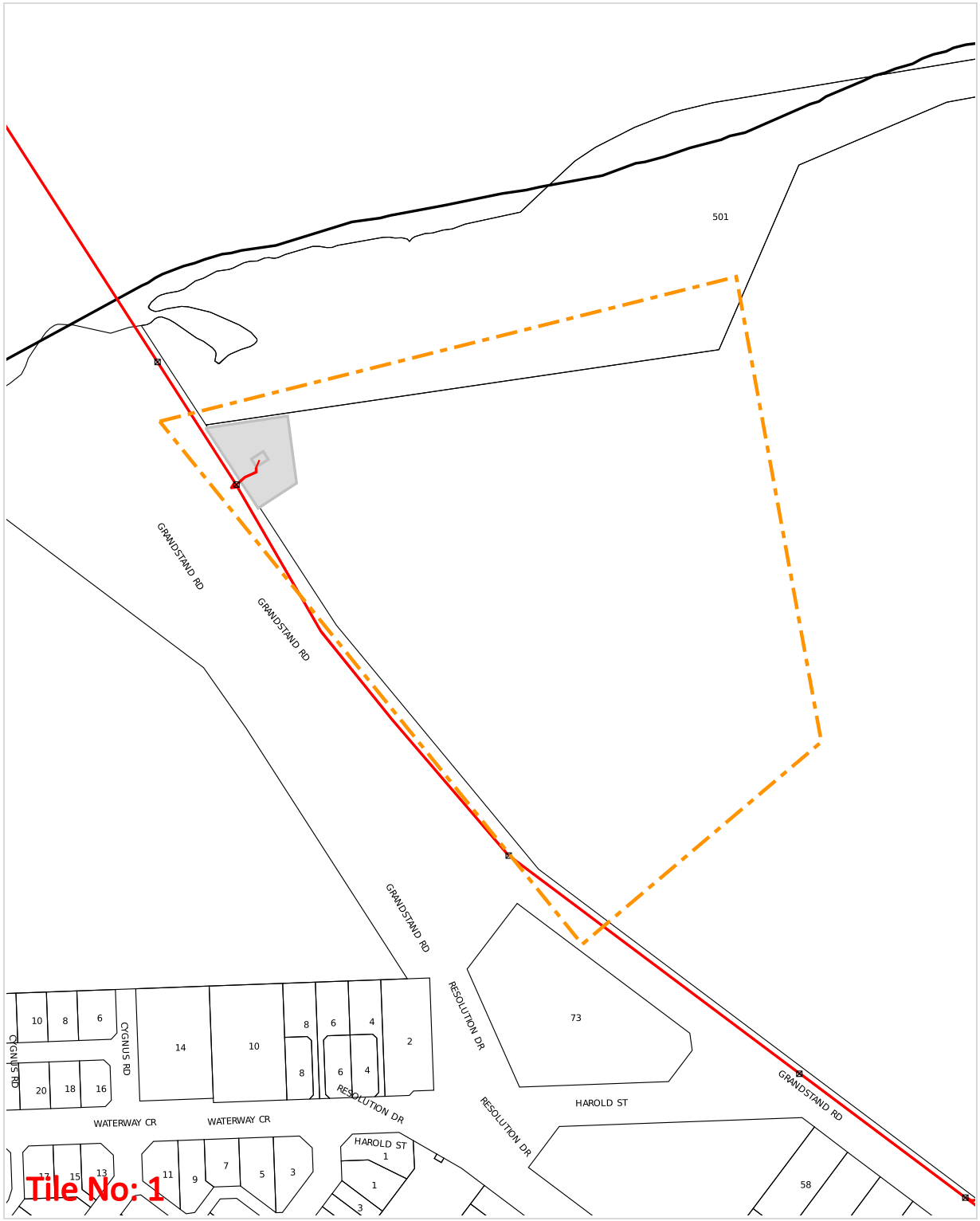






Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.



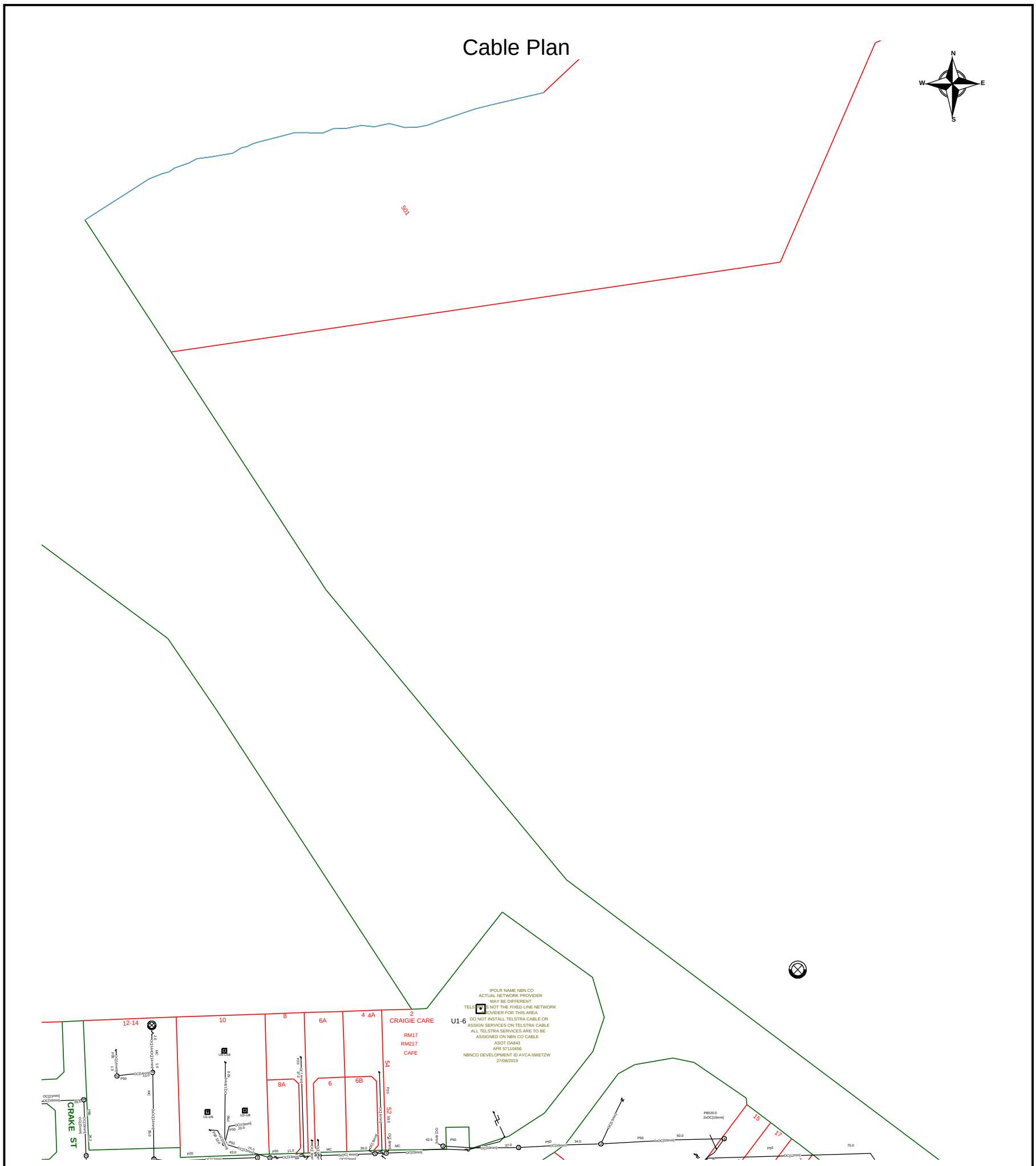
WARNING: This document is confidential and may also be privileged. Confidentiality nor privilege is not waived or destroyed by virtue of it being transmitted to an incorrect addressee. Unauthorised use of the contents is therefore strictly prohibited. Any information contained in this document that has been extracted from our records is believed to be accurate, but no responsibility is assumed for any error or omission. Optus Plans and information supplied are valid for 30 days from the date of issue. If this timeline has elapsed, please raise a new enquiry.

Sequence Number: 240900413

Date Generated: 21 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

Plans generated 21 Jun 2024 by Pelicancorp TicketAccess Software | www.pelicancorp.com



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900417
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:14	

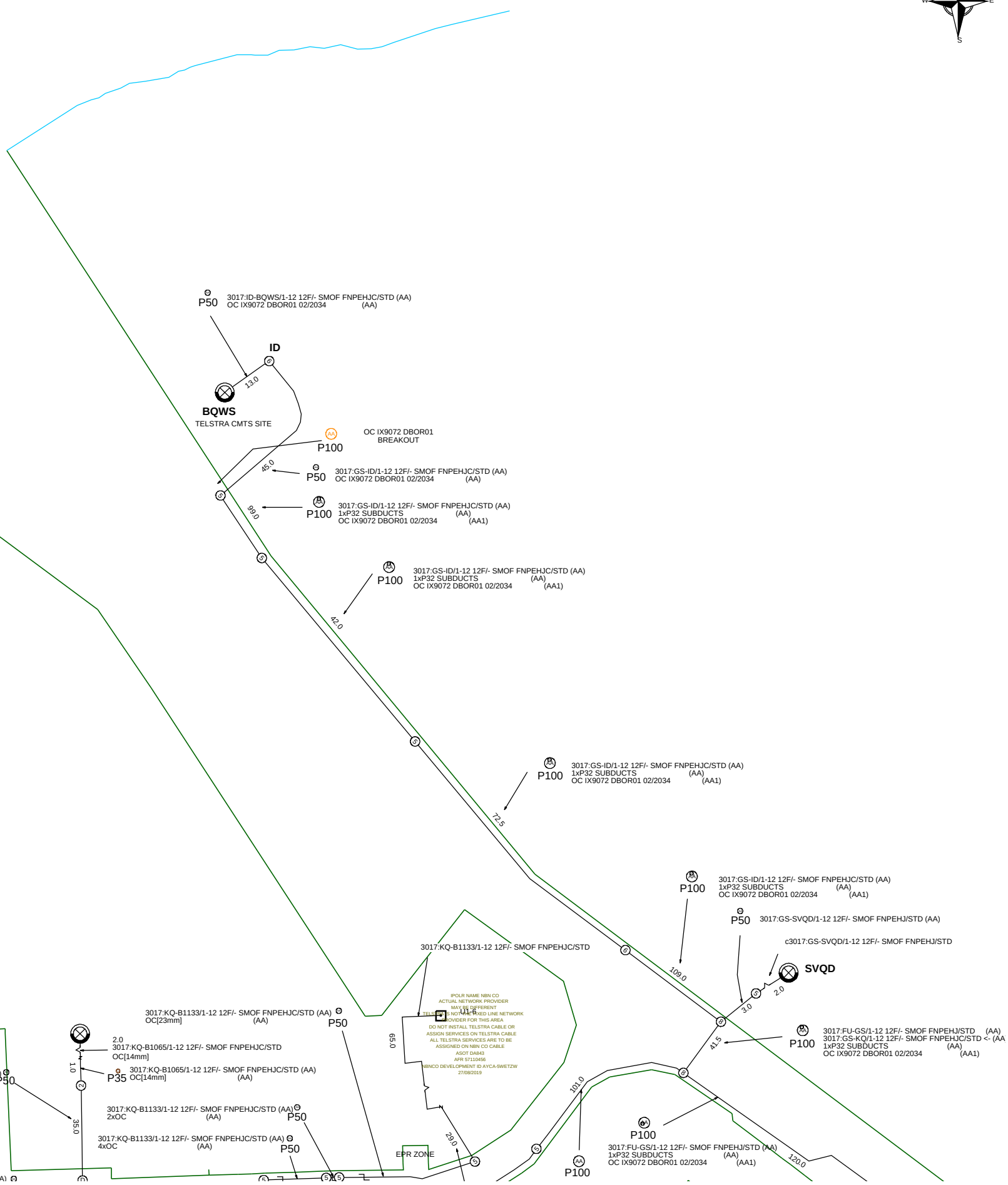
The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment
Ph - 13 22 03
Email - Telstra.Plans@team.telstra.com
Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries

TELSTRA LIMITED A.C.N. 086 174 781

Generated On 21/06/2024 19:05:16

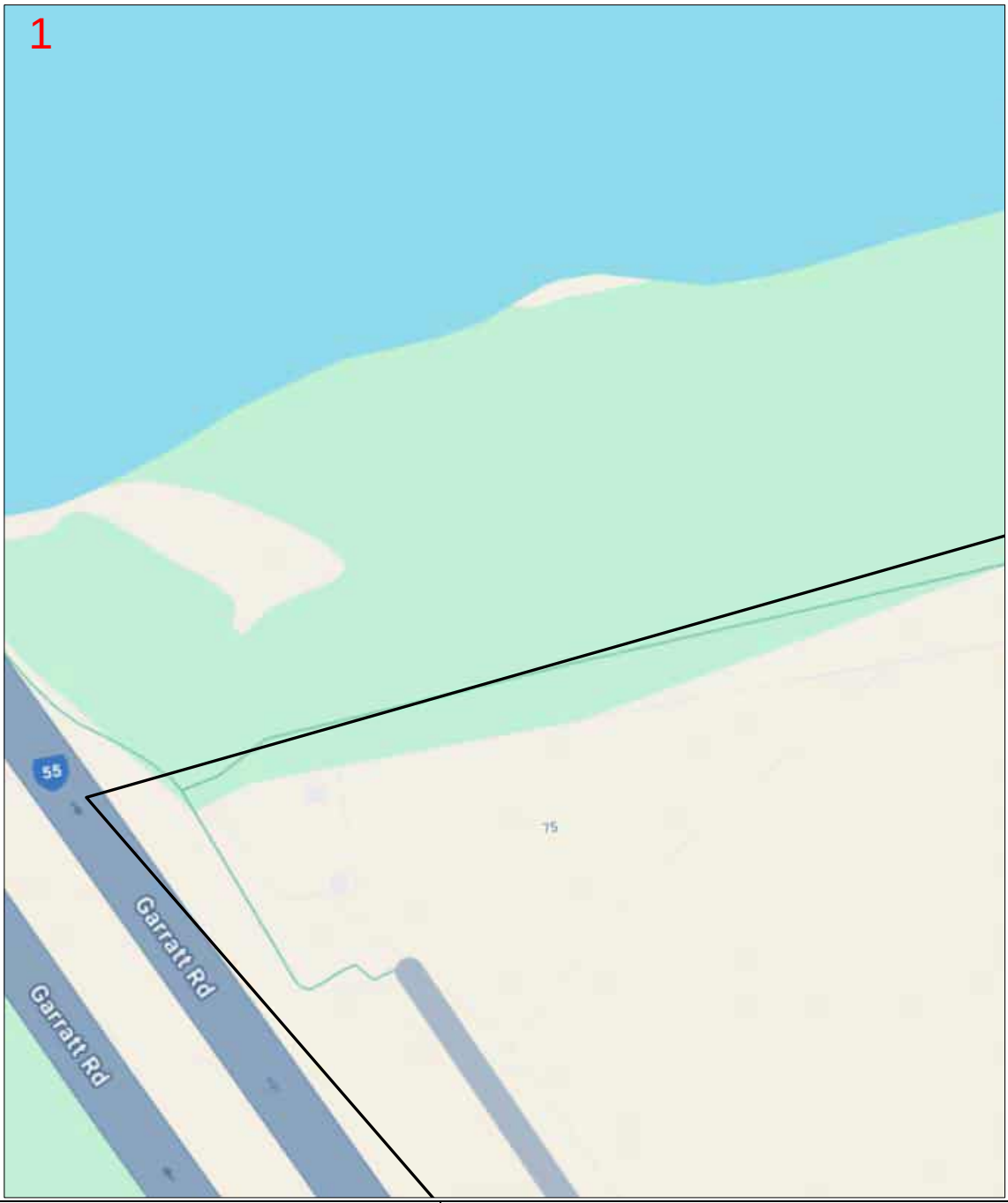
Sequence Number: 240900417

CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

WARNING
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See the Steps- Telstra Duty of Care that was provided in the email response.

Page 2 of 2



Enquiry Number: 240900414

Map Sheet: 1

Scale: 1: 750

0 0.008km

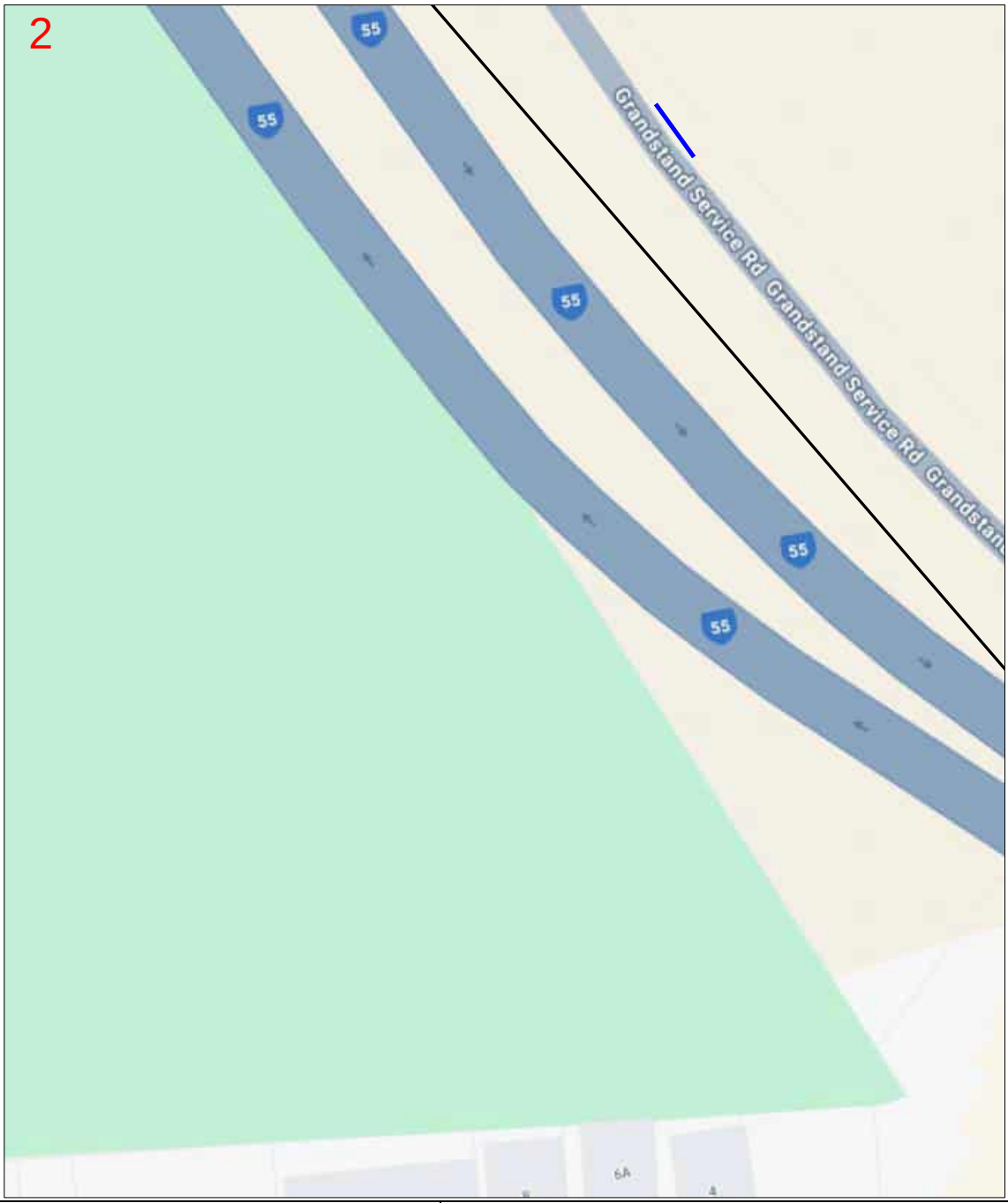
N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900414

Map Sheet: 2

Scale: 1: 750

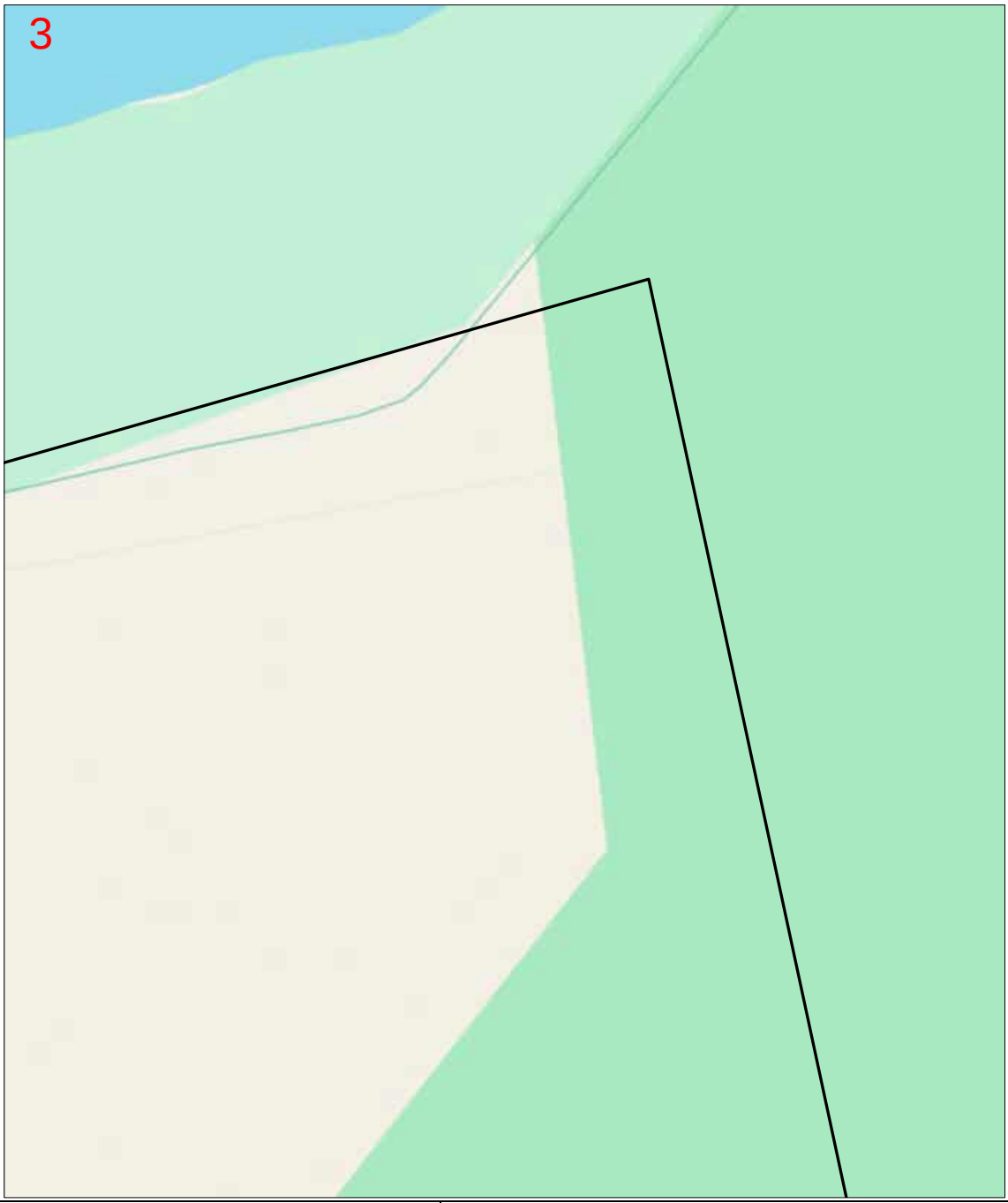
0 0.008km

N

LEGEND

BYDA Work Area			
AAPT/PowerTel Pit		TransACT Pit	
AAPT/PowerTel Duct		TransACT Duct	
DDA Pit		SOUL Pattinson Telecoms Pit	
DDA Duct		SOUL Pattinson Telecoms Duct	
Agile/Adam Pit		PIPE Networks Pit	
Agile/Adam Duct		PIPE Networks Duct	

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Enquiry Number: 240900414

Map Sheet: 3

Scale: 1: 750

0 0.008km

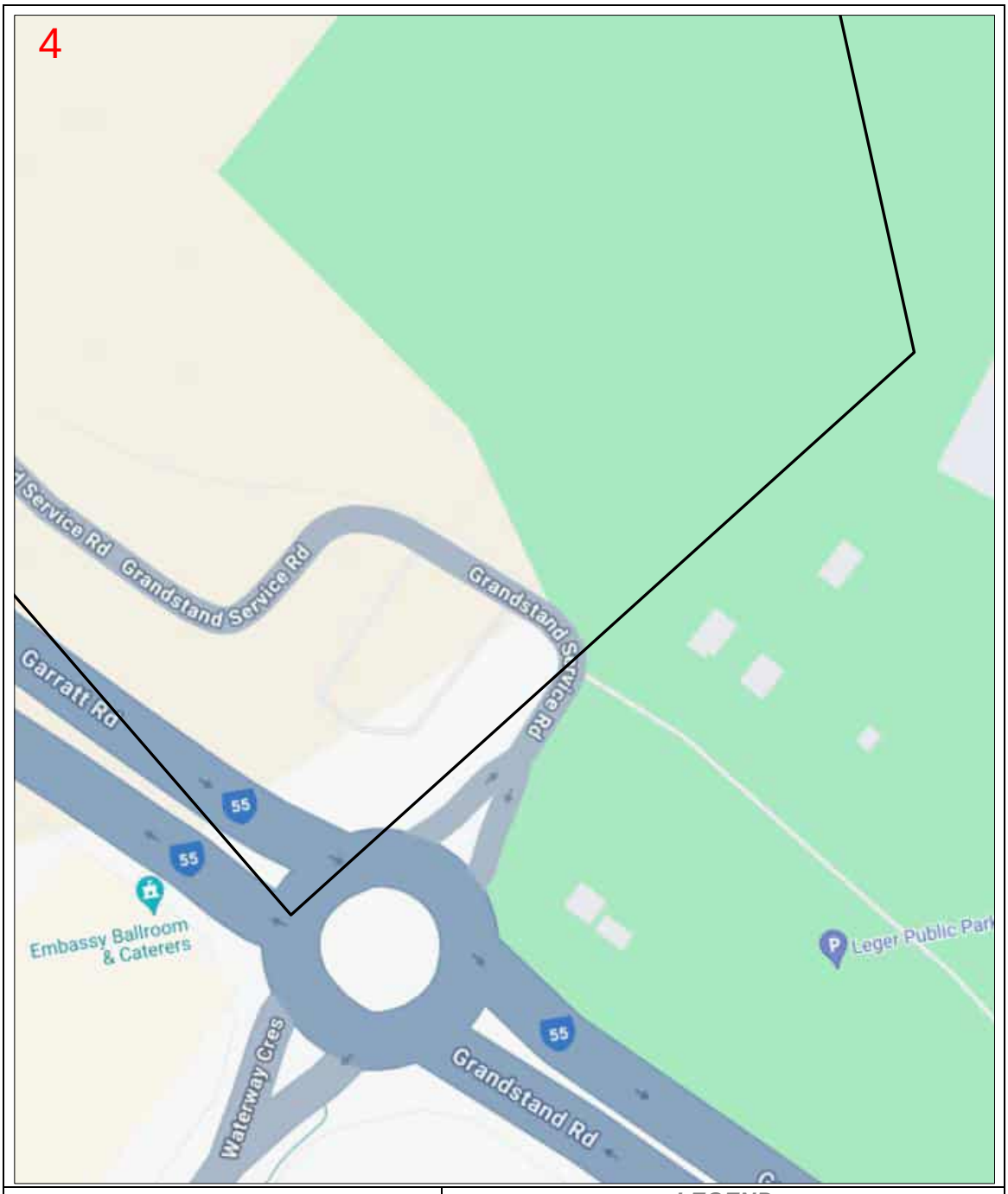
N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900414

Map Sheet: 4

Scale: 1: 750

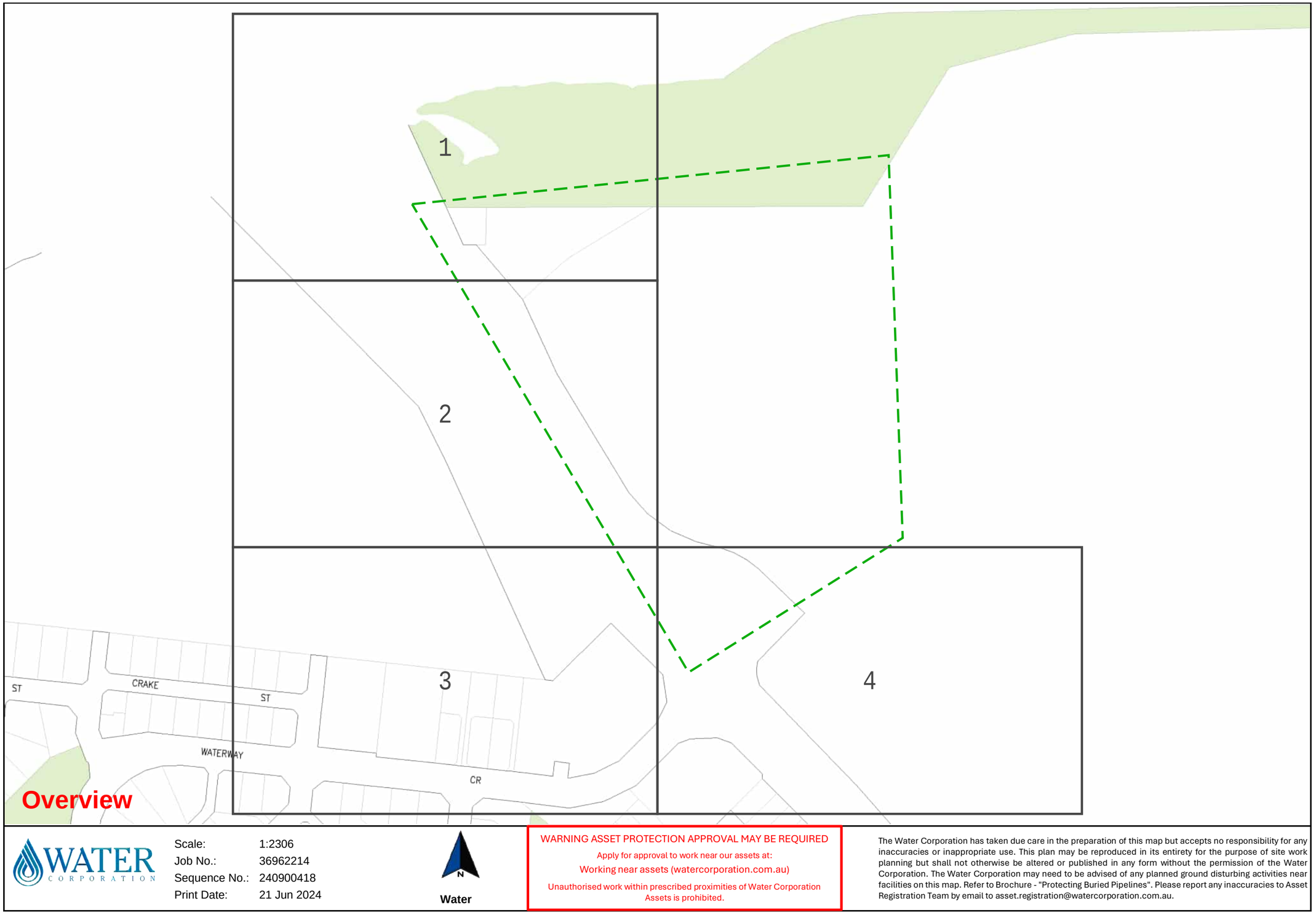
0 0.008km

N

LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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WATER CORPORATION

Scale: 1:2306
Job No.: 36962214
Sequence No.: 240900418
Print Date: 21 Jun 2024

N

Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

Apply for approval to work near our assets at:

Working near assets (watercorporation.com.au)

Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

The Water Corporation has taken due care in the preparation of this map but accepts no responsibility for any inaccuracies or inappropriate use. This plan may be reproduced in its entirety for the purpose of site work planning but shall not otherwise be altered or published in any form without the permission of the Water Corporation. The Water Corporation may need to be advised of any planned ground disturbing activities near facilities on this map. Refer to Brochure - "Protecting Buried Pipelines". Please report any inaccuracies to Asset Registration Team by email to asset.registration@watercorporation.com.au.



Page No: 1

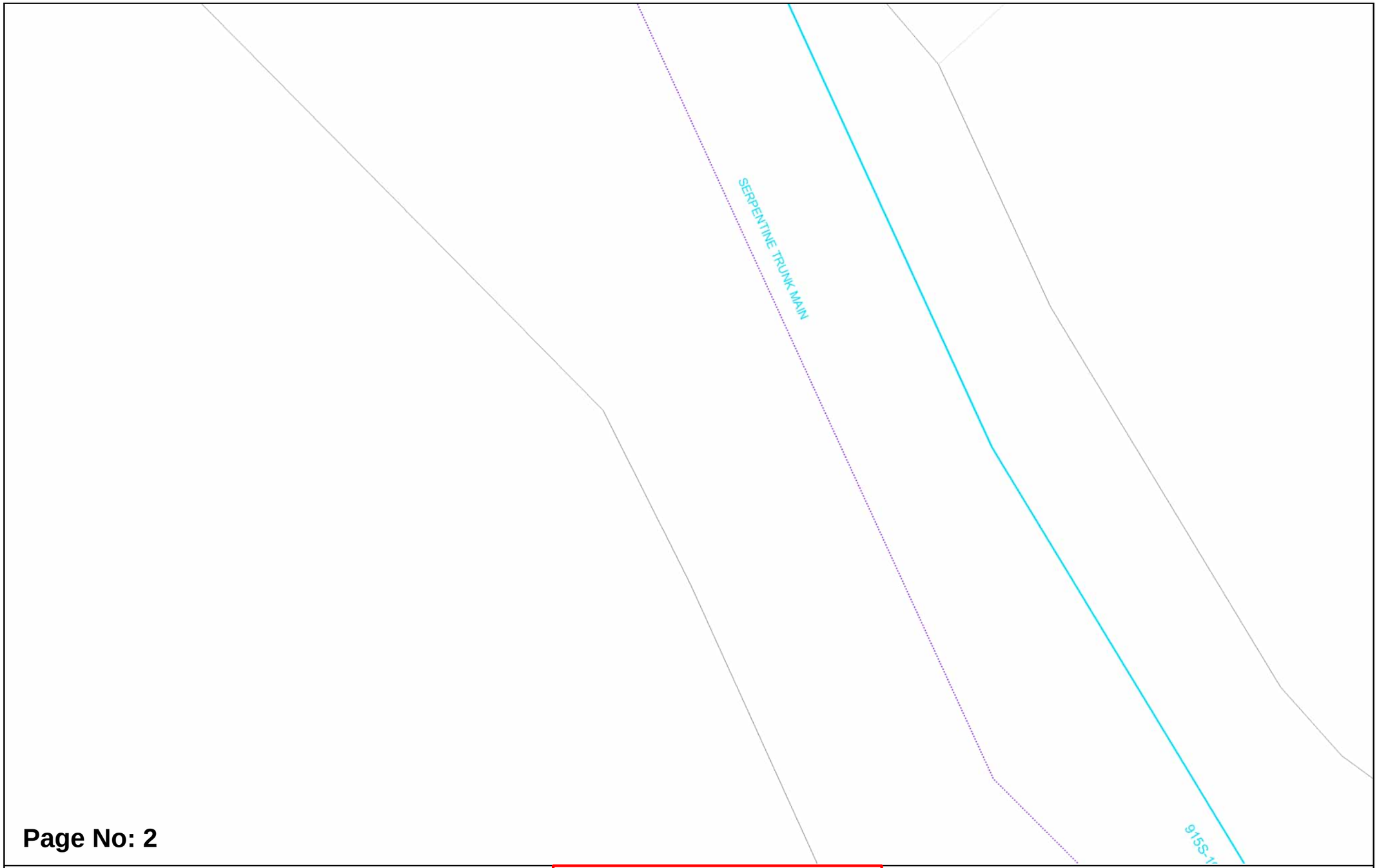
WATER CORPORATION

Scale: 1:750
Job No.: 36962214
Sequence No.: 240900418
Print Date: 21 Jun 2024

N
Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED
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Page No: 2

WATER CORPORATION

Scale: 1:750
Job No.: 36962214
Sequence No.: 240900418
Print Date: 21 Jun 2024

N

Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

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Page No: 3

WATER CORPORATION

Scale:	1:750
Job No.:	36962214
Sequence No.:	240900418
Print Date:	21 Jun 2024

N

Water

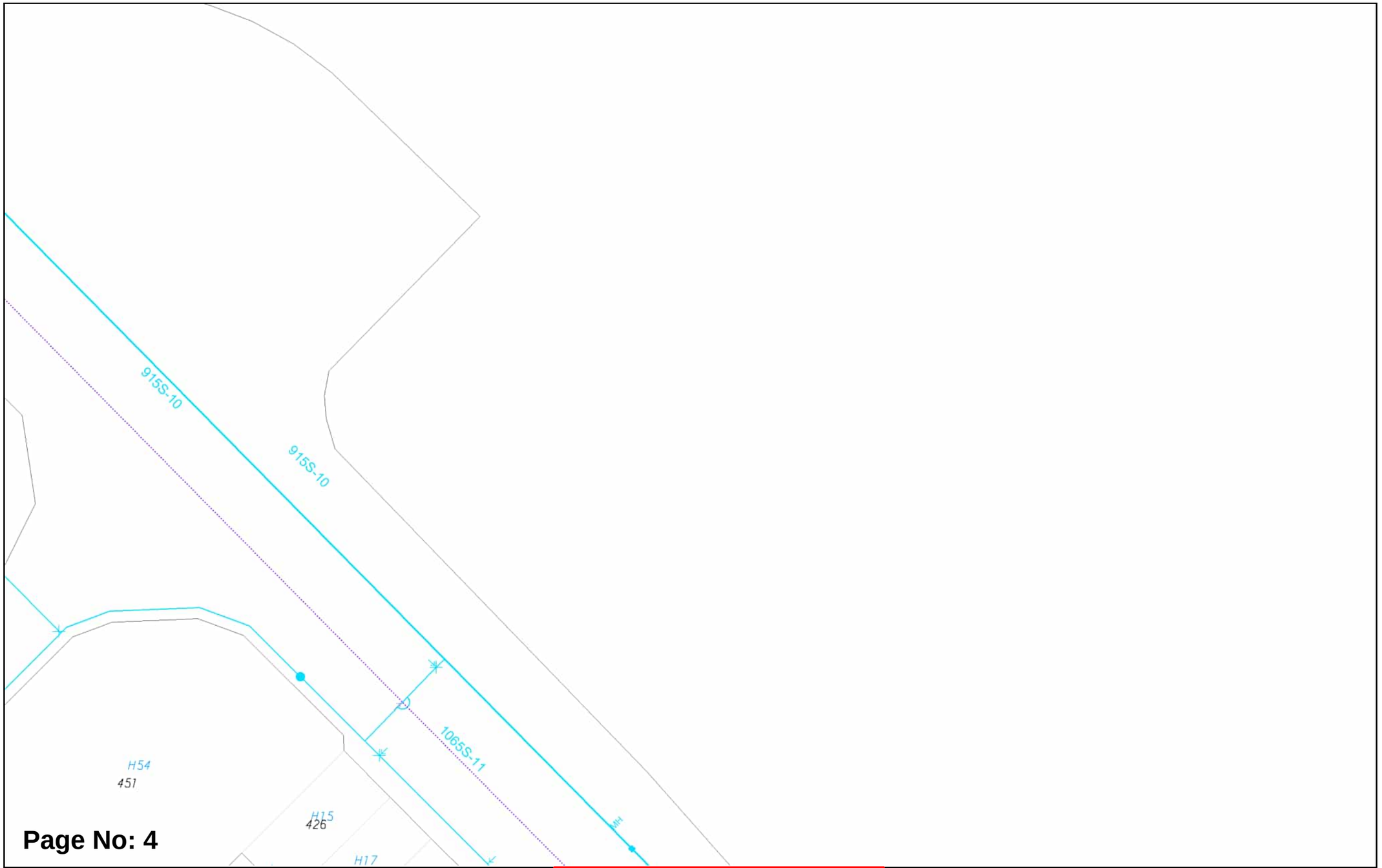
WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

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WATER CORPORATION

Scale: 1:750
Job No.: 36962214
Sequence No.: 240900418
Print Date: 21 Jun 2024

N

Water

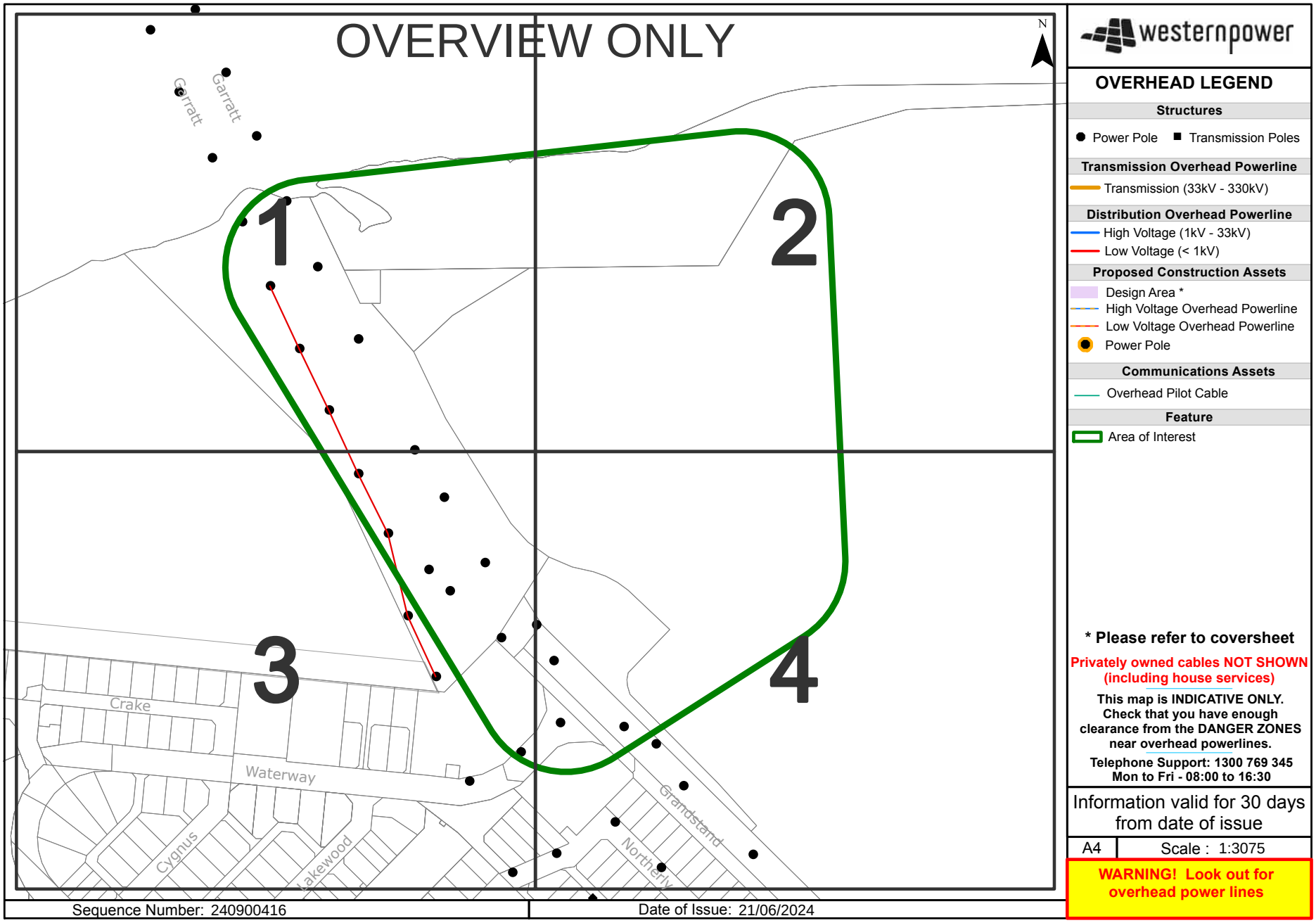
WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

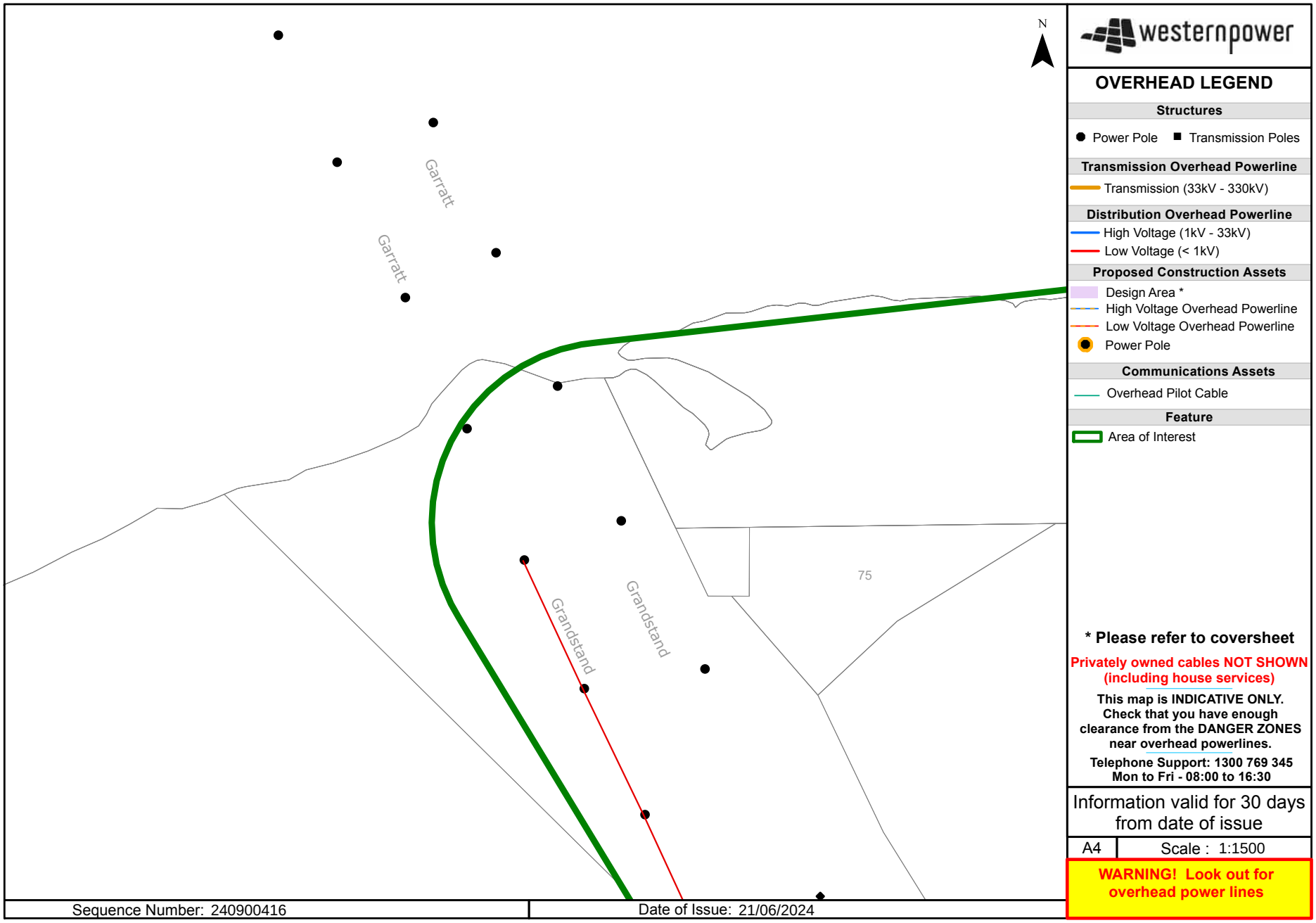
Apply for approval to work near our assets at:

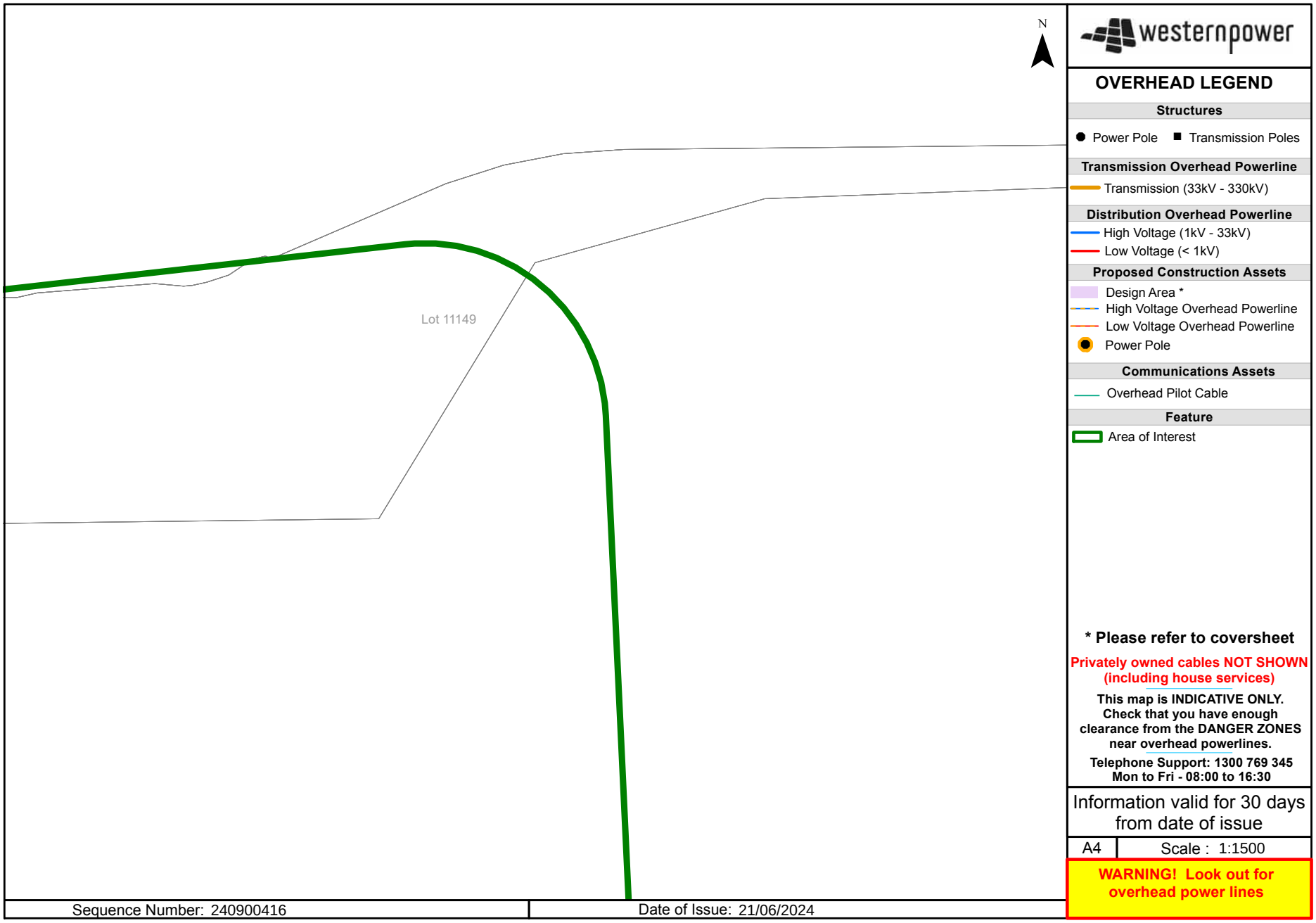
Working near assets (watercorporation.com.au)

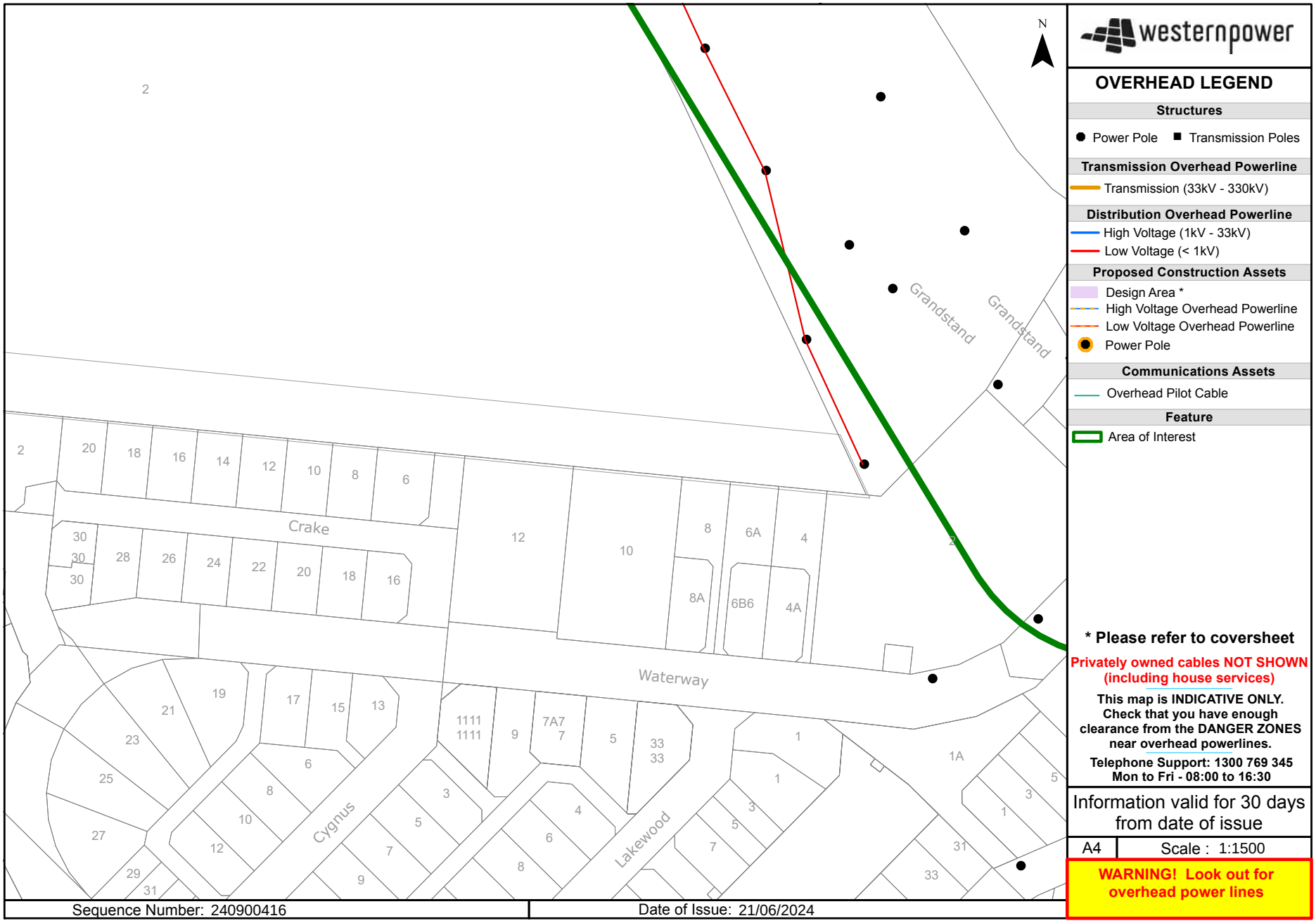
Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

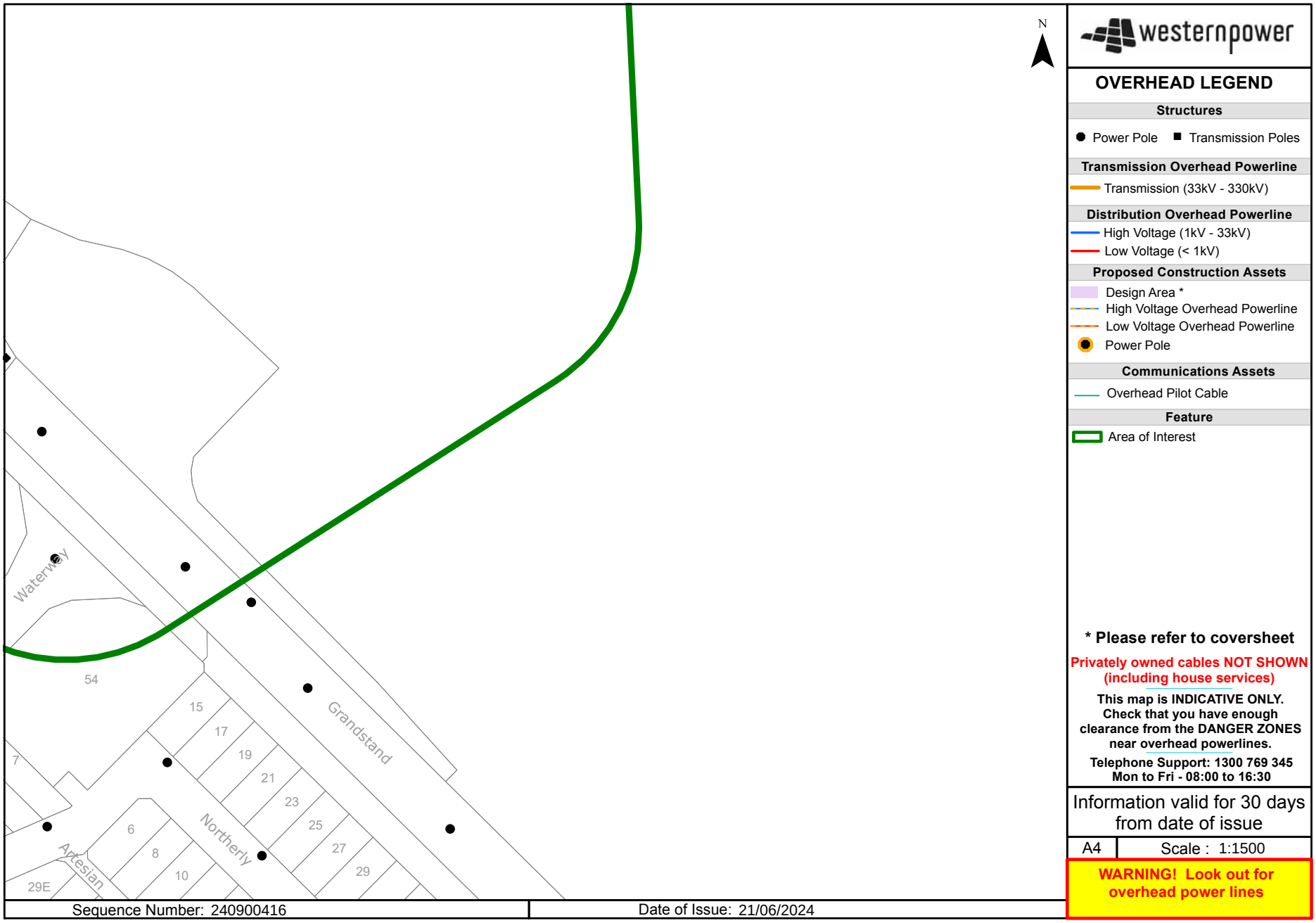
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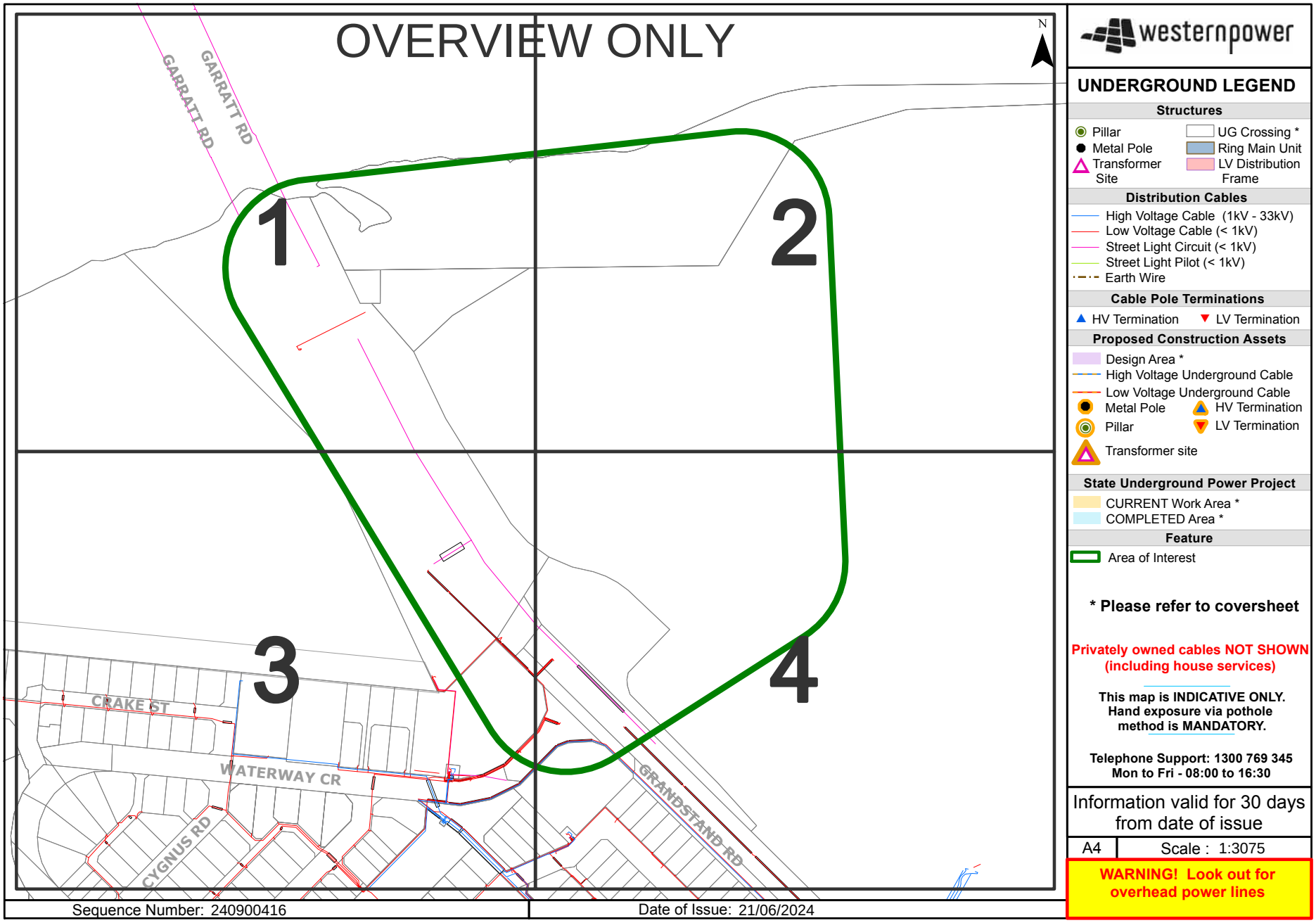

OVERVIEW ONLY
N
Garratt
Garratt
1
2
3
4
Crake
Waterway
Cygnus
Lakewood
Grandstand
Northerly
Sequence Number: 240900416
Date of Issue: 21/06/2024
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:3075
WARNING! Look out for overhead power lines

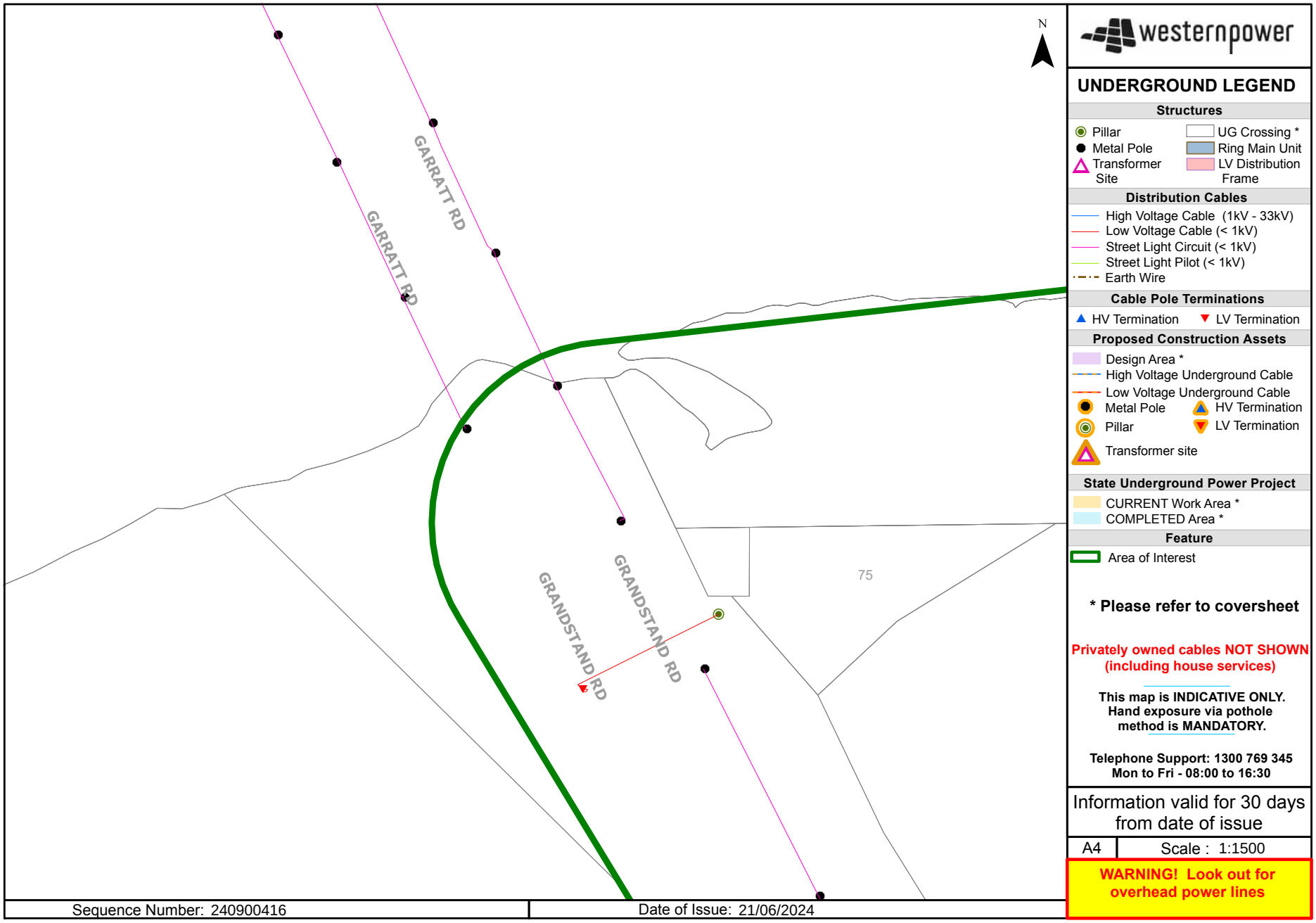

N
Garratt
Garratt
Grandstand
Grandstand
75
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900416
Date of Issue: 21/06/2024

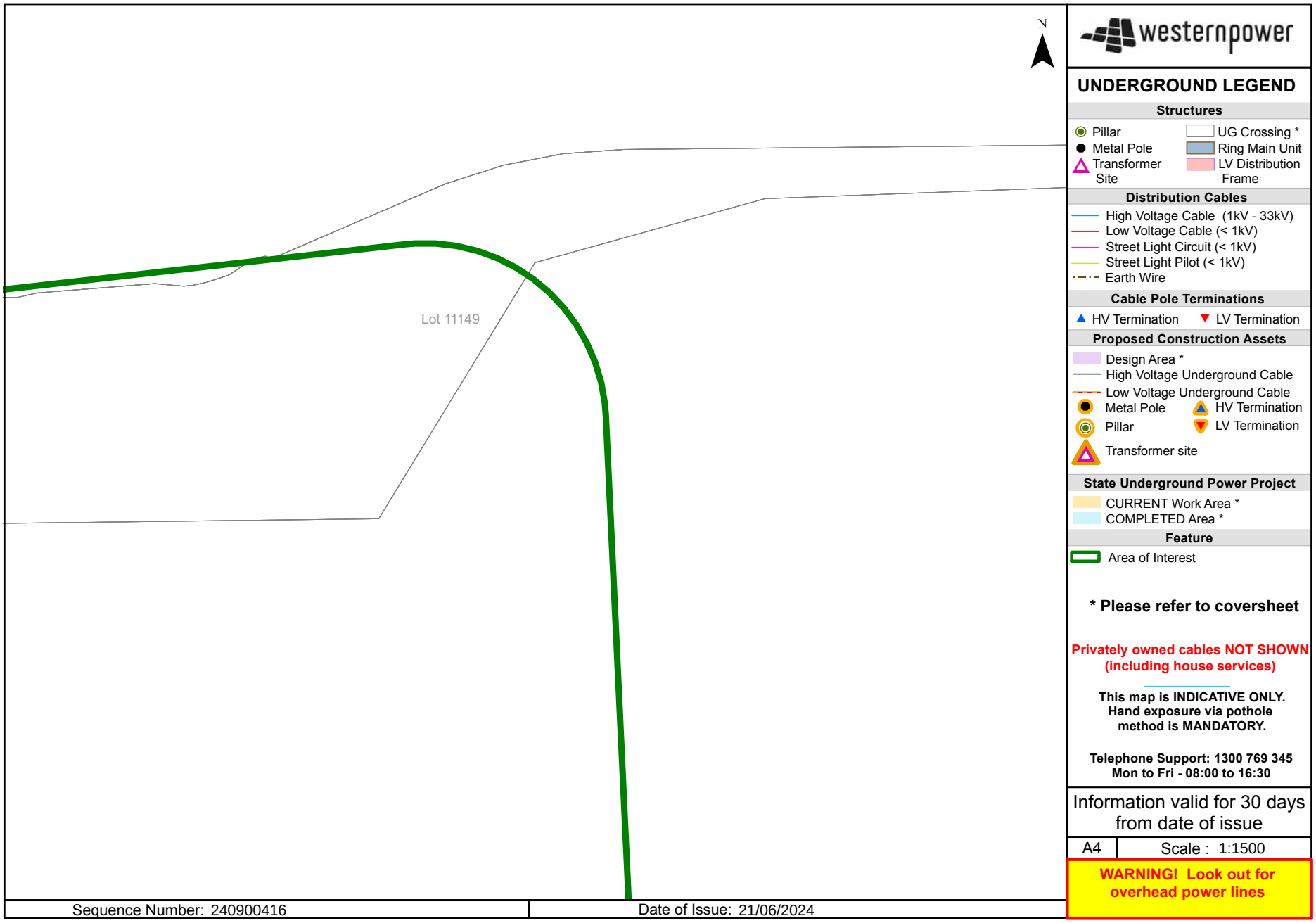

N
Lot 11149
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
A4
Scale : 1:1500
WARNING! Look out for overhead power lines
Sequence Number: 240900416
Date of Issue: 21/06/2024

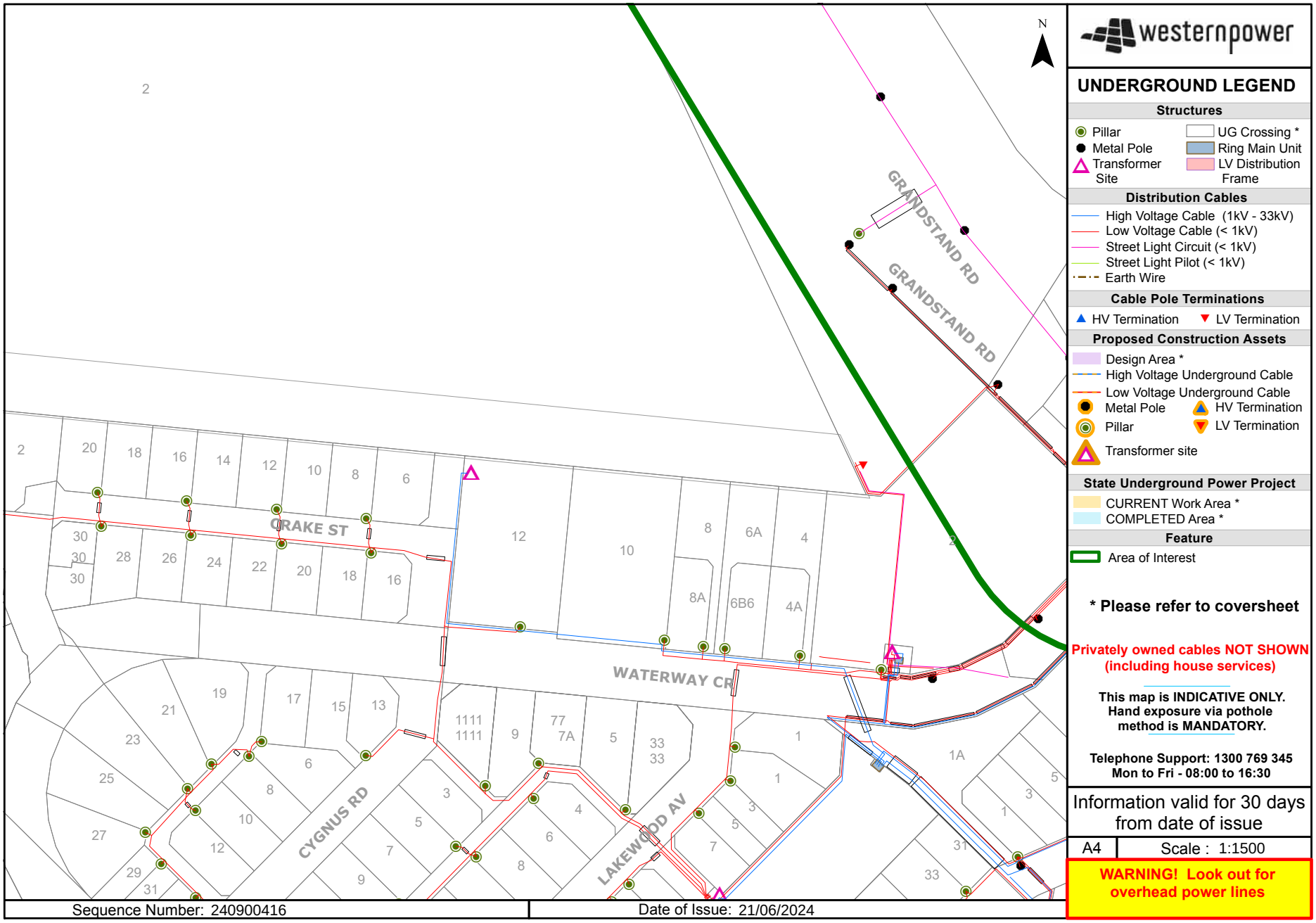

N
Grandstand
Grandstand
Crake
Waterway
Cygnus
Lakewood
Sequence Number: 240900416
Date of Issue: 21/06/2024
westernpower
OVERHEAD LEGEND
Structures
Power Pole
Transmission Poles
Transmission Overhead Powerline
Transmission (33kV - 330kV)
Distribution Overhead Powerline
High Voltage (1kV - 33kV)
Low Voltage (< 1kV)
Proposed Construction Assets
Design Area *
High Voltage Overhead Powerline
Low Voltage Overhead Powerline
Power Pole
Communications Assets
Overhead Pilot Cable
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Check that you have enough clearance from the DANGER ZONES near overhead powerlines.
Telephone Support: 1300 769 345
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WARNING! Look out for overhead power lines

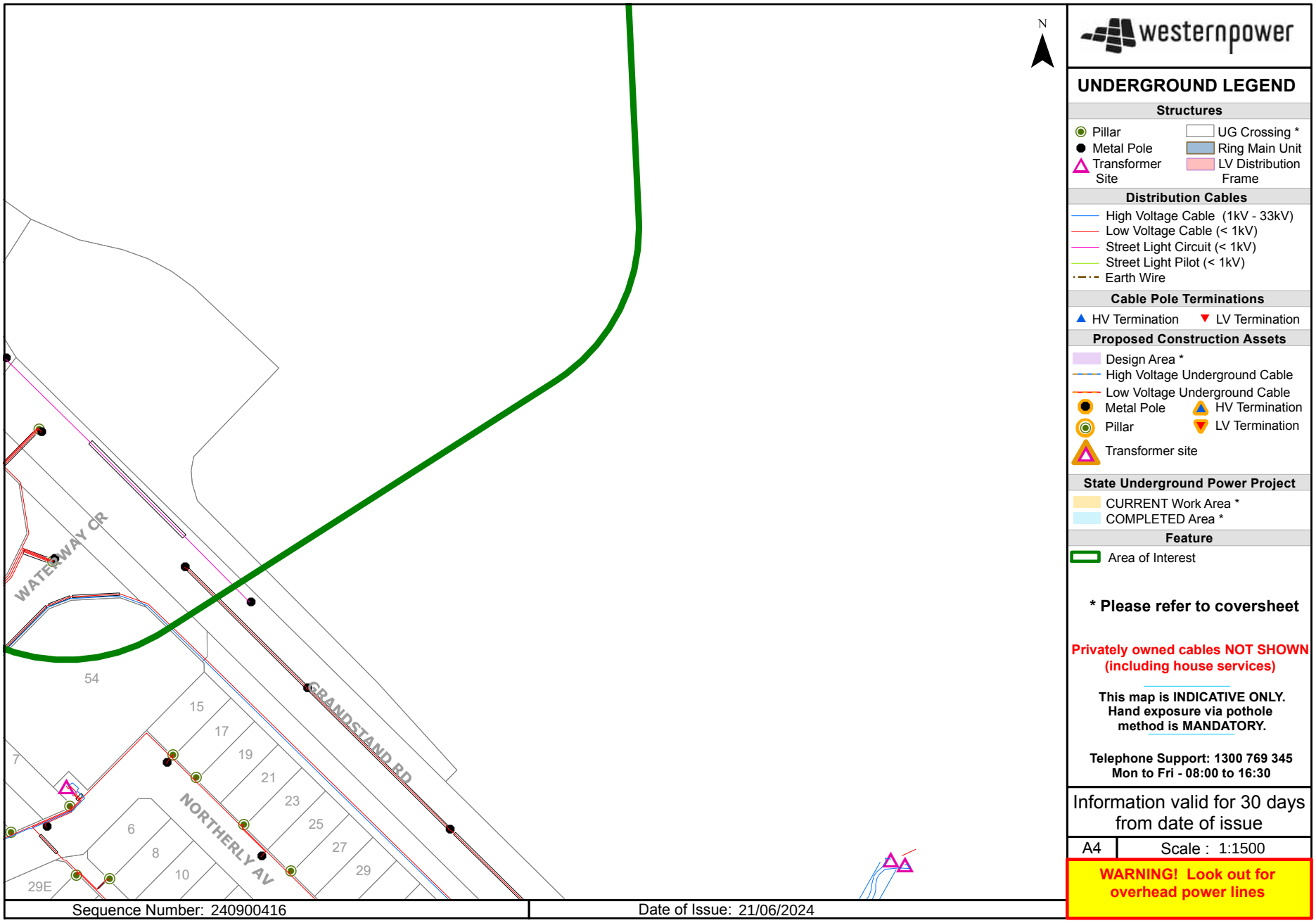

N
Waterway
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Artesian
54
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westernpower
OVERHEAD LEGEND
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Transmission Overhead Powerline
Transmission (33kV - 330kV)
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OVERVIEW ONLY
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GARRATT RD
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4
CRAKE ST
WATERWAY CR
CYGNUS RD
GRANDSTAND RD
Sequence Number: 240900416
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.
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GARRATT RD
GRANDSTAND RD
GRANDSTAND RD
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westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
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Privately owned cables NOT SHOWN (including house services)
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Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
Earth Wire
Cable Pole Terminations
HV Termination
LV Termination
Proposed Construction Assets
Design Area *
High Voltage Underground Cable
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Metal Pole
Pillar
Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
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Area of Interest
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Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.
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WARNING! Look out for overhead power lines
Sequence Number: 240900416
Date of Issue: 21/06/2024


N
GRANDSTAND RD
GRANDSTAND RD
DRAKE ST
WATERWAY CR
CYGNUS RD
LAKEWOOD AV
Sequence Number: 240900416
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
Transformer Site
UG Crossing *
Ring Main Unit
LV Distribution Frame
Distribution Cables
High Voltage Cable (1kV - 33kV)
Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)
Street Light Pilot (< 1kV)
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LV Termination
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Low Voltage Underground Cable
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Transformer site
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LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
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Sequence Number: 240900416
Date of Issue: 21/06/2024
westernpower
UNDERGROUND LEGEND
Structures
Pillar
Metal Pole
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High Voltage Cable (1kV - 33kV)
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Design Area *
High Voltage Underground Cable
Low Voltage Underground Cable
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Transformer site
HV Termination
LV Termination
State Underground Power Project
CURRENT Work Area *
COMPLETED Area *
Feature
Area of Interest
* Please refer to coversheet
Privately owned cables NOT SHOWN (including house services)
This map is INDICATIVE ONLY. Hand exposure via pothole method is MANDATORY.
Telephone Support: 1300 769 345
Mon to Fri - 08:00 to 16:30
Information valid for 30 days from date of issue
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Scale : 1:1500
WARNING! Look out for overhead power lines

ATTACHMENT 8

Traffic Impact Assessment

Perth Racing

Ascot Racecourse Local Structure Plan and Scheme Amendment

Transport Impact Assessment

May 2024

Project Code: 07575

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Version Control and Approval

Version	Date	Main Contributor	Issued by	Approved by
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1 Introduction

1.1 Background

On behalf of Perth Racing (Applicant), Davison Advisory Services commissioned PJA Australia Pty Ltd to prepare this Transport Impact Assessment (TIA) for the proposed Local Structure Plan and the Scheme Amendment for the Applicant's landholding, encompassing Ascot Racecourse and surrounding land in the City of Belmont, Western Australia.

This assessment has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)*. This is the most appropriate level of TIA for a proposed Local Structure Plan and Scheme Amendment submission.

1.2 Summary of TIA

In accordance with WAPC Guidelines for Transport Impact Assessments, this report sets out the details of the proposed Local Structure Plan (LSP) and Scheme Amendment in the context of the movement network, assesses the site in terms of connectivity by active and public transport, parking and vehicular access. The TIA also reviews the future traffic generation of the LSP and any potential impacts that may need to be mitigated.

Under the WAPC Guidelines for TIAs, a LSP and/or Scheme Amendment requires a 'broad brush' assessment of the impacts of the development, given structure planning is for a larger area. This report sets recommendations for more detailed traffic analysis at later stages of the planning process, subject to the LSP and Scheme Amendment being ultimately supported.

This TIA also refers to the developing City of Belmont's Golden Gateway LSP (GGLSP) which currently encompasses part of the land under the ownership of the Applicant, which has been a catalyst to complete this LSP and Scheme Amendment to guide development in this area in a considered way. In pre-submission discussions with the City of Belmont's strategic planners, the support in principle for the Applicant to undertake a LSP has been provided and it is understood that through a later iteration of the concurrent Golden Gateway LSP, the City of Belmont will look to remove the Applicant's landholdings from the GGLSP.

1.3 Regional and Local Policy Context

1.3.1 Metropolitan Region Scheme (MRS)

The Site area is currently zoned for the most part as 'Private Recreation' for the area in use as Ascot Racecourse, with the surrounding land within the site boundary zoned as 'Urban'. Some land surrounding the site boundary to the north and west is also zoned as 'Parks and Recreation-Restricted Public Access' and the Great Eastern Highway is zoned as a 'Primary Regional Road'. **Figure 1-1** illustrates the site area's MRS zoning in map 16.

Figure 1-1: MRS Zone Maps 16



Source: Metropolitan Region Scheme

1.3.2 City of Belmont Local Planning Scheme No.15

Under the provisions of *the City of Belmont Local Planning Scheme No.15* (LPS No.15) the site area is for the most part zoned as 'Place of Public Assembly' comprising the area in use as Ascot Racecourse, in the southern extent of the site a small parcel is zoned as 'Mixed Use'. The area surrounding the site boundary largely comprises of 'Mixed Use', 'Mixed Business' and 'Residential and Stables' zoning, the latter of which is bespoke to the Ascot Racecourse area and is intended "to provide for compatible and environmentally responsible use of land in proximity" to the Racecourse and Swan River to the north-west.

Part 4 of LPS No.15 sets out the general development requirements for each key zone, inclusive of the minimum car and bicycle parking requirements for largely non-residential land uses (Table 2 and Table 3), residential parking requirements are set out separately. These parking requirements will be considered as the LSP and Scheme Amendment progresses.

Figure 1-2 illustrates the LSP area zoning in the context of the site area.

Figure 1-2: City of Belmont's Local Planning Scheme 15



Source: Local Planning Scheme 15, Local Zoning, City of Belmont

1.3.3 City of Belmont's Redcliffe Station Precinct Activity Centre Plan & DA6

The Redcliffe Station Precinct Activity Centre Plan (RSPACP) is an extension of the Development Area 6 (DA6) Vision Plan and Implementation Strategy adopted by the City of Belmont in 2014. As set out on Council's website:

"Development Area 6 (DA6) is DA6) is a redevelopment area bound by Great Eastern Highway, Coolgardie Avenue, Redcliffe Road, Fauntleroy Avenue and Tonkin Highway, as well as Perth Airport's Airport West Precinct. This area can be easily distinguished into two main areas:

- *Perth Airport's Airport West Precinct*
- *A portion of the Redcliffe neighbourhood between Perth Airport and Great Eastern Highway.*

Perth Airport Pty Ltd is responsible for planning work for its Airport West Precinct through the preparation and review of the Perth Airport Masterplan.

For the remainder of the DA6 Precinct in Redcliffe, in December 2022, the WAPC wrote to advise landowners about the initiation of Improvement Plan 45 – Redcliffe Station Precinct. The Improvement Plan itself does not change the development potential of land at this point in time. Initiating the Improvement Plan is the first step of the planning pathway to establish the appropriate development potential and planning standards for future development in the precinct. The Improvement Plan sets out the broad objectives for the redevelopment of the area, after which an Improvement Scheme is prepared. The Improvement Scheme will set out the specific standards for future development.

The DPLH has been tasked to prepare the Improvement Scheme and has advised that the City will continue to play an important role in the development and delivery of this planning framework for the precinct. The Department is currently making arrangements to progress an Improvement Scheme for the Development Area 6 Precinct, which will take several months to prepare. Once drafted, there will be a minimum 90-day consultation period. The Department will subsequently review submissions and assess if any modifications to the Improvement Scheme are necessary, prior to making a recommendation to the Minister for Planning".

The City of Belmont's Vision Plan for DA6 area is shown in Figure 1-3.

Figure 1-3: DA6 Vision Plan



Source: City of Belmont

1.3.4 Recent Movement Network Upgrades in Ascot

The City of Belmont confirmed the following recent movement network upgrades in the vicinity of the subject site over the last approximate three years:

a) Network changes due to the Tonkin Gap Project: Motorists using Garratt Road bridge to access Great Eastern Highway and Guildford Road rather than the previous Tonkin Highway route increased and the City observed increased rat running over Stanton Road bridge, Abernethy Road (entire route), Hardey Road and Kooyong Road.

b) Redcliffe Train station opened 9 October 2022. This enabled bus network changes including new routes and frequency every 10 minutes. New super-buses will be established from the train station to the Perth CBD via Great Eastern Highway.

c) A 24/7 Woolworths opened near DFO late 2023.

d) Marina Drive residential development is complete and operational.

e) Belmont is slowing in rate of redeveloping the blocks of land from single site dwellings to multi-dwellings.

f) The Springs development area near Rowe Avenue & Riversdale Road, Rivervale: Increase in residential development from The Springs development. City is planning to restrict one car bay per unit, allowing all other on-street bays to be for visitors and people visiting the commercial shops and local businesses. The City has installed 'P' signs which have encouraged Fly-in/Fly-out (FIFO) workers and ALL DAY motorists heading to the Perth CBD. The City has commenced a parking strategy to review the parking. No paid parking will be involved.

Among the aforementioned projects, the Tonkin Gap project and the Marina Drive residential development are expected to directly impact the Ascot LSP area. Specifically, the Marina Drive development serves as an access point to/from Resolution Drive, via the western arm of the existing roundabout. Meanwhile, the Tonkin Gap project's construction diversions were routed via Garratt Road and subsequently Grandstand Road. However, with the recent completion of new traffic counts in 2024 as part of this Ascot LSP, both aforementioned projects (now complete) have been incorporated into the updated traffic counts, providing a basis for assessing the network's suitability and functionality.

2 Existing Situation

2.1 Existing Site Context and Land Uses

The Site is located in the Ascot suburb of Perth, immediately south of the Swan River, bound to the south-west by Grandstand Road (State Road 55) and south-east/east by Resolution Drive and largely residential land uses, with some stables.

As the site is already well established as Ascot Racecourse, vehicular access can already be achieved from several points along Grandstand Road and Matheson Road, via Raconteur Drive (from Grandstand Road) and further minor accesses via the residential streets to the south-east of the site such as Hardey Road (north), Carbine Street, Leake Street and Ascot Place. The location of the Site is illustrated in **Figure 2-1**.

Figure 2-1: Site Location



Source Mapping: NearMap 2024

2.2 Existing Road Network

The Site is located north-east of Grandstand Road and north-west of Matheson Road and Resolution Drive. Each carriageway abutting the site boundary is within the care and control of the City of Belmont, though the extent of Matheson Road and Raconteur Drive that sits within the site boundary is under the ownership of the Applicant.

Figure 2-2 shows the layout and classification of the roads surrounding the site, including the primary road network. Grandstand Road is classified under the Main Roads WA Road Hierarchy as a Distributor A, though it is worth noting that further north, the Garratt Road Bridge is classified as a Primary Distributor. This will be due to the management of the bridge sitting with Main Roads rather than the Local Government. Grandstand Road is a dual carriageway road, each side typically measuring 7.0m to 7.8m wide. No on-road cycle lane facilities are provided. A single continuous shared use path along the north-eastern side of Grandstand Road exists, with intermittent (not all continuous) provision on the south-western side. For large portions, the footpaths are separated from the carriageway by a landscaped kerbed area or colour-contrasted paving to provide separation from the road for a more pleasant walking/riding experience.

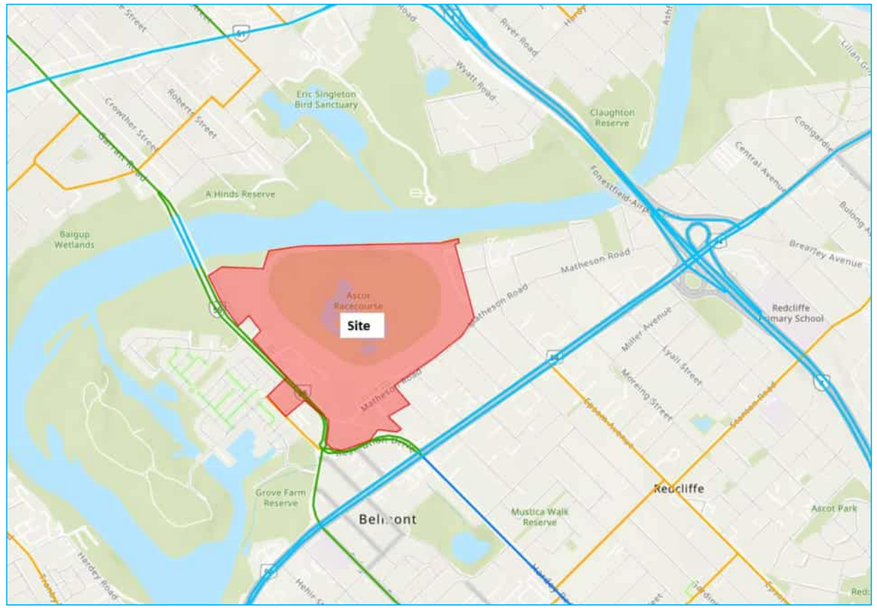
Raconteur Drive diverts east from Grandstand Road, as a one-way single-lane carriageway providing access to Matheson Road and an existing car park for Ascot Racecourse (horse float car park). Again, there are no on-road cycle lane facilities but a pedestrian footpath exists on the northern side of the carriageway connecting to Grandstand Road and another pedestrian path exists along Matheson Road (southern side) from east of Carbine Street all the way to Moreing Street. There is also a horse path along the northern side of Matheson Road that extends from the racecourse in an easterly direction. Beyond the site boundary, Matheson Road is classified as an Access Road under the Mains Road WA Road Hierarchy and no pedestrian or cycle infrastructure is noted on this route.

South of the site boundary, Resolution Drive continues west as a Distributor A route, from the Grandstand Road / Stoneham Street / Resolution Drive roundabout intersection. Resolution Drive is a single carriageway with shoulders of approx. 1.8m, each side of the approx. 3.5m carriageway. East of the roundabout, Resolution Drive meets the Great Eastern Highway (National Route 1 / National Highway 94) and Hardey Road via a signal-controlled intersection.

Stoneham Street continues ahead from Grandstand Road as a dual carriageway on approach to a signal-controlled intersection with the Great Eastern Highway and Belgravia Street. Great Eastern Highway is classified as a Primary Distributor while Belgravia Street continues from Stoneham Street as a Distributor A.

Figure 2-3 over page sets out the speed limits for the road network surrounding the site. Grandstand Road, Resolution Road, Stoneham Street and the Great Eastern Highway are all subject to a 60km/hr speed limit. The remaining access roads surrounding the site are subject to a 40km/h speed limit, including Matheson Road.

Figure 2-2: Road Hierarchy

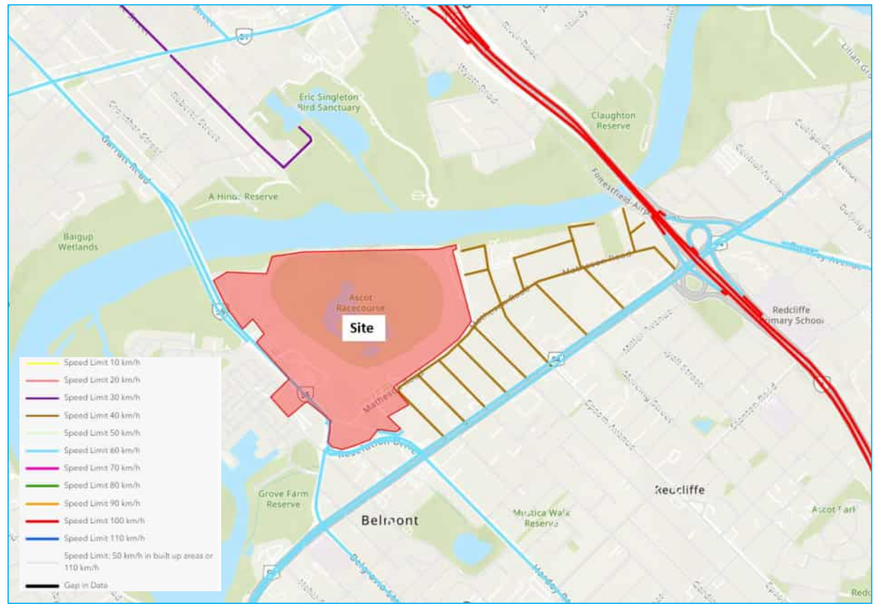


Source: MRWA Road Information Mapping System

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

- **Primary Distributors** (light blue): Form the regional and inter-regional grid of MRWA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State roads. They are managed by Main Roads.
- **Regional Distributors** (red): Roads that are not Primary Distributors but link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by Local Government.
- **District Distributor A** (green): These carry traffic between industrial, commercial, and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.
- **District Distributor B** (dark blue): Perform a similar function to "District Distributor A" but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.
- **Local Distributors** (orange)**:** Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.
- **Access Roads** (grey): Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local Government.

Figure 2-3: Speed Classifications



Source: MRWA Road Information Mapping System

2.3 Existing RAV Network

The road network around the site does not currently form part of the Restricted Access Vehicle (RAV) Network.

2.4 Existing Key Intersections

The key intersections within the study area are as follows, with further detail and layouts shown below:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Resolution Drive / Great Eastern Highway / Hardey Road Signalised Intersection
- Stoneham Street / Great Eastern Highway / Belgravia Street Signalised Intersection
- Garratt Road / Guildford Road Signalised Intersection.

All of the above intersections are modelled for traffic performance in this TIA with the exception of the Guildford Road intersection which is some 1.7km away from the LSP area.

South of Site:

Resolution Drive / Stoneham Street / Grandstand Road: The 4-way roundabout is located approx. 700m south of the site and connects Grandstand Road (providing several site accesses) with the Great Eastern Highway further south. Figure 2-4 shows the existing geometry of the intersection, Grandstand Road and Stoneham Street both have two-lane approaches to the roundabout while both approaches from Resolution Drive have a single lane approach.

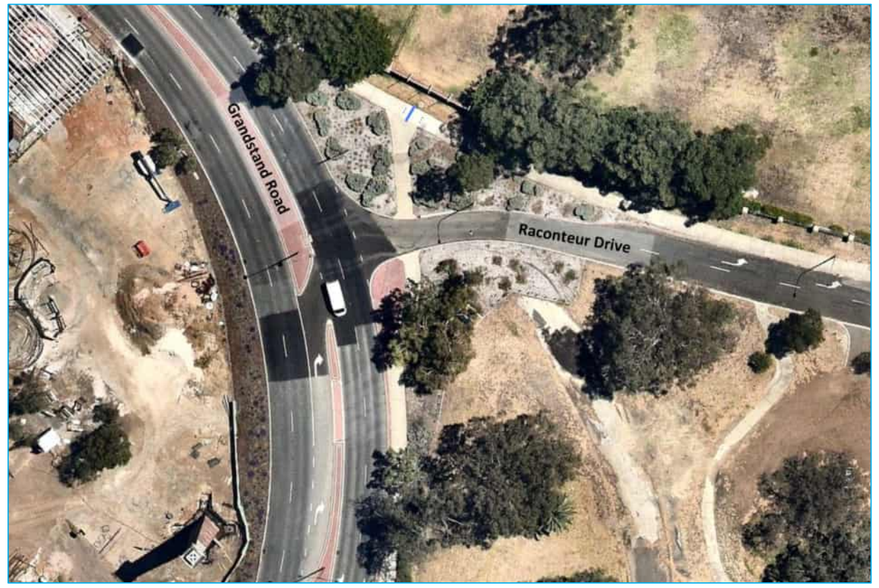
Figure 2-4: Resolution Drive / Stoneham Street / Grandstand Road – 4-way roundabout



Source Mapping: NearMap 2024

Raconteur Drive / Grandstand Road: The 3-way priority-controlled intersection is located approx. 500m south of the site and provides access to Raconteur Drive connecting to Matheson Road for one of the Ascot Racecourse car parks. As Raconteur Drive is one-way in this section, the intersection allows only left-in and right-in turning movements from each side of Grandstand Road (unless otherwise permitted under race day traffic management controls). **Figure 2-4** shows the existing geometry of the intersection.

Figure 2-5: Raconteur Drive / Grandstand Road – 3-way priority-controlled intersection (left-in / right in only)



Source Mapping: NearMap 2024

Resolution Drive / Great Eastern Highway / Hardey Road: The 4-way signalised intersection is located approx. 1km south of the site and provides access to existing residential areas to the south-east of Ascot Racecourse. **Figure 2-4** shows the existing geometry of the intersection. This includes three through lanes in each direction on the Great Eastern Highway, an intersection bus queue jump lane, a left-turn lane and a right-turn/U-turn lane.

Existing Situation

Figure 2-6: Resolution Drive / Great Eastern Highway / Hardey Road – 4-way signalised intersection



Source Mapping: NearMap 2024

Stoneham Street / Great Eastern Highway / Belgravia Street Signalised Intersection: The 4-way signalised intersection is located approx. 1km south of the site and provides access to existing residential areas to the south-east of Ascot Racecourse. **Figure 2-7** shows the existing geometry of the intersection. This includes three through lanes in each direction on the Great Eastern Highway, as well as bus queue jump lane for buses, a left-turn lane and a right-turn/U-turn lane.

Figure 2-7: Stoneham Street / Great Eastern Highway / Belgravia Street – 4-way signalised intersection



Source Mapping: NearMap 2024

North-West of the Site:

Garratt Road / Guildford Road Signalised Intersection: This 4-way signalised intersection is located approximately 1.7km north-west of the site and provides access to existing residential areas to the north-west of Ascot Racecourse. **Figure 2-8** shows the existing geometry of the intersection.

Figure 2-8: Garratt Road / Guildford Road – 4-way signalised intersection



Source – NearMap 2024

2.5 Existing Traffic Volumes

PJA contacted the City of Belmont, who kindly provided their latest traffic count data for the intersection of Resolution Drive/Grandstand Road/Stoneham Street from surveys undertaken in 2017 as part of the GGLSP studies presently being undertaken by the City. In addition to this, recent traffic counts were commissioned by PJA as part of the Ascot Racecourse project in February 2024.

Complementing the existing SCATS traffic counts at the signalised intersections, traffic counts were undertaken at the intersection of Resolution Drive/Raconteur Drive priority-controlled intersection and Grandstand Road/Waterway Crescent roundabout.

Midblock traffic counts were sourced from the Main Roads TrafficMap, and these indicate that there are the following daily traffic flows on the key roads near the Ascot Racecourse:

- Grandstand Road 16,670 vehicles per day (vpd) – 2018 counts
- Resolution Drive 7,860 vpd – 2021 counts
- Stoneham Street 14,270 vpd – 2018 counts.

Review of these midblock traffic flows over an extended period[1] up to the present day, indicates that traffic flows in the Ascot area have been increasing by approximately 0.75% per annum. Advice from the City, informed from the development of the traffic model for the Golden Gateway LSP, has indicated a 0.5% growth rate.

Thus, for the derivation of equivalent 2024 traffic flows for the intersection of Resolution Drive/Grandstand Road/Stoneham Street, the traffic flows to and from the main legs of the intersection has been increased by 0.5% per annum from 2017 to 2024. This was discussed with the City as being appropriate for use for the Ascot LSP.

These actual and/or derived counted 2024 traffic flows are shown below in **Figure 2-9**.

Figure 2-9: Peak Hour 2024 Traffic Flows



2.6 Existing Pedestrian / Cycle Networks

Existing pedestrian / cycle networks are illustrated in **Figure 2-10.** The first part of the below figure shows the proximity of the Perth-Midland Principal Shared Path (PSP) to the site, as it links through Meltham and Bayswater north of the site. The Perth-Midland PSP is a high-quality urban dual-use pathway which runs parallel to the Midland railway line. To access the PSP from the site, shared used paths are available on the northern side of the Garratt Road Bridge to/from the site which

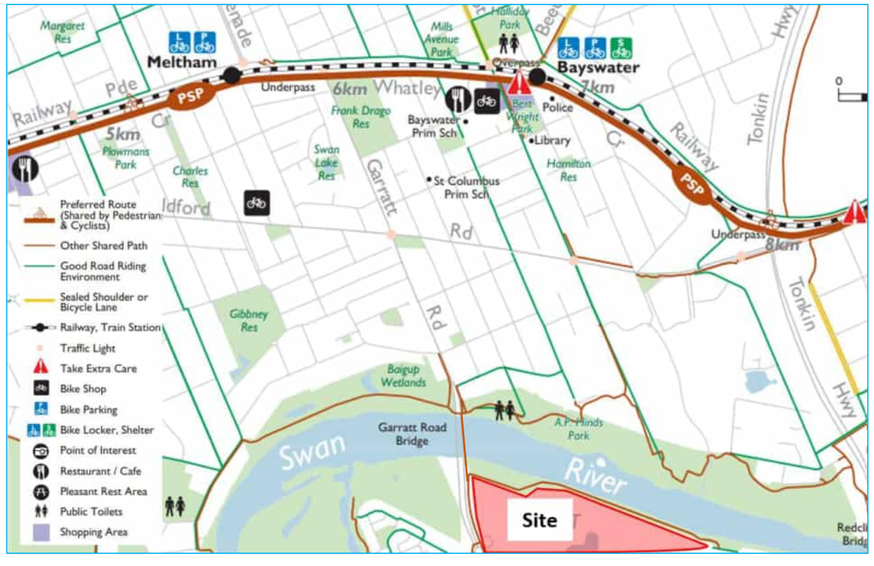
[1] Extended period over approximately 20 years (2002 – 2021).

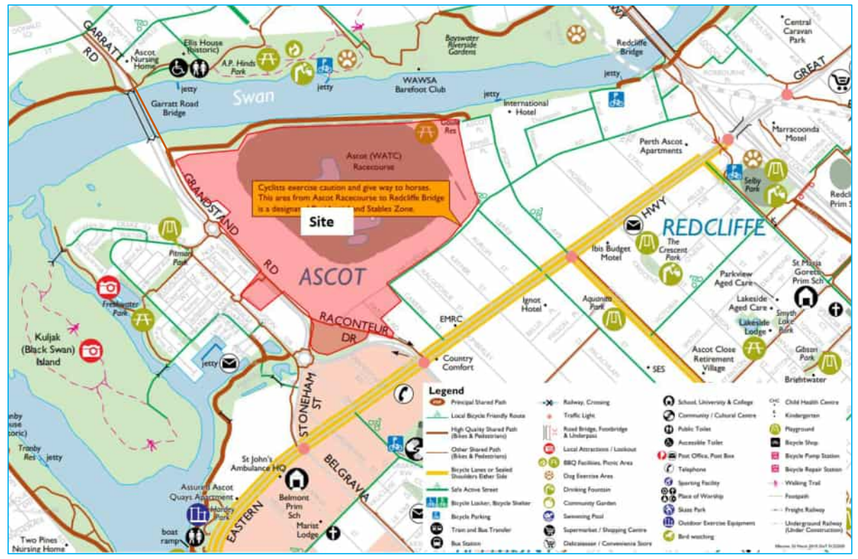
also runs parallel to the Swan River. From here, Leake Street and King William Street are two roads with good road riding environments in order to reach the PSP.

The second part of the figure below shows the existing cycle infrastructure available to the south, west and east of the site. One of the modal integration items to note is for cyclists to exercise caution and to give way to horses in the area between the racecourse and adjacent Redcliffe Bridge as a designated 'Residential and Stables' zone.

Immediately north of the site, a high-quality shared path for cyclists and pedestrians in available between the shared paths along Grandstand Road and Ascot Place. A number of local roads surrounding the site are highlighted as local cycle friendly routes including Matheson Road and Epsom Avenue. Additionally, the Great Eastern Highway is highlighted as providing cycle lanes or sealed shoulders on either side of the carriageway, though these are largely provided as on-road cycle lanes with no physical separation and are combined with, or are immediately adjacent to, bus lanes with vehicles travelling above the Safe System speeds of 30km/h for vulnerable road users.

Figure 2-10: Existing Pedestrian / Cycle Networks





Source: WA Department of Transport (2024)

2.7 Existing Public Transport

The main bus stops accessible from the site are on Grandstand Road immediately adjacent to one of the key pedestrian access points to the racecourse. Based on a desktop review, the infrastructure provided at these stops is limited as a shelter with seating is only available on the south-western side while a raised kerb to assist with reduced mobility access is only available for a short distance on the north-eastern side of Grandstand Road. It would be recommended that the City of Belmont undertake a review of these bus stops (irrespective of this development), particularly as they serve a significant destination.

These stops are served by the bus 998/999 which provided clockwise and anti-clockwise routes of the Perth CircleRoute (shown in purple in **Figure 2-11**), respectively. This circular route has limited stops and a good frequency of every 15 minutes, Monday-Saturday and every 30 minutes on Sundays, which encompasses many of Perth's suburbs encircling central Perth and locally providing connectivity to Bayswater Rail Station. Ascot Racecourse is serviced by the clockwise service at 06:03 on weekdays and a last service at 22:13. A shortened service is available on weekends and public holidays. These timings are reflected similarly in the anticlockwise service.

Additional frequent bus services are accessible from the site along the Great Eastern Highway as shown in **Figure 2-11** including services towards Redcliffe Station, central Perth and Perth Airport.

Existing Situation

Figure 2-11: Public Transport Services



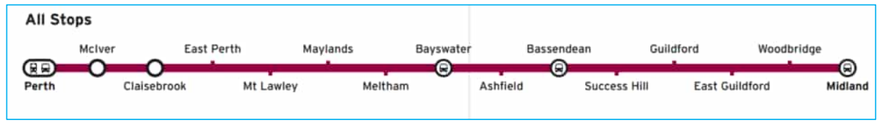
Source: WA Department of Transport (2024)

Rail Services

Bayswater Train Station is accessible via bus service 999 and provides access to both the Midland Railway Line and the Airport Line.

During the week, the Midland railway line carries passenger rail services between Perth city, and stations in between as shown in **Figure 2-12**, at intervals of approximately 10 to 15 minutes between 05:00am and 21:00pm. The frequency reduces past 9pm to every 30 minutes until 12:30am.

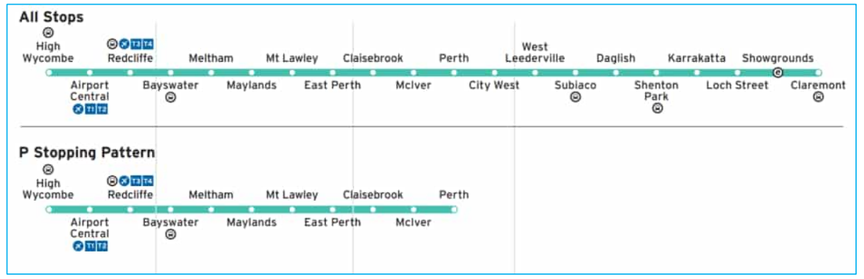
Figure 2-12: Stopping Pattern on the Midland Rail Line



Source: Transperth

The Airport Line operates from Claremont to High Wycombe via Perth Station, with some services throughout the day just terminating at Perth Station. Both variations of the route are shown in **Figure 2-13**. The service provides a fast connection to Perth Airport, operating every 12 minutes during the peak period, every 15 minutes during the day and every 30 minutes at night.

Figure 2-13: Stopping Pattern on the Airport Rail Line



Source: Transperth

Overall, the existing public transport service within the vicinity of the Site is good with moderate-to-high frequency of services operating during the network peak periods.

2.8 Crash Assessment

A search of the Main Roads WA Reporting Centre for crash data was undertaken. This search covered all recorded traffic accidents for the most recently available five-year reporting period between 1 January 2019 and 31 December 2023 for the study area shown in **Figure 2-14** and **Figure 2-15** which includes the following intersections:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Resolution Drive / Great Eastern Highway / Hardey Road Signalised Intersection
- Stoneham Street / Great Eastern Highway / Belgravia Street Signalised Intersection

Both figures highlight how the majority of recorded crashes within the study area are 'Property Damage Only' and mostly occur on the midblock carriageway itself rather than the intersections noted above. The majority of these incidents occur on the Great Eastern Highway, which is typical as a 'Primary Distributor' with higher volumes (crash exposure).

The recorded crash types for the 200 crashes recorded in the study area are shown in **Table 2-1** below. The 'Hospital' and 'Medical' crashes recorded are typically rear-end, non-collision and right-angle types of crash.

Table 2-1: Crash Data for Study Area

Type of Crash	Fatal	Hospital	Medical	Major PDO*	Minor PDO*	Total
Rear End	-	4	19	62	40	125
Sideswipe	-	-	-	8	11	19
Hit Object	-	-	-	2	3	5
Head On	-	-	-	-	-	-
Non-Collision	-	1	-	1	1	3
Right Angle	-	-	1	12	10	23
Other	-	1	-	5	6	12
Total	0	6	20	90	71	187

**Property Damage Only*

Existing Situation

Figure 2-14: Summary of All Crashes in Latest 5-Year Period

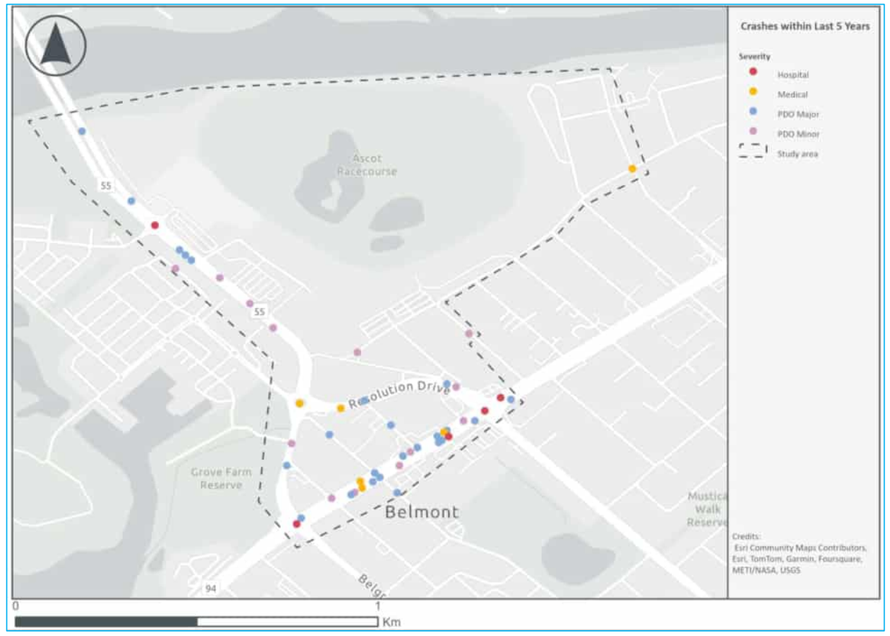
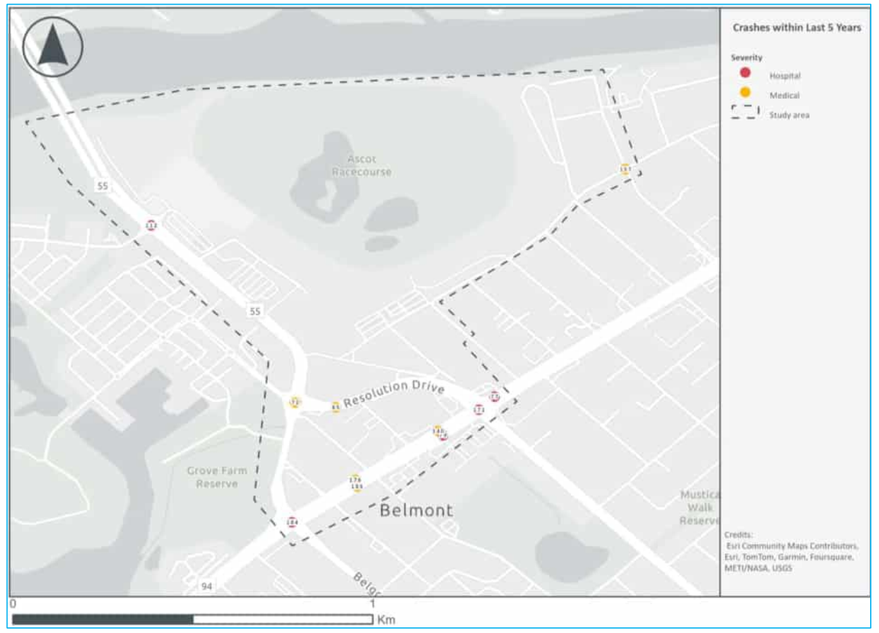


Figure 2-15: Hospital and Medical Severity Crashes in the Latest 5-Year Period



3 Proposed Local Structure Plan and Scheme Amendment

3.1 Proposed Zoning

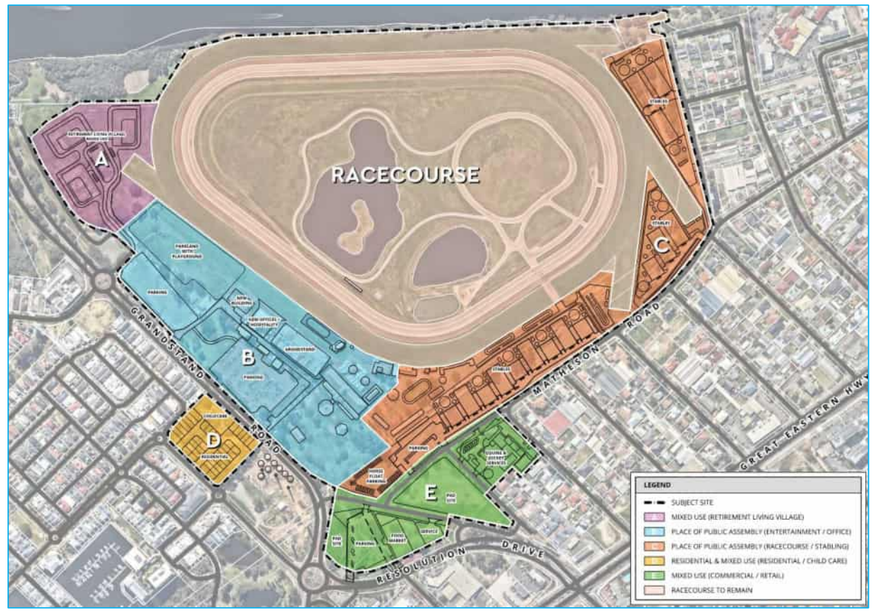
In Section 1 of this TIA, the site area was identified as largely dedicated to uses relating to Ascot Racecourse, such as 'Private Recreation' (MRS) or 'Place of Public Assembly' (LPS No.15), with some areas within the site boundary zoned as 'Urban' or 'Mixed Use'.

The Ascot LSP and Scheme Amendment proposes rezoning areas within the site boundary into five specific precincts, as summarised in **Table 3-1**, set out in **Figure 3-1** (**Appendix B**).

Table 3-1: Proposed Land Use Yield

Precinct	Proposed Zoning	Proposed Uses	Proposed Built Form/Yield
A	Mixed Use	Retirement Living Village	– 330-390 retirement apartments (across 3 buildings of up to 15 storeys, each with 110-130 apartments). – Maximum 300m^2 café.
B	Place Of Public Assembly (No Change to Existing Zone)	Entertainment / Racecourse Administration Office – (New building with replace the footprint of an existing building and existing building rebuilt adjacent to new building.)	– New building - Office on Ground Floor, approx. 61 people across 680m^2 NLA (Net Lettable Area). – New Building - Hospitality venue on Upper Floor - Total building footprint of 1,020m^2 – Parkland with a playground.
C	Place Of Public Assembly (No Change to Existing Zone)	Racecourse / Stabling	– 3 On-course stabling complexes. – Approx. 400 stables. – Parking area inc. Horse float parking.
D	Residential & Mixed Use (R60)	Residential / Child Care	– Child care centre fronting Grandstand Rd, across approx. 2,100m^2 for 70-90 children. – Residential development with a yield of approx. 41 lots.
E	Mixed Use (with additional use of 'shop')	Commercial / Retail	– Site 1: 3,400m^2 retail floorspace and 2,500m^2 commercial floorspace – Site 2: 5,200-7,100m^2 commercial floorspace. – Site 3: Equine Centre - 'Jockey Health' inc. 'consulting room' type uses.

Figure 3-1: Proposed Masterplan Concept



Source: Rowe Group Design, 2024

3.2 Vehicular Driveway Access Arrangements

While individual lot driveway access arrangements and car parking typically fall outside the scope of a general Structure Plan-level transport assessment outlined in the WAPC Guidelines, the Ascot LSP Applicant is proactively presenting several solutions upfront to enhance future lot access arrangements and network performance. These suggestions and recommendations are intended for discussion purposes only and are subject to further refinement in subsequent stages of development planning.

As highlighted in Section 2, the existing racecourse is served by a number of vehicular access points from Grandstand Road and Matheson Road.

It is acknowledged that in the draft GGLSP, a new roundabout intersection was previously proposed to replace the existing Grandstand Road / Raconteur Drive intersection, introducing an opportunity for a high capacity and controlled access to the racecourse via a new 4th arm of the roundabout. This arm would have also provided direct access for horse floats looking to travel northbound on Grandstand Road. However, it is understood that this new roundabout option was mooted based on stakeholder feedback during the City's draft GGLSP advertising period and subsequently the current intersection format will be retained.

Notwithstanding the above, for the Ascot LSP, this Grandstand Road and Resolution Drive intersection presents a major opportunity to modify the permissible movements at the restricted access point, to improve the overall access strategy for the LSP. This is further explored.

For the proposed Precinct B (Entertainment / Racecourse Administration Office) car park, vehicular access from the members carpark onto Grandstand Road, is expected to be retained as left-in/left-out (LILO). There are existing roundabouts at either end of the racecourse at Waterway Crescent and Resolution Drive that provide the same function as right turns at the crossover points. The traffic concern with allowing any right turns at the Precinct B crossovers is the added delay for patrons queuing and waiting to access the parking areas or when leaving after the races. If the LSP was to pursue direct right turn options at the Precinct B crossovers, it is recommended that the impacts would need to be assessed in finer detail, on a number of different peak weekend race days. Only the AM and PM effects of the wider development coinciding with the typical AM and PM commuter peaks has been examined for this LSP, as these would represent the highest traffic flow on a regular basis. The median island is wide enough for the northern two crossovers to potentially have two-stage right turn movements, but the southern crossover has a narrower median opposite, and therefore would not appear to have enough width to allow for two-staged median movements.

Any crossover to Precinct D (Child Care and Residential) onto Grandstand Road is recommended in the form of a LILO. A LILO is supported in balancing the needs of access to the child care centre and the amenity of residents on Northerly Avenue and Resolution Drive. There would be some non-local child care centre traffic along Resolution Drive if no LILO on Grandstand Road was permitted. As such, a LILO should be pursued to/from Grandstand Boulevard to Precinct D, which would need to be integrated safely with the operations of the crossover on the opposite side of the road to the racecourse. This can be assessed in detail in later stages, post LSP endorsement as an approval of a Scheme Amendment is not contingent on these details and available wider accessibility.

For the driveway accesses for Precinct E (commercial precinct) east of the roundabout, there is limited frontage available along Resolution Drive between Raconteur Drive and Grandstand Road. As such, full movement crossovers are unlikely to be possible due to road safety and as such likely to be in the form of LILOs.

Given the above restrictions for most access points to LILOs due to geometrical constraints, a relief valve is needed to support northbound traffic (right turning vehicle demands from the east). In this regard, the existing intersection of Grandstand Road and Resolution Drive is proposed to be open permanently to traffic with left and right turns allowed from Grandstand Road into Raconteur Drive and a left turn out from Raconteur Drive onto Grandstand Road (LILO-RI). These are the same movements currently permitted at this intersection on race days to allow racecourse patrons to park and exit. This critical left turn out to, and right turn in from Grandstand Road are both expected to operate satisfactorily with acceptable queues and delays to support the Ascot LSP (refer Section 6). Ultimate development queues are expected to be able to be contained within the current right turn pocket length on Grandstand Road.

3.3 Parking Impacts

Again, while individual lot driveway access arrangements and car parking typically fall outside the scope of a general Structure Plan-level transport assessment outlined in the WAPC Guidelines, the Ascot LSP Applicant is proactively presenting several solutions upfront to enhance future lot access arrangements.

The proposed redevelopment of Precinct E (commercial/retail) will impact the availability for parking that currently occurs on race days. The redevelopment will alter existing race patron parking and also horse-float and jockey parking in Precinct E.

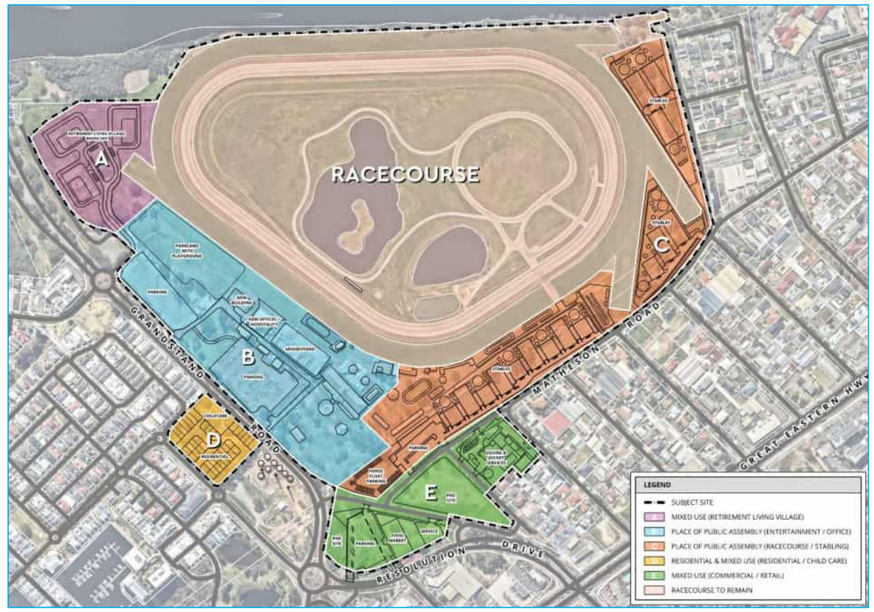
Current parking layout in **Figure 3-2** shows typical parking demand for an opening racing day on 14th October 2023. This shows paved patron parking and members parking within Precinct B (the racecourse entertainment) and patron parking within Precincts C (stabling) and E (commercial/retail). Similarly, the proposed development of Precinct C with the relocation of jockey parking and horse float parking towards the south west extremity of Precinct C will impact the ability of patrons to park within this existing area on race days. A similar impact is expected for Precinct E, where retail development will impact parking currently occurring across this land.

From **Figure 3-2** aerial imagery, there was assessed to be approximately 270 cars parked across the patron parking areas straddling the clouded area across Precincts B, C and E at the south east end of the racecourse.

Figure 3-2: Typical Parking on Race Days



Figure 3-3: Possible Future Parking Layout



The current patron parking within Precinct C (stabling) and E (commercial/retail) will be the most impacted by the LSP with these parking areas no longer available. The southern Precinct B patron parking area would still be available and could be managed to improve parking utilisation on race days. Based on observations of parking demand within the area of the grassed area in Precinct B and E, approximately 110 to 125 cars park within this area on a busy race day.

From the above aerial observations, it was found that there were approximately 40 spaces available within the patron parking in Precinct B at the north west end of the racecourse (accessed from the Waterways Crescent roundabout), approximately 70 spaces available within the member's parking area (accessed grom Grandstand Road) and the possibility to park up to 75 cars on the grassed area between the patron and member parking areas, all up approximately 185 cars could be parked.

Combined, this indicates that supply across the sites would more than meet the total demand for car parking with a **surplus of approximately 60 to 75 parking spaces** for the currently observed parking demand for a busy typical race day at Ascot. This is based on typical race days. For non-typical large events (such as the New Years Perth Cup) the traffic management plan for the racecourse would be appropriate for continued adoption.

To further manage the relocation of parking within the racecourse it is a recommendation of this TIA to implement a Travel Demand Plan for typical race days to actively discourage patrons from using their private motor vehicle to drive to and from the racecourse. This plan may include both the encouragement in the use of the currently available public transport services near the racecourse, improvement in private services, and the uptake of ride share services.

Routes 998 and 999 (CircleRoutes) stop on Grandstand Road immediately in front of the racecourse and high frequency bus service 940 stops on Great Eastern Highway. The CircleRoutes provide onward connections to Morley Bus Station via the new Bayswater Train Station (soon to be completed with Airport, Ellenbrook and Perth-Midland services and be the busiest station outside of Perth Station). Route 940 runs between Elizabeth Quay bus station (immediately next to Elizabeth Quay train station) and Redcliffe train station.

Implementing Travel Demand strategies to promote rideshare services (also known as Mobility as a Service (MaaS)) presents another option to reduce the reliance on private vehicle usage among Ascot Racecourse patrons. MaaS offers users a range of mobility options through a single platform or service provider, reducing congestion, alleviate parking demand, and promote other sustainable travel choices on race days.

Several strategies could be employed to encourage patrons to use MaaS options effectively and almost immediately:

- partnerships with MaaS providers and local transit agencies can enhance the integration of various transportation modes, ensuring seamless connectivity and ease of use for patrons.
- offering incentives such as discounted fares or priority access to race days for MaaS users (such as dedicated drop-off/pick-up areas) could further encourage patronage.
- By promoting MaaS as a viable alternative to private vehicle usage, the Ascot racecourse development could work towards addressing any perceived parking challenges.

The travel behaviours of patrons of entertainment services (hotels, taverns, restaurants, sporting venues etc) are now skewed towards using ride sharing instead of driving to these land uses. This in due to a combination of many factors but mostly the affordability, availability, attractiveness to latter generations and finally, allowing patrons to enjoy themselves without worry of driving under the influence.

3.4 Proposed Internal Transport Network

The proposed Local Structure Plan sets out the indicative future road network for the Scheme Amendment area, which is shown in **Figure 3-1**. The internal network will be detailed further as the lot submissions for each precinct are lodged for assessment. The City of Belmont places high importance on sustainable transport modes (public transport, walking and cycling) and would be seeking high-quality cycling facilities, footpaths, street trees etc to facilitate and reduce reliance on low-occupancy private car modes.

3.5 Assessment Years and Time Periods

This TIA analyses the existing base year of 2024 and the anticipated opening year of 2036 'with' and 'without' the full build-out of the Ascot LSP. Section 7 of this report discusses the assessment years and development traffic generation in more detail.

3.6 Pedestrian and Cyclist Access

Pedestrian and cyclist access has not yet been fully defined; however, it should be provided generally in accordance with the requirements of national and local guidance, the Department of Transport's Long Term Cycle Network, and areas comprising largely residential uses should be in accordance with *Liveable Neighbourhoods* and Safe System Engineering.

The proposed pedestrian and cyclist facilities should aim to provide a permeable road network within the subject site and create attractive opportunities that maximise the use of non-private vehicle transport modes. Section 5 of this report discusses access to public transport and recommended improvements.

4 Changes to External Transport Network

Part of the Ascot Racecourse development is currently within the GGLSP, with Precincts D and E falling wholly within the currently nominated GGLSP area with part of Precinct C. The draft Movement and Access Strategy report prepared by the GGLSP proposed road network changes as part of the LSP to support the LSP, noting that the proposal of a new roundabout at Resolution Drive / Grandstand Boulevard have been mooted based on advertising feedback from stakeholders. Accordingly, the GGLSP is presently in the process of being modified, to address agency concerns and comments and as such the road network is expected to remain much the same as it is presently.

The previous draft proposed road network is shown below in Figure 4-1. The proposed new roundabout, north of the current roundabout at Grandstand Road/Resolution Drive/Stoneham Street, was proposed to be a 3-way roundabout and would have provided Ascot Racecourse Precinct E an opportunity for a fourth approach entry.

The retention of the current road network does have the benefit of retaining Precinct E to be unbisected by any major roadway.

Figure 4-1: Golden Gateway Local Structure Plan



Source: Golden Gateway Public Realm Strategy

5 Integration with Surrounding Area

5.1 Surrounding Attractors / Generators

As Ascot Racecourse is already very well established in the local area, a variety of uses including retail, food, beverage and recreational uses are available in the local area primarily along the Great Eastern Highway and on the Racecourse site itself. In addition, as an attractor and a key employment location itself, the racecourse is located in close proximity to large residential areas of Redcliffe, Belmont, Rivervale and Maylands surrounding the site.

Approximately 1.2 km to the south of the Site, is Belmont Primary School.

5.2 Proposed Changes to Surrounding Land Uses

The City of Belmont's LPS No.15 details the proposed local zoning of land uses within the area surrounding the Site including DA6 to the south of Great Eastern Highway. The proposed changes to these zones are set out in full in Section 3 of this TIA, in the context of the existing zones.

5.3 Level of Overall Accessibility

As Ascot Racecourse is already very well established in the local area, the existing levels of accessibility will be maintained and built upon with the proposals to improve access for all to the site.

5.4 Pedestrian and Cyclist Accessibility

The existing shared path network on the northern side of Grandstand Road provides good active transport links to the area surrounding Ascot Racecourse. This will be further enhanced by the improvements proposed within the Ascot LSP and Scheme Amendment, as well as the Public Realm Strategy being developed as part of the GGLSP.

It is a recommendation of this TIA that, investigations be undertaken to extend the existing footpath network surrounding the racecourse, including south of Grandstand Road and improving pedestrian and cycle connections towards the local amenities on Great Eastern Highway and Belmont Primary School. If feasible, this would encourage trips on foot and wheels to local centres and help increase public transport usage to reduce the reliance on private vehicles.

6 Analysis of Transport Network

6.1 Assessment Years and Time Period

Each intersection will be assessed using the following two scenarios:

- **Scenario 1** – 2024 'current situation'.
- **Scenario 2** – 2036 'without development'.
- **Scenario 3** – 2036 'with Ascot LSP development'.

Scenario 1 sets the baseline for the area for the current traffic flows as surveyed and derived from intersection counts.

Scenario 2 without the development flows have been based on expected traffic flows in 2036 with no development of the Ascot Racecourse nor the effects of the GGLSP. In discussion with the City of Belmont, it was apparent that the previous modelling assessments undertaken for the GGLSP are presently needing to be revised by the GGLSP team. Consequently, there are too many unknowns relating to the GGLSP to assess/assume the outcomes or specific intersection turning movement traffic flows for various scenarios of the GGLSP and the adoption of the draft (now mooted) traffic flows would lead to erroneous results. Accordingly, the 2036 without development Scenario 2 assumes current traffic flows will increase to 2036 with no GGLSP influences.

Scenario 3 is with full development traffic anticipated in 2036 when all precincts are assumed to be fully developed, in line with the Ascot Racecourse anticipated rollout.

6.2 Background Traffic

The background traffic assumptions for this assessment have been based on PJA's consultation with the City of Belmont on the City's current GGLSP traffic assumptions, concluding a 0.5% growth per annum from 2021 through to 2036 is to be applied. Advice from the City of Belmont goes further to say that this growth rate is expected to be maintained through to 2041, beyond the assessment year as noted above. This growth has been applied to major traffic flows on the network but excluding traffic flows to and from:

- Waterways Crescent
- Resolution Drive west of the Grandstand Road/Resolution Drive/Stoneham Street roundabout.

The reason is that the two local Access Roads are established with the Marina Drive residential development recently completed and opened, and therefore 'ultimate' flows are captured in the 2024 base data collated.

6.3 Traffic Generation

The traffic generation rates in the AM peak trips for the Bulky Goods and Supermarket land uses are based on 20% of the expected PM peak flows.

The trip generation for Precinct A retirement village is based on a rate of 3 trips er dwelling per day and is appropriate, given that it is expected the units will have limited parking and that the demographics of the residents are expected to suggest a lower car ownership.

Table 6-1, sourced from the various sources, have been used to calculate an estimate of the traffic generated in the AM and PM peak periods. Given the location of the Site, the above is considered robust trip rates, with no reductions applied to account for linked or internal trips.

No trips were assigned to Precinct B (Racecourse) as the use of the racecourse in the AM and PM peaks during normal weekdays is comparatively negligible. The use of this precinct is expected to be at its highest on weekends and big race days, where traffic management may be utilised on Grandstand Road.

Likewise, no trips were assigned to Precinct C (the Stables). The reason for this is that activity at the stables typically occur well before the AM peak when horses are trained on the course early in the morning. After which, traffic movements from the stables will typically then occur after the typical network AM peak period.

Finally, for the retail use in Precinct E (Commercial / Retail), this was assumed to be a café of approximately 100-200m^2 in gross floor area. This development alone is not expected to generate notable trips independently, but any café patronage would be reciprocal between the proposed supermarket and commercial floorspace proposed to be located under the one roof. The café will also likely attract employees in the nearby area, who are expected to walk to and from the establishment.

The AM trips rates for the Bulky Goods and Supermarket land uses are based on 20% of the expected PM peak flows.

The trip generation for the retirement village is based on a rate of 3 trips er dwelling per day and is appropriate, given that it is expected the units will have limited parking and that the demographics of the residents are expected to suggest a lower car ownership.

Table 6-1: Trip Generation Rates

Land Use	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Retirement (Precinct A)	0.075 trips per dwelling	0.225 trips per dwelling	0.2 trips per dwelling	0.1 trips per dwelling
Racecourse (Precinct B)	NIL	NIL	NIL	NIL
Stables (Precinct C)	NIL	NIL	NIL	NIL
Residential (Precinct D)	0.2 trips per dwelling	0.6 trips per dwelling	0.5 trips per dwelling	0.3 trips per dwelling
Child Care (Precinct D)	0.25 trips per child	0.25 trips per child	0.15 trips per child	0.15 trips per child
Jockey Services (Precinct E)	1.6 trips per 100m^2	0.4 trips per 100m^2	0.4 trips per 100m^2	1.6 trips per 100m^2
Supermarket (Precinct E)	1.55 trips per 100m^2	1.55 trips per 100m^2	7.75 trips per 100m^2	7.75 trips per 100m^2
Commercial (Precinct E)	0.32 trips per 100m^2	0.08 trips per 100m^2	0.4 trips per 100m^2	1.6 trips per 100m^2
Retail (Precinct E)	NIL	NIL	NIL	NIL
Bulky Goods Retail (Precinct E)	0.2 trips per 100m^2	0.2 trips per 100m^2	1.0 trips per 100m^2	1.0 trips per 100m^2

Application of the above noted trip generation rates leads to the creation of Table 7-2 which summarises the trip volumes derived from the adopted generation rates.

Table 6-2: Estimated LSP Traffic Generation (vehicles per hour)

Land Use	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Retirement (Precinct A)	29	88	78	39
Racecourse (Precinct B)	0	0	0	0
Stables (Precinct C)	0	0	0	0
Residential (Precinct D)	8	24	21	11

Land Use	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Child Care (Precinct D)	20	20	12	12
Jockey Services (Precinct E)	21	5	5	21
Supermarket (Precinct E)	72	18	224	224
Commercial (Precinct E)	1	0	4	4
Retail (Precinct E)	0	0	0	0
Bulky Goods Retail (Precinct E)	31	8	96	96
Total	**182**	**163**	**440**	**407**

The Site is expected to generate a total of 345 two-way vehicle trips in the AM peak hour and approximately 845 in the PM peak hour. The overall development is expected to generate the highest flows in the PM and thus the PM peak has been chosen as the basis for the following intersection assessment as these higher flows would be putting the road network under the greatest stress.

Of the above generated trips, 50% of the trips associated with the supermarket have been assumed to be pass-by trips. These trips already exist on the adjacent road network, with drivers diverted from the adjacent road network onto the site and then to exit the site to continue on their journey.

6.4 Future Year Traffic Growth

As previously discussed, the future year growth rates to 2036 (and further to 2041) were provided by the City. From 2021 to 2041 traffic flows are expected to increase by 0.5% per annum linear growth. With the Ascot Waters area being now fully developed (apart from the Precinct D component) traffic flows to and from the legs of intersections into Ascot Waters has been assumed to have zero future traffic growth.

6.5 Traffic Distribution and Assignment

The distribution of trips to and from the Site via the various site accesses have been estimated based on the existing traffic flow percentage split travelling in each direction in the AM and PM peak periods.

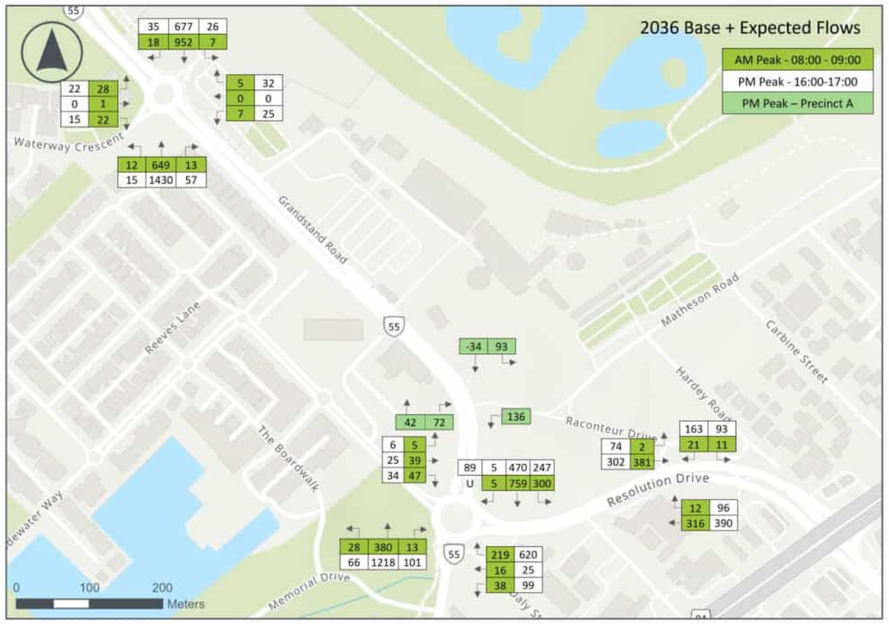
The percentage split of traffic is in keeping with the expectation that a greater proportion of trips generated by the Site will travel in same direction as the commuter peak for the residential and retirement uses. For the commercial attractions, this will be in the same direction as the commuter peak flows for the pass-by trips, but for new trips these will be attracted to the site based on the arrival flow proportions entering the Ascot Racecourse area along Grandstand Road, Resolution Drive and Stoneham Street. The estimated 2036 flows with expected distribution is presented in **Figure 6-1** to **Figure 6-3.**

Figure 6-1: Base 2036 Traffic Flows (no development; background growth only)



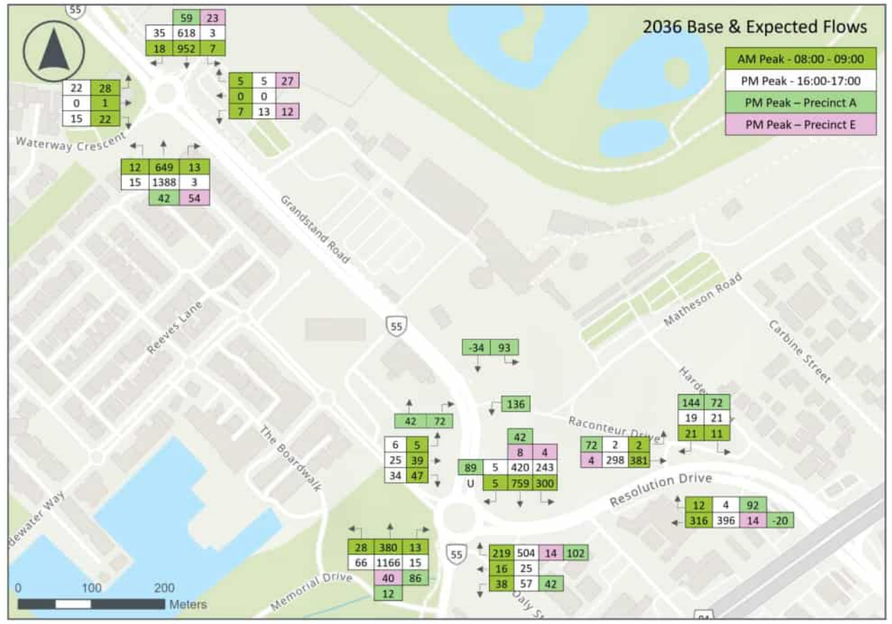
Credits: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA,

Figure 6-2: 2036 Traffic Flows (plus Precinct A Development Flows)



Credits: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA,

Figure 6-3: 2036 Traffic Flows (with Ultimate Ascot LSP Development Flows)



Credits: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA,

The above figure focuses on the distribution of traffic onto the road network for typical AM and PM peak periods. The Racecourse access has not been shown on this figure as the peak movements to and from the racecourse are expected to occur on a Saturday, when traffic flows on Grandstand Road are approximately 60% of typical PM peak values. Peak Racecourse flow is typically at approximately 12pm, prior to the start of the first race at the racecourse and the expected peak arrival time of patrons. The last race typically concludes at about 5:30pm and traffic flows at that time on Grandstand Road are approximately 50% of PM peak flows, this at a time when patrons will be leaving the racecourse at the highest rate.

To put the above into context, the peak weekend flows on Grandstand Road are approximately the same as the inter-peak weekday flows at about the same time.

6.6 Intersection Performance

SIDRA analysis was undertaken at the following intersections to estimate the impact of the development generated traffic on the surrounding transport network:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Grandstand Road and Waterways Cresent Roundabout
- Resolution Drive / Raconteur Drive intersection.

SIDRA results for each approach are presented below in the form of Degree of Saturation (DOS), Average Delay, Level of Service (LOS) and 95th Percentile Queue. These characteristics are defined as follows:

- **Degree of Saturation (DOS)**: is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded for an un-signalised intersection where DOS > 0.80;
- **95% Queue:** is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- **Average Delay:** is the average of all travel time delays for vehicles through the intersection. An unsignalised intersection is considered to be operated at capacity where the average delay exceeds 40 seconds for any movement; and
- **Level of Service (LOS)**: is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers.

6.7 Scenario 1 - Current Year 2024

The following presents the analysis of the key access points as noted above assuming current traffic flows on the road network and without the Ascot Racecourse developed.

Figure 6-4: Current Performance – Grandstand Rd/Waterways Cres

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.45	4	A	26
Precinct A	0.03	7	A	1
Grandstand Rd W	0.20	4	A	12
Waterway Cres	0.05	10	A	2
Intersection	**0.45**	**4**	**A**	**26**

Figure 6-5: Current Performance – Grandstand Rd/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.45	0	A	0
Raconteur Dr	NA	NA	NA	NA
Grandstand Rd W	0.33	0	A	0
Intersection (based on minor leg appr/mvt)	**0.45**	**0**	**A**	**0**

Figure 6-6: Current Performance – Grandstand Rd/Resolution Dr/Stoneham St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Stoneham St S	0.62	9	A	54
Resolution Dr E	0.74	15	B	47
Grandstand Rd N	0.33	4	A	21
Resolution Dr W	0.16	13	B	7
Intersection	**0.74**	**9**	**A**	**55**

Figure 6-7: Current Performance – Resolution Dr/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Resolution Dr E	0.21	0	A	0
Resolution Dr E RT	0.003	4	A	0.1/0.5
Raconteur Dr RT	0.02	6	A	0.5
Resolution Dr W	0.16	0	A	0
Intersection (based on minor leg appr/mvt)	**0.02**	**6**	**A**	**0.1/0.5**

Figure 6-8: Current Performance – Great Eastern Hwy/Resolution Dr/Hardey Rd

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Hardey Rd E	0.52	76	E	99
GEH N	0.75(T)/0.90(R)	44	D	306
Resolution Dr W	0.93	64	E	75
GEH S	0.83(T)/0.65(R)	31	C	319
Intersection	**0.93**	**42**	**D**	**319**

Figure 6-9: Current Performance – Great Eastern Hwy/Stoneham St/Belgravia St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Belgravia St E	0.81	72	E	172
GEH N	0.70(T)/0.63(R)	17	B	173
Stoneham St W	0.93	92	F	129
GEH S	0.80(T)/0.88(R)	25	C	294
Intersection	**0.93**	**34**	**C**	**294**

As summarised, apart from Great Eastern Highway, intersections all typically operate at a good level of service, with typically LoS A on all leg/movements, with some LoS B on the Resolution Drive approaches to the Resolution Drive / Stoneham Street / Grandstand Road Roundabout. The largest amount of queueing occurs at this same roundabout where it has a DoS (a

measure of how much traffic takes up the available traffic carrying capacity) of 0.74, this maximum being on the Resolution Drive eastern approach to the roundabout and considered acceptable. Intersections on Great Eastern Highway at Resolution Drive and Stoneham Street operate with DoS of approximately 0.7 to 0.85 on Great Eastern Highway with higher DoS on the western leg approaches (Resolution Drive and Stoneham Street) where DoS is approaching 0.93.

6.8 Scenario 2 – 2036 No Development, Background Traffic Growth

The following presents the analysis of the same intersections assuming a future growth horizon to 2036 with NO build out of the development. The intersections have been assessed based on the current geometries.

Ascot LSP Area Intersections: Grandstand Road and Raconteur Drive

Figure 6-10: 2036 Performance – Grandstand Rd/Waterways Cres

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.54	4	A	38
Precinct A	0.03	7	A	1
Grandstand Rd W	0.25	4	A	15
Waterway Cres	0.06	13	B	3
Intersection	**0.54**	**4**	**A**	**38**

Figure 6-11: 2036 Performance – Grandstand Rd/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.54	0	A	0
Raconteur Dr	NA	NA	NA	NA
Grandstand Rd W	0.35	0	A	0
Intersection (based on minor leg appr/mvt)	**0.54**	**0**	**A**	**0**

Figure 6-12: 2036 Performance – Grandstand Rd/Resolution Dr/Stoneham St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Stoneham St S	0.69	11	B	68
Resolution Dr E	0.81	17	B	59
Grandstand Rd N	0.35	4	A	23
Resolution Dr W	0.19	14	B	8
Intersection	**0.81**	**10**	**A**	**68**

Figure 6-13: 2036 Performance – Resolution Dr/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Resolution Dr E	0.22	0	A	0
Resolution Dr E RT	0.002	6	A	0.6
Raconteur Dr RT	0.02	7	A	0.5/0.6
Resolution Dr W	0.17	0	A	0
Intersection (based on minor leg appr/mvt)	**0.02**	**7**	**A**	**0.5/0.6**

With no development, and with continued anticipated background traffic growth on the adjacent road network, the intersections are expected to still operate satisfactorily. Noted performance changes to each intersection are:

- Grandstand Road/Waterways Crescent

  This intersection is expected to be operating well, with an overall LoS A, the same as now. There is expected to be a lengthening of vehicle queues on Grandstand Road and a slight increase in the DoS, notably for the Grandstand Road eastern approach to the roundabout.

- Grandstand Road/Raconteur Drive

  Raconteur Drive is presently closed to traffic on non-race days.

- Grandstand Road/Resolution Drive/Stoneham Street

  With the background traffic growth, this intersection is still expected to operate satisfactorily in 2036. Queues are expected to slightly lengthen with the DoS increasing from 0.74 to 0.81. Overall, the intersection is expected to operate at a LoS A.

- Resolution Drive/Raconteur Drive

  This intersection is expected to operate in almost identical manner to how it presently operates. There is still expected to be minimal delays and good corresponding LoS. The DoS for the critical right turn from Raconteur Drive onto Resolution Drive is low at 0.02, this being a measure of good operational performance for this intersection.

Great Eastern Highway Intersections

Figure 6-14: 2036 Performance – Great Eastern Hwy/Resolution Dr/Hardey Rd

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Hardey Rd E	0.54	75	E	106
GEH N	0.71(T)/1.25(R)	70	E	411
Resolution Dr W	1.24	132	F	126
GEH S	0.90(T)/0.90(R)	30	C	410
Intersection	**1.25**	**56**	**E**	**411**

Figure 6-15: 2036 Performance – Great Eastern Hwy/Stoneham St/Belgravia St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Belgravia St E	1.12	199	F	389
GEH N	0.65(T)/0.82(R)	12	B	127
Stoneham St W	1.13	237	F	232
GEH S	0.91(T)/1.13(R)	38	D	525
Intersection	**1.13**	**67**	**E**	**525**

- Great Eastern Highway/Resolution Drive/Hardey Road

  With the background traffic growth, this intersection is expected to be oversaturated in 2036. Queues are expected to slightly lengthen with the DoS increasing from 0.93 to 1.25, this high DoS as a result of the right turn lane on the northern Great Eastern Highway approach being over saturated. Overall, the intersection is expected to operate at a LoS E. Options tested to improve this intersection included the introduction of an additional right turn lane on the northern Great Eastern Highway approach, this was found to reduce the DoS to 0.99, based on the Resolution Drive approach.

- Great Eastern Highway/Stoneham Street/Belgravia Street

  Similar to the intersection above, with the background traffic growth, this intersection is expected to be oversaturated in 2036. Queues are expected to lengthen with the DoS increasing from 0.93 to 1.13, this high DoS as a result of the right turn lane on the southern Great Eastern Highway approach along with the Stoneham Street approach being over saturated. Overall, the intersection is expected to operate at a LoS E. Options tested to improve this intersection included the introduction of an additional right turn lane on the southern Great Eastern Highway approach, this was found to still have a similar overall DoS of 1.17, based on the Stoneham Street approach. But the DoS for the right turn movement on the southern approach on Great Eastern Highway reducing to 0.79.

6.9 Scenario 3 – 2036 With Ascot LSP Development

The following presents the analysis of the assessment of the road network assuming a future growth horizon to 2036 with full build out of the Ascot Racecourse LSP development for a comprehensive assessment.

Ascot LSP Area Intersections: Grandstand Road and Raconteur Drive

Figure 6-16: 2036 Performance with Development – Grandstand Rd/Waterways Cres

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.54	5	A	38
Precinct A	0.10	8	A	3
Grandstand Rd W	0.28	4	A	16
Waterway Cres	0.06	13	B	3
Intersection	**0.54**	**5**	**A**	**38**

Figure 6-17: 2036 Performance with Development – Grandstand Rd/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.48	0	A	0
Grandstand Rd E RT	0.09	4	A	2
Raconteur Dr	0.08	6	A	2
Grandstand Rd W	0.18	0	A	0
Intersection (based on minor leg appr/mvt)	**0.48**	**0.5**	**A**	**2**

Figure 6-18: 2036 Performance with Development – Grandstand Rd/Resolution Dr/Stoneham St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Stoneham St S	0.85	23	C	136
Resolution Dr E	0.86	17	B	79
Grandstand Rd N	0.28	5	A	16
Resolution Dr W	0.28	18	B	13
Intersection	**0.86**	**17**	**B**	**136**

Figure 6-19: 2036 Performance with Development – Resolution Dr/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Resolution Dr E	0.22	0	A	0
Resolution Dr E RT	0.09	2.2	A	2
Raconteur Dr RT	0.19	8	A	3.9/4.9
Resolution Dr W	0.17	0	A	0
Intersection (based on minor leg appr/mvt)	**0.19**	**8**	**A**	**3.9/4.9**

With full development of the Ascot Racecourse LSP area, and with continued background traffic growth on the adjacent road network, the intersections are expected to still operate satisfactorily in Scenario 3 and only minor changes to performance results to each intersection as compared to the previous Scenario 2:

- Grandstand Road/Waterways Crescent

  This intersection is expected to continue to operate well, with an overall LoS A, the same as for the no-development Scenario 2. Other metrics for this intersection are expected to be similar to the 2036 scenario and thus there is expected to be no detrimental impact issues caused by the LSP development.

- Grandstand Road/Raconteur Drive

  This intersection is proposed to be open permanently to traffic with left and right turns allowed from Grandstand Road into Raconteur Drive and only a left turn out from Raconteur Drive onto Grandstand Road. These are the same

movements currently permitted at this intersection when the intersection is open on race days to allow racecourse patrons to park. It is noted that the critical right turn from Grandstand Road onto Raconteur Drive and the left turn from Raconteur Drive onto Grandstand Road are both expected to operate at LoS A with DoS of 0.8 to 0.9, acceptable queues and delays. Queues are expected to be able to be contained within the current right turn pocket length on Grandstand Road.

- Grandstand Road/Resolution Drive/Stoneham Street

  With the background traffic growth and the Ascot LSP development traffic, this intersection is still expected to operate satisfactorily in 2036. Queues are expected to lengthen to 136m (68m) on Stoneham Street and 79m (from 59m) on Resolution Drive eastern approach. Overall, the DoS for the intersection is expected to be 0.86, this again acceptable with a total average delay of 17s and overall LoS B. Across all measures, this intersection is expected to operate satisfactorily.

- Resolution Drive/Raconteur Drive

  This intersection is expected to still operate similar to 2024 as in 2036 without any development. The DoS for the right turn from Raconteur Drive onto Resolution Drive is expected to be 0.19 with slightly longer queues, but no more than a single vehicle queued either at Raconteur Drive prior to entering Resolution Drive, or within the median waiting to entering the western traffic flow back towards the roundabout at the intersection of Grandstand Road/Resolution Drive/Stoneham Street.

Great Eastern Highway Intersections

Figure 6-20: 2036 Performance with Development – Great Eastern Hwy/Resolution Dr/Hardey Rd

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Hardey Rd E	0.60	81	F	116
GEH N	0.72(T)/1.53(R)	126	F	634
Resolution Dr W	1.51	204	F	195
GEH S	0.91(T)/0.90(R)	30	C	417
Intersection	**1.53**	**86**	**F**	**634**

Figure 6-21: 2036 Performance with Development – Great Eastern Hwy/Stoneham St/Belgravia St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Belgravia St E	1.20	252	F	461
GEH N	0.63(T)/1.10(R)	15	B	98
Stoneham St W	1.40	480	F	354
GEH S	0.88(T)/1.38(R)	40	D	468
Intersection	**1.40**	**103**	**F**	**468**

- Great Eastern Highway/Resolution Drive/Hardey Road

  The addition of the LSP development traffic is expected to exacerbate the performance of this intersection, which is expected to be over capacity in 2036 without the development. The intersection is expected to be oversaturated with 2036 queues expected to lengthen and the DoS increasing from 1.25 to 1.53. This high DoS is a result of the right turn lane on the northern (or north-east orientated) Great Eastern Highway approach being oversaturated (demand exceeds capacity). Overall, the intersection is expected to operate at a LoS F, slightly worse than the expected E without the LSP development.

- Great Eastern Highway/Stoneham Street/Belgravia Street

  Similar to the highway intersection above, with the background traffic growth and the addition of the LSP development traffic, this intersection is expected to also be oversaturated in 2036. Queues are expected to lengthen with the DoS increasing from 1.13 to 1.40, this high DoS as a result of the right turn lane on the southern (or south-west orientated) Great Eastern Highway approach along with the Stoneham Street approach being oversaturated. Overall, the intersection is expected to operate at a LoS F, slightly worse than the expected E without the LSP development.

6.10 SIDRA Intersection Results

Analysis of the intersections in the Ascot LSP area at the 2024 (base) and 2036 (full development) design horizons shows that there is predicted to be no detrimental issues with respect to traffic queuing and delays for any movement in the PM peak period where the highest traffic flows are expected. This is on the basis that the existing intersection of Grandstand Road and Resolution Drive is able to be opened permanently to traffic as a LILO-RI as currently occurs on race days.

The Great Eastern Highway signalised intersections at Resolution Drive and Stoneham Street were also checked for performance in 2036. Unsurprisingly, these highway intersections are expected to be oversaturated in 2036, even without the Ascot LSP development, primarily due to increasing demands on Great Eastern Highway.

In summary, outside of the highway intersections, all parameters of this capacity assessment are within recognised thresholds for acceptable intersection operation.

7 Conclusions & Recommendations

This Transport Impact Assessment (TIA) for Ascot Racecourse has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)*, which is the most appropriate level of TIA for a proposed Scheme Amendment and Local Structure Plan submission.

The Site, which is the subject of this assessment, is currently zoned as Place of Public Assembly across the proposed five development Precinct. This zoning is proposed be changed to mixed use, place of public assembly, and residential across the five precincts to allow development in keeping with the Applicant's intention for this Site as a multi-use development and complements the intention for the proposed Golden Gateway LSP.

The following conclusions and recommendations have been made regarding the proposed development with respect to this TIA:

7.1 Overall Integration with Surrounding Attractors / Generators

As Ascot Racecourse is already very well established in the local area, a variety of uses including retail, food, beverage and recreational uses are available in the local area primarily along the route of the Great Eastern Highway and on the Racecourse site itself. In addition, as an attractor and employment location itself, the racecourse is located in close proximity to large residential areas of Redcliffe, Belmont, Rivervale and Maylands surrounding the site.

Approximately 1.2 km to the south of the Site, is situated Belmont Primary School.

7.2 Road Network Accessibility and Parking

The site is well located in relation to the existing road network with access available from the major road network through Ascot via current intersections.

The following key intersections are located on the main road network within the Ascot area and will be immediately affected by traffic flows to and from the development site:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Grandstand Road and Waterways Cresent Roundabout
- Resolution Drive / Raconteur Drive intersection.

Under the WAPC Guidelines for TIAs, a Scheme Amendment requires a 'broad brush' assessment of the impacts of the development. While individual lot driveway access arrangements and car parking typically fall outside the scope of a general Structure Plan-level transport assessment outlined in the WAPC Guidelines, the Ascot LSP Applicant is proactively presenting discussions/solutions to enhance future lot access arrangements and network performance. These suggestions are subject to further refinement in subsequent stages of development planning.

Given the Ascot LSP restrictions for most access points will be LILOs due to geometrical constraints, a relief valve is needed to support northbound traffic (right turning vehicular demands from the east). In this regard, the existing intersection of Grandstand Road and Raconteur Drive is proposed to be opened permanently to traffic with left and right turns allowed from Grandstand Road into Raconteur Drive and a left turn out from Raconteur Drive onto Grandstand Road (LILO-RI). These are the same movements currently permitted at this intersection on race days to allow racecourse patrons to park and exit. This critical left turn out to, and right turn in from Grandstand Road are both expected to operate satisfactorily with acceptable queues and delays to support the Ascot LSP. Ultimate development queues are expected to be able to be contained within the current right turn pocket length on Grandstand Road.

Additionally, the Applicant has undertaken a high-level parking appraisal for the Ascot LSP, even though this is not a standard requirement of a Structure Plan assessment under the WAPC Guidelines. The exiting net parking availability of Ascot on a race day and the proposed new development areas combined, is estimated to be able to adequately meet the currently observed parking demand for a busy typical race day at Ascot. For non-typical large events (such as the New Years Perth Cup) the traffic management plan for the racecourse would be appropriate for continued adoption. To further ensure that racecourse patrons are well informed of parking distribution and pick up / set down areas, it is a recommendation of this TIA to implement a Travel Demand Plan to assist traffic management and actively discourage patrons from using their private motor vehicle to drive to and from the racecourse. This plan may include both the encouragement in the use of the currently available public transport services near the racecourse, improvement in private high occupancy services, and the uptake of ride share services (MaaS).

7.3 Pedestrian and Cycle Accessibility

The existing footpath network on the northern side of Grandstand Road provides good links to the area surrounding Ascot Racecourse. This will be further enhanced by the improvements proposed through the LSP and Scheme Amendment, as well as the Public Realm Strategy being developed as part of the Golden Gateway LSP.

It is a recommendation of this report that, investigations be undertaken to extend the existing footpath network surrounding the racecourse, including south of Grandstand Road and improving pedestrian and cycle connections towards the local amenities on Great Eastern Highway. If feasible, this would encourage trips on foot to local centres and help increase public transport usage to reduce the reliance on private vehicle modes.

7.4 Public Transport Accessibility

The main bus stops accessible from the site are on Grandstand Road immediately adjacent to one of the key pedestrian access points to the racecourse. Based on a desktop review, the infrastructure provided at these stops is limited as a shelter with seating is only available on the south-western side while a raised kerb to assist with reduced mobility access is only available for a short distance on the north-eastern side of Grandstand Road. It would be recommended that a review of these bus stops is undertaken irrespective of any development, particularly as they serve a significant destination, it could also be considered that the proposed development provides a contribution to these improvements.

Additional frequent bus services are accessible from the site along the Great Eastern Highway towards the new Bayswater Railway Sation, Redcliffe Station, central Perth and Perth Airport.

7.5 Analysis of the Transport Network

Analysis of the intersections in the Ascot area with and without the Ascot LSP has been assessed at the 2024 (current) and 2036 (ultimate) design horizons. The comparison of results show that there is predicted to be no detrimental issues with respect to traffic queuing and delays for any movement in the PM peak period (PM peak is when the highest traffic flows are expected). All parameters of this capacity assessment are within recognised thresholds for acceptable intersection operation.

The downstream Great Eastern Highway intersections were also assessed for completeness and were shown to operate above their capacity in 2036, this without the addition of the Ascot LSP development.

It is important to note that at the time of preparing this report, the details of the Golden Gateway Local Structure Plan were still under revision. Whilst every endeavour was made to interrogate the previous traffic modelling and road network proposals in the draft reports and liaise with key project members for updates, the details were still unfinished and presented too many unknowns to be adequately and accurately incorporated into this traffic modelling intersection analyses.

7.6 Recommendations

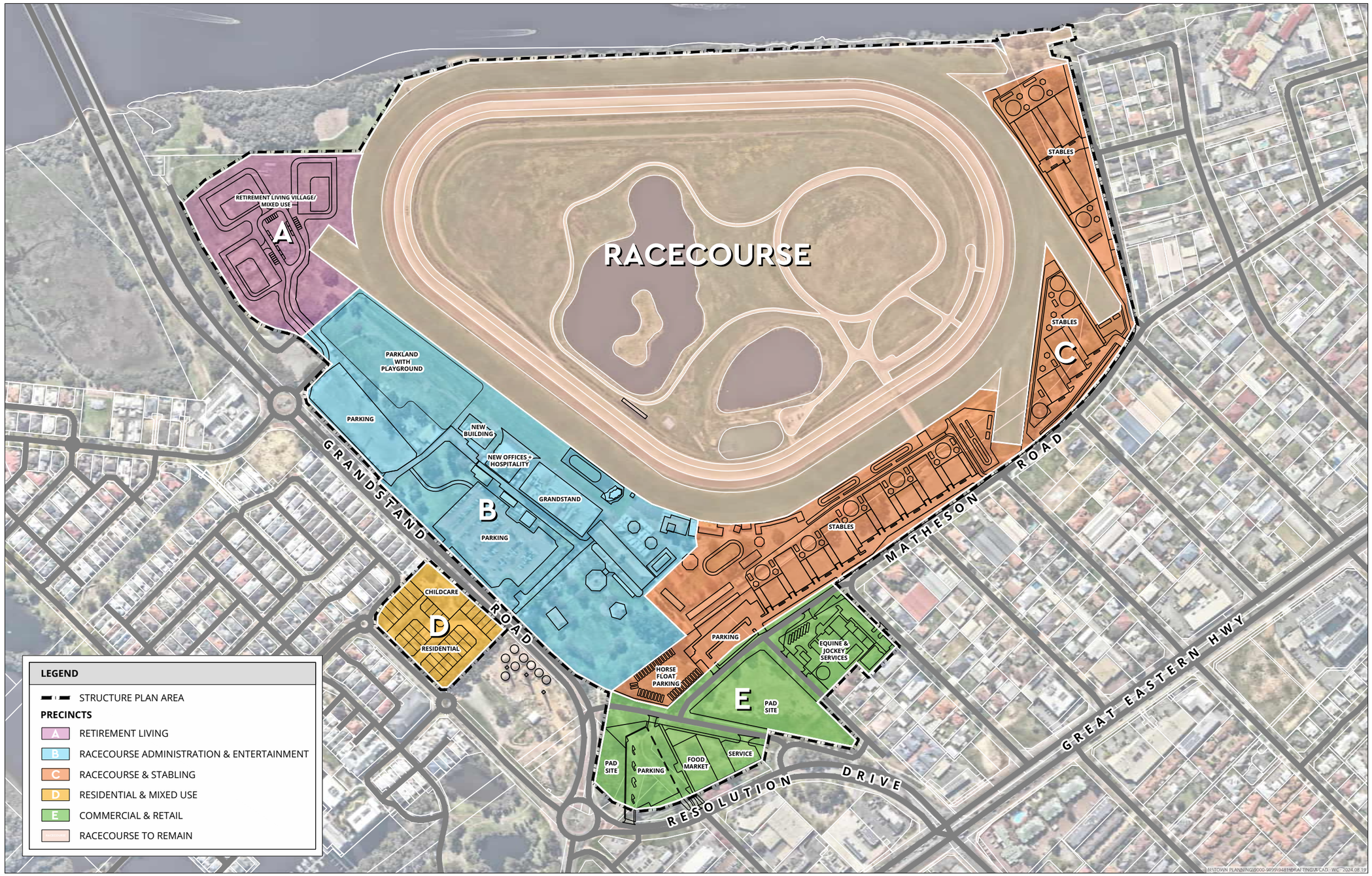
It is the recommendation of this TIA that:

- the existing intersection of Grandstand Road and Raconteur Drive be opened permanently to traffic as a LILO-RI as currently occurs on race days.
- Travel Demand Plan be undertaken to assist Ascot Racecourse patrons better utilise the parking available around the racecourse on race days and/or address this within the Ascot Event Traffic Management Plan.
- When GGLSP details are finalised, the external highway intersections be re-assessed in terms of their capacity to accommodate future development-generated traffic of the wider network and their anticipated background growth:
    - Great Eastern Highway/Resolution Drive/Hardey Road
    - Great Eastern Highway/Stoneham Street/Belgravia Street.

Appendix A TIA Checklist

Item	Provided	Comments/Proposals
Summary	Y	
Introduction / Background	Y	
Structure Plan Proposal		
Regional context	Y	
Proposed land uses	Y	
Table of land uses and quantities	Y	
Major attractors / generators	Y	
Specific issues	Y	
Existing Situation		
Existing land uses within structure plan	Y	
Existing land uses within 800m of structure plan area	Y	
Existing road network within structure plan area	Y	
Existing pedestrian / cycle network within structure plan area	Y	
Existing public transport services within structure plan area	Y	
Existing road network within 2 (or 5) km of the structure plan area	Y	
Traffic flows on roads within the structure plan area (PM and/or AM peak hours)	Y	
Existing pedestrian / cycle networks within 800m of the structure plan area.	Y	
Existing public transport services within 800m of the structure plan area.	Y	
Proposed Internal Transport Networks		
Changes / additions to existing road network or proposed new road network	Y	
Road reservation widths	Y	
Road cross-sections & speed limits	Y	
Intersection controls	Y	
Pedestrian / cycle networks and crossing facilities	Y	
Changes to External Transport Networks		
Road network	Y	
Intersection controls	Y	
Pedestrian/cycle networks and crossing facilities	Y	
Public transport services	Y	
Integration with the surrounding area		
Trip attractors / generators within 800 metres	Y	
proposed changes to land uses within 800 metres	Y	
travel desire lines from development to these attractors/ generators	Y	
adequacy of external transport networks	Y	
deficiencies in external transport networks	Y	
remedial measures to address deficiencies	Y	
Analysis of internal transport networks		
assessment years	Y	
time periods	Y	
Structure plan generated traffic	Y	
Extraneous (through) traffic	Y	
Design traffic flows (that is, total traffic)	Y	
Road cross-sections	Y	
Intersection controls	Y	
Access strategy	Y	
Pedestrian / cycle networks	Y	
Safe routes to schools	Y	
Pedestrian permeability & efficiency	Y	
Access to public transport	Y	
Analysis of external transport networks		
Extent of analysis	Y	
Base flows for assessment year(s)	Y	
Total traffic flows	Y	
Road cross-sections	Y	
Intersection layouts and controls	Y	
Pedestrian / cycle networks	Y	
Conclusions	Y	

Appendix B Proposed Masterplan Precincts



DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

N
0 100 m
SCALE @ A3: 1:4000
9481-CON-01-D

DRAWN: WC
DATE CREATED: 2024.08.19
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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ROWE GROUP DESIGN

Appendix C SIDRA Modelling Outputs

LANE SUMMARY

Site: 103a [Leg 1 PM (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	101	0.0	101	0.0	1149	0.088	100	2.2	LOS A	0.3	2.5	Full	6	0.0	0.0
Approach	101	0.0	101	0.0		0.088		2.2	LOS A	0.3	2.5				
North: Racecourse															
Lane 1	172	0.0	172	0.0	1298	0.132	100	5.7	LOS A	0.6	4.5	Short	50	0.0	NA
Lane 2	150	0.0	150	0.0	1122	0.133	100	4.6	LOS A	0.5	3.9	Full	500	0.0	0.0
Approach	322	0.0	322	0.0		0.133		5.2	LOS A	0.6	4.5				
West: Raconteur Dr															
Lane 1	78	0.0	78	0.0	1772	0.044	100	5.6	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	314	2.5	314	2.5	1883	0.167	100	0.0	LOS A	0.0	0.0	Full	550	0.0	0.0
Approach	392	2.0	392	2.0		0.167		1.1	NA	0.0	0.0				
All Vehicles	815	1.0	815	1.0		0.167		2.9	NA	0.6	4.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	101	101	0.0	1149	0.088	100	NA	NA
Approach	101	101	0.0		0.088			

North: Racecourse

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	172	-	172	0.0	1298	0.132	100	0.0	2
Lane 2	-	150	150	0.0	1122	0.133	100	NA	NA

Approach	172	150	322	0.0		0.133			
West: Raconteur Dr									
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	78	-	78	0.0	1772	0.044	100	0.0	2
Lane 2	-	314	314	2.5	1883	0.167	100	NA	NA
Approach	78	314	392	2.0		0.167			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	815	1.0		0.167					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
North: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103b [Leg 2 PM (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Raconteur Dr															
Lane 1	417	3.8	417	3.8	1860	0.224	100	0.1	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 2	101	0.0	101	0.0	1773	0.057	100	5.7	LOS A	0.0	0.0	Short	85	0.0	NA
Approach	518	3.0	518	3.0		0.224		1.2	NA	0.0	0.0				
North: Median															
Lane 1	150	0.0	150	0.0	781	0.192	100	3.4	LOS A	0.7	4.9	Full	6	0.0	0.0
Approach	150	0.0	150	0.0		0.192		3.4	LOS A	0.7	4.9				
All Vehicles	668	2.3	668	2.3		0.224		1.7	NA	0.7	4.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

East: Raconteur Dr

Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	417	-	417	3.8	1860	0.224	100	NA	NA
Lane 2	-	101	101	0.0	1773	0.057	100	0.0	1
Approach	417	101	518	3.0		0.224			

North: Median

Mov. From N To Exit:	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	150	150	0.0	781	0.192	100	NA	NA
Approach	150	150	0.0		0.192			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	668	2.3	0.224

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
East: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103a [Leg 1 PM (Site Folder: Grandstand/Raconteur)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Grandstand PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
NorthEast: Raconteur Dr															
Lane 1	100	0.0	100	0.0	1237	0.081	100	5.7	LOS A	0.3	2.4	Short	50	0.0	NA
Lane 2	1	0.0	1	0.0	871	0.001	100	5.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	101	0.0	101	0.0		0.081		5.7	LOS A	0.3	2.4				
NorthWest: Grandstand Rd															
Lane 1	98	0.0	98	0.0	1548	0.063	100	5.8	LOS A	0.3	1.9	Short	75	0.0	NA
Lane 2	345	3.5	345	3.5	1864	0.185	100	0.1	LOS A	0.0	0.0	Full	550	0.0	0.0
Lane 3	345	3.5	345	3.5	1864	0.185	100	0.1	LOS A	0.0	0.0	Full	550	0.0	0.0
Approach	788	3.1	788	3.1		0.185		0.8	LOS A	0.3	1.9				
SouthWest: Median															
Lane 1	76	0.0	76	0.0	869	0.087	100	3.7	LOS A	0.3	2.2	Full	6	0.0	0.0
Approach	76	0.0	76	0.0		0.087		3.7	LOS A	0.3	2.2				
All Vehicles	964	2.5	964	2.5		0.185		1.5	NA	0.3	2.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

NorthEast: Raconteur Dr

Mov. From NE To Exit:	L2 SE	T1 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	100	-	100	0.0	1237	0.081	100	0.0	2
Lane 2	-	1	1	0.0	871	0.001	100	NA	NA
Approach	100	1	101	0.0		0.081			

NorthWest: Grandstand Rd

Mov. From NW To Exit:	L2 NE	T1 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	-	98	0.0	1548	0.063	100	0.0	2

Lane 2	-	345	345	3.5	1864	0.185	100	NA	NA
Lane 3	-	345	345	3.5	1864	0.185	100	NA	NA
Approach	98	690	788	3.1		0.185			
SouthWest: Median									
Mov. From SW To Exit:	T1 NE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	76	0.0		869	0.087	100	NA	NA
Approach	76	76	0.0			0.087			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	964	2.5	0.185

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
NorthEast: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: Grandstand Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
SouthWest: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103b [Leg 2 PM (Site Folder: Grandstand/Raconteur)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Grandstand PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandtand Rd															
Lane 1	912	2.2	912	2.2	1888	0.483	100	0.3	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 2	912	2.2	912	2.2	1888	0.483	100	0.3	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 3	76	0.0	76	0.0	1770	0.043	100	5.7	LOS A	0.0	0.0	Short	50	0.0	NA
Approach	1900	2.1	1900	2.1		0.483		0.5	NA	0.0	0.0				
NorthEast: Median															
Lane 1	1	0.0	1	0.0	115	0.009	100	30.2	LOS D	0.0	0.2	Full	6	0.0	0.0
Approach	1	0.0	1	0.0		0.009		30.2	LOS D	0.0	0.2				
All Vehicles	1901	2.1	1901	2.1		0.483		0.5	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

SouthEast: Grandtand Rd

Mov. From SE To Exit:	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	912	-	912	2.2	1888	0.483	100	NA	NA
Lane 2	912	-	912	2.2	1888	0.483	100	NA	NA
Lane 3	-	76	76	0.0	1770	0.043	100	0.0	2
Approach	1824	76	1900	2.1		0.483			

NorthEast: Median

Mov. From NE To Exit:	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	0.0	115	0.009	100	NA	NA
Approach	1	1	0.0		0.009			

	Total	%HV	Deg.Satn (v/c)

All Vehicles	1901	2.1	0.483

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandtand Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103a [Leg 1 PM - No Dev (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur Current PM (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	4	0.0	4	0.0	1200	0.004	100	1.8	LOS A	0.0	0.1	Full	6	0.0	0.0
Approach	4	0.0	4	0.0		0.004		1.8	LOS A	0.0	0.1				
North: Racecourse															
Lane 1	23	0.0	23	0.0	1298	0.018	100	5.5	LOS A	0.1	0.6	Short	50	0.0	NA
Lane 2	21	0.0	21	0.0	1202	0.018	100	4.1	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	45	0.0	45	0.0		0.018		4.9	LOS A	0.1	0.6				
West: Raconteur Dr															
Lane 1	2	0.0	2	0.0	1838	0.001	100	5.5	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	314	2.5	314	2.5	1883	0.167	100	0.0	LOS A	0.0	0.0	Full	550	0.0	0.0
Approach	316	2.5	316	2.5		0.167		0.1	NA	0.0	0.0				
All Vehicles	365	2.1	365	2.1		0.167		0.7	NA	0.1	0.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	4	0.0	1200	0.004	100	NA	NA
Approach	4	4	0.0		0.004			

North: Racecourse

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	23	-	23	0.0	1298	0.018	100	0.0	2
Lane 2	-	21	21	0.0	1202	0.018	100	NA	NA

Approach	23	21	45	0.0		0.018			
West: Raconteur Dr									
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	-	2	0.0	1838	0.001	100	0.0	2
Lane 2	-	314	314	2.5	1883	0.167	100	NA	NA
Approach	2	314	316	2.5		0.167			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	365	2.1		0.167					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
North: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103b [Leg 2 PM - No Dev (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur Current PM (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Raconteur Dr															
Lane 1	417	3.8	417	3.8	1860	0.224	100	0.1	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 2	4	0.0	4	0.0	1838	0.002	100	5.7	LOS A	0.0	0.0	Short	85	0.0	NA
Approach	421	3.7	421	3.7		0.224		0.2	NA	0.0	0.0				
North: Median															
Lane 1	21	0.0	21	0.0	850	0.025	100	2.5	LOS A	0.1	0.6	Full	6	0.0	0.0
Approach	21	0.0	21	0.0		0.025		2.5	LOS A	0.1	0.6				
All Vehicles	443	3.5	443	3.5		0.224		0.3	NA	0.1	0.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

East: Raconteur Dr

Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	417	-	417	3.8	1860	0.224	100	NA	NA
Lane 2	-	4	4	0.0	1838	0.002	100	0.0	1
Approach	417	4	421	3.7		0.224			

North: Median

Mov. From N To Exit:	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	21	21	0.0	850	0.025	100	NA	NA
Approach	21	21	0.0		0.025			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	443	3.5	0.224

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
East: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 PM - with GG/ Dev (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	917	0.9	917	0.9	1695	0.541	100	4.3	LOS A	5.1	38.1	Full	300	0.0	0.0
Lane 2	772	0.9	772	0.9	1427	0.541	100	4.8	LOS A	5.0	36.9	Full	300	0.0	0.0
Approach	1689	0.9	1689	0.9		0.541		4.6	LOS A	5.1	38.1				
NorthEast: Racecourse															
Lane 1[d]	74	1.4	74	1.4	710	0.104	100	8.0	LOS A	0.4	3.3	Full	500	0.0	0.0
Approach	74	1.4	74	1.4		0.104		8.0	LOS A	0.4	3.3				
NorthWest: Garratt Road															
Lane 1[d]	472	1.3	472	1.3	1686	0.280	100	4.2	LOS A	2.2	16.1	Full	500	0.0	0.0
Lane 2	400	1.3	400	1.3	1429	0.280	100	4.7	LOS A	2.1	15.8	Full	500	0.0	0.0
Approach	872	1.3	872	1.3		0.280		4.4	LOS A	2.2	16.1				
SouthWest: Waterway Cres															
Lane 1[d]	35	0.0	35	0.0	588	0.059	100	11.7	LOS B	0.4	2.8	Full	500	0.0	0.0
Approach	35	0.0	35	0.0		0.059		11.7	LOS B	0.4	2.8				
All Vehicles	2669	1.0	2669	1.0		0.541		4.7	LOS A	5.1	38.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	15	902	-	-	917	0.9	1695	0.541	100	NA	NA
Lane 2	-	722	48	1	772	0.9	1427	0.541	100	NA	NA
Approach	15	1624	48	1	1689	0.9		0.541			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	41	1	32	74	1.4		710	0.104	100	NA	NA
Approach	41	1	32	74	1.4			0.104			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	47	424	-	-	472	1.3	1686	0.280	100	NA	NA
Lane 2	-	365	32	3	400	1.3	1429	0.280	100	NA	NA
Approach	47	789	32	3	872	1.3		0.280			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	15	35	0.0		588	0.059	100	NA	NA
Approach	19	1	15	35	0.0			0.059			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2669	1.0	0.541

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway Current AM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	342	2.8	342	2.8	1747	0.196	100	4.0	LOS A	1.1	8.4	Full	300	0.0	0.0
Lane 2	290	2.9	290	2.9	1483	0.196	100	4.2	LOS A	1.1	8.3	Full	300	0.0	0.0
Approach	633	2.8	633	2.8		0.196		4.1	LOS A	1.1	8.4				
NorthEast: Racecourse															
Lane 1[d]	18	29.1	18	29.1	455	0.039	100	11.0	LOS B	0.1	1.5	Full	500	0.0	0.0
Approach	18	29.1	18	29.1		0.039		11.0	LOS B	0.1	1.5				
NorthWest: Garratt Road															
Lane 1[d]	589	1.4	589	1.4	1747	0.337	100	4.1	LOS A	2.8	20.9	Full	500	0.0	0.0
Lane 2	498	1.4	498	1.4	1476	0.337	100	4.3	LOS A	2.8	20.6	Full	500	0.0	0.0
Approach	1086	1.4	1086	1.4		0.337		4.2	LOS A	2.8	20.9				
SouthWest: Waterway Cres															
Lane 1[d]	53	4.0	53	4.0	866	0.061	100	7.4	LOS A	0.3	2.2	Full	500	0.0	0.0
Approach	53	4.0	53	4.0		0.061		7.4	LOS A	0.3	2.2				
All Vehicles	1789	2.2	1789	2.2		0.337		4.3	LOS A	2.8	20.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	328	-	-	342	2.8	1747	0.196	100	NA	NA
Lane 2	-	280	9	1	290	2.9	1483	0.196	100	NA	NA
Approach	14	608	9	1	633	2.8		0.196			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	1	7	18	29.1	455	0.039	100	NA	NA

Approach	9	1	7	18	29.1			0.039			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	8	580	-	-	589	1.4	1747	0.337	100	NA	NA
Lane 2	-	481	16	1	498	1.4	1476	0.337	100	NA	NA
Approach	8	1061	16	1	1086	1.4		0.337			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	26	53	4.0		866	0.061	100	NA	NA
Approach	25	1	26	53	4.0			0.061			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1789	2.2	0.337

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway Current PM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	956	1.0	956	1.0	1758	0.544	100	4.2	LOS A	5.1	37.6	Full	300	0.0	0.0
Lane 2	804	1.0	804	1.0	1480	0.544	100	4.3	LOS A	5.0	36.9	Full	300	0.0	0.0
Approach	1760	1.0	1760	1.0		0.544		4.2	LOS A	5.1	37.6				
NorthEast: Racecourse															
Lane 1[d]	21	5.0	21	5.0	706	0.030	100	7.1	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	21	5.0	21	5.0		0.030		7.1	LOS A	0.1	0.9				
NorthWest: Garratt Road															
Lane 1[d]	438	1.7	438	1.7	1781	0.246	100	4.0	LOS A	2.0	15.1	Full	500	0.0	0.0
Lane 2	370	1.5	370	1.5	1506	0.246	100	4.5	LOS A	2.0	14.6	Full	500	0.0	0.0
Approach	808	1.6	808	1.6		0.246		4.2	LOS A	2.0	15.1				
SouthWest: Waterway Cres															
Lane 1[d]	35	0.0	35	0.0	610	0.057	100	12.7	LOS B	0.4	3.1	Full	500	0.0	0.0
Approach	35	0.0	35	0.0		0.057		12.7	LOS B	0.4	3.1				
All Vehicles	2624	1.2	2624	1.2		0.544		4.4	LOS A	5.1	37.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	15	941	-	-	956	1.0	1758	0.544	100	NA	NA
Lane 2	-	799	4	1	804	1.0	1480	0.544	100	NA	NA
Approach	15	1740	4	1	1760	1.0		0.544			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	15	1	5	21	5.0		706	0.030	100	NA	NA
Approach	15	1	5	21	5.0			0.030			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	435	-	-	438	1.7	1781	0.246	100	NA	NA
Lane 2	-	335	32	4	370	1.5	1506	0.246	100	NA	NA
Approach	3	769	32	4	808	1.6		0.246			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	15	35	0.0		610	0.057	100	NA	NA
Approach	19	1	15	35	0.0			0.057			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2624	1.2	0.544

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 AM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	384	2.8	384	2.8	1751	0.220	100	4.0	LOS A	1.3	9.8	Full	300	0.0	0.0
Lane 2	326	2.8	326	2.8	1484	0.220	100	4.2	LOS A	1.3	9.6	Full	300	0.0	0.0
Approach	710	2.8	710	2.8		0.220		4.1	LOS A	1.3	9.8				
NorthEast: Racecourse															
Lane 1[d]	18	29.1	18	29.1	421	0.042	100	11.7	LOS B	0.2	1.6	Full	500	0.0	0.0
Approach	18	29.1	18	29.1		0.042		11.7	LOS B	0.2	1.6				
NorthWest: Garratt Road															
Lane 1[d]	662	1.4	662	1.4	1750	0.379	100	4.1	LOS A	3.3	24.8	Full	500	0.0	0.0
Lane 2	559	1.4	559	1.4	1477	0.379	100	4.3	LOS A	3.3	24.5	Full	500	0.0	0.0
Approach	1221	1.4	1221	1.4		0.379		4.2	LOS A	3.3	24.8				
SouthWest: Waterway Cres															
Lane 1[d]	53	4.0	53	4.0	839	0.063	100	7.6	LOS A	0.3	2.2	Full	500	0.0	0.0
Approach	53	4.0	53	4.0		0.063		7.6	LOS A	0.3	2.2				
All Vehicles	2002	2.2	2002	2.2		0.379		4.3	LOS A	3.3	24.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	371	-	-	384	2.8	1751	0.220	100	NA	NA
Lane 2	-	315	9	1	326	2.8	1484	0.220	100	NA	NA
Approach	14	686	9	1	710	2.8		0.220			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	9	1	7	18	29.1		421	0.042	100	NA	NA
Approach	9	1	7	18	29.1			0.042			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	8	654	-	-	662	1.4	1750	0.379	100	NA	NA
Lane 2	-	542	16	1	559	1.4	1477	0.379	100	NA	NA
Approach	8	1196	16	1	1221	1.4		0.379			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	26	53	4.0		839	0.063	100	NA	NA
Approach	25	1	26	53	4.0			0.063			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2002	2.2	0.379								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 PM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	880	1.0	880	1.0	1756	0.501	100	4.1	LOS A	4.3	31.9	Full	300	0.0	0.0
Lane 2	742	1.0	742	1.0	1479	0.501	100	4.3	LOS A	4.2	31.4	Full	300	0.0	0.0
Approach	1622	1.0	1622	1.0		0.501		4.2	LOS A	4.3	31.9				
NorthEast: Racecourse															
Lane 1[d]	21	5.0	21	5.0	729	0.029	100	6.9	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	21	5.0	21	5.0		0.029		6.9	LOS A	0.1	0.9				
NorthWest: Garratt Road															
Lane 1[d]	404	1.7	404	1.7	1779	0.227	100	4.0	LOS A	1.8	13.5	Full	500	0.0	0.0
Lane 2	342	1.5	342	1.5	1506	0.227	100	4.5	LOS A	1.8	13.1	Full	500	0.0	0.0
Approach	747	1.6	747	1.6		0.227		4.2	LOS A	1.8	13.5				
SouthWest: Waterway Cres															
Lane 1[d]	35	0.0	35	0.0	643	0.054	100	11.3	LOS B	0.4	2.6	Full	500	0.0	0.0
Approach	35	0.0	35	0.0		0.054		11.3	LOS B	0.4	2.6				
All Vehicles	2424	1.2	2424	1.2		0.501		4.3	LOS A	4.3	31.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	15	866	-	-	880	1.0	1756	0.501	100	NA	NA
Lane 2	-	736	4	1	742	1.0	1479	0.501	100	NA	NA
Approach	15	1602	4	1	1622	1.0		0.501			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	15	1	5	21	5.0		729	0.029	100	NA	NA
Approach	15	1	5	21	5.0			0.029			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	401	-	-	404	1.7	1779	0.227	100	NA	NA
Lane 2	-	307	32	4	342	1.5	1506	0.227	100	NA	NA
Approach	3	708	32	4	747	1.6		0.227			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	15	35	0.0		643	0.054	100	NA	NA
Approach	19	1	15	35	0.0			0.054			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2424	1.2	0.501

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 AM - with GG/ Dev (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	479	2.3	479	2.3	1626	0.295	100	4.3	LOS A	2.0	15.4	Full	300	0.0	0.0
Lane 2	407	2.2	407	2.2	1379	0.295	100	4.8	LOS A	2.0	14.9	Full	300	0.0	0.0
Approach	886	2.2	886	2.2		0.295		4.5	LOS A	2.0	15.4				
NorthEast: Racecourse															
Lane 1[d]	125	4.2	125	4.2	556	0.225	100	10.5	LOS B	1.0	7.6	Full	500	0.0	0.0
Approach	125	4.2	125	4.2		0.225		10.5	LOS B	1.0	7.6				
NorthWest: Garratt Road															
Lane 1[d]	683	1.3	683	1.3	1713	0.399	100	4.2	LOS A	3.5	26.4	Full	500	0.0	0.0
Lane 2	577	1.3	577	1.3	1446	0.399	100	4.4	LOS A	3.5	26.0	Full	500	0.0	0.0
Approach	1260	1.3	1260	1.3		0.399		4.3	LOS A	3.5	26.4				
SouthWest: Waterway Cres															
Lane 1[d]	53	4.0	53	4.0	741	0.071	100	8.4	LOS A	0.3	2.6	Full	500	0.0	0.0
Approach	53	4.0	53	4.0		0.071		8.4	LOS A	0.3	2.6				
All Vehicles	2324	1.9	2324	1.9		0.399		4.8	LOS A	3.5	26.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	466	-	-	479	2.3	1626	0.295	100	NA	NA
Lane 2	-	378	27	1	407	2.2	1379	0.295	100	NA	NA
Approach	14	844	27	1	886	2.2		0.295			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	63	1	61	125	4.2		556	0.225	100	NA	NA
Approach	63	1	61	125	4.2			0.225			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	26	657	-	-	683	1.3	1713	0.399	100	NA	NA
Lane 2	-	560	16	1	577	1.3	1446	0.399	100	NA	NA
Approach	26	1217	16	1	1260	1.3		0.399			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	26	53	4.0		741	0.071	100	NA	NA
Approach	25	1	26	53	4.0			0.071			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2324	1.9	0.399								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham Current AM (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 7

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	234	2.8	234	2.8	1458	0.160	100	4.3	LOS A	1.0	7.3	Full	300	0.0	0.0
Lane 2	187	3.0	187	3.0	1167	0.160	100	5.2	LOS A	0.9	6.9	Full	300	0.0	0.0
Approach	421	2.9	421	2.9		0.160		4.7	LOS A	1.0	7.3				
East: Resolution Dr															
Lane 1[d]	271	2.9	271	2.9	773	0.351	100	10.2	LOS B	1.8	14.0	Full	500	0.0	0.0
Approach	271	2.9	271	2.9		0.351		10.2	LOS B	1.8	14.0				
North: Grandstand Road															
Lane 1[d]	580	3.0	580	3.0	1649	0.352	100	4.0	LOS A	2.9	22.1	Full	500	0.0	0.0
Lane 2	479	3.0	479	3.0	1361	0.352	100	4.2	LOS A	2.8	21.5	Full	500	0.0	0.0
Approach	1059	3.0	1059	3.0		0.352		4.1	LOS A	2.9	22.1				
West: Resolution Dr															
Lane 1[d]	99	1.0	99	1.0	864	0.115	100	7.3	LOS A	0.6	4.1	Full	500	0.0	0.0
Approach	99	1.0	99	1.0		0.115		7.3	LOS A	0.6	4.1				
All Vehicles	1850	2.8	1850	2.8		0.352		5.3	LOS A	2.9	22.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	28	205	-	-	234	2.8	1458	0.160	100	NA	NA
Lane 2	-	172	13	2	187	3.0	1167	0.160	100	NA	NA
Approach	28	377	13	2	421	2.9		0.160			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	38	16	217	271	2.9		773	0.351	100	NA	NA
Approach	38	16	217	271	2.9			0.351			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	297	283	-	-	580	3.0	1649	0.352	100	NA	NA
Lane 2	-	469	5	4	479	3.0	1361	0.352	100	NA	NA
Approach	297	752	5	4	1059	3.0		0.352			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	42	51	99	1.0		864	0.115	100	NA	NA
Approach	5	42	51	99	1.0			0.115			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1850	2.8	0.352

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham Current PM (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	751	2.8	751	2.8	1084	0.693	100	9.7	LOS A	9.0	68.1	Full	300	0.0	0.0
Lane 2	561	3.0	561	3.0	810	0.693	100	12.2	LOS B	8.0	60.7	Full	300	0.0	0.0
Approach	1312	2.9	1312	2.9		0.693		10.8	LOS B	9.0	68.1				
East: Resolution Dr															
Lane 1[d]	618	2.9	618	2.9	763	0.810	100	17.2	LOS B	7.7	58.7	Full	500	0.0	0.0
Approach	618	2.9	618	2.9		0.810		17.2	LOS B	7.7	58.7				
North: Grandstand Road															
Lane 1[d]	581	3.0	581	3.0	1677	0.346	100	3.8	LOS A	3.0	23.1	Full	500	0.0	0.0
Lane 2	481	3.0	481	3.0	1388	0.346	100	4.1	LOS A	2.9	22.3	Full	500	0.0	0.0
Approach	1062	3.0	1062	3.0		0.346		3.9	LOS A	3.0	23.1				
West: Resolution Dr															
Lane 1[d]	75	1.0	75	1.0	404	0.186	100	13.9	LOS B	1.1	8.3	Full	500	0.0	0.0
Approach	75	1.0	75	1.0		0.186		13.9	LOS B	1.1	8.3				
All Vehicles	3066	2.9	3066	2.9		0.810		9.8	LOS A	9.0	68.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	71	680	-	-	751	2.8	1084	0.693	100	NA	NA
Lane 2	-	543	16	1	561	3.0	810	0.693	100	NA	NA
Approach	71	1223	16	1	1312	2.9		0.693			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	60	28	530	618	2.9		763	0.810	100	NA	NA
Approach	60	28	530	618	2.9			0.810			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	255	326	-	-	581	3.0	1677	0.346	100	NA	NA
Lane 2	-	469	6	6	481	3.0	1388	0.346	100	NA	NA
Approach	255	795	6	6	1062	3.0		0.346			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	29	39	75	1.0		404	0.186	100	NA	NA
Approach	7	29	39	75	1.0			0.186			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3066	2.9	0.810

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham 2036 AM - No Change (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	247	2.8	247	2.8	1440	0.172	100	4.4	LOS A	1.1	8.0	Full	300	0.0	0.0
Lane 2	197	3.0	197	3.0	1149	0.172	100	5.3	LOS A	1.0	7.5	Full	300	0.0	0.0
Approach	445	2.9	445	2.9		0.172		4.8	LOS A	1.1	8.0				
East: Resolution Dr															
Lane 1[d]	287	2.9	287	2.9	751	0.382	100	10.7	LOS B	2.1	16.1	Full	500	0.0	0.0
Approach	287	2.9	287	2.9		0.382		10.7	LOS B	2.1	16.1				
North: Grandstand Road															
Lane 1[d]	614	3.0	614	3.0	1640	0.375	100	4.0	LOS A	3.2	24.2	Full	500	0.0	0.0
Lane 2	506	3.0	506	3.0	1351	0.375	100	4.3	LOS A	3.1	23.4	Full	500	0.0	0.0
Approach	1120	3.0	1120	3.0		0.375		4.1	LOS A	3.2	24.2				
West: Resolution Dr															
Lane 1[d]	105	1.0	105	1.0	846	0.124	100	7.5	LOS A	0.6	4.5	Full	500	0.0	0.0
Approach	105	1.0	105	1.0		0.124		7.5	LOS A	0.6	4.5				
All Vehicles	1957	2.8	1957	2.8		0.382		5.4	LOS A	3.2	24.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	30	218	-	-	247	2.8	1440	0.172	100	NA	NA
Lane 2	-	181	14	2	197	3.0	1149	0.172	100	NA	NA
Approach	30	399	14	2	445	2.9		0.172			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	40	17	229	287	2.9		751	0.382	100	NA	NA
Approach	40	17	229	287	2.9			0.382			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	315	300	-	-	614	3.0	1640	0.375	100	NA	NA
Lane 2	-	496	6	5	506	3.0	1351	0.375	100	NA	NA
Approach	315	795	6	5	1120	3.0		0.375			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	6	45	54	105	1.0		846	0.124	100	NA	NA
Approach	6	45	54	105	1.0			0.124			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1957	2.8	0.382								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham 2036 PM - No Change (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	776	2.8	776	2.8	1037	0.749	100	11.2	LOS B	10.5	79.9	Full	300	0.0	0.0
Lane 2	574	3.0	574	3.0	767	0.749	100	14.1	LOS B	9.2	70.1	Full	300	0.0	0.0
Approach	1350	2.9	1350	2.9		0.749		12.4	LOS B	10.5	79.9				
East: Resolution Dr															
Lane 1[d]	636	2.9	636	2.9	752	0.846	100	20.7	LOS C	10.5	79.7	Full	500	0.0	0.0
Approach	636	2.9	636	2.9		0.846		20.7	LOS C	10.5	79.7				
North: Grandstand Road															
Lane 1[d]	598	3.0	598	3.0	1673	0.358	100	3.8	LOS A	3.2	24.1	Full	500	0.0	0.0
Lane 2	495	3.0	495	3.0	1384	0.358	100	4.1	LOS A	3.1	23.2	Full	500	0.0	0.0
Approach	1093	3.0	1093	3.0		0.358		4.0	LOS A	3.2	24.1				
West: Resolution Dr															
Lane 1[d]	77	1.0	77	1.0	371	0.208	100	14.3	LOS B	1.2	8.9	Full	500	0.0	0.0
Approach	77	1.0	77	1.0		0.208		14.3	LOS B	1.2	8.9				
All Vehicles	3156	2.9	3156	2.9		0.846		11.2	LOS B	10.5	79.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	74	703	-	-	776	2.8	1037	0.749	100	NA	NA
Lane 2	-	556	17	1	574	3.0	767	0.749	100	NA	NA
Approach	74	1259	17	1	1350	2.9		0.749			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	62	28	546	636	2.9		752	0.846	100	NA	NA
Approach	62	28	546	636	2.9			0.846			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	262	336	-	-	598	3.0	1673	0.358	100	NA	NA
Lane 2	-	483	6	6	495	3.0	1384	0.358	100	NA	NA
Approach	262	819	6	6	1093	3.0		0.358			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	30	40	77	1.0		371	0.208	100	NA	NA
Approach	7	30	40	77	1.0			0.208			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	3156	2.9	0.846								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham 2036 PM - NO GG & Ascott (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	821	2.7	821	2.7	963	0.852	100	20.8	LOS C	17.9	135.6	Full	300	0.0	0.0
Lane 2	590	2.7	590	2.7	692	0.852	100	26.1	LOS C	14.9	112.5	Full	300	0.0	0.0
Approach	1411	2.7	1411	2.7		0.852		23.0	LOS C	17.9	135.6				
East: Resolution Dr															
Lane 1[d]	741	2.4	741	2.4	866	0.855	100	17.2	LOS B	10.5	79.1	Full	500	0.0	0.0
Approach	741	2.4	741	2.4		0.855		17.2	LOS B	10.5	79.1				
North: Grandstand Road															
Lane 1[d]	444	3.0	444	3.0	1615	0.275	100	3.9	LOS A	2.1	15.9	Full	500	0.0	0.0
Lane 2	363	2.3	363	2.3	1321	0.275	100	5.9	LOS A	2.0	15.2	Full	500	0.0	0.0
Approach	807	2.7	807	2.7		0.275		4.8	LOS A	2.1	15.9				
West: Resolution Dr															
Lane 1[d]	85	0.9	85	0.9	306	0.277	100	18.2	LOS B	1.7	12.7	Full	500	0.0	0.0
Approach	85	0.9	85	0.9		0.277		18.2	LOS B	1.7	12.7				
All Vehicles	3043	2.6	3043	2.6		0.855		16.6	LOS B	17.9	135.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	72	749	-	-	821	2.7	963	0.852	100	NA	NA
Lane 2	-	524	65	1	590	2.7	692	0.852	100	NA	NA
Approach	72	1273	65	1	1411	2.7		0.852			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	95	28	618	741	2.4		866	0.855	100	NA	NA
Approach	95	28	618	741	2.4			0.855			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	251	193	-	-	444	3.0	1615	0.275	100	NA	NA
Lane 2	-	282	6	75	363	2.3	1321	0.275	100	NA	NA
Approach	251	474	6	75	807	2.7		0.275			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	29	49	85	0.9		306	0.277	100	NA	NA
Approach	7	29	49	85	0.9			0.277			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	3043	2.6	0.855								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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Project: C:\PJA\Phil Jones Associates\SharedData - 07575 Ascot Racecourse Local Structure Plan & Scheme Amendment\4. Technical\4.3 Analysis\4.3.1 Transport\07575_M_01_A_Ascot Racecourse LSP&SA.sip9

LANE SUMMARY

Site: 103av [TCS PM - Current (Site Folder: GEH/Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	121	5.8	121	5.8	307	0.393	87[6]	75.6	LOS E	9.4	73.9	Short	60	0.0	NA
Lane 2	144	5.8	144	5.8	319	0.452	100	72.1	LOS E	11.4	89.1	Full	500	0.0	0.0
Lane 3	158	5.8	158	5.8	303	0.522	100	78.9	LOS E	12.7	99.1	Short	60	0.0	NA
Approach	423	5.8	423	5.8		0.522		75.6	LOS E	12.7	99.1				
NorthEast: GEH															
Lane 1	117	5.8	117	5.8	1329	0.088	12[5]	18.9	LOS B	2.3	17.7	Short	120	0.0	NA
Lane 2	579	6.3	579	6.3	771[1]	0.750	100	39.1	LOS D	36.0	283.5	Full	500	0.0	0.0
Lane 3	614	6.3	614	6.3	818	0.750	100	31.0	LOS C	38.8	305.7	Full	500	0.0	0.0
Lane 4	561	6.3	561	6.3	748[1]	0.750	100	36.3	LOS D	34.6	272.4	Full	500	0.0	0.0
Lane 5	308	5.8	308	5.8	342	0.903	100	101.5	LOS F	29.6	231.4	Short	125	0.0	NA
Approach	2179	6.2	2179	6.2		0.903		43.8	LOS D	38.8	305.7				
NorthWest: Resolution Dr															
Lane 1	157	5.8	157	5.8	742	0.211	100	23.7	LOS C	6.4	50.1	Short	90	0.0	NA
Lane 2	37	5.8	37	5.8	103	0.362	39[6]	92.4	LOS F	3.3	25.7	Full	430	0.0	0.0
Lane 3	95	5.8	95	5.8	103	0.926	100	109.3	LOS F	9.5	74.6	Short	140	0.0	NA
Lane 4	32	5.8	32	5.8	98	0.323	100	97.3	LOS F	2.8	21.7	Short	58	0.0	NA
Approach	321	5.8	321	5.8		0.926		64.4	LOS E	9.5	74.6				
SouthWest: GEH															
Lane 1	57	5.8	57	5.8	781	0.073	9[5]	52.7	LOS D	2.8	21.8	Short	75	0.0	NA
Lane 2	610	11.7	610	11.7	731[1]	0.834	100	36.4	LOS D	34.4	291.3	Full	500	0.0	0.0
Lane 3	641	11.7	641	11.7	768	0.834	100	20.1	LOS C	37.6	319.0	Full	500	0.0	0.0
Lane 4	641	11.7	641	11.7	768	0.834	100	20.1	LOS C	37.6	319.0	Full	500	0.0	0.0
Lane 5	221	5.8	221	5.8	342	0.647	100	77.8	LOS E	17.9	140.2	Short	240	0.0	NA
Approach	2169	10.9	2169	10.9		0.834		31.4	LOS C	37.6	319.0				
All Vehicles	5093	8.2	5093	8.2		0.926		42.5	LOS D	38.8	319.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd										
Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	85	36	-	121	5.8	307	0.393	87[6]	23.9	2
Lane 2	-	144	-	144	5.8	319	0.452	100	NA	NA
Lane 3	-	-	158	158	5.8	303	0.522	100	51.1	2
Approach	85	180	158	423	5.8		0.522			
NorthEast: GEH										
Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	117	-	-	117	5.8	1329	0.088	12[5]	0.0	2
Lane 2	-	579	-	579	6.3	771[1]	0.750	100	NA	NA
Lane 3	-	614	-	614	6.3	818	0.750	100	NA	NA
Lane 4	-	561	-	561	6.3	748[1]	0.750	100	NA	NA
Lane 5	-	-	308	308	5.8	342	0.903	100	61.9	4
Approach	117	1754	308	2179	6.2		0.903			
NorthWest: Resolution Dr										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	157	-	-	157	5.8	742	0.211	100	0.0	2
Lane 2	-	37	-	37	5.8	103	0.362	39[6]	NA	NA
Lane 3	-	95	-	95	5.8	103	0.926	100	0.0	2
Lane 4	-	-	32	32	5.8	98	0.323	100	0.0	3
Approach	157	133	32	321	5.8		0.926			
SouthWest: GEH										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	57	-	-	57	5.8	781	0.073	9[5]	0.0	2
Lane 2	-	610	-	610	11.7	731[1]	0.834	100	NA	NA
Lane 3	-	641	-	641	11.7	768	0.834	100	NA	NA
Lane 4	-	641	-	641	11.7	768	0.834	100	NA	NA
Lane 5	-	-	221	221	5.8	342	0.647	100	0.0	4
Approach	57	1892	221	2169	10.9		0.834			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5093	8.2	0.926

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd Merge Type: **Priority**												
Exit Short Lane	1	45	0.0	316	326	3.09	2.06	154	1413	0.109	0.5	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				316	1800	0.176	0.0	0.0
NorthEast Exit: GEH												

Merge Type: **Priority**												
Exit Short Lane	1	120	0.0	610	642	3.09	2.06	157	1076	0.146	1.3	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				610	1800	0.339	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**												
Exit Short Lane	1	140	0.0	453	466	3.09	2.06	92	1265	0.073	0.8	1.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				453	1800	0.252	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 (Site Folder: GEH/Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	141	5.8	141	5.8	318	0.442	87[6]	75.2	LOS E[11]	11.0	86.3	Short	60	0.0	NA
Lane 2	167	5.8	167	5.8	329	0.508	100	72.2	LOS E[11]	13.3	104.1	Full	500	0.0	0.0
Lane 3	169	5.8	169	5.8	312[1]	0.542	100	78.5	LOS E[11]	13.5	106.0	Short	60	0.0	NA
Approach	477	5.8	477	5.8		0.542		75.3	LOS E[11]	13.5	106.0				
NorthEast: GEH															
Lane 1	125	5.8	125	5.8	1341	0.093	13[5]	16.1	LOS B	2.6	20.0	Short	120	0.0	NA
Lane 2	619	6.3	619	6.3	866[1]	0.714	100	28.6	LOS C	33.7	265.4	Full	500	0.0	0.0
Lane 3	650	6.3	650	6.3	910	0.714	100	23.7	LOS C	36.0	283.4	Full	500	0.0	0.0
Lane 4	608	6.3	608	6.3	852[1]	0.714	100	29.4	LOS C	32.9	259.6	Full	500	0.0	0.0
Lane 5	330	5.8	330	5.8	264	1.252	100	333.4	LOS F[11]	52.6	411.1	Short	125	0.0	NA
Approach	2331	6.2	2331	6.2		1.252		69.9	LOS E[11]	52.6	411.1				
NorthWest: Resolution Dr															
Lane 1	168	5.8	168	5.8	628	0.267	100	31.7	LOS C	8.4	65.5	Short	90	0.0	NA
Lane 2	40	5.8	40	5.8	82	0.485	39[6]	96.0	LOS F[11]	3.6	28.2	Full	430	0.0	0.0
Lane 3	102	5.8	102	5.8	82	1.239	100	320.5	LOS F[11]	16.0	125.5	Short	140	0.0	NA
Lane 4	34	5.8	34	5.8	78	0.433	100	100.9	LOS F[11]	3.1	23.9	Short	58	0.0	NA
Approach	344	5.8	344	5.8		1.239		131.7	LOS F[11]	16.0	125.5				
SouthWest: GEH															
Lane 1	61	5.8	61	5.8	869	0.070	8[5]	44.9	LOS D	2.7	21.2	Short	75	0.0	NA
Lane 2	735	11.7	735	11.7	813[1]	0.903	100	31.6	LOS C	42.6	360.7	Full	500	0.0	0.0
Lane 3	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 4	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 5	237	5.8	237	5.8	264	0.897	100	100.4	LOS F[11]	22.8	178.1	Short	240	0.0	NA
Approach	2576	11.0	2576	11.0		0.903		30.0	LOS C	48.4	410.3				
All Vehicles	5728	8.3	5728	8.3		1.252		56.1	LOS E[11]	52.6	411.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	91	49	-	141	5.8	318	0.442	87[6]	38.2	2
Lane 2	-	167	-	167	5.8	329	0.508	100	NA	NA
Lane 3	-	-	169	169	5.8	312[1]	0.542	100	57.5	2
Approach	91	217	169	477	5.8		0.542			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	125	-	-	125	5.8	1341	0.093	13[5]	0.0	2
Lane 2	-	619	-	619	6.3	866[1]	0.714	100	NA	NA
Lane 3	-	650	-	650	6.3	910	0.714	100	NA	NA
Lane 4	-	608	-	608	6.3	852[1]	0.714	100	NA	NA
Lane 5	-	-	330	330	5.8	264	1.252	100	100.0	4
Approach	125	1876	330	2331	6.2		1.252			

NorthWest: Resolution Dr

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	168	-	-	168	5.8	628	0.267	100	0.0	2
Lane 2	-	40	-	40	5.8	82	0.485	39[6]	NA	NA
Lane 3	-	102	-	102	5.8	82	1.239	100	0.0	2
Lane 4	-	-	34	34	5.8	78	0.433	100	0.0	3
Approach	168	142	34	344	5.8		1.239			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	-	-	61	5.8	869	0.070	8[5]	0.0	2
Lane 2	-	735	-	735	11.7	813[1]	0.903	100	NA	NA
Lane 3	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 4	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 5	-	-	237	237	5.8	264	0.897	100	0.0	4
Approach	61	2278	237	2576	11.0		0.903			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5728	8.3	1.252

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd Merge Type: **Priority**												
Exit Short Lane	1	45	0.0	319	328	3.09	2.06	165	1411	0.117	0.5	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				319	1800	0.177	0.0	0.0

NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	120	0.0	735	773	3.09	2.06	168	935	0.179	1.8	2.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				735	1800	0.408	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**												
Exit Short Lane	1	140	0.0	431	443	3.09	2.06	110	1289	0.086	0.8	1.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				431	1800	0.239	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	33.2	453.8	NA
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	9.8	429.8	NA
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 - mod (Site Folder: GEH/ Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	148	5.8	148	5.8	351	0.422	87[6]	54.2	LOS D	9.6	75.3	Short	60	0.0	NA
Lane 2	160	5.8	160	5.8	329	0.486	100	71.9	LOS E[11]	12.7	99.0	Full	500	0.0	0.0
Lane 3	169	5.8	169	5.8	312[1]	0.542	100	78.5	LOS E[11]	13.5	106.0	Short	60	0.0	NA
Approach	477	5.8	477	5.8		0.542		68.8	LOS E[11]	13.5	106.0				
NorthEast: GEH															
Lane 1	125	5.8	125	5.8	1326	0.094	13[5]	16.6	LOS B	2.7	21.5	Short	120	0.0	NA
Lane 2	614	6.3	614	6.3	868[1]	0.707	100	28.2	LOS C	33.2	261.5	Full	500	0.0	0.0
Lane 3	644	6.3	644	6.3	910	0.707	100	23.6	LOS C	35.3	278.3	Full	500	0.0	0.0
Lane 4	619	6.3	619	6.3	875[1]	0.707	100	27.6	LOS C	33.5	264.2	Full	500	0.0	0.0
Lane 5	149	5.8	149	5.8	239	0.624	83[6]	90.3	LOS F[11]	12.5	98.0	Short	125	0.0	NA
Lane 6	181	5.8	181	5.8	239	0.756	100	89.4	LOS F[11]	15.8	124.0	Short	125	0.0	NA
Approach	2331	6.2	2331	6.2		0.756		34.8	LOS C	35.3	278.3				
NorthWest: Resolution Dr															
Lane 1	168	5.8	168	5.8	628	0.267	100	31.7	LOS C	8.4	65.5	Short	90	0.0	NA
Lane 2	40	5.8	40	5.8	103	0.387	39[6]	92.6	LOS F[11]	3.5	27.5	Full	430	0.0	0.0
Lane 3	102	5.8	102	5.8	103	0.991	100	128.6	LOS F[11]	11.1	87.1	Short	140	0.0	NA
Lane 4	34	5.8	34	5.8	98	0.346	100	97.5	LOS F[11]	3.0	23.3	Short	58	0.0	NA
Approach	344	5.8	344	5.8		0.991		74.0	LOS E[11]	11.1	87.1				
SouthWest: GEH															
Lane 1	61	5.8	61	5.8	869	0.070	8[5]	44.7	LOS D	2.7	21.2	Short	75	0.0	NA
Lane 2	735	11.7	735	11.7	813[1]	0.903	100	31.6	LOS C	42.6	360.7	Full	500	0.0	0.0
Lane 3	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 4	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 5	237	5.8	237	5.8	244	0.969	100	120.5	LOS F[11]	25.2	197.2	Short	240	0.0	NA
Approach	2576	11.0	2576	11.0		0.969		31.9	LOS C	48.4	410.3				
All Vehicles	5728	8.3	5728	8.3		0.991		38.7	LOS D	48.4	410.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	91	57	-	148	5.8	351	0.422	87[6]	25.6	2
Lane 2	-	160	-	160	5.8	329	0.486	100	NA	NA
Lane 3	-	-	169	169	5.8	312[1]	0.542	100	57.5	2
Approach	91	217	169	477	5.8		0.542			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	125	-	-	125	5.8	1326	0.094	13[5]	0.0	2
Lane 2	-	614	-	614	6.3	868[1]	0.707	100	NA	NA
Lane 3	-	644	-	644	6.3	910	0.707	100	NA	NA
Lane 4	-	619	-	619	6.3	875[1]	0.707	100	NA	NA
Lane 5	-	-	149	149	5.8	239	0.624	83[6]	4.2	4
Lane 6	-	-	181	181	5.8	239	0.756	100	4.2	5
Approach	125	1876	330	2331	6.2		0.756			

NorthWest: Resolution Dr

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	168	-	-	168	5.8	628	0.267	100	0.0	2
Lane 2	-	40	-	40	5.8	103	0.387	39[6]	NA	NA
Lane 3	-	102	-	102	5.8	103	0.991	100	0.0	2
Lane 4	-	-	34	34	5.8	98	0.346	100	0.0	3
Approach	168	142	34	344	5.8		0.991			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	-	-	61	5.8	869	0.070	8[5]	0.0	2
Lane 2	-	735	-	735	11.7	813[1]	0.903	100	NA	NA
Lane 3	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 4	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 5	-	-	237	237	5.8	244	0.969	100	0.0	4
Approach	61	2278	237	2576	11.0		0.969			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5728	8.3	0.991

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd												

Merge Type: **Priority**												
Exit Short Lane	1	45	0.0	339	348	3.09	2.06	165	1389	0.119	0.6	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				339	1800	0.188	0.0	0.0
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	120	0.0	735	773	3.09	2.06	168	935	0.179	1.8	2.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				735	1800	0.408	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**												
Exit Short Lane	1	140	0.0	341	351	3.09	2.06	267	1387	0.192	0.6	0.8
Merge Lane	2	-	100.0	Merge Lane is not Opposed				341	1800	0.189	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
Lane 6	0.0	0.0	0.0	0.0
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 - with LSP (Site Folder: GEH/ Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	168	5.4	168	5.4	321	0.522	87[6]	81.3	LOS F[11]	13.4	104.2	Short	60	0.0	NA
Lane 2	184	4.8	184	4.8	307[1]	0.600	100	78.8	LOS E[11]	14.9	115.6	Full	500	0.0	0.0
Lane 3	169	5.8	169	5.8	312[1]	0.542	100	83.8	LOS F[11]	13.5	106.0	Short	60	0.0	NA
Approach	521	5.3	521	5.3		0.600		81.2	LOS F[11]	14.9	115.6				
NorthEast: GEH															
Lane 1	125	5.8	125	5.8	1341	0.093	13[5]	16.2	LOS B	2.6	20.0	Short	120	0.0	NA
Lane 2	620	6.3	620	6.3	866[1]	0.716	100	28.8	LOS C	33.9	266.7	Full	500	0.0	0.0
Lane 3	652	6.3	652	6.3	910	0.716	100	23.7	LOS C	36.2	285.0	Full	500	0.0	0.0
Lane 4	605	6.3	605	6.3	844[1]	0.716	100	44.8	LOS D	32.7	257.9	Full	500	0.0	26.6[8]
Lane 5	405	4.7	405	4.7	265	1.529	100	593.6	LOS F[11]	81.9	633.9	Short	125	0.0	NA
Approach	2406	6.0	2406	6.0		1.529		125.8	LOS F[11]	81.9	633.9				
NorthWest: Resolution Dr															
Lane 1	207	4.7	207	4.7	631	0.328	100	33.4	LOS C	11.1	85.8	Short	90	0.0	NA
Lane 2	49	4.7	49	4.7	83	0.590	39[6]	96.8	LOS F[11]	4.5	34.6	Full	430	0.0	0.0
Lane 3	125	4.7	125	4.7	83	1.508	100	559.7	LOS F[11]	25.2	194.9	Short	140	0.0	NA
Lane 4	41	4.8	41	4.8	78	0.525	100	101.5	LOS F[11]	3.7	29.0	Short	58	0.0	NA
Approach	422	4.7	422	4.7		1.508		203.7	LOS F[11]	25.2	194.9				
SouthWest: GEH															
Lane 1	75	4.7	75	4.7	872	0.085	9[5]	44.8	LOS D	3.4	25.9	Short	75	0.0	NA
Lane 2	729	11.7	729	11.7	805[1]	0.906	100	31.8	LOS C	42.2	357.5	Full	500	0.0	0.0
Lane 3	774	11.7	774	11.7	855	0.906	100	18.3	LOS B	49.3	417.3	Full	500	0.0	0.0
Lane 4	774	11.7	774	11.7	855	0.906	100	18.3	LOS B	49.3	417.3	Full	500	0.0	0.0
Lane 5	237	5.8	237	5.8	264	0.897	100	100.4	LOS F[11]	22.8	178.1	Short	240	0.0	NA
Approach	2589	11.0	2589	11.0		0.906		30.4	LOS C	49.3	417.3				
All Vehicles	5939	8.0	5939	8.0		1.529		85.8	LOS F[11]	81.9	633.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
8 Probability of Blockage has been set on the basis of a queue that overflows from a short lane.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	91	77	-	168	5.4	321	0.522	87[6]	55.9	2
Lane 2	-	184	-	184	4.8	307[1]	0.600	100	NA	NA
Lane 3	-	-	169	169	5.8	312[1]	0.542	100	57.5	2
Approach	91	261	169	521	5.3		0.600			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	125	-	-	125	5.8	1341	0.093	13[5]	0.0	2
Lane 2	-	620	-	620	6.3	866[1]	0.716	100	NA	NA
Lane 3	-	652	-	652	6.3	910	0.716	100	NA	NA
Lane 4	-	605	-	605	6.3	844[1]	0.716	100	NA	NA
Lane 5	-	-	405	405	4.7	265	1.529	100	100.0	4
Approach	125	1876	405	2406	6.0		1.529			

NorthWest: Resolution Dr

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	207	-	-	207	4.7	631	0.328	100	0.7	2
Lane 2	-	49	-	49	4.7	83	0.590	39[6]	NA	NA
Lane 3	-	125	-	125	4.7	83	1.508	100	35.2	2
Lane 4	-	-	41	41	4.8	78	0.525	100	0.0	3
Approach	207	175	41	422	4.7		1.508			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	75	-	-	75	4.7	872	0.085	9[5]	0.0	2
Lane 2	-	729	-	729	11.7	805[1]	0.906	100	NA	NA
Lane 3	-	774	-	774	11.7	855	0.906	100	NA	NA
Lane 4	-	774	-	774	11.7	855	0.906	100	NA	NA
Lane 5	-	-	237	237	5.8	264	0.897	100	0.0	4
Approach	75	2278	237	2589	11.0		0.906			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5939	8.0	1.529

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd Merge Type: **Priority**												

Exit Short Lane	1	45	0.0	320	329	3.08	2.05	174	1413	0.123	0.5	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				320	1800	0.178	0.0	0.0
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	120	0.0	729	768	3.07	2.05	207	952	0.217	1.7	2.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				729	1800	0.405	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**												
Exit Short Lane	1	140	0.0	449	460	3.07	2.05	151	1281	0.118	0.8	1.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				449	1800	0.250	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	70.0	952.5	NA
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	21.1	914.4	NA
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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Project: C:\PJA\Phil Jones Associates\SharedData - 07575 Ascot Racecourse Local Structure Plan & Scheme Amendment\4. Technical\4.3 Analysis\4.3.1 Transport\07575_M_01_A_Ascot Racecourse LSP&SA.sip9

LANE SUMMARY

Site: 103av [TCS PM - Current (Site Folder: GEH/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	268	13.0	268	13.0	332	0.806	100	69.0	LOS E	19.9	172.3	Full	500	0.0	0.0
Lane 2	247	13.0	247	13.0	306[1]	0.806	100	74.3	LOS E	18.4	159.3	Full	500	0.0	0.0
Lane 3	173	13.0	173	13.0	320	0.540	67[5]	71.6	LOS E	11.5	99.3	Short	73	0.0	NA
Approach	687	13.0	687	13.0		0.806		71.5	LOS E	19.9	172.3				
NorthEast: GEH															
Lane 1	136	4.6	136	4.6	1226	0.111	16[5]	13.6	LOS B	3.2	24.9	Full	500	0.0	0.0
Lane 2	587	6.2	587	6.2	835	0.702	100	13.8	LOS B	22.0	173.4	Full	500	0.0	0.0
Lane 3	587	6.2	587	6.2	835	0.702	100	13.8	LOS B	22.0	173.4	Full	500	0.0	0.0
Lane 4	587	6.2	587	6.2	835	0.702	100	13.8	LOS B	22.0	173.4	Full	500	0.0	0.0
Lane 5	82	5.8	82	5.8	129	0.637	100	82.4	LOS F	6.2	48.2	Short	180	0.0	NA
Approach	1978	6.1	1978	6.1		0.702		16.7	LOS B	22.0	173.4				
NorthWest: Stoneham St															
Lane 1	11	5.8	11	5.8	199	0.053	100	71.4	LOS E	0.7	5.4	Short	75	0.0	NA
Lane 2	194	5.8	194	5.8	210	0.926	100	88.9	LOS F	16.5	128.7	Full	300	0.0	0.0
Lane 3	188	5.8	188	5.8	203[1]	0.926	100	92.5	LOS F	15.9	124.6	Full	300	0.0	0.0
Lane 4	184	5.8	184	5.8	199	0.926	100	95.8	LOS F	15.7	122.6	Short	60	0.0	NA
Approach	577	5.8	577	5.8		0.926		91.9	LOS F	16.5	128.7				
SouthWest: GEH															
Lane 1	712	5.8	712	5.8	1261	0.564	70[5]	13.5	LOS B	21.0	164.6	Short	145	0.0	NA
Lane 2	646	6.8	646	6.8	804	0.803	100	25.6	LOS C	34.9	277.3	Full	500	0.0	0.0
Lane 3	665	6.8	665	6.8	828	0.803	100	26.0	LOS C	36.9	293.5	Full	500	0.0	0.0
Lane 4	665	6.8	665	6.8	828	0.803	100	26.0	LOS C	36.9	293.5	Full	500	0.0	0.0
Lane 5	114	4.6	114	4.6	130	0.877	100	91.6	LOS F	9.3	72.0	Short	210	0.0	NA
Approach	2802	6.5	2802	6.5		0.877		25.4	LOS C	36.9	293.5				
All Vehicles	6044	7.0	6044	7.0		0.926		34.1	LOS C	36.9	293.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program

Approach Lane Flows (veh/h)

SouthEast: Belgravia St

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	84	184	-	268	13.0	332	0.806	100	NA	NA
Lane 2	-	247	-	247	13.0	306[1]	0.806	100	NA	NA
Lane 3	-	-	173	173	13.0	320	0.540	67[5]	33.0	2
Approach	84	431	173	687	13.0		0.806			
NorthEast: GEH										
Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	136	-	-	136	4.6	1226	0.111	16[5]	NA	NA
Lane 2	-	587	-	587	6.2	835	0.702	100	NA	NA
Lane 3	-	587	-	587	6.2	835	0.702	100	NA	NA
Lane 4	-	587	-	587	6.2	835	0.702	100	NA	NA
Lane 5	-	-	82	82	5.8	129	0.637	100	0.0	4
Approach	136	1760	82	1978	6.1		0.702			
NorthWest: Stoneham St										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	-	-	11	5.8	199	0.053	100	0.0	2
Lane 2	-	194	-	194	5.8	210	0.926	100	NA	NA
Lane 3	-	100	87	188	5.8	203[1]	0.926	100	NA	NA
Lane 4	-	-	184	184	5.8	199	0.926	100	71.4	3
Approach	11	295	272	577	5.8		0.926			
SouthWest: GEH										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	712	-	-	712	5.8	1261	0.564	70[5]	16.5	2
Lane 2	-	646	-	646	6.8	804	0.803	100	NA	NA
Lane 3	-	665	-	665	6.8	828	0.803	100	NA	NA
Lane 4	-	665	-	665	6.8	828	0.803	100	NA	NA
Lane 5	-	-	114	114	4.6	130	0.877	100	0.0	4
Approach	712	1977	114	2802	6.5		0.877			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	6044	7.0	0.926

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	646	667	3.09	2.06	11	1049	0.010	1.4	1.5
Merge Lane	2	-	100.0	Merge Lane is not Opposed				646	1800	0.359	0.0	0.0
SouthWest Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	587	604	3.16	2.11	84	1069	0.079	1.3	1.6

Merge Lane	2	-	100.0	Merge Lane is not Opposed	587	1800	0.326	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 (Site Folder: GEH/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	333	13.0	333	13.0	296	1.123	100	213.6	LOS F[11]	44.9	389.1	Full	500	0.0	0.0
Lane 2	276	13.0	276	13.0	246[1]	1.123	100	241.7	LOS F[11]	37.5	324.9	Full	500	0.0	0.0
Lane 3	185	13.0	185	13.0	275[1]	0.672	60[5]	108.9	LOS F[11]	15.3	132.5	Short	73	0.0	NA
Approach	793	13.0	793	13.0		1.123		199.0	LOS F[11]	44.9	389.1				
NorthEast: GEH															
Lane 1	145	4.6	145	4.6	1296	0.112	17[5]	12.9	LOS B	3.6	27.8	Full	500	0.0	0.0
Lane 2	628	6.2	628	6.2	962	0.652	100	7.1	LOS A	16.1	127.1	Full	500	0.0	0.0
Lane 3	628	6.2	628	6.2	962	0.652	100	7.1	LOS A	16.1	127.1	Full	500	0.0	0.0
Lane 4	628	6.2	628	6.2	962	0.652	100	7.1	LOS A	16.1	127.1	Full	500	0.0	0.0
Lane 5	88	5.8	88	5.8	107	0.818	100	104.3	LOS F[11]	8.3	64.6	Short	180	0.0	NA
Approach	2116	6.1	2116	6.1		0.818		11.5	LOS B	16.1	127.1				
NorthWest: Stoneham St															
Lane 1	11	5.8	11	5.8	185	0.061	100	97.0	LOS F[11]	0.9	7.0	Short	75	0.0	NA
Lane 2	221	5.8	221	5.8	195[1]	1.129	100	232.6	LOS F[11]	29.7	232.7	Full	300	0.0	0.0
Lane 3	194	5.8	194	5.8	172[1]	1.129	100	241.9	LOS F[11]	26.2	205.2	Full	300	0.0	0.0
Lane 4	191	5.8	191	5.8	170[1]	1.129	100	245.0	LOS F[11]	25.9	202.8	Short	60	0.0	NA
Approach	617	5.8	617	5.8		1.129		236.9	LOS F[11]	29.7	232.7				
SouthWest: GEH															
Lane 1	761	5.8	761	5.8	1254	0.607	67[5]	18.4	LOS B	30.1	235.3	Short	145	0.0	NA
Lane 2	665	6.8	665	6.8	729[1]	0.912	100	36.5	LOS D	46.1	366.3	Full	500	0.0	0.0
Lane 3	870	6.8	870	6.8	954	0.912	100	30.8	LOS C	66.1	525.0	Full	500	0.0	9.4
Lane 4	846	6.8	846	6.8	928[1]	0.912	100	36.9	LOS D	63.4	503.5	Full	500	0.0	5.6
Lane 5	122	4.6	122	4.6	108	1.126	100	233.7	LOS F[11]	16.3	127.0	Short	210	0.0	NA
Approach	3264	6.5	3264	6.5		1.126		38.2	LOS D	66.1	525.0				
All Vehicles	6791	7.1	6791	7.1		1.129		66.7	LOS E[11]	66.1	525.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)											
SouthEast: Belgravia St											
Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	90	242	-	333	13.0	296	1.123	100	NA	NA
Lane 2	-	276	-	276	13.0	246[1]	1.123	100	NA	NA
Lane 3	-	-	185	185	13.0	275[1]	0.672	60[5]	60.0	2
Approach	90	519	185	793	13.0		1.123			
NorthEast: GEH										
Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	145	-	-	145	4.6	1296	0.112	17[5]	NA	NA
Lane 2	-	628	-	628	6.2	962	0.652	100	NA	NA
Lane 3	-	628	-	628	6.2	962	0.652	100	NA	NA
Lane 4	-	628	-	628	6.2	962	0.652	100	NA	NA
Lane 5	-	-	88	88	5.8	107	0.818	100	0.0	4
Approach	145	1883	88	2116	6.1		0.818			
NorthWest: Stoneham St										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	-	-	11	5.8	185	0.061	100	0.0	2
Lane 2	-	221	-	221	5.8	195[1]	1.129	100	NA	NA
Lane 3	-	95	99	194	5.8	172[1]	1.129	100	NA	NA
Lane 4	-	-	191	191	5.8	170[1]	1.129	100	100.0	3
Approach	11	315	291	617	5.8		1.129			
SouthWest: GEH										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	761	-	-	761	5.8	1254	0.607	67[5]	49.5	2
Lane 2	-	665	-	665	6.8	729[1]	0.912	100	NA	NA
Lane 3	-	870	-	870	6.8	954	0.912	100	NA	NA
Lane 4	-	846	-	846	6.8	928[1]	0.912	100	NA	NA
Lane 5	-	-	122	122	4.6	108	1.126	100	0.0	4
Approach	761	2381	122	3264	6.5		1.126			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	6791	7.1	1.129							

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	665	686	3.09	2.06	11	1029	0.011	1.4	1.6
Merge Lane	2	-	100.0	Merge Lane is not Opposed				665	1800	0.369	0.0	0.0
SouthWest Exit: GEH												

Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	628	647	3.16	2.11	80	1024	0.078	1.4	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				628	1800	0.349	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	18.2	221.7	NA
Lane 2	0.0	15.1	221.7	NA
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	12.6	232.6	NA
Lane 3	0.0	11.1	232.6	NA
Lane 4	0.0	11.0	232.6	NA
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	6.8	226.7	NA

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LANE SUMMARY

Site: 103av [TCS PM - 2036 - mod (Site Folder: GEH/ Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	336	13.0	336	13.0	303	1.109	100	184.7	LOS F[11]	43.9	380.6	Full	500	0.0	0.0
Lane 2	272	13.0	272	13.0	245[1]	1.109	100	229.8	LOS F[11]	36.2	313.9	Full	500	0.0	0.0
Lane 3	185	13.0	185	13.0	275[1]	0.671	61[5]	108.1	LOS F[11]	15.3	132.5	Short	73	0.0	NA
Approach	793	13.0	793	13.0		1.109		182.4	LOS F[11]	43.9	380.6				
NorthEast: GEH															
Lane 1	145	4.6	145	4.6	1336	0.109	17[5]	11.7	LOS B	3.3	25.5	Full	500	0.0	0.0
Lane 2	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 3	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 4	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 5	88	5.8	88	5.8	78	1.125	100	228.7	LOS F[11]	11.8	92.3	Short	180	0.0	NA
Approach	2116	6.1	2116	6.1		1.125		14.4	LOS B	11.8	92.3				
NorthWest: Stoneham St															
Lane 1	11	5.8	11	5.8	312	0.036	100	83.0	LOS F[11]	0.8	6.3	Short	75	0.0	NA
Lane 2	217	5.8	217	5.8	185	1.173	100	268.7	LOS F[11]	31.2	244.1	Full	300	0.0	0.0
Lane 3	196	5.8	196	5.8	167[1]	1.173	100	279.5	LOS F[11]	28.2	220.2	Full	300	0.0	0.0
Lane 4	193	5.8	193	5.8	165[1]	1.173	100	282.6	LOS F[11]	27.8	217.6	Short	60	0.0	NA
Approach	617	5.8	617	5.8		1.173		273.1	LOS F[11]	31.2	244.1				
SouthWest: GEH															
Lane 1	761	5.8	761	5.8	1276	0.597	68[5]	20.2	LOS C	28.6	224.0	Short	145	0.0	NA
Lane 2	635	6.8	635	6.8	722[1]	0.880	100	32.6	LOS C	41.0	325.4	Full	500	0.0	0.0
Lane 3	875	6.8	875	6.8	995	0.880	100	21.9	LOS C	57.4	456.4	Full	500	0.0	0.0
Lane 4	870	6.8	870	6.8	990[1]	0.880	100	22.9	LOS C	56.9	452.1	Full	500	0.0	0.0
Lane 5	61	4.6	61	4.6	77	0.790	100	107.4	LOS F[11]	5.8	44.8	Short	210	0.0	NA
Lane 6	61	4.6	61	4.6	77	0.790	100	106.3	LOS F[11]	5.8	44.8	Short	210	0.0	NA
Approach	3264	6.5	3264	6.5		0.880		27.0	LOS C	57.4	456.4				
All Vehicles	6791	7.1	6791	7.1		1.173		63.6	LOS E[11]	57.4	456.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)										
SouthEast: Belgravia St										
Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	90	246	-	336	13.0	303	1.109	100	NA	NA
Lane 2	-	272	-	272	13.0	245[1]	1.109	100	NA	NA
Lane 3	-	-	185	185	13.0	275[1]	0.671	61[5]	60.0	2
Approach	90	519	185	793	13.0		1.109			
NorthEast: GEH										
Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	145	-	-	145	4.6	1336	0.109	17[5]	NA	NA
Lane 2	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 3	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 4	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 5	-	-	88	88	5.8	78	1.125	100	0.0	4
Approach	145	1883	88	2116	6.1		1.125			
NorthWest: Stoneham St										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	-	-	11	5.8	312	0.036	100	0.0	2
Lane 2	-	217	-	217	5.8	185	1.173	100	NA	NA
Lane 3	-	98	98	196	5.8	167[1]	1.173	100	NA	NA
Lane 4	-	-	193	193	5.8	165[1]	1.173	100	100.0	3
Approach	11	315	291	617	5.8		1.173			
SouthWest: GEH										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	761	-	-	761	5.8	1276	0.597	68[5]	44.9	2
Lane 2	-	635	-	635	6.8	722[1]	0.880	100	NA	NA
Lane 3	-	875	-	875	6.8	995	0.880	100	NA	NA
Lane 4	-	870	-	870	6.8	990[1]	0.880	100	NA	NA
Lane 5	-	-	61	61	4.6	77	0.790	100	0.0	4
Lane 6	-	-	61	61	4.6	77	0.790	100	0.0	5
Approach	761	2381	122	3264	6.5		0.880			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	6791	7.1	1.173							

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	635	656	3.09	2.06	11	1061	0.011	1.3	1.5

Merge Lane	2	-	100.0	Merge Lane is not Opposed			635	1800	0.353	0.0	0.0
SouthWest Exit: GEH Merge Type: **Priority**											
Exit Short Lane	1	100	0.0	628	647	3.16	2.11	81	1024	0.079	1.4	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed			628	1800	0.349	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	16.6	196.5	NA
Lane 2	0.0	13.4	196.5	NA
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	4.9	224.9	NA
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	16.0	311.0	NA
Lane 3	0.0	14.4	311.0	NA
Lane 4	0.0	14.2	311.0	NA
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
Lane 6	0.0	0.0	0.0	0.0

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Project: C:\PJA\Phil Jones Associates\SharedData - 07575 Ascot Racecourse Local Structure Plan & Scheme Amendment\4. Technical\4.3 Analysis\4.3.1 Transport\07575_M_01_A_Ascot Racecourse LSP&SA.sip9

LANE SUMMARY

Site: 103av [TCS PM - 2036 - with LSP (Site Folder: GEH/ Stoneham)]

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New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	359	12.1	359	12.1	299	1.199	100	276.3	LOS F[11]	53.7	460.6	Full	500	0.0	0.0
Lane 2	302	11.8	302	11.8	251[1]	1.199	100	307.9	LOS F[11]	45.3	387.2	Full	500	0.0	0.0
Lane 3	185	13.0	185	13.0	274[1]	0.674	56[5]	112.9	LOS F[11]	15.3	132.5	Short	73	0.0	NA
Approach	845	12.2	845	12.2		1.199		251.8	LOS F[11]	53.7	460.6				
NorthEast: GEH															
Lane 1	145	4.6	145	4.6	1336	0.109	17[5]	11.7	LOS B	3.3	25.5	Full	500	0.0	0.0
Lane 2	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 3	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 4	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 5	97	5.2	97	5.2	88	1.105	100	212.0	LOS F[11]	12.7	98.4	Short	180	0.0	NA
Approach	2126	6.0	2126	6.0		1.105		14.6	LOS B	12.7	98.4				
NorthWest: Stoneham St															
Lane 1	13	4.9	13	4.9	167	0.080	100	108.2	LOS F[11]	1.1	8.4	Short	75	0.0	NA
Lane 2	247	5.0	247	5.0	176	1.402	100	479.2	LOS F[11]	45.6	353.6	Full	300	0.0	19.9
Lane 3	228	5.0	228	5.0	163[1]	1.402	100	490.1	LOS F[11]	42.2	327.1	Full	300	0.0	12.8
Lane 4	225	5.0	225	5.0	161[1]	1.402	100	493.2	LOS F[11]	41.6	322.6	Short	60	0.0	NA
Approach	714	5.0	714	5.0		1.402		480.2	LOS F[11]	45.6	353.6				
SouthWest: GEH															
Lane 1	846	5.2	846	5.2	1264	0.669	76[5]	22.6	LOS C	31.9	247.9	Short	145	0.0	NA
Lane 2	627	6.8	627	6.8	709[1]	0.885	100	34.1	LOS C	41.4	328.6	Full	500	0.0	0.0
Lane 3	881	6.8	881	6.8	995	0.885	100	22.6	LOS C	58.9	468.1	Full	500	0.0	0.0
Lane 4	873	6.8	873	6.8	986[1]	0.885	100	23.6	LOS C	58.0	460.5	Full	500	0.0	0.0
Lane 5	122	4.6	122	4.6	88	1.376	100	448.3	LOS F[11]	22.1	171.7	Short	210	0.0	NA
Approach	3348	6.3	3348	6.3		1.376		40.5	LOS D	58.9	468.1				
All Vehicles	7033	6.8	7033	6.8		1.402		102.7	LOS F[11]	58.9	468.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)

SouthEast: Belgravia St

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	90	269	-	359	12.1	299	1.199	100	NA	NA
Lane 2	-	302	-	302	11.8	251[1]	1.199	100	NA	NA
Lane 3	-	-	185	185	13.0	274[1]	0.674	56[5]	60.1	2
Approach	90	570	185	845	12.2		1.199			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	145	-	-	145	4.6	1336	0.109	17[5]	NA	NA
Lane 2	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 3	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 4	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 5	-	-	97	97	5.2	88	1.105	100	0.0	4
Approach	145	1883	97	2126	6.0		1.105			

NorthWest: Stoneham St

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	-	-	13	4.9	167	0.080	100	0.0	2
Lane 2	-	247	-	247	5.0	176	1.402	100	NA	NA
Lane 3	-	118	111	228	5.0	163[1]	1.402	100	NA	NA
Lane 4	-	-	225	225	5.0	161[1]	1.402	100	100.0	3
Approach	13	365	336	714	5.0		1.402			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	846	-	-	846	5.2	1264	0.669	76[5]	54.4	2
Lane 2	-	627	-	627	6.8	709[1]	0.885	100	NA	NA
Lane 3	-	881	-	881	6.8	995	0.885	100	NA	NA
Lane 4	-	873	-	873	6.8	986[1]	0.885	100	NA	NA
Lane 5	-	-	122	122	4.6	88	1.376	100	0.0	4
Approach	846	2381	122	3348	6.3		1.376			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	7033	6.8	1.402

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	627	648	3.07	2.05	13	1079	0.012	1.3	1.5
Merge Lane	2	-	100.0	Merge Lane is not Opposed				627	1800	0.349	0.0	0.0
SouthWest Exit: GEH												

Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	628	647	3.16	2.11	75	1024	0.073	1.4	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				628	1800	0.349	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	29.8	358.4	NA
Lane 2	0.0	25.0	358.4	NA
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	4.6	189.6	NA
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	35.4	723.2	NA
Lane 3	0.0	32.7	723.2	NA
Lane 4	0.0	32.3	723.2	NA
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	16.6	677.1	NA

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Project: C:\PJA\Phil Jones Associates\SharedData - 07575 Ascot Racecourse Local Structure Plan & Scheme Amendment\4. Technical\4.3 Analysis\4.3.1 Transport\07575_M_01_A_Ascot Racecourse LSP&SA.sip9

Cr Sekulla disclosed at Item 3 of the Agenda "Disclosure of Interest" an Impartiality Interest in the following item in accordance with Regulation 22 of the *Local Government (Model Code of Conduct) Regulations 2021*.

12.1 Ascot Racecourse Precinct Structure Plan

Voting Requirement	:	Simple Majority
Subject Index	:	128/019
Location/Property Index	:	Lots 1 (No. 88), 3 (No.96), 13, 50, and 9002 (No. 71) and Lot 452 (No. 70) Grandstand Road, Lot 7005 (No. 71) Matheson Road, and Lots 51 (No. 2) and 100 (No. 1) Raconteur Drive, Ascot
Application Index	:	N/A
Disclosure of any Interest	:	Nil
Previous Items	:	N/A
Applicant	:	Rowe Group
Owner	:	The Western Australian Turf Club Western Australian Planning Commission
Responsible Division	:	Development and Communities

Council role

Legislative	Includes adopting local laws, local planning schemes and policies.

Purpose of report

For Council to consider the draft Ascot Racecourse Precinct Structure Plan following public advertising and make a recommendation to the Western Australian Planning Commission (WAPC).

Summary and key issues

- Rowe Group on behalf of Perth Racing has prepared the draft Ascot Racecourse Precinct Structure Plan (PSP) to guide the future use and development of the land in and around Ascot Racecourse.
- The draft PSP was advertised for 43 days between 24 October 2024 and 6 December 2024. At the close of the advertising period, a total of 103 submissions were received.
- The key matters raised in submissions relate to:

– Concerns, including on the appropriateness of certain instances of Crown Land and Road Reserves being able to accommodate the proposed development.

  - The clearing of trees.
  - Safe crossing points to and from the Racecourse across Grandstand Road.
  - The interface between future development on Lot 452 and the adjacent single houses.
  - Amenity impacts of future stables development within Precinct C.
  - Increased traffic congestion including concerns with increased movements within the 'Residential and Stables' zone.
  - Concerns about the loss of parking bays due to commercial development in Precinct E and the potential for increased street parking.
  - The amount of retail floor space proposed within the precinct.
- Several modifications to the draft PSP are proposed in response to the submissions and following an assessment of the document, with key changes relating to:
  - Aligning documentation with the latest draft Golden Gateway Local Structure Plan.
  - Providing further justification in the Transport Impact Assessment regarding parking availability, traffic impacts within the residential and stables area, and pedestrian crossings.
  - Updating the Retail Needs Assessment to include measures that justify the incremental expansion of retail development over time, tied to justified milestones and the associated provisions for this.
  - Updating land use permissibility.
  - Investigating and identifying trees for protection.
  - Adjusting the boundary of Precinct A to exclude development within the Crown Grant in Trust land.
  - Introducing additional development provisions to manage interfaces with Ascot Waters, Matheson Road, and the Central Belmont Main Drain.
- It is recommended that Council recommends the draft Ascot Racecourse PSP be approved by the WAPC, subject to modifications.

Officer Recommendation

That Council, pursuant to Schedule 2, Part 4, Clause 20 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, recommends the draft Ascot Racecourse Precinct Structure Plan (Attachment 12.1.1) and supporting appendices (Attachments 12.1.2 through 12.1.8), incorporating the modifications detailed in Attachment 12.1.9, be approved by the Western Australian Planning Commission.

Note:

Cr Marks put forward the following Alternative Motion.

Alternative Councillor Motion

Marks moved, Kulczycki seconded

That Council, pursuant to Schedule 2, Part 4, Clause 20 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, recommends the draft Ascot Racecourse Precinct Structure Plan (Attachment 12.1.1) and supporting appendices (Attachments 12.1.2 through 12.1.8), incorporating the modifications detailed in Attachment 12.1.9, be approved by the Western Australian Planning Commission, subject to:

1. The draft Ascot Racecourse Precinct Structure Plan and supporting appendices being updated to reflect the existing gates on Matheson Road and Hardey Road remaining in place and continuing to operate as they currently do and updating modifications 52 and 81 within the schedule of modifications to reflect this.

Reason

- Opening the development to the Residential and Stables Zone is detrimental to the operation of the zones traffic and horse component.

Note: Cr Kulczycki put forward the following foreshadowed motion.

Alternative Councillor Motion

That Council, pursuant to Schedule 2, Part 4, Clause 20 of the Planning and Development (Local Planning Schemes) Regulations 2015, recommends the draft Ascot Racecourse Precinct Structure Plan (Attachment 12.1.1) and supporting appendices (Attachments 12.1.2 through 12.1.8), incorporating the modifications detailed in Attachment 12.1.9, be approved by the Western Australian Planning Commission, subject to updating modification 71 to include:

1. Update the entire report to address and identify trees across on the site worthy of protection at development and subdivision stage. The report should adopt a default position that remnant vegetation is to be retained in the first instance through the avoidance of development, and, where necessary, identify built form controls that reflect and respond to these environmental values and opportunities.
2. As part of the above, in relation to Precinct E, there shall be a detailed analysis of the currently unzoned land, the Parks and Recreation reserve, and the Central Belmont Main Drain area. The analysis should acknowledge the presence of mature 'suitable' and 'potential' nesting trees, the significance of the site as the largest remaining pocket of native vegetation within the precinct, and the potential opportunity for a future living stream along the Central Belmont Main Drain.

Reasons

- The proposed amended Precinct Structure Plan (PSP) is an endeavour pursued by the proponent, Perth Racing, to advance their commercial interests. Council must seriously consider the merits and consequences of the proposal and weigh up the strategic objectives of Council on behalf of the community and the proponent's aspirations in a considered manner.
- Construction of a car park would negatively impact upon the environmental value of the existing land, containing a high density of mature "suitable" and "potential" nesting trees as demonstrated by the proponent's own Environmental Assessment Report.
- The location also contains the most significant remaining pocket of native vegetation across the entire PSP site.
- Positioning a car park upon Water Corporation assets, which forms part of the Central Belmont Main Drain would result in an environmentally deficient outcome, removing the potential to form a future living stream and puts into conflict land zoned Parks and Recreation.
- Without amendment, habitat destruction occurring as a result from the proposed amended PSP, is inconsistent with Council's strategic objectives as outlined in the endorsed Environment and Sustainability Strategy and Strategic Community Plan.
- This amendment balances Council's obligations to its own strategic direction and planning, community expectations as outlined via public comments, and accommodates the commercial interests of Perth Racing through the broader objectives outlined in their PSP.

The Mover and Seconder agreed to amend the Alternative Councillor Motion to include Cr Kulczycki's foreshadowed motion.

Amended Alternative Councillor Motion

Marks moved, Kulczycki seconded

That Council, pursuant to Schedule 2, Part 4, Clause 20 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, recommends the draft Ascot Racecourse Precinct Structure Plan (Attachment 12.1.1) and supporting appendices (Attachments 12.1.2 through 12.1.8), incorporating the modifications detailed in Attachment 12.1.9, be approved by the Western Australian Planning Commission, subject to:

1. The draft Ascot Racecourse Precinct Structure Plan and supporting appendices being updated to reflect the existing gates on Matheson Road and Hardey Road remaining in place and continuing to operate as they currently do and updating modifications 52 and 81 within the schedule of modifications to reflect this.
2. Update the entire report to address and identify trees across on the site worthy of protection at development and subdivision stage. The report should adopt a default position that remnant vegetation is to be retained in the first instance through the avoidance of development, and, where necessary, identify built form controls that reflect and respond to these environmental values and opportunities.
3. As part of the above, in relation to Precinct E, there shall be a detailed analysis of the currently unzoned land, the Parks and Recreation reserve, and the Central Belmont Main Drain area. The analysis should acknowledge the presence of mature 'suitable' and 'potential' nesting trees, the significance of the site as the largest remaining pocket of native vegetation within the precinct, and the potential opportunity for a future living stream along the Central Belmont Main Drain.

Reasons

- Opening the development to the Residential and Stables Zone is detrimental to the operation of the zones traffic and horse component.
- The proposed amended Precinct Structure Plan (PSP) is an endeavour pursued by the proponent, Perth Racing, to advance their commercial interests. Council must seriously consider the merits and consequences of the proposal and weigh up the strategic objectives of Council on behalf of the community and the proponent's aspirations in a considered manner.
- Construction of a car park would negatively impact upon the environmental value of the existing land, containing a high density of mature "suitable" and "potential" nesting trees as demonstrated by the proponent's own Environmental Assessment Report.
- The location also contains the most significant remaining pocket of native vegetation across the entire PSP site.

- Positioning a car park upon Water Corporation assets, which forms part of the Central Belmont Main Drain would result in an environmentally deficient outcome, removing the potential to form a future living stream and puts into conflict land zoned Parks and Recreation.
- Without amendment, habitat destruction occurring as a result from the proposed amended PSP, is inconsistent with Council's strategic objectives as outlined in the endorsed Environment and Sustainability Strategy and Strategic Community Plan.
- This amendment balances Council's obligations to its own strategic direction and planning, community expectations as outlined via public comments and accommodates the commercial interests of Perth Racing through the broader objectives outlined in their PSP.

Carried 7 votes to 1

For: Davis, Harris, Kulczycki, Marks, Ryan, Sekulla and Sessions

Against: Rossi

Location

The draft PSP encompasses 61.3ha of land bound by the Swan River, Ascot Waters Estate, Grandstand Road, Resolution Drive, the Residential and Stables zone, Hardey Road, Carbine Street and Matheson Road in Ascot (refer to Figure 1 below).

More specifically, the draft PSP applies to nine lots, eight of which are owned by Perth Racing. The remaining lot located within Precinct E (shaded yellow on Figure 1) adjacent to Grandstand Road is owned by the WAPC.

A further description of the land and tenure is included within the Report section.



Figure 1: Ascot Racecourse Precinct Structure Plan Area (outlined red)

Consultation

The draft Ascot Racecourse PSP was advertised between 24 October 2024 and 6 December 2024 by:

- Sending letters to relevant State agencies and landowners and occupiers of properties outlined on Figure 2;
- Publishing a public notice in the 24 October 2024 edition of the PerthNow newspaper; and
- Displaying a public notice and information on the City's website, Belmont Connect and at the Civic Centre.



Figure 2: Referral Area (outlined red)

At the close of the advertising period, a total of 103 submissions were received. A summary of the submissions received, and officer's responses are included in the Schedule of Submissions contained as Attachment 12.1.10 and Confidential Attachment 12.1.11.

The key matters raised in submissions relate to:

- Land tenure concerns, including a portion of Precinct E being Crown Land, another designated as Road Reserve, and a portion of Precinct A subject to a Crown Grant in Trust.
- The clearing of trees.
- Safe crossing points to and from the Racecourse across Grandstand Road.
- The interface between future development on Lot 452 and the adjacent single houses.
- Amenity impacts of future stables development within Precinct C.
- Increased traffic congestion including concerns with increased movements within the 'Residential and Stables' zone.
- Concerns about the loss of parking bays due to commercial development in Precinct E and the potential for increased street parking.
- The amount of retail floor space proposed within the precinct.

The above matters will be further discussed in the report section.

Strategic Community Plan implications

In accordance with the 2024–2034 Strategic Community Plan:

Key Performance Area: Place

Outcome: 6. Sustainable population growth with responsible urban planning.

Key Performance Area: Performance

Outcome: 11. A happy, well informed and engaged community.

Policy implications

There are no policy implications associated with this report.

Statutory environment

Strategic Planning Framework

Perth and Peel @ 3.5 Million

Perth and Peel @ 3.5 Million provides a strategic framework to guide development across the Perth and Peel regions, in response to a projected population of 3.5 million by 2050. The document divides the Perth metropolitan area into four sub-regions: Central, North-West, North-East, and South. The subject land is located within the Central Sub-region.

The strategy also outlines Urban Consolidation Principles and identifies corresponding precincts. Of particular relevance to this draft PSP are the 'Green Network', 'Urban Corridor' and 'Activity Centres' principles and precincts.

The racecourse is identified as part of the 'Green Network' that extends along the Swan River. The document highlights the importance of supporting population growth and higher-density living with a connected network of public and private open spaces.

Great Eastern Highway, located south of the subject land, is identified as an 'Urban Corridor', intended to accommodate higher-density residential development that leverages proximity to public transport while minimising impacts on surrounding areas and maintaining the efficiency of the regional transport network. Great Eastern Highway, Grandstand Road, and Resolution Drive are also identified as high-frequency public transit routes.

The document references State Planning Policy SPP 4.2 (SPP 4.2) and the hierarchy of centres based on the future importance of each centre from a network perspective. Additionally, the document identifies the important role that activity centres have in being a focal point for commercial and social activity and

the importance of these areas being designed to be walkable and near public transport to support these means of access.

Local Planning Strategy

The City of Belmont Local Planning Strategy is the strategic planning document that broadly sets out the long-term planning direction for the City. The Strategy also informed the preparation of Local Planning Scheme No. 15 (LPS 15). The key objectives of the Local Planning Strategy and relevant

sub-strategies for this precinct are as follows:

- To enhance the north-west entrance to the City.
- To encourage landmark development.
- Acknowledge that Ascot Racecourse and the Swan River are 'strategic tourism sites' of State significance to benefit future tourism development.

Activity Centre Planning Strategy

The Activity Centre Planning Strategy (ACPS) was prepared to guide the future planning and coordination of activity centres within the City of Belmont and was adopted by Council at the February 2024 Ordinary Council Meeting (OCM). The ACPS identifies a future local centre within the broader Golden Gateway precinct, which includes a portion of Perth Racing's land and outlines that it is to be 1,200m² in the first instance. The ACPS states that following further residential development within the Golden Gateway precinct, it may be appropriate for this figure to be reviewed through a Needs Assessment or Net Benefit Test.

Statutory Planning Framework

Metropolitan Region Scheme

The subject land area is primarily zoned 'Private Recreation' under the Metropolitan Region Scheme (MRS), with the balance zoned 'Urban' and land abutting the Swan River reserved 'Parks and Recreation' (Figure 3).



Figure 3: MRS zones and reserves (subject site outlined red and proposed MRS Amendment area outlined yellow)

The draft PSP proposes rezoning the area shown in yellow in Figure 3 above to 'Mixed Use' under LPS 15. To facilitate this, Perth Racing is seeking an MRS amendment to apply an 'Urban' zone. However, this is subject to a separate planning process.

Planning and Development (Local Planning Schemes) Regulations 2015 (WA)

Part 4, Schedule 2 – Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)* (Regulations) outlines the procedure for the preparation, advertising and consideration of a structure plan. The key requirements under Part 4 of the Regulations are as follows:

- The local government must advertise a structure plan for at least 42 days unless otherwise approved by the WAPC.
- Within 60 days (or an alternative date agreed to by Department of Planning, Lands and Heritage) from the last day for making submissions, the local government must consider all submissions made on the proposed structure plan and prepare a report for the WAPC. In this case, the WAPC has granted an extension until 25 April 2025. The report must include the following:

– A list of the submissions considered by the local government;

– Any comments by the local government in respect of those submissions;

- A schedule of any proposed modifications to address issues raised in the submissions;
- The local government's assessment of the proposal based on appropriate planning principles;
- A recommendation by the local government on whether the proposed structure plan should be approved by the WAPC.

- If the WAPC is not given a report on a proposed structure plan they may make a decision on the proposed structure plan in the absence of a report. In making a decision, the WAPC may request technical advice or further information from the local government and if the local government fails to provide this, the WAPC may obtain the information themselves. If the WAPC incur any costs during this process, they may seek to recover these from the local government.
- On receipt of a report on a proposed structure plan from the local government, the WAPC must within 120 days, consider the plan and determine whether to approve the structure plan, require the structure plan to be modified or refuse the structure plan.
- The WAPC may direct the local government to readvertise the structure plan where it considers that major modifications have been made; however, it cannot direct the local government to readvertise the structure plan on more than one occasion.

Local Planning Scheme No. 15

The subject land is predominantly zoned 'Place of Public Assembly – Racecourse' under LPS 15. The southern portion of the subject land, abutting Resolution Drive, is zoned 'Mixed Use', and a separate portion of land adjacent to Grandstand Road is not currently assigned a zone or reserve (refer to Figure 4).



Figure 4: LPS 15 zones and reserves *(subject land outlined yellow)*

The draft PSP proposes to rezone land within Precincts A, D and E as detailed within the Report section. It is important to note that while the Structure Plan outlines the intended zoning, it does not itself rezone land. Instead, it provides the framework for a future scheme amendment to formally implement the proposed zoning changes.

Local Planning Scheme No. 15 includes objectives for the various zones. The objectives relevant to the draft PSP are as follows:

Commercial Zone:

> "The Town Centre and Commercial Zones are intended to provide for the retail commercial function and entertainment."

Mixed Use Zone:

> "The Mixed Use Zone is intended to allow for the development of a mix of varied but compatible land uses such as housing, offices, showrooms, amusement centres, eating establishments and appropriate industrial activities which do not generate nuisances detrimental to the amenity of the district or to the health, welfare and safety of its residents. Buildings should be of a high standard of architectural design set in pleasant garden surrounds with limited vehicular access from properties to primary roads."

Residential Zone:

> "The purpose and intent of the Residential Zone is to increase the population base of the City of Belmont by permitting a mix of single housing and other housing types to reflect household composition and thereby increase the resident population."

Place of Public Assembly Zone:

> "The 'Places of Public Assembly' zone is intended to allow for special places of assembly, such as halls, private schools, grounds for athletics, sports grounds with provision for spectators, racecourses, trotting track, stadia and/or showgrounds."

Residential and Stables Zone:

> "The Residential and Stables Zone is intended to provide for compatible and environmentally responsible use of land in proximity to the Ascot Racecourse and the Swan River by residential accommodation and stables and ancillary functions of the horse racing industry."

As the zones proposed to be applied to Precincts A, D and E are inconsistent with the existing zonings under LPS 15, and because the list of 'additional uses' is

proposed to be expanded and 'restricted uses' introduced, a scheme amendment will be required. This will occur separate to the structure planning process.

Regarding land use permissibility, Schedule 1 of LPS 15 includes land use definitions, while Table 1 – Zoning Table sets permissibility for these across the various zones. There are several uses defined within Schedule 1 which are not listed within the Zoning Table (e.g. 'Animal Establishment'). Such uses are to be treated as 'use not listed', must be publicly advertised, and generally submitted to Council for determination.

Clause 3.5 of LPS 15 addresses 'Additional Uses' and outlines that, regardless of the use class designation in the Zoning Table, land uses for areas specified in Schedule 2 can receive approval, subject to the specific conditions being met. Land zoned 'Place of Public Assembly – Racecourse' is currently assigned Additional Use 18 for 'Horse Sales' and 'Stables'. Further 'Additional Uses' are proposed by the draft PSP as discussed in the Report section.

Clause 3.6 of LPS 15 relates to 'Restricted Uses' and outlines that only the uses contained within Schedule 3 (Restricted Use Table) can be considered. The draft PSP proposes 'Restricted Uses' be applied to Precincts A, D and E. Further information on this is included within the Report section.

Draft Golden Gateway Local Structure Plan

The draft Golden Gateway Local Structure Plan (draft Golden Gateway LSP) has been prepared to coordinate future subdivision, zoning and development of land generally bound by Great Eastern Highway to the south, the Swan River to the west, the Ascot Waters precinct to the north, and the Ascot Racecourse/Residential and Stables precinct to the east (refer to Figure 5).

The draft Golden Gateway LSP originally proposed zoning changes and development provisions for part of the subject land. However, Perth Racing subsequently indicated its intent to pursue a separate planning framework for its landholdings. In response, the draft Golden Gateway LSP acknowledges that part of Perth Racing's land will be subject to a separate planning process. Retaining a portion of Perth Racing's land within the Golden Gateway precinct is considered appropriate to facilitate a coordinated and holistic approach to planning for both areas.

The Golden Gateway LSP indicates that a 1,200m^2 local centre may be appropriate within the precinct (including over Perth Racing's land). Further discussion on this is included within the Report section.



Figure 5: Draft Golden Gateway Local Structure Plan Area (outlined red)

The draft Golden Gateway Local Structure Plan was presented to Council at the 25 February 2025 OCM, where it was resolved to recommend that the WAPC approve the Structure Plan, subject to modifications. The document has been forwarded to the WAPC for their consideration.

State Planning Policy 3.0 – Urban Growth and Settlement

State Planning Policy 3.0 – Urban Growth and Settlement ('SPP 3.0') outlines key principles and considerations to guide sustainable urban growth and settlement across Western Australia. The objectives of SPP 3.0 are:

- To promote a sustainable and well-planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space.
- To build on existing communities with established local and regional economies, concentrate investment in the improvement of services and infrastructure, and enhance the quality of life in those communities.
- To manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage, and community values and constraints.

- To promote the development of a sustainable and liveable neighbourhood form which reduces energy, water, and travel demand, while ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing, and creates an identifiable sense of place for each community.
- To coordinate new development with the efficient, economic, and timely provision of infrastructure and services.

These matters have been considered through the assessment of the draft PSP and are further discussed in the Report section.

State Planning Policy 4.2 – Activity Centres

State Planning Policy 4.2 guides the planning and development of activity centres in the Perth and Peel region. The document emphasises the importance of activity centres having a compact urban form with

pedestrian-focused streetscapes. The City's ACPS identifies a local centre within the Golden Gateway precinct, including part of Perth Racing's landholdings subject to the draft PSP. State Planning Policy 4.2 states that neighbourhood and local centres should cater to daily and weekly household shopping needs, provide community facilities, and offer a small range of convenience services. Neighbourhood centres typically include a supermarket, personal services, and convenience shops, supported by small-scale offices. Local centres share these characteristics but operate on a smaller scale.

State Planning Policy 4.2 highlights that it is important to ensure that development of activity centre uses within an area generally comply with the floorspace need identified for specific activity centres in local planning strategies or structure plans. Where a proposal exceeds that floorspace need, the proposal is to demonstrate a net benefit to the community. A net benefit test is to be prepared in accordance with Section 7.8 of SPP 4.2 and address matters included in Section 5.3 of the Implementation Guidelines as follows:

- Is there a demand for additional floorspace, and how does the proposal meet this demand?
- How will the proposed development impact on the role of the activity centre and/or the viability and vibrancy of other activity centres in the hierarchy?
- What is the anticipated loss and/or gain of services to the community?
- What is the anticipated impact on access (distance, time, mode of travel) to services by the community?
- Will the proposal contribute to a net increase in employment? Does the proposal align with the objectives and outcomes of this policy and the planning framework?
- Are any potential impacts reduced over the longer term?

A Net Benefit Test has been prepared in support of the draft PSP. Further discussion on this is included in the Report section.

The draft PSP proposes part of Precinct E for 'showrooms.' State Planning Policy 4.2 states that these should be located in an Activity Centre Frame but notes that smaller centres may not have a frame. It also identifies bulky goods showrooms as a desired use within the frame of district centres but not for the frame of local or neighbourhood centres.

State Planning Policy 5.4 – Road and Rail Noise

State Planning Policy 5.4 – Road and Rail Noise ('SPP 5.4') applies to proposals for noise-sensitive land uses located near major transport and freight corridors. Under SPP 5.4, the proposed 'Mixed Use' zone within the draft PSP is partially situated within the noise buffer zone of Great Eastern Highway, a key freight and traffic route.

A Transportation Noise Assessment has been prepared in support of the draft PSP. The assessment found:

- The screening effect of existing buildings ensures that any ground-floor noise-sensitive uses would comply with the outdoor noise target.
- Noise-sensitive uses above the ground floor and within 200 metres of Great Eastern Highway would need to meet the requirements of Package A, including a notification on the title. Alternatives to the Deemed-to-Comply Package A may be considered if supported by a report from a qualified acoustical consultant (a member of the Association of Australasian Acoustical Consultants (AAAC)) once detailed plans are available.

The implementation of these requirements will be addressed as a condition of subdivision or development approval, as applicable.

State Planning Policy 7.2 – Precinct Design

State Planning Policy 7.2 – Precinct Design ('SPP 7.2') and the associated Precinct Design Guidelines provide direction on the design, planning, assessment, and implementation of precinct structure plans, local development plans, subdivisions, and developments within designated precinct areas.

State Planning Policy 7.2 identifies six precinct design elements that guide decision-makers in assessing such proposals: urban ecology, urban structure, public realm, movement, land use, and built form. These design elements have been addressed by the draft Ascot Racecourse PSP in the Design Response section of the document.

State Planning Policy 7.3 – Residential Design Codes

The Residential Design Codes (R-Codes) establish built form controls for all residential development within Western Australia and are used in the assessment of residential development and subdivision proposals. Volume 1 of the R-Codes establishes standards for single houses, grouped dwellings, and multiple dwellings up to R60. Volume 2 of the R-Codes specifically relates to multiple dwelling developments at the R80 code and above.

Background

Rowe Group prepared the draft Ascot Racecourse Precinct Structure Plan on behalf of Perth Racing, lodging it on 21 August 2024. The WAPC granted consent to prepare the Precinct Structure Plan on 19 September 2024. The draft PSP has been prepared to address the following:

- The proposed zoning, reservation and density coding of land within the precinct.
- The proposed permissibility of certain land uses.
- Built form controls including plot ratio, building heights, setbacks and car parking requirements.
- The road network and vehicle access arrangements.
- Strategies for the management and treatment of stormwater.
- The identification of infrastructure and servicing requirements to facilitate development within the precinct.

The following reports have been prepared in support of the draft PSP:

- Attachment 12.1.2 – Local Water Management Strategy
- Attachment 12.1.3 – Environmental Assessment Report
- Attachment 12.1.4 – Engineering Servicing Report
- Attachment 12.1.5 – Transport Impact Assessment
- Attachment 12.1.6 – Retail Assessment (Net Benefit Test)
- Attachment 12.1.7 – Transportation Noise Assessment
- Attachment 12.1.8 – Landscape Master Plan.

An assessment of the draft PSP is detailed in the Report section.

Separately from this structure planning process, Perth Racing submitted a development application for stables and related facilities in Precinct C, which the Metro Inner Development Assessment Panel approved on 13 March 2025. This approval does not render this aspect of the draft PSP redundant, as the structure plan provides a broader framework for future planning and coordination.

Additionally, the approval is time limited and may not be acted upon, so the PSP will guide future development proposals.

Report

The draft Ascot Racecourse PSP was advertised between 24 October 2024 and 6 December 2024. Following a review of the submissions and an assessment of the draft PSP, several modifications are proposed as detailed within the Schedule of Modifications (Attachment 12.1.10 and Confidential Attachment 12.1.11).

The draft PSP identifies five precinct areas, as shown in Figure 6 below.

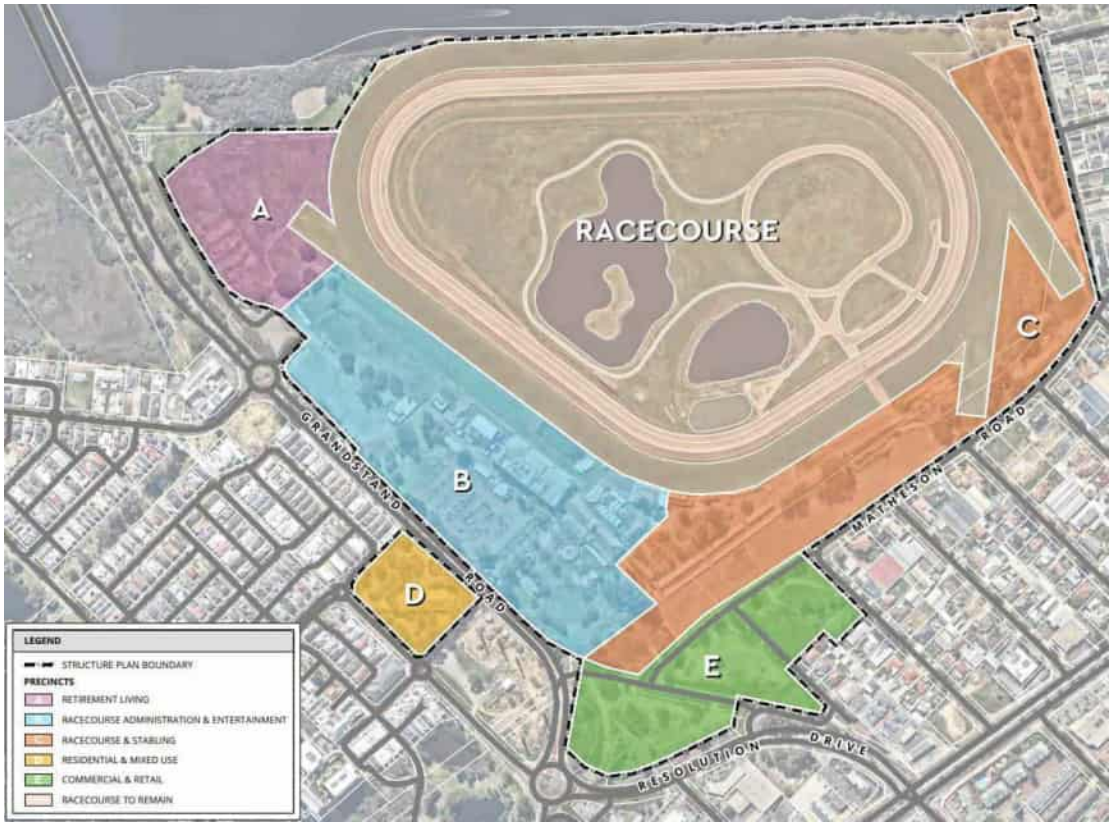


Figure 6: Structure Plan Precincts

An overview of the zoning, density and development provisions for Precinct A – E and the racecourse is outlined below.

Precinct wide matters relating to restricted use, the movement network, public open space, environment, heritage and general modification are also subsequently detailed.

Precinct A

Zoning

Land within Precinct A is currently zoned 'Place of Public Assembly' under the City's LPS 15. The draft Ascot Racecourse PSP proposes that a 'Mixed Use' zone be applied to this land. In considering the suitability of this zone, the following is noted:

- The Department of Planning, Lands and Heritage Land Use Management team has advised that a portion of Precinct A is held by the WA Turf Club as a conditional freehold tenure (Crown Grant in Trust). A key condition of this tenure is that the land must be used solely for activities relating to the running of a public racecourse under the *Land Administration Act 1997*.
- A plan showing the outline of the Crown Grant in Trust Land is shown in Figure 7.

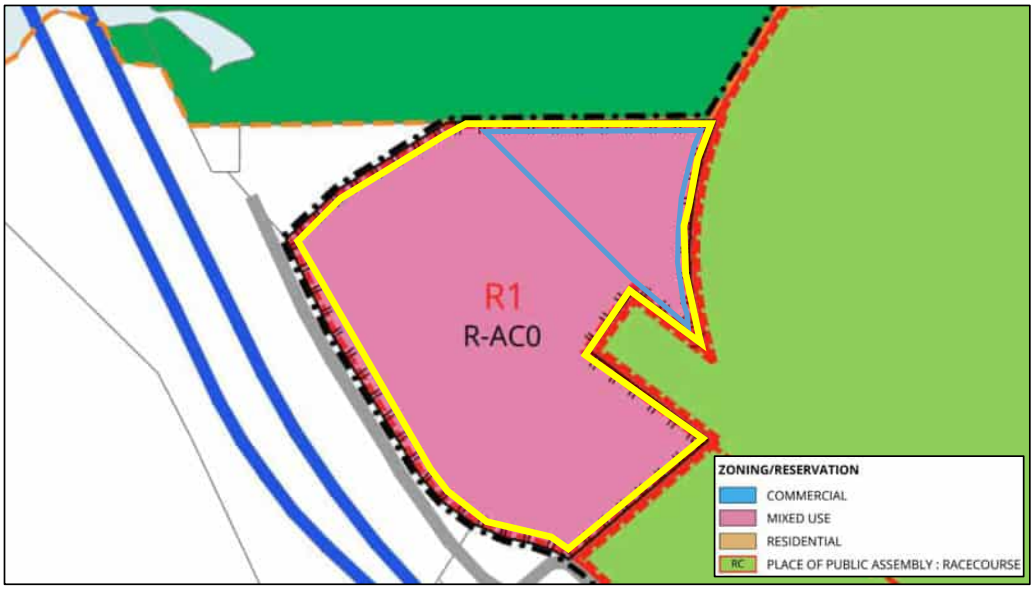


Figure 7: Precinct A and Crown Grant in Trust Identification (Precinct A outlined yellow and the area subject to the Crown Grant In Trust outlined blue)

- A 'Mixed Use' zoning of this land is not considered to align with the tenure requirements, particularly in relation to the 'Retirement Village' proposed in the development concept plan, as this land use does not directly relate to the operation of a public racecourse.
- Consequently, it is recommended that the draft Structure Plan be modified so that Precinct A does not encroach into the Crown Grant in Trust Land.
- Regarding the appropriateness of the 'Mixed Use' zone being applied to the balance of Precinct A the following is relevant:

– It is not considered necessary for the land to be zoned 'Mixed Use' to facilitate the proposed 'Retirement Village' shown in the development concept, as this type of development can be appropriately accommodated within a 'Residential' zone. However, the 'Residential' zone does not

ordinarily permit certain commercial uses that could enhance the function and amenity of the 'Retirement Village'.

- To address this, it is considered appropriate for the land to be subject to a different set of restricted uses than those currently proposed by the draft Precinct Structure Plan. This approach would allow for greater flexibility to accommodate complementary uses, while still ensuring that commercial activity remains focused in closer proximity to Great Eastern Highway and does not expand into other areas.
- Accordingly, it is recommended that a different set of restricted uses be applied to the land, including 'Nursing Home', 'Multiple Dwelling', and 'Restaurant/Café'. A modification is recommended to reflect this change.

Density and Proposed Development Provisions

An R-ACO density code is proposed for Precinct A which provides for development requirements to be prescribed by the draft PSP. A plot ratio of 2.5 and a building height of 15 storeys are proposed. In considering the appropriateness of this height and plot ratio the following is relevant:

- Based on the findings of a feasibility study, a plot ratio of 5.0 is proposed for 15 storeys within the Golden Gateway Precinct. Therefore, the proposed plot ratio of 2.5 may not be realistic for the proposed height, and unlikely to be applied without variation.
- Several submitters raised concerns that a 15-storey building is inconsistent with the scale of nearby development and that an entry statement into the City of Belmont is unnecessary. In response, it is not considered that a 15-storey development will negatively impact nearby residents in terms of visual privacy, noise, or overshadowing. It is considered that this is a distinct and separate site that is well separated from other residential areas, including Ascot Waters. Furthermore, Precinct A offers an opportunity for development to capitalise on its outlook over the Swan River and Ascot Racecourse. Any future proposal will still be subject to assessment at the development application stage, where potential impacts will be considered against the specific plans lodged.

Based on these considerations, no changes to the proposed building height are recommended. However, a modification is proposed to further investigate the plot ratio and make necessary adjustments to the draft PSP.

Precinct B

Zoning

Land within Precinct B is currently zoned 'Place of Public Assembly' under LPS 15. No changes are proposed to the zoning of this land under the draft PSP (Figure 8).

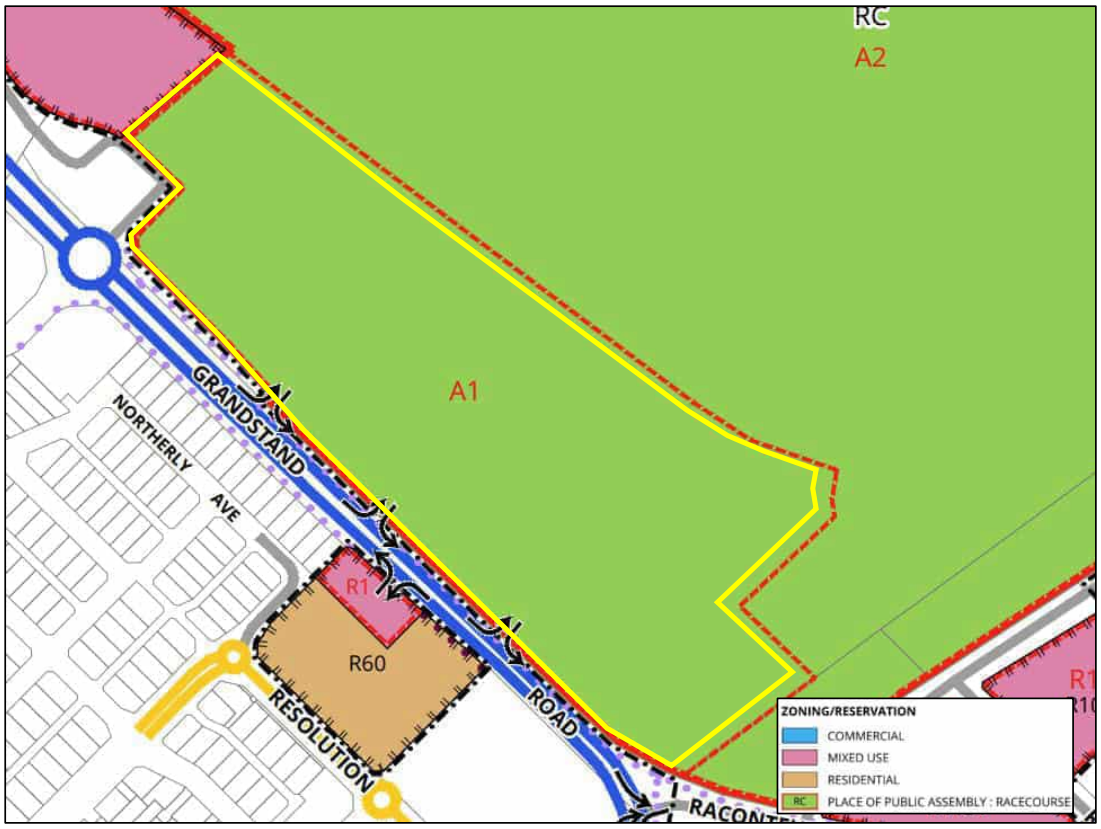


Figure 8: Precinct B zoning and Additional Use identification (Precinct B outlined yellow and Additional Use area outlined Red and notated A1)

The land within this precinct is currently subject to the 'Additional Uses' of 'Horse Sales' and 'Stables' under LPS 15. This allows these uses to be considered, regardless of the permissibility outlined for them in the Zoning Table. Whilst this is the case, the draft PSP does not propose to continue to provide for these uses within Precinct B.

Instead, and to align with the objective of the precinct as a 'Racecourse Administration and Entertainment Precinct', the following 'Additional Uses' are proposed to be introduced:

- Office
- Hotel
- Reception Centre
- Restaurant
- Tavern.

It is considered that these additional uses are appropriate as they will support the continuation of racecourse entertainment functions and provide for Perth Racing's administrative functions.

Density and Proposed Development Provisions

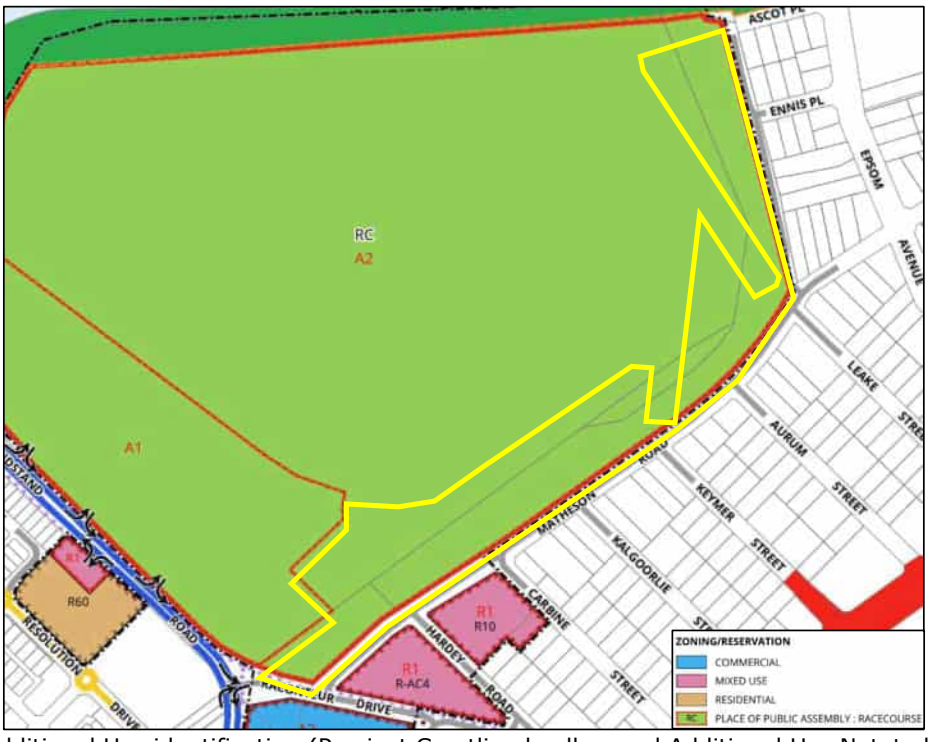
No density code is proposed to be applied to land within Precinct B, as it is proposed to retain its existing 'Place of Public Assembly' zone. The draft PSP proposes to apply a building height of six storeys to Precinct B. This building height is considered acceptable noting that the precinct is well separated from any existing residential development by Grandstand Road.

Precinct C

Zoning

Land within Precinct C is currently zoned 'Place of Public Assembly' under LPS 15, with no proposed changes to its zoning under the draft PSP (Figure 9).

Figure 9: Precinct C and



Additional Use identification (Precinct C outlined yellow and Additional Use Notated A2)

Precinct C is currently subject to the 'Additional Uses' of 'Horse Sales' and 'Stables.' The draft PSP proposes the removal of 'Horse Sales,' which is deemed appropriate as it is not listed in Table 1 – Zoning Table of LPS 15. The draft PSP also recommends introducing 'Veterinary Centre' and 'Animal Establishment' as additional uses within Precinct C. The 'Veterinary Centre' is considered appropriate as an 'Additional Use' as it would support the function of the racecourse and stabling area.

In terms of 'Animal Establishment,' while this use is considered acceptable within the precinct, it should not be listed as an 'Additional Use'. This is because 'Animal Establishment' is not included in the Zoning Table of LPS 15. While it can still be considered in the precinct, it would need to be treated as a 'Use not Listed'.

Density and Proposed Development Provisions

Similar to Precinct B, no density code is proposed to be applied to land within Precinct C as it is proposed to retain its existing 'Place of Public Assembly' zone. In terms of other development controls, a building height of three storeys is proposed for Precinct C. This height is considered appropriate, as there are also provisions requiring future development to be setback a minimum of 10 metres from adjacent properties and 7.5 metres from Matheson Road.

To further facilitate an appropriate interface between development within this precinct, adjacent single houses and Matheson Road, it is considered appropriate to require a minimum landscaping width of 3 metres adjacent to these areas. While this arrangement is not reflected in the approved development plans relating to this precinct, that approval is time-limited and may not proceed. As such, it is appropriate to consider the Matheson Road interface independently of the approved development application.

Precinct D

Zoning

Land within Precinct D is currently zoned 'Place of Public Assembly' under LPS 15. The draft PSP proposes to apply a 'Residential' and 'Mixed Use' zone to this land as per Figure 10.



Figure 10:'Residential' and 'Mixed Use' zone applied to Precinct D (outlined Black)

It is considered that the proposed 'Residential' zone is appropriate as it will largely provide for a residential interface to Ascot Waters.

Several submissions raised concerns with the proposed 'Mixed Use' zone due to it being located directly adjacent to existing residential development. Additionally, there was concern that this land may be used for more intensive uses such as shops, offices, showrooms and other uses.

In considering these submissions and the appropriateness of the proposed 'Mixed Use' zone the following is noted:

- The objective of the 'Mixed Use' zone is to enable the development of a mix of compatible land uses, such as housing, offices, restaurants, cafes, and high-quality designed buildings. This zone is considered appropriate for the location; however, due to the wide range of uses that can currently be considered within this zone, there is a need for a greater level of control to manage potential amenity impacts.
- The draft PSP proposes to restrict the permissibility of uses within this precinct to those generally allowed under the 'Mixed Use' zone, with the exception of 'Amusement Facility,' 'Amusement Parlour,' 'Auction Mart,' 'Garden Centre,' 'Industry – Light,' 'Industry – Service,' 'Motor Vehicle Repair,' and 'Warehouse.'
- Despite these restrictions, it is considered necessary to impose additional limitations on the uses that can occur in this precinct. This will be further discussed in the 'Restricted Uses' section.

Density and Proposed Development Provisions

The draft PSP proposes to apply an R60 density code to Precinct D and a height of three storeys. Several submitters have raised concerns about the proposed three-storey height for Precinct D and the potential for commercial development adjacent to residential areas within Ascot Waters. In response:

- The proposed three-storey building height is consistent with buildings within the Ascot Waters Estate which in this locality ranges between two and four storeys.
- Most of the interface with Ascot Waters consists of 'Residential' lots, with only one lot abutting the proposed 'Mixed Use' zoned lot.
- For the 'Mixed Use' zoned lot, the draft PSP applies side setback requirements for non-residential development in line with Volume 1 of the R-Codes. However, the R-Codes allow setbacks to be reduced to nil, which is not considered to provide an appropriate interface to the adjacent residential development.

To address this, a modification is proposed to require non-residential development in Precinct D to have a minimum 3 metre setback from adjoining residential properties, with this area to be landscaped. Additionally, a modification to the precinct objectives is also proposed to highlight the need for non-residential uses to be compatible with surrounding residential development.

With these modifications, future development in Precinct D is expected to provide an appropriate interface to Ascot Waters.

Precinct E

Zoning

Land within Precinct E is currently zoned 'Mixed Use', 'Place of Public Assembly', 'Residential and Stables' or is unzoned, as shown in Figure 12. The Central Belmont Main Drain directly abuts Precinct E and is reserved 'Parks and Recreation'. As the drain forms part of the precinct, a modification is proposed to update all PSP maps to extend the Precinct E boundary over the drain as shown in Figure 11 below. The drain should remain reserved 'Parks and Recreation'.

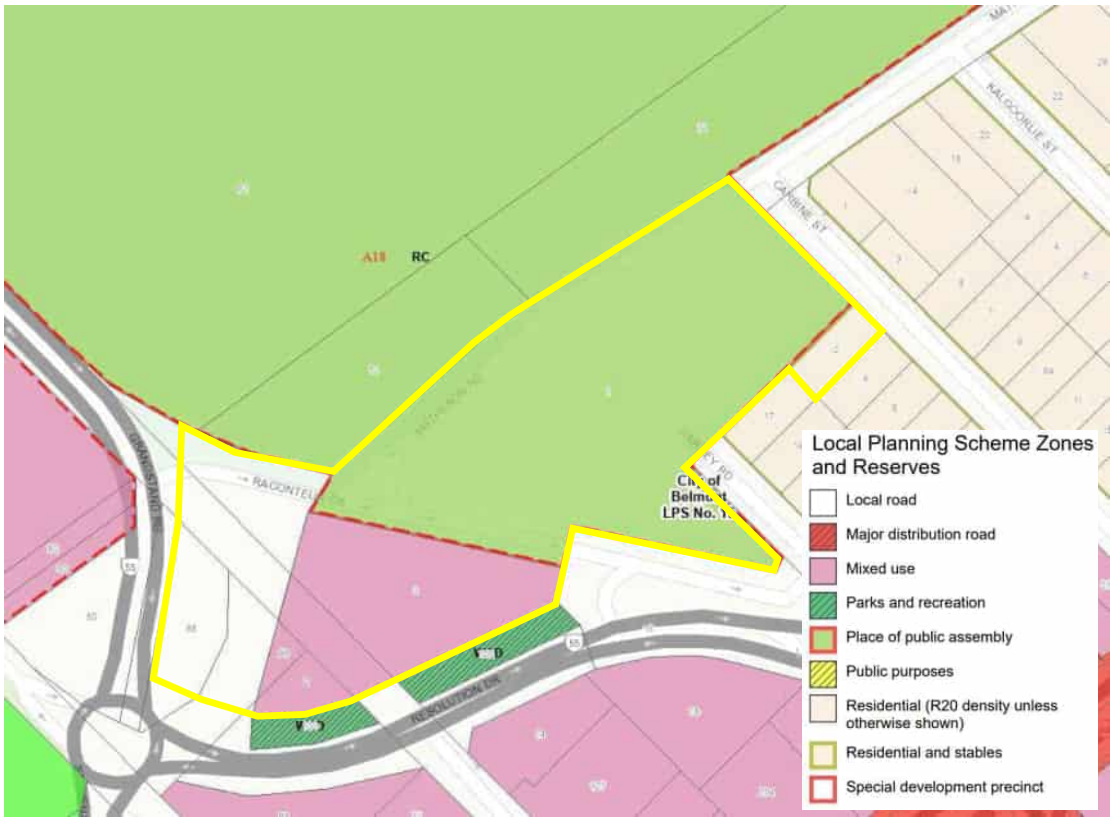


Figure 11: Existing Zoning Precinct E (existing precinct boundary outlined yellow)

The draft PSP proposes to apply a 'Commercial' zone over the portion of land that is currently zoned 'Mixed Use' and to land that is currently unzoned (white area) as per Figure 12. An 'Additional Use' of 'Health Centre' is also proposed over this portion of Precinct E which is considered an appropriate land use to locate within an activity centre.

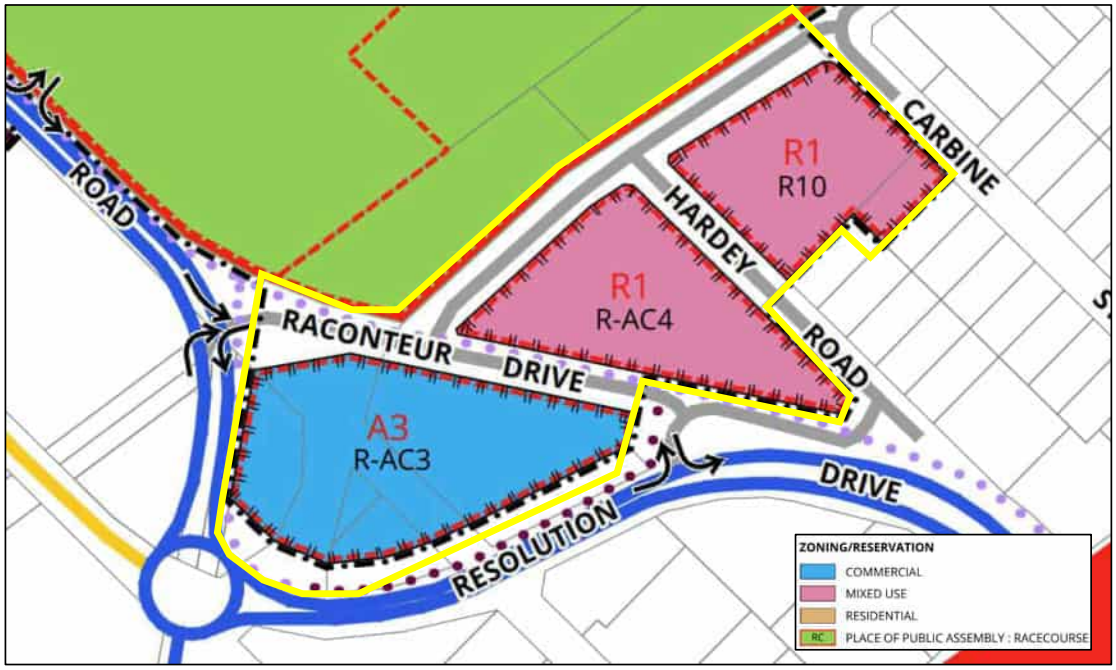


Figure 12:'Commercial' and 'Mixed Use' zone applied to Precinct E (proposed boundary of Precinct E outlined yellow)

In considering the appropriateness of the 'Commercial' zone the following is noted:

- The draft Golden Gateway LSP and draft Ascot Racecourse PSP both support the development of a local centre within the precincts. The proposed 'Commercial' zone would facilitate this and is therefore considered appropriate.
- Land subject to the proposed 'Commercial' zone is fragmented. Part of the land is held in freehold ownership by the WAPC (highlighted blue on Figure 13), while the remainder is designated as road reserve (highlighted yellow on Figure 13).
- The Department of Planning, Lands and Heritage (DPLH) has raised concerns regarding the intended use of the land, noting that leases for Crown Land can only be granted if the proposed use aligns with the land's purpose (e.g. public use of the road). In response, the applicant has clarified that the road reserve is intended to be used for parking, and advice provided to the applicant from DPLH indicates this is possible. A modification to the draft PSP is proposed to reflect this arrangement. If Perth Racing wish to pursue changing the road reserve to zoned land, this would be subject to a separate process in the future.
- The 'Commercial' zoned portion of Precinct E also accommodates major water distribution mains owned and managed by the Water Corporation. While zoning applied to land does not automatically enable development

without due consideration of existing infrastructure and assets, Water Corporation have opposed the rezoning of the land stating that the infrastructure cannot be moved or built on. However, the applicant has further engaged with Water Corporation who have now advised that car parking over the assets is possible. A modification is proposed to the draft PSP for this to be further detailed within the PSP documentation.



Figure 13: WAPC Freehold Land highlighted blue, and Road Reserve highlighted yellow

While the 'Commercial' zone is considered appropriate in light of the above points, concerns remain regarding the proposed level of retail floorspace within the precinct and the justification provided in the draft PSP. These concerns are further addressed in the Retail Floorspace section of the report.

Regarding the portions of Precinct E intended to be zoned 'Mixed Use', the following is relevant:

- Part of this land is adjacent to the 'Residential and Stables' zone. Given this proximity and the draft PSP concept plan designating the land for an Equine Welfare Centre and Jockey Services, officers inquired whether the applicant would consider applying the 'Residential and Stables' zone to this land. It is considered these uses align with the objectives of this zone.
- The applicant did not support this suggestion and advised that the draft PSP appropriately restricts certain uses. The applicant also advised that this zone offers flexibility and that development provisions could ensure a sympathetic built form interface with residential areas.
- Officers have considered the applicant's position and similar to the approach taken for Precinct D, consider that if a 'Mixed Use' zone were applied to this

land, further land use controls would be necessary to manage potential land use conflicts or amenity impacts. These are further discussed in the 'Restricted Uses' section.

- If further land use controls are not applied, it would be more appropriate to apply a 'Residential and Stables' zoning to the land bound by Hardey Road, Matheson Road, Carbine Street and residential and stables properties.
- Regarding the other portion of Precinct E intended to be zoned 'Mixed Use' (bound by Raconteur Drive, Matheson Road and Hardey Road) the proposed zoning is considered appropriate. However, further land use controls are also considered necessary as detailed in subsequent sections of this Report.

Density and Proposed Development Provisions

The draft PSP proposes applying an R10 density code to the portion of Precinct E bound by Hardey Road, Matheson Road, Carbine Street, and 'Residential and Stables' zoned properties. This density is considered acceptable, as development within the adjoining 'Residential and Stables' zone is also assessed against the R10 development controls.

The draft PSP proposes a maximum building height of two storeys, along with setback provisions to Carbine Street and adjoining properties. The proposed setbacks in the draft PSP are as follows:

- Primary and secondary street setback to Carbine Street: Minimum 3.75 metres.
- Average Primary and secondary street setback to Carbine Street: 7.5 metres
- Side setback (as per R10 development requirements under the R-Codes):
  - Nil setback where the wall abuts an existing or simultaneously constructed boundary wall of equal or greater dimension.
  - Minimum 1 metre where no major opening is proposed.
  - Minimum 1.5 metres where a major opening is proposed.

It is considered that these provisions ensure that new developments align with the scale of residential buildings within the residential stables area and create a suitable interface.

- A density code of R-AC4 is proposed for the portion of Precinct E bound by Raconteur Drive, Matheson Road, and Hardey Road, with a maximum building height of three storeys. It is considered that the proposed heights are acceptable, as future development will be sufficiently separated from existing residential development. The setbacks outlined in the draft PSP, combined with those in LPS 15, are considered appropriate. Therefore, no modifications to these controls are recommended.

For the portion of Precinct E designated as 'Commercial,' a density code of

R-AC3 is proposed, with a maximum height of six storeys. It is considered that the proposed heights are acceptable due to the separation from residential areas. However, there are concerns that this could result in six-storey retail or commercial development. As outlined later in this report, there are concerns with excessive retail and commercial floor space within the precinct. Given this, it is considered necessary to recommended that the draft PSP be modified to restrict heights above two storeys to residential and office developments. The setbacks outlined in the draft PSP, combined with those in LPS 15, are considered appropriate. Therefore, no modifications to these controls are considered necessary.

The Central Belmont Main Drain runs along the southern portion of the 'Commercial' area in Precinct E. Although the draft PSP currently suggests addressing this interface at the development application stage, it is considered beneficial to include specific requirements within the draft PSP to ensure certainty at the subsequent development stage. These provisions aim to ensure a positive interface with the drain, enhance the streetscape along Resolution Drive, and provide an appropriate transition to the Golden Gateway precinct. Therefore, modifications are proposed to:

- Include development provisions in Table 4 addressing the interface with the Central Belmont Main Drain.
- Explicitly reference this interface under Design Element Objective 1.1 (Urban Ecology) and 03.3 (Public Realm).
- Require activation of all street frontages to enhance the interface with the drain and contribute positively to streetscapes.

Retail Floorspace

The draft PSP identifies two areas for potential retail development within Precinct E:

- A Neighbourhood Centre within the 'Commercial' zoned land, with a net lettable area (NLA) of 3,400m²; and
- Up to 9,600m² of 'Shop/Retail' floorspace within the 'Mixed Use' area bounded by Raconteur Drive, Matheson Road and Hardey Road.

Further discussion on each component is provided below.

Neighbourhood Centre

The City's ACPS was informed by a 2020 Retail Needs Assessment and supports a 1,200m² net lettable area (NLA) local centre in this location. It also identifies the potential to expand this to a 2,700–3,000m² neighbourhood centre. This future expansion of floorspace and category of centre is intended to align with further

development within the Golden Gateway Precinct, and will be subject to a Net Benefit Test to assess the need for additional floorspace in response to increased population. The draft PSP proposes a larger 3,400m² neighbourhood centre. One submitter has objected to this scale, noting it is inconsistent with the City's adopted Strategy.

In considering the proposed centre classification, level of retail floor space, and the matters raised in the submission, the following is relevant:

- A Retail Assessment (Net Benefit Test) has been prepared in support of the draft PSP. While the assessment concludes that the proposed retail floorspace aligns with the City's strategic framework, this view is not considered to reflect the intent of the City's ACPS. The City's ACPS anticipates incremental expansion over time, whereas the draft PSP proposes delivery a 3,400m^2 neighbourhood centre from the outset.
- The Retail Assessment states that the centre will be sustainable by 2026 without broader precinct development and with minimal impact on adjacent centres. This assumption relies on sufficient demand from the immediate trade area. However, as the draft Golden Gateway LSP has not been finalised, development within the precinct is unlikely to progress within this timeframe.
- Population growth projections also indicate that growth may not materialise until 2031–2041. As a result, the local population base in 2026 may be insufficient to support a 3,400m^2 neighbourhood centre without significantly drawing sales from existing centres. The claim that the centre will be sustainable by 2026 is therefore considered overly optimistic and requires further justification.
- Section 2.1 of theRetail Assessment mentions the key considerations outlined in SPP 4.2's Implementation Guidelines for preparation and assessment of retail assessments. However, the report does not provide clear responses to address these matters. The Retail Assessment is therefore not satisfactory in its current form.

Having regard to the above, modifications are proposed to require the Retail Assessment to address the inconsistency with the City's ACPS, particularly its approach to incremental expansion, and to provide further justification for the claim that the centre will be sustainable by 2026. In doing so, the assessment should not focus solely on whether the proposed centre is sustainable but also consider the proposal to establish a full neighbourhood centre from the outset rather than progressing incrementally, as intended in the City's Strategy. Additionally, it should justify why the proposed floorspace exceeds the final outcome anticipated in the Strategy, particularly given the very limited development expected by 2026. Furthermore, clear answers to the questions raised within Section 2.1 of the Retail Assessment should be provided within the conclusions of the report.

Other Retail Floorspace

As outlined earlier, the portion of Precinct E bound by Raconteur Drive, Matheson Road, and Hardey Road is proposed to accommodate 9,600m^2 of 'Other Retail' floorspace, with a focus on 'Showrooms'. In considering the level of 'Other Retail' floorspace, the following is relevant:

- The Retail Assessment states that the proposed bulky goods showroom will result in insignificant/low risk impacts on the surrounding existing and planned activity centre network, with the potential sales impact offset by the potential for substantial growth in the trade area over the next 15 years.
- The addition of 9,600m² of retail floorspace represents a significant change that is not contemplated in the City's strategic planning framework. Existing planned precincts, such as those along Great Eastern Highway and within the City's business park, are more appropriate to accommodate this use.
- The assessment also indicates that, similar to the neighbourhood centre, the level of retail floorspace will be sustainable in 2026. However, it is unclear what level of development is expected to occur to support the bulky goods showrooms within this timeframe. Given the limited development anticipated by 2026.
- The proposed 'Other Retail' includes more retail floorspace than the designated centre itself, which could undermine the intended role and hierarchy of the centre by effectively making it the secondary destination. Irrespective of the floor space matter above, the appropriateness of bulky goods showrooms in this location must be further considered having regard to the following:

– There are distinct differences between establishing a bulky goods showroom on Great Eastern Highway compared to locating it adjacent to a local or neighbourhood centre. The latter is subject to significant transformation under relevant Structure Plans, with a key focus on active uses that foster walking and cycling.

– The land identified for bulky goods showrooms is located directly adjacent to the designated future local centre. In accordance with the principles of SPP 4.2, local centres should have a compact urban form with pedestrian-oriented streetscapes, where activity is concentrated along key public streets and open spaces. Introducing bulky goods showrooms in this location contradicts these outcomes. The use is inherently car dependent and fundamentally undermines the intended function of the local centre as a pedestrian-friendly, mixed-use environment.

– State Planning Policy 4.2 designates 'Showroom' as a desired use adjacent to district centres but does not extend this designation to local and neighbourhood centres. Furthermore, while SPP 4.2 states that 'Showrooms' are appropriate within activity centre frame areas, it also

acknowledges that smaller centres may not have a frame. In this instance, a frame is not considered appropriate, particularly where the retail floorspace within the frame exceeds that of the centre itself.

Having regard to the above, modifications are proposed to prevent 'Showrooms' from being approved on any 'Mixed Use' zoned land within the precinct. This will result in all references to 'Showrooms' being deleted from the draft PSP and supporting reports, and Figure 16 being updated to remove the activity centre frame designation.

Restricted Uses

Restricted Use areas are a mechanism in local planning schemes that limit land to specific permitted uses. This means that only the designated use(s) are allowed on a particular site, and any other uses that would typically be permissible within the zone are not permitted.

The draft PSP proposes to restrict the permissible uses within the 'Mixed Use' zoned land so that the following cannot be approved:

- 'Amusement Facility'
- 'Amusement Parlour'
- 'Auction Mart'
- 'Garden Centre'
- 'Industry – Light'
- 'Industry – Service'
- 'Motor Vehicle Repair'
- 'Warehouse'.

While this approach is supported, the current wording in the 'Restricted Use' table states: "uses permissible in the Mixed Use zone, but excluding the following uses," followed by a list of the abovementioned uses. To better reflect the intent of 'Restricted Use' areas, it is considered more appropriate to include a full list of uses capable of approval in Table 2. A modification is therefore proposed to explicitly list all permissible uses, ensuring clearer alignment with the purpose of the 'Restricted Use' mechanism.

Further, it is considered necessary to expand the list of uses not permissible in Precincts D and E to include the following:

- 'Fast Food Outlet/Lunch Bar'
- 'Funeral Parlour'
- 'Garden Centre'

- 'Pet Day Care'
- 'Night Club'
- 'Radio or TV Installation'
- 'Restricted Premises'
- 'Service Station'
- 'Vet Hospital'
- 'Showroom'.

These uses are not considered appropriate within proximity to residential development as they are likely to have adverse amenity impacts or do not align with the intent of these precincts. Therefore, a modification is proposed to ensure that the list of 'Restricted Uses' within Table 2 does not include the abovementioned uses.

Restricted Uses are also proposed to apply to Precinct A as discussed earlier in the report.

Racecourse

The balance of the subject land outside Precincts A – E is the Racecourse. This land is currently predominantly zoned 'Place of Public Assembly' and partly reserved 'Parks and Recreation' (refer to Figure 14). The draft PSP does not propose any changes to the zoning or reserve applied to this area of land.



Figure 14: Existing zoning applied to the Racecourse

The Department of Biodiversity Conservation and Attractions requested that the portion reserved 'Parks and Recreation' be ceded to the State Government and that a Foreshore Management Plan should be prepared. In considering this feedback, the following is relevant:

- The Draft PSP does not propose any changes to the Racecourse.
- As the PSP does not alter the Racecourse, there is not considered to be a sufficient need or nexus to reasonably justify ceding the Foreshore Reserve.
- A strategic planning tool such as the PSP is not the appropriate mechanism for requiring land to be ceded. If development or subdivision were proposed in this area, the PSP could identify potential opportunities, but in the absence of such changes, ceding the Foreshore Reserve is not justified.
- Since no changes to the Racecourse are proposed, there is no need or mechanism for requiring a Foreshore Management Plan. However, this may be appropriate for Precincts A and C, and it is recommended that Section 4.3 is updated to address this.

Having regard to the above, the requirement for ceding a portion of the racecourse (land reserved 'Parks and Recreation') is not supported.

Public Open Space

The draft PSP does not propose public open space within the precinct. While Liveable Neighbourhoods typically requires a 10% public open space contribution for residential development, this does not apply to 'Commercial' or 'Mixed Use' zoned land.

In terms of the proposed 'Residential' zoned land it is considered appropriate for the requirement for public open space to be further considered as part of future subdivision and development applications relating to the site. A modification is recommended to the draft PSP to capture this.

In the case of the 'Commercial' and 'Mixed Use' zoned land there is a requirement for existing open space within 300m of the site to be considered. In considering this, the following is relevant:

- The precinct is located in close proximity to and within 300 metres of the Swan River foreshore, Belmont Trust land, and future open space opportunities at the Ascot Kilns site, as outlined in the draft Golden Gateway LSP.
- The draft PSP also identifies an opportunity for a 1.4ha privately owned, publicly accessible parkland between Precincts A and B, incorporating landscaping, picnic facilities, and a playground. Further information regarding this space is required in the draft PSP; open space on private land would not ordinarily constitute public open space.

A modification is also recommended to the draft PSP to reflect this information.

Movement

Road Network and Intersection Upgrades

The road network within and around the precinct will largely remain in its existing configuration (refer to Figure 15). The only intersection modifications specifically mentioned within the draft PSP and Traffic Impact Assessment (TIA) are restricting the Resolution Drive and Raconteur Drive intersection to

left-in/left-out access and permanently opening the gates at Raconteur Drive and Grandstand Road. It is also not clear if the gates along Hardey Road and Matheson Road will be opened.

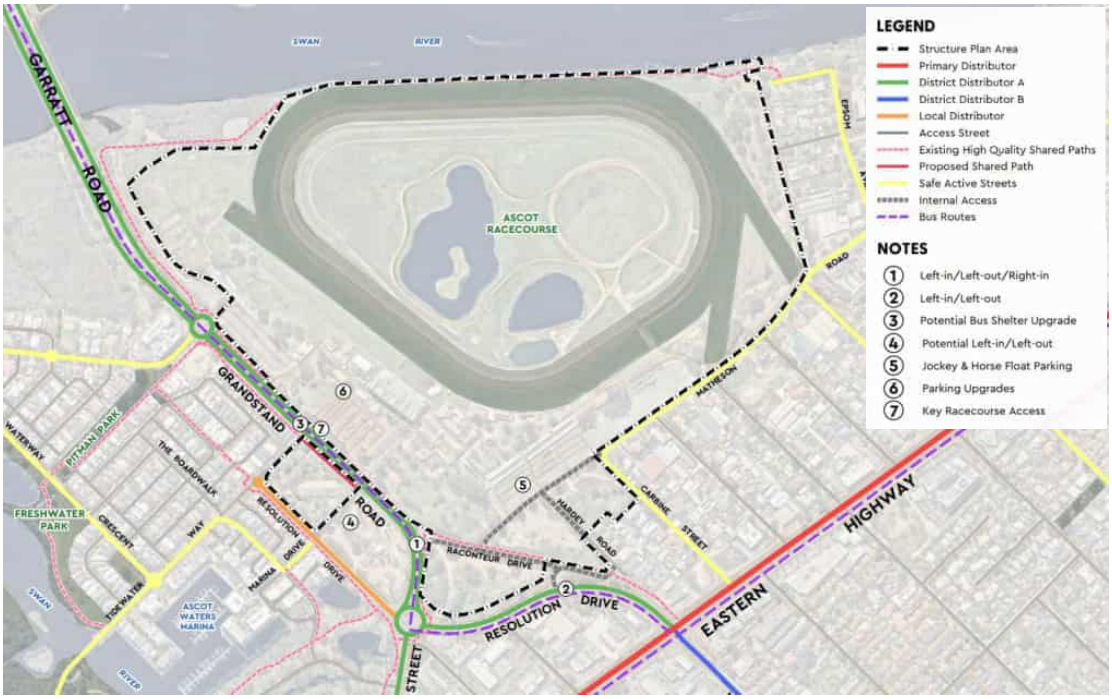


Figure 15*: Proposed Movement Network*

Submitters raised several concerns regarding the road network and vehicle movements, including:

- Increased traffic and congestion specifically:
  - On race days.
  - Due to development within the precinct and the Golden Gateway Precinct.
  - Through the 'Residential and Stables' precinct.
  - At the roundabouts along Grandstand Road.
- Amenity impacts associated with access from Ennis Place.
- Traffic flow concerns caused by right turns from Grandstand Road onto Raconteur Drive and from Stoneham Street into Daly Street, as shown in Figure 16 of the draft PSP (refer to Figure 16).



Figure 16: Extract of Figure 16 from the draft PSP

In considering these concerns the following is relevant:

- A TIA has been prepared to assess the likely impacts on road network's performance. It factors in anticipated trip generation rates and concludes that the network and all intersections will operate at an acceptable level of service. Despite this, there are updates required to the TIA as detailed in subsequent points.
- The TIA was prepared before details of the Golden Gateway LSP were available. Now that these details are known, the assessment should be updated to address traffic within the Golden Gateway precinct, with conclusions in both the draft PSP and assessment updated accordingly. Despite this, it should be noted that the Movement and Access Strategy prepared in support of the Golden Gateway LSP factors in movements associated with future racecourse development and concludes that the road network and intersections are able to operate at an acceptable level of service.
- Regarding congestion associated with race day, the TIA indicates that peak racecourse activity occurs outside AM and PM weekday peak periods and that traffic management will continue to be in place on race days. As such,

traffic impacts are expected to be appropriately managed. It is also important to note that this is an existing activity that is not being introduced by the draft PSP.

- The TIA states that the gate providing access to Raconteur Drive from Grandstand Road will remain open permanently, leading to increased traffic within the Residential and Stables precinct. While no mention is made of it, it is also not clear if the gates along Hardey Road and Matheson Road will be opened. It is considered that the assessment does not adequately address any associated traffic impacts. The draft PSP and TIA need to be updated to explicitly state whether these gates are proposed to be permanently opened and to provide a more comprehensive analysis of any impacts, and if necessary, mitigation measures.
- Regarding access from Ennis Place, this has been considered in the assessment of the recently approved development for Precinct C, which found it to be suitable. However, the draft PSP and TIA do not identify the potential for access from Ennis Place. Therefore, a modification is proposed that this arrangement be mentioned within the draft PSP and TIA. There may need to be restrictions on vehicle types and access hours. Additionally, this would require access through Lot 10194 which is owned by the State of WA. Therefore, permission may also be required for access through this lot. These matters shall be referenced in the draft PSP.
- Regarding right turns from Grandstand Road into Raconteur Drive, it should be noted these are already accommodated under the existing intersection configuration, and the assessment confirms this arrangement will operate satisfactorily.
- Regarding the right turn from Stoneham Street into Daly Street, a modification is proposed to remove all vehicle movement arrows from Figure 16. The draft Golden Gateway LSP proposes a cul-de-sac at Daly Street, consistent with Main Roads Western Australia's Vehicle Access Strategy for Great Eastern Highway.

Beyond submitter comments, officers have identified further matters requiring attention:

- The assessment assumes no vehicle movements during peak hours for Precincts B and C, whereas some movements are expected, even if low. A modification is proposed to update the assessment to reflect this.
- Figure 14 of the draft PSP shows a left-in/left-out arrangement over the Ascot Kilns site. Clarification is needed on what this relates to, when this land is located within the Golden Gateway precinct and is identified as requiring further planning.
- The Structure Plan states that road reserves are to be maintained in their existing configuration and tenure in accordance with the Structure Plan Map. It is noted that currently Perth Racing own a section of Raconteur Drive. However, this road is shown as a local road on the Structure Plan Map.

Officers queried whether this road would stay in private ownership under the care and control of Perth Racing noting that it will purely provide access to Perth Racing's landholdings. Perth Racing have advised that they wish to retain flexibility until future development outcomes are known. It is considered appropriate for Section 4.1.3 of the draft PSP to be updated accordingly.

Crossover Locations

The draft PSP outlines proposed vehicle access arrangements for each precinct and includes indicative crossover locations on the Masterplan. While it is acknowledged that the TIA notes these locations and details will be confirmed at later stages, it is considered more appropriate for the Masterplan to omit the crossover locations at this stage, as they will require technical justification and assessment in later design phases.

Parking

Submitters raised concerns about the loss of parking bays due to commercial development in Precinct E and the potential for increased street parking. It is important to note that the adequacy of parking for future development will be assessed in accordance LPS 15, giving due regard to parking provisions included within the draft PSP. Irrespective of this, officers have identified the following updates required to the draft PSP and TIA as follows:

- The TIA states that parking lost in Precincts C and E will be offset by surplus bays elsewhere on the site and upgrades to a parking area in Precinct B. While officers have reviewed the parking calculations, it is considered that a clearer explanation of the calculations and parking availability should be provided. In addition, the draft PSP and TIA should be updated to ensure consistency. For example, the TIA notes: "Based on observations of parking demand within the grassed area in Precincts B and E, approximately 110 to 125 cars park within this area on a busy race day". However, the draft PSP states: "The Southern Precinct B patron parking area would be upgraded to accommodate an improved layout, accommodating approximately 110 to 125 cars". This creates uncertainty as to whether the 110 to 125 spaces refer to existing capacity or a planned upgrade.
- The TIA indicates that a Travel Demand Plan will be prepared to assist with traffic management, actively discourage patrons from using private motor vehicles, and ensure that racecourse patrons are well informed about parking distribution and pick-up/set-down areas. While this initiative is supported, it is recommended that more specific details of the Travel Demand Plan be included in the draft PSP, and that Part 1 explicitly reference the requirement for such a plan as part of future development

applications relating to the racecourse activities. A modification is proposed to address this.

Submitters also raised general concerns about the availability of parking within new developments.

The structure plan applies parking rates in accordance with LPS 15 and the

R-Codes, except for 'Shop,' 'Office,' and 'Bulky Goods Showroom' uses in Precinct E, which are proposed to align with the DPLH's *Guidance for*

Non-Residential Car Parking Requirements. When a new structure plan is being prepared, this planning manual recommends that the minimum and maximum car parking rates set out in the document are adopted. However, as outlined earlier in this report, officers do not support the establishment of 'Bulky Goods Showroom' uses within the precinct.

Pedestrian/Cyclist Movements and Crossings

Submitters advocated for enhanced pedestrian infrastructure, specifically requesting the installation of a pedestrian crossing signal at the bus stop on Grandstand Road, along with railings to prevent crossings at other locations. In response:

- The draft PSP proposes improved pedestrian connectivity, including new shared paths. However, officers note that specific details on implementation and responsibility are lacking. For instance, while a shared path is mentioned along Resolution Drive adjacent to Precinct E, the implementation details, such as who is responsible for its development, are not provided.
- The TIA recommends investigating footpath extensions around the racecourse, including south of Grandstand Road, as well as improved connections to local amenities on Great Eastern Highway. However, specific upgrade details are not outlined.
- Neither the draft PSP nor the TIA addresses improvements to pedestrian crossings. Main Roads Western Australia (MRWA) has requested an updated TIA to assess and determine necessary pedestrian facility upgrades around Ascot Racecourse, including modelling the potential impacts on the road network.
- In response to submitters' suggestions for crossing lights and railings on Grandstand Road, officers consider that while restricting crossing points is unnecessary, further investigations into pedestrian safety, including the potential for crossing lights, are warranted. This would also address another submitter's suggestion for improved pedestrian connectivity to the proposed publicly accessible private open space.

Having regard to the above, it is recommended that further investigations be undertaken for improvements to pedestrian and cyclist infrastructure and that

specific details be included within both the draft PSP and the TIA. These details should include details on who will be responsible for delivering this infrastructure.

Environment

Site Contamination

The draft PSP classifies Precincts A, B, and C as "possibly contaminated – investigation required" due to horse racing activities and potential runoff from animal storage and agistment areas nearby. The PSP indicates that Perth Racing is conducting monitoring and investigations into potential contamination, with findings to be reviewed by the Department of Water and Environmental Regulation (DWER). The Local Water Management Strategy mentions that detailed site investigations have been conducted in a separate report. As contamination could affect future development, a modification is proposed to include additional details in the documentation and address its potential impacts.

Acid Sulphate Soils

The DWER's Acid Sulphate Soils (ASS) risk mapping shows that most of the site has a high to moderate risk of ASS occurrence within 3 meters of the natural surface. However, parts of Precincts B, C, and the racecourse are classified as having a moderate to low risk. A modification is proposed to the Structure Plan to specify in Part One, Section 4.3.7 that if ASS is encountered in a moderate to low-risk area, an ASS Management Plan will be required at the subdivision and/or development stage. Additionally, a modification to Section 2.1.4.2 is recommended to clarify that in high to moderate-risk areas, an ASS assessment will be required for subdivision and/or development, and an ASS Management Plan and dewatering plan may also be necessary as a condition of approval.

Tree Retention

Before addressing specific matters raised in submissions and referral responses, it is important to clarify the respective roles of planning and environmental legislation in Western Australia. While planning decisions under the *Planning and Development Act 2005* may consider environmental matters, they do not in themselves grant approval to undertake activities such as vegetation clearing. Such activities are subject to separate requirements under the *Environmental Protection Act 1986*, including the need to obtain a clearing permit. The environmental surveys undertaken to inform planning proposals are intended to support the planning level consideration, noting that more detailed further flora and fauna surveys may still be required to support applications under the *Environmental Protection Act 1986*. It is important not to conflate the role of environmental assessment under the *Environmental Protection Act 1986* with that of assessment under the *Planning and Development Act 2005*. From a planning

perspective, the surveys submitted are considered adequate and appropriate for the planning consideration at this stage of the process.

There are existing mature trees on the subject land, particularly within Precincts C and E. Several submissions raised concerns about the potential loss of habitat for Carnaby's Black Cockatoos due to future development in these precincts. The referral response from the Department of Biodiversity, Conservation and Attractions (DBCA) also states that there are opportunities for retaining mature vegetation including potential Carnaby Cockatoo habitat trees. In considering these comments, the following is relevant:

- An Environmental Assessment Report prepared for the draft PSP identifies 1.27ha of Carnaby's Black Cockatoo (CBC) foraging habitat of which 0.35ha comprised primary foraging habitat. A total of 0.84ha of foraging habitat for Forest Red-Tailed Black Cockatoo (FRTBC) was also recorded of which 0.28ha comprised primary foraging habitat. A total of 66 habitat trees were recorded with five trees containing hollows potentially suitable for black cockatoo breeding while the remaining 61 did not contain hollows.
- The majority of the vegetation on the site has been heavily disturbed with limited intact native vegetation present. The vegetation was therefore mostly determined to be in 'degraded – completely degraded' and 'completely degraded' condition, with a small portion determined to be 'very good – good' in part of the site not impacted by the stables development.
- The black cockatoo foraging habitat identified by the field survey is patchily distributed across the site and interspersed with plant species not used by CBC or FRTBC. Additionally, the trees identified as cockatoo foraging habitat are located in parts of the site categorised as being in a degraded condition.
- Although trees were identified as being potential habitat, no signs of use were identified during the targeted black cockatoo survey, such as chew marks, droppings or moulted feathers within any of the habitat trees with potential hollows.
- The consultant comments that the potential habitat trees for CBC and FRTBC within the site are unlikely to represent critical foraging or breeding habitat, given its small extent within an urban setting with minimal potentially suitable hollows and no evidence of use by CBC or FRTBC.
- A recent approval for stables within Precinct C proposes the removal of trees identified as potential nesting/foraging trees. As detailed below, officers were satisfied that the environmental consultant's investigations adequately addressed this matter within the scope of planning legislation. However, separate legislative requirements under the *Environmental Protection Act 1986* must still be satisfied before any clearing can occur.
- The recent Development Assessment Panel report for stables recognise that prior to any clearing, a clearing permit is required to be applied for and granted under the *Environmental Protection Act 1986*.

- A separate condition of the development approval requires the applicant to provide a Conservation Management Plan prepared by a suitably qualified ecologist. This plan is required to identify existing trees to be retained, how they will be protected and other management measures that are to be implemented to mitigate any potential impacts during construction and ongoing use of the development.
- Potential habitat trees exist outside Precinct C, presenting an opportunity through the PSP process to proactively identify trees worthy of protection in future development proposals.
- Although the Environmental Assessment Report states that trees will be retained where possible, it does not specify which trees should be prioritised for protection. To strengthen this, the report should include details on trees worthy of retention, with corresponding protection measures incorporated into Part 1 of the PSP. Additionally, the draft PSP's Urban Ecology objectives should be updated to emphasise tree retention opportunities.

Having regard to the above, modifications are proposed to the draft PSP and Environmental Assessment Report to better identify opportunities for tree retention.

Heritage

Aboriginal Heritage Act 1972

The draft PSP identifies two Aboriginal heritage sites within and adjacent to the subject land: Site 3756 (Swan River) and Site 3753, which intersects the western edge of Precinct B. Section 5.2.6 of the draft PSP states that while the Master Plan does not propose development within these sites, if development within Precinct B intersects the boundary of Site 3753, a DPLH file search should be undertaken to confirm the site's extent before works commence. These details are not included in Part One, Section 4.3.2 – Heritage of the Structure Plan, and modifications are proposed to address this. Additional modifications are also proposed to:

- Identify the potential need for an Aboriginal Heritage Management Plan; and
- Require the location of the two sites to be shown on Figure 83 as per the Aboriginal Heritage Inquiry System Mapping Tool.

Heritage under the *Heritage Act 2018* and Local Planning Scheme No. 15

The precinct includes two places on the City's Heritage List: the Ascot Racecourse Complex and the Ascot Residential and Stables Area. It also contains Lee-Steere House and the Matheson Rail Line, which are included on the City's Local Heritage Survey. The Bristile Kilns site, which adjoins the subject land, is also on the City's Heritage List.

The Structure Plan mandates a Heritage Impact Statement for any proposal to demolish, alter, or significantly impact a heritage-listed place, ensuring that heritage values are considered in future development. Part Two of the draft PSP specifies that a photographic record must be made of Lee-Steere House before its demolition to facilitate residential development in Precinct D. However, this requirement is absent from Part One, and a modification to Section 4.3.2 is proposed to address this.

Further modifications are proposed to improve the accuracy and consistency of heritage information throughout the draft PSP. These include clarifying that the Ascot Residential and Stables Area is only partly within the precinct and ensuring the Matheson Rail Line is consistently referenced and shown on Figure 83.

General Modifications

There are a range of general modifications required to the draft PSP and supporting attachments as detailed below. There are also a range of other administrative modifications as detailed within the Schedule of Modifications.

References to the Golden Gateway Local Structure Plan

The draft PSP contains incorrect text and map references related to the draft Golden Gateway LSP. These references, including those for building height and descriptions of Council's previous resolutions should be updated to align with the current version of the draft Golden Gateway LSP.

Additionally, the draft PSP incorrectly assumes that Perth Racing's land will be removed from the Golden Gateway precinct. However, the decision to retain Perth Racing's land within the precinct was made in consultation with officers and Perth Racing. This approach allows Perth Racing to proceed with its own planning while enabling the draft Golden Gateway LSP to move forward. Retaining Perth Racing's land within the broader Golden Gateway precinct ensures coordinated planning for both areas. Therefore, modifications are proposed to correct the assumption that Perth Racing's land will be removed from the Golden Gateway precinct.

Indicative Development Staging

The draft PSP includes an indicative development staging section however there is limited detail provided. Therefore, a modification is proposed to update this section to include specific staging details. This could make reference to small scale food and beverage and commercial uses within Precinct A and describe infrastructure considerations that may be required to deliver development mentioned in the table.

Walkable Catchments

The draft PSP states that Precinct A is within the walkable catchment of the future Golden Gateway Activity Centre. Noting that Precinct A is in excess of 500 metres from Precinct E, Precinct A is not within the walkable catchment of the future centre. A modification is proposed to address this, and a separate modification is proposed to Figure 11 for walkable catchments to be shown on the plan.

Section 4.3 – Other Requirements

Section 4.3 of the draft PSP describes other requirements for future development. Prior to approval of the draft PSP by the WAPC, a Local Planning Scheme Amendment will be required to formalise aspects of the draft PSP such as zoning and land use permissibility changes under LPS 15. A modification is proposed that requires mention of this to be included within Section 4.3.

Section 5.0 - Additional Details

Section 5.0 of the draft PSP includes a list of additional information that may be required to be submitted as part of future development applications. Officers have considered this list and note there are five other reports that may be required as part of subsequent stages of planning. These include:

- Geotechnical Report
- Foreshore Management Plan
- Acoustic Report
- Environmental Impact Assessment
- Aboriginal Heritage Management Plan.

A modification is proposed to require Section 5.0 to be updated with details of these reports.

Figure 17 – Built Form

Design Element 6 of SPP 7.2 – Precinct Design Guidelines requires that built form support a precinct environment that is appropriate in character, intensity, bulk, and scale. Considering the existing built form character within the precinct, particularly in Precinct B. It is therefore deemed appropriate to update Figure 17 to identify all buildings to be retained. A modification to the draft PSP is proposed to reflect this.

Subsurface Drainage

The Local Water Management Strategy (LWMS) states that surface runoff generated by lots, stables and hardstand/car park areas will be directed into subsurface storage. It also states that these storage areas will be located beneath road reserves/verges or other available areas. It is recommended that the LWMS be modified to remove all references to subsurface storage beneath road reserves to avoid impacts on utility services, maintenance, liability, and future infrastructure expansion. Such storage may also compromise pavement integrity, increase the risk of pavement failure and water pressure issues.

Existing Power Services

Figure 16 of the Engineering Servicing Report identifies existing power services within the precinct. However, it does not show the existing power lines running through a portion of Lot 100 Raconteur Drive. Therefore, a modification is proposed to address this.

Conclusion

The Ascot Racecourse PSP has been prepared to guide the future use and development of the land in and around Ascot Racecourse. Having regard to matters raised during assessment of the PSP and comments received from the public consultation period, a number of modifications are proposed to the draft PSP. It is recommended that Council support the draft PSP with modifications, with a recommendation that it is approved by the WAPC.

Financial implications

There are no financial implications evident at this time.

Environmental implications

The draft PSP includes areas where vegetation clearing is anticipated. While vegetation clearing has been considered from a planning perspective, it remains subject to separate assessment and approval under the *Environmental Protection Act 1986*, including the requirement to obtain a clearing permit. Modifications are proposed to the draft PSP and Environmental Assessment Report to strengthen the identification and protection of trees worthy of retention, with further investigation of tree retention opportunities to be undertaken as part of future development proposals.

Social implications

The draft Ascot Racecourse PSP proposes land uses that will enhance the range of services and facilities in the area.

Attachment details

Attachment No and title
1. Ascot Racecourse Precinct Structure Plan [**12.1.1** - 140 pages]
2. Local Water Management Strategy [**12.1.2** - 165 pages]
3. Environmental Assessment Report [**12.1.3** - 300 pages]
4. Engineering Servicing Report [**12.1.4** - 320 pages]
5. Transport Impact Assessment [**12.1.5** - 92 pages]
6. Retail Assessment [**12.1.6** - 38 pages]
7. Transportation Noise Assessment [**12.1.7** - 18 pages]
8. Landscape Master Plan [**12.1.8** - 41 pages]
9. Schedule of Modifications [**12.1.9** - 7 pages]
10. Schedule of Submissions [**12.1.10** - 41 pages]
11. CONFIDENTIAL REDACTED - Schedule of Submissions - (Confidential matter in accordance with Local Government Act 1995 (W A) Section 5.23(2)(b)) [**12.1.11** - 42 pages]

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Ascot Racecourse Precinct Structure Plan

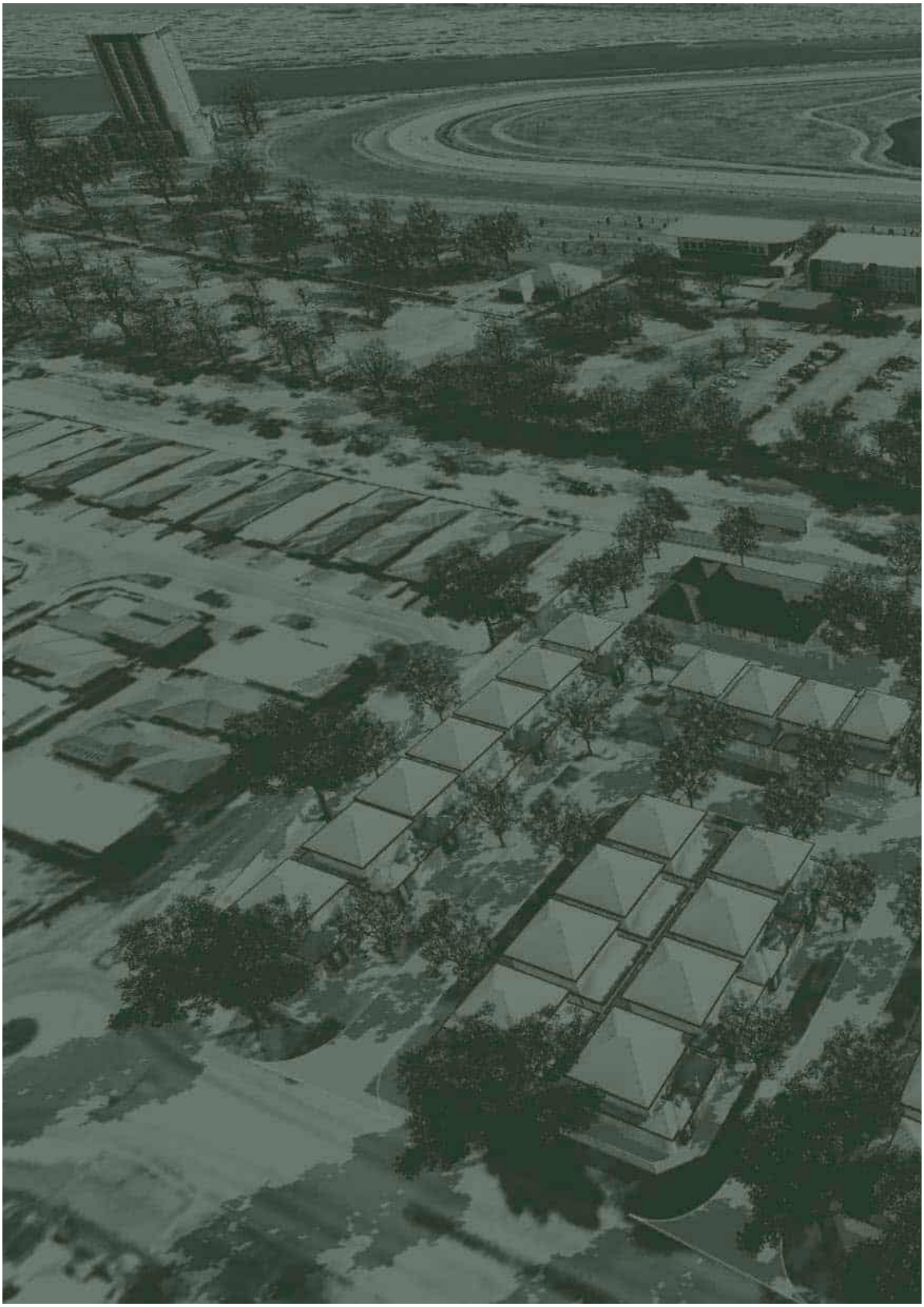
Lots 1, 3, 13, 50, 452 & 9002 Grandstand Road, Lot 7005 Matheson Road, Lots 51 & 100 Raconteur Drive, Ascot



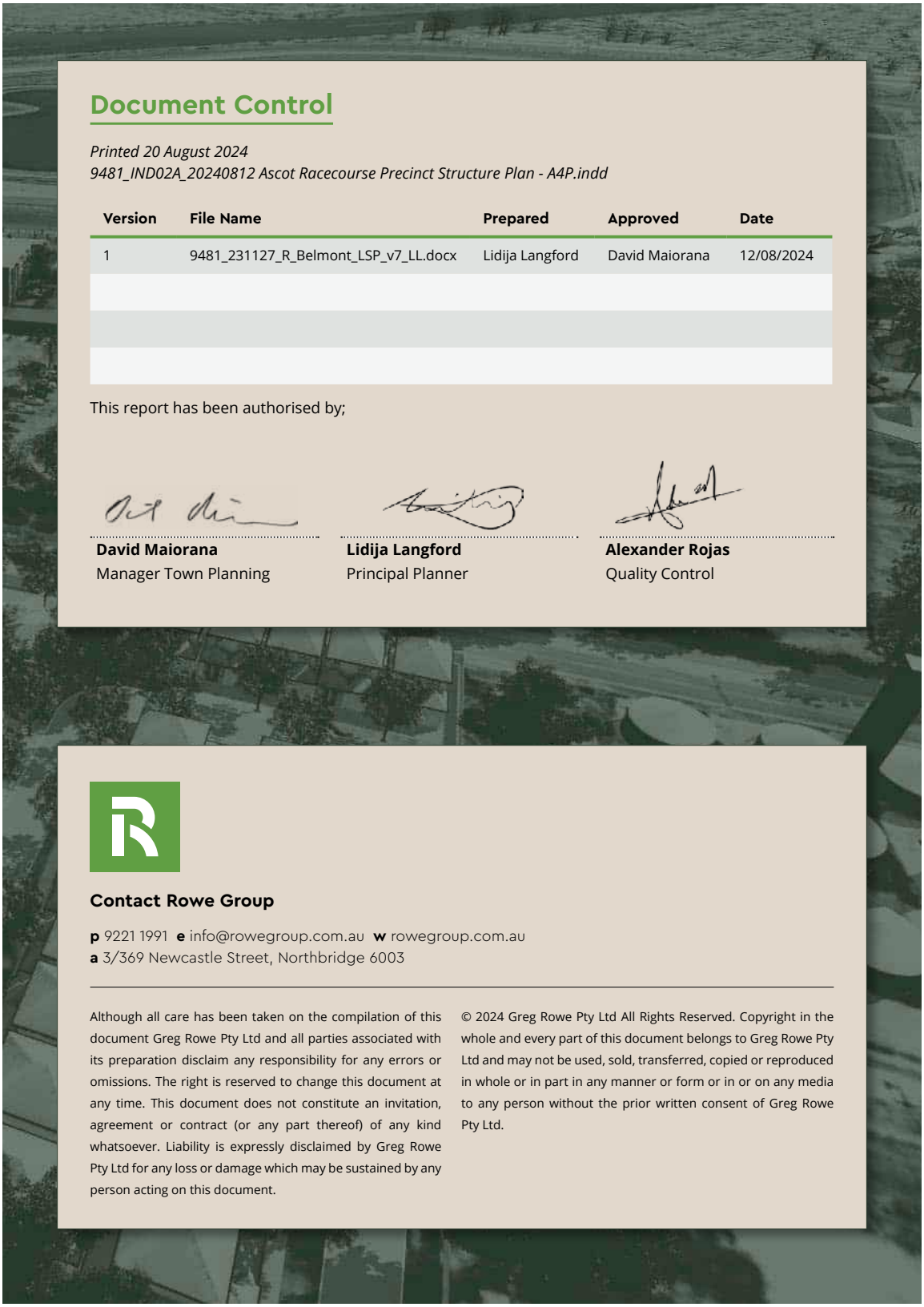
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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



Record of Endorsement

This structure plan is prepared under the provisions of the City of Belmont Local Planning Scheme No. 15.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

..... Date

Signed for and on behalf of the Western Australian Planning Commission:

an officer of the Commission duly authorised by the Commission pursuant to section 16

of the Planning and Development Act 2005 for that purpose, in the presence of:

..... Witness

..... Date

..... Date of Expiry

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



Table of Amendments

Amendment No.	Summary of the Amendment	Amendment Type	Date Approved by WAPC

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Executive Summary

The Ascot Racecourse Precinct Structure Plan has been prepared to guide the future use and development of Perth Racing's landholdings in Ascot, including and surrounding the existing Ascot Racecourse. This Report has been prepared in accordance with the requirements of the *Planning and Development (Local Planning Schemes) Regulations 2015* and the Western Australian Planning Commission's ('WAPC') Guidance for Structure Plans.

The PSP area comprises nine (9) lots with a total area 61.3294ha, all of which are owned by Perth Racing, except for one (1) lot which is owned by the WAPC. The area is generally bound by the Swan River to the north, the Ascot Residential and Stables area and Matheson Road to the east and south-east, Resolution Drive to the south and south-west, and Grandstand Road to the west.

The Ascot Racecourse PSP is divided into three parts, being:

- **Part One: Implementation** – Part One outlines the implementation requirements to be applied when considering land use, development and subdivision proposals in the PSP area.
- **Part Two: Explanatory Section** – Part Two outlines all relevant information that has informed the preparation of the PSP, incorporating material from more detailed technical studies.
- **Technical Appendices** – A substantial number of technical studies have been completed to inform the PSP. These are provided in Part Three and include:
  - Local Water Management Strategy
  - Environmental Assessment Report
  - Engineering Servicing Report
  - Transport Impact Assessment
  - Retail Assessment (Net Benefit Test)
  - Transportation Noise Assessment
  - Landscape Master Plan



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Precinct Structure Plan Summary

Item	Data	Section number referenced in Part 2 of report
Total area covered by the Precinct Structure Plan	61.3294ha	Section 1
Area of each land use proposed:		Section 5.6
Residential	0.94 hectares	
Commercial	1.36 hectares	
Mixed Use	4.96 hectares	
Place of Public Assembly: Racecourse	51.25 hectares	
Parks & Recreation	2.28 hectares	
Estimated number of dwellings	400 dwellings	
Estimated population	920 people	
Estimated commercial floor space	15,000m²	
Number of school sites	N/A	-
Estimated area and percentage of public open space given over to Local Open Space:	N/A	-

Note: All information and areas are approximate only and are subject to survey and detailed design.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

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5. Transport Impact Assessment
6. Retail Assessment (Net Benefit Test)
7. Transportation Noise Assessment
8. Landscape Master Plan

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Technical Appendices

Appendix Number	Document Title	Nature of Document	Referral/Approval Agency	Approval status and Modifications
1	Certificates of Title	Supporting	-	-
2	Local Water Management Strategy	Requires Approval	City of Belmont, DWER	-
3	Environmental Assessment Report	Supporting	City of Belmont, DBCA	-
4	Engineering Servicing Report	Supporting	-	-
5	Transport Impact Assessment	Supporting	City of Belmont	-
6	Retail Assessment (Net Benefit Test)	Supporting	-	-
7	Transportation Noise Assessment	Supporting	-	-
8	Landscape Master Plan	Supporting	-	-

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Part One Implementation



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



1. Structure Plan Area & Operation

This Precinct Structure Plan ('Structure Plan') applies to Lots 1 (No. 88), 3 (No. 96), 13, 50, and 9002 (Nos. 71), and Lot 452 (No. 70) Grandstand Road, Lot 7005 (No. 71) Matheson Road, and Lots 51 (No. 2) and Lots 51 (No. 2) and 100 (No. 1) Raconteur Drive, Ascot. The Structure Plan area is defined as the land contained within the inner edge of the line denoting the Structure Plan area on the Structure Plan Map).

Refer **Plan 1 – Structure Plan Map**.

This Structure Plan has effect from the date stated on the cover and for a period of 10 years (or for any other period approved by the WAPC) commencing on the day on which approval of the Ascot Racecourse Precinct Structure Plan is granted.

The operation of the Structure Plan shall be in accordance with the City of Belmont Local Planning Scheme No. 15 ('LPS 15') and the *Planning and Development (Local Planning Schemes) Regulations 2015* ('the Regulations').

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2. Purpose & Objectives

The purpose of this Precinct Structure Plan is to guide the future use and development of Perth Racing's landholdings in Ascot, including and surrounding Ascot Racecourse.

2.1. Precinct Objectives

The Structure Plan designates five (5) precinct areas subject to different objectives and planning requirements. The precincts are summarised below. Refer **Plan 2 – Structure Plan Precincts**.



Precinct A (Retirement Living)

a) Facilitate the development of a vertical residential living village to accommodate retiring members of the horse racing industry.

b) Provide for small scale food and beverage and commercial uses that are ancillary to, and integrated with, the residential housing village.

c) Facilitate development that will serve as a landmark in the locality, capitalising on its position at the northern gateway to the City of Belmont, its high amenity values, proximity to the future Golden Gateway activity centre, and high frequency public transport accessibility.



Precinct B (Racecourse Administration & Entertainment)

a) Support the continuation of the Racecourse spectator and entertainment area.

b) Integrate Perth Racing's administration functions within the Ascot Racecourse site.

c) Enhance public and spectator amenity through attractive built form, expansive open spaces, and landscaping.

d) Respect existing heritage values of the site.



Precinct C (Racecourse & Stabling)

a) Facilitate land use and development that supports, and is complementary to, the horse racing industry.

b) Provide for the planned development of on-course horse stabling and ancillary functions to support the ongoing viability of Ascot Racecourse.

c) Mitigate potential land use conflict through appropriate design and management practices.

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Precinct D (Residential & Mixed Use)

a) Provide for medium density residential development of a scale that is consistent and/or compatible with surrounding residential area.

b) Support the development of small-scale non-residential uses fronting Grandstand Road, including but not limited to a 'Child Care Premises'.

Precinct E (Commercial)

a) Facilitate the development of an activity centre at the intersection of Grandstand Road and Resolution Drive.

b) Support retail, commercial, and other land uses that are consistent and complementary with the role and function of an activity centre.

c) Support land use and development that is complementary to Racecourse operations.

d) Satisfy existing and future demand for convenience retail and amenities in the local area.



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3. Staging

The staging of development has not yet been defined, nonetheless it will be primarily influenced by Perth Racing's requirements, funding availability, and market demand. The indicative staging for development within the Precinct Structure Plan area is outlined by **Table 1** below.

Indicative Timeframe	Precinct Area	Development
Short Term (0-5 years)	Precinct B	New Racecourse Administration Building & Hospitality Venue
	Precinct C	On-Course Stabling
	Precinct D	Residential Development
	Precinct E	Commercial Development
Medium Term (5-10 years)	Precinct E	Commercial Development
Long Term (10+ years)	Precinct A	Retirement Village
	Precinct E	Commercial Development

Table 1: Indicative Development Staging



4. Subdivision & Development Requirements

4.1. Zones & Land Use

4.1.1. Zones

Plan 1 – Structure Plan Map designates proposed zones in the Structure Plan area, as follows:

- Precinct A: 'Mixed Use' zone
- Precinct B: 'Place of Public Assembly: Racecourse' zone
- Precinct C: 'Place of Public Assembly: Racecourse' zone
- Precinct D: 'Residential' and 'Mixed Use' zones
- Precinct E: 'Commercial' and 'Mixed Use' zones

4.1.2. Land Use Permissibility

Land use permissibility within the Structure Plan area shall be in accordance with the City of Belmont Local Planning Scheme No. 15, with Additional Uses and Restricted Uses, as follows:

No.	Description of Land	Restricted Use	Conditions
1.	All land contained within Precinct A, Precinct D and Precinct E of the Structure Plan area subject of the 'Mixed Use' zone.	Uses permissible in the Mixed Use zone, but excluding the following uses: Amusement Facility Amusement Parlour Auction Mart Garden Centre Industry – Light Industry – Service Motor Vehicle Repair Warehouse	Nil.

Table 2: Restricted Uses

No.	Description of Land	Additional Use	Conditions
1.	All land contained within Precinct B of the Structure Plan area.	Office Hotel Reception Centre Restaurant Tavern	Nil.
2.	All land contained within Precinct C of the Structure Plan area.	Animal Establishment Stables Veterinary Centre	Nil.
3.	All land contained within Precinct E subject of the 'Commercial' zone.	Health Centre	Nil.

Table 3: Additional Uses

4.1.3. Road Reserves

Road reserves are to be maintained in their existing configuration and tenure in accordance with **Plan 1 – Structure Plan Map**.

4.1.4. Public Open Space

This Structure Plan does not propose any areas of public open space within the Structure Plan area.

4.1.5. Foreshore Reserves

Plan 1 – Structure Plan Map depicts the Parks and Recreation Metropolitan Region Scheme ('MRS') reserve and Swan Canning Development Control Area applicable to the Structure Plan area.

4.2. Density & Development

4.2.1. Density & R-Codes

Plan 1 – Structure Plan Map designates the R-Coding applicable to subdivision and development within the Structure Plan area, as follows:

- Precinct A: 'R-AC0'
- Precinct D: 'R60'
- Precinct E: 'R-AC3', 'R-AC4' & 'R10'

Subdivision and development within the Structure Plan area is to be in accordance with the residential density code prescribed by the Precinct Structure Plan, or where no residential density code is prescribed, the provisions of Local Planning Scheme No. 15.

4.2.2. Development Provisions

All development within the Structure Plan area shall be in accordance with the provisions of Local Planning Scheme No. 15, the Residential Design Codes, and any applicable Local Planning Policy, unless otherwise provided below.

Precinct Area	Requirement	Provision(s)
Precinct A (Retirement Living)	Building Height	(i) Maximum building height of 15 storeys (refer to **Plan 3 – Building Height Plan**). (ii) Maximum podium height of 3 storeys. (iii) Boundary walls shall not exceed a maximum height of 3 storeys.
	Setbacks	(iv) Minimum primary street setback of nil. (v) Development shall be setback a minimum 10m from the Swan River Development Control Area.
	Plot Ratio	(vi) Maximum plot ratio of 2.5.
Precinct B (Racecourse Administration & Entertainment)	Building Height	(i) Maximum building height of 6 storeys (refer to **Plan 3 – Building Height Plan**).
Precinct C (Racecourse & Stabling)	Building Height	(i) Maximum building height of 3 storeys (refer to **Plan 3 – Building Height Plan**).
	Setbacks	(ii) Development shall be setback minimum 10m from the Swan River Development Control area. (iii) Buildings setback minimum 7.5m to Matheson Road. (iv) Stables, associated buildings, yards, and training/walking rings setback minimum 10m from any dwelling on adjacent property.
	Landscaping	(v) Minimum 1 shade tree for every 4 open air parking bays.
Precinct D (Residential & Mixed Use)	Building Height	(i) Maximum building height of 3 storeys (refer to **Plan 3 – Building Height Plan**).
	Setbacks	(ii) Non-residential development setback minimum 2m from Grandstand Road. (iii) Non-residential development adjoining land used for residential purposes shall confirm with the setback requirements under Volume 1 of the Residential Design Codes.
	Landscaping	(iv) Minimum 1 shade tree for every 4 open air parking bays for non-residential development.
	Access	(v) Direct access to Grandstand Road is restricted to left-in/ left-out movements only.

Precinct Area	Requirement	Provision(s)		
Precinct E (Commercial)	Building Height	(i) Maximum building heights as per **Plan 3 – Building Height Plan**.		
	Setbacks	(ii) Minimum primary and secondary street setback to Carbine Street – 3.75m (iv) Average primary and secondary street setback to Carbine Street – 7.5m (v) Minimum primary and secondary street setback to all other roads (including private roads) – nil setback (non-residential development only). (vi) Residential development setback from street and lot boundaries as per the Residential Design Codes. (vii) Non-residential development adjoining land used for residential purposes shall conform with setback requirements under Volume 1 of the Residential Design Codes.		
	Landscaping	(viii) Minimum 1 shade tree for every 4 open air parking bays. (ix) Minimum 3m wide landscaping to Grandstand Road frontage.		
	Access	(x) Direct lot access to Resolution Drive is restricted to left-in/ left-out movements only. (xi) The existing Grandstand Road and Raconteur Drive intersection is restricted to left-in, left-out and right-in movements only.		
	Parking	**Land Use**	**Minimum**	**Maximum**
		Shop	1 / 50m² FA	1 / 20m² FA
		Office	1 / 200m² FA	1/ 50m² FA
		Bulky Goods Showroom	1 / 100m² FA	1 / 50m² FA

Table 4: Development Provisions

4.3. Other Requirements

4.3.1. Activity Centre

This Precinct Structure Plan includes a portion of the Golden Gateway Activity Centre (within Precinct E) and is supported by a Net Benefit Test to assess the economic demand and implications for potential retail and commercial development in this area. **Refer Appendix 6 – Retail Assessment (Net Benefit Test)**.

Development within the Golden Gateway Activity Centre shall be in accordance with the provisions of this Precinct Structure Plan and the requirements of State Planning Policy 4.2 – Activity Centres ('SPP 4.2').

Development of Shop/Retail floorspace up to 3,400m² NLA is permitted within the Golden Gateway Activity Centre without requiring further assessment. Any development proposal involving net additional Shop/Retail floorspace above 3,400m² NLA within the Golden Gateway Activity Centre constitutes 'major development' and shall be supported by a further Net Benefit Test prepared in accordance with SPP 4.2.

4.3.2. Heritage

The Structure Plan area contains the 'Ascot Racecourse Complex' (Place Number 6123), the 'Ascot Residential & Stables Precinct' (Place Number 16779), and 'Lee Steere House' (Place Number 27274) which are identified under the City of Belmont's Local Heritage Survey, and in the case of the 'Ascot Racecourse Complex', also the Heritage List, as having local heritage significance.

A Heritage Impact Statement is to be prepared by an appropriately qualified and experienced Heritage Consultant and provided with the application for development approval pertaining to any development proposal to demolish, modify or otherwise significantly impact the heritage values of the abovementioned heritage places.

4.3.3. Land Assembly

The Structure Plan area includes areas of redundant road reservation that fragment developable land within Precinct E. To achieve a coordinated development outcome, land assembly will be required by way of a road closure and subsequent amalgamation, or lease arrangement, prior to the commencement of development on the affected land.

Satisfactory arrangements are to be made with servicing authorities to provide for the modification and/or protection of existing services within land, as required.

4.3.4. Transport Noise

This Structure Plan is supported by a Transportation Noise Assessment prepared in accordance with State Planning Policy 5.4 – Road and Rail Noise ('SPP 5.4'). **Refer Appendix 7 – Transportation Noise Assessment**.

Subdivision and development of land proposing noise-sensitive land uses within 200 metres of Great Eastern Highway shall accord with any recommendations outlined in the Assessment, and may require:

- The preparation of a Noise Management Plan.
- Implementing any 'Quiet House Design' package requirements.
- A notification being placed on the Certificate of Title(s) of the lots to advise prospective purchasers of potential for noise impacts from major transport corridors.

The management of transport noise will ultimately be considered as part of future applications to subdivide or develop land within the Structure Plan area, in accordance with the requirements of SPP 5.4. A condition of subdivision or development approval, where applicable, may be required at that time.

4.3.5. Water Management

This Precinct Structure Plan is supported by a Local Water Management Strategy ('LWMS') prepared in accordance with the WAPC's Better Urban Water Management Guidelines. **Refer Appendix 2 – Local Water Management Strategy**.

An Urban Water Management Plan or Stormwater Management Plan (as appropriate) addressing water (including groundwater) management measures in accordance with the adopted LWMS will be required as a condition of subdivision or development approval. The preparation of these plans shall be informed by geotechnical investigations, where appropriate.

4.3.6. Flood Management

Precincts A, D and E of the Structure Plan area are affected by the Swan River 1% Annual Exceedance Probability ('AEP') floodway and/or flood fringe. All lots within the Structure Plan area must achieve a minimum 500mm clearance above the 1% AEP flood level of the Swan River.

4.3.7. Acid Sulphate Soils

Subdivision and development of land within the Structure Plan area that is within a 'high to moderate' acid sulphate soil ('ASS') risk area will be required to undertake an ASS assessment and may require the preparation of an ASS management plan and dewatering management plan as a condition of approval.

4.3.8. Environmental Protection & Management

This Structure Plan is supported by an Environmental Assessment Report that outlines environmental factors to be considered in progressing subdivision and development within the Structure Plan area. **Refer Appendix 3 – Environmental Assessment Report**.

To minimise potential impacts to the retained vegetation and fauna during construction works, a Conservation and Environmental Management Plan will be required as a condition of development approval for any works affecting or within proximity to a Threatened Ecological Community ('TEC').

Where any future development works within the site will result in potential impacts to Black Cockatoos, a fauna management plan will be required as a condition of development approval to minimise impacts to fauna through clearing and construction works.

4.3.9. Infrastructure & Servicing

Infrastructure necessary to service the subdivision and development within the Structure Plan area will be upgraded, modified, or extended, where applicable, as part of future subdivision and development.

5. Additional Details

The details of additional information required to be submitted and the stage which it is to be submitted, are summarised below.

Additional Information	Approval Stage	Consultation Required
Transport Impact Statement/ Assessment	Development Application	City of Belmont
Heritage Impact Statement	Development Application	City of Belmont
Net Benefit Test	Development Application (if required)	City of Belmont
Waste Management Plan	Development Application	City of Belmont

Table 5: Information to be Submitted with an Application

The following additional information, studies or plans are to be required as a condition of subdivision or development approval.

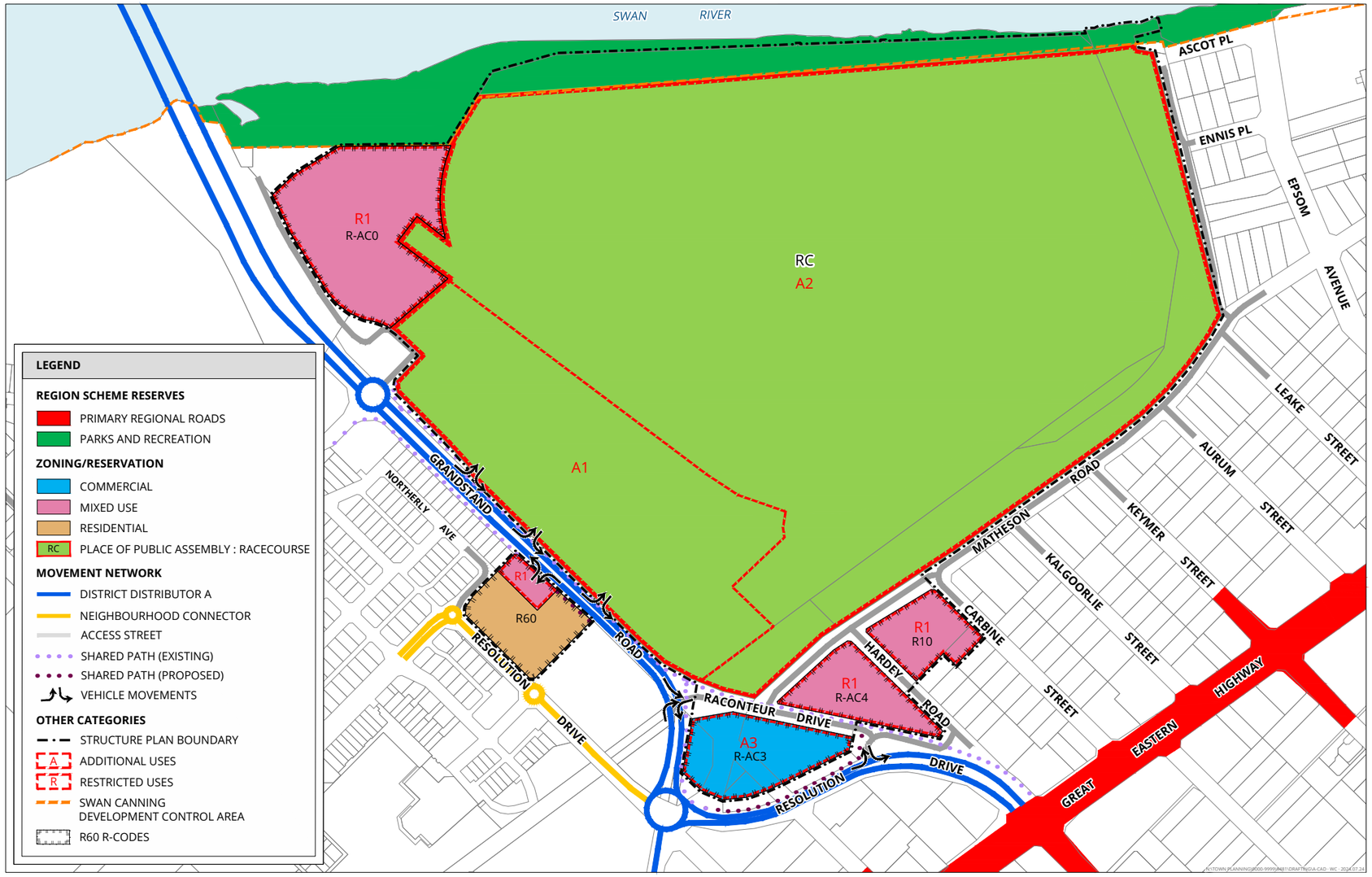
Condition of Approval	Responsible Agency
Landscaping Plan	City of Belmont
Fauna Management Plan	City of Belmont, DBCA
Conservation & Environmental Management Plan	City of Belmont, DBCA
Urban Water Management Plan / Stormwater Management Plan	City of Belmont, DBCA
Acid Sulphate Soil Management Plan	DWER

Table 6: Information Required as a Condition of Approval



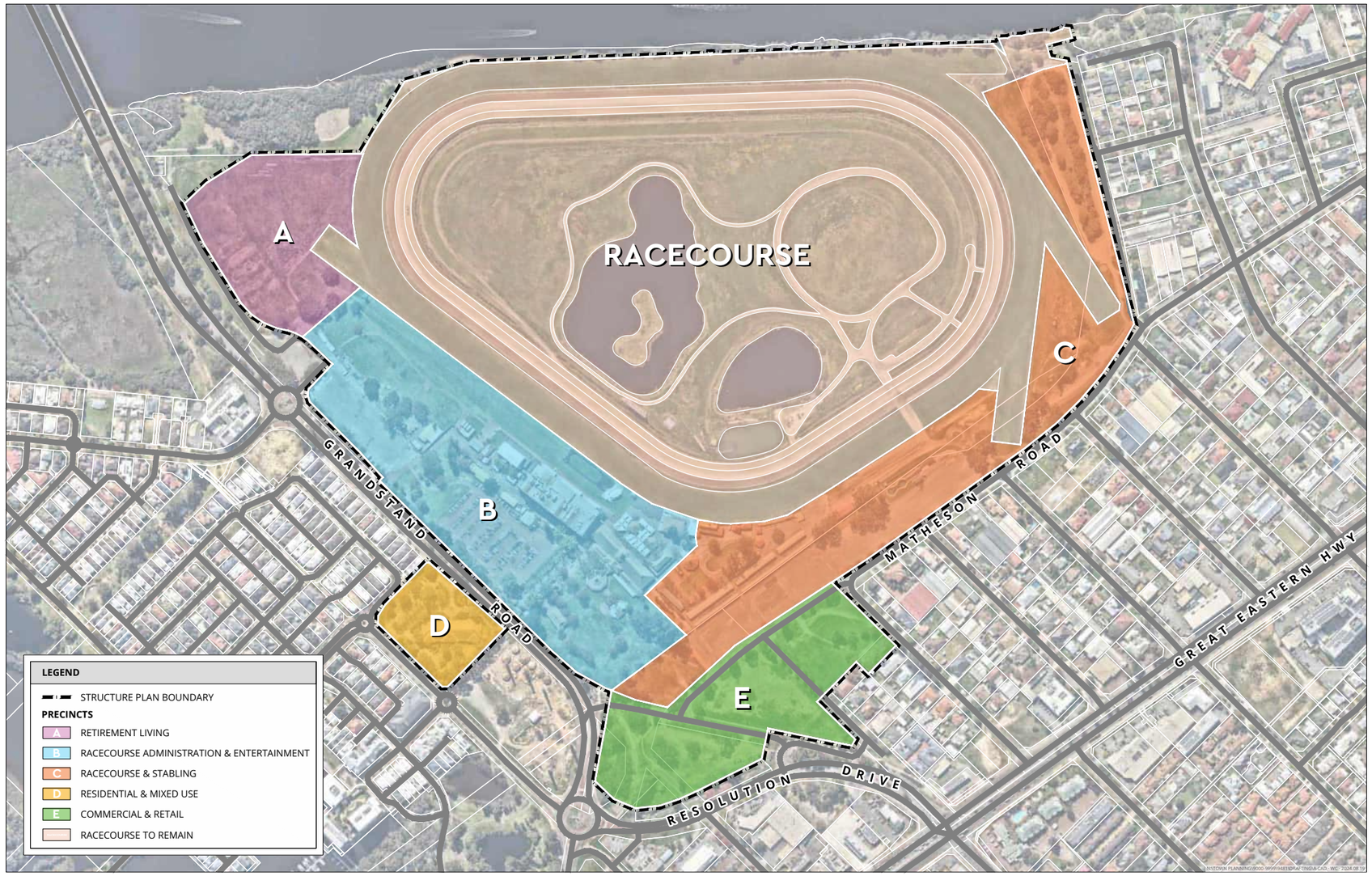
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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



Plan 1 – Structure Plan Map

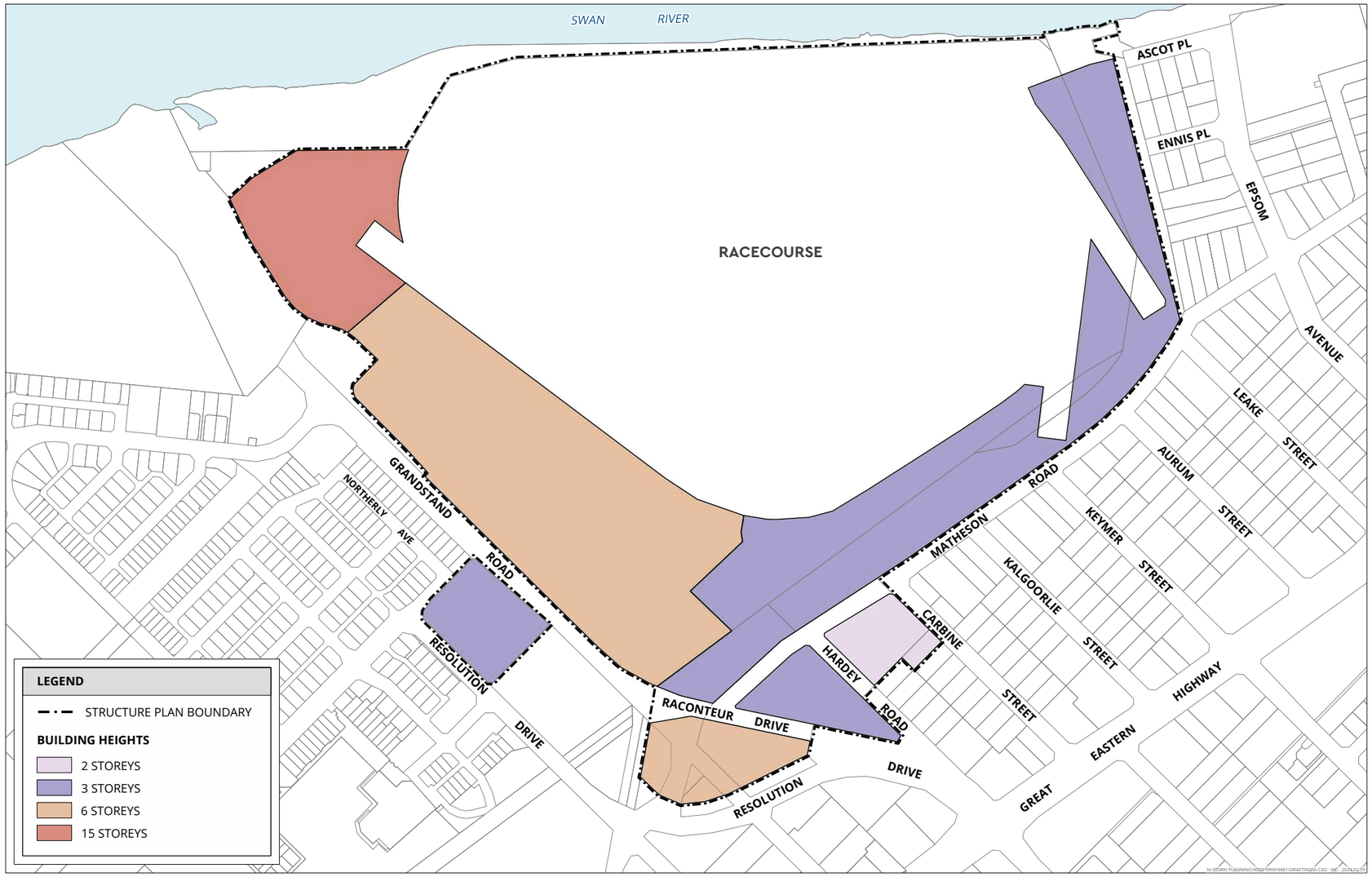
Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



Plan 2 – Structure Plan Precincts

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



Plan 3 – Building Height Plan

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Part 2
Explanatory Section



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

1. Introduction & Purpose

The purpose of the Ascot Racecourse Precinct Structure Plan is to guide future use and development of the Precinct Structure Plan area. The Precinct Structure Plan has been prepared on behalf of Perth Racing and encompasses approximately 61.3ha of land bound by the Swan River, Ascot Waters Estate, Grandstand Road, Resolution Drive, Hardey Road, and Carbine Street, in Ascot.

Refer **Figure 1 – Site Plan**.

1.1. Purpose

The purpose of this Report is to provide the relevant planning background and explanatory information that has formed the basis for preparing the Ascot Racecourse Precinct Structure Plan. This Report includes:

- A site and context analysis outlining the physical, community, and planning and governance context relevant to the area and the Precinct Structure Plan.
- An opportunities and constraints analysis of the subject site and the identification of the key design objectives and considerations.
- An overview of stakeholder engagement that has occurred to inform the preparation of the Precinct Structure Plan.
- A detailed explanation of the design response to the site and context analysis, opportunities and constraints analysis, and stakeholder feedback.

The Precinct Structure Plan will guide future land use and development over the subject land and provide a framework for more detailed planning at development application and/or subdivision stage. The following sections provide further detail and explanation for the Structure Plan Part 1 provisions.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

1.2. Objectives

The objectives of the Ascot Racecourse Precinct Structure Plan are to:

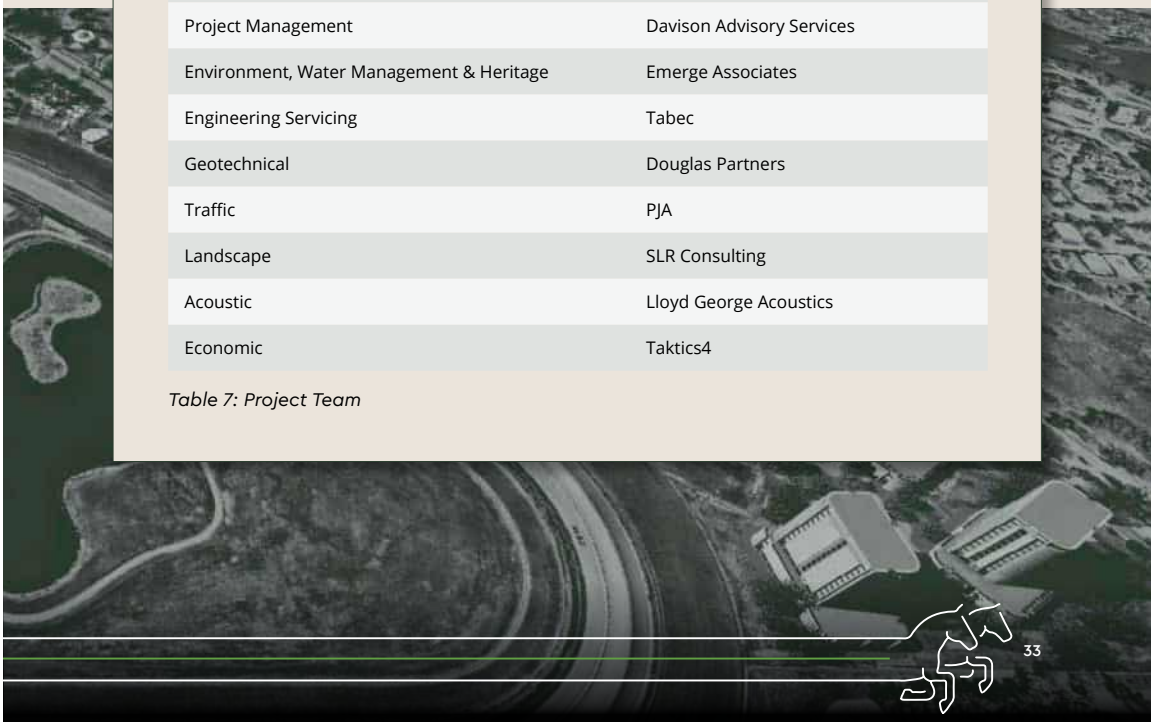
- Provide a framework to guide the use and development of Perth Racing's landholdings including and surrounding Ascot Racecourse.
- Identify Perth Racing's vision and feasible development aspirations for its landholdings, having regard to landownership restrictions and the need to support the ongoing viability of horse racing operations at Ascot Racecourse.
- Identify zoning, density, built form, and other requirements that will enable Perth Racing's vision to be realised, and inform subsequent stages of planning, having regard to the site context, opportunities, and constraints of the area.

1.3. Project Team

The following multidisciplinary project team have progressed the preparation of the Ascot Racecourse Precinct Structure Plan:

Discipline	Consultant
Town Planning & Urban Design	Rowe Group
Project Management	Davison Advisory Services
Environment, Water Management & Heritage	Emerge Associates
Engineering Servicing	Tabec
Geotechnical	Douglas Partners
Traffic	PJA
Landscape	SLR Consulting
Acoustic	Lloyd George Acoustics
Economic	Taktics4

Table 7: Project Team



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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



1. Site Plan

2. Site Context & Analysis

2.1. Physical Context

2.1.1. Location

The subject land is in the municipality of the City of Belmont ('City'), in the Perth Metropolitan Region. The site is located approximately 7.7 kilometres east of the Perth Central Business District.

Refer **Figure 2 – Regional Location**.

The subject land is situated in the suburb of Ascot, and is bound by the Swan River to the north, the Ascot Residential and Stables area and Matheson Road to the east and south-east, Resolution Drive to the south and south-west, and Grandstand Road to the west.

Grandstand Road provides access to the regional road network including Tonkin Highway and Graham Farmer Freeway via Garrat Road and Guildford Road to the north, and Great Eastern Highway to the south via Resolution Drive and Stoneham Street. The southern portion of the subject land is bound by Resolution Drive and Matheson Road providing access to local residential streets to the south, west and east of the subject area.

Refer **Figure 3 – Local Location**.

2.1.2. Tenure, Ownership & Buildings

The Structure Plan area comprises several landholdings totalling 61.3294ha in area, legally described below.

Lot	Deposited Plan	Volume	Folio	Area	Landowner
1	55346	1724	276	2,452m²	Western Australian Planning Commission
3	55346	1742	278	350m²	The Chair of the Committee of the Western Australian Turf Club
13	26760	1883	670	7,312m²	The Chair of the Committee of the Western Australian Turf Club
50	5729	1041	934	3,516m²	The Chair of the Committee of the Western Australian Turf Club
51	15104	1883	668	6,939m²	The Chair of the Committee of the Western Australian Turf Club
100	60341	2723	304	25,725m²	The Chair of the Committee of the Western Australian Turf Club
452	60339	2723	355	11,441m²	The Chair of the Committee of the Western Australian Turf Club
7705	209359	1789	567	43,318m²	The Chair of the Committee of the Western Australian Turf Club
9002	60342	2723	303	512,241m²	The Chair of the Committee of the Western Australian Turf Club

Table 8: Summary of Land

Refer **Appendix 1 – Certificates of Title**.

The Structure Plan area includes the Ascot Racecourse complex, including the Racecourse, entertainment/ hospitality areas, and car parking, forming the 'core' of the site. To the south of the Racecourse is vacant land, which is currently used for overflow car parking on event days. Lee-Steere House, being Perth Racing's administration building, is located to the west of the Racecourse, adjacent to Ascot Waters Estate.

2.1.3. Surrounding Area & Land Uses

The Structure Plan area abuts the Swan River foreshore located to the north, the Ascot Residential and Stables area to the south and east, light industrial/commercial development to the south, and the Ascot Waters residential estate and Bristile Kilns (also known as the 'Ascot Kilns') to the west.

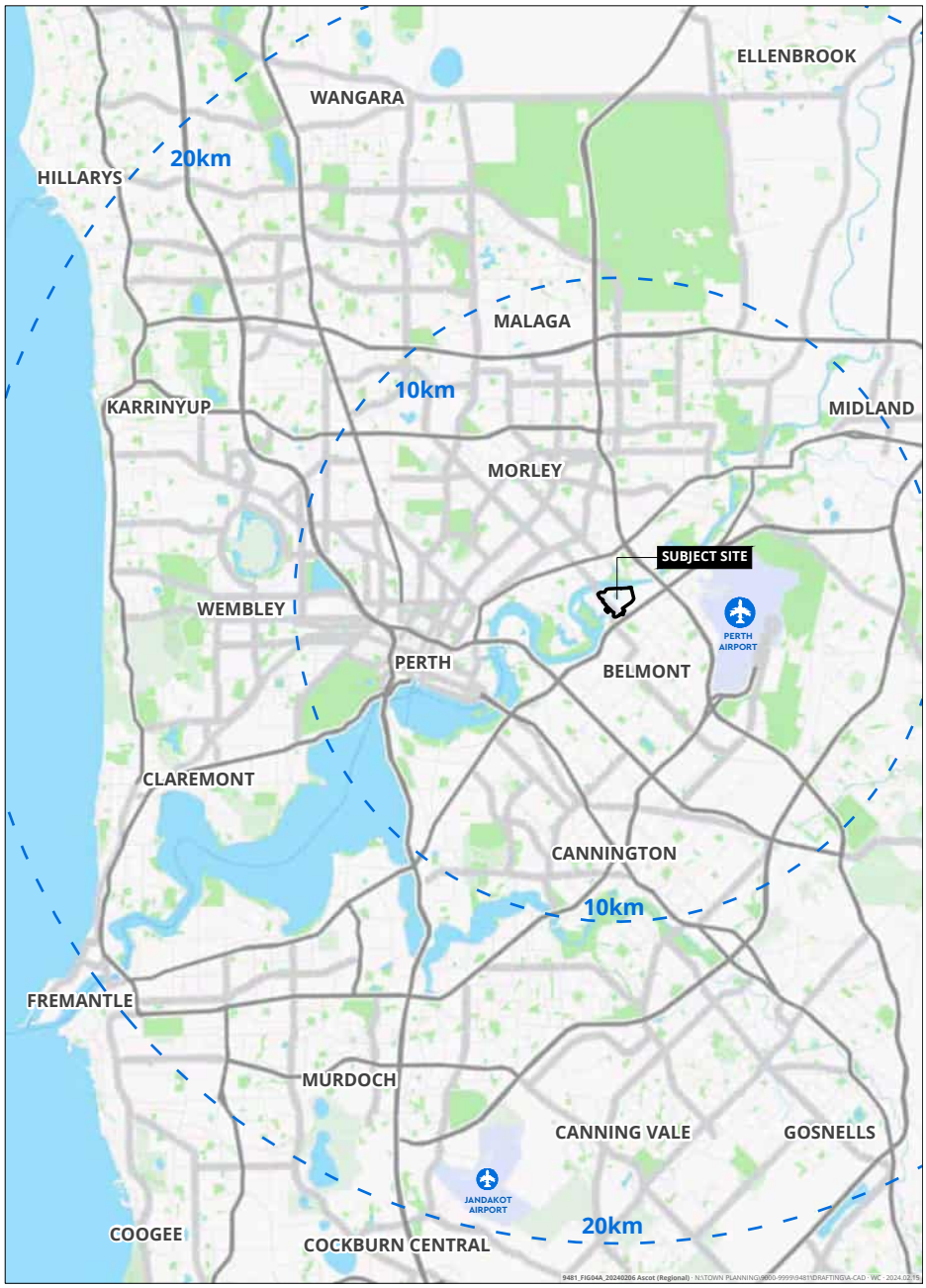
The Ascot Residential and Stables area to the south and east of the subject land is inherently linked to the horse racing industry and the operation of Ascot Racecourse. The existing zoning applicable to the area permits the keeping of horses within private stable complexes, enabling horse trainers to operate in the area and utilise the Racecourse for training purposes.

Land to the west and south-west of the Precinct Structure Plan area includes a historical landmark being the Bristile Kilns located on the border of the Ascot Waters residential estate.

The light industrial/commercial development to the south comprises of a range of land uses including corporate offices, fast food outlets, and service stations.

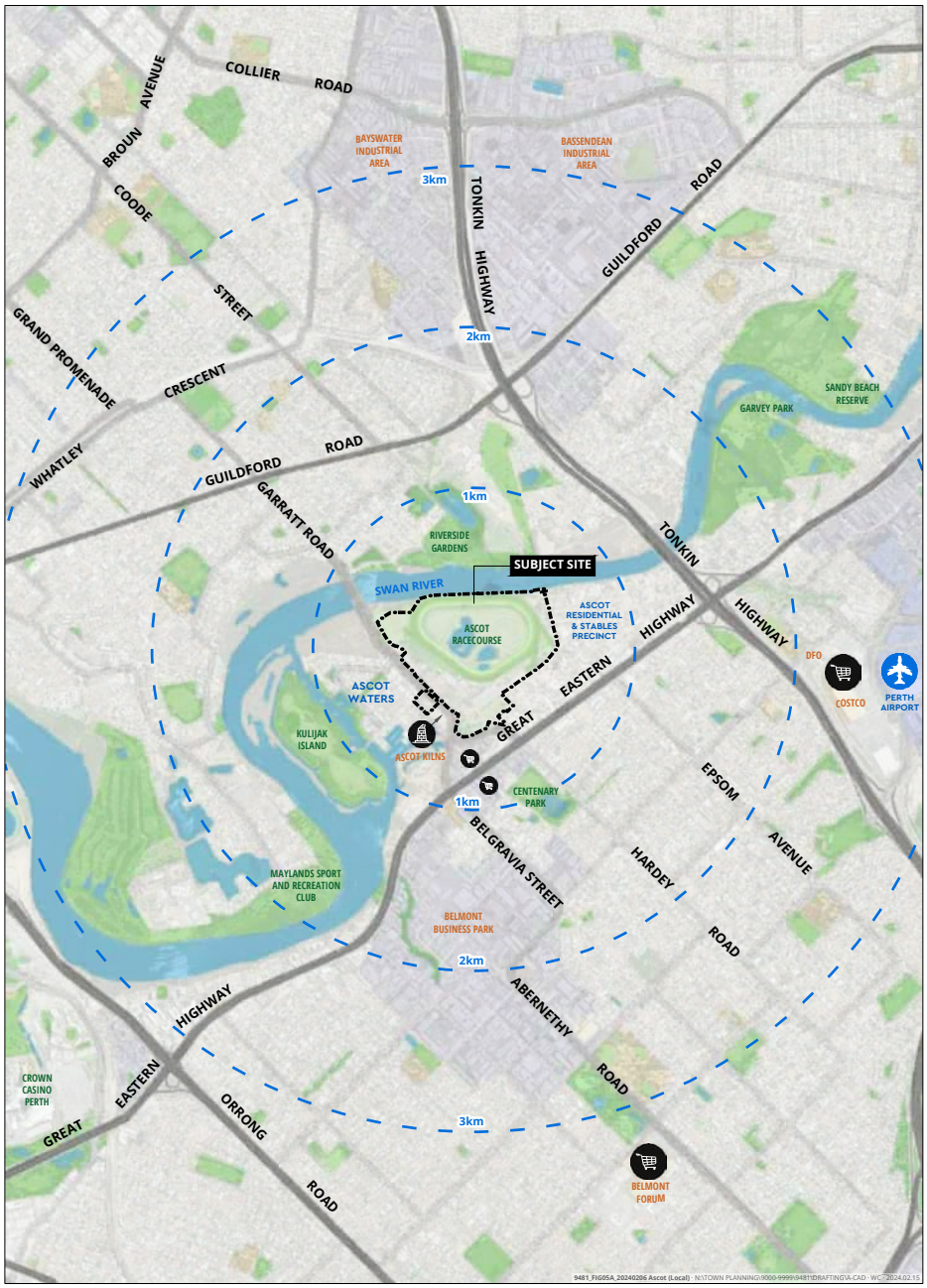


Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



2. *Regional Location*

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



3. Local Location

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2.1.4. Environment

2.1.4.1. Landform & Soils

The subject site is generally flat, with a slight increase in elevation in its eastern extent. The northern portion of the site, adjacent to the Swan River, is the lowest point within the subject site at 0m Australian Height Datum (AHD). The remainder of the site is elevated at 2m AHD to the north-west and 7.5m AHD to the east.

The subject site falls within the Swan River Terrace system and contains Guildford formation of Alluvial and leached yellow sands. The soil types present at the subject site include:

- **Ms2** – Sandy Silt: Strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.
- **Ms4** – Sandy Silt: light yellow brown, blocky, mottled with some fine to medium sand, soft when moist, variable clay content.
- **S8** – Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin.

Geotechnical investigations were undertaken specifically for Precinct A (Douglas Partners, 2014), Precinct C (Douglas Partners, 2023) and Precinct D (Galt, 2024). Each investigation confirms the regional geological mapping generally consisting of shallow layers of sand overlying sandy clay of the Guildford formation, which is generally unsuitable for on-site stormwater disposal.

From a site classification perspective, Precinct A would be 'Class P', Precinct C is also 'Class P' but can be re-classified to 'Class S' with appropriate site preparation, and Precinct D is 'Class S'. It is assumed that Precinct B will have ground conditions similar to Precincts A and C, however further geotechnical investigations will be required to ensure adequate treatment of ground conditions before future development. For Precinct E, it is anticipated that ground conditions would be consistent with the natural material from the geotechnical investigations and geological mapping.

Refer **Appendix 4 – Engineering Servicing Report**.

2.1.4.2. Acid Sulphate Soils

The Department of Water and Environmental Regulation Acid Sulphate Soils ('ASS') risk mapping indicates that the majority of the site is considered to have a 'high to moderate' risk of ASS occurrence within 3 m of the natural surface. A portion of the site, including parts of Precinct B, Precinct C and the Racecourse are mapped as having a 'moderate to low' risk of ASS occurring within the 3m of the natural surface. Should ASS be encountered, an ASS Management Plan will be prepared and implemented at subdivision and/or development stage.

2.1.4.3. Site Contamination

A review of the Department of Water and Environmental Regulation's ('DWER') Contaminated Sites Database indicates that no areas within the subject site are registered as a 'contaminated site' under the *Contaminated Sites Act 2003*.

A basic summary of records of Lot 9002 on DP60342 was requested from DWER which indicated that Precincts A, B and C are classified as 'possibly contaminated – investigation required'. The possible contamination is associated with the site's historical use for horse-racing and runoff from animal storage on the site and agistment in the surrounding areas. Perth Racing are currently undertaking monitoring and investigation into the potential contamination of the site which will be reviewed by DWER.

2.1.4.4. Groundwater & Surface Water

The Perth Groundwater Map (DWER, 2023) indicates that the regional groundwater level sits at 0.5m AHD across the site. The groundwater clearance from south-east to north-west of the site therefore ranges from 6.5m to 0.5m. Local groundwater monitoring undertaken in August 2022 indicates that annual maximum groundwater levels were measured at 1.26m AHD and 1.70m AHD.

In terms of future development, it is anticipated that additional fill may be required to satisfy minimum groundwater clearance of 1.2m above maximum groundwater levels. This would be subject to further investigations on final development requirements and land uses.

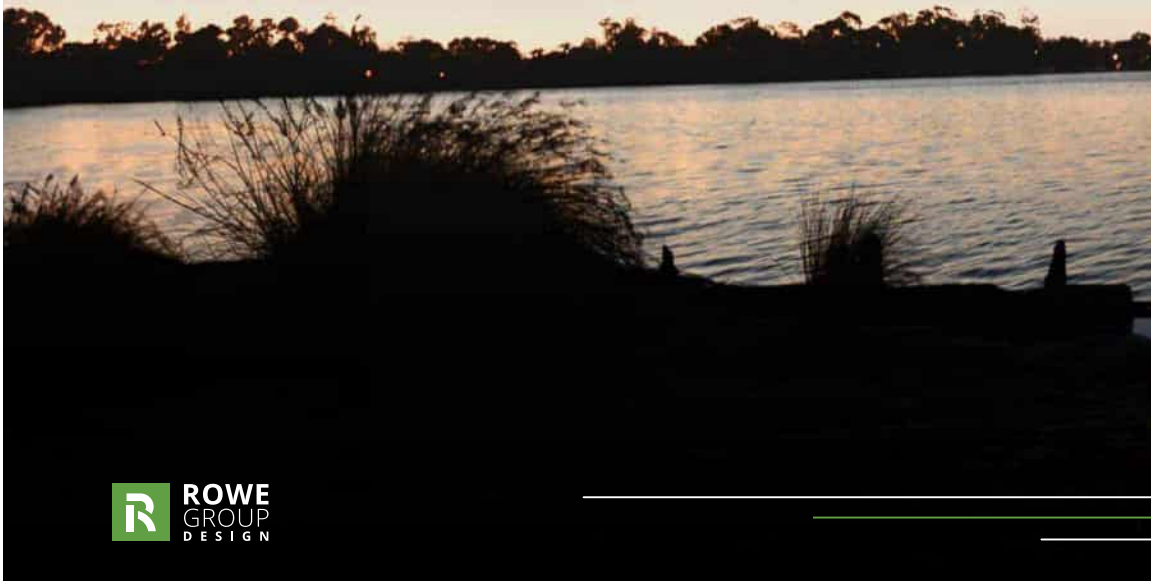
Groundwater is abstracted from an artesian production bore assigned to the Leederville Aquifer to meet the irrigation demand of the Racecourse and surrounds. The bore is located adjacent to the Irrigation Lake at the south corner of the racetrack.

Water quality monitoring indicates that electrical conductivity (EC), total dissolved solids (TDS), and hydrogen (pH) values do not exceed guideline trigger values, however nitrogen (TN) and phosphorous (TP) concentrations continually exceed Australian and New Zealand Environment and Conservation Council (ANZEC) guideline trigger values.

2.1.4.5. Hydrology

The dominant hydrological feature of the site is the Swan River, which adjoins the northern boundary of the site and falls within the Swan Canning Development Control Area and Swan Canning River Park. Online floodplain mapping indicates flood levels in proximity to the Swan River at 2.8m AHD. All lots must have a minimum 500mm elevation above this Swan River flood level and a minimum of 300mm clearance above the 1% AEP top of water level of drainage basins.

There are three lakes located within the centre of the Racecourse (Irrigation Lake, Lined Lake and Wetland Lake). These lakes receive runoff from the grandstand buildings in Precinct B and stables/buildings in Precinct C.



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2.1.4.6. Wetlands

The Geomorphic Wetlands of the Swan Coastal Plain dataset indicates the following wetlands within the site:

- Multiple Use Wetland (UFI 8424, UFI 8425, UFI 8426)
- Resource Enhancement Wetland (UF 8423).

The adjacent Swan River is classified as a Conservation Category Wetland (UFI 1316 – Estuary waterbody) and has significant ecological, cultural and heritage values. The associated riparian vegetation associated with the Swan River extends into the north-eastern portion of the site and would provide habitat for waterbirds and aquatic fauna species.

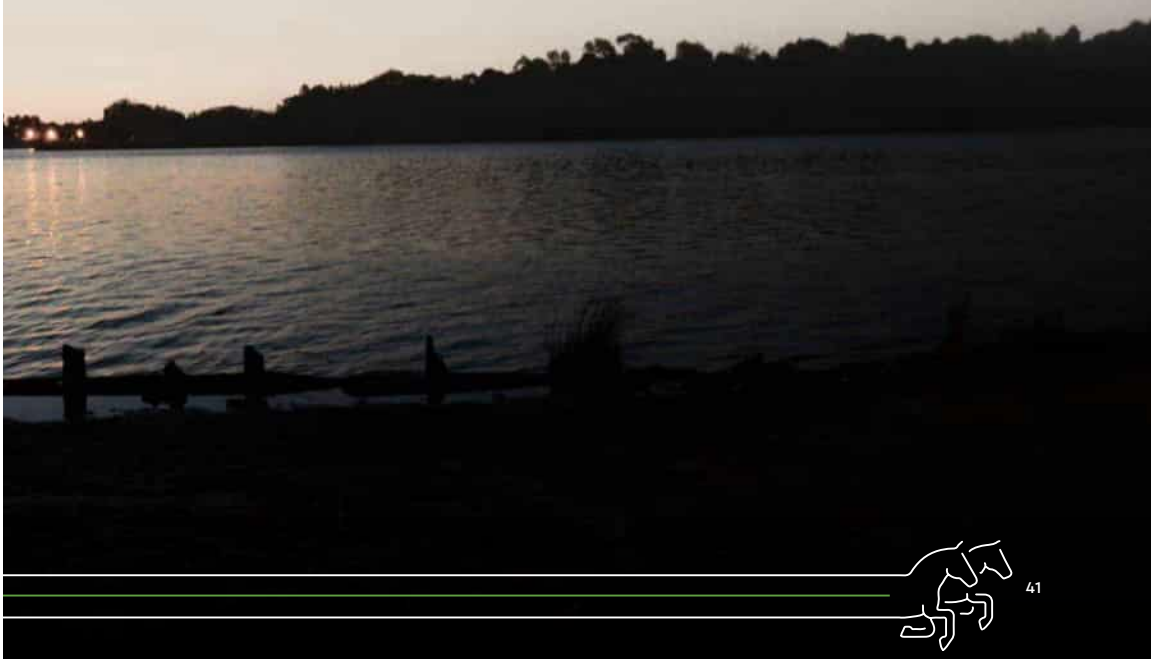
2.1.4.7. Biodiversity & Natural Area Assets

A flora and fauna survey of the subject site undertaken in March 2023 by Emerge Associates identified a total of 1.1ha of native vegetation, comprising of scattered flooded gum (*Eucalyptus rudis*) and marri (*Corymbia calophylla*) trees, and fringing vegetation (vegetation type ErJkSt). The survey found the majority of the subject site is heavily disturbed with limited intact native vegetation. Most of the vegetation was deemed to be in a 'degraded' and 'completely degraded' state.

A small portion of native vegetation in the north-eastern corner of on the site, comprising approximately 70m², was identified as being in 'Good – Very Good' condition. This area includes the 'subtropical and temperate coastal saltmarsh' ecological community which is listed as a Threatened Ecological Community ('TEC') ('vulnerable') under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and as a Priority Ecological Community (Priority 3) under the *Biodiversity Conservation Act 2016*.

The survey found no threatened or priority flora species or suitable habitat for threatened or priority species. Whilst a desktop search indicated potential for two threatened and priority flora species, these were not considered likely to occur on the site due to lack of suitable habitat.

The northern portion of the site (along the Swan River) is identified as an environmentally sensitive area ('ESA') which are prescribed protection under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.



2.1.4.8. Fauna

A basic fauna and targeted black cockatoo survey undertaken by Emerge Associates found that fauna habitat values within the site are limited by historical disturbance and are primarily suited to widespread fauna species with non-specific habitat requirements. The survey found 24 fauna species were recorded within the site including two (2) conservation significant species.

The two conservation significant species recorded at the time of survey include one threatened species, being the Forest Red-Tailed Black Cockatoo (*Zanda banksia naso*) and one Priority 4 species (blue-billed duck (*Oxyura australis*).

A total of 1.27ha of Carnaby's Black Cockatoo foraging habitat was recorded on the site, of which 0.35ha comprised primary foraging habitat and 0.92ha of secondary foraging habitat. A total of 0.84ha of Forest Red-Tailed Black Cockatoo foraging habit was recorded on the site, comprising 0.28ha of primary native habitat, 0.56ha of secondary foraging habitat.

A total of 32 Black Cockatoo habitat trees were recorded during the survey, of which 29 were located within the subject site. Of the trees located on the site, four (4) trees contained hollows potentially suitable for Black Cockatoo breeding.

2.1.5. Physical Infrastructure & Services

An Engineering Servicing Report has been prepared by TABEC in support of this Precinct Structure Plan. The purpose of the report is to provide servicing and infrastructure advice on the development area and associated future requirements. The findings of the report are summarised below.

Refer **Appendix 4 – Engineering Servicing Report**.

2.1.5.1. Sewer

Precinct A is located in proximity to an existing sewer at Waterway Crescent, however it is anticipated that the existing pipe network will not have sufficient cover below finished ground levels to extend from its current location to the subject site. Alternative options include:

1. Connecting to the existing wastewater pump station to the east located on Ascot Place, requiring the construction of a private pump station and the construction of 950m of DN100 pressure main and new gravity sewer through Ascot Racecourse that discharges into the pump station.
2. Extending the existing 225mm sewer up Grandstand Road from the Marina Drive/ Resolution Drive roundabout. This connection would trigger downstream upgrades due to capacity constraints, with the existing 225mm sewer on Great Eastern Highway requiring an upgrade to a 300mm sewer.

Precinct B is currently serviced by an existing sewer connection located at Raconteur Drive, however Water Corporation do not have any record of this connection and therefore wastewater flows from this Precinct have not been included in their planning assumptions. As such, if there is a substantial increase in wastewater flows to this connection, further discussions will be required with Water Corporation.

In the case of Precinct C, which will include the development of on-course stabling complexes along the outer edge of the Racecourse, multiple sewer connections will be required to service the site. The western portion of the Precinct (between Kalgoorlie Street and Raconteur Drive) is expected to be conveyed to the west to the existing internal sewer. The central area of the Precinct, along Matheson Road, is proposed to be serviced via an existing connection from Kalgoorlie Street. The eastern portion of the Precinct will require two new connections along the eastern boundary to the existing sewer network.

Precinct D can be serviced by the existing sewer network located near the intersection of Marina Drive and Resolution Drive, as confirmed by the Water Corporation.

In terms of Precinct E, there is an existing sewer network located along Resolution Drive which continues north-east from Raconteur Drive towards Carbine Street via Lot 100, which can service future development on Lots 51 and 100.

2.1.5.2. Water

Investigations indicate that the existing water reticulation network within the area can service the subject land depending on final water usage requirements, specifically:

- Precinct A can be serviced by an existing water main located in the western verge of the Waterway Crescent / Grandstand Road roundabout, which will need to be extended to the development site to provide water supply.
- Precinct B is currently serviced by an existing 100mm water main, however if additional water supply is required, this water main may require upgrading.
- Precinct C has access to an existing 100mm water main located along the southern verge of Matheson Road which can service the Precinct area. If, however greater supply is required above the capacity of the pipework, there may be a need to upgrade the size of the water main to Precinct C.
- Precinct D has access to an existing 150mm water main on the western verge of Resolution Drive and a 100mm water main on Grandstand Road which provide adequate opportunity for connection and water supply.
- Precinct E can be serviced by an existing DN100mm water main located within the existing redundant road reserves dissecting this Precinct area.

2.1.5.3. Power

Preliminary estimates on power demand indicate that the site has a total power requirement of 5.4MVA with the proposed new developments requiring an additional 4.2MVA. Western Power's Capacity Mapping indicates there is sufficient capacity within the network (30MVA) to accommodate the proposed development, as contemplated by this Precinct Structure Plan.

2.1.5.4. Stormwater Drainage

There are two significant drainage systems that convey stormwater from the subject area to the Swan River. The first is the Central Belmont Main Drain which is managed by Water Corporation, and the second is the local drainage network located near Matheson Road which conveys water from the surrounding road reserves into the lake system at the centre of the Racecourse.

The lake systems are interconnected, with flows discharging from the lakes to the Swan River via a 450mm and 375mm concrete pipe at peak water level, with its outlet being controlled to restrict tidal influence on the internal lake system.

In terms of precinct-specific stormwater drainage management:

- Precinct A does not currently have access to a stormwater connection, and as part of future development, drainage from this area would be treated and captured within the precinct area.

- Precinct B currently captures and infiltrates water at source, with overland flow being graded towards the existing track.
- Precinct C will be a combination of infiltration at source where levels and soil conditions allow, and discharge to the lake system.
- Precinct D will include stormwater storage and infiltration at the site, with the 1% AEP event discharging into the local drainage network on Resolution Drive.
- Precinct E is anticipated to be treated via bio-retention swale before overflowing to a proposed detention basin storage for the 1% AEP event, with overflow from the basin discharging into the Water Corporation's drainage system.

Refer **Appendix 2 – Local Water Management Strategy**.

2.1.6. People Movement

A detailed review of the existing movement network has been undertaken through the preparation of a Transport Impact Assessment ('TIA'), a summary of which is outlined below. Refer **Appendix 5 – Transport Impact Assessment**.

The Structure Plan area is bound by Grandstand Road to the west, Resolution Drive to the south, and Matheson Road to the south-east. All roads abutting the site are under the care and control of the City of Belmont, though the extent of Matheson Road and Raconteur Drive that sits within the site boundary is owned privately by Perth Racing with access controlled through gates.

Grandstand Road is classified as a 'Distributor A' road under the Main Roads WA Functional Road Hierarchy and forms as a dual carriageway carrying volumes of approximately 16,700 vehicles per day (2018). There are no on-road cycle lane facilities on Grandstand Road. A single continuous shared use path exists along the north-eastern side of Grandstand Road, with intermittent provision on the south-western side. A high-quality shared path extends from the Grandstand Road/Garratt Road bridge to Ascot Place, adjacent to the Swan River and along the northern boundary of the Racecourse.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

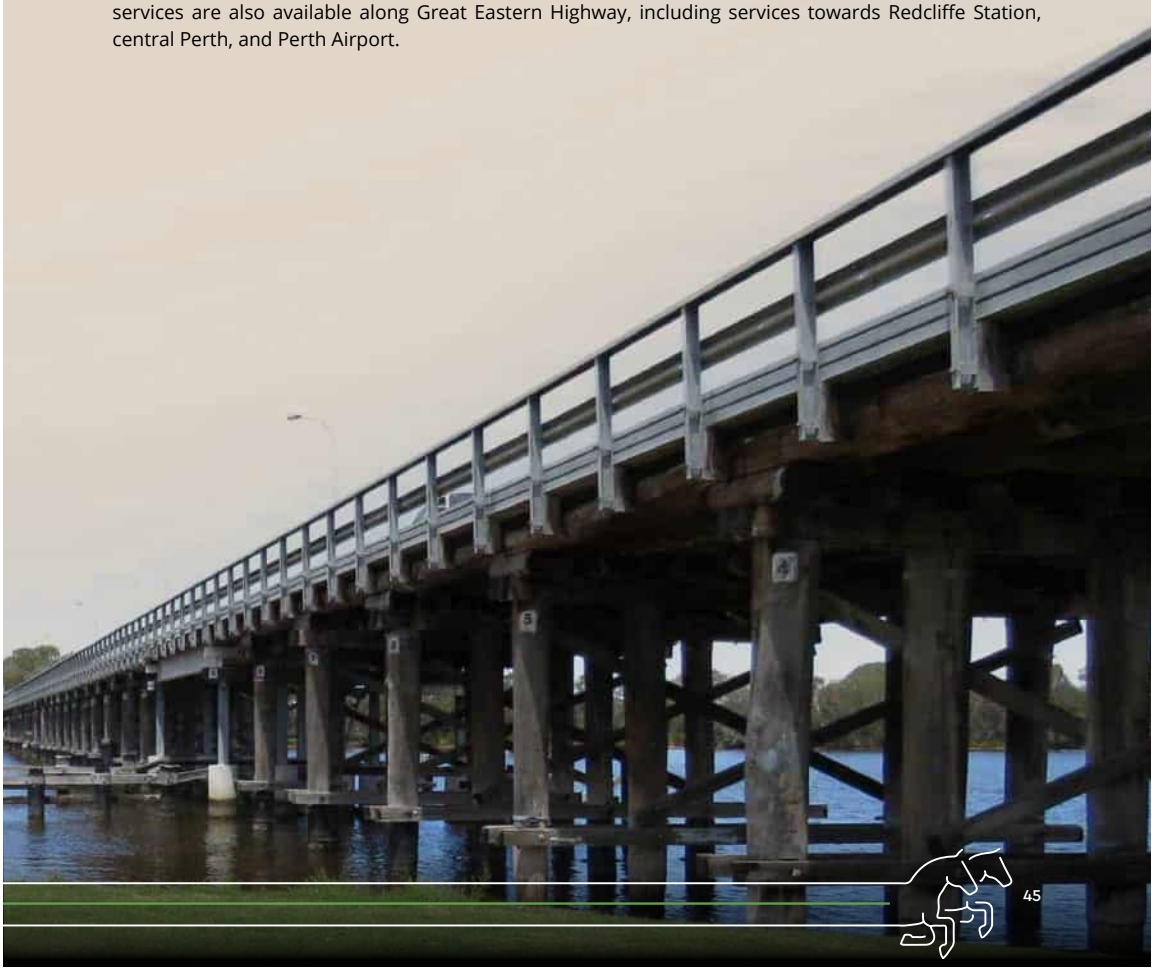
Resolution Drive, to the south of the subject area, is classified as a 'Distributor A' road and forms as a single carriageway, extending between the four-lane Grandstand Road / Stoneham Street / Resolution Drive roundabout to the signalised intersection at Great Eastern Highway and Hardey Road. Based on 2021 traffic count data, Resolution Drive carries approximately 7,900 vehicles per day.

Raconteur Drive diverts east from Grandstand Road, in the form of a three-way priority-controlled intersection, with left-in and right-in movements from each side of Grandstand Road. Raconteur Drive forms as a one-way single-lane carriageway providing access (albeit gated) to Matheson Road and the existing car park for Ascot Racecourse. A pedestrian footpath exists along the northern side of Raconteur Drive connecting to Grandstand Road and Resolution Drive.

Matheson Road is classified as an 'Access Road' and forms as a single-lane carriageway servicing the Residential and Stables area. A shared path exists along the south-eastern side of Matheson Road, with a dedicated horse trail along the northern side.

Great Eastern Highway, to the south of the subject land, is classified as a 'Primary Distributor' under the Functional Road Hierarchy and carries significant volumes of traffic. Great Eastern Highway includes on-road cycle laneways with no physical separation and are combined with bus lanes.

There are existing bus stops located along Grandstand Road, immediately adjacent to one of the key pedestrian access points to the Racecourse, which are served by the 998/999 circle route which has good frequency and provides connectivity through central Perth and Bayswater Train Station. Frequent bus services are also available along Great Eastern Highway, including services towards Redcliffe Station, central Perth, and Perth Airport.



2.2. Community Context

2.2.1. Culture, Values & Identity

The Ascot locality is renowned for its connection to the horse racing industry, with the historical Ascot Racecourse and surrounding Residential and Stables area forming a significant role in the contemporary culture and identity of the area. Ascot Racecourse was established in 1853, importing the English notions of society and social pastimes within a colonial setting. Since that time, the Racecourse has been a site of social interaction, particularly over the summer months, which contributes to the sense of place of both the local area and the wider State.

The continuation of the Residential and Stables area, integrating horse stabling with housing, is reflective of the community's values for ongoing provision of horse racing at Ascot Racecourse, and its association with the individuals and families who are significant in the history of the local area. In recent years, however, it is understood that many emerging horse trainers are now locating on the outskirts of the Perth metropolitan area and travelling to Ascot for training and racing.

The Swan River forms a key feature that signifies the area, extending along the northern boundary of the Racecourse. The Swan River foreshore serves a significant amenity and environmental feature in the area, and a recreational asset for the wider community.

Situated opposite the Ascot Racecourse is a prominent landmark featuring eight (8) brick circular downdraught kilns and five (5) tall brick chimneys, known as the Bristile Kilns (or Ascot Kilns). Becoming known beyond the local community due to heritage significance and prominent location adjacent to Ascot Racecourse and at the gateway to the City of Belmont.



2.2.2. History & Heritage

2.2.2.1. Aboriginal Heritage

A search of the Aboriginal Cultural Heritage Inquiry System identified two (2) Aboriginal heritage places located within and adjacent to the subject land, as follows:

- Site ID 3753 – Registered site, Name: Perth, Type: Historical, Mythological, Hunting Place, Named Place, Natural Feature.
- Site ID 3536 – Registered site, Name: Swan River, Type: Creation / Dreaming Narrative.

Site 3753 partially intersects with the western edge of the site and the boundary is a broader area, with the exact area not being defined. Site 3756 is located immediately adjacent to the site.

2.2.2.2. European Heritage

A search of the 'Inherit' database of the Western Australian Heritage Council ('WAHC') and the City of Belmont Local Heritage Survey and Heritage List identifies five (5) European heritage listings within and adjacent to the Precinct Structure Plan area.

Inherit Id	Name	Address	Local Heritage Survey Management Category
6123	Ascot Racecourse Complex	71 Grandstand Road, Ascot	1
868	Bristile Kilns (Ascot Kilns)	80 Grandstand Road, Ascot	1
16779	Ascot Residential and Stables Area	Area bound by Great Eastern Highway, Hardy Road, Swan River and Tonkin Highway, Ascot	2
27274	Lee-Steere House	70 Grandstand Road, Ascot	4
16863	Rail Line - site	Matheson Road, Ascot	4
18987	Swan and Canning Rivers	Swan River	N/A

Table 9: Heritage Places



2.2.2.2.1. State Register of Heritage Places

The Bristile Kilns – Heritage Place No. 868, located immediately outside of the Precinct Structure Plan area, is included in the State Register of Heritage Places, in recognition of its cultural heritage significance. The Bristile Kilns is an industrial site comprising eight (8) brick circular downdraught kilns and five (5) tall brick chimneys and is the largest cluster of circular downdraught kilns and associated stacks in Australia, which are an increasingly rare industrial structure nationally.

The place represents the development of the clay industry in the Belmont area and has had a significant impact on the development of the City of Belmont from 1905 to 1982. The Bristile Kilns now form part of the Ascot skyline with both aesthetic and social value due to its landmark qualities.

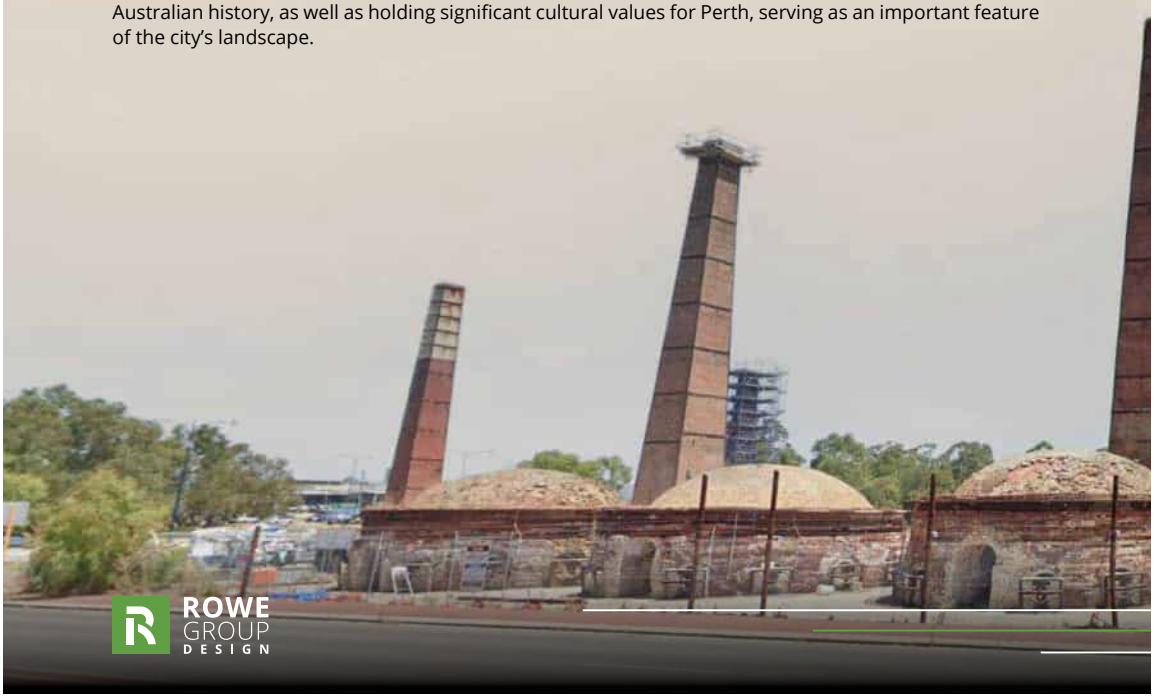
The proposed Precinct Structure Plan will not cause harm or impact the significance of the Bristile Kilns heritage place. Any future development application proposed in proximity to the heritage site may be subject to further heritage assessments.

2.2.2.2.2. State Register Assessment Program Places

There are two (2) places within the Precinct Structure Plan area included on the Western Australian Heritage Council's Assessment Program for consideration for inclusion on the State Register of Heritage Places, being the Ascot Racecourse Complex – Place No. 6123 and the Swan and Canning Rivers – Place No. 18987.

The Ascot Racecourse Complex comprises a complex of buildings surrounding the horse racing track, established in 1850. The place demonstrates the popularity of horseracing in Western Australia, and the allocation of public funds by Government in order to provide facilities for the sport and maintain revenue generated by gambling. The Ascot Racecourse Complex represents the economic prosperity and population increase generated by the Gold Boom of the 1890s, which resulted in dramatically increased building activity. The place remains a rare example of a largely intact group of buildings including parts of a horse racing complex, that still relates to the original form and function of the surrounding area.

The Swan and Canning Rivers (or Swan Canning Riverpark) cover 72.1 square kilometres of river reserve and adjoining public lands. The Swan Canning Riverpark supports a diverse array of plant and animal life, some endemic to the region. The Swan and Canning Rivers stretch and snake their way for 280 kilometres from Wickepin to the Indian Ocean in Fremantle, representing an important slice of Western Australian history, as well as holding significant cultural values for Perth, serving as an important feature of the city's landscape.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

2.2.2.2.3. Local Heritage Survey and Heritage List

The City of Belmont's Local Heritage Survey and Heritage List (June 2023) identifies and records places that are, or may become of, cultural heritage significance to the local community within the Local Heritage Survey. Those places considered to contain cultural heritage significance requiring protection and conservation are included on the Heritage List.

The Ascot Racecourse Complex, the Ascot Residential and Stables Area, and Bristile Kilns are all included on the City's Heritage List, with the former being the only site contained within the subject area. Lee-Steere House and the Rail Line are contained within the subject area, however, are not included on the Heritage List based on their Management Category.

The Ascot Residential & Stables Precinct is located immediately adjacent to the subject area and provides evidence in the built environment of a long association with the horse racing industry and Ascot Racecourse. The area presents a rare surviving example of a suburban area that has retained a significant number of actively used stables integrated into the urban subdivisions. The precinct has social value to the community for the ongoing provision of horse racing at the Ascot Racecourse and for its association with the individuals and families who are significant in the history of the local area and / or the racing profession.

The Local Heritage Survey also identifies two (2) places that contribute to Belmont's history and community as a Management Category 4 (little significance) place. These places include the Rail Line – Site and the Lee-Steere House, which are both situated within the Precinct Structure Plan area.

The former Rail Line site is located on a portion of Matheson Road, Ascot. The site has historic value for its association with the rail link which connected Belmont to the Perth to Guildford railway line. This brought racegoers to Ascot and provided essential deliveries to local businesses. The former Rail line demonstrates how significant the racing industry was to the development of the Belmont district. It should be noted that the site does not contain any original infrastructure and its former use is acknowledged via a plaque located onsite.

Lee-Steere House has historic and social value for the members of the horse racing industry for its provision of services since the 1980s. It is noted that the building is not of any distinct architectural merit but is connected to the racing industry and built in the style of similar clubhouses from that era. The intended use of the building continues to perform the functions for which it was built, being an administration centre, however it is proposed to be decommissioned with administrative functions of Perth Racing being consolidated into the Racecourse site.



2.2.3. People

Ascot Racecourse operates as both a racetrack and training facility, with more than 500 horses training at the Racecourse during a typical week.

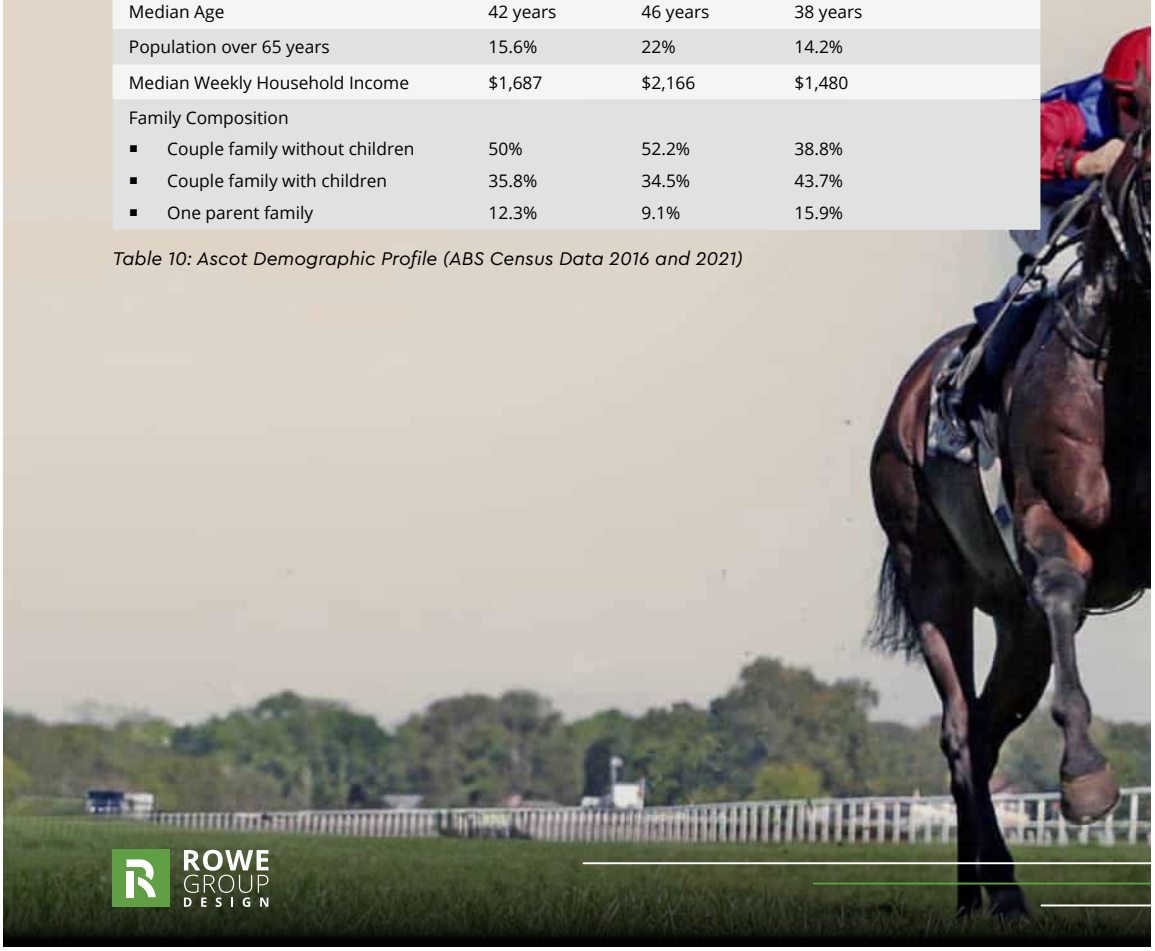
Ascot Racecourse, through both racing and non-racing events attracts a range of community members, irrespective of socio-economic status, age or gender, and supports the development and preservation of social and community benefits throughout the Perth Region through club activities and partnerships with community organisations. Amongst the community, horse racing is a profession, sport, hobby and leisure activity.

Perth Racing is the only thoroughbred racing club established within the Perth Region, with racing occurring between Ascot Racecourse (summer months) and Belmont Racecourse (winter months). There are 7,366 people who participate in the thoroughbred horse racing industry within the Perth Region, including 4,928 people who participate in producing racing animals, 1,498 racing club and industry staff, and 541 stable employees (IER, May 2023).

In terms of the wider area, the population of Ascot has steadily grown over the past five (5) years reflecting an increasing trend of an aging population. The key demographic statistics that comprise the Ascot community are summarised in the table below.

Statistic	Ascot (2016)	Ascot (2021)	Western Australia (2021)
Population	2,572 people	3,095 people	-
Median Age	42 years	46 years	38 years
Population over 65 years	15.6%	22%	14.2%
Median Weekly Household Income	$1,687	$2,166	$1,480
Family Composition			
▪ Couple family without children	50%	52.2%	38.8%
▪ Couple family with children	35.8%	34.5%	43.7%
▪ One parent family	12.3%	9.1%	15.9%

Table 10: Ascot Demographic Profile (ABS Census Data 2016 and 2021)



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

2.2.4. Economy

Within the Perth Region, the thoroughbred horse racing is responsible for generating $467.9 million in value-added contribution to Gross State Product and sustaining a total of 3,633 full-time equivalent jobs in the region (IER, May 2023). In terms of contribution to the Belmont area, Perth Racing provides an economic contribution of almost $250 million annually, over 1,500 jobs and almost 2,000 participants and volunteers, and household income of over $116 million (IER data, May 2022).

A significant number of racing participants have skills that are not easily transferable to other employment sectors, in particular trainers, jockeys, drivers and breeders, and therefore are heavily reliant on the success of the racing industry.

The Ascot locality is characterised by typical labour force participation and an above average proportion of workers who are employed on a full-time basis (ABS Census Data, 2021). The key employment industries for the portion of Ascot defined by Ascot Racecourse and the Residential and Stables area are 'Accommodation & Food Services', 'Arts & Recreational Services' and 'Tourism'. These industries generate a total of 426 jobs in area, representing 64% of all jobs within the area, and a combined economic output of over $82 million (REMPLAN, 2024).



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2.3. Governance Context

2.3.1. Planning Strategies

2.3.1.1. Perth and Peel @ 3.5 Million and Central Sub-Regional Planning Framework

The Perth and Peel @ 3.5 Million suite of documents provides a framework for the development of the Perth and Peel regions as the population reaches an estimated 3.5 million people by 2050. The suite of documents includes four planning frameworks for the Central, North-West, North-East and South Metropolitan sub-regions. These documents provide the detailed commentary and analysis accompanying the overall 'Spatial Plan for Perth and Peel @ 3.5 million'.

The subject site lies within the Central Sub-Regional Planning Framework. Under the Framework, Ascot Racecourse is identified as forming part of a 'Green Network' that extends along the Swan River. Great Eastern Highway is identified as an 'Urban Corridor' where focus should be given to investigating increased residential densities, with potential for mixed land uses where appropriate. Both Great Eastern Highway, and Grandstand Road and Resolution Drive immediately abutting Perth Racing's landholdings are identified as a 'high-frequency public transit' route.

2.3.1.2. City of Belmont Local Planning Scheme No. 15 – Report of Review

In accordance with the requirements of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the City undertook a review of LPS 15, preparing a 'Report of Review' analysing the operation of the existing local planning framework. The Report of Review acknowledged the Council had adopted a number of supporting documents and sub-planning strategies to LPS 15, however it was concluded that these documents were considered outdated (adoptions dating from 2008 to 2011).

The Report of Review states that due to the extent of the review required and the age of the strategy, a new local planning strategy and associated sub-strategies should be prepared. The recommendations of the Report of Review were supported by the WAPC on 9 February 2021.

2.3.1.3. City of Belmont Activity Centres Planning Strategy

The City's Activity Centre Planning Strategy ('ACPS') is a holistic guide for the future planning of activity centres within the City of Belmont, based on the current strategic planning framework, future economic trends and analysis of best practice activity centre planning, as outlined by State Planning Policy 4.2 – Activity Centres ('SPP 4.2').

Of relevance to the Precinct Structure Plan area, the ACPS identifies a future 'Local Centre' within the Ascot Waters residential estate (500m2 NLA) and the Golden Gateway Precinct (1,200m2 NLA). It is intended that the 'Local Centre' would capture a 200m walkable radius which would include a portion of the Precinct area. Further to this, it is noted that a Retail Needs Assessment commissioned by the DPLH in 2016, predicts that the nearby Ascot Kilns site could accommodate a total of 515m2 of retail floor area.

During the ACPS consultation period, a submission was prepared on behalf of Perth Racing seeking to designate the future Golden Gateway Local Centre on Perth Racing's landholdings, immediately adjacent to Resolution Drive. Additionally, and as part of this Precinct Structure Plan, a Net Benefit Test has been prepared to justify the appropriateness of the proposed Local Centre in this location to address future planning of its landholdings. This is discussed further in Section 5.6 of this Report.

Refer **Appendix 6 – Retail Assessment (Net Benefit Test)**.

2.3.1.4. City of Belmont draft Great Eastern Highway Urban Corridor Strategy

The City's draft Great Eastern Highway Urban Corridor Strategy ('Corridor Strategy') has been prepared to guide land use planning along Great Eastern Highway, which is identified as an 'Urban Corridor' under the Central Sub-Regional Planning Framework. The Corridor Strategy establishes a 'vision' for the corridor, addressing matters relating to land use, built form, the public realm, and access arrangements.

Of relevance to the Precinct Structure Plan area, the Corridor Strategy identifies land fronting Great Eastern Highway, within the Golden Gateway Precinct as an 'Activity Node'. This Activity Node will provide convenience for residents to the north within the Golden Gateway Precinct, being a portion of the Precinct Structure Plan area.

Following the consideration of submissions, at the Council meeting held on 26 September 2023, the Corridor Strategy was endorsed for further modifications and readvertising for a period of 28 days. One of the modifications include updating the Corridor Strategy to be consistent with the principles of SPP 4.2 and the activity centres identified in the ACPS. At the time of writing this Structure Plan, the Corridor Strategy had not yet been adopted.

2.3.2. Zoning & Reservations

2.3.2.1. Metropolitan Region Scheme

The Precinct Structure Plan area is primarily zoned 'Private Recreation' under the Metropolitan Region Scheme ('MRS'), with the balance of the land zoned 'Urban'. Land abutting the Swan River within the Precinct Structure Plan area is reserved 'Parks and Recreation' and is situated within the 'Swan and Canning River Development Control' area. The surrounding land is zoned 'Urban', notwithstanding 'Bush Forever Site No. 313' situated to the north-west of the subject land and Garratt Road.

The Structure Plan identifies the rezoning of Precinct A to 'Mixed Use' under LPS 15, which is currently subject to a 'Private Recreation' zone under the MRS. To provide consistency with the MRS, it may be necessary to progress an MRS Amendment to facilitate the 'Mixed Use' zoning of the site under LPS 15.

Refer **Figure 4 – Metropolitan Region Scheme Zoning**.

2.3.2.2. City of Belmont Local Planning Scheme No. 15

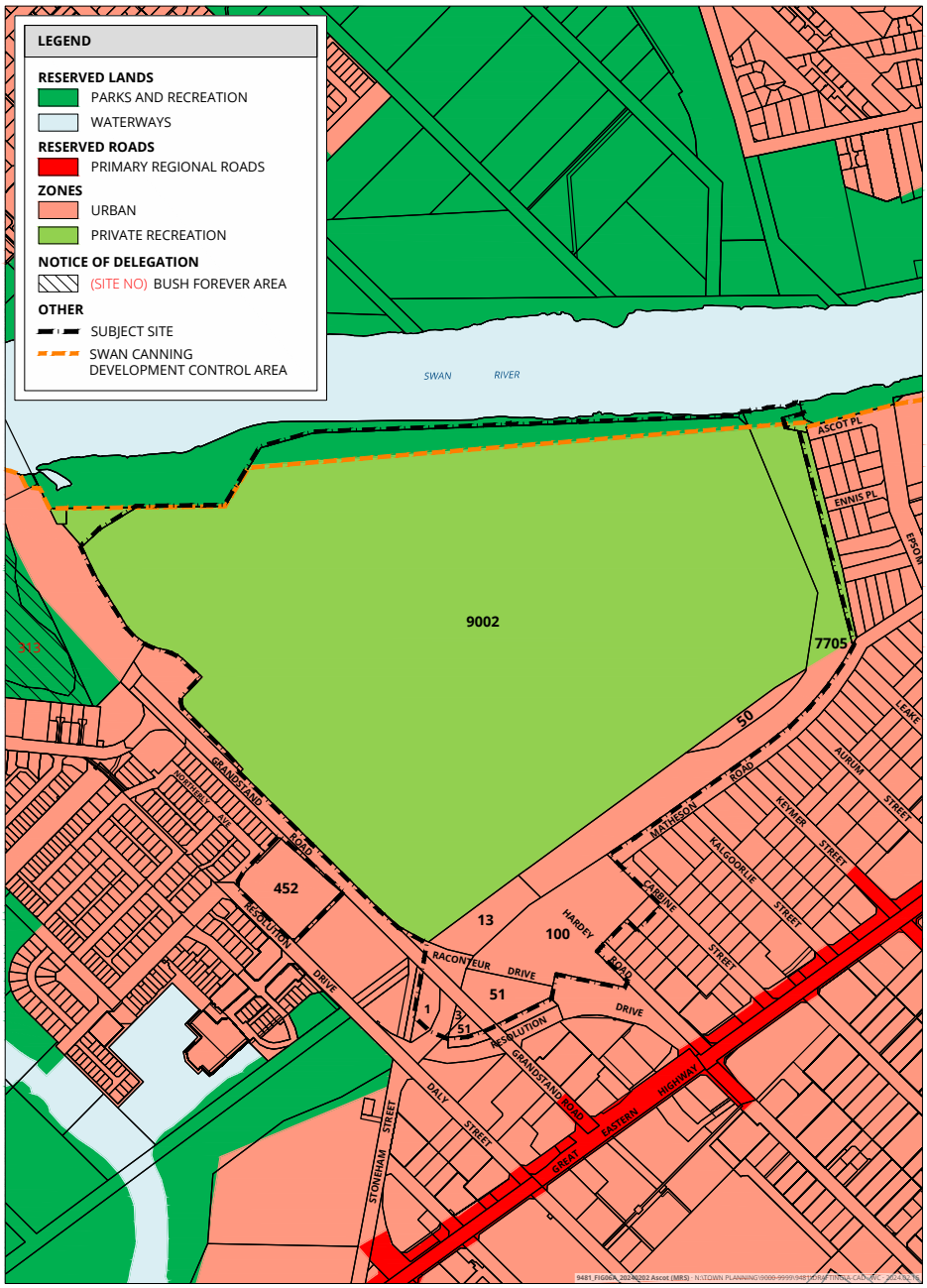
The Precinct Structure Plan area is predominantly zoned 'Place of Public Assembly – Racecourse' and identified as 'Additional Use 18' ('A18') under the City of Belmont's LPS 15. The southern portion of the subject land, abutting Resolution Drive, is zoned 'Mixed Use' under LPS 15.

Under the provisions of LPS 15, A18 enables the subject land to be considered for the additional uses of 'Horse Sales' and 'Stables' which are not otherwise permissible under the 'Place of Public Assembly' zone. This Precinct Structure Plan proposes to modify the scope of Additional Uses applicable to the Place of Public Assembly zone, but retain the general intent and nature of the uses provided.

The proposed zoning under Plan 1 – Local Structure Plan would be inconsistent with the existing zonings applicable to Precincts A, D, and E. A Scheme Amendment will be required to ensure consistency between the Structure Plan and LPS 15.

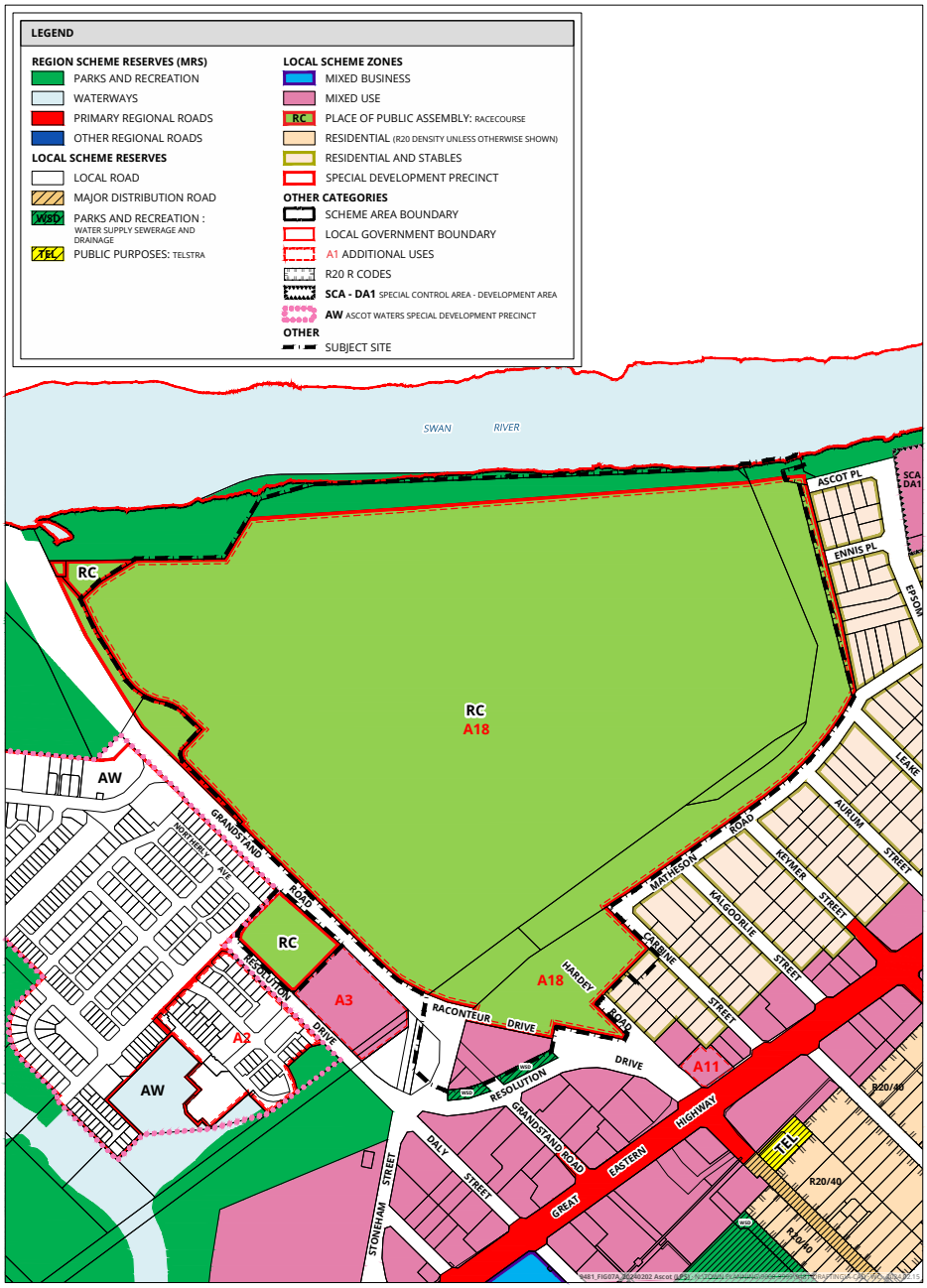
Refer **Figure 5 – City of Belmont Local Planning Scheme No. 15 Zoning**.

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



4. *Metropolitan Region Scheme*

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



5. *LPS 15 Zoning Plan*

2.3.3. Draft Golden Gateway Local Structure Plan

The City's draft Golden Gateway Structure Plan was prepared to coordinate future subdivision, zoning and development of land generally bound by Great Eastern Highway to the south, the Swan River to the west, the Ascot Waters precinct to the north, and the Ascot Racecourse/Residential and Stables precinct to the east.

The Golden Gateway Structure Plan proposes 'Mixed Use' and 'Residential' zones that enables development ranging from 2 to 20 storeys, including approximately 5.1ha of Perth Racing landholdings, and proposes to establish a 'Local Centre' along Daly Street.

On 23 June 2020, the Golden Gateway Structure Plan was presented to Council following the conclusion of public consultation. During the advertising period, 127 submissions were received, raising issues relating to traffic, built form, public open space, land use, car parking and the future of the Ascot Kilns and Belmont Trust sites.

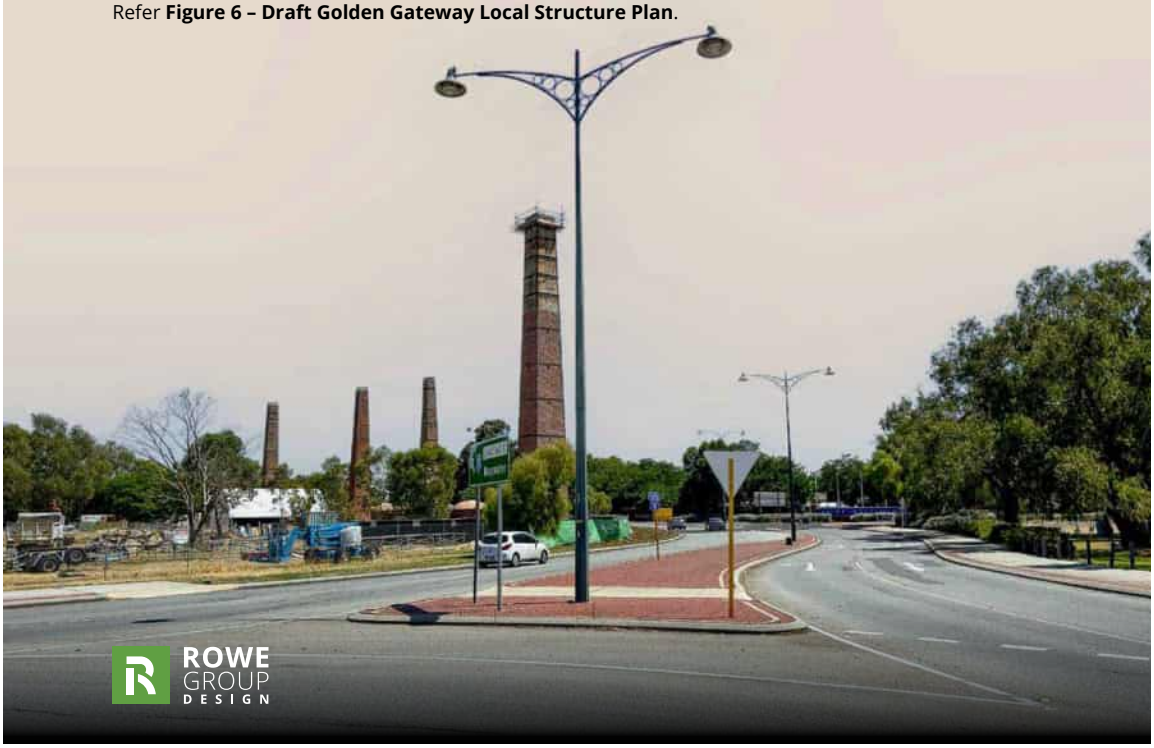
In response to the above and of relevance to the Precinct Structure Plan area, Council resolved to:

- Revisit the proposed changes to the movement network, including the realignment of Resolution Drive along Raconteur Drive.
- Reduce the building heights to facilitate an appropriate interface to the existing Ascot Waters Estate and Residential and Stables area.

Council also noted their desire to see the Ascot Kiln site developed into a park to allow for the wider community to access and interact with the heritage structures.

At the time of writing this report, we understand that the City is seeking to proceed with the option of retaining the existing road network as is, namely maintaining the existing alignment of Resolution Drive. It is also understood that the City are open to reviewing the position of the future Local Centre within the Precinct, with a view that it could be predominantly located on Perth Racing's landholdings.

Refer **Figure 6 – Draft Golden Gateway Local Structure Plan**.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



6. Draft Golden Gateway Local Structure Plan

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

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2.3.4. State Planning Policies & Guidelines

2.3.4.1. State Planning Policy 2.10 – Swan-Canning River System

State Planning Policy 2.10 – Swan-Canning River System ('SPP 2.10') is an overarching framework that sets out guiding principles for decision making in relation to planning proposals over the Swan and Canning River and its foreshore.

SPP 2.10 contains four (4) guiding principles of social benefit, environmental values, cultural and natural heritage and design and development, and nine (9) precinct areas. The Precinct Structure Plan area is identified within the 'Lower Swan' precinct which is a broad area around the Burswood, Maylands, and Garvey Park peninsulas. The precinct area is subject to certain objectives concerning landscape values which aims to:

- Establish protection measures for riparian vegetation on foreshores;
- Promote an aesthetic environment for new riverside development appropriate to its surroundings, and establish a sense of place by the river;
- Recognise the importance of the river for transport, commerce, tourism and leisure as well as its conservation value;
- Enhance the appearance and function of existing recreation, tourism and commercial nodes and of proposed nodes identified in an adopted Swan-Canning precinct plan;
- Protect places of cultural significance, in particular places on the Register of Heritage Places and the Department of Indigenous Affairs register of significant places; and
- Ensure that subdivisions incorporate adequate foreshore reserves and building setbacks.

The Precinct Structure Plan promotes development outcomes that respect the values of the Swan River. No clearing is proposed within the Swan River foreshore area and the Precinct Structure Plan stipulates minimum setback distances from the foreshore in accordance with DBCA policy.

2.3.4.2. State Planning Policy 3.0 – Urban Growth & Settlement

State Planning Policy 3.0 – Urban Growth and Settlement ('SPP 3.0') is a broad sector policy that sets out the principles and considerations to facilitate sustainable patterns of urban growth and settlement in Western Australia. The objectives of SPP 3.0, are as follows:

- To promote a sustainable and well-planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space.
- To build on existing communities with established local and regional economies, concentrate investment in the improvement of services and infrastructure and enhance the quality of life in those communities.
- To manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage and community values and constraints.

- To promote the development of a sustainable and liveable neighbourhood form which reduces energy, water and travel demand whilst ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing and creates an identifiable sense of place for each community.
- To coordinate new development with the efficient, economic, and timely provision of infrastructure and services.

The Precinct Structure Plan is consistent with (and promotes) a number of key principles contained within SPP 3.0 including the following:

- Sufficient and suitable serviced land in the right locations for housing, employment, commercial, recreational and other purposes, coordinated with the efficient and economic provision of transport, essential infrastructure and human services.
- Variety and choice in the size, type and affordability of housing to support a range of household sizes, ages and incomes and which is responsive to housing demand and preferences.
- Making the most efficient use of land in existing urban areas through the use of vacant and under-utilised land and buildings, and higher densities where these can be achieved without detriment to neighbourhood character and heritage values; the cost-effective use of urban land and buildings, schools and community services, infrastructure systems and established neighbourhoods; and promoting and encouraging urban development that is consistent with the efficient use of energy.
- Supporting higher residential densities in the most accessible locations, such as, in and around town and neighbourhood centres, high frequency public transport nodes and interchanges, major tertiary institutions and hospitals, and adjacent to high amenity areas such as foreshores and parks.



- Giving priority to infill development in established urban areas, particularly through urban regeneration and intensification of development of under-utilised urban land, whilst respecting neighbourhood character.
- Locating higher residential densities in locations accessible to transport and services, such as in and around the CBD, regional and district centres, activity corridors and higher education campuses, and in selected areas of high amenity on the coast and river foreshores.

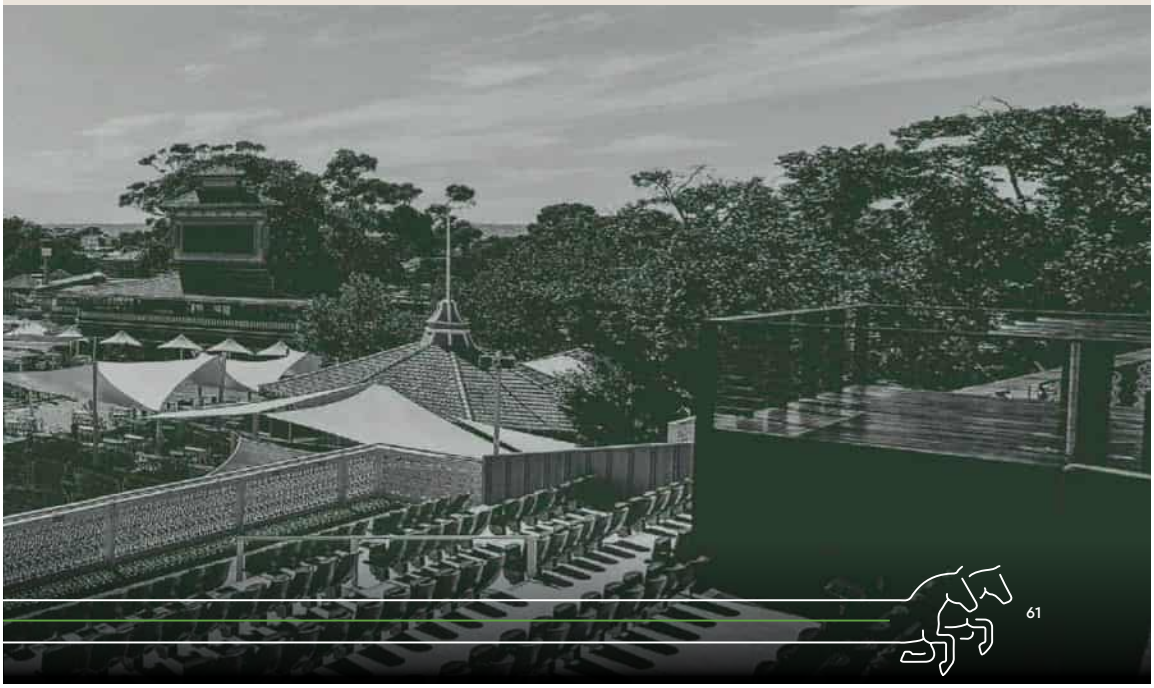
In this regard, the proposed Precinct Structure Plan is consistent with the objectives and principles for future urban growth. The proposal promotes a well-planned pattern of development within the existing urban area of the Ascot Racecourse and surrounding land.

Furthermore, the provisions of the Precinct Structure Plan will ensure that development and subdivision over the subject land responds well to the existing context through the promotion and coordination of sustainable development, consistent with the objectives of SPP 3.0.

2.3.4.3. State Planning Policy 4.2 – Activity Centres

SPP 4.2 provides a hierarchy and network of activity centres that meets the needs of the community , and provides economic and environmental benefits, enables the distribution of goods and services, and facilitates retail, commercial and mixed used developments.

SPP 4.2 applies to the Precinct Structure Plan as Precinct E is intended to facilitate the development of an activity centre at the intersection of Grandstand Road and Resolution Drive, forming part of the wider Golden Gateway activity centre. The size and scale of the proposed Golden Gateway activity centre would be akin to a 'Local Centre' or a 'Neighbourhood Centre' under SPP 4.2.



SPP 4.2 outlines the role and characteristics of a 'Local Centre' and 'Neighbourhood Centre' as follows:

> *Local centres provide for the convenience and incidental needs of local communities. These centres provide an important role in providing walkable access to services and facilities for local communities.*
>
> *Neighbourhood centres are important focal points that provide for daily to weekly household shopping needs, community facilities and a small range of other convenience services. They are also a focus for medium density housing. These centres play an important* role in providing walkable access to services and facilities for local communities.

In this regard, the proposed Golden Gateway activity centre, partially located within the Precinct E of the Structure Plan area, will provide for the required convenience, services and community facilities to sufficiently cater for the proposed housing density and future community.

Refer **Appendix 6 – Retail Assessment (Net Benefit Test)**.

2.3.4.4. State Planning Policy 5.4 – Road and Rail Noise

State Planning Policy 5.4 – Road and Rail Noise ('SPP 5.4') applies where a noise sensitive land use is proposed within proximity to major transport and freight corridors. Under SPP 5.4, the proposed 'Mixed Use' zone of the Precinct Structure Plan is partially located within the noise buffer zone of Great Eastern Highway, being a strategic freight and major traffic route.

In this regard, a Transportation Noise Assessment has been prepared by Lloyd George Acoustics in support of the proposed Precinct Structure Plan. The Transportation Noise Assessment concluded that:

- Due to the screening effect of existing buildings, any ground floor noise sensitive uses would be compliant with the outdoor noise target; and
- Noise sensitive uses above ground floor and within 200 metres of Great Eastern Highway would be subject to Package A, including a notification on title. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available.

Implementation of the abovementioned requirements will be applied as a condition of subdivision or development approval (as applicable).

Refer **Appendix 7 – Transportation Noise Assessment**.

2.3.4.5. State Planning Policy 7.2 – Precinct Design

State Planning Policy 7.2 – Precinct Design ('SPP 7.2') and associate Precinct Design Guidelines provides guidance on the design, planning, assessment and implementation of precinct structure plans, local development plans, subdivision and development in areas identified as precincts.

SPP 7.2 contains six (6) precinct design elements which set out specific considerations for decisionmakers when considering the above proposals. These include, urban ecology, urban structure, public realm, movement, land use and built form.

Each of the design principles has been considered and informs the design objectives for the Precinct Structure Plan, as set out in the Design Response section of this Report.

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

3. Opportunities & Constraints Analysis

3.1. Analysis

The preparation of this Precinct Structure Plan has been informed by a detailed site analysis and technical reporting. An analysis of the strengths, weaknesses, opportunities and threats is provided below.

Strengths

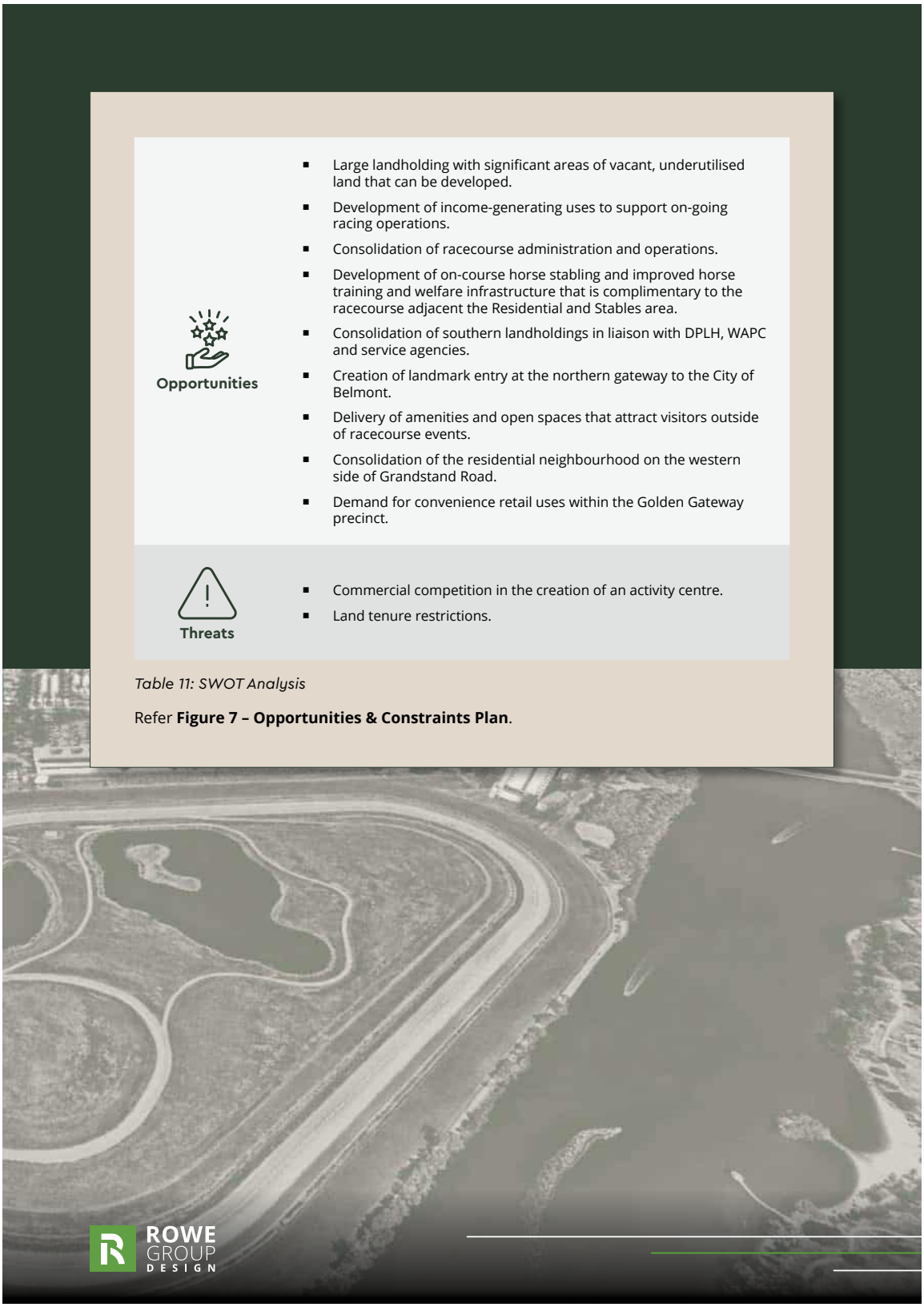
- Established racecourse operation serving as the premier racing destination in Western Australia.
- Established horse racing community within Ascot.
- Single landownership.
- Location at the northern gateway to the City of Belmont.
- Position adjacent to a future activity centre with significant redevelopment potential.
- High levels of accessibility and passing trade from the adjacent road network (Grandstand Road and Resolution Drive) and proximity to Great Eastern Highway.
- Proximity to existing commercial development within Golden Gateway, along Great Eastern Highway, and further afield in the Belmont Business Park.
- Existing heritage values.
- Position adjacent to the Swan River, offering high-amenity values.
- Existing services.

Weaknesses

- Separation between Perth Racing's administration and racecourse operations.
- Land tenure arrangement limits development opportunities.
- Due to restricted ability to sell Perth Racing's landholdings, there is a need to develop income generating uses.
- Fragmentation of southern landholdings towards Resolution Drive with redundant road reservations and existing utility and service infrastructure.
- The Ascot Residential and Stables area is cost-prohibitive for emerging generations of horse trainers and jockeys.
- Access constraints surrounding the existing Grandstand Road / Resolution Drive / Stoneham Street roundabout.

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



Opportunities

- Large landholding with significant areas of vacant, underutilised land that can be developed.
- Development of income-generating uses to support on-going racing operations.
- Consolidation of racecourse administration and operations.
- Development of on-course horse stabling and improved horse training and welfare infrastructure that is complimentary to the racecourse adjacent the Residential and Stables area.
- Consolidation of southern landholdings in liaison with DPLH, WAPC and service agencies.
- Creation of landmark entry at the northern gateway to the City of Belmont.
- Delivery of amenities and open spaces that attract visitors outside of racecourse events.
- Consolidation of the residential neighbourhood on the western side of Grandstand Road.
- Demand for convenience retail uses within the Golden Gateway precinct.

Threats

- Commercial competition in the creation of an activity centre.
- Land tenure restrictions.

Table 11: SWOT Analysis

Refer **Figure 7 – Opportunities & Constraints Plan**.

3.2. Design Objectives

The design objectives of this Precinct Structure Plan are as follows:

- Respect the history and importance of Ascot Racecourse and the wider horse racing industry through the protection and enhancement of racecourse operations.
- Provide appropriate land use and built form transition and interface with the Residential and Stables area.
- Facilitate land uses that support the development of the Golden Gateway activity centre and provide income-streams to support racing operations.
- Support land use and development adjacent to Ascot Waters Estate that is consistent and compatible with the residential nature and built form scale of this area.
- Utilise high amenity land adjacent to the Swan River and Racecourse for landmark development, reflective of its position at the northern gateway to the City of Belmont.
- Enhance the public interface, amenity, and accessibility of Ascot Racecourse.

The above objectives have been considered through the development of a Master Plan and the Structure Plan. It ultimately provides a site responsive design that integrates the aspirations of Perth Racing with the characteristics of the local area.



3.3. Concept Development

A Master Plan was prepared as a reflection of the findings of the site analysis and design objectives. The purpose of the Master Plan exercise was to examine the physical attributes of the Structure Plan area and its surrounding context, to ultimately underpin the design and development of the subject land.

The design process began by mapping the existing physical characteristics of the subject land and surrounding area, such as:

- The location of the existing Racecourse and supporting infrastructure.
- Land tenure arrangement and degree of land consolidation/fragmentation.
- The identification of vacant, underutilised land.
- The prevailing land use and development pattern in the surrounding area, notably the Residential and Stables area to the south and east, Ascot Waters Estate to the west, commercial development to the south, and the Swan River to the north.
- The wider public open space and movement network, including traffic routes, key access points, the pedestrian and cycling network, and recreational nodes.
- Existing character elements of the site and surrounding area, noting historical features within Ascot Racecourse and adjacent Ascot Kilns.
- Land and environmental considerations, considering topography, soil, environmental attributes and associated requirements.
- Availability of existing servicing infrastructure.

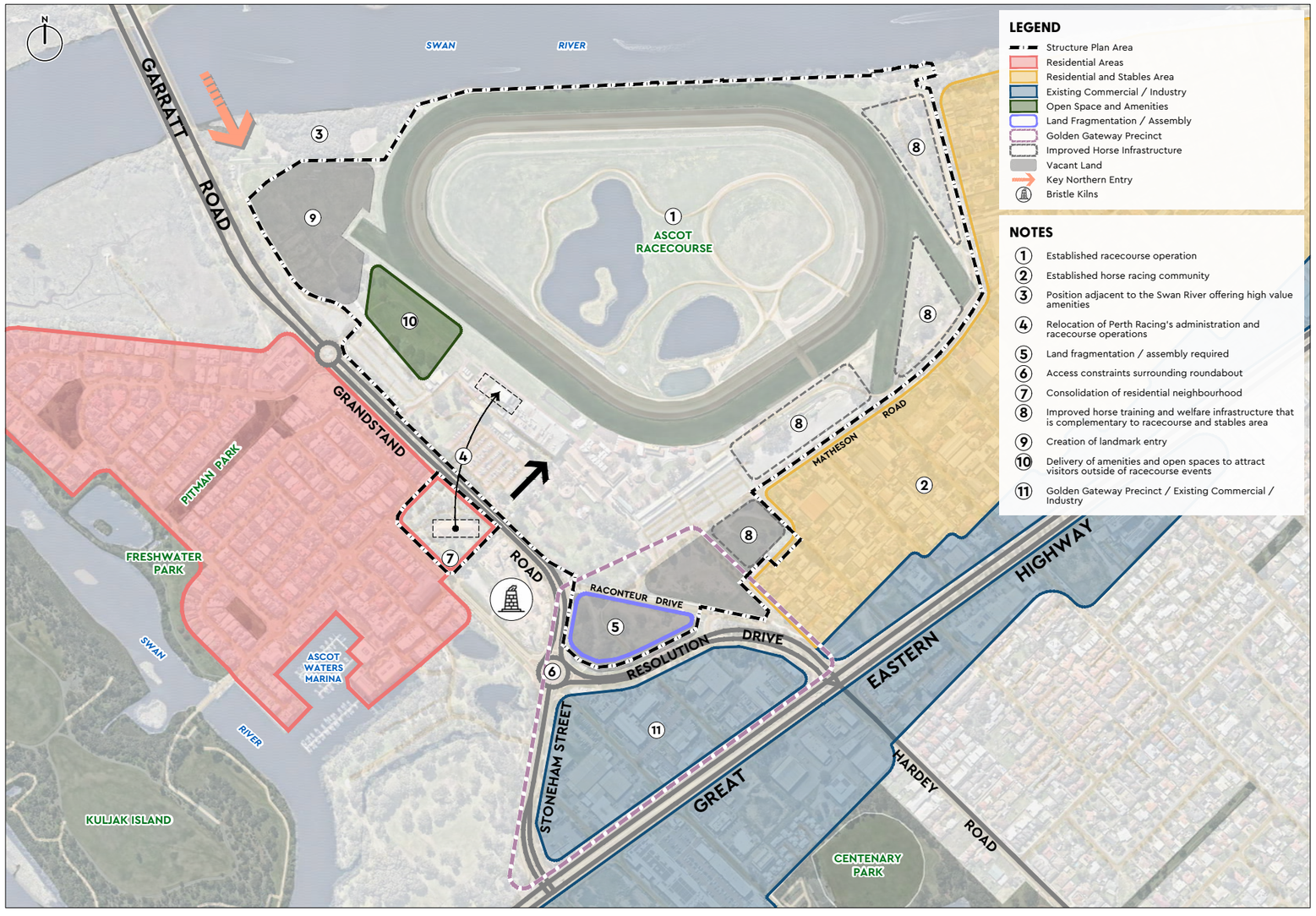
The design was then developed into an overall Master Plan for the land, considering the key design objectives for the site. The key features of the Master Plan include:

- The development of on-course horse stabling, horse training and horse welfare infrastructure (equine welfare centre) along the site's southern and eastern boundaries, adjacent to the Racecourse and Residential and Stables area.
- Utilising Perth Racing's southern landholdings to develop a range of commercial uses that support the development of the Golden Gateway activity centre.
- The development of a retirement village at the north-western gateway of the site overlooking the Swan River and Racecourse.
- The development of a new Perth Racing administrative building, hospitality venue, and parkland area at the Racecourse, adjacent to existing facilities.
- The redevelopment of the existing administrative building adjacent to Ascot Waters Estate for residential uses.

Refer **Figure 8 – Master Plan**.

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



7. Opportunities & Constraints Plan

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



8. Master Plan

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4. Stakeholder & Community Engagement

4.1. Pre-Lodgement Engagement

4.1.1. City of Belmont

The Project Team have had ongoing discussions with the City of Belmont in relation to planning work being undertaken in the area, specifically the Golden Gateway Structure Plan, Perth Racing's development aspirations, and the progression of its own Structure Plan for its landholdings.

In terms of initial engagement, in October 2019, Perth Racing prepared a submission on the draft Golden Gateway Structure Plan, which encompassed Perth Racing's southern and eastern landholdings. Perth Racing were generally supportive of the Structure Plan intent and zoning proposed, however raised concerns in relation to the proposed movement network. At that time, Perth Racing had not developed a vision for its landholdings.

Since 2021, Perth Racing have been developing a long-term vision for their landholdings, including both land within and outside of the Golden Gateway Precinct. It became apparent through this work that the development aspirations outlined in the Golden Gateway Structure Plan, being predominantly focussed on mixed commercial/residential development, did not align with the development outcomes that could be realistically delivered by Perth Racing or appropriately planned by the City of Belmont.

On this basis, Perth Racing, in consultation with the City of Belmont, made the decision to proceed with preparing a separate Structure Plan for the entirety of its landholdings. It is understood that the City of Belmont are supportive of this approach and would look to excise Perth Racing's landholdings from the draft Golden Gateway Structure Plan.

In terms of this Structure Plan, initial feedback was received from the City in relation to the proposed zoning and development provisions. Key feedback provided by the City included:



- The need to adequately justify the proposed elements of the Structure Plan such as building height, plot ratio, and retail floorspace provision.
- Managing the interface and access arrangements of commercial development to Resolution Drive and the Belmont Main Drain.
- The inclusion of provisions to manage the heritage values of the site.
- The inclusion of provisions to address landscape interfaces, particularly along Grandstand Road and Matheson Road.

The above key feedback has been considered and addressed in the preparation of this Structure Plan.

4.1.2. Department of Planning, Lands & Heritage

The Project Team met with officers at the Department of Planning, Lands & Heritage ('DPLH') on two occasions in April 2024 to discuss the preparation and progression of a Structure Plan for Perth Racing's landholdings in Ascot.

The purpose of the initial meeting was to brief DPLH on Perth Racing's development aspirations and initial concept and seek support for the preparation of a Structure Plan to facilitate zoning changes to enable those aspirations to be realised. The DPLH provided high-level feedback only, focussing on the need for a Structure Plan to be prepared rather than commenting on specific elements of the draft concept.

The second meeting with DPLH included officers from the City of Belmont. Discussion focussed on the relationship between the draft Golden Gateway Structure Plan and the proposed Ascot Racecourse Precinct Structure Plan, and the manner in which they can holistically plan over the area. Particular consideration was given to Precinct E, the portion of Perth Racing's landholdings which falls within, and will interface with, the draft Golden Gateway Structure Plan area. The consensus with the City of Belmont was that these matters can be appropriately managed through collaboration with Perth Racing's Project Team. The DPLH concluded that they would permit concurrent structure plans being prepared.



4.1.3. Department of Biodiversity, Conservation & Attractions

The Project Team met with officers from the Department of Biodiversity, Conservation & Attractions ('DBCA') in March 2024 to receive preliminary feedback on the concept plan. The key themes raised by DBCA included the following:

- The importance of wastewater management, ensuring no increase in nutrient loading to groundwater given the site's proximity to the Swan River.
- The need for development and infrastructure to be setback a minimum of 10m from the Swan River foreshore.
- The need to consider the aesthetics of proposed development from the foreshore river, including colour schemes and fencing.
- Support for any landscape screening and/or revegetation with native plantings, including trees that provide shade and habitat.
- Support for stormwater recycling on-site for irrigation purposes, depending on flood management requirements and water quality management.

The DBCA encouraged further preliminary engagement ahead of the lodgement of applications for development approval for works adjacent to the Swan River foreshore.

4.1.4. Community Engagement

Extensive community engagement was undertaken by the City of Belmont in the preparation and review of the draft Golden Gateway Structure Plan, which included consideration of Perth Racing's landholdings. The key concerns raised through the engagement process related to:

- The proposed building heights and their appropriateness for the area.
- The appropriateness of certain land uses within the 'Mixed Use' zone.
- The adequacy of public open space provision.
- Potential built form outcomes.
- The design of the movement network.
- Traffic increases and the capacity of the existing road network.
- Car parking requirements.

The feedback was subject to deliberation by the City and Council, with an Officer Report prepared for Council's consideration at their 23 June 2020 Ordinary Council Meeting. In considering the draft Structure Plan, Council resolved to require a series of modifications to the plan. Of relevance to the Ascot Racecourse Precinct Structure Plan, key modifications included:

- Applying a 'Residential' and 'Mixed Use' zoning over Lot 452 Grandstand Road (Precinct D) and applying densities of 'R40' and 'R100' with maximum building height limits of 3 to 5 storeys.
- Maintaining the 'Mixed Use' zoning to land immediately fronting Resolution Drive (Lot 3 Grandstand Road and Lot 51 Raconteur Drive within Precinct E) and applying a density of 'R-AC3' with a maximum building height of 6 storeys.

- Applying a 'Residential and Stables' zoning and a density of 'R10' to the portion of Lot 100 Raconteur Drive (Precinct E), bound by Hardey Road, Matheson Road and Carbine Street, to align with the zoning of the adjacent area.
- Applying a 'Residential' zoning and densities of 'R50' and 'R100' to the portion of Lot 100 Raconteur Drive (Precinct E), bound by Hardey Road and Raconteur Drive to serve as a transition between the 'Mixed Use' and 'Residential and Stables' zones.

The abovementioned modifications have been considered in the preparation of the Ascot Racecourse Precinct Structure Plan, whilst also having regard to Perth Racing's vision for their landholdings which has significantly evolved since Council's consideration of the Golden Gateway Structure Plan.

4.2. Post-Lodgement Engagement

In accordance with the requirements of the *Planning and Development (Local Planning Schemes) Regulations 2015* – Schedule 2 – Deemed Provisions ('Regulations'), the Precinct Structure Plan is required to be publicly advertised and referred to any public authority or utility service provider, as relevant.

Public advertising would typically occur by way of letters being sent to owners and occupiers who, in the opinion of the City, are likely to be affected by the proposed Precinct Structure Plan. In addition, advertising of the Structure Plan must occur by way of a notice being published on the City's website. Advertising may also occur by way of newspaper advertising, a sign being placed on the site, and documents being made available at the City's office.

In terms of service agencies and utility providers, the Precinct Structure Plan should, at the very least, be referred to the following agencies/utility providers:

- Main Roads WA
- Water Corporation
- ATCO
- Western Power
- Heritage Council of WA
- Department of Biodiversity, Conservation and Attractions
- Department of Water & Environmental Regulation

Following public advertising, the City is required in accordance with the Regulations, to consider all submissions received and provide a recommendation to the WAPC on the progression of the Precinct Structure Plan.

Further engagement may also be required to satisfy obligations under the *Aboriginal Heritage Act 1972*, the *Environmental Protection Act 1986*, and the *Environment Protection and Biodiversity Conservation Act 1999*.

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5. Design Response

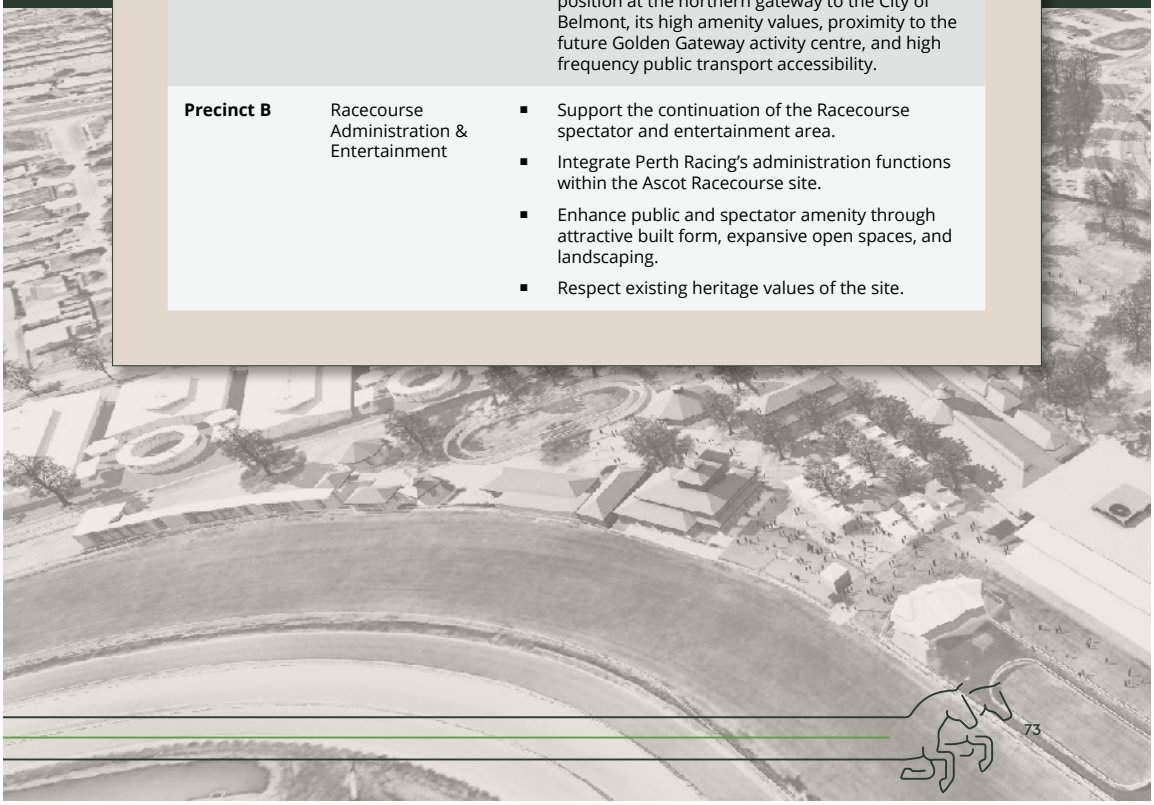
5.1. Vision & Objectives

The Vision of this Precinct Structure Plan is as follows:

> *To support ongoing horse racing activities at Ascot Racecourse through improved facilities and community infrastructure, and business development opportunities, planned in a manner that is financially sustainable and responsive to site context and community needs.*

Having regard to the above Vision and the Opportunities & Constraints Analysis, the Precinct Structure Plan designates five (5) precinct areas subject to a distinctive vision and associated objectives, as outlined below.

Precinct Area	Vision	Objectives
Precinct A	Retirement Living	▪ Facilitate the development of a vertical residential living village to accommodate retiring members of the horse racing industry. ▪ Provide for small scale food and beverage and commercial uses that are ancillary to, and integrated with, the residential housing village. ▪ Facilitate development that will serve as a landmark in the locality, capitalising on its position at the northern gateway to the City of Belmont, its high amenity values, proximity to the future Golden Gateway activity centre, and high frequency public transport accessibility.
Precinct B	Racecourse Administration & Entertainment	▪ Support the continuation of the Racecourse spectator and entertainment area. ▪ Integrate Perth Racing's administration functions within the Ascot Racecourse site. ▪ Enhance public and spectator amenity through attractive built form, expansive open spaces, and landscaping. ▪ Respect existing heritage values of the site.



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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Precinct Area	Vision	Objectives
Precinct C	Racecourse & Stabling	▪ Facilitate land use and development that supports, and is complementary to, the horse racing industry. ▪ Provide for the planned development of on-course horse stabling and ancillary functions to support the ongoing viability of Ascot Racecourse. ▪ Mitigate potential land use conflict through appropriate design and management practices.
Precinct D	Residential & Mixed Use	▪ Provide for medium density residential development of a scale that is consistent and/or compatible with surrounding residential area. ▪ Support the development of small-scale non-residential uses fronting Grandstand Road, including but not limited to a 'Child Care Premises'.
Precinct E	Commercial	▪ Facilitate the development of an activity centre at the intersection of Grandstand Road and Resolution Drive. ▪ Support retail, commercial, and other land uses that are consistent and complimentary with the role and function of an activity centre. ▪ Support land use and development that is complementary to Racecourse operations. ▪ Satisfy existing and future demand for convenience retailing and amenities in the local area.

Table 12: Precinct Vision & Objectives

Refer **Figure 9 – Structure Plan Precincts**.

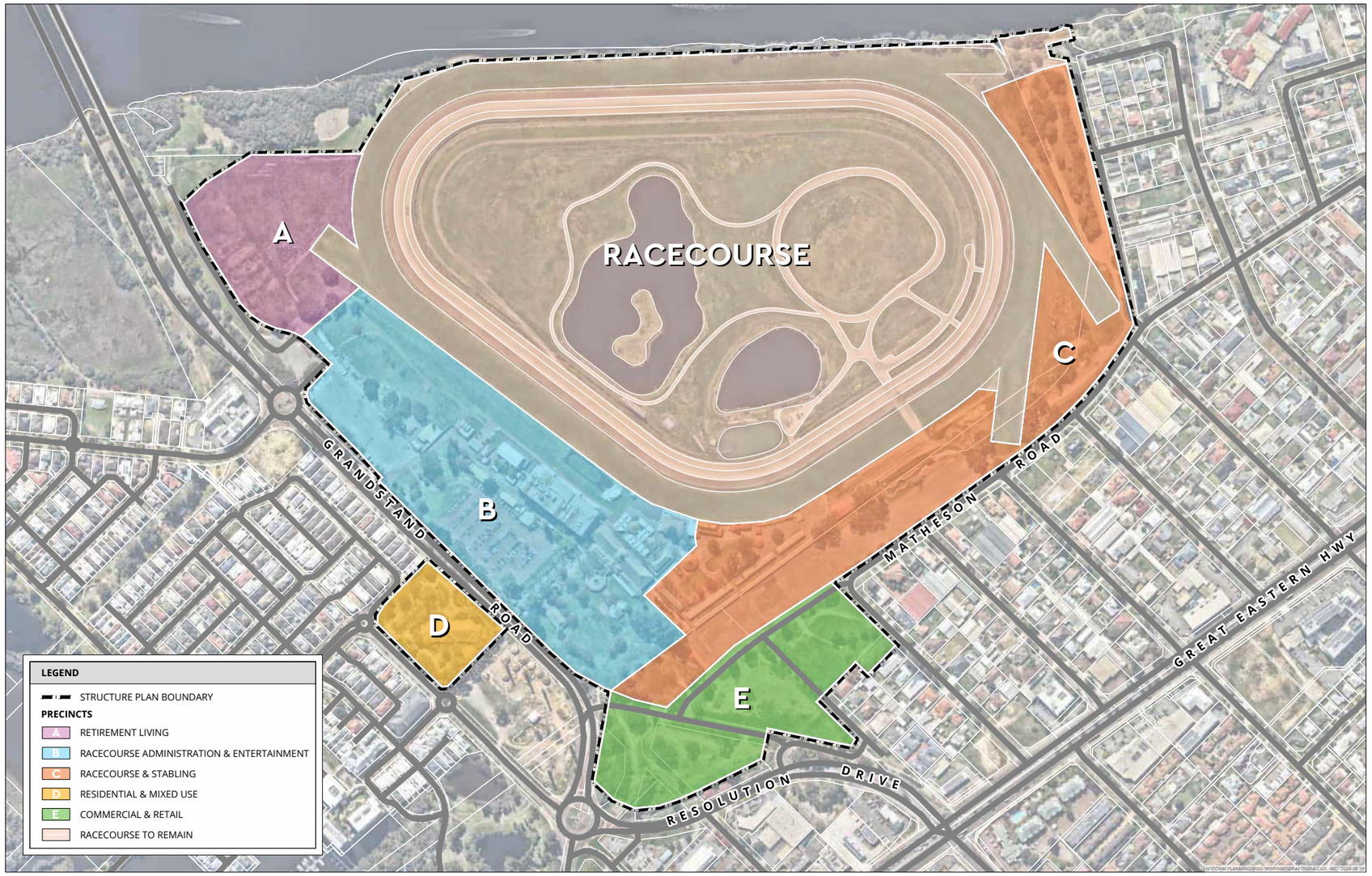
In order to realise the abovementioned vision and objectives, this Precinct Structure Plan provides a framework to guide the use and development of Perth Racing's landholdings in Ascot to support the ongoing viability of horse racing operations at Ascot Racecourse. More specifically, this Precinct Structure Plan seeks to:

- Identify development objectives on a precinct basis, responding to site characteristics, development opportunities, and design responses.
- Provide an indication of likely development outcomes and staging.
- Establish appropriate zoning, land use permissibility, density allocation, and built form requirements that are reflective of precinct objectives and responsive to site context.
- Identify planning requirements applicable to the future subdivision and development of land within the Structure Plan area, having regard to State Planning Policy and other legislative requirements.

Having regard to SPP 7.2, the specific design responses provided by this Structure Plan are discussed below.

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



9. *Structure Plan Precincts*

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

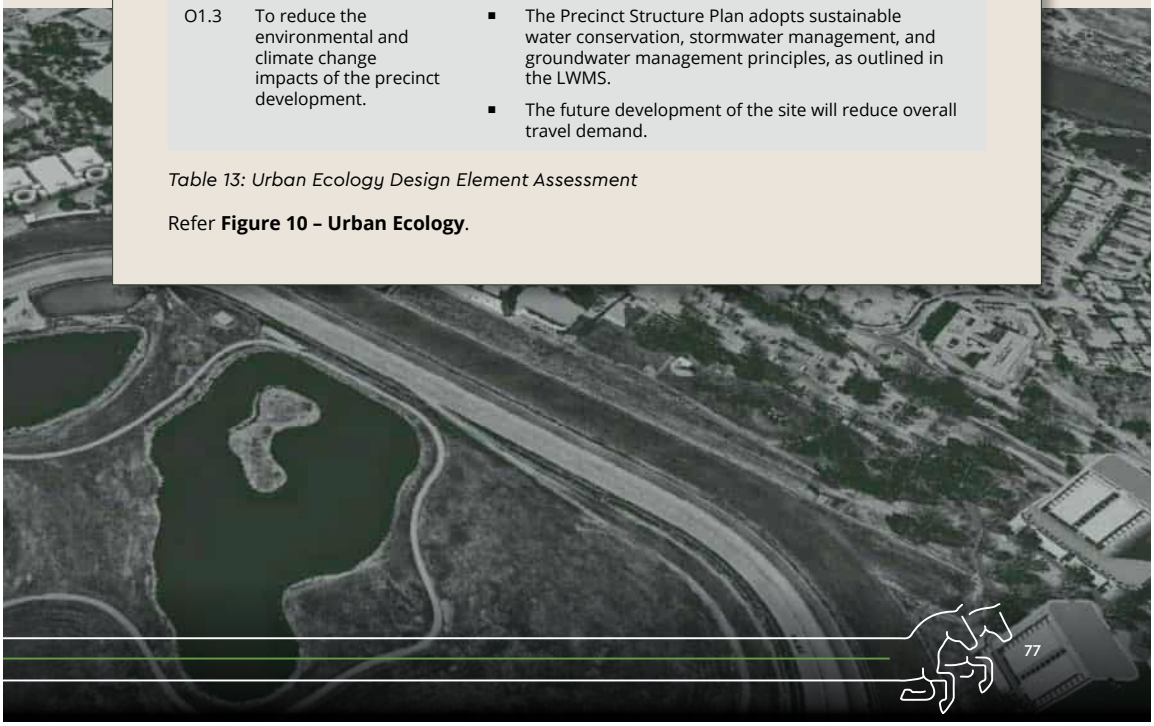
5.2. Urban Ecology

Design Element 1 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Urban Ecology', specifically in developing a holistic understanding of the built and natural environment of the site and its wider context. The SPP 7.2 Design Element Objectives and Design Responses are summarised below, with key considerations outlined in further detail thereafter.

No.	Design Element Objective	Design Element Response
O1.1	To protect, enhance and respond to the ecological systems of the precinct.	▪ The Precinct Structure Plan responds to the ground conditions, understanding the likely fill requirements to address soil and groundwater conditions and flood level clearance. ▪ The Precinct Structure Plan identifies principles and development outcomes that respond to, and seek to enhance existing green networks, through development layout, landscaping provision and interface.
O1.2	To enhance the sense of place by recognising and responding to Aboriginal, cultural and built heritage.	▪ The development outcomes proposed by the Structure Plan do not impact any areas of Aboriginal cultural heritage significance. ▪ The development outcomes proposed by the Precinct Structure Plan, being predominantly related to horse racing, is entirely consistent with the heritage of the site and wider area. ▪ The Precinct Structure Plan limits built scale adjacent to the Bristile Kilns to respect its heritage and landmark values.
O1.3	To reduce the environmental and climate change impacts of the precinct development.	▪ The Precinct Structure Plan adopts sustainable water conservation, stormwater management, and groundwater management principles, as outlined in the LWMS. ▪ The future development of the site will reduce overall travel demand.

Table 13: Urban Ecology Design Element Assessment

Refer **Figure 10 – Urban Ecology**.



5.2.1. Topography & Ground Conditions

The subject site is generally flat, with a slight grade with its highest elevation (7.5m AHD) at the eastern corner of the site, adjacent to Matheson Road, and the lowest elevation (2m AHD) at the north-western area of the site adjacent to the Swan River foreshore reserve. Ground conditions are generally unsuitable for on-site stormwater disposal and due to the flood and regional groundwater levels across the site, some level of fill will likely be required.

Notably, Precinct A will need to accommodate an addition 1-2m of fill to achieve clearance from flood levels. Given Precinct A's interface to an existing road reserve on its western boundary and foreshore reserve on its northern boundary, consideration will need to be given to battering and landscaping to ensure an appropriate interface, noting opportunities to provide connectivity to the foreshore reserve. This will be addressed at the development stage.

A majority of the site is considered to have a 'high to moderate' risk of ASS occurrence within 3m of the natural surface. A detailed ASS investigation and management plan will be required for any intrusive works in areas mapped as having a 'high to moderate' ASS risk.

Refer to **Appendix 4 – Engineering Servicing Report**.

5.2.2. Climate

The site experiences a dry Mediterranean climate of hot dry summers and cool wet winters and is in an area of moderate to high rainfall. Addressing climate change is imperative to future planning, specifically encouraging the adoption of more sustainable practices.

Ascot Racecourse currently holds a groundwater licence with a significant allocation to meet the irrigation requirements of the site and surrounding areas. The Precinct Structure Plan seeks to adopt water conservation measures to limit demand on existing groundwater for irrigation purposes, as outlined in the LWMS. Other water conservation measures are also proposed to generally limit water consumption across the site.

Ascot Racecourse is positioned close to the Perth Central Business District and connected via frequent public transport services, supporting alternative modes of transport to the site. The development of an activity centre accommodating convenience uses will reduce travel demand across the local area.

The development of on-course stables at Ascot Racecourse will enable horses to be kept on premises and thereby reduce travel demand for trainers and jockeys, many of whom are travelling from outer areas of the Perth region.



5.2.3. Water Management

A LWMS has been prepared in support of this Precinct Structure Plan, functioning as a broad drainage strategy for the subject site addressing the management of water associated with future development. The LWMS has been prepared in accordance with the WAPC's Better Urban Water Management document, addressing the principles, objectives, and key criteria.

The principle behind stormwater management at the site is to mimic pre-development hydrological conditions and utilise existing infrastructure where sensible to do so. In the case of groundwater management, the strategy is to maintain existing groundwater hydrology.

The water management criteria of the LWMS are outlined below.

Water Management Criteria

Water Conservation	
WC1	For residential dwellings, consumption target of 60 kL/person/year
WC2	Ensure the efficient use of all water resources.
WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.
Stormwater Management	
SW1	Retain and treat the first 15mm of rainfall as close to source as possible and within site.
SW2	Detain up to 1% AEP rainfall event on-site.
SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.
SW4	Finished floor levels must have a minimum of 300mm clearance above the 1% AEP TWL in the FSA.
SW5	All lots must have a minimum of 500mm clearance above the 1% AEP flood level of the Swan River.
SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.
SW7	Reduce nutrient loads by applying appropriate non-structural measures.
SW8	Design infiltration areas to avoid creating mosquito habitat.
Groundwater Management	
GW1	Surface based infiltration structures should have 300mm clearance above MGL.
GW2	Habitable floor levels should have a clearance to MGL of at least 1.2m.

Table 14: LWMS Water Management Criteria

The LWMS details implementation measures to apply the abovementioned water management criteria to particular elements of the site. Part One of the Precinct Structure Plan identifies the requirement for an Urban Water Management Plan or Stormwater Management Plan to be prepared as a condition of approval to addressing the water management measures outlined by the LWMS.

Refer **Appendix 2 – Local Water Management Strategy**.

5.2.4. Environmental Values

The subject site is predominantly cleared with limited intact native vegetation present or environmental values. Notwithstanding, an assessment undertaken by Emerge Associates identified a small area of 'subtropical and temperate coastal saltmarsh' native vegetation in the north-eastern corner of the site, adjacent to the Swan River, which is listed as a TEC. In addition, the Swan River and adjacent foreshore is identified as a 'Environmentally Sensitive Area' and comprises the Swan River Development Control Area ('DCA'), with the river itself identified as a Conservation Category Wetland ('CCW').

Preliminary consultation with DBCA indicated that any future development will require a minimum 10m setback from the Swan River DCA boundary, which has been reflected as a requirement in Part One of this Structure Plan. Notwithstanding, the Master Plan concept for the site does not propose any development in proximity to the DCA and CCW boundaries or the TEC in the north-eastern corner of the site. Any clearing of native vegetation on the site will require a Clearing Permit pursuant to Part V of the EP Act.

Emerge Associates also found that the site contains 1.27ha of Black Cockatoo foraging habitat and 29 habitat trees, of which four (4) trees contained hollows potentially suitable for Black Cockatoo breeding. These areas are primarily located within the eastern and southern portions of Precinct C, with a small area also located in the north-eastern corner of Precinct E. These areas generally conflict with plans for the on-course stabling and the equine welfare centre, however there may be opportunities to retain some limited areas. This will be considered further through detailed design, however in any event, a referral under the EPBC Act may be warranted prior to works being undertaken.

Part One of the Structure Plan includes requirements for the preparation of a Conservation and Environmental Management Plan and Fauna Management Plan to minimise potential impacts of development works on the abovementioned environmental values.



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5.2.5. Green Network

The established nature of Ascot Racecourse limits opportunities to create new 'green networks' within the site. Notwithstanding, it is pertinent that consideration be given to the existing green network surrounding the site and opportunities for the Structure Plan area to relate to and enhance that green network.

The existing green network surrounding the site is heavily influenced by the Swan River, generally following the foreshore, including along the northern boundary of Ascot Racecourse. Noting the amenity value of this green network, future development within Precinct A will seek to maximise interaction and linkages to this space.

There is a disconnect in the foreshore green network on the western side of the Garratt Road Bridge, requiring pedestrians and cyclists to travel along Grandstand Road to connect to the green network extending westwards from Waterway Crescent, or travel further towards Resolution Drive to connect to the green network south of Ascot Waters Estate. In terms of the latter, to support this linkage, treatments along Ascot Racecourse's existing interface to Grandstand Road are relevant and have been addressed in the supporting Landscape Master Plan.

To the south and east of Ascot Racecourse, there is an existing horse path/trail network that provides safe access between nearby stables and the racecourse. Whilst this does not form a 'green network', it nonetheless influences the layout of the site, noting its connectivity to the proposed on-course stables development along the south and eastern side of the Racecourse.



5.2.6. Heritage

In terms of Aboriginal heritage, the DPLH's Aboriginal Cultural Heritage Inquiry System identified two Aboriginal heritage places located within and adjacent to the subject land. One of the sites (Site 3756 – Swan River) is located outside, but immediately adjacent to the subject land, with the other site (Site 3753: Perth) intersects the western edge of the site (Precinct B), with the boundary being a broader area not accurately defined.

The Master Plan does not propose any development within the boundaries of the identified Aboriginal heritage places. Notwithstanding, should development occur within Precinct B that intersects the boundary of Site 3753, a DPLH file search should be undertaken to accurately determine the extent of the site, prior to any works commencing.

In terms of European heritage, the 'Ascot Racecourse Complex' and 'Lee-Steere House' are heritage places located within the Structure Plan area, both of which are identified under the City of Belmont's Local Heritage Survey with a Management Category of '1' and '4', respectively. Outside of the site, Bristile Kilns (Ascot Kilns), located adjacent to Precinct C, is listed on the State Register of Heritage Places, and the 'Ascot Residential and Stables Area' is included in the City's Local Heritage Survey.

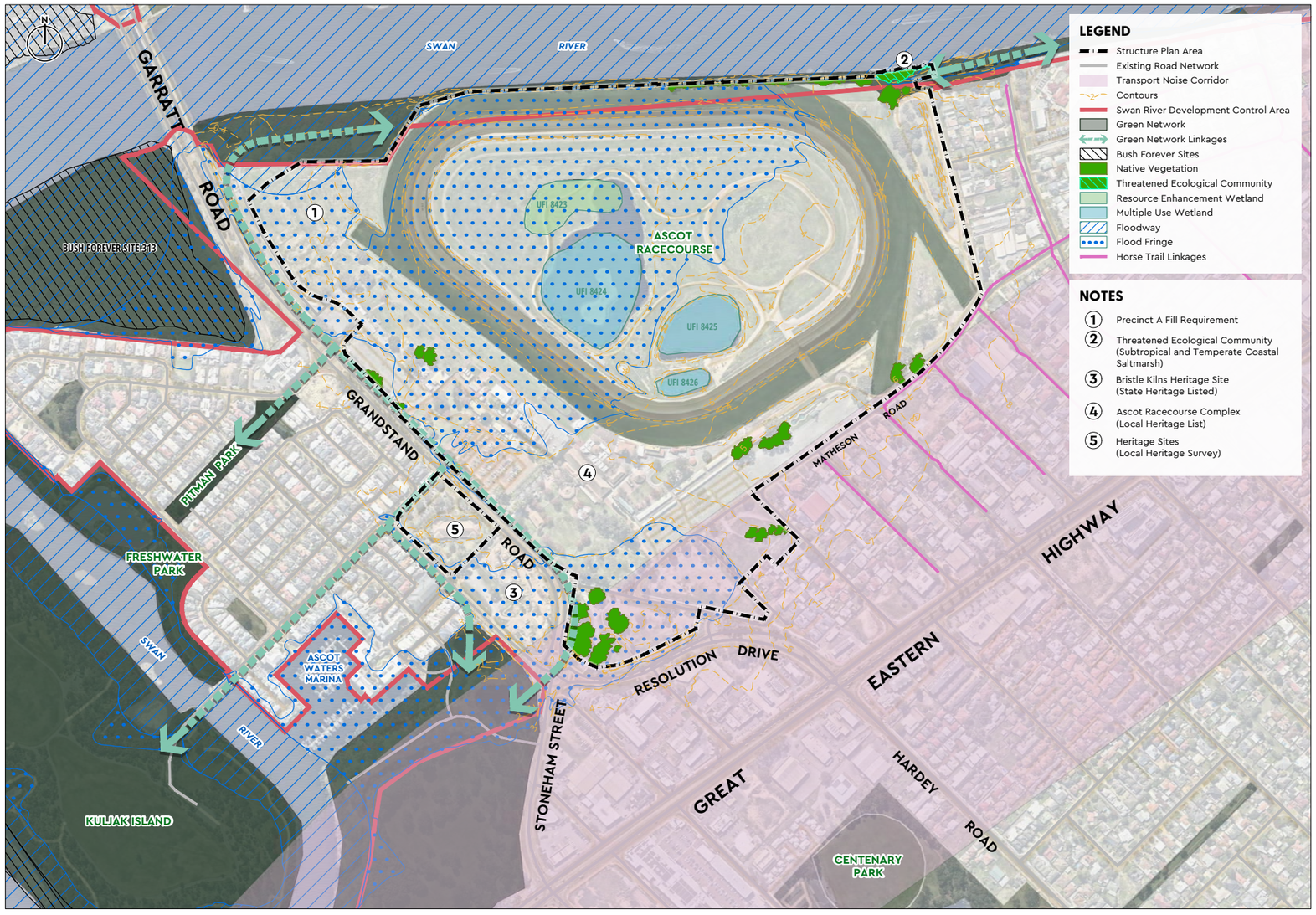
Any future development in relation to the heritage sites within the Structure Plan area may require the preparation of a Heritage Impact Statement, which is addressed in Part One of this Structure Plan. Aside from Lee-Steere House, which is expected to be demolished to accommodate residential development as per the vision for Precinct D, the development outcomes proposed by the Structure Plan, being predominantly related to horse racing, is entirely consistent with the heritage of the area. Prior to the demolition of Lee-Steere House, the site should be photographically recorded, as per the recommendations of the City's Local Heritage Survey.

Noting sensitivities surrounding the Ascot Kilns, consideration has been given to minimising the scale and bulk of future development immediately adjacent to the site. More specifically, Part One of this Structure Plan limits the built scale of development within the immediately vicinity of the Ascot Kilns to 3-storeys, affecting Precinct D. These limitations are considered appropriate in ensuring that the Ascot Kilns remains a landmark heritage feature in the area.



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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



10. Urban Ecology

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5.3. Urban Structure

Design Element 2 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Urban Structure' with the intent that it should be robust, flexible and legible, and designed to support the intended function and built form of the precinct. The SPP 7.2 Design Element Objectives and Design Responses are summarised below, with key considerations outlined in further detail thereafter.

No.	Design Element Objective	Design Element Response
O2.1	To ensure the pattern of blocks, streets, buildings and open space responds and contributes to a distinct, legible precinct character.	▪ Utilising the existing urban structure, the Structure Plan facilitates development outcomes that will better define Ascot Racecourse and improve upon visual connectivity of the site.
O2.2	To promote an urban structure that supports accessibility and connectivity within and outside the precinct.	▪ The Structure Plan is not proposing outcomes that would undermine existing accessibility and connectivity within the area. ▪ The Structure Plan provides for the extension of the existing shared path network, improving wider accessibility (discussed further under the Movement section).
O2.3	To ensure the urban structure supports the built form, public realm and activity intended for the precinct.	▪ The Structure Plan facilitates the creation of development cells that are appropriately sized to accommodate the intended form of development, whilst also providing flexibility to adapt to change.
O2.4	To ensure an adaptable urban structure that can respond to and facilitate change within a precinct.	

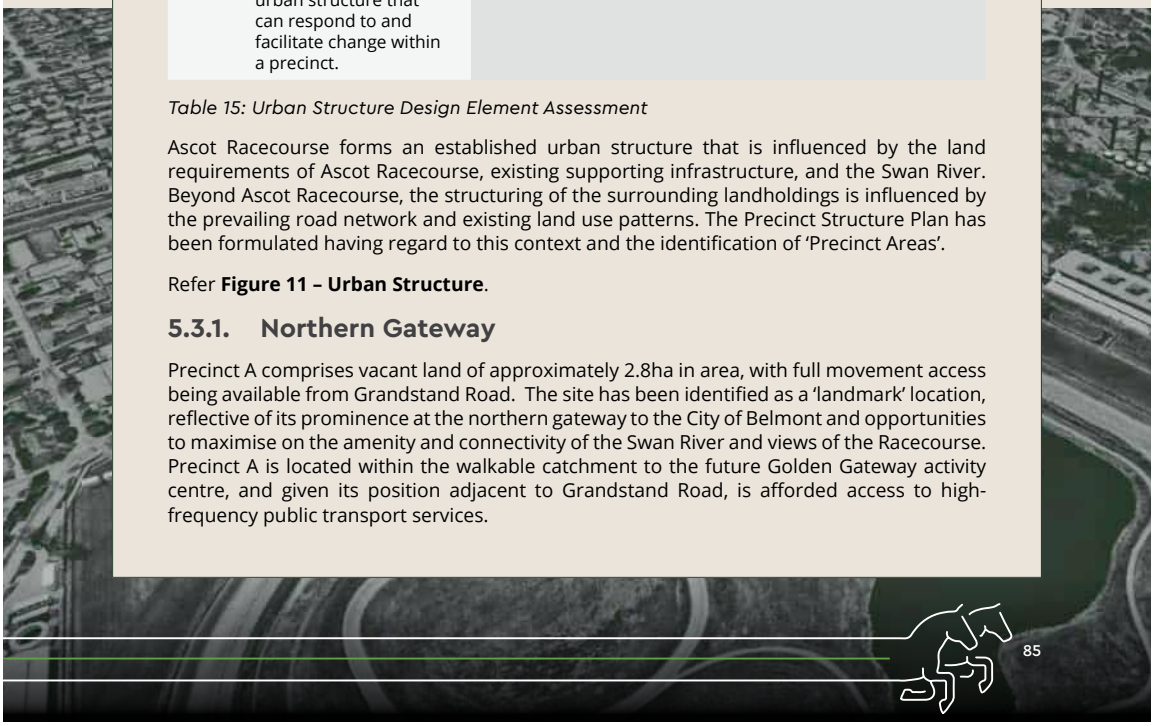
Table 15: Urban Structure Design Element Assessment

Ascot Racecourse forms an established urban structure that is influenced by the land requirements of Ascot Racecourse, existing supporting infrastructure, and the Swan River. Beyond Ascot Racecourse, the structuring of the surrounding landholdings is influenced by the prevailing road network and existing land use patterns. The Precinct Structure Plan has been formulated having regard to this context and the identification of 'Precinct Areas'.

Refer **Figure 11 – Urban Structure**.

5.3.1. Northern Gateway

Precinct A comprises vacant land of approximately 2.8ha in area, with full movement access being available from Grandstand Road. The site has been identified as a 'landmark' location, reflective of its prominence at the northern gateway to the City of Belmont and opportunities to maximise on the amenity and connectivity of the Swan River and views of the Racecourse. Precinct A is located within the walkable catchment to the future Golden Gateway activity centre, and given its position adjacent to Grandstand Road, is afforded access to high-frequency public transport services.



The identification of high-density residential development in this location represents an attractive proposition for the development of infill housing. Compared to landholdings along Great Eastern Highway, the site is afforded high levels of amenity making it attractive for development. Furthermore, this location is separated from existing residential development to the south-west of the site, giving rise to standalone considerations of built form scale.

5.3.2. Racecourse Operations & Stabling

Precincts B and C encompass existing Racecourse operations, with the former accommodating existing Racecourse entertainment areas (grandstand and pavilions) and the latter accommodating Racecourse stabling and training areas. From a structuring perspective, it is logical to retain and consolidate Precinct B as the Racecourse administration and entertainment area, shifting the existing Perth Racing headquarters to this area. The establishment of on-course stabling along the southern and eastern edge of the Racecourse maximises land use efficiency due to its proximity to the Racecourse and access to Matheson Road and is compatible with the adjacent Residential and Stables area.

5.3.3. Residential Precinct

Precinct D, comprising the existing Perth Racing headquarters, is located on the western side of Grandstand Road and sits amongst Ascot Waters Estate, with adjacent low to medium scale built form. The site also abuts Ascot Kilns, a prominent site with significant heritage values. The redevelopment of Precinct D for residential purposes would represent a logical 'rounding-off' of residential development on the western side of Grandstand Road. Noting the site's position on Grandstand Road, there are opportunities for low-intensity community or commercial uses to be provided fronting Grandstand Road, such as a Child Care Premises.

5.3.4. Commercial Precinct

Precinct E forms part of the wider Golden Gateway activity centre, which encompasses a triangular area of land between Great Eastern Highway, Resolution Drive and Stoneham Street. Planning for this wider area will facilitate a mixed-use environment with commercial and residential uses. The existing street network in this precinct is established and defining, with Stoneham Street, Resolution Drive, Great Eastern Highway, and Grandstand Road forming the key access routes that accommodate high volumes of traffic, passing trade, and public transport access.

The existing land use pattern surrounding Precinct E makes it suitable for commercial development, with retail (convenience and bulky goods showrooms) fronting Resolution Drive, maximising on passing trade, view corridors from Great Eastern Highway, and supporting integration with the Golden Gateway activity centre.

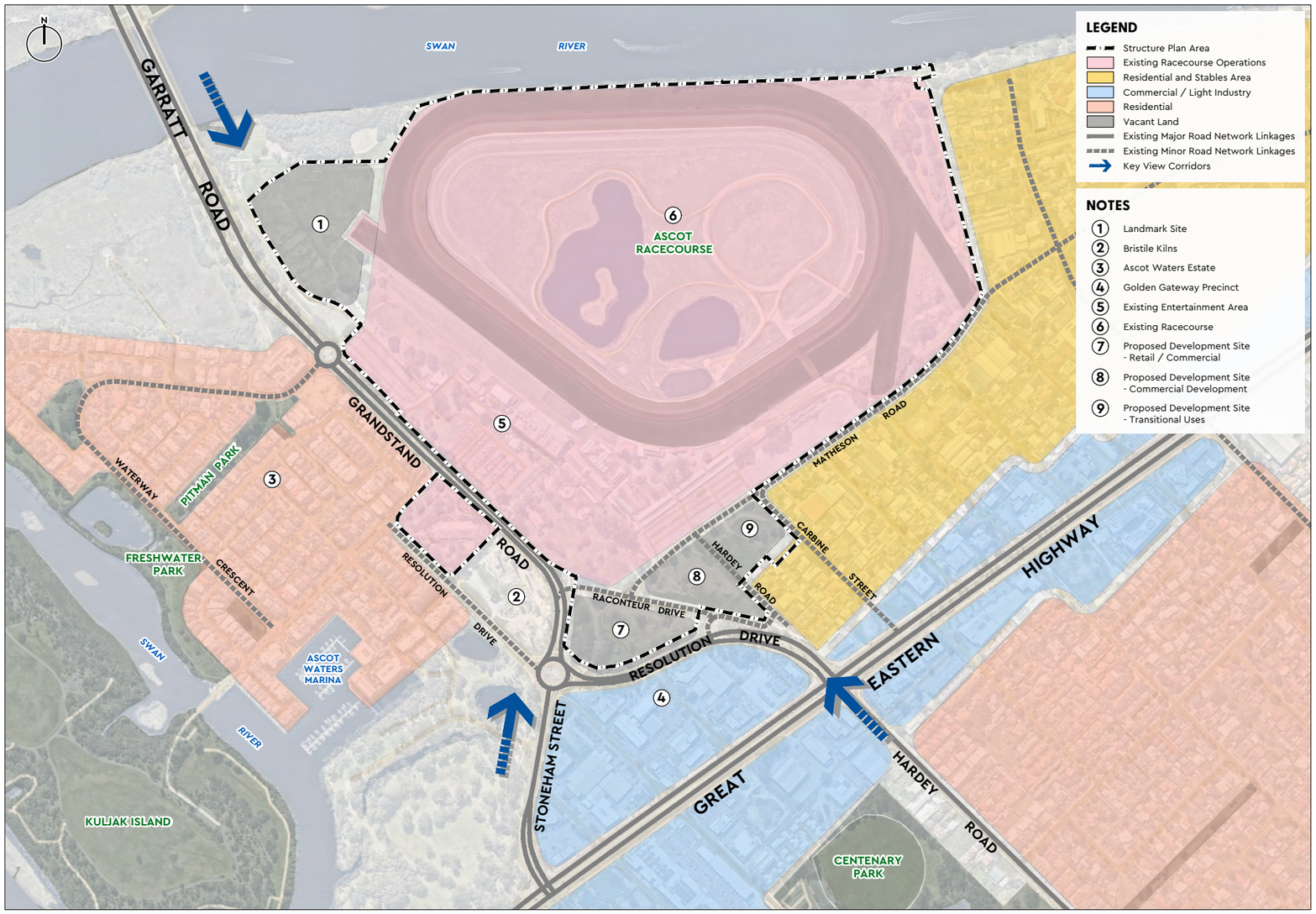
Future development sites, ranging from approximately 8,000m² to 14,000m² in area have been identified within Precinct E, which are sized and configured appropriately to accommodate commercial development. The former Raconteur Drive reservation can provide access to these future development sites. Complementary and/or transitional uses can be supported in the eastern portion of Precinct E, abutting Ascot Racecourse and the Residential and Stables area.

Land assembly will be required to create a future development within Precinct E, specifically Lot 3 (No. 96) Grandstand Road, Lot 51 (No. 2) Raconteur Drive, and Lot 1 (No. 88) Grandstand Road, Ascot. This area includes redundant road reservations which fragment these lots. To achieve a coordinated development outcome, land assembly will be required through a road closure and subsequent amalgamation, or a lease arrangement. Given the presence of existing service alignments within this Precinct, satisfactory arrangements are to be made with servicing authorities to provide for the modification and/or protection of existing services.

Refer **Figure 12 – Precinct E Land Assembly Plan**.

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



11. Urban Structure

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



12. Land Assembly Plan

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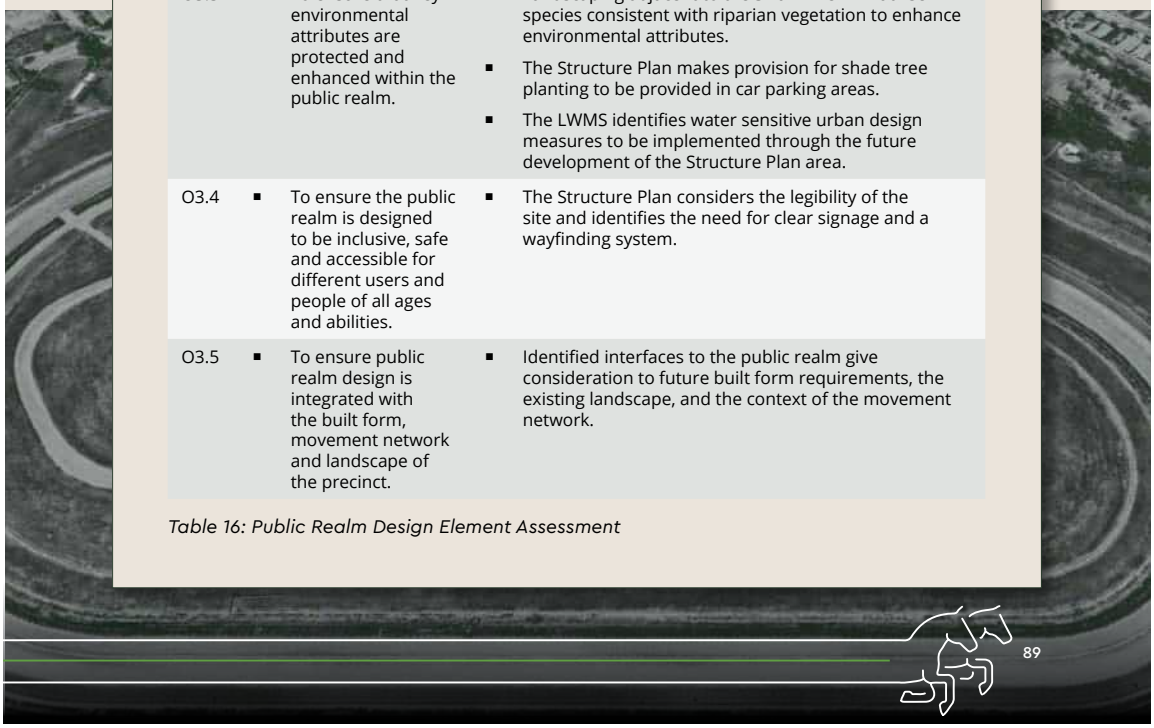
Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5.4. Public Realm

Design Element 3 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Public Realm' with a view to providing a range of well-connected, functional and enriching places, appropriate to the function, scale and character of the precinct. The SPP 7.2 Design Element Objectives and Design Responses are summarised below, with key considerations outlined in further detail thereafter.

No.	Design Element Objective	Design Element Response
O3.1	▪ To ensure the public realm is designed to promote community health and wellbeing.	▪ The Parkland area will provide an exciting local recreational destination that will contribute to the community's health and wellbeing. ▪ The proposed Parkland area will support the usage of the site beyond racing events both informally (passive recreation) and formally (private and community events). ▪ The proposed Parkland area is positioned to maximise solar access during winter months and will be appropriately landscaped to provide shade for summer months.
O3.2	▪ To enable local character and identity to be expressed in public realm design to enhance sense of place.	▪ Landscaping will reinforce the visual and landscape linkages between the racecourse and Swan River. ▪ Materials and finishes, plant species and artwork will make reference to the historical and cultural values of the site. ▪ Consideration will be given to the character and identity of the site through design preparation and statutory review processes.
O3.3	▪ To ensure that key environmental attributes are protected and enhanced within the public realm.	▪ Landscaping adjacent to the Swan River will utilise species consistent with riparian vegetation to enhance environmental attributes. ▪ The Structure Plan makes provision for shade tree planting to be provided in car parking areas. ▪ The LWMS identifies water sensitive urban design measures to be implemented through the future development of the Structure Plan area.
O3.4	▪ To ensure the public realm is designed to be inclusive, safe and accessible for different users and people of all ages and abilities.	▪ The Structure Plan considers the legibility of the site and identifies the need for clear signage and a wayfinding system.
O3.5	▪ To ensure public realm design is integrated with the built form, movement network and landscape of the precinct.	▪ Identified interfaces to the public realm give consideration to future built form requirements, the existing landscape, and the context of the movement network.

Table 16: Public Realm Design Element Assessment



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This Precinct Structure Plan is supported by a Landscape Master Plan prepared by SLR Consulting which identifies a landscape vision, objectives, and design responses for the future development of the subject area.

Refer **Figure 13 – Public Realm and Appendix 8 – Landscape Master Plan**.

5.4.1. Character & Identity

The character and identity of the subject site area is heavily influenced by its existing and historical use as a racecourse. Whilst there is a mix of built form styles and materials, there are consistent elements such as the use of red bricks, terra cotta tiled gable roofs, open/permeable fencing and feature trees. The Ascot Racecourse design itself has a 'village' feel around the entry gates and entertainment areas, with 'equine' character elements such as post and rail fencing, grass areas, and formal planting (both native and exotic) throughout the site.

The future development of the subject area should consider the character and identity of the site, as outlined in the Landscape Master Plan, and having regard to the principles of State Planning Policy 7.0 – Design of the Built Environment through design preparation and statutory review processes. Any proposal that may impact the heritage values of the site will require the preparation of a Heritage Impact Statement.



5.4.2. Parkland Area

The Ascot Racecourse Master Plan identifies an opportunity to develop a parkland area of approximately 1.4ha immediately adjacent to the Racecourse and existing public car parking area, within Precinct B. The area will provide a public interface to the Racecourse from Grandstand Road and serve as a green link between future development in Precinct A and the existing Racecourse facilities in Precinct B.

The parkland area is intended to be publicly accessible, attracting visitors to the site outside of racing events, and will be developed to include landscaping, a playground, and picnic facilities. The position of the area adjacent to existing car parking makes it suitable for public access, and along with its position adjacent to existing racecourse facilities, allow for future use as part of racecourse events. The site has an uninterrupted northern aspect, allowing for maximum solar access during winter, and with appropriate landscape planting, shade can be provided for summer.

5.4.3. Internal Treatments

The Landscape Master Plan identifies a number of treatments and design responses to enhance the internal public realm, including:

- Creating a pedestrian link between Precincts A and B, including an entry point (vehicles and pedestrians) from Precinct B into Precinct A. The landscape in this area is to remain open to allow views to the Racecourse and Swan River foreshore.
- Within the existing Racecourse entertainment area (Precinct B), ensure the pedestrian access system is shaded, safe and legible, with a clear signage and wayfinding system throughout the site that complements the branding and character of the racecourse.
- Provide shade tree planting in open areas and car parking areas.

Consideration will be given to the above treatments through the future design processes.



5.4.4. Public Realm Interface

5.4.4.1. Commercial Precinct

The proposed commercial precinct (Precinct E) is currently vacant land with scattered trees, particularly along existing drainage corridors and roads/driveways. The area is predominantly fenced/gated and is utilised for overflow parking for events at Ascot Racecourse. The area generally has a low level of visual amenity with limited visible connection to the Racecourse.

As part of the development of this land, there is an opportunity to improve the public realm interface of Precinct E, particularly to Grandstand Road and Resolution Drive, and enhance the connection and relationship to the Racecourse and wider Golden Gateway Precinct. These opportunities include:

- The creation of edges to proposed development that focuses towards key entry points and vistas to the Racecourse.
- Enhance the interface of the Water Corporation's open drain along the Resolution Drive frontage with appropriate landscaping and high-quality fencing.
- Incorporate street tree planting with theming reflective of the character of the site.
- Building frontages addressing the street to improve personal safety through increased surveillance and activity, with sleeved car parking areas.

The above opportunities have been highlighted in the Landscape Master Plan and will be implemented through the future development process of those sites.

5.4.4.2. Matheson Road

The south-eastern portion of Precinct C, fronting Matheson Road, is currently characterised by open hardstand areas associated with jockey and horse float parking, fencing, street trees, and views of the Racecourse. Land on the opposite side of Matheson Road forms part of the Residential and Stables area and presents to the public realm as a low-density residential area, however noting that these properties contain stables typically to the rear of lots.

The south-eastern portion of Precinct C is intended to be developed for on-course stabling, resulting in the future removal of a significant portion of the open hardstand area. The on-course stabling complex is intended to accommodate a stables development with associated amenities and infrastructure, including horse walks, parade rings, sand rolls and horse walkers. Structures visible to the Matheson Road interface include stables buildings, all of which will be consistent with the character of the area.

The Landscape Master Plan identifies opportunities to screen the remaining hardstand area (jockey and horse float parking) and reinforce pedestrian entry and arrival points along Matheson Road. Car parking areas fronting Matheson Road can be softened by on-site tree planting/landscaping. The avenue of street trees along Matheson Road can be further enhanced to harmonise the stables development with the surrounding area and better define the edge and enhance the character of the Racecourse.

The treatment of the Matheson Road frontage will be addressed through the development application process for the on-course stables development.

5.4.4.3. Racecourse Entry / Grandstand Road

The key entry to Ascot Racecourse is provided from Grandstand Road via several vehicle and pedestrian access points. Whilst the interface to Grandstand Road is very 'green' with landscaping both within the road reserve and site itself, the existing landscaping does not maximise opportunities to allow or screen views at appropriate points. Parking areas are currently very visible and prominent from Grandstand Road, whereas landscaping, along with fencing and signage, block views into key public areas of the racecourse from Grandstand Road.

The Landscape Master Plan identifies the following key opportunities to improve the streetscape interface of the Racecourse entry from Grandstand Road:

- Create views from the entry points along Grandstand Road to the racecourse and open space areas.
- Limit views to car parks and 'back-of-house' areas through screening landscaping and high-quality fencing.
- Upgrade entry points to improve legibility and access to key areas in the racecourse using pavement changes, landscaping and signage.
- Upgrade the presentation to Grandstand Road with high quality fencing.

Whilst the abovementioned upgrades do not form part of any specific development plans, consideration will be given to these improvements where coinciding with proposed development and/or upgrades, including the new Perth Racing administration building, the proposed parkland area, and development within Precinct A.



5.4.4.4. Swan River Foreshore

The Swan River foreshore extends along the northern boundary of the site, with Precinct A interfacing the foreshore to the west and Precinct C to the east, with the racecourse extending between the two precinct areas. The foreshore is predominantly narrow, flat, low-lying, and accommodates an existing shared path and riparian vegetation.

Precinct A currently represents a flat open space with views of the racetrack. There are currently limited views to the Swan River from ground level, however there would be potential for views from higher points in future development. There are opportunities for future development to provide physical path links to the foreshore reserve, connecting to the existing path network within the reserve thereby providing significant amenity benefit to future residents.

In order to accommodate future development in Precinct A, there will be a requirement to fill the site by 1-2m to achieve clearance from flood levels. At the development stage, detailed consideration will be given to the management of fill and battering to ensure an appropriate interface in this area. Landscaping within Precinct A is to borrow from riparian vegetation along the Swan River (species and character).

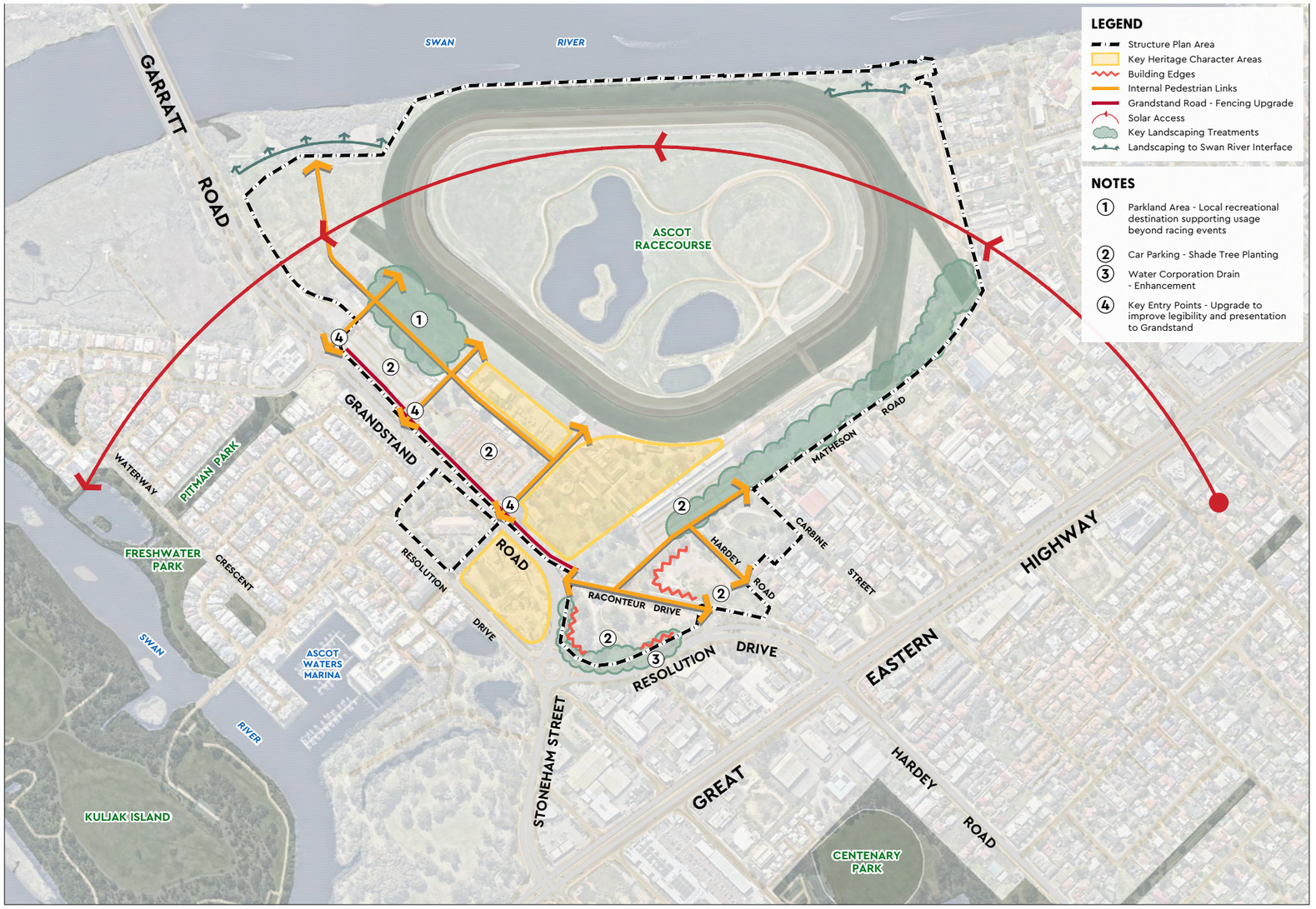
To the north-eastern part of the site, within Precinct C, the existing interface consists of open style fencing adjacent to a horse training arena. Future development plans within this location include a stable complex, with stables, washdown areas, sand roll areas, horse walkers and holding stalls. Open areas, including sand roll areas and horse walkers, will interface with the northern boundary of Precinct C, with the stables (building) setback from the foreshore thereafter.

At the development stage, consideration will need to be given to the interface of stables development to the north-eastern boundary, having regard to the aesthetics as viewed from the foreshore including colour schemes, fencing barriers, and landscape treatments.



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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



13. Public Realm

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5.5. Movement

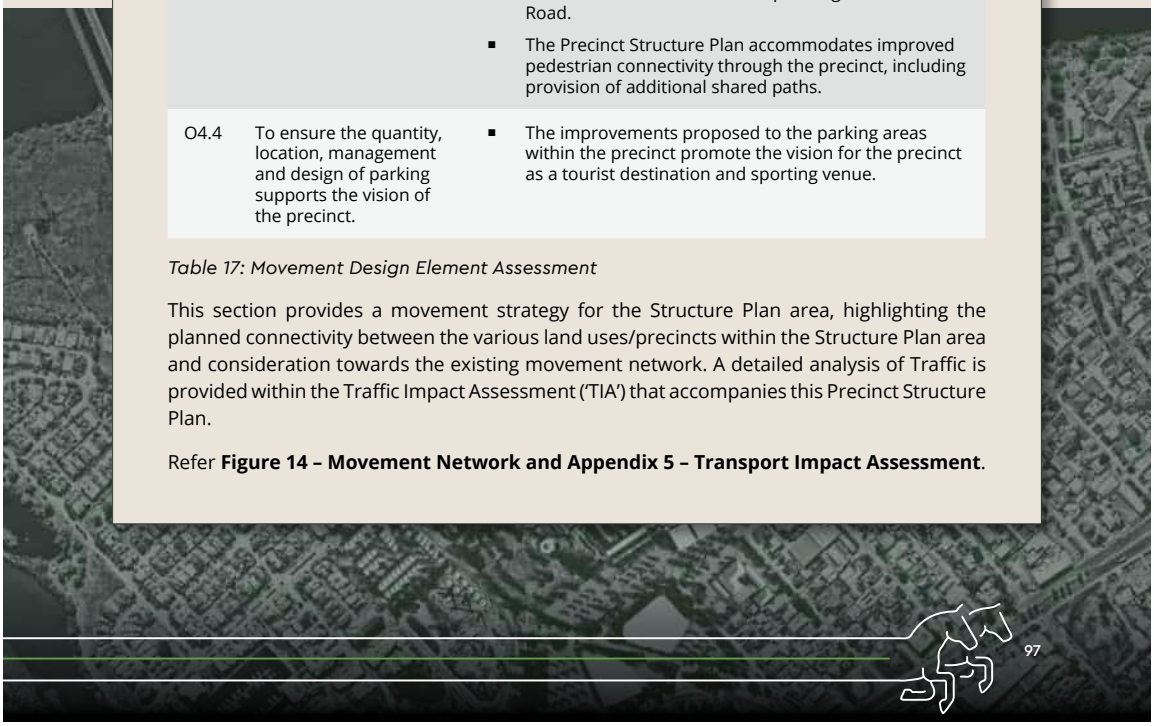
Design Element 4 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Movement', noting that the movement network should respond to the identified movement and place function of the precinct and provide for a range of transport modes. The SPP 7.2 Design Element Objectives and Design Responses are summarised below, with key considerations outlined in further detail thereafter.

No.	Design Element Objective	Design Element Response
O4.1	To ensure the movement network supports the function and ongoing development of the precinct.	▪ The Precinct Structure Plan facilitates the function and ongoing development of the precinct, including leasing of un-used road reserve land.
O4.2	To ensure a resilient movement network that prioritises affordable, efficient, sustainable and healthy modes of transport.	▪ The Precinct Structure Plan promotes sustainable and healthy modes of transport, reducing reliance on the private motor vehicle.
O4.3	To enable a range of transport choices that meet the needs of residents, workers and visitors.	▪ Through the preparation of a Travel Demand Plan, implementation of the Precinct Structure Plan will see use of private motor vehicles discouraged and encourage use of public transport and ride share options. ▪ The Precinct Structure Plan encourages upgrades to the infrastructure at bus stops along Grandstand Road. ▪ The Precinct Structure Plan accommodates improved pedestrian connectivity through the precinct, including provision of additional shared paths.
O4.4	To ensure the quantity, location, management and design of parking supports the vision of the precinct.	▪ The improvements proposed to the parking areas within the precinct promote the vision for the precinct as a tourist destination and sporting venue.

Table 17: Movement Design Element Assessment

This section provides a movement strategy for the Structure Plan area, highlighting the planned connectivity between the various land uses/precincts within the Structure Plan area and consideration towards the existing movement network. A detailed analysis of Traffic is provided within the Traffic Impact Assessment ('TIA') that accompanies this Precinct Structure Plan.

Refer **Figure 14 – Movement Network and Appendix 5 – Transport Impact Assessment**.



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5.5.1. Proposed Vehicle Access & Intersection Upgrades

Vehicle access to the Ascot Racecourse complex is achieved from several locations along Grandstand Road, Resolution Drive, and Matheson Road. Intersection arrangements to Grandstand Road will remain the same for the Ascot Racecourse complex.

There is an opportunity for a left-in/left-out access from Precinct D (opposite the racecourse) to Grandstand Road to serve a future commercial/community use. This will need to ensure the access is integrated safely with the operations of the crossover on the opposite side of the road to the racecourse. Detailed assessment of the anticipated traffic impacts associated with a commercial development on this site will occur in later planning stages. Precinct D also accommodates future residential uses, however access to residential lots in this location will be provided from Resolution Drive.

In terms of Precinct E, this Precinct Structure Plan proposes modifications to the existing access arrangement at Grandstand Road/Raconteur Drive to facilitate left-in, left-out and right-in movements only. Access from the existing Resolution Drive/Raconteur Drive intersection is proposed to be restricted to left-in/left-out movements only.

Access to Precinct A will be provided via the existing Waterway Crescent/Grandstand Road roundabout.

5.5.2. Proposed Pedestrian Network

The Precinct Structure Plan proposes the continuation of pedestrian access within the precinct, including along Grandstand Road, adjacent to Precinct D. The ability exists (for others) to extend this past the Bristile Kilns should this be required.

The shared path is proposed to be extended along Resolution Drive, adjacent to Precinct E, connecting to the existing shared path network along Grandstand Road and Raconteur Drive.



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5.5.3. Parking Improvements

Precinct B accommodates the Ascot Racecourse, the use of which relies on parking currently located within Precincts B, C and E. The proposed redevelopment of Precinct C (for on course stabling purposes) and Precinct E (for a commercial development) will remove some on-site parking. In this regard, parking arrangements are proposed to be improved as follows:

- The jockey and horse float parking will be relocated towards the southern extent of Precinct C.
- The southern Precinct B patron parking area would be upgraded to accommodate an improved layout, accommodating approximately 110 to 125 cars.
- On a typical busy race day, investigations suggest there is an oversupply of parking within the northern end of Precinct B, suggesting approximately 40 parking bays are underutilised.
- A Travel Demand Plan will therefore be implemented for typical race days to actively discourage patrons from using private motor vehicles and instead encouraging the use of readily available public transport options and private ride share services, recognising the non-typical nature of parking at the racecourse, being reflective of a tourist destination/ sporting venue.
- For non-typical large event days, such as the Perth Cup, implementation of the adopted traffic management plan for the Racecourse will continue.



Parking for future commercial development within Precinct E is to be provided having regard to the DPLH's Interim Guidance for Non-Residential Car Parking Requirements, through the application of minimum and maximum parking standards. This is reflective of a move towards reducing the traditional over-supply of under-utilised parking, better meeting the parking demands for different centres and responding to the preferred approach for precinct planning.

Car parking for residential development within Precinct D will be provided in accordance with the Residential Design Codes.

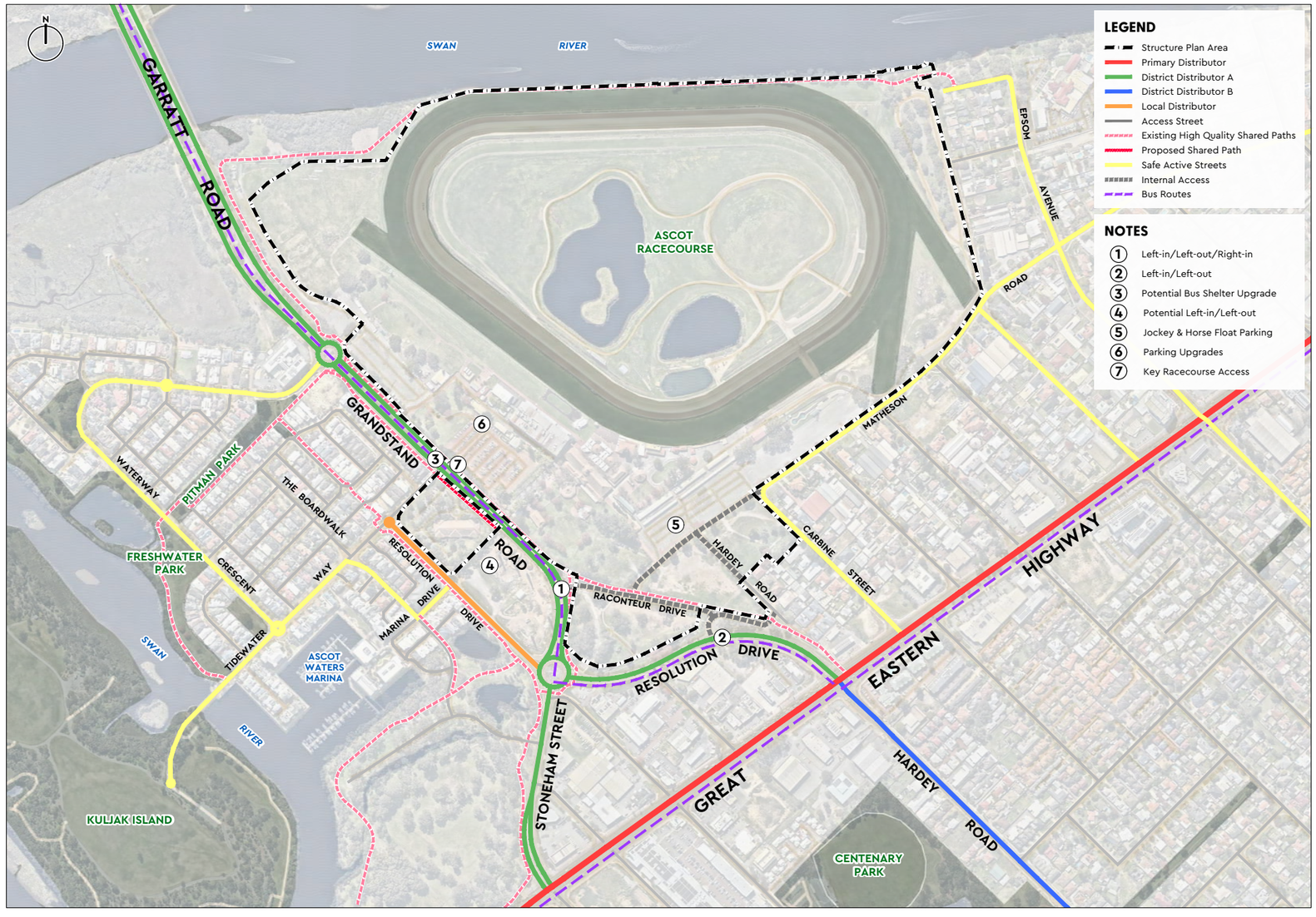
5.5.4. Public Transport

There are existing bus stops along Grandstand Road, immediately adjacent to one of the key pedestrian access points to the Racecourse, which is served by the 998/999 circle route, providing connectivity to the central Perth and Bayswater Train Stations. Frequent bus services are also available along Great Eastern Highway, providing access to Redcliffe Station, central Perth and Perth Airport.

Development of the site will utilise the existing public transport network, with opportunities to upgrade the infrastructure at the stops along Grandstand Road.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



14. *Movement Network*

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

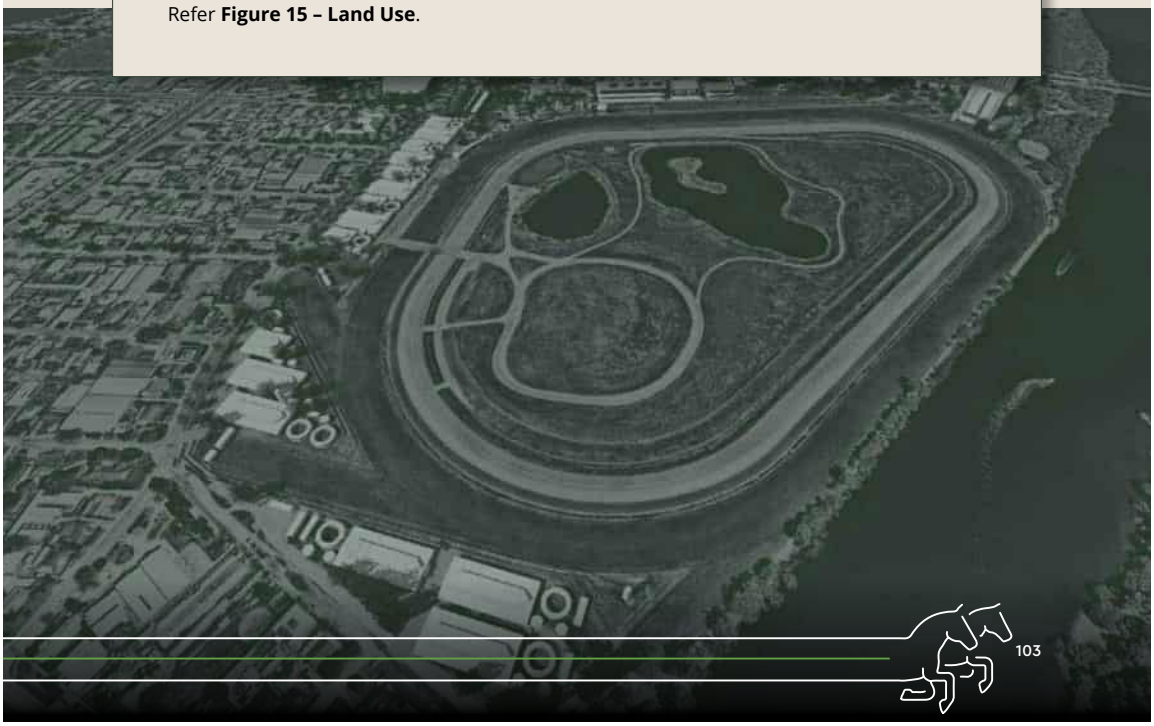
5.6. Land Use

Design Element 5 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Land Use', noting that land use planning should reflect the role of the precinct in its wider context and respond to community needs, current and intended future activities and functions, alongside broader trends. The SPP 7.2 Design Element Objectives and Design Responses are summarised below, with key considerations outlined in further detail thereafter.

No.	Design Element Objective	Design Element Response
O5.1	To ensure current and planned land uses respond to the needs and expectations of the community.	▪ The Precinct Structure Plan provides for the development of retail convenience uses which respond to an identified need within the Ascot locality. ▪ The Precinct Structure Plan facilitates a residential interface to Ascot Waters Estate.
O5.2	To ensure the planned land use types contribute positively to the precinct character and amenity.	▪ The Precinct Structure Plan maintains and facilitates equine-focussed land uses adjacent to the established Ascot Racecourse and Residential and Stables area. ▪ Higher trip-generating land uses are focussed on the existing distributor road and public transport network.
O5.3	To achieve a mix of land uses and activity that supports the precinct vision.	▪ Through the application of appropriate zoning and land use controls, the Precinct Structure Plan provides for a mix of land uses that respond to the characteristics of the locality and site-specific opportunities identified by the Master Plan.

Table 18: Land Use Design Element Assessment

Refer **Figure 15 – Land Use**.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5.6.1. Land Use & Zoning

The subject area is currently zoned 'Place of Public Assembly' under the City of Belmont's LPS 15, except for Lot 3 (No. 96) Grandstand Road and Lot 51 (No. 2) Raconteur Drive, Ascot, in the southern part of the site (Precinct E), which are currently zoned 'Mixed Use'. The Racecourse component of the site is subject to 'Additional Uses' under LPS 15 which permit the land uses 'Horse Sales' and 'Stables', which are not otherwise permissible in the 'Place of Public Assembly' zone.

5.6.1.1. Precinct A

In accordance with the Master Plan, Precinct A is intended to be developed for a residential housing village to accommodate retiring members of the horse racing industry, with small-scale food and beverage and commercial uses that are ancillary to, and integrated with, the residential housing village. Overall, it is estimated that this development could yield up to 360 apartments and a maximum 300m² café.

This development outcome is responsive to the land tenure restrictions of the site, specifically the inability for the site to be subdivided/on-sold and the limitation on use to horse-racing related activities. This Structure Plan applies a 'Mixed Use' zoning to Precinct A to support the abovementioned development outcomes, with 'Restricted Uses' that limit the scope of land uses that can be applied to the site to ensure an appropriate interface with the Swan River.

5.6.1.2. Precincts B & C

Precinct B, which contains the entertainment areas associated with Ascot Racecourse, it intended to be developed to include a new administration building for Perth Racing (approximately 700m²), along with a hospitality venue (approximately 1,000m²). Precinct C, comprising the existing Racecourse, is intended to be developed with approximately 400 on-course stables across three (3) stabling complexes.

The objective of the 'Place of Public Assembly' zone, along with the land uses that are currently permissible on the site under LPS 15, are considered appropriate for the existing Racecourse operations, which are proposed to be retained (Precincts B and C). This includes retaining the existing Additional Uses applicable to Precinct C which will support the proposed on-course stables development. To provide flexibility for future administration and hospitality uses within Precinct B, the Structure Plan provides for several Additional Uses including 'Office', 'Hotel', 'Reception Centre', 'Restaurant', and 'Tavern'.



5.6.1.3. Precinct D

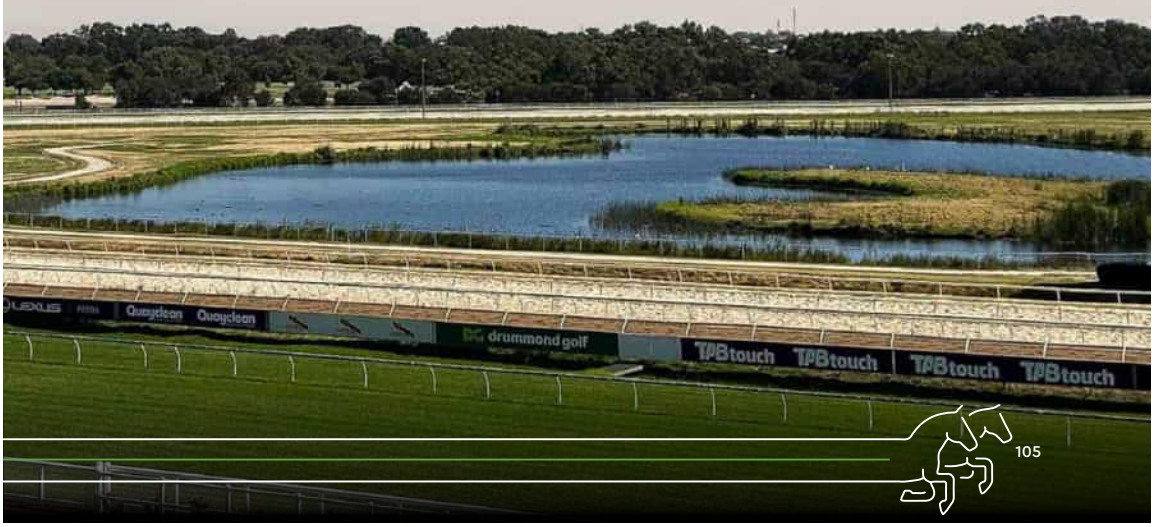
Following the relocation of Perth Racing's administration building, Precinct D is intended to be redeveloped for residential purposes, with a small-scale commercial/community use (such as a Child Care Premises) fronting Grandstand Road. It is estimated that this development could yield approximately 41 residential lots and a potential 2,000m² commercial lot. This outcome would be consistent with the residential character of the adjacent Ascot Waters Estate, whilst noting that some opportunity exists for low intensity and compatible non-residential uses that would benefit from frontage to a distributor road.

This Precinct Structure Plan applies a 'Residential' zoning to a majority of Precinct D, with a 'Mixed Use' zone applied to a portion fronting Grandstand Road. Given the extent of permitted uses afforded by the 'Mixed Use' zone, this Precinct Structure Plan applies 'Restricted Uses' to limit the intensity/scale of development on the site to ensure compatibility with surrounding development.

5.6.1.4. Precinct E

Precinct E has been identified for future commercial development, reflective of its position within the Golden Gateway activity centre. The Structure Plan provides for Precinct E to be zoned 'Commercial' and 'Mixed Use' to facilitate a range of commercial uses. Land immediately adjacent to Resolution Drive and Grandstand Road, proposed to be zoned 'Commercial', would be suitable for active land uses such as a supermarket and speciality retail uses, and could form as the 'core' of the activity centre, positioned centrally within the activity centre and having suitable access and exposure to passing trade.

To provide an appropriate transition to the adjacent 'Residential and Stables' precinct, Perth Racing are also exploring opportunities to develop transitional commercial and/or equine focussed development, such as bulky goods showroom, offices, a gym, and/or vet consulting rooms, to the north-east of Raconteur Drive. The application of the 'Mixed Use' zoning by the Precinct Structure Plan will support the development of these land uses. Like Precincts A and D, 'Restricted Uses' are proposed to be applied to the 'Mixed Use' zone to ensure compatibility with surrounding development.



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5.6.2. Golden Gateway Activity Centre

5.6.2.1. Activity Centre Considerations

The City of Belmont's Activity Centres Planning Strategy ('ACPS') identifies a future activity centre ('Golden Gateway activity centre') within the Golden Gateway Precinct in Ascot, in the area bound by Great Eastern Highway, the Swan River, Resolution Drive (north), Grandstand Road (north), the south-eastern boundary of Ascot Racecourse, Carbine Street and Hardey Road. This area encompasses the southern portion of Perth Racing's landholdings identified as Precinct E in this Structure Plan.

Refer **Figure 16 – Golden Gateway Activity Centre**.

There are unique considerations in the planning of the Golden Gateway activity centre including, but not limited to, the extent of land fragmentation, the type and nature of existing land uses/development, and access constraints. The centre's proximity to Great Eastern Highway makes it attractive for uses reliant upon passing trade, such as bulky goods showrooms. Similarly, its proximity to the Perth Central Business District and Belmont Business Park, coupled with high levels of accessibility afforded by the road network and public transport services, makes it attractive for service industries and offices to locate.

There is currently no residential development within the centre, with the residential catchment being limited to that of the surrounding area. The draft Golden Gateway Structure Plan identified a desire for intensive residential development to be undertaken within the Golden Gateway activity centre, which would support the development of the activity centre. In the case of Perth Racing's land, there is an inability to subdivide and sell-off landholdings in Precinct E, meaning that any proposition of residential development cannot be realised in Precinct E.



As outlined, Perth Racing's vision for Precinct E is to develop active commercial/retail land uses adjacent to Resolution Drive and Grandstand Road and transitioning to less intensive retail (i.e. bulky goods showrooms), commercial, and/or equine focussed development to the north-east of Raconteur Drive, adjacent to the Residential and Stables area. These land uses would be consistent with the intent of an activity centre in this location, whilst also responding to the existing 'equine-focus' of the area.

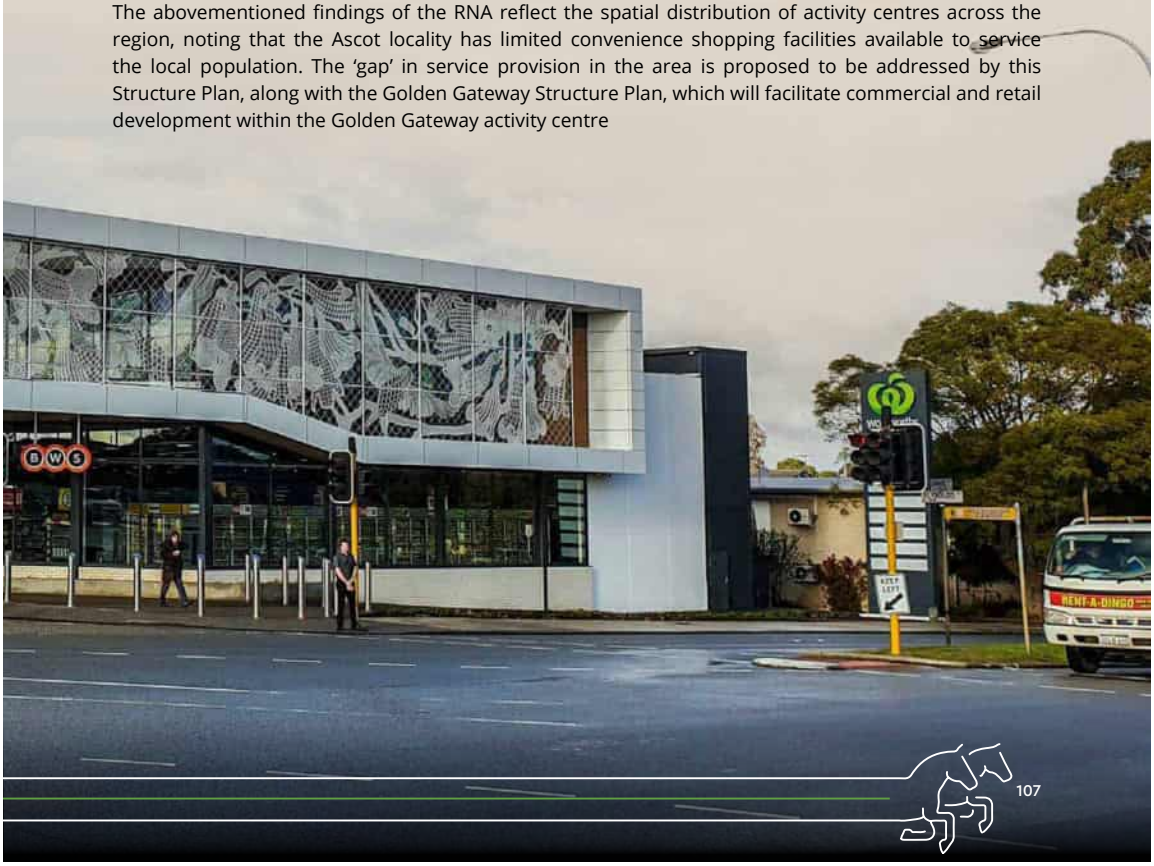
Given the size, positioning, and current vacant status of Perth Racing's landholdings, there is a real opportunity for development in this location to serve as a catalyst for future development within the Golden Gateway activity centre. It is anticipated that other land within the activity centre will transition to mixed-use development outcomes over time as amenity and land values improve, opportunities will exist to better utilise land.

The size and configuration of Perth Racing's landholdings in Precinct E are such that development outcomes could not reasonably or practically exceed that of a local or neighbourhood centre, nor similarly be developed in such a way that would be conducive to the creation of a standalone bulky good showroom precinct. Any development in this locality would be reflective of local community needs, having regard to locational characteristics and market demands.

5.6.2.2. Retail Needs Assessment

The ACPS has been informed by a Retail Needs Assessment ('RNA') undertaken in accordance with the requirements of SPP 4.2. The findings of the RNA, as outlined by the ACPS, anticipates a 7,000m² retail floorspace increase within the Precinct by 2036, and an increase in retail floorspace to approximately 7,000m² by 2036, providing for the establishment of a neighbourhood centre with 2,700m² to 3,000m² of retail floorspace. This demand is reflective of the limited-service provision within the Ascot locality.

The abovementioned findings of the RNA reflect the spatial distribution of activity centres across the region, noting that the Ascot locality has limited convenience shopping facilities available to service the local population. The 'gap' in service provision in the area is proposed to be addressed by this Structure Plan, along with the Golden Gateway Structure Plan, which will facilitate commercial and retail development within the Golden Gateway activity centre



5.6.2.3. Net Benefit Test

In accordance with SPP 4.2, a Net Benefit Test has been prepared by Taktics4 in support of this Structure Plan to assess the economic demand and implications for potential retail development in this area. Through this assessment, particular attention was given to the 'Shop/Retail' (PLUC: 5-SHP) and 'Other Retail' (PLUC: 6-RET) planning land use categories.

Under SPP 4.2, the 'Shop/Retail' (PLUC: 5-SHP) planning land use category captures the land uses 'Shop', 'Liquor Store – Large', 'Fast Food Outlet/Lunch Bar', and 'Restaurant/Café'. The 'Other Retail' (PLUC: 6-RET) planning land use category applies to the land uses 'Bulky Goods Showroom' and 'Motor Vehicle, Boat, or Caravan Sales', noting the latter of which is not permitted under the 'Mixed Use' zone.

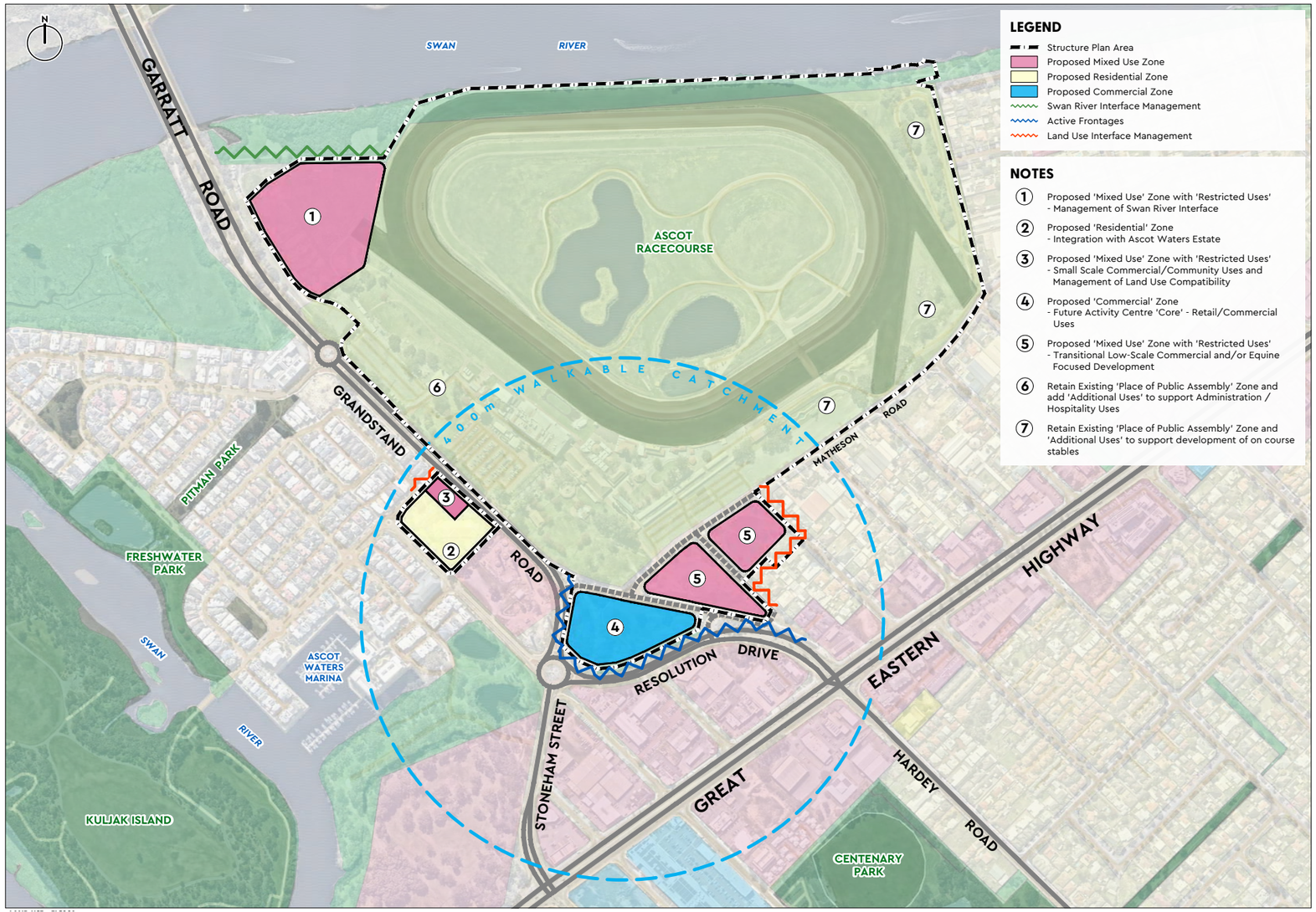
The Net Benefit Test assesses the potential for 3,400m² net lettable area ('NLA') of 'Shop/Retail' floorspace and 9,600m² NLA of 'Other Retail', representing a 'worst-case' maximum retail floorspace scenario for Precinct E. The findings of the Net Benefit Test indicate the following:

- The proposed development of 'Shop/Retail' and 'Other Retail' within the activity centre will have low/insignificant impacts on the existing and future activity centre network, with any impacts likely offset by potential sales growth generated by additional population and spending over the next 15 years.
- The creation of an activity centre in the area will reduce the number of vehicle kilometres required to be travelled by residents in the immediate trade area, and overall will save up to 700,000 vehicle trips per annum outside of the trade area.
- The development could create up to 205 full-time equivalent jobs.
- The 'Shop/Retail' floorspace will be sustainable from 2026 and satisfy an existing resident trade area, filling an existing demand in the market.
- Any development of 'Other Retail' will complement existing offerings in the vicinity.

Refer **Appendix 6 – Retail Assessment (Net Benefit Test)**.

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



15. Land Use

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



16. Golden Gateway Activity Centre

ROWE GROUP DESIGN

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5.7. Built Form

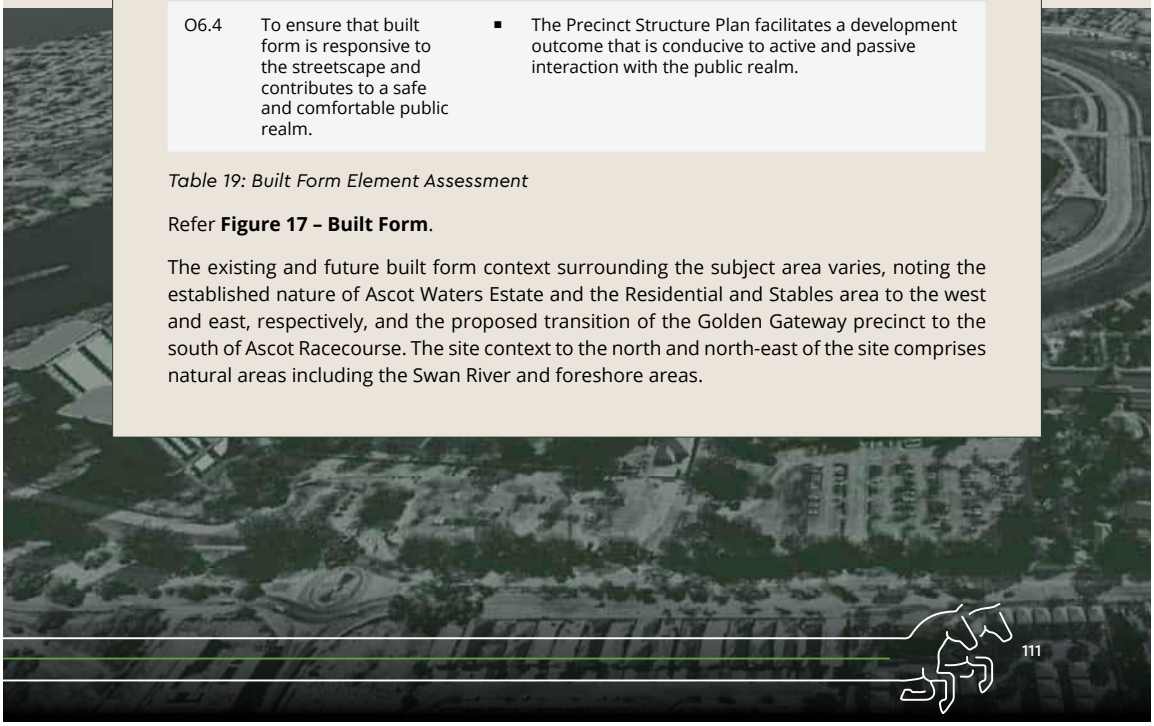
Design Element 6 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Built Form', outlining that built form should support a precinct environment that is place and functionally appropriate in character, intensity, bulk and scale. The SPP 7.2 Design Element Objectives and Design Responses are summarised below, with key considerations outlined in further detail thereafter.

No.	Design Element Objective	Design Element Response
O6.1	To ensure that the built form is responsive to the purpose, context and intended character of the precinct.	▪ Built form outcomes provided by this Structure Plan align with the future context and character of the Golden Gateway Precinct. ▪ The Precinct Structure Plan provides for built form outcomes which are consistent with the character of Ascot Waters Estate and the Residential and Stables area. ▪ In recognising the strategic positioning of Perth Racing's north-western corner, the Precinct Structure Plan seeks to facilitate a landmark development. ▪ The intended placement of buildings is responsive to site context and configuration.
O6.2	To ensure building placement, scale and massing is appropriate for the intended precinct and streetscape character.	
O6.3	To ensure that built form design reduces energy demand across the precinct by facilitating climate-responsive design.	▪ Street block configuration and built form scale support solar access to buildings and the public realm and do not undermine natural ventilation on adjoining properties and the public realm. ▪ The Precinct Structure Plan makes provision for increased tree canopy to reduce heat-island effect.
O6.4	To ensure that built form is responsive to the streetscape and contributes to a safe and comfortable public realm.	▪ The Precinct Structure Plan facilitates a development outcome that is conducive to active and passive interaction with the public realm.

Table 19: Built Form Element Assessment

Refer **Figure 17 – Built Form**.

The existing and future built form context surrounding the subject area varies, noting the established nature of Ascot Waters Estate and the Residential and Stables area to the west and east, respectively, and the proposed transition of the Golden Gateway precinct to the south of Ascot Racecourse. The site context to the north and north-east of the site comprises natural areas including the Swan River and foreshore areas.



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5.7.1. Commercial Precinct

Under the draft Golden Gateway LSP, the Golden Gateway precinct is intended to be transformed into a mixed-use precinct with maximum building heights of 9 storeys with an 'R-AC1' coding along Great Eastern Highway and 6 storeys with an 'R-AC3' coding across the remainder of the precinct, inclusive of Perth Racing's properties fronting Grandstand Road within Precinct E.

As per Perth Racing's vision, the portion of Precinct E fronting Resolution Drive is intended to be developed for commercial and retail purposes, with no intention to undertake residential development or any form of intensive built form development. Notwithstanding, in acknowledging that this land will have the potential to be developed for residential purposes and to provide consistency with the Golden Gateway Structure Plan, this Structure Plan applies an 'R-AC3' coding and a maximum 6 storey building height.

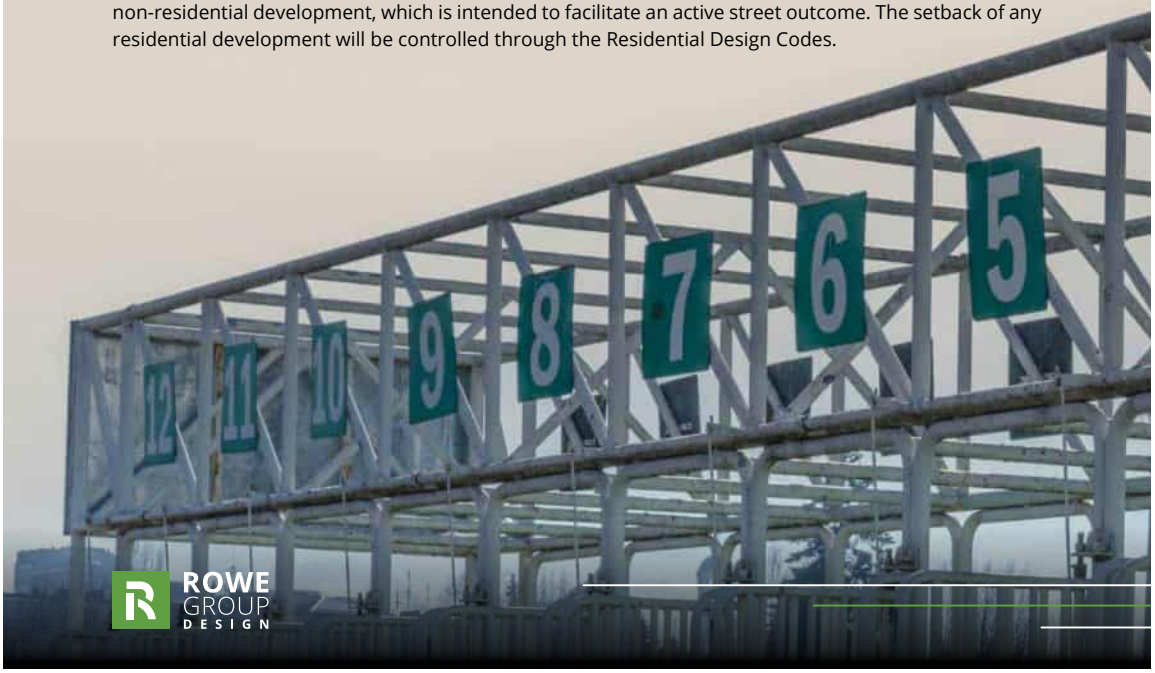
Development fronting Resolution Drive is intended to accommodate more 'active' land uses and should be designed accordingly in line with contemporary planning practice. There are some limitations to the positioning of buildings on this site due to the presence of existing services, however, as shown in the Master Plan, there are opportunities to position buildings such that they address and interface with the street and sleeve parking areas from key viewpoints.

Given the presence of the Belmont Main Drain along the site's frontage to Resolution Drive, consideration should be given to its presentation through the detailed design process. This includes the potential for landscaping within and/or surrounding the drain, and the upgrade of fencing.

To reduce the dominance of car parking and heat-island effect, Part One of the Precinct Structure Plan applies a requirement for shade trees within car parking areas.

To provide a transition to the Residential and Stables area, built form is intended to 'step down', with an 'R-AC4' coding applied to the portion of Precinct E comprising the southern part of Lot 100 Raconteur Drive and a maximum 3-storey building height. This site is 'triangular' in shape, meaning that the positioning of buildings will likely occur on the wider north-western portion of the site, with parking placed towards the south-eastern portion, adjacent to Raconteur Drive and Hardey Road.

In terms of boundary setbacks, the control of non-residential development will be provided through LPS 15. Part One of the Precinct Structure Plan does however identify a nil street setback requirement for non-residential development, which is intended to facilitate an active street outcome. The setback of any residential development will be controlled through the Residential Design Codes.



ROWE GROUP DESIGN

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

5.7.2. Residential & Stables Interface

The Ascot Residential and Stables area to the south and east of the Structure Plan area is unique from a land use and built form perspective. The area is characterised by large rectangular lots ranging from approximately 800m² to 2,000m² in area and typically containing a single house at the front (facing the street) with stables provided to the rear within the backyard area of each respective lot. Development within this area is typically single storey in scale, but intensive site coverage, with stables development often occupying significant portions of the lot with nil or limited setbacks provided to side boundaries.

Under the City's LPS 15, the Residential and Stables area is not subject to a density code, however the Scheme Text states that the provisions of the 'R10' code apply with regard to 'open space' and 'minimum setbacks from boundaries' (for residential development only). In accordance with Volume 1 of the R-Codes, the primary street setback under the 'R10' coding is a minimum of 3.75m and an average of 7.5m. There are no building height limits that apply to the Residential and Stables zone.

Under this Structure Plan, both Precincts C and E interface with the Residential and Stables area. In the case of Precinct C, which is subject to the proposed on-course stables development, Part One of this Precinct Structure Plan includes development provisions pertaining to the setback of development from Matheson Road to the south (7.5m setback) and the setback of stables and yard areas to private properties to the east (10m setback). The minimum setbacks identified align with the primary street setback requirement under the R-Codes and the City's Local Laws pertaining to stable and yard setbacks from dwellings.

In terms of the Precinct E interface, as outlined in Perth Racing's vision, development immediately adjacent to the Residential and Stables area is intended to be equine focussed, potentially in the form of an equine welfare centre and jockey support centre. Such a development would likely be of a low-scale and predominantly single-storey in nature. Part One of the Precinct Structure Plan provides for a maximum 2-storey building height in this location, a maximum residential density of 'R10', and a minimum and average primary and secondary street setback of 3.75m and 7.5m, respectively, to be consistent with that of the surrounding area.



5.7.3. Ascot Waters & Bristile Kilns Interface

Built form within Ascot Waters Estate is residential and mixed use in nature, ranging from two to four-storeys in height and at a scale equivalent to the 'R30', 'R40' and 'R100' density codes. In Council's deliberations on the draft Golden Gateway LSP, consideration was given to this context in relation to Lot 452 Grandstand Road (Precinct D) where it was determined appropriate to apply densities of 'R40' and 'R100' with maximum building height limits of 3 to 5 storeys.

This Structure Plan applies an 'R60' coding with a maximum building height of 3 storeys to Lot 452 Grandstand Road (Precinct D). Whilst this approach does not strictly align with Council's previous decision, it represents a balanced approach to built form on the site and avoids a situation where requirements differ across a lot, proving more flexibility from a development perspective. Furthermore, it is considered that a maximum building height provided by this Precinct Structure Plan would not impose upon or undermine the heritage values of the adjacent Bristile Kilns.

In terms of Precinct B, there is limited built form interrelationship with Ascot Waters Estate given the substantial building setbacks within Ascot Racecourse and the positioning and treatment of Grandstand Road is serving as a logical separation between these areas.

5.7.4. Swan River Interface

Perth Racing's vision for Precinct A, which interfaces to Swan River, is to develop a residential housing village with small-scale integrated commercial uses. It is envisioned that future development could comprise three (3) tower buildings developed up to a maximum of 15 storeys, and oriented such that they provide outlook to the Swan River and Racecourse. This vision is reflective of the site's notable prominence, being strategically positioned on the Swan River and at the northern gateway to the City of Belmont.

Precinct A is situated on the southern side of the Swan River and is devoid of surrounding development, meaning that any implications associated with intensive built form scale, such as overshadowing and privacy, will be negligible. Whilst there will be a need to undertake earthworks on the site to lift ground levels, there are opportunities through the detailed design process to consider appropriate setbacks, battering and/or retaining to the Swan River interface.

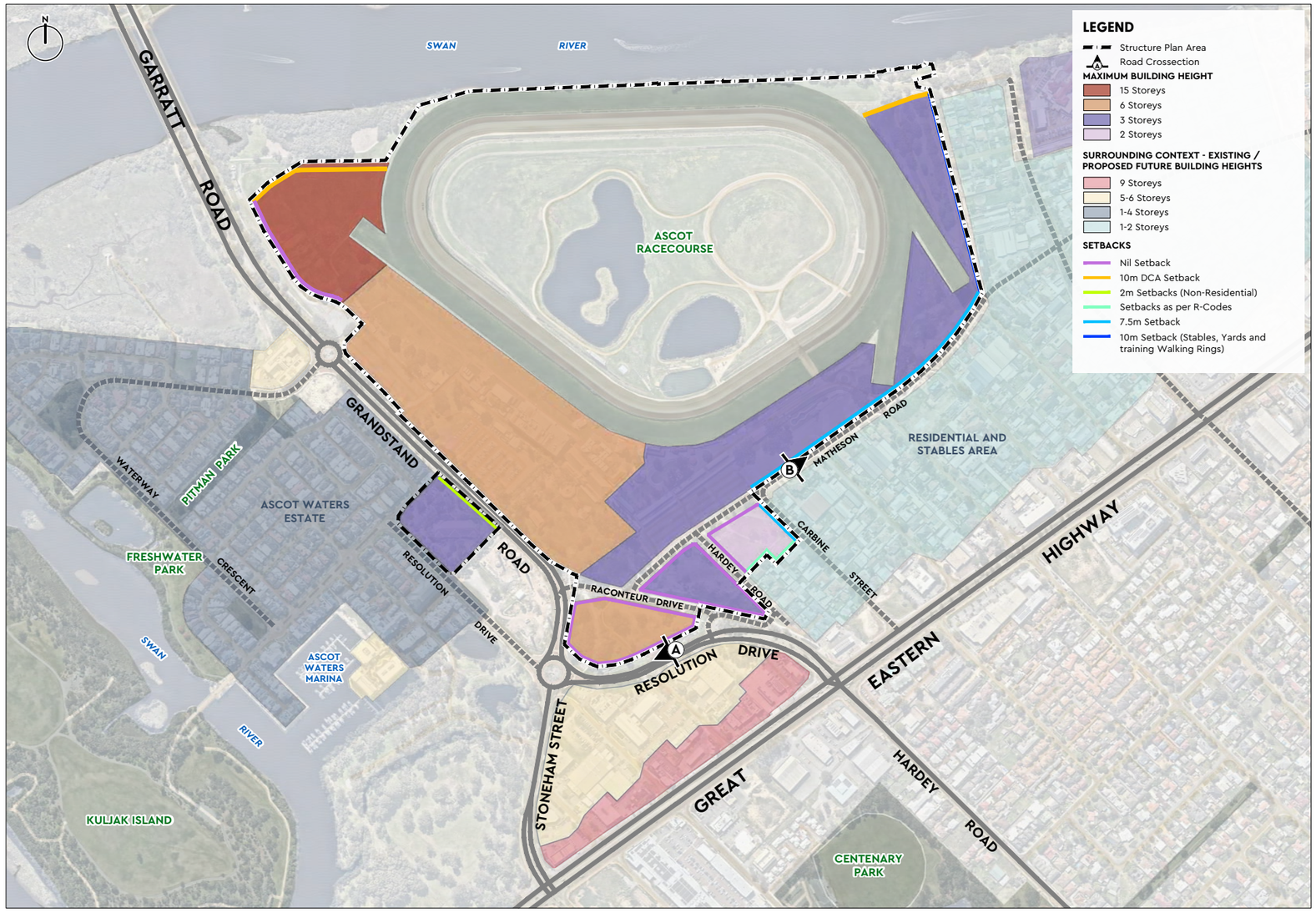
In terms of density, an 'R-AC0' coding has been applied to Precinct A to enable this Precinct Structure Plan to identify specific built form primary controls pertaining to building height, plot ratio, and setbacks. Specifically, Part One of the Precinct Structure Plan identifies a maximum building height of 15-storeys with a maximum 3-storey podium height, and a maximum plot ratio of 2.5 which is reflective of the vision for the site. In accordance with DBCA requirements, the Precinct Structure Plan identifies a minimum 10m setback requirement from the Swan River foreshore. Given Precinct A's existing substantive setback to Grandstand Road, the Precinct Structure Plan allows for a nil setback to the primary street.

Noting the limitations posed by groundwater hydrology and flood levels in Precinct A, basement structures in this location will likely be impractical, meaning that car parking areas will likely be a combination of at-grade and above-ground parking integrated into the building. The design process for these buildings will need to ensure that car parking areas are designed in such a way that they do not dominate or detract from the overall design of the site and its interface to the Swan River.

All other development controls applicable to Precinct A will be provided by LPS 15 and Volume 2 of the R-Codes.

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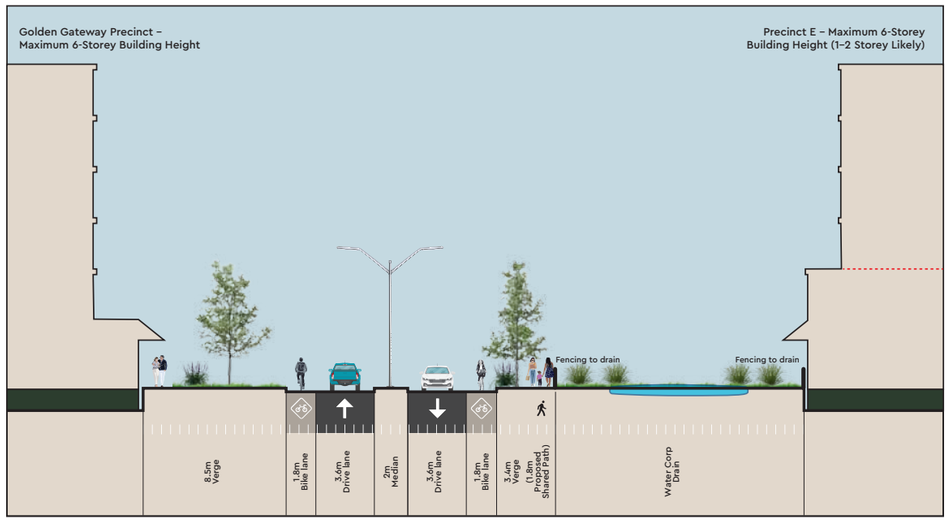
Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan



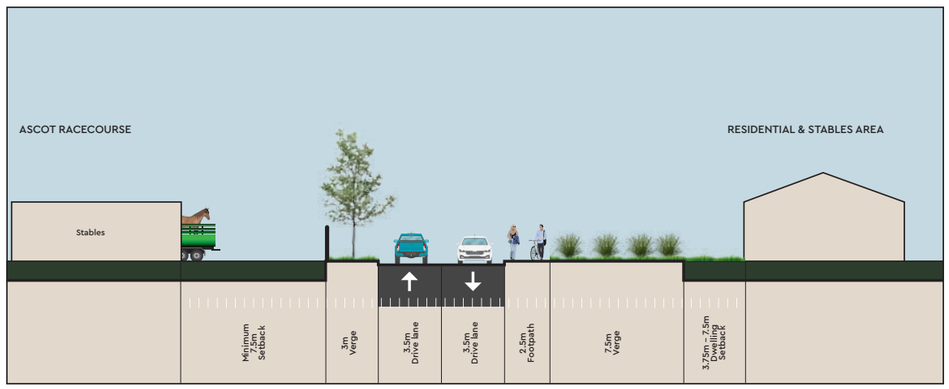
17. Built Form

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Cross Section A – Resolution Drive



Cross Section B – Matheson Road

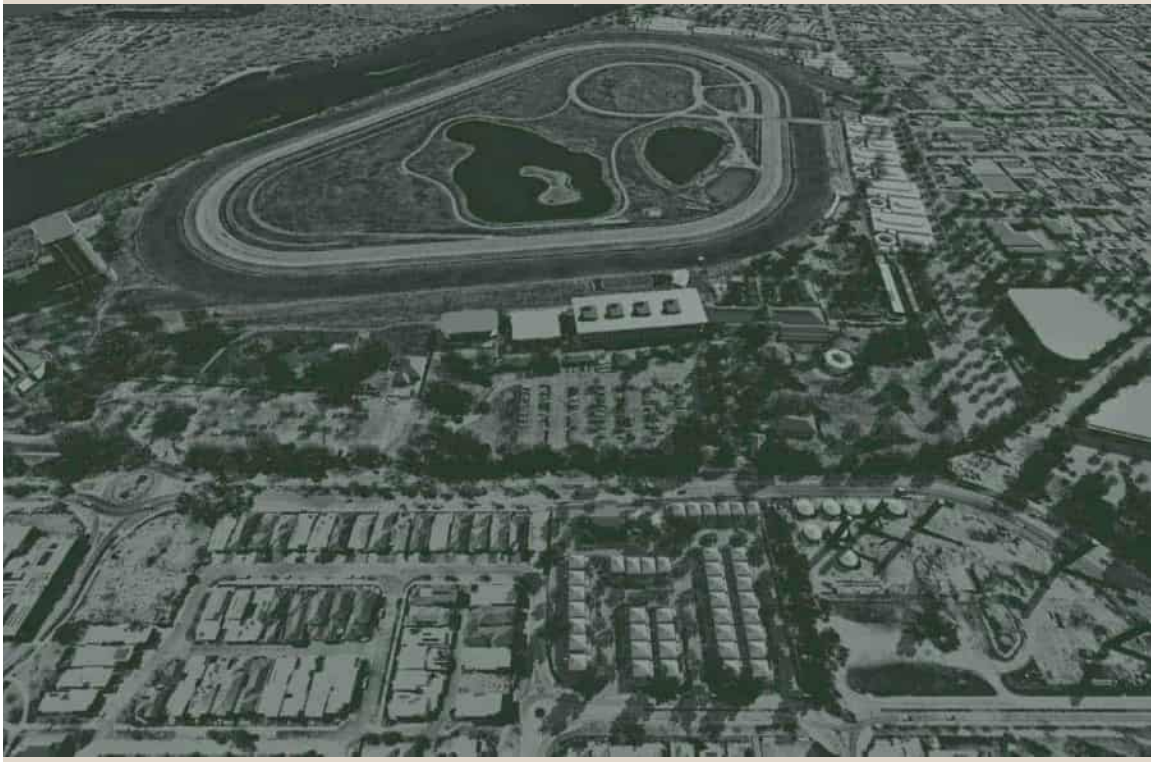


18. Indicative Cross Sections

Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

Appendix 1

Certificates of Title



Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1041	**934**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 50 ON PLAN 5729

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	P5729
PREVIOUS TITLE:	1041-164
PROPERTY STREET ADDRESS:	71 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
2723	**355**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 452 ON DEPOSITED PLAN 60339

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. EASEMENT BURDEN CREATED UNDER SECTION 167 P. & D. ACT FOR DRAINAGE PURPOSES TO CITY OF BELMONT - SEE DEPOSITED PLAN 60339.
2. L014556 EASEMENT TO CITY OF BELMONT FOR RIGHT OF FOOTWAY PURPOSES - SEE SKETCH ON DEPOSITED PLAN 60339. REGISTERED 30/7/2009.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP60339
PREVIOUS TITLE:	1776-799
PROPERTY STREET ADDRESS:	70 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
2723	**304**

RECORD OF CERTIFICATE OF TITLE

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 100 ON DEPOSITED PLAN 60341

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. EASEMENT BURDEN CREATED UNDER SECTION 27A T.P. & D. ACT FOR GAS PURPOSES TO S.E.C. - SEE SKETCH ON DEPOSITED PLAN 60341 AS CREATED ON PLAN 15104.
2. L014550 EASEMENT TO WA GAS NETWORKS PTY LTD FOR GAS PIPELINE PURPOSES - SEE DEPOSITED PLAN 60341 REGISTERED 21/7/2009.
3. M230259 EASEMENT TO ELECTRICITY NETWORKS CORPORATION FOR TRANSMISSION OF ELECTRICITY PURPOSES - SEE SKETCH ON DEPOSITED PLAN 76199 REGISTERED 4/4/2013.
4. M230260 EASEMENT TO ELECTRICITY NETWORKS CORPORATION FOR TRANSMISSION OF ELECTRICITY PURPOSES - SEE SKETCH ON DEPOSITED PLAN 76199 REGISTERED 4/4/2013.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP60341
PREVIOUS TITLE:	1883-667
PROPERTY STREET ADDRESS:	1 RACONTEUR DR, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
2723	**303**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 9002 ON DEPOSITED PLAN 60342

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. CROWN GRANT IN TRUST. SEE CROWN GRANT FOR CONDITIONS. AS TO THE PORTION OF SWAN LOCATION 823 FORMERLY COMPRISED IN VOLUME 1771 FOLIO 332 ONLY.
2. H712859 LEASE TO VODAFONE NETWORK PTY LTD OF 799 PACIFIC HIGHWAY, CHATSWOOD, NEW SOUTH WALES EXPIRES: SEE LEASE. AS TO PORTION ONLY. REGISTERED 4/4/2001.
   - H970091 TRANSFER OF LEASE H712859, LESSEE NOW CROWN CASTLE AUSTRALIA PTY LTD OF CARE OF LEVEL 1, 754 PACIFIC HIGHWAY, CHATSWOOD, NEW SOUTH WALES REGISTERED 24/12/2001.
   - K929949 EXTENSION OF LEASE H712859. REGISTERED 5/5/2009.
3. I041460 LEASE TO OPTUS MOBILE PTY LTD OF OPTUS CENTRE, 101 MILLER STREET, NORTH SYDNEY, NEW SOUTH WALES AS TO PORTION ONLY. EXPIRES: SEE LEASE. REGISTERED 13/3/2002.
4. K929948 LEASE TO CROWN CASTLE AUSTRALIA PTY LTD OF LEVEL 1, 754 PACIFIC HIGHWAY, CHATSWOOD, NEW SOUTH WALES EXPIRES: SEE LEASE. AS TO PORTION ONLY. REGISTERED 5/5/2009.
5. K944992 CAVEAT BY CROWN CASTLE AUSTRALIA PTY LTD AS TO PORTION ONLY. LODGED 19/5/2009.
6. EASEMENT BURDEN CREATED UNDER SECTION 167 P & D ACT FOR ELECTRICITY PURPOSES TO ELECTRICITY NETWORKS CORPORATION - SEE DEPOSITED PLAN 60342.
7. L399948 MEMORIAL. CONTAMINATED SITES ACT 2003 REGISTERED 13/8/2010.
8. M813804 LEASE TO OPTUS MOBILE PTY LTD OF 1 LYONPARK ROAD, MACQUARIE PARK, NEW SOUTH WALES EXPIRES: SEE LEASE. AS TO PORTION ONLY REGISTERED 31/10/2014.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

END OF PAGE 1 - CONTINUED OVER

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RECORD OF CERTIFICATE OF TITLE

REGISTER NUMBER: 9002/DP60342 VOLUME/FOLIO: 2723-303 PAGE 2

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP60342
PREVIOUS TITLE:	2216-686
PROPERTY STREET ADDRESS:	71 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1883	**670**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 13 ON DIAGRAM 26760

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE. VOL 1883 FOL 670.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1883-670 (13/D26760)
PREVIOUS TITLE:	202-100A
PROPERTY STREET ADDRESS:	71 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1883	**668**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 51 ON PLAN 15104

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1883-668 (51/P15104)
PREVIOUS TITLE:	1883-666
PROPERTY STREET ADDRESS:	2 RACONTEUR DR, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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Attachment 12.1.1 Ascot Racecourse Precinct Structure Plan

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1789	**567**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 7705 ON DEPOSITED PLAN 209359

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE.
2. CROWN GRANT IN TRUST. SEE CROWN GRANT FOR CONDITIONS.
3. K930699 EASEMENT TO WATER CORPORATION FOR TANK AND PIPELINE PURPOSES - SEE DEPOSITED PLAN 58026 REGISTERED 5/5/2009.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1789-567 (7705/DP209359)
PREVIOUS TITLE: 1259-989
PROPERTY STREET ADDRESS: 71 MATHESON RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY: CITY OF BELMONT

NOTE 1: K364458 DEPOSITED PLAN (INTEREST ONLY) 58026 LODGED

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1742	**278**

RECORD OF CERTIFICATE OF TITLE

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 3 ON DIAGRAM 55346

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

THE CHAIRMAN OF THE COMMITTEE OF THE WESTERN AUSTRALIAN TURF CLUB OF 70 GRANDSTAND ROAD ASCOT WA 6104

(AN N508676) REGISTERED 13/12/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

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SKETCH OF LAND:	1742-278 (3/D55346)
PREVIOUS TITLE:	1742-275
PROPERTY STREET ADDRESS:	96 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT

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WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
1742	**276**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1 ON DIAGRAM 55346

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

STATE PLANNING COMMISSION OF 22 ST. GEORGE'S TERRACE, PERTH

(T D398174) REGISTERED 15/1/1987

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. D367664 CAVEAT BY DIAMOND SYNDICATE PTY LTD LODGED 24/11/1986.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1742-276 (1/D55346)
PREVIOUS TITLE:	1742-275
PROPERTY STREET ADDRESS:	88 GRANDSTAND RD, ASCOT.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BELMONT
RESPONSIBLE AGENCY:	WESTERN AUSTRALIAN PLANNING COMMISSION

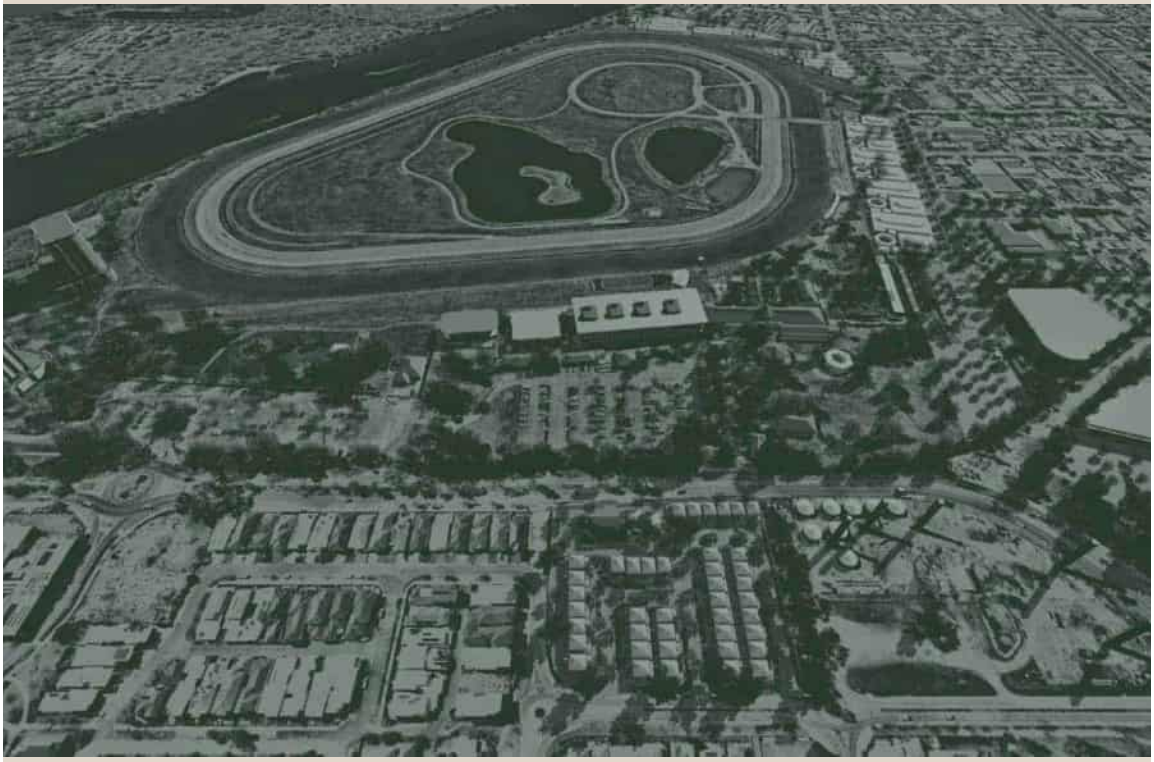
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Appendix 2

Local Water Management Strategy



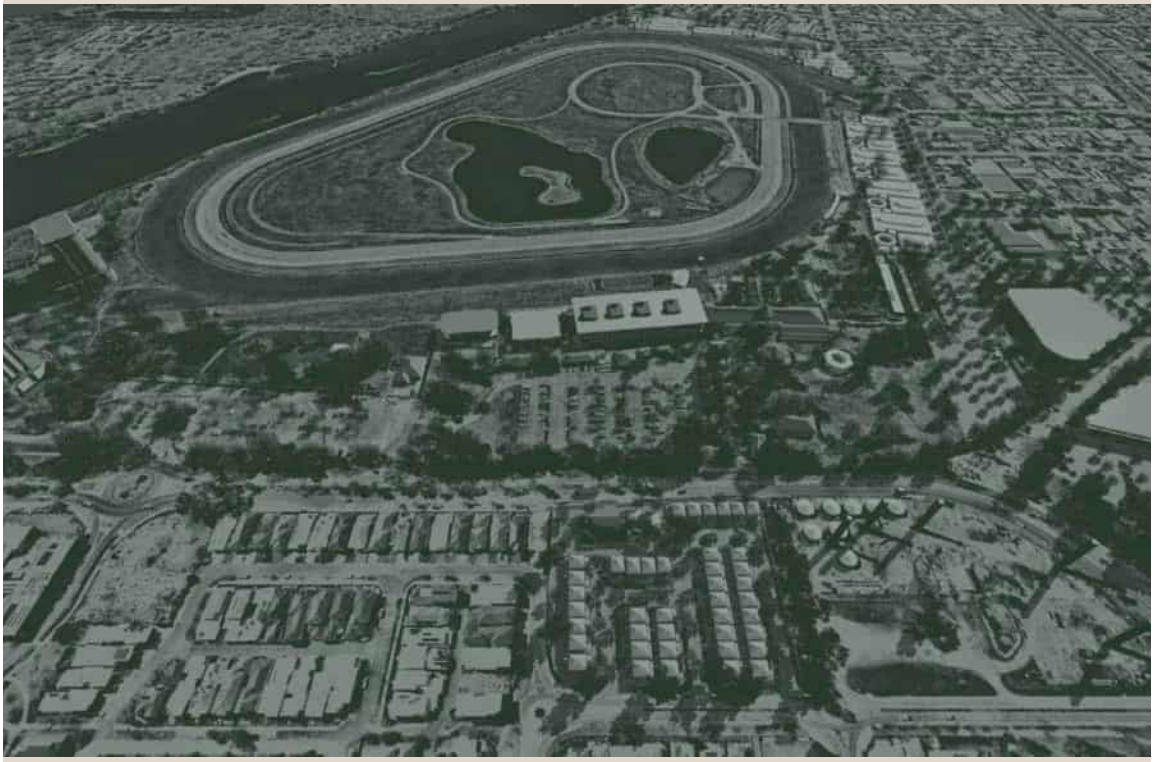
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Appendix 3

Environmental Assessment Report



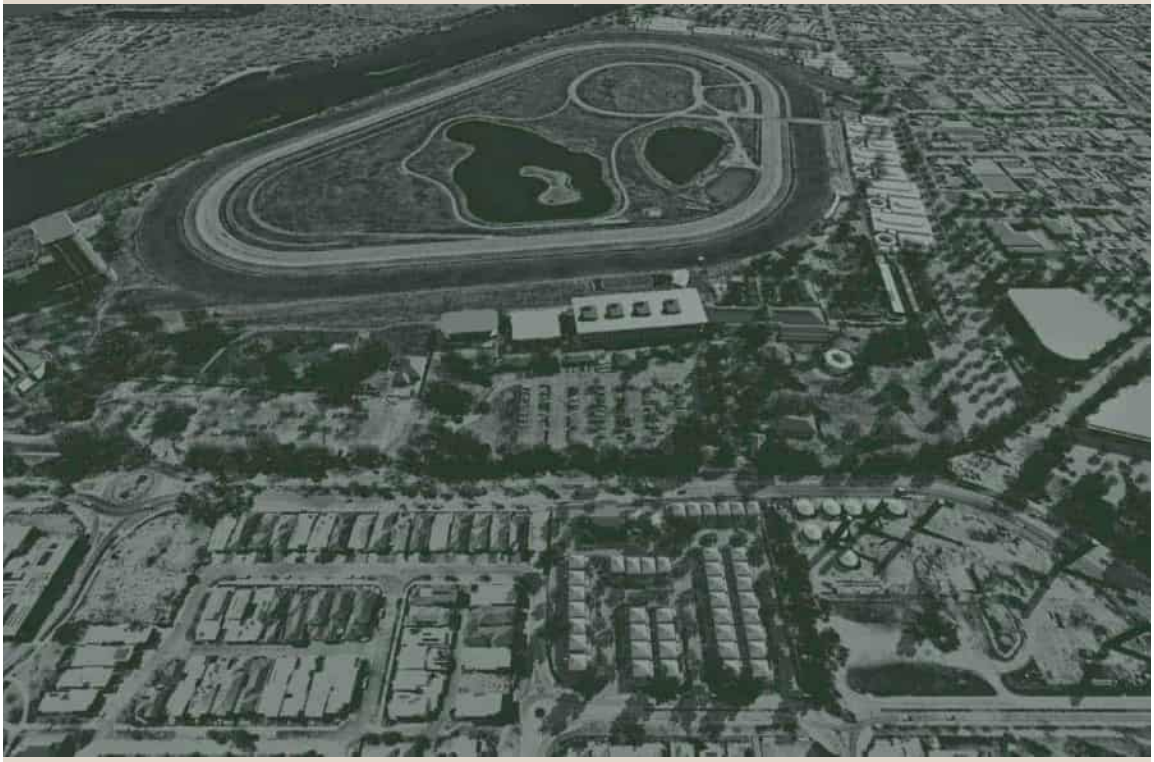
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Appendix 4

Engineering Servicing Report



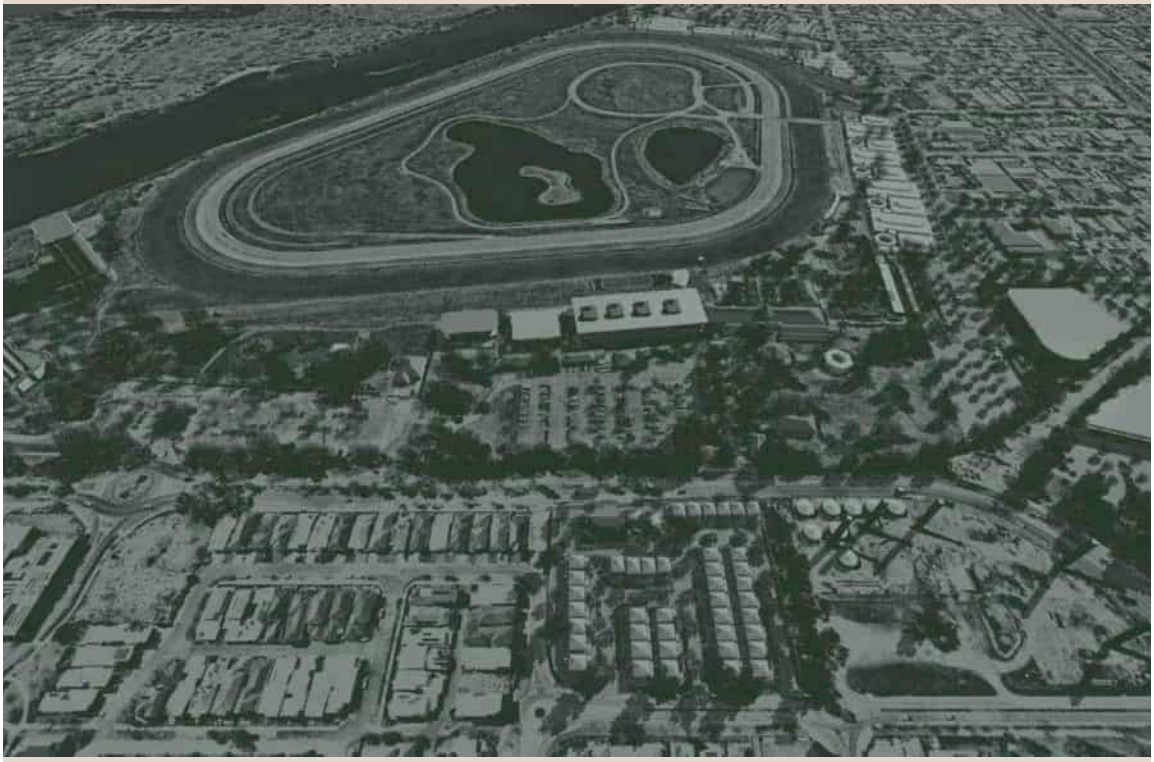
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Appendix 5

Transport Impact Assessment



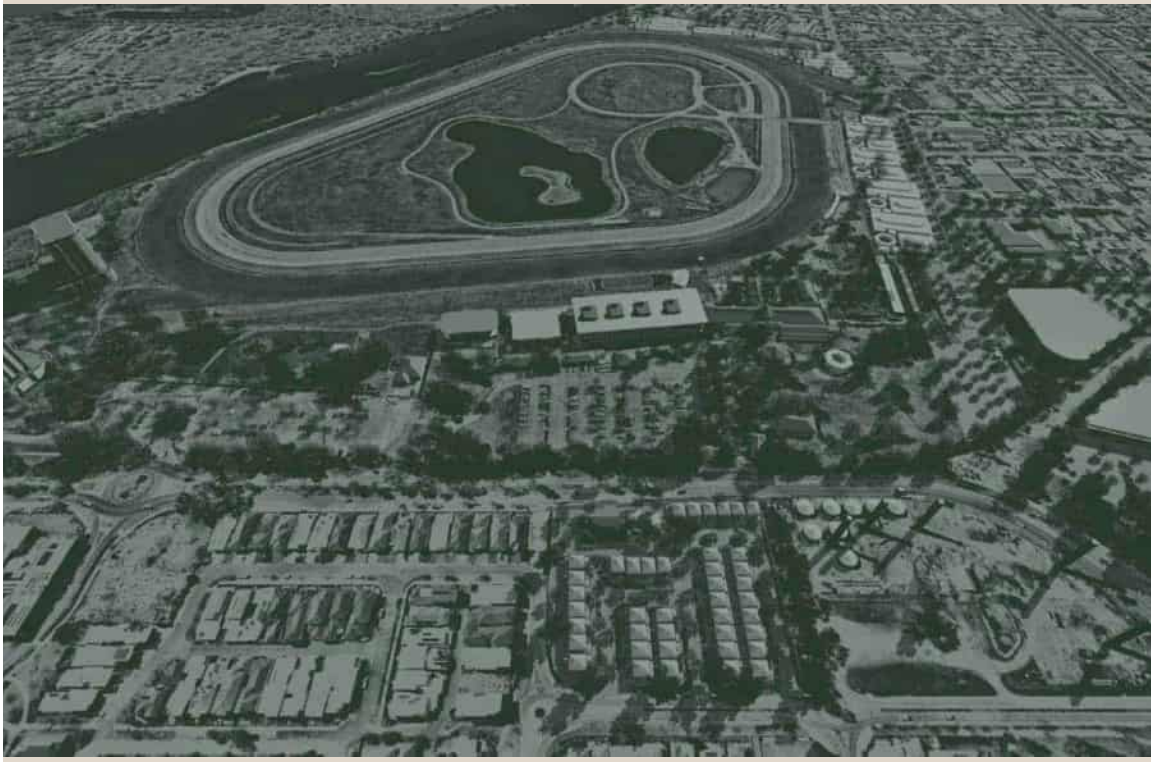
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Appendix 6

Retail Assessment (Net Benefit Test)



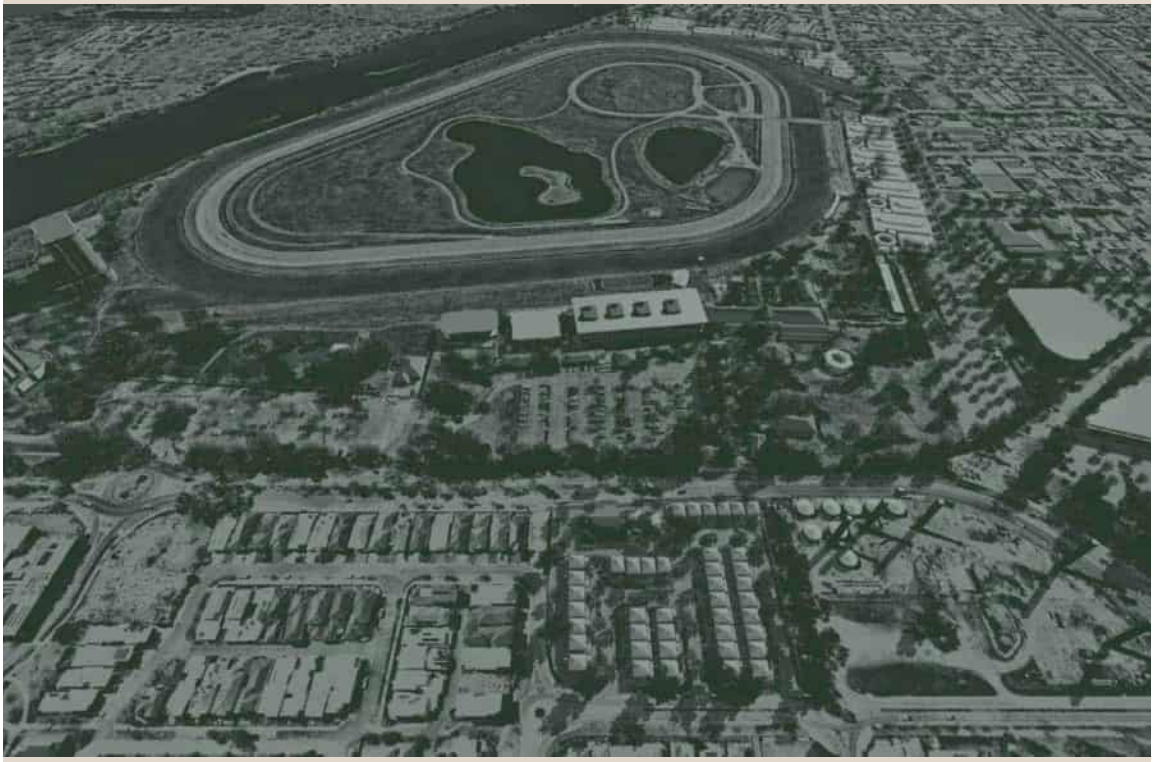
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Appendix 7

Transportation Noise Assessment



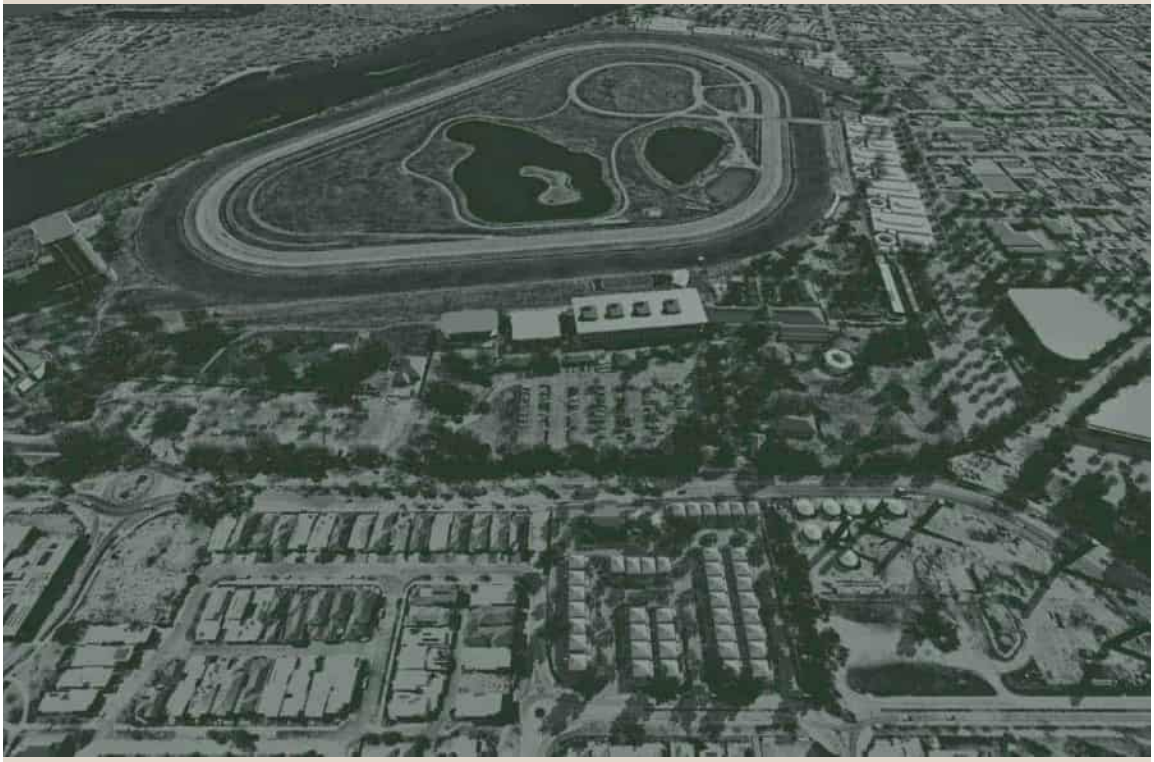
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Appendix 8

Landscape Master Plan

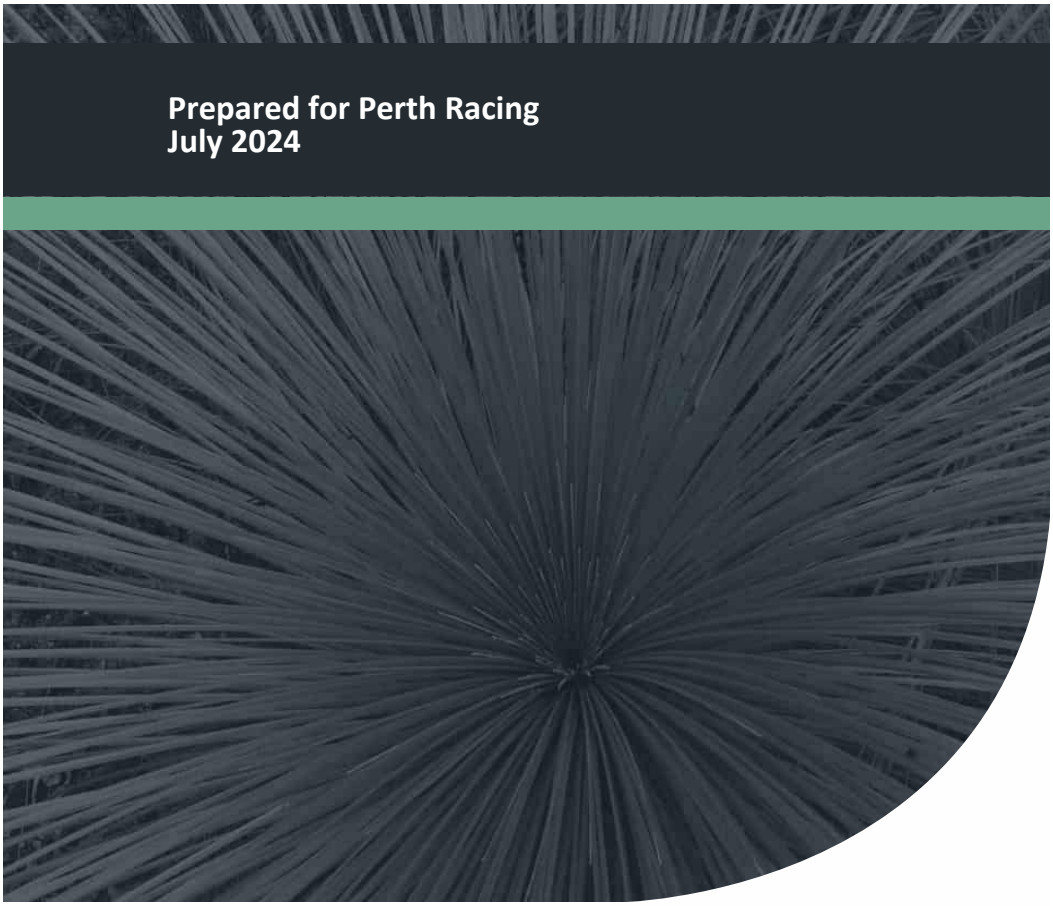


Attachment 12.1.2 Local Water Management Strategy

Local Water Management Strategy

Ascot Racecourse Local Structure Plan

Project No: EP23-109(03)



Attachment 12.1.2 Local Water Management Strategy

Document Control

Doc name:	Local Water Management Strategy Ascot Racecourse Local Structure Plan				
Doc no.:	EP23-109(03)--001B JM				
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	For submission to Agencies				

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Attachment 12.1.2 Local Water Management Strategy

Local Water Management Strategy

Ascot Racecourse Local Structure Plan

Executive Summary

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B (largely unchanged form existing), Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**. The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and City of Belmont (CoB). The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
  - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
  - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
  - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).
- The highest groundwater level beneath the site is reported 3.03 mBGL during February 2024 (Galt 2024), located beneath Precinct D.

Attachment 12.1.2 Local Water Management Strategy

- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The Central Belmont Main Drain (CBMD), managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Matheson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the racecourse. These are understood to receive runoff from the Grandstand buildings in Precinct B and stables/buildings in Precinct C.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

The design criteria and the manner in which they are proposed to be achieved are presented in **Table E1**.

Attachment 12.1.2 Local Water Management Strategy

Table E1: Water management criteria and compliance summary

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Water Conservation	WC1	For residential dwellings consumption target of 60 kL/person/year scheme water.	Provide advice to Precinct A and Precinct D residents on water conservation measures	Proponent	Point of sale
			RWTs can be utilised for non-potable uses	Lot owner	Post-house construction
			Promotion and use of WWG in lots within Precinct D and other open spaces across all precincts	Proponent/Lot owner	Point of sale/Post-house construction
			Promotion and use of water efficient appliances within Precinct A and Precinct D	Proponent/Lot owner	Point of sale/Post-house construction
			Mandate water efficient fittings within Precinct A and Precinct D	CoB	Building approval
	WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in all open spaces and verges	Proponent	Landscape design
			Open spaces designed to use no more than allocated groundwater		
			Minimise water requirements for open spaces and verge maintenance		
			Use of water efficient appliances within Precinct A and Precinct D	Lot owner	Post-house construction
			Use of WWG principles within Precinct A and Precinct D		
	WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the racecourse.	Proponent	Landscape design

Attachment 12.1.2 Local Water Management Strategy

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Stormwater Management	SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.	Lot owner/developer	Construction
	SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.	Proponent	Construction
			Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.	Proponent	Construction
	SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.95 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.	Proponent	Construction
	SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the basins.	Proponent	Detailed drainage design
	SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.	Proponent	Detailed drainage design
	SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the nutrient concentrations within surface water meet the regional water quality target.	Proponent	Detailed drainage design
	SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within POS and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use	Landscape/Maintenance Contactor/Proponent	Landscape Implementation/ Point of Sale
	SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.	Proponent	Detailed drainage design

Attachment 12.1.2 Local Water Management Strategy

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Groundwater Management	GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, and subsoil drainage will be provided in the POS.	Proponent	Detailed drainage design
	GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.	Proponent	Detailed drainage design

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Central Belmont Main Drain Water Corporation

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Local Water Management Strategy

Ascot Racecourse Local Structure Plan

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
ANZECC	Australian and New Zealand Environment and Conservation Council
BoM	Bureau of Meteorology
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
CoB	City of Belmont
WC	Water Corporation of Western Australia (Water Corp)

Table A2: Abbreviations – General terms

General terms	
AEP	Annual exceedance probability
ASS	Acid sulfate soils
CCW	Conservation category wetland
CEMP	Construction Environmental Management Plan
DCA	Development Control Area
DMP	Drainage management plan
EC	Electrical conductivity
FMP	Foreshore management plan
LWMS	Local Water Management Strategy
MGL	Maximum groundwater level
MRS	Metropolitan Region Scheme
NWQMS	National Water Quality Management Strategy
POS	Public open space
SCWQIP	Swan and Canning Water Quality Improvement Plan
SRA	Swan River Alluvium
TDS	Total dissolved solids
TEC	Threatened ecological community
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids

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General terms	
TWL	Top water level
UFI	Unique feature identifier
UWMP	Urban Water Management Plan
WSUD	Water sensitive urban design
WWG	Water wise gardening

Table A3: Abbreviations – units of measurement

Units of measurement	
cm	centimetre
ha	hectare
m	metre
m^2	square metre
m^3	cubic metre
m^3 / s	cubic metres per second
mAHD	metres in relation to the Australian height datum
mBGL	metres below ground level
mm	millimetre
mS / cm	millisiemens per centimetre
µg/L	micrograms per litre
mg / L	milligrams per litre

Table A4: Terminology – design rainfall

Rainfall event	Annual exceedance probability (AEP)	Approximate equivalent average recurrence interval (ARI)
Small	1 exceedance year (EY) event (frequent)	1 in 1 year ARI event
Minor (residential purposes)	20% AEP event	1 in 5 year ARI event
Minor (commercial purposes)	10% AEP event	1 in 10 year ARI event
Major	1% AEP event	1 in 100 year ARI event

Attachment 12.1.2 Local Water Management Strategy

1 Introduction

1.1 Background

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse and Perth Racing Administration lot/building on Grandstand Road. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**.

1.2 Town planning context

The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

1.3 Purpose of this report

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and CoB. The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

1.4 Policy Framework

There are a number of State Government legislation and policies of relevance to the site. These policies include:

- *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d)
- *Swan and Canning Rivers Management Act 2006* (Government of WA 2006)
- *Policy 49 – Planning for stormwater management affecting the Swan Canning Development Control Area* (DPaW 2016)
- *Local Planning Scheme No. 15 (City of Belmont)* (WAPC 2023a)
- *State Water Plan* (Government of WA 2007)
- *Draft State Planning Policy 2.9: Planning for Water Guidelines* (DPLH 2021)
- *State Planning Policy 2.10 Swan Canning River System* (WAPC 2006b)
- *Guidance Statement No. 33: Environmental Guidance for Planning and Development* (EPA 2008)
- *Liveable Neighbourhoods* (WAPC 2009a)
- *Planning Bulletin No. 64: Acid Sulfate Soils* (WAPC 2009b)

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In addition to the above policies, there are a number of published guidelines and standards available that provide direction regarding the water management characteristics that urban developments should aim to achieve. These are key inputs that relate either directly or indirectly to the site and include:

- *Better Urban Water Management* (WAPC 2008b)
- *Urban Water Management Plans: Guidelines for Preparing Plans and for Complying with Subdivision Conditions* (DoW 2008)
- *National Water Quality Management Strategy (NWQMS)* (ANZECC 2000)
- *Australian Runoff Quality* (Wong et al. 2006)
- *National Water Quality Management Strategy* (ANZECC 2000)
- *Stormwater Management Manual for Western Australia* (DoW 2007)
- *Decision Process for Stormwater Management in Western Australia* (DWER 2017)
- *Australian Rainfall and Runoff* (Ball J et al. 2019)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008)
- *Golden Gateway Structure Plan* (CoB 2019).

1.5 Previous Studies

1.5.1 Golden Gateway Local Water Management Strategy

The draft Golden Gateway LWMS (Essential Environmental 2018b) was prepared to support the Golden Gateway Structure Plan (CoB 2019) by Essential Environmental. The LWMS was prepared in consideration of *Better Urban Water Management* (WAPC 2008b) and *State Planning Policy 2.9: Water Resources* (WAPC 2006a). The key objectives and design criteria of the draft LWMS (Essential Environmental 2018b) included:

Water Conservation:

- Ensure the efficient use of all water resources in the redeveloped urban form and aim to achieve highest value use of fit-for-purpose water.
- Maintain opportunities for future generations by using water more efficiently.

Stormwater management:

- The first 15 mm of rainfall is to be retained within all lots through a combination of raingardens, water tanks and soakwell systems.
- Raingardens and tree-pits are to be installed in all new or upgraded streets to provide infiltration of the first 15 mm of rainfall.
- Minor event runoff from events larger than 15mm total depth are to be managed in accordance with serviceability requirements of the City of Belmont.
- Roads and public open spaces are to be designed to cater for the surface overflow for more severe storm events with habitable floors at least 0.3 m above the 1% AEP flood or storage level at any location.
- Habitable floors are to be constructed at least 0.5m above the 1% AEP flood level in the Swan River adjacent to the development area.

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- Water quality treatment systems and stormwater management structures should be designed in accordance with the *Stormwater Management Manual for Western Australia* (DoW 2007) and *Australian Runoff Quality: A guide to water sensitive urban design* (Wong et al. 2006).

Groundwater management:

- Groundwater management systems are to be designed as free discharging under normal operating conditions.
- Flows from groundwater management systems are to be treated prior to discharge.

1.6 LWMS objectives

Whilst the criteria proposed in the Golden Gateway LWMS are relevant to some parts of the Ascot Racecourse structure plan area, it is not representative of all areas and site characteristics and therefore only partially applicable. This LWMS supports the Ascot Racecourse Structure Plan, which proposes an alternate layout (to the Golden Gateway Structure Plan) to some of the land uses surrounding the Ascot Racecourse. The design criteria and objectives proposed in this LWMS are generally based on those proposed in the Golden Gateway LWMS, though with additional consideration for site and Precinct- specific characteristics. This LWMS adopts the following major objectives:

- Protect water quality in the Swan River by providing appropriate water quality treatment at source.
- Mitigate potential flooding within the Structure Plan area and immediate surrounds.
- Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater.
- Provide a broad level stormwater management framework to support future urban development.
- Incorporate appropriate best management practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified.
- Minimise development construction costs, which will result in reduced land costs for future home owners.
- Minimise transport of nutrients/pollutants to groundwater.
- Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area.
- Gain support from DWER, DBCA, CoB and Water Corporation for the proposed method to manage stormwater within the site.

Detailed objectives for water management within the site are further discussed in **Section 4**.

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2 Proposed Development

A total of approximately 62.0 ha is proposed to be developed as shown on **Figure 1**. The Ascot Racecourse Structure Plan proposes six precincts with different objectives and character, and these include:

- **Precinct A –** Approximately 3.0 ha for retirement living/village and mixed use purposes
- **Precinct B –** Approximately 9.3 ha for the use of public assembly (i.e. entertainment/office purposes)
- **Precinct C –** Approximately 8.0 ha for the use of public assembly (i.e. racecourse/stabling purposes)
- **Precinct D –** Approximately 1.5 ha for residential/childcare purposes
- **Precinct E –** Approximately 4.2 ha for mixed use (i.e. commercial/retail purposes)
- **The Racecourse –** Approximately 36.0 ha of retained 'Place of Public Assembly: Racecourse' uses.

The proposed land uses surrounding Ascot Racecourse will be integrated into the Racecourse Precinct. Management of surface and groundwater will take a water sensitive urban design (WSUD) approach that will integrate the management of water within the Precincts with the Racecourse and immediately surrounding infrastructure.

The WSUD measures that will be adopted within the Structure Plan area will include:

- Bio-retention areas (BRAs) to meet water quality treatment requirements
- Subsurface infiltration cells that will facilitate at-source infiltration
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse
- Flood storage areas (FSAs) to provide flood detention, retention and infiltration as close to source as possible.

The WSUD approaches are further discussed in **Section 6**.The detailed concept plan and preliminary civil drawings are provided in **Appendix A** and **Appendix C**.

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3 Pre-development Environment

3.1 Sources of information

The following sources of information were used to provide a broad regional environmental context for the site:

- *Geological Survey of Western Australia* (Gozzard 2007)
- *Map Viewer Plus* (Landgate 2023)
- *Water Register* (DWER 2024c)
- *Perth Groundwater Map* (DWER 2024a)
- *Weather and Climate Statistics Data* (BoM 2024)
- *Acid Sulfate Soil Mapping* (DWER 2023a)
- *Water Information Reporting* (DWER 2024b).

In addition to the above information, site-specific investigations have been conducted. These have aimed at providing more detail to the existing regional information. These site-specific investigations and information have been available from the following sources:

- *Draft Golden Gateway Structure Plan* (CoB 2019)
- *Draft Golden Gateway LWMS* (Essential Environmental 2018b)
- *Draft Golden Gateway Environmental Report* (Essential Environmental 2018a)
- *Draft Infrastructure Assessment Report : Golden Gateway Precinct* (Cardno 2017)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008).

3.2 Land use context

The site has been used as the Ascot Racecourse since 1892 (Landgate 2023). The northeast portion of the site is being used for horse racing and training purposes and the surrounding area is being used for stabling, training and entertainment venues which support the above purposes. Some portions of the site are predominantly cleared (e.g. Precinct A, Precinct E) and are occasionally used for parking or other temporary uses. The Precinct D area is used for commercial purposes, being the current Perth Racing administration building.

3.3 Climate

The site experiences a dry Mediterranean climate of hot dry summers and cool wet winters and is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August (BoM 2024). The region experiences rainfall for 84.8 days annually (on average).

3.4 Topography

The site is mostly flat with a slight downward slope from east to north and northwest, with a few low points. The variance in topography of the Precincts is described further as:

- The Racecourse slopes from Precinct C towards the Swan River with topography approximately 7 m Australian Height Datum (mAHD) to 1m AHD and from 7 mAHD (east) to 3 mAHD (west). There are a few local depressions (i.e., lakes and swale) observed within the centre of the racecourse.
- Precinct A has a generally flat topography of 2 mAHD with a high point of 3 mAHD to the west adjacent to Grandstand Road.
- Precinct B slopes from south to north (4 mAHD to 2 mAHD) and from west to east (3 mAHD to 2 mAHD). Precinct D and E are generally flat with a topography of 3 mAHD and 2 mAHD respectively.
- Parts of Precinct C (existing stables and buildings) drain towards the Racecourse, however most of Precinct C is currently carpark that drains towards Precinct E and the Southern Main Drain.
- Precinct D is generally flat with a topographic level 3 mAHD.
- Precinct E has a gentle slope from east to west. The topography of the precinct ranges from 4 mAHD to the east to 2 mAHD to the west.

The topographic contours of the site are shown on **Figure 2**.

3.5 Geotechnical conditions

3.5.1 Geology and soils

The Perth Metropolitan Region 1:50,000 Environmental Geology Series (Gozzard 1986) *and Sea to scarp - geology, landscape, and land use planning in the southern Swan Coastal Plain* (Gozzard 2011) describes that the site lies in the Swan River Terraces system, being underlain by the Guildford formation of alluvial and leached yellow sand. The regional geological mapping indicates that the site soils include:

- **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
- **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
- **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin

The regional geological mapping is shown on **Figure 3**.

3.5.2 Precinct A geotechnical investigation

A detailed geological investigation has been carried out in January 2024 (Douglas Partners 2024) for Precinct A (see **Appendix B**). This investigation generally confirms the regional geological mapping, and the ground conditions of Precinct A are described as:

- Uncontrolled Fill
  - Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL
  - Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY
- Overlying natural soils includes
  - Clayey soils including Clayey SAND and CLAY
  - Sandy soils including SAND and Silty SAND

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Douglas Partners (2024) concluded that if unmodified, Precinct A is considered unsuitable for on-site stormwater disposal due to the low permeability soils and shallow groundwater depth. To meet geotechnical requirements, stormwater should be managed by connecting to a suitable outflow (Douglas Partners 2024).

3.5.3 Precinct D geotechnical investigation

Galt has undertaken a geotechnical study in March 2024 (Galt 2024) for Precinct D (provided in **Appendix B**) and has described the Precinct D ground conditions as:

- **Surficial Topsoil** (in landscaped areas) up to 0.3 m thick and **Hardstand Fill Layers** (in carparks and access ways); overlying
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Whilst detailed geotechnical investigations have not been undertaken in each Precinct, it is expected that the soils encountered will be generally consistent with regional geological mapping and the investigations undertaken for Precincts A and D and will consist of generally shallow layers of sand overlying sandy clay of the Guildford formation. Such soils are unlikely to be suitable for onsite infiltration of all stormwater and onsite detention unless modified and stormwater management will need to be supplied with an outlet so that flood storage areas have a way to drain between storm events.

3.5.4 Acid sulfate soils

The acid sulfate soil (ASS) risk mapping (DWER 2023b) indicates that most of the site is considered to have a high to moderate risk of ASS occurring within the 3 m of the natural surface. Some portions of Precinct B, Precinct C and the Racecourse are mapped to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.

The ASS risk mapping is shown on **Figure 4**.

3.6 Environmental assets

3.6.1 Environmentally sensitive area

The northern portion of the site (along the Swan River) is identified as an environmentally sensitive area (ESA). ESAs are shown on **Figure 5**.

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3.6.2 Sewerage sensitive area

The entirety of the site is classified as a sewage sensitive area (SSA) by the *Government Sewerage Policy* (DPLH 2019). The two classifications of relevance to the site define a SSA as:

- a) Estuary catchments on the Swan and Scott Coastal Plains.
- f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.

3.6.3 Geomorphic wetlands

The *Geomorphic Wetlands of the Swan Coastal Plain* dataset indicates the following wetlands within the site:

- Multiple Use Category Wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
- Resource Enhancement Wetland (REW) area (UFI 8423)

The Swan River, situated immediately adjacent to the northern boundary of the site, is recognised as a "Conservation Category Wetland" (CCW) (UFI 1316 - Estuary waterbody) within the *Geomorphic Wetlands of the Swan Coastal Plain* dataset and has additional significant ecological, cultural and heritage values (DEC 2011).

The location of the geomorphic wetlands is shown on **Figure 5.**

3.7 Hydrology

3.7.1 Surface water

3.7.1.1 Water Resources

The dominant hydrological feature of the site is the Swan River estuary. The estuary is subject to marked seasonality, which controls the salinity of the site, and particularly the foreshore area. This seasonality is a result of the short winter rainfall patterns, a small tidal range and the landform of the estuary (Hodgkin and John 1986).

The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park (shown on **Figure 6**). Any proposed development on land adjacent river within the DCA and/or partly within DCA are subject to assessed and approved by the Department of Biodiversity, Conservation and Attraction (DBCA) under Part 5 of the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007* (CoB 2018).

Water management strategies will be needed to ensure protection (i.e. water quality improvement) of the Swan River. The catchments of the Swan Canning River system are the subject of the Swan Canning Water Quality Improvement Plan (SRT 2009) which contains catchment management measures and control actions.

The major event flood levels in the Swan River have been documented in recent studies undertaken on behalf of DWER (DWER 2023c).These flood levels, along with the extent of floodway/floodplain

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are shown in the DWER online floodplain mapping tool. This tool indicates that the anticipated 1% AEP flood level adjacent to the site is 2.8 mAHD – noting that this level includes consideration for future climate change. The extent of floodway/floodplain from the Swan River adjacent to the site is shown on **Figure 6**.

3.7.1.2 Lakes

There are three lakes within the racecourse including:

- **Irrigation lake** – located adjacent to the Production Bore 1 (PB01) and has a volume of 6,000 m^3 to 7,000 m^3. Water is pumped out from PB01 into the lake, and irrigation water is drawn from the Irrigation Lake. During winter the Irrigation Lake overflows into the adjacent Lined Lake. The current irrigation demand for the Racecourse is approximately 3,000 m^3/day, there is no shortage of irrigation water supply as the lake has sufficient storage capacity. The top water level (TWL) of the Irrigation Lake is approximately 3.1 mAHD.
- **Lined Lake** – this Lake is sealed with a natural clay liner and fed via a 225 mm overflow pipe from the Irrigation Lake. The Lined Lake overflows into the Wetland Lake. The elevation of the Lined Lake is approximately 2.1 mAHD.
- **Wetland lake** – is the largest of the three lakes and has approximately 2.6 ha of surface area. The Wetland Lake has a TWL of approximately 0.4 mAHD. Two overflow pipes at the northern end of the Wetland Lake allow excess water within the Lake to flow to the Swan River.

Peak water levels within the Lined Lake and Wetland Lake were predicted for a 10% AEP storm event (Evangelisti & Associates 1997). The peak water level for was 2.68 mAHD in the Lined Lake which then discharged to the Wetland Lake. The Wetland Lake discharged to the Swan River after reaching the peak water level of 0.53 mAHD. The lakes are connected by 450 mm RCP pipes. The outfall into the Swan River is directed via two pipes (450 mm RCP and 375 mm RCP). The pipes are fitted with headwall and tidal control gate to mitigate inundation from the Swan River (Evangelisti & Associates 1997).

The location of the lakes and overflow pipes are shown on **Figure 6**.

3.7.1.3 Drainage network systems

The Central Belmont Main Drain (CBMD) is managed by the Water Corporation and is the regional drainage system and has a catchment area of 189 ha and which discharges into the Swan River. Catchment plans for the CBMD indicate that inflow from the site occurs in the southwestern corner of Precinct E, where an open drain connects to the CBMD at node CAN008 as shown in **Appendix E** and **Figure 6**.

The CoB has a local drainage piped network located beneath Hardey Road adjacent to Precinct C and which discharges to the CBMD within Precinct E. A larger local CoB network extends along Matheson Road to the East. This is currently connected to the 900 mm pipe that discharges northwards to the lined lake within the centre of the racecourse.

CoB local drainage pipes also exist beneath Grandstand Road adjacent to Precinct A however there is no current connection between Precinct A and the local drainage network. The same network also extends past/adjacent to Precinct D along the northern end of Resolution Drive, however there is no

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current connection from Precinct D to the local pipe network. The pipe network along Resolution Drive includes a 450 mm and 525 mm pipe which are understood to discharges into the CBMD. Whilst the CoB catchment has not been modelled to determine peak flows under differing storm durations, an estimate can be made based on the capacity of the pipes which discharge to the CBMD. The combined capacity of the two existing pipes is estimated to be 0.62 m^3/s, and therefore the allowable discharge from Precinct C and Precinct E is estimated to be 0.33 m^3/s.

Within the Racecourse an existing swale is being used around the racecourse to convey water from the track into the central Wetland Lake.

The location of the swales within the Racetrack Precinct and outlet to Swan River from the Wetland Lake is shown on **Figure 6**.

3.7.2 Groundwater

3.7.2.1 Groundwater Resource

The groundwater beneath the site is a multi-layered system comprised of the following:

City of Bayswater – Perth Superficial Swan unconfined aquifer. The Superficial Aquifer is approximately 20 m thick under the Ascot Racecourse, with the base of the aquifer under the racecourse at approximately - 20 mAHD (Davidson, 1995). The aquifer is recharged directly by rainfall and from the Swan River.

King Park Aquifer. The Kings Park Aquifer is 155 m thick starting from - 20 mAHD and is recharged laterally from the adjacent northern Mirrabooka Aquifer and Superficial Aquifer. The Kings Park Aquifer comprises 2 members: the Mullaloo Sandstone and Como Sandstone. Only the Mullaloo Sandstone member is present at the Ascot site (Davidson, 1995). The Mullaloo Sandstone member is underlain by the Kardinya Shale confining bed of the Osborne Formation.

The groundwater salinity in the aquifer in 1995 was mapped as 500 mg/L to 1,000 mg/L TDS (Davidson, 1995). However, data in recent years indicates the aquifer salinity levels are increasing due to saltwater intrusion.

Perth South – Perth Leederville confined aquifer is below -160 mAHD and is approximately 370 m thick. In the Ascot area the Leederville Aquifer is confined but further to the south and north of Perth it is hydraulically connected to the Superficial Aquifer. The Leederville Aquifer comprises of four formations under the Ascot Racecourse, namely Henley Sandstone, Pinjar Member, Wanneroo Member and the Mariginiup Member.

Groundwater flow is generally westwards through the Leederville Aquifer. Lateral discharge can occur to the Kings Park Aquifer but depends on levels of abstraction in the Leederville Aquifer adjacent to the discharge area.

Generally, groundwater salinity in the Leederville Aquifer can be divided into an upper and a lower zone. The upper zone is generally fresh with salinity ranging from 250 to 1,000 mg/L. Salinity in the lower zone (below -400 mAHD) ranges from 1,000 mg/L to greater than 3,000 mg/L.

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Groundwater is abstracted from an artesian production bore (PB1) assigned to the Leederville Aquifer to meet the irrigation demand of the Racecourse and surrounds. The bore is located adjacent the Irrigation Lake at the south corner of the Ascot Racecourse track. The bore is screen in the upper Leederville Formation which extends between -160 mAHD and -400 mAHD.

The allocation status of aquifers is further discussed in **Section 5.1.2**.

3.7.2.2 Groundwater levels

Perth Groundwater Map indicates (DWER 2023e) that the regional groundwater level sits at 0.5 m AHD across the site. Therefore, the groundwater clearance from southeast to northwest of the site ranges from 6.5 m to 0.5 m.

There are two groundwater level and quality monitoring bores (Bore1 and Bore2) and one production bore (PB1) within the Racecourse (see **Figure 2**) which are monitored by Perth Racing. Groundwater levels in these are monitored monthly.

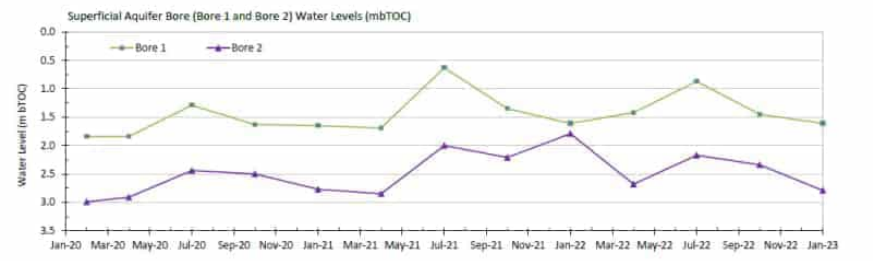


Plate 1: Groundwater levels within the Superficial Aquifer at Bore1 and Bore2 (JDA 2023)

Plate 1 depicts the groundwater levels observed within the Racecourse which clearly indicates the rise and fall of groundwater levels seasonally. The peak groundwater level at Bore 1 and Bore 2 were recorded 1.26 m AHD and 1.70 m AHD respectively, during August 2022.

Monitoring has recently been undertaken within Precinct A. Six monitoring wells were installed for the Precinct A geotechnical investigation. The groundwater depth below the surface of the Precinct A (during January 2024) varied from 1.09 m below ground level (mBGL) to 2.37 mBGL (Douglas Partners 2024).

Monitoring has also recently been undertaken within Precinct D by Galt Geotechnics during the geotechnical investigation. The highest groundwater level beneath Precinct D is reported as 3.03 mBGL during February 2024 (Galt 2024).The various monitoring data/sources have been collated to prepare estimated maximum groundwater contours beneath the site. These have also considered the surface elevation of swales adjacent to the racetrack and the reported TWL of the Wetland Lake. The regional groundwater levels are shown in **Figure 2,** with spot heights recorded at the various locations also provided. It is noted that these do not necessarily represent the annual maximum groundwater levels at all parts of the site given the various timing of measurement of groundwater. Notwithstanding the variability of timing, it is likely that the management of stormwater (and in

particular infiltration) will more likely be influenced by localised soil conditions than seasonal peak groundwater levels in the superficial aquifer.

3.7.2.3 Groundwater quality

Water quality monitoring was conducted monthly at PB1 and quarterly at Bore1 (JDA 2023). Water quality parameters those were analysed during the monitoring period include:

Monitoring Bore (Bore1)

- EC
- pH
- TDS
- Total phosphorus (TP)
- Filterable Reactive Phosphorus or Phosphorus in Orthophosphate (PO_4-P)
- Total Nitrogen (TN)
- Nitrogen in Total Oxidised Nitrogen (NO_x-N)
- Nitrogen in Ammonia (NH_3-N)
- Total Kjeldahl Nitrogen (TKN)

Production Bore (PB1)

- Electrical conductivity (EC)
- pH
- Total Dissolved Solids (TDS)

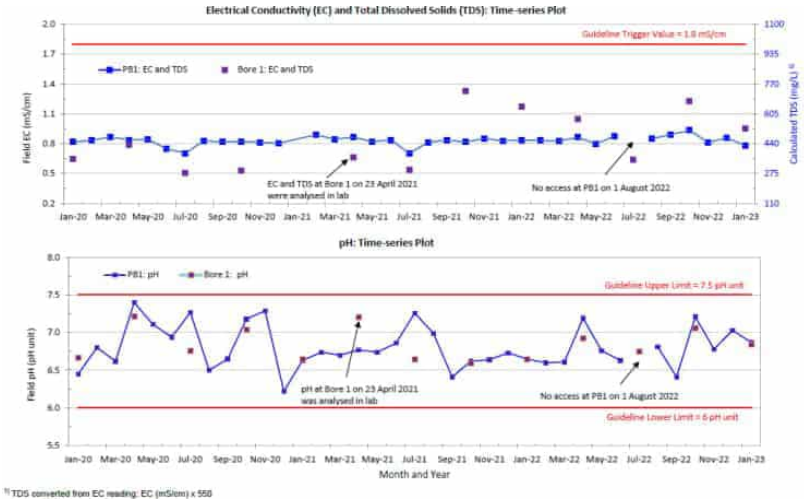


Plate 2: Water Quality (EC, TDS and pH) Monitoring results (JDA 2023)

Plate 2 and **Plate 3** illustrate the water quality of the groundwater within the site is generally consistent over the monitoring periods with typically low variance in parameters tested. EC, TDS and

pH values did not display any exceedances of the trigger values. However, TN and TP regularly exceeded the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L (respectively). It is also noted a large exceedance in TN occurred in August 2022 however this does not appear to be representative of long-term values.



Plate 3: Water Quality (TN and TP) Monitoring results (JDS 2023)

3.8 Summary of existing environment

In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
  - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
  - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
  - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).

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- The highest groundwater level beneath Precinct D is reported 3.03 mBGL during February 2024 (Galt 2024).
- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The CBMD, managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Mathieson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the Racecourse. These are understood to receive runoff from the grandstand buildings in Precinct B and stables/buildings in Precinct C.
- Allowable discharge to the CBMD from the local drainage network is 0.95 m^3/s based on Water Corporation modelling.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

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4 Design Criteria and Objectives

This section outlines the objectives and design criteria that this LWMS and future management plans must achieve. The water management strategy includes water conservation, groundwater management and stormwater management.

4.1 Integrated water cycle management

Better Urban Water Management (WAPC 2008a) endorses the promotion of integrated water cycle management and application of WSUD principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies.

The key principles of integrated water cycle management include:

- Considering all water sources, including wastewater, stormwater and groundwater
- Integrating water and land use planning
- Allocating and using water sustainably and equitably
- Integrating water use with natural water processes
- Adopting a whole catchment integration of natural resource use and management.

Integrated water cycle management addresses not only physical and environmental aspects of water resource use and planning, but also integrates other social and economic concerns. Water management design objectives should therefore seek to deliver better outcomes in terms of:

- Potable water consumption
- Stormwater quality management
- Groundwater management.

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. The existing environmental context of the site has been discussed in **Section 3** of this document. Guidance regarding environmental values and criteria is provided by a number of national and state policies/guidelines and site-specific studies undertaken in and around the site. These were detailed in **Section 1.4** and **Section 1.5** respectively.

4.2 Water conservation

This LWMS proposes the following water conservation criteria:

Criteria WC1 For residential dwellings, consumption target of 60 kL/person/year.

Criteria WC2 Ensure the efficient use of all water resources

Criteria WC3 Non-potable irrigation water to be sourced from existing groundwater licences held over the area.

The manner in which this objective will be achieved is further detailed in **Section 5**.

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4.3 Stormwater management

The principle behind stormwater management at the site is to mimic the pre-development hydrological conditions and utilise existing infrastructure where sensible to do so, as described in **Section 3.7**. This principle and the guidance documents discussed in **Section 1.4** and **Section 1.5** and have guided the stormwater management criteria.

Criteria SW1 Retain and treat the first 15 mm of rainfall as close to source as possible and within site.

Criteria SW2 Detain up to 1% AEP rainfall event on-site.

Criteria SW3 Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.

Criteria SW4 Finished floor levels must have a minimum of 300 mm clearance above the 1 % AEP TWL in the FSA.

Criteria SW5 All lots must have a minimum of 500 mm clearance above the 1 % AEP flood level in the Swan River.

Criteria SW6 Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.

Criteria SW7 Reduce nutrient loads by applying appropriate non-structural measures.

Criteria SW8 Design infiltration areas to avoid creating mosquito habitat.

The manner in which these objectives will be achieved is further detailed in **Section 6**.

4.4 Groundwater management

The principle behind the groundwater management strategy is to maintain the existing groundwater hydrology. The groundwater management criteria for the site include:

Criteria GW1 Surface based infiltration structures should have 300 mm clearance above the MGL.

Criteria GW2 Habitable floor levels should have a clearance to the MGL of at least 1.2 m.

The manner in which the groundwater management objectives will be achieved is further detailed in **Section 7**.

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5 Water Conservation Strategy

5.1 Fit for purpose water use

Conservation of water through fit-for-purpose use and best management practices is encouraged so that scheme water is not wasted. Fit-for-purpose describes the use of water that is of a quality suitable for the required use of the water. Fit-for-purpose principles have been utilised in the water conservation strategy for the site and will achieve **Criteria WC1**.

5.1.1 Scheme water supply

Scheme water will be supplied by the Water Corporation Integrated Water Supply System. Scheme water is proposed to be used for all potable uses. Scheme water will also service some external uses, where fit-for-purpose alternatives are not available.

5.1.2 Groundwater

As discussed in **Section 3.7.2.1**, the site is located beneath a multi-layered system comprising of the Superficial Swan, Kings Park Formation, Leederville and Yarragadee aquifers.

The proponent holds a groundwater allocation from the Perth South Leederville confined aquifer for the following:

- GWL 178519 - 347,000 kL

This licence will be used to meet the irrigation requirements for the Racecourse Precinct, Precinct A, Precinct B and part of Precincts C and E.

The above-mentioned measure will achieve **Criteria WC3**.

5.1.3 Rainwater tanks

Rainwater tanks (RWTs) can be used within private lots to harvest roof runoff. This water is considered non-potable but can be used to supplement non-potable water uses.

5.2 Lot scale water conservation measures

This LWMS proposes that the water conservation measures to be adopted would include RWTs, waterwise principles for lot scale gardens and within estate landscaping (WWG) and water efficient fixtures and appliances (WEFA) to ensure that the residential portion of the development minimises the use of water. These are summarised in the following sections.

5.2.1 Rainwater tanks

The use of RWTs will not be mandated, and the stormwater quantity management strategy does not rely on their use. They are therefore only considered to be a water conservation measure. Given that rainwater tanks will not be mandated or supplied by the proponent, it has been assumed that these would be implemented by 7.5% of households within Precinct D. Whilst they may be considered for

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Precinct A they are not proposed to be taken up in other Precincts. The assumed uptake rate has been based on data obtained from the Australian Bureau of Statistics (ABS 2013). It is assumed (for the purposes of the water balance analysis) that all rainwater tanks have a capacity of 3 kL.

5.2.2 Water efficient fixtures and appliances

Water conservation strategy for the site proposes the use of WEFA. Water efficient fittings will be mandated through the building licence, while uptake of water efficient appliances can be encouraged by State and Local Government rebates in addition to education from the proponent at point of sale. WEFA are relevant to Precinct A and Precinct D. It is assumed that water efficient appliances will be implemented by 40% of households within Precinct A and Precinct D, which has been based on data obtained from the Australian Bureau of Statistics (ABS 2013, 2014).

5.2.3 Waterwise gardens

Landscape packages will not be provided as a part of the land sale contract. Lot scale waterwise gardening principles (WWG) are only relevant for Precinct D. These will be achieved by promoting Waterwise gardening principles (WWG) (WC 2003) at the time of sale of land within Precinct D. It is assumed that 75% of households in Precinct D will implement WWG principles within lot gardens (ABS 2013). WWG principles include:

- Soil to be improved with soil conditioner certified to Australian Standard (AS) 4454 to a minimum depth of 150 mm where turf is to be planted and a minimum depth of 300 mm for garden beds.
- The irrigation system shall be designed and installed according to best water efficient practices:
  - The controller must be 'hydrozoned'.
  - Emitters must disperse coarse droplets or be subterranean.
- Garden beds to be mulched to 75mm with a product certified to AS4454.
- Increasing community awareness of water conservation by promoting Waterwise practices, fixtures and fittings at the point of sale.

WWG principles will also be considered for Precinct A and Precinct E, however it is anticipated that these areas will have minimal irrigated landscaping to which this would apply. The current approach to irrigation within the Racecourse Precinct, Precinct B and Precinct C adopts a range of water conservation measures (including non-irrigated area and retention of existing trees/vegetation) to ensure that Perth Racing operates within the available groundwater allocation. This approach is not proposed to be significantly modified.

The above measures will assist in achieving **Criteria WC1** and **WC2**.

5.3 Water use analysis

5.3.1 Lot scale water use analysis

A water use analysis has been undertaken for Precinct D to estimate the expected individual residential lot water use to demonstrate the effectiveness of the water conservation strategy. The water use analysis has been based on the rates and calculation methodology presented in the Water

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Corporation (2011) spreadsheet *AltWaterSupply_Water_Use_Model.xls*. This spreadsheet has been adapted to model the effects of using the water conservation measures proposed, and key assumptions include:

- Lot area has been based on a conceptual lot layout (see **Appendix A**).
- Average residency of 2.6 people per single lot dwelling. This value has been calculated from data provided by ABS for new housing developments in Perth (ABS 2022).
- Assumed up-take rates include:
  - 100% uptake of water efficient fittings
  - 40% uptake of water efficient appliances
  - 7.5% uptake of RWTs
  - 55% uptake of WWG principles.

The results of the water balance indicate that if households in Precinct A and Precinct D adopt the proposed water conservation measures (e.g. efficient fittings, RWT, WWG principals) at typical uptake rates they will use an average of 33.0 kL/year/person. This achieves the water target of no more than 60 kL/year/person of scheme water and satisfies **Criteria WC1**.

5.4 Wastewater management

The wastewater generated from the site will be managed by connecting the development to the Water Corporation deep sewer network.

5.5 Water conservation management criteria compliance

A summary of the proposed water conservation management criteria and how these are addressed is provided within **Table 1.**

Table 1: Water conservation management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
WC1	Residential consumption target of 60 kL/person/year scheme water.	Provide advice to residents in Precinct A and Precinct D on water conservation measures
		RWTs can be utilised for non-potable uses within Precinct D
		Promotion and use of WWG in lots within Precinct D
		Promotion and use of water efficient appliances to Precinct A and Precinct D
		Mandate water efficient fittings within Precinct A and Precinct D
WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in open spaces
		Open spaces designed to use no more than allocated groundwater
		Minimise water requirements for open space and verge maintenance
		Use of water efficient appliances within Precinct A and Precinct D
		Use of WWG principles in lots in Precinct D

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Table 2: Water conservation management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the Racecourse and surrounding Precincts.

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6 Stormwater Management

The principle behind the stormwater management strategy for the site is to maintain the existing hydrology by detaining, retaining and treating runoff from the small rainfall event (i.e. first 15 mm) as close to source as possible and detaining/retaining the major event (1% AEP) on site prior to discharge to either the centre of the Racecourse (i.e. self-retained) or to the CBMD the pre-development outflow rates. Due to the existing soil conditions (See **Section 3.5**), the site is not well suited for structural controls utilising infiltration of stormwater unless modified. However, given that fill will be utilised to ensure that habitable floor levels are above the 1% AEP flood elevation of the Swan River, final elevations will be approximately 4 mAHD. Where fill is used to achieve this there will be sufficient clearance to MGL and permeability of soils to adopt WSUD measures which utilise infiltration.

WSUD measures proposed will vary across the Precincts and will include:

- BRAs to achieve water quality treatment (Precincts A, C, D and E)
- FSAs to detain runoff prior to discharge to the adjacent road network system
- Subsurface infiltration cells that will facilitate at-source infiltration (Precinct D)
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse (for Precinct A and C)
- FSAs to provide flood detention and infiltration as close to source as possible (Precinct E).

The overall approach to precinct drainage is shown on **Figure 7**.

The WSUD measures that will be implemented as a part of the development are described in the following sections. Precinct B has been assumed to be self-retained and a portion of Precinct C (already connected to the Lakes in the centre of the track) has been assumed to be the same as it is now. Surface runoff modelling undertaken using XPSWMM has been used to inform the design of stormwater infrastructure as detailed in the following sections. Assumptions used to represent the post-development environment are provided in the modelling assumptions report in **Appendix D**.

6.1 Lot scale drainage measures

Lots within Precinct D and Precinct E will retain the first 15 mm rainfall event runoff within soakwells/soakage which will need a capacity of 150 m^3/ha. Lot storage is the responsibility of the lot owner and will be assessed as part of the building approval process prior to construction.

The use of soakwells/soakage areas will assist in achieving **Criteria SW1**.

6.2 Development drainage measures

6.2.1 Bio-retention areas

Runoff from the first 15 mm of rainfall will be captured and retained within a vegetated BRA located in open spaces. The BRA is assumed to have a depth of 500 mm with 1:3 side slopes. Treatment of

runoff will be provided through interaction with vegetation and adsorption to sand particles through infiltration prior to reaching groundwater.

The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10). This will be finalised prior to detailed design. The location of the BRA will either be in a drainage reserve, an open space or they may be within the centre of the Racecourse as a separate treatment area (separate from the existing Lakes). The sizing and spatial requirements of BRAs will be confirmed in the detailed designs.

The use of BRA will assist in achieving **Criteria SW1, SW6,** and **SW8**.

6.2.2 Flood detention/storage

An FSA will be utilised to detain runoff above the first 15 mm and up to the 1% AEP rainfall event. To achieve this, the invert of the FSA will have sufficient clearance above groundwater 300 mm. FSAs are assumed to be 1.2 m depth with 1:6 side slope and will be integrated into POS or drainage reserve, and will overflow to the Water Corporation drainage network. The sizes and spatial requirements for the FSA will be confirmed in the detailed designs and development stages.

The use of an FSA will assist in achieving **Criteria SW1, SW2, SW4,** and **SW6.**

6.2.3 Subsurface storage

Surface runoff generated by lots, stables and hardstand/carpark areas will be directed into sub-surface storage. Precinct D will have an independent drainage pipe network within individual precincts which convey flows to downstream sub-surface retention structures.

These structures have been sized to accommodate up to the 1% AEP rainfall event and have been designed as a 1 m deep structure. The detailed configurations could be modified to suit site constraints. These will either be location beneath road reserve/verge or beneath an open space and will require an overflow connection to the local (CoB) drainage network to ensure that they can dry out. The sizes and spatial requirements for the subsurface storages are provided in **Table 2** and illustrated in **Figure 7A**: Precinct A Stormwater Management Plan

Figure 7B: Precinct C Stormwater Management Plan

Figure .

The use of the sub-surface storage will assist in achieving **Criteria SW1, SW2,** and **SW6.**

6.2.4 Lake storage

Precinct A and Precinct C (stables) will first direct runoff to a bio-retention areas, however overflow from these will be catered for in the Wetland Lake. In a 1% AEP storm event an additional 78 mm of depth will occur within the Wetland Lake from both Precincts.

As indicated in **Section 3.7.1.2**, the Wetland Lake is connected/discharges to the Swan River via a 375 mm and 450 mm culvert. These are not proposed to be modified. The combined nominal flow capacity of the 375 mm and 450 mm pipes is approximately 0.4 m^3/s. The inlet, length, grade, etc of

these pipes is not proposed to be modified and therefore the current overflow regime from the site to the Swan River will remain unchanged.

The use of the Wetland Lake storage will assist in achieving **Criteria SW1, SW2, SW3,** and **SW6.**

6.3 Precinct based drainage approach

6.3.1 Precinct A

There is no current connection point for drainage to be exported from site to the local CoB network. Runoff will therefore need to be managed within Precinct A and the Racecourse. Precinct A will require a single BRA that will address treatment of water quality; this will be located within Precinct A as close to source as possible. The BRA should have the following characteristics:

- Base will be vegetated with reeds/rushes as per a biofilter
- 1:3 side slopes
- Depth of 300 – 500 mm pending final design
- Volume of the BRA will need to achieve 194 m^3
- Nominal surface area of 450 m^2.

In addition to the volume achieved by the BRA, in a major (1% AEP) storm event a further 1,345m^3 of flood retention storage will be required. The proposed earthwork level of Precinct A (4.0 mAHD) means that it is possible to direct runoff exceeding BRA capacity to the Wetland Lake in the centre of the Racecourse. This approach will add approximately 52 mm to the central 2.6 ha Wetland Lake.

The volumes of storage required and locations of storage across the Precincts is summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7A**.

6.3.2 Precinct B and Racecourse

As indicate previously, there are no substantial changes proposed to Precinct B. Precinct B currently manages surface runoff within the precinct and adjacent Racecourse, largely via at source infiltration, swales around the perimeter of the track surface and the existing lake system Precinct B and the Racecourse are proposed to be retained largely as is.

As indicated in **Section 3**, the Wetland Lake currently has a piped overflow connection to the Swan River. This overflow pipe(s) reportedly rarely overflow and can be controlled via a structure at the outlet (which also prevents tidal influence on the Wetland Lake). The Wetland Lake has a 2.6 ha surface area, and therefore can provide significant volume of stormwater retention in the event of a major storm event. There are no new connections proposed to the Swan River and there are no changes proposed to the management approach currently taken for the Wetland Lake and the current piped outlets.

6.3.3 Precinct C

Precinct C is the existing stables area, adjacent carparks and future stables areas along the south and east of the Structure Plan area. The existing buildings currently either infiltrate runoff at source or

discharge to the Lined Lake in the centre of the Racecourse. This approach is proposed to be retained.

Surface runoff generated by hardstand/carpark areas of Precinct C will be directed and discharged towards Precinct E via the existing connections to the CoB drainage network along Matheson Road or via the existing pipe connection in the southwest of the Structure Planning area to the existing connection to the CBMD (Water Corporation drainage system) within Precinct E.

The drainage requirements for the southern (carpark) portion of Precinct C are therefore detailed with those proposed for Precinct E.

For the two currently undeveloped portions of Precinct C (future stables along the south and east of the Structure Plan area), the post-development drainage system will collect the runoff from these areas and direct them to the centre of the Racecourse. Initial treatment will be provided by a BRA which accommodates 418 m^3, with a nominal surface area of 924 m^2.

Runoff exceeding the capacity of the BRA (which will be 684 m^3) will be directed to the Wetland Lake. The direction of major event stormwater runoff to the Wetland Lake will add 26 mm to the top water level of the Wetland Lake.

The volumes required to be treated and for flood mitigation for Precinct C are summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7B**.

6.3.4 Precinct D

As indicated in **Section 6.1**, private lots and the childcare building within Precinct D are assumed to retain the first 15 mm within the lot boundary, most likely within soakwells, which should be appropriate given that some measure of imported fill will be required to meet clearance above regional flood levels. Based on the density of lots proposed in Precinct and lack of open space, this precinct will need 42 m^3 of subsurface storage to accommodate and detain the 1% AEP storm event to ensure that the post development peak flow rates will mimic the pre -development conditions. This is assumed to be located adjacent to Resolution Drive as shown in **Figure 7C**. The outflow from this Precinct will likely be predominantly overland flow once the first 15 mm of storage has reached capacity, however a low flow to ensure that these can adequately drain between storm events is recommended.

The volumes required to be treated and for flood mitigation for Precinct D are summarised in **Table 2**.

6.3.5 Precinct E

Surface runoff from across Precinct E (inclusive of Precinct C hardstand/carpark) will be conveyed via the drainage network firstly to a BRA for water quality treatment and then this will overflow to an FSA (detention drainage structure) at the south western corner of Precinct E for detention of the 1% AEP storm event. Overflow from Precinct E basin will discharge into the CBMD (Water Corporation drainage system) at existing flow rates. The Water Corporation surface runoff modelling of the CBMD indicates that the local drainage network contributes 0.95 m^3/s at node CNA008. This is understood to be contributed to by existing 450 mm and 525 mm pipes beneath Resolution Drive and therefore it is assumed that 0.62 m^3/s is taken up by the existing pipe network, and approximately 0.33 m^3/s of

capacity is available to convey runoff from Precinct C, Precinct E and upstream contributing catchments.

The volumes required to be treated and for flood mitigation for Precinct E are summarised in **Table 2**. The approach to water management in Precinct E is shown in **Figure 7D**.

6.3.6 Precinct drainage summary

The requirements for water quality treatment within the Precincts is summarised in **Table 2**.

Table 2: Precinct drainage summary

Precinct	First 15 mm requirement (m^3)	Location of first 15 mm	1% AEP flood mitigation requirement (m^3)	Location of 1% AEP flood mitigation requirement	1% AEP outflow from site
Precinct A	194	BRA located within Precinct A	1,345	Wetland Lake, centre of Racecourse	0
Precinct B	No change to existing	Precinct B	No change to existing	Precinct B	Self-retained
Precinct C (Stables)	418	BRA located in the centre of the Racecourse	684	Wetland Lake in centre of Racecourse	0
Precinct C (carpark)	Combined with Precinct E volumes	BRA in Precinct E	Combined with Precinct E volumes	FSA in Precinct E	
Precinct D	28	Subsurface storage cells beneath road reserve/drainage reserve	42	Subsurface storage cells beneath road reserve/drainage reserve	0.402 m^3/s to local drainage network/road pavement
Precinct E	365	Southwest corner of Precinct E, adjacent to FSA	930	South west corner of Precinct E	0.32 m^3/s to CBMD

There will be no new connections to the Swan River or to the CBMD, and the existing flow regimes at these outlet points will be maintained. Specifically with regard to overflow from the Wetland Lake which occurs via gravity, the peak flow rates that the existing 375 mm and 450 mm pipes are capable of achieving (approximately 0.4 m^3/s) will not change given that the inlet, length, grade and outlet of these pipes is not proposed to be modified.

Precinct D will require a connection to the local drainage network, however the outflow rate will be nominal, and has not been accounted for when sizing the subsurface storage cells within Precinct D. The direction of runoff from Precinct A and a portion of Precinct C to the centre of the Racecourse will require a BRA with a surface area of 1,105 m^2 (for Precinct C) and will add a total of 78 mm depth to the top water levels within the Wetland Lake.

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The precinct areas and a summary of the approach to surface water management are shown on **Figure 7**.

6.3.7 Non-structural measures

A number of non-structural measures will be implemented to help reduce nutrient loads within stormwater runoff. These measures include:

- Minimising fertiliser use to establish and maintain vegetation within POS and road verges.
- Street sweeping at regular intervals.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- Minimising the use of turf within open spaces.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.
- Education of residents regarding fertiliser use and nutrient absorbing vegetation species within lots.

The above measures will assist in achieving **Criteria SW7**.

6.3.8 Earthwork levels

Finished floor levels of the entire development will be set at minimum of 4.0 mAHD (See **Appendix C**) which will assist in achieving **Criteria SW5**.

6.4 Stormwater criteria compliance

A summary of the proposed stormwater design criteria and how these are addressed is provided in **Table 3**.

Table 3: Stormwater management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.
SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.
		Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.
SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.32 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.
SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the habitable floor levels must have a

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		minimum of 300 mm clearance above the 1% AEP TWL in the basins.
SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.
SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the long term nutrient concentrations within surface water meet the regional water quality targets.

Table 4: Stormwater management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within open space and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use
SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.

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7 Groundwater Management

7.1 Groundwater management approach

The principle behind groundwater management is to maintain the existing hydrology across the site, provide appropriate protection from groundwater inundation, and maintain or improve existing groundwater quality.

7.2 Groundwater level management

The regional groundwater map (DWER 2023e), localised measurement of groundwater and the surface contours of the site (see **Section 3.4** and **Figure 2**) indicate that there is sufficient clearance to groundwater beneath the site to facilitate infiltration of stormwater runoff, on the basis that fill is being imported to raise finished levels to 4.0 mAHD.

Whilst the underlying parent soils have demonstrated generally low permeability, the earthworks approach will require import of fill to 4.0 mAHD to achieve clearance above the 1% AEP flood level in the Swan River for Precinct A, Precinct D and Precinct E. Therefore, stormwater will be encouraged to infiltrate at source wherever possible to minimise stormwater runoff and to adopt an at-source approach to management of runoff where possible. This will occur within soakwells, permeable portions of lots and BRAs which will have at least 300 mm of clearance above the MGL. The above-mentioned measure will assist in achieving **Criteria GW1**.

For Precinct C (stables) runoff will be directed to the centre of the racetrack. The stables facilities do not require a specific separation from groundwater, and in order to accommodate equine uses the land between buildings/facilities should be as flat as possible. The most appropriate response is therefore to accommodate stormwater quality treatment and flood retention within the centre of the racetrack. Given the low permeability of soils in the centre of the racetrack, the BRA is unlikely to achieve separation from groundwater or the low permeability soil layer. This is however considered acceptable as it is consistent with the presence of the three Lakes currently within the centre of the racetrack.

The control of groundwater by subsoil drainage is not proposed due to requirements to provide adequate clearance above the 1% AEP flood levels and the proximity of the Swan River. Rather, groundwater separation requirements will be achieved by the use of imported fill as described above. The earthworks strategy provided in **Appendix C** shows that all habitable floor levels will be greater than 1.2 m above the MGL. The above-mentioned measure will assist in achieving **Criteria GW2**.

As previously discussed, there are no changes proposed to the form of development within Precinct B or to the Racecourse. These areas are currently managed by the swales aligned with the existing racetrack which control soil moisture conditions in these areas, and which discharge to the Wetland Lake. This approach will be retained in the post-development environment.

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7.3 Groundwater quality management

Whilst not specified in a design criterion, the main objective for groundwater quality management is to maintain or improve the existing groundwater quality. This can be achieved by reducing the total nutrient load into the groundwater that originates from the site. Groundwater that originates from the site is surface runoff that has infiltrated into the soil profile. Therefore, improving groundwater quality can be achieved by treatment of the surface runoff prior to infiltrating to groundwater.

The reduction of nutrient load to the groundwater will be achieved by:

- Retention of existing trees within open spaces wherever possible.
- Directing stormwater to a vegetated (with native wetland species) BRA.
- The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10).
- Minimise fertiliser use to establish and maintain vegetation within open space areas and road verges.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- The use of turf will be minimised, however where adopted a drought tolerant turf species that require minimal water, and nutrients will be used.
- Roll-on turf will be used within the open space areas and road verges, to prevent the high nutrient input requirement during establishment of the turf.
- Garden beds should not be immediately adjacent to BRAs to reduce nutrient transportation into these infiltration areas.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.

The above measures will improve the quality of water prior to it infiltrating into the underlying groundwater.

7.4 Groundwater criteria compliance summary

A summary of the proposed groundwater quantity design criteria and how these are addressed within the site is provided in **Table 4**.

Table 4: Groundwater criteria compliance summary

Criteria number	Criteria description	Manner in which compliances will be achieved
GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, the exception being the BRA in the centre of the racetrack.
GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.

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8 Subdivision and Urban Water Management Plans

The requirements to undertake preparation of more detailed water management plans to support subdivision is generally imposed as a condition of subdivision. This will be most relevant to Precinct D. Other precincts may be developed under a Development Approval and therefore water management will likely be documented within a Stormwater Management Plan (SMP). The development of future UWMP/SMPs should follow *Urban Water Management Plans: Guidelines for preparing plans and for Complying with Subdivision Conditions* (DoW 2008).

While strategies have been provided within this LWMS that address planning for water management within the site, it is a logical progression that future subdivision designs and the supportive UWMP/SMP will clarify details not provided within the LWMS. The main areas that will require further clarification within future UWMP/SMPs may include (pending which precinct is being addressed):

- Extent of land uses within Precincts
- Connection to local and Main Drainage networks
- Surface runoff modelling
- Implementation of water conservation strategies
- Non-structural water quality improvement measures
- Management and maintenance requirements
- Construction period management strategy.

These are further detailed in the following sections. As stated above, ongoing (post-development) monitoring of groundwater will be detailed in the UWMP/SPM, however in this LWMS is outlined broadly in **Section 9**.

8.1 Extent of land uses within Precincts

It is expected that the layout and extent of land uses within Precincts may evolve over time. Future water planning documents will need to be updated to align with the most up to date spatial plans for each Precinct. Changes to the spatial plans will likely have an implication on the size of stormwater infrastructure and possibly their location, and should be revised and clarified in future UWMP/SMPs.

8.2 Connection to local and Main Drainage networks

This LWMS has made assumptions regarding connectivity to the CoB local drainage network and to the Water Corporation's CBMD. These are assumptions are made based on the information available at the time of preparing this LWMS and may need to be revised pending feedback from these agencies. This could result in updates to surface runoff modelling (see **Section 8.3**).

8.3 Surface runoff modelling

It is acknowledged that the water management strategies documented in this LWMS are based upon broad-scale assumptions and to some extent regional data. These assumptions are considered

Attachment 12.1.2 Local Water Management Strategy

adequate for development of this LWMS and are of an appropriate level of detail. However, verification of proposed subdivision drainage designs will be undertaken once the specific basin designs and extent of inclusion of finer scale WSUD elements are confirmed.

It is expected that future UWMP/SMPs will update surface runoff modelling as appropriate, and this may result in evolution of the spatial layout of the structure plan/future subdivisions or detailed civil design approach.

8.4 Implementation of water conservation strategies

The non-potable water needs from the Precincts are to be accommodated from the existing groundwater allocation and therefore, track water usage is a significant consideration. Notwithstanding licensed volumes available, there is minimal new open space areas proposed within the Precincts that would demand significant additional groundwater allocation, and it is therefore anticipated that non-potable water needs can be met by the existing licence held by Perth Racing.

A number of potential measures to conserve water have been presented within this LWMS. These water conservation strategies will be incorporated into design and the on-going maintenance of the Precinct A, B and C open spaces and where relevant. Landscape concept design measures that will be incorporated into the water conservation strategy will be further detailed within the future UWMP/SMPs produced for the development.

The manner in which the developer intends to promote water conservation measures discussed in this LWMS to future lot owners will also be discussed within the future UWMP/SMPs.

8.5 Non-structural water quality improvement measures

Guidance for the development and implementation of non-structural water quality improvement measures is provided within the *Stormwater Management Manual for Western Australia* (DWER 2022). Some measures will be more appropriately implemented by CoB for local roads, such as street sweeping, however many can be implemented relatively easily within the design and maintenance of the subdivision and the open space areas. It is expected that any privately managed development areas (e.g. Precinct A, Precinct B and Precinct C) will be managed by Perth Racing or another appropriate management body, and that the management of areas exposed to equine uses (Precinct C and the Racecourse) will continue to adopt contemporary best practice nutrient management.

Future UWMP/SMPs will provide an implementation plan/timing/responsibility for measures such as street sweeping, public education (through measures such as signage that may be implemented to raise awareness), etc.

8.6 Management and maintenance requirements

The management measures to be implemented to address surface water quality (such as the use of vegetation within WSUD assets) will require ongoing maintenance. It is therefore expected that the future UWMP/SMPs will detail management and maintenance procedures that will set out required maintenance actions (e.g. gross pollutant removal), timing (e.g. how often it will occur), locations (e.g. exactly where it will occur) and responsibilities (e.g. who will be responsible for carrying out the

actions). Given that approval from the CoB will be sought for the proposed measures, it is anticipated that consultation will be undertaken and referral to guiding policies and documents will be made.

8.7 Construction period management strategy

It is anticipated that the construction stage will require some management of various aspects (e.g. soil erosion, sedimentation of downstream water bodies, dust, surface runoff, noise, traffic etc.). The management measures undertaken for construction management will be addressed either in the future UWMP/SMPs or a separate Construction Management Plan (CMP).

9 Monitoring

9.1 Post-development monitoring

The post-development monitoring of water quality should be undertaken within groundwater immediately upstream and downstream of BRAs within Precinct A, Precinct C and Precinct E. It should also be undertaken at the outlet to or adjacent to the subsurface detention system in Precinct D. This should be undertaken via shallow groundwater bores installed immediately upstream and immediately downstream based on local groundwater flow direction, based on information available at the time (or in the case of Precinct D it could be at the outlet from the subsurface storage cells).

The monitoring should also consider and be generally consistent in the approach with the monitoring undertaken to comply with conditions of Groundwater Licence GWL 178519.

The WSUD measures (BRAs) should also be monitored to ensure their continued effectiveness. This should occur at the outlets from BRAs prior to their discharge to the Wetland Lake. It is noted that this may be difficult to achieve as it will require a rainfall event > 15 mm and to be timed to occur when overflow is occurring or alternatively auto samplers could be employed.

Monitoring of the outlet to the Swan River from the Wetland Lake is not proposed to be undertaken given the infrequent nature of overflow from the Lake to the River. Further, the Lake intersects shallow groundwater and any discharge from the pipes to the River is likely to be influenced by local groundwater quality.

9.1.1 Trigger values

The water quality targets from the *National Water Quality Management Strategy* (ANZECC and ARMCANZ 2000) and the trigger criteria are acknowledged as long term targets for the site, being 1.2 mg/L for TN and 0.065 mg/L for TP. However, it is also recognised that recent site monitoring undertaken (and reported in **Section 3**) shows repeated exceedances of the NWQMS default trigger criteria. Therefore, short term trigger values are proposed based on the approximate average nutrient concentrations measured in groundwater, and these are shown in **Table 5**.

Table 5: Post-development trigger values

Analyte	pH	EC (uS/cm)	TN (mg/L)	TP (mg/L)
Value	6-7.5	1800	3.0	0.15

Monitoring should be undertaken on a quarterly basis and should include:

- pH
- Conductivity
- Dissolved oxygen
- Temperature
- Nutrients (TN, TP)
- Nutrient Species (Ammonium, NH_4, Oxides of nitrogen, NO_x ortho-phosphorous (ORP))

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9.1.2 Condition monitoring

It is proposed that the overall condition of the Precincts will be monitored on a bi-annual basis. This monitoring will be implemented after the completion of the civil and landscaping works and will continue for a period of two years.

A visual assessment will be undertaken to monitor the overall condition of the Precincts, with the aim to ascertain that the maintenance activities are achieving the overall management objectives for the development. The parameters that will be monitored include:

- Gross pollutants
- Terrestrial weeds
- Irrigation
- Vegetation density
- Paths, benches, walkways and other infrastructure.

The management and maintenance objectives will be detailed within future UWMPs along with details of the corresponding monitoring program.

9.1.3 Contingency Action Plan

If the results from the initial monitoring occasion indicate that nutrient concentrations exceed the nominated (short term) trigger values, a number of contingency measures may be employed.

The first action that should be undertaken if groundwater trigger criteria are exceeded is to repeat the monitoring to remove the potential for sampling error. If the repeat monitoring still shows results which breach the trigger value, the next action will be to compare the upstream (incoming) nutrient concentrations with the outgoing (downstream) nutrient concentrations. If the downstream nutrient concentrations are >50% higher than the upstream nutrient concentrations, the following actions should be undertaken:

- Review open space nutrient application practices to identify source if possible.
- Conduct surveillance of Precincts and drainage infrastructure to determine any other potential and obvious nutrient inputs.
- Remove source if possible (i.e. fertiliser input, etc.).
- Remove sediment–bound nutrients by removing basin sediments.
- Manual removal of plant material from BRAs to facilitate further nutrient uptake.

If the downstream nutrient concentrations are found to be generally consistent with the upstream concentrations the next action will be to conduct a site – specific comparison of long-term background data presented in this LWMS. There is some amount of variability (temporally) in nutrient concentrations experienced across the site, and this is the reason for the proposed short and long term trigger values. The comparison of measured values to trigger values and historical monitoring data should then be used as a management tool to determine if the trigger values should be revised.

Following the implementation of the above contingency measures the groundwater quality will be re – sampled. If the results of the analysis still show water quality characteristics which breach the trigger values an additional set of upstream/downstream monitoring bores may be installed. The

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additional bores would be sampled as per the ongoing sampling regime already being undertaken for the first two bores. If the additional locations demonstrate results consistent with the initial monitoring, an assessment will be undertaken as to whether the results are representative of a broader site management concern, and whether any additional contingency actions need to be implemented onsite.

9.2 Reporting

A post-development monitoring report will be prepared on conclusion of the two-year monitoring period and will be provided to CoB on request. This will be undertaken per Precinct once development within the Precinct has occurred. Interim results (spreadsheet) can be provided to either CoB, DWER or DBCA on request during the monitoring program.

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10 Implementation

10.1 Roles and responsibility

The LWMS provides a framework that the proponent can utilise to assist in establishing stormwater management methods that have been based upon site-specific investigations, are consistent with relevant State and Local Government policies and have been endorsed by DWER, DBCA and CoB. The responsibility for working within the framework established within the LWMS rests initially with the proponent, although it is anticipated that a future UWMP/SMP will be developed in consideration of other relevant policies and documents. A summary of roles and responsibilities relevant to the current and future planning stages and ongoing management of the site is summarised in **Table 6**.

Table 6: Roles and responsibilities for various planning stages

Stakeholder	Perth Racing	City of Belmont	Water Corporation	DWER	DBCA	WAPC
LWMS preparation	√					
LWMS review and advice		√	√	√	√	
LWMS approval				√		√
UWMP/SMP & civil design preparation	√					
UWMP/SMP review and approval		√				
Precinct implementation	√					
Post development Precinct management	√					
Public roads/open space ongoing management	√	√				

10.2 Funding

The proponent will fund all subdivision, civil and landscape works within the public realm (roads and open spaces) and within Precincts that are being privately managed (Precinct A, Precinct B and Precinct C). Development of individual lots will be the responsibility of the lot owner at the lot-scale development application stage.

10.3 Review

It is not anticipated that this LWMS will be reviewed unless the Ascot Racecourse Structure plan undergoes significant change post-lodgement of the LWMS. If the proposed layout of the

Attachment 12.1.2 Local Water Management Strategy

development is substantially modified, the surface runoff modelling undertaken for this LWMS may need to be reviewed and the criteria revised to ensure that all are still appropriate.

The next stage of water management for most of the Precincts is UWMP preparation to support subdivision (relevant to Precinct D) or SMP preparation to support Development Approval (relevant to all other precincts). The UWMP/SMP is largely an extension of the LWMS, as it should provide detail to the designs proposed within this LWMS and will demonstrate compliance with the criteria proposed in **Section 4**. Regardless of whether a UWMP or SMP is prepared, these should be prepared as per *Better Urban Water Management*.

The next stage of development following the UWMP is single lot development. It is recognised that certain elements of the LWMS and the UWMP will not be implemented until this late stage, and that there is little or no statutory control that can be applied to ensure the implementation of any remaining measures. While the remaining measures are unlikely to be enforced at this stage their implementation could be encouraged by the CoB through policy (or modification of these where necessary), building licence or awareness programs (such as the Water Corporation Waterwise program).

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11 References

11.1 General references

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11.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 11.1**, with access date information provided in **Table R1**.

Table R1 Access dates for online references

Reference	Date accessed	Website or dataset name
(ABS 2013)	19/4/2024	ABS: Water Use and Conservation Data
(ABS 2014)	19/4/2024	ABS: Energy Use and Conservation Data
(DWER 2023a)	12/04/2024	Acid Sulfate Soil Risk Map
(BoM 2024)	12/04/2024	Climate Data
(Landgate 2023)	31/01/2024	Landgate Map Viewer Plus
(WAPC 2023a)	11/12/2023	Local Planning Scheme No. 15 Map
(DWER 2024a)	12/04/2024	Perth Groundwater Map
(DWER 2024b)	12/04/2024	Water Information Reporting
(DWER 2024c)	12/04/2024	Water Register
(DWER 2023c)	26/04/2024	FPM Floodplain Area (DWER-020)

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Figure 7B: Precinct C Stormwater Management Plan

Figure 7C: Precinct D Stormwater Management Plan

Figure 7D: Precinct E Stormwater Management Plan

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Figure 1: Site Location

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(03)--F23**
Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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Figure 2: **Topographic and Groundwater Contours**

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number:
EP23-109(03)--F24
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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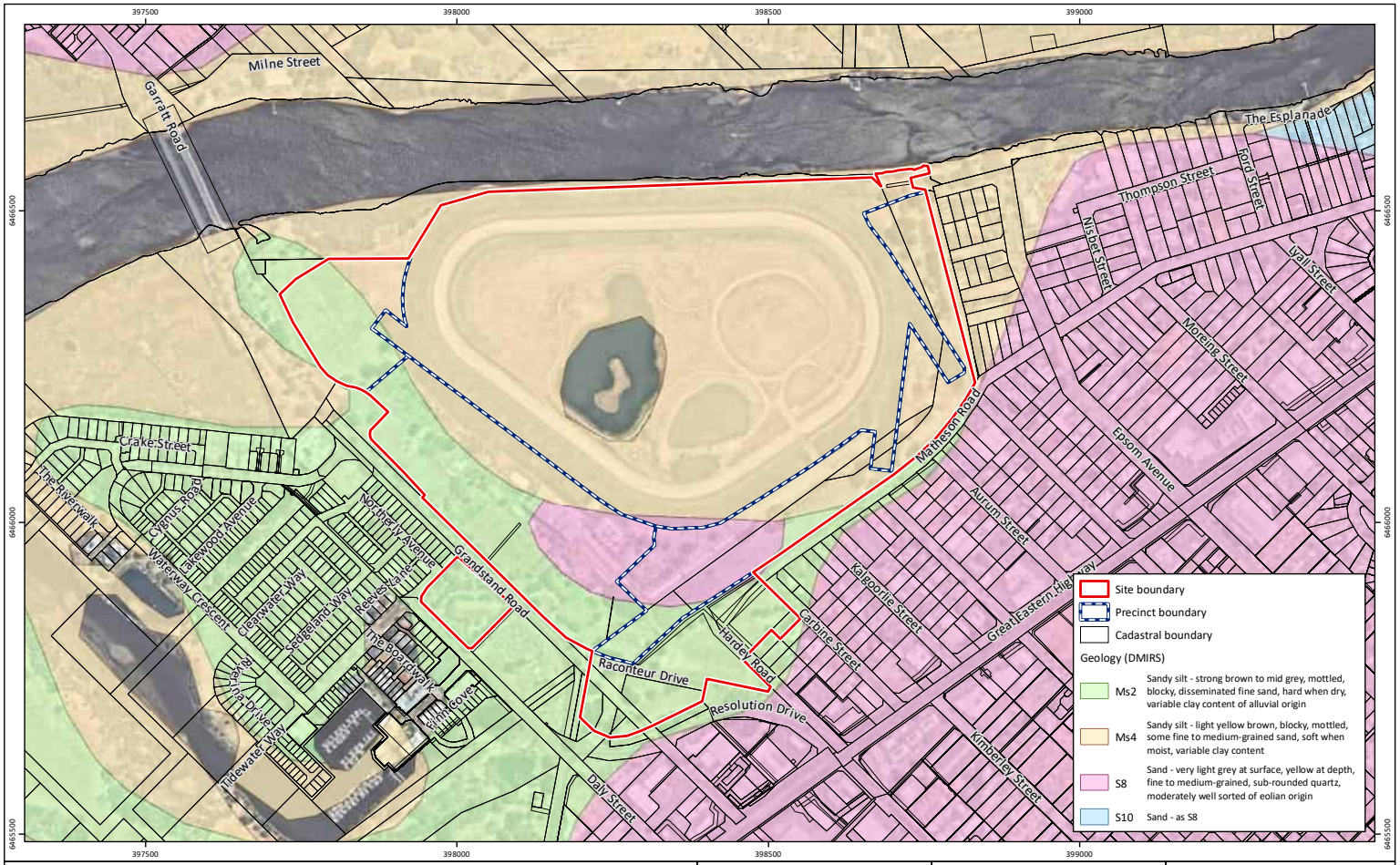


Figure 3: Geological Mapping

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F25

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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GDA2020 MGA Zone 50

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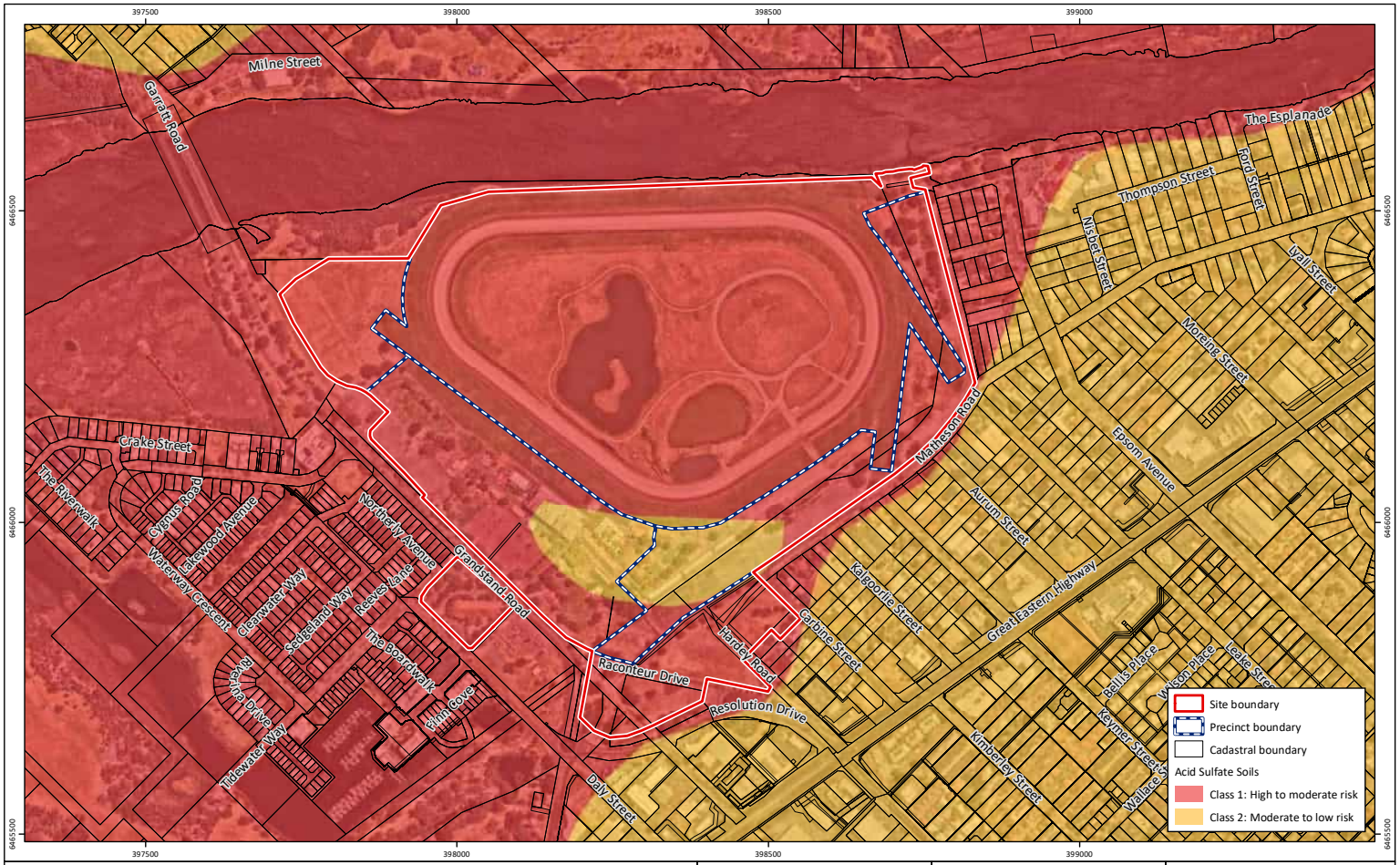


Figure 4: **Acid Sulfate Soil Mapping**

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number: EP23-109(03)--F26
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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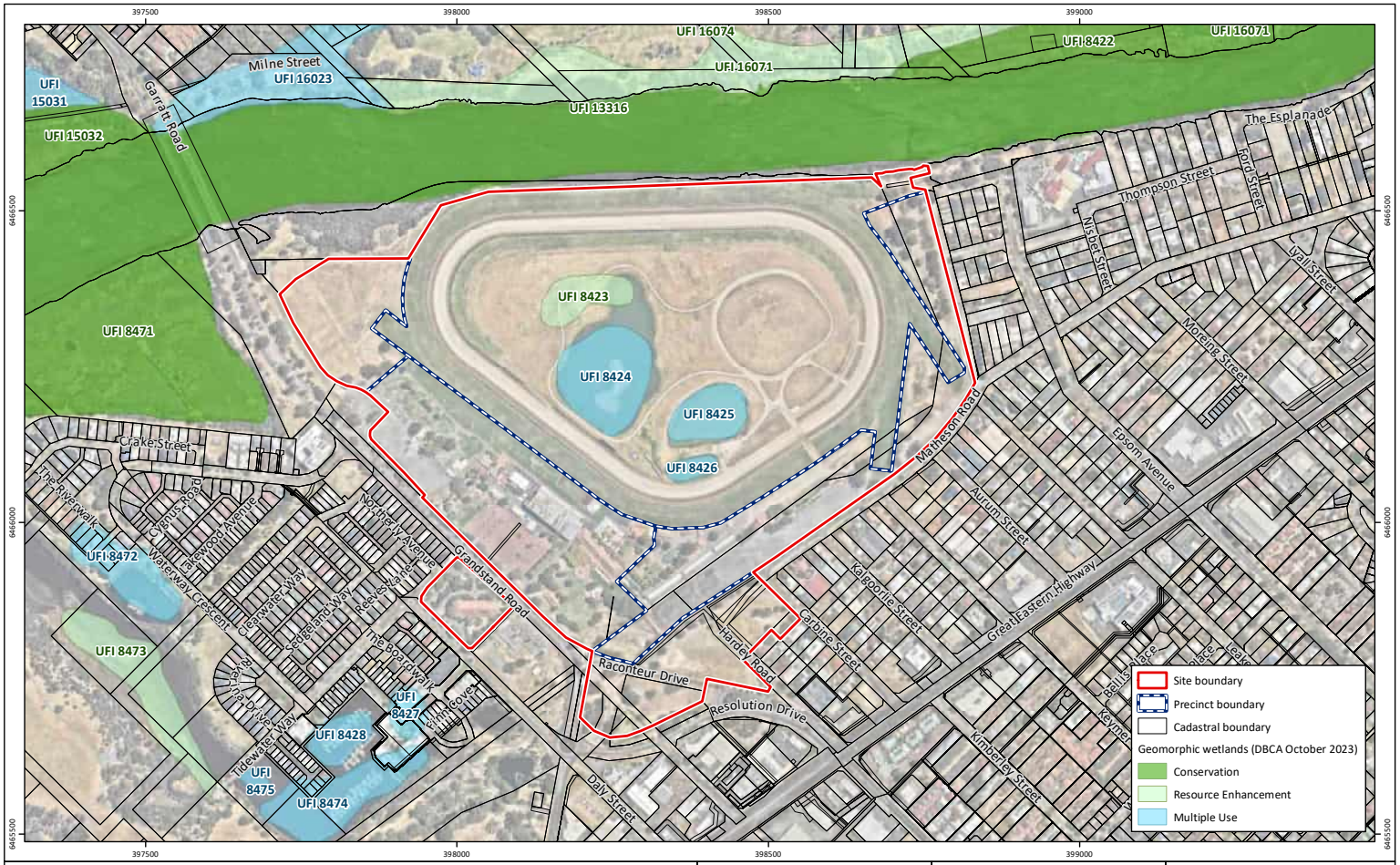


Figure 5: Environmental Assets

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F27

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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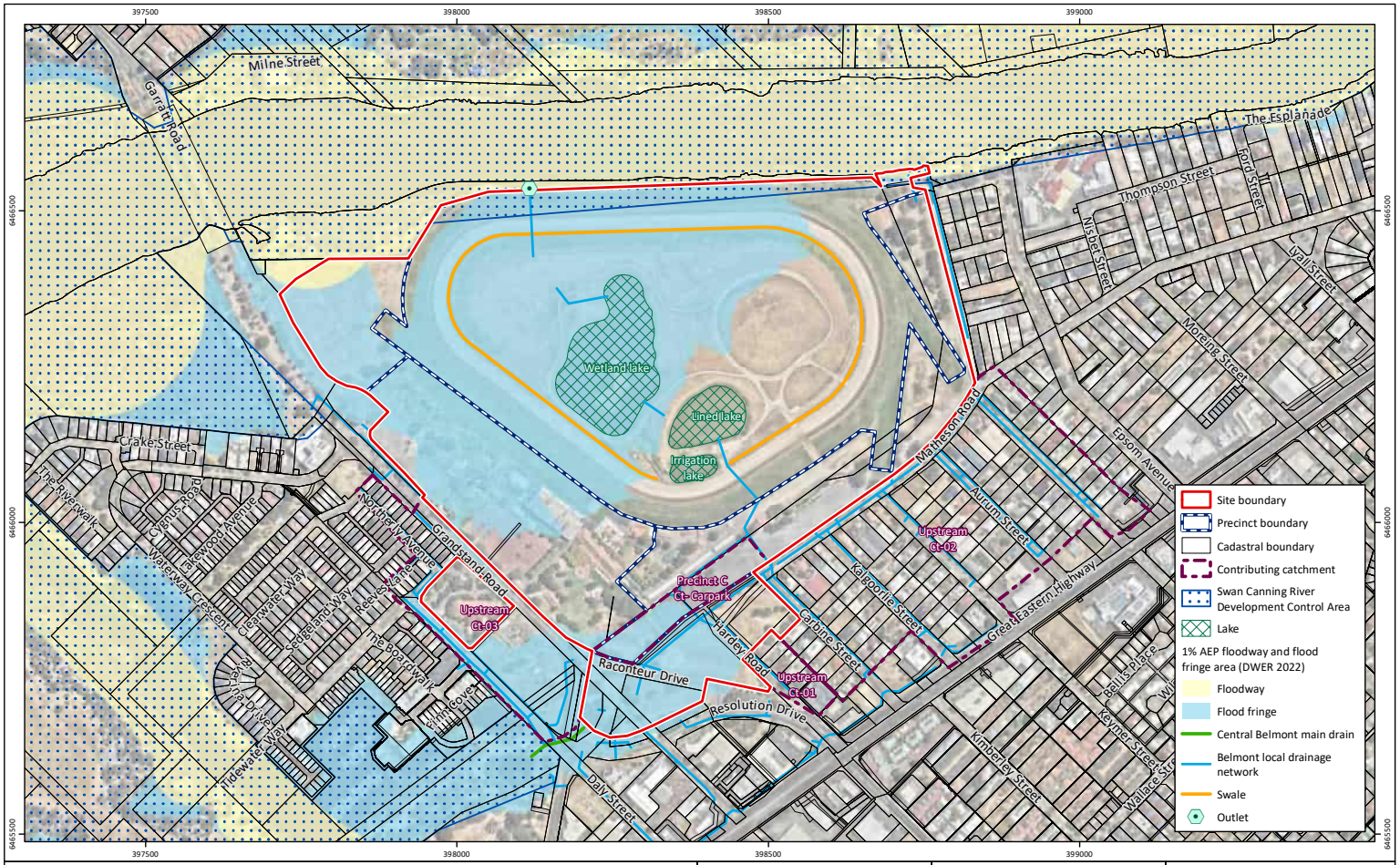


Figure 6: Hydrological Features

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number: EP23-109(03)--F28
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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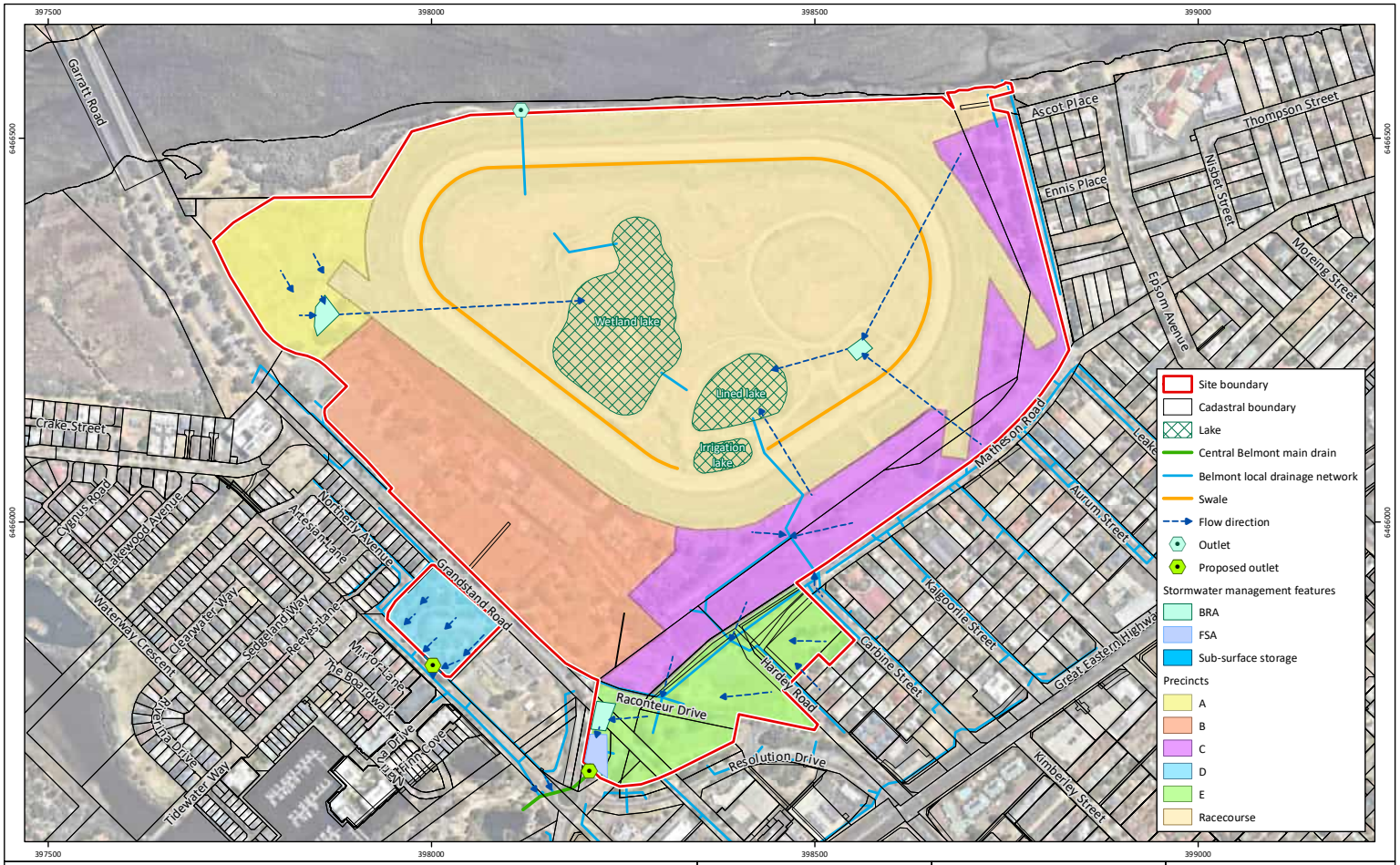


Figure 7: Ascot LSP Precinct Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(03)--F29**
Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

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Metres
Scale: 1:6,500@A4
GDA2020 MGA Zone 50

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Figure 7A: Precinct A Stormwater Management Plan

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number: EP23-109(03)--F32
Drawn: WJC
Date: 01/05/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 40 80
Metres
Scale: 1:2,500@A4
GDA2020 MGA Zone 50

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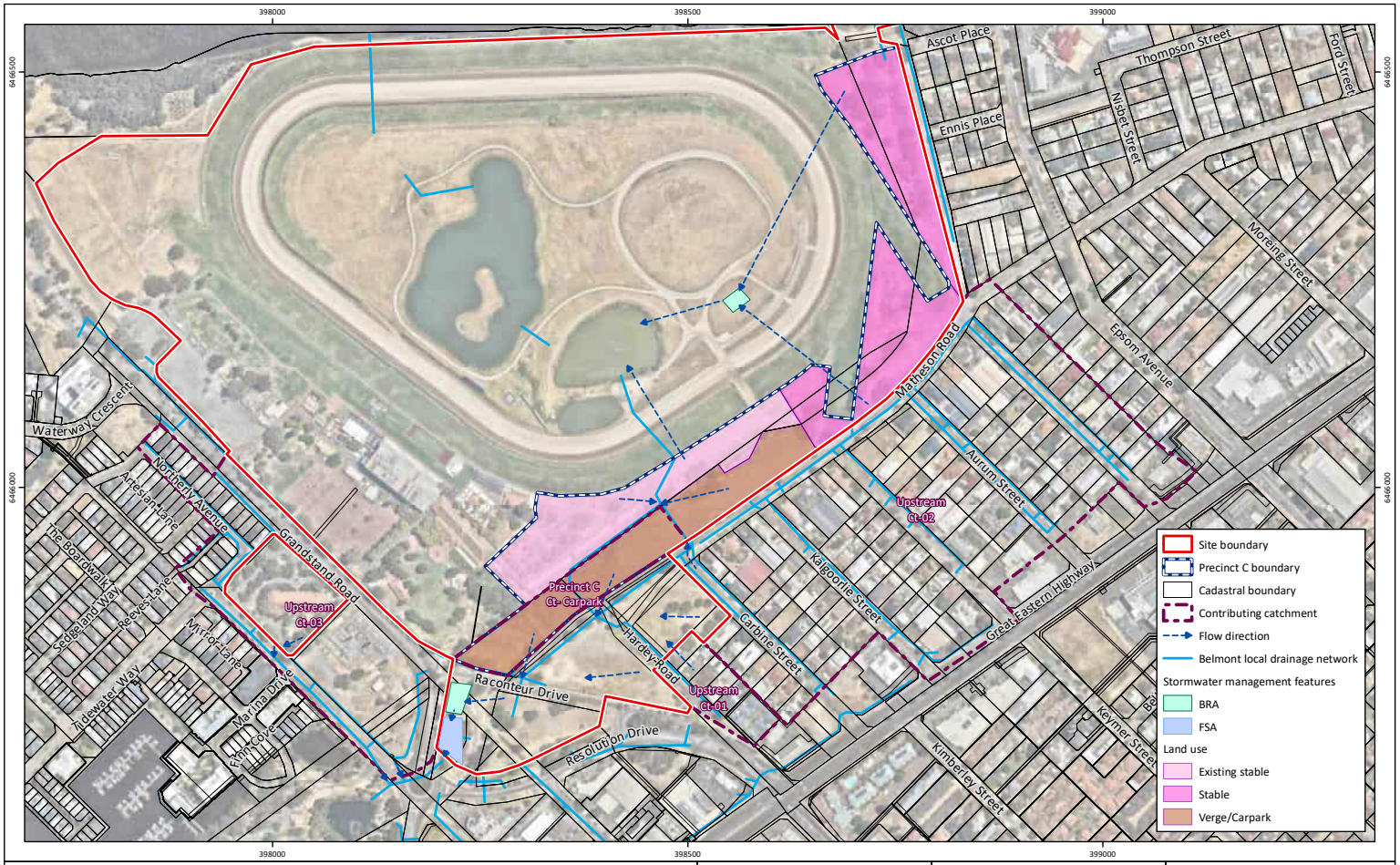


Figure 7B: Precinct C Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(03)--F33**
Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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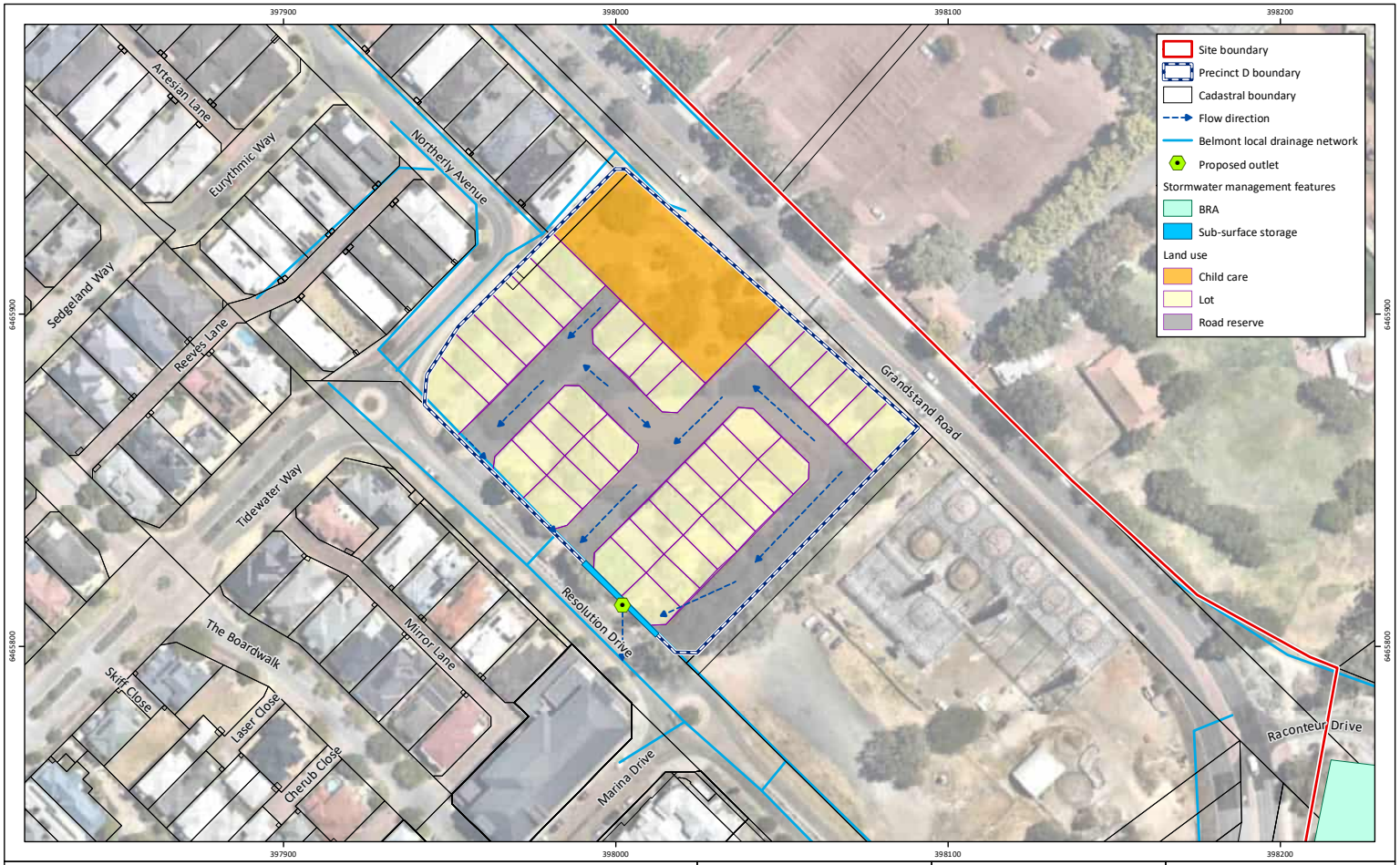


Figure 7C: Precinct D Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(03)--F34**
Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 25 50
Metres
Scale: 1:1,500@A4
GDA2020 MGA Zone 50

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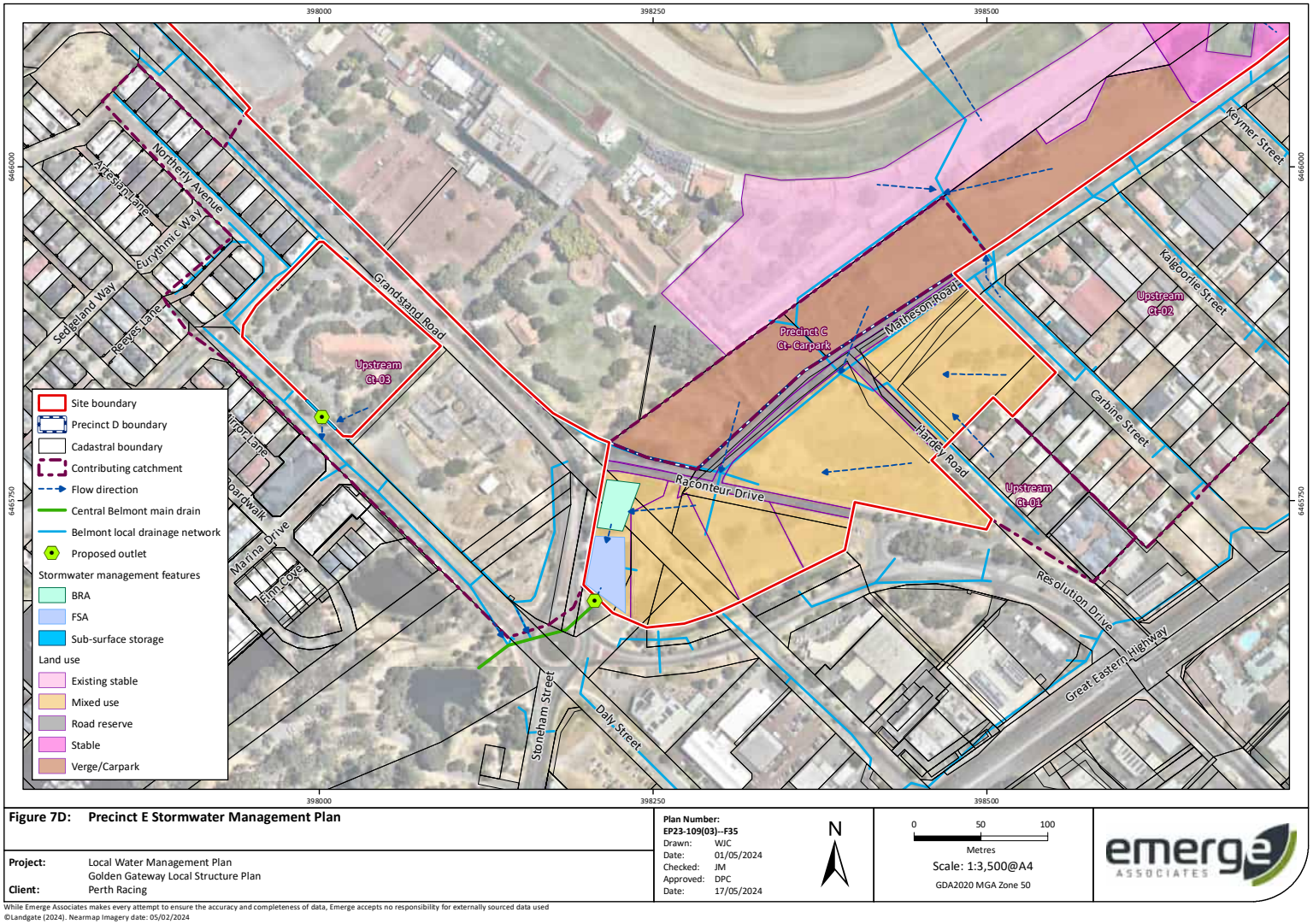


Figure 7D: Precinct E Stormwater Management Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F35

Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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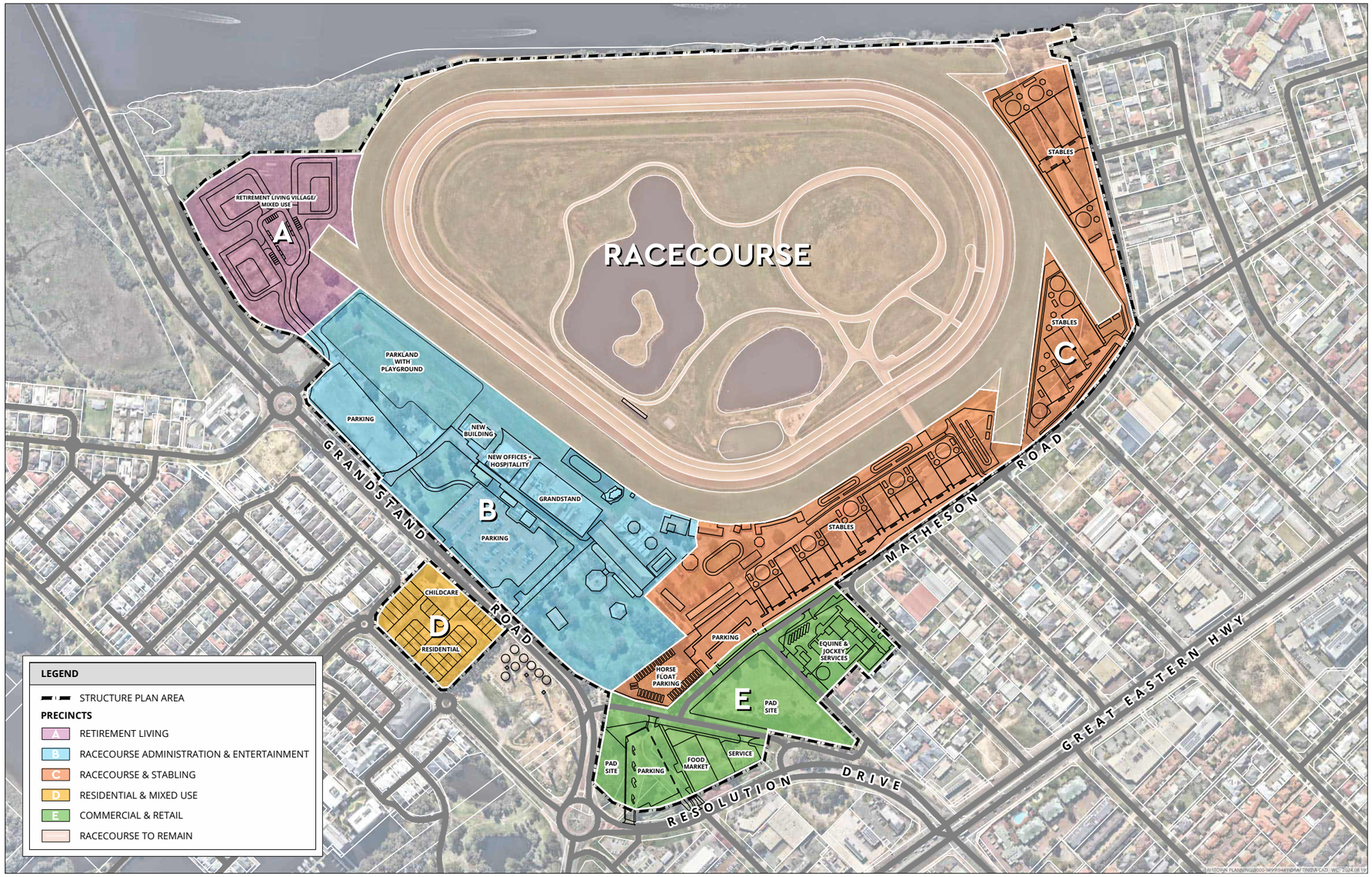
Attachment 12.1.2 Local Water Management Strategy

Appendix A

Concept plan

ROWE Group Design (2023)

Attachment 12.1.2 Local Water Management Strategy



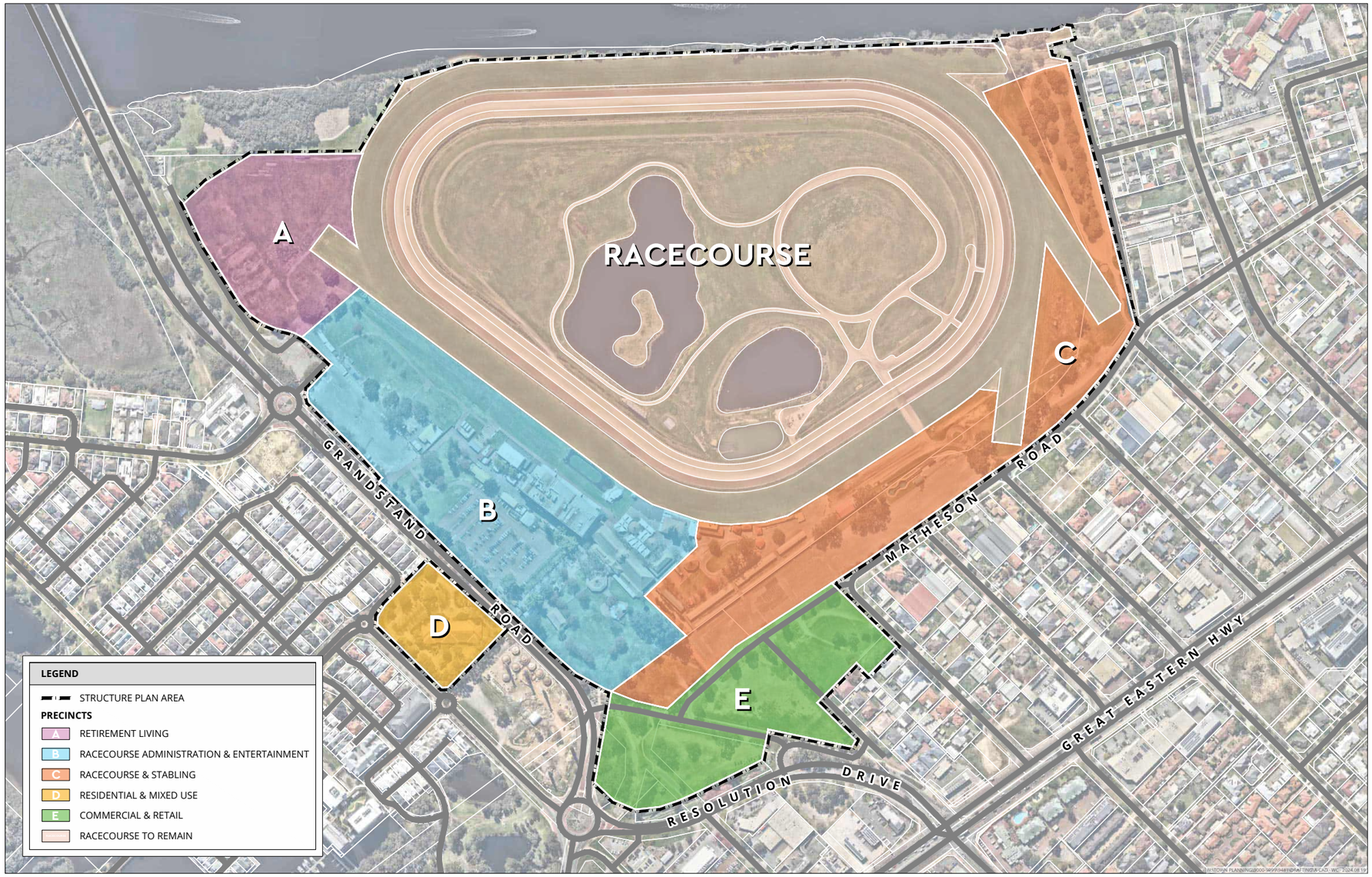
DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

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0 100 m
SCALE @ A3: 1:4000
9481-CON-01-D

DRAWN: WC
DATE CREATED: 2024.08.19
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831
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ROWE GROUP DESIGN

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STRUCTURE PLAN PRECINCTS
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

N
0 100 m
SCALE @ A3: 1:4000
9481-FIG-02-C

DRAWN: WC
DATE CREATED: 2024.08.19
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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ROWE GROUP DESIGN

Attachment 12.1.2 Local Water Management Strategy

Appendix B

Geotechnical Reports

Precinct A – Douglas Partners 2024

Precinct D – Galt 2024

Attachment 12.1.2 Local Water Management Strategy

Douglas PARTNERS | GROUNDED EXPERTISE

Report on Preliminary Geotechnical Investigation

Proposed Residential Development

Part of Lot 9002 Grandstand Road, Ascot WA

Prepared for Perth Racing

Project 219164.03

25 January 2024

Attachment 12.1.2 Local Water Management Strategy

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Document History
Details

Project No.	219164.03
Document Title	Report on Preliminary Geotechnical Investigation
Site Address	Part of Lot 9002 Grandstand Road, Ascot WA
Report Prepared For	Perth Racing
Filename	219164.03.R.001.Rev0

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Venkat Vallurapalli/Brendan Divilly	Frederic Verheyde	25 January 2024

Distribution of Copies

Status	Issued to
Revision 0	Perth Racing

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		25 January 2024
Reviewer		25 January 2024

FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Attachment 12.1.2 Local Water Management Strategy

Douglas PARTNERS | GROUNDED EXPERTISE

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Appendix A: About This Report

Appendix B: Test Location Plan

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Test Pit and Borehole Logs

CPT Results

Appendix C: Geotechnical Laboratory Test Certificates

FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Attachment 12.1.2 Local Water Management Strategy

Report on Preliminary Geotechnical Investigation
Proposed Residential Development
Part of Lot 9002 Grandstand Road, Ascot WA

1. Introduction

This report presents the results of a preliminary geotechnical investigation undertaken for a proposed residential development across Part of Lot 9002 Grandstand Road, Ascot WA. The investigation was commissioned by Mr. James Oldring of Perth Racing in a signed order to proceed dated 8 August 2023 and was undertaken in accordance with Douglas' proposal dated 8 May 2023.

It is understood that Perth Racing is evaluating the feasibility of developing the northwest portion of Lot 9002 for possible residential use (the 'site').

The objective of the investigation is to assess the subsurface soil and groundwater conditions at across the site to provide preliminary comments on:

- The geotechnical suitability of the site for the proposed development.
- Geotechnical opportunities and constraints relevant to the proposed development.
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks.
- Site preparation, including the possible reuse of existing soil as controlled fill.
- Excavation conditions.
- The likely site classification in accordance with the requirements of AS 2870-2011.
- Appropriate earthquake design factor for the site, in accordance with AS 1170.4-2007.
- Suitable foundation systems, including preliminary design parameters.
- Preliminary design parameters for the design of retaining structures and batter slopes.
- Depth to groundwater at the time of the investigation.
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

The investigation included eight cone penetration tests, 16 test pits and one borehole excavated and drilled as a part of detailed site investigation (for contamination), and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on the items listed above.

The investigation was conducted concurrently with a detailed site investigation (for contamination), which has been reported under separate cover (219164.01.R.001.Rev0). The detailed site investigation (for contamination) report should be read in conjunction with this report.

2. Site Description

The site comprises an irregular shaped area, approximately 36.2 ha in size, that covers a part of Lot 9002 Grandstand Road, within the Ascot Racecourse.

At the time of the field work, the majority of the site was vacant and vegetated with short grass. A few mature trees, about 5 m to 10 m in height, occupied the southern part of the site. A parking lot and small loading area were located at the south-western corner of the site. Some fly-tipped rubbish, including fences and posts, were observed at several locations across the site.

According to publicly available LiDAR data (DEM derived to 5 m), the topography across Lot 9002 is relatively flat with existing surface levels ranging from approximately RL 2 m relative to the Australian Height Datum (AHD) in the western part of the site to RL 3.5 in the north-eastern corner of the site.

The Perth 1: 50 000 Environmental Geology sheet indicates that shallow sub surface conditions beneath the western two thirds of the site comprise sandy silt of the Guildford Formation, and beneath the north-eastern corner and eastern corner of the site comprise alluvium.

The Perth Groundwater Atlas (2004) indicates that in May 2003, the groundwater level beneath the site was less than RL 1 m, or between approximately 1.0 m and 2.5 m below the existing surface level. The Atlas also indicates that the groundwater flow direction beneath the site in May 2003 was approximately northwest towards the Swan River.

The published acid sulfate soil risk mapping indicates that the site is located within an area which is mapped as "*high to moderate risk of acid sulfate soils occurring within 3 m of natural soil surface*".

3. Field Work Methods

Field work for the investigation was carried out between 11 October and 9 November 2023 and comprised:

- The excavation of 16 test pits.
- The drilling of one borehole.
- Perth sand penetrometer (PSP) or Dynamic cone penetrometer (DCP) testing adjacent to each test pit or borehole location.
- The performance of cone penetration tests at 8 locations (CPT24 to CPT31A). A total of 14 CPTs were undertaken after repeating CPTs at some locations in attempt to achieve greater testing depth following shallow refusal in uncontrolled fill.

The test pits (locations 7 to 22) were excavated using a 5-tonne excavator, equipped with 450 mm toothed bucket, and the borehole (location 23) was drilled using a 250 mm diameter power auger attached to the same excavator. The ground conditions at each test pit and borehole were logged in accordance with Australian Standard (AS 1726, 2017) by a geo-environmental engineer from Douglas. Soil samples were recovered from selected locations for subsequent laboratory testing.

Dynamic cone penetrometer (DCP) and Perth sand penetrometer (PSP) tests were undertaken adjacent to the test pit and borehole locations in accordance with Australian Standards (AS 1289.6.3.3, 1997; AS 1289.6.3.2, 1997) to assess the in-situ density of the shallow soils.

The CPTs use a 36 mm diameter instrumented cone with a following 130 mm long friction sleeve attached to rods of the same diameter, pushed continuously at a rate of 20 mm/sec into the soil by hydraulic thrust from a truck rig. Strain gauges in the cone and sleeve measure resistance to penetration and friction along the sleeve during penetration. This data is recorded on a computer and analysed to assess the type, properties and condition of the materials penetrated. The CPT's were pushed to termination depths of up to 20.2 m. Upon withdrawing the CPT probe, each test hole was dipped in an attempt to measure groundwater levels. CPTs were repeated at several test locations to attempt achieving greater testing depth following shallow CPT refusal on inferred hard foreign inclusions in the uncontrolled fill.

Test locations were determined using a handheld GPS and site features and are marked on Drawing 1, Appendix B. Surface elevations were recorded using a differential GPS with a reported accuracy of 0.1 m.

4. Field Work Results

4.1 Ground Conditions

The logs of the ground conditions and results of the field testing are presented in Appendix B, together with notes defining descriptive terms and classification methods, in Appendix A.

- **Uncontrolled FILL**
    - **Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL (SP, SP-SM, SM and GP-GM)** – generally sandy fill (or gravelly material associated with pavement layers at location 23), uncontrolled (apart from the pavement layers), from surface to depths of between 0.6 m and 3.6 m depth, encountered at all locations. A layer of organic sandy fill layer was observed between 1.4 m and 1.8 m depth at location TP8. The sandy fill was generally loose to medium.
    - **Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY (SM, SC, CI and CL-CI)** – generally stiff to very stiff, either underlying the aforementioned sandy fill material or interbedded within layers of sandy fill, encountered at test pit locations 9, 20, 21, 23, and CPT locations 24, 24A, 29 and 29A.

  A considerable amount of foreign inclusions such as fragments of brick, glass, timber, geo-fabric, concrete, plastic, rubber, scrap metal, terracotta pipes, redundant cables and PACMs were observed at all test pit locations, except location 22. A layer of asphalt was encountered at 0.95 m depth at TP9. The fill materials across the site are uncontrolled.

  It is noted that the fill extended below groundwater level at many locations.

Overlying natural soils including:

- **Clayey soils including Clayey SAND and CLAY** – ranging between very soft to soft and stiff to very stiff, encountered under the fill materials at CPTs 25, 30 and 31A to depths between 4.2 m and 14.9 m.
- **Sandy soils including SAND and Silty SAND** – underlying and interbedded within the above clayey soils at CPTs 25, 30 and 31A. The sand was generally very loose and loose to medium dense to depths between 10.5 m and 14.9 m, becoming medium dense and dense below.

4.2 Groundwater

Groundwater level observations between 18 September and 9 November 2023 are summarised in Table 1 and are shown on the logs in Appendix B.

The test holes were immediately backfilled following sampling, which precluded longer-term monitoring of groundwater levels. Six monitoring wells (MW01 to MW06) were installed as part of the preliminary environmental investigation (reported separately) and groundwater observations available from these wells at the time of report writing have been included in Table 1.

Table 1: Summary of Groundwater Levels

Location	Date of Measurement	Ground Surface Level [1] (m AHD)	Groundwater Depth (m)	Groundwater Level [2] (RL m AHD)
MW01	18 September 2023	1.9	1.30	0.6
MW02		2.0	1.46	0.5
MW03		3.2	2.37	0.8
MW04		2.4	1.59	0.8
MW05		2.5	1.21	1.3
MW06		2.2	1.09	1.1
TP7	9 November 2023	2.9	2.30	0.6
TP9		2.1	2.10	0.0
TP12		2.1	2.10	0.0
TP13		2.8	2.50	0.3
TP15		2.2	2.40	-0.2
TP16		2.6	2.50	-0.1
TP17		2.2	2.10	0.1
TP19		2.2	1.80	0..4
TP20		2.0	2.10	-0.1
TP21		2.1	1.80	0.3
TP22		2.3	1.80	0.5
BH23		2.4	1.70	0.7
CPT25	11 October 2023	3.4	3.00	0.4
CPT28		1.9	1.30	0.6
CPT29A		2.3	2.20	0.1
CPT30		3.2	2.80	0.4
CPT31A		2.1	2.00	0.1

Notes for Table 1: [1]: Surface level measured using a differential GPS.
[2]: Groundwater Level = Surface Level – Groundwater Depth.

It should be noted that groundwater levels are affected by climatic conditions and land usage and will therefore vary with time. In addition, owing to the proximity of the Swan River, the groundwater levels are expected to be impacted by the tidal river conditions and river flood levels.

5. Laboratory Testing

A geotechnical laboratory testing programme was carried out by a NATA accredited laboratory and comprised:

- the particle size distributions on seven samples;
- the Atterberg Limits and linear shrinkage on three samples; and
- the organic content on four samples.

Results of the laboratory testing are summarised in Tables 2. The test certificates are presented in Appendix C.

Table 2: Results of Laboratory Testing for Soil Identification

Location	Depth (m)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)	OC (%)	Material
TP8	1.5	9	61	30	-	-	-	-	6.8	FILL / Organic SAND SP-SM, with gravel and silt
TP13	1.5	4	95	1	-	-	-	-	1.6	FILL / SAND SP, trace gravel and silt
TP19	2.5	5	83	12	-	-	-	-	1.5	FILL / SAND SP, trace gravel and silt
TP21	2.0	40	51	9	37	24	13	8.5	-	Sandy CLAY CI, medium plasticity, trace gravel
TP22	2.0	7	93	0	NO	NP	NP	-	-	SAND SP-SM, with silt
TP23	2.0	45	48	7	44	22	22	9.5	-	FILL / Sandy CLAY CI, medium plasticity, trace gravel
TP23	2.5	12	87	1	-	-	-	-	1.2	FILL / SAND SP-SM, with silt, trace gravel

Notes: Fines = Finer than 75 µm.
Sand = Between 2.36 mm and 75 µm.
Gravel = Larger than 2.36 mm.
LL – liquid limit PL – plastic limit PI – plasticity index LS – linear shrinkage
OC – organic content NO – not obtainable NP – non plastic

6. Proposed Development

At the time of preparing this report, the details for the proposed development were not yet available. Notwithstanding, it is understood that the proposed development is likely to be residential and, given the location, is presumed would likely be multistorey and possibly include a basement level.

7. Comments

7.1 Site Suitability

The investigation indicates that the site is generally underlain by uncontrolled fill overlying very soft to stiff clayey materials and very loose sandy soils becoming medium dense and dense with depth as described in Section 4.1 above.

From a geotechnical standpoint, there are several significant geotechnical constraints that will adversely impact on any development of the site including;

- Deep uncontrolled fill, unsuitable to support shallow foundations, and will impact on construction activities associated with deep piled foundations.
- Deep very soft and very loose natural soils under the uncontrolled fill, unsuitable to support shallow foundations.
- Shallow groundwater which will make earthworks across the site any possible remediation works of the above difficult. It should be noted that the abovementioned uncontrolled fill and soft soils both extend below groundwater.

Owing to the significant geotechnical constraints, any possible development will likely require a piled foundation solution into the medium dense and dense sandy soils, encountered below depths of approximately 10 m to 15 m. Additional geotechnical investigation will be required to confirm the foundation design and suitable pile design parameters. Also, noting that any proposed additional loading of the ground (for instance from the placement of fill to raise site levels, if proposed) would generate further consolidation of the soft soils underlying the site and cold result in some possible significant ground settlement. Therefore, surcharging areas (by placing temporary fill prior to construction of any structure) outside the proposed building envelopes might also be required during the site preparation to manage the risk of differential settlements between proposed buildings and adjacent ground, following their construction.

7.2 Site Classification

The shallow ground conditions beneath the site comprise uncontrolled fill materials and deep loose and soft soil deposits. Based on the results of the investigation and in accordance with Australian Standard (AS 2870, 2011), a site classification of 'Class P' applies to the site, owing to the presence of the uncontrolled fill and deep loose and soft soil.

7.3 Site Seismic Classification

Owing to the uncontrolled fill and deep very loose and very soft soil deposits across the site, an earthquake design soil sub-class of Ee is considered appropriate for this site in accordance with Australian Standard (AS 1170.4, 2007). The Hazard Factor (Z) for the site is 0.09, according to Australian Standard (AS 1170.4, 2007). Due to the deep loose soil below the water table, the site also has a significant potential for liquefaction. An assessment on the liquefaction potential of the site should be considered during any detailed investigation, when more details can be collected on the extent of deep loose soils.

7.4 Excavation Conditions

The encountered ground conditions generally comprise uncontrolled fill, with some large foreign inclusions within the fill, extending below groundwater. Conventional earthmoving equipment (such as large excavators, say at least 20 t) should be generally suitable for shallow excavations in the surficial uncontrolled fill. Shallow groundwater is likely to impact excavations across the site.

The majority of the uncontrolled fill encountered during this preliminary investigation is considered to be geotechnically unsuitable for re-use as structural fill in its current condition. Any further consideration to reuse the uncontrolled fill would require some specific geotechnical provisions, such as screening and disposing its unsuitable components. Separating the re-useable granular components (e.g. the sandy fill) from its cohesive components (e.g. clayey fill) might also prove to be practically difficult. Owing to the significant variability of uncontrolled fill materials across the site, any re-use potential from a geotechnical standpoint should be confirmed on-site by a geotechnical engineer. Some environmental considerations (i.e. contamination) are also anticipated to be required. Overall, at this stage of the study, the reuse of the encountered uncontrolled fill should be considered to be associated with some significant constraints that might preclude such reuse.

7.5 Slope Stability

During construction, it is recommended that temporary batter slopes across the site are maintained flatter than 2:1 (H:V) if not retained. This batter angle is valid provided no surcharge loads (including live loads such as vehicles and machinery) apply at the top of the slope. In uncontrolled fill materials, a safe batter angler not steeper than 3:1 (H:V) is recommended for design for slopes not greater than 3 m in height, however, owing to variability of the uncontrolled fill materials, this value should be adjusted during construction based on the encountered conditions.

The design of unpropped flexible or rigid walls should be undertaken using a triangular pressure distribution and the earth pressure parameters given in Table 4. In addition to the soil pressure, wall design should also allow for external loads such as buildings, live loads and hydrostatic pressure. Owing to the likely significant settlements associated with the uncontrolled fill and deep soft soils, the requirement to adopt a piles foundation system to support proposed retaining walls is anticipated.

Table 4: Preliminary Soil Parameters for Earth Retaining Design

Soil Type and Density	Soil Unit Weight Above Water γ (kN/m^3)	Submerged Soil Unit Weight γ' (kN/m^3)	Drained Angle of Friction Φ' (°)	Undrained Shear Strength Cu (kPa)	Coefficient of Earth Pressure – Active K_a	Coefficient of Earth Pressure – Passive K_p	Coefficient of Earth Pressure – at Rest K_0
Uncontrolled Fill Materials	16	6	28	-	0.36	2.7	0.5

It should be noted that the passive earth pressure coefficient (second last column of Table 4) is an ultimate value and does not incorporate a factor of safety. Because the stress-strain relationship curve for lateral loading is not linear, relatively large strains are required to mobilise full passive pressure, but only relatively small strains are required to mobilise half the passive pressure, therefore it would be prudent to incorporate a factor of safety of at least 2 for uncontrolled fill materials, to derive design values from the ultimate values.

7.6 Foundation Options

Shallow footings are not considered suitable across this site, owing to the significant thickness of uncontrolled fill and deep loose and soft soils.

7.6.1 Piles

It is anticipated that a piled foundation system, with deep bored piles that penetrate the deep loose and soft soils into the medium dense and dense sandy soils at depth, would likely be required for any foundations on-site.

Bored piles will require temporary or permanent casing throughout the uncontrolled fill materials, noting that possible obstructions within the uncontrolled might cause some difficulties when driving the casing or drilling the pile hole. This pile type will involve soil excavation to target founding level and hence would produce spoil that needs to be handled and disposed of in a suitable manner, which will need to also be considered from an environmental standpoint.

Installation through the uncontrolled fill materials could be affected by the possible presence of large, hard inclusions and the design of the pile installation methodology should take this possibility into consideration.

The settlement of the uncontrolled fill will exert negative skin friction on the piles, which the piles will need to be designed to accommodate or be constructed in sleeves.

Additional deep geotechnical boreholes will be required across the site to inform on the pile design.

7.6.1 Controlled Modulus Columns

Controlled modulus columns could be installed as an alternative to conventional pile foundations, allowing shallow footings to be used whilst controlling settlements to acceptable limits.

Installation of controlled modulus columns involves displacing a column of material using a reverse flight auger, densifying the soil around the auger, and backfilling the resulting hole with cement ground under moderate pressure to create a 'hard' inclusion in the ground. The columns are typically 250 mm to 500 mm in diameter. Column spacings of columns typically 1.8 m to 2.5 m but would need input from a specialist ground improvement contractor. Columns can be installed to depths of up to 50 m, so could penetrate to the base of the uncontrolled fill and deep loose and soft soils. However, if large hard inclusions such as concrete slabs or beams, are encountered then the auger may experience refusal, as the CPTs did at several locations during the preliminary geotechnical investigation.

A load transfer platform, such as a granular, well compacted fill layer, possibly reinforced with geogrid or geotextile, would be needed to transfer loads from shallow foundations to the columns.

One main benefit of this ground improvement option (compared to piling) would be to minimise differential settlement across the site and notably between buildings and surrounding grounds. However, it would likely be limited to low level development (say 2 to 3 level buildings), and this option is anticipated to likely be prohibitively expensive, with likely significant mobilisation and installation costs. The advice of a specialist ground improvement contractor, such as Menard Oceania, is suggested to be sought to further assess the suitability of this ground improvement to the proposed development.

7.7 Pavement Construction

The uncontrolled fill across the site does not form a suitable subgrade material for pavement in its current condition. Depending on the expected loading of proposed pavement, the requirement for some over-excavation of uncontrolled fill is likely. Construction should involve the use of a geo-composite layer (such as Global Synthetics' Combigrid) across the base of the over-excavation, overlain by a 500 mm thick layer of compacted crushed limestone, placement of a layer of geogrid (such as Global Synthetics' Secugrid), and a further 500 mm of compacted sand fill. The base of the constructed floating pavement footprint should be at least 2 m wider on each side than the total pavement width (4 m wider in total) to account for a suitable batter and transfer of load. Standard flexible pavements could then be constructed on the 1 m thick raft of stiffened subgrade. Placement of the initial base layer of composite geogrid may be difficult across areas of exposed uncontrolled fill. As such, depending on the site conditions, a 300 mm thick capping layer of clean fill may be required.

Regardless of the above site preparation, some settlement of the pavement should be expected over its service life and should be considered in the selection of the pavement surfacing. The use of pavers should be considered as such surfacing treatment would deform without cracking. Alternatively, a bituminous seal should be preferred over say an asphalt, owing to greater flexibility and to decrease maintenance and repair requirements, noting however that seals are less resistant than asphalt to shearing forces from tyres of turning heavy vehicles. The use a specialised asphalt, such as a stone mastic asphalt, could also be considered, noting it would be less resistant to the risk of cracking than a seal. Some allowance for regular maintenance and repairs should be allowed during the serviceability of the pavement.

7.8 Stormwater Drainage

Owing to the occurrence of low permeability soils and groundwater at shallow depth, the site is considered unsuitable for on-site stormwater disposal. It is suggested that stormwater is controlled using positive drainage or a subsoil drainage network, connected to a suitable outflow.

7.9 Additional Geotechnical Investigation

Additional geotechnical investigation across the site, by way of deep geotechnical boreholes (as a minimum), further CPT and additional laboratory testing, should be undertaken to help refine the ground model, provide pile design parameters, confirm suitable bearing strata for piles, and assess the soil aggressivity and exposure classification for piles. It is recommended that the detailed investigation programme be developed once some details of the proposed development

are known, if possible, in order to target specific geotechnical issues associated with the development.

The investigation covered in this report should be considered preliminary and as noted in selected sections of the report, additional detailed geotechnical testing at a greater testing frequency is anticipated once the project design has progressed.

8. References

AS 1170.4. (2007). *Structural Design Actions, Part 4: Earthquake Actions in Australia.* Reconfirmed 2018. Incorporating Amendments 1 & 2: Standards Australia.

AS 1289.6.3.2. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - 9kg dynamic cone penetrometer test.* Reconfirmed 2013: Standards Australia.

AS 1289.6.3.3. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - Perth sand penetrometer test.* Reconfimed 2013: Standards Australia.

AS 1726. (2017). *Geotechnical Site Investigations.* Standards Australia.

AS 2159. (2009). *Piling - Design and Installation.* Standards Australia.

AS 2870. (2011). *Residential Slabs and Footings.* Standards Australia.

9. Limitations

Douglas Partners (DP) has prepared this report for this project at Part of Lot 9002 Grandstand Road, Ascot WA in accordance with DP's proposal dated 8 May 2023 and acceptance received from Mr James Oldring in a signed services order dated 8 August 2023. The work was carried out under DP's Engagement Terms. This report is provided for the exclusive use of Perth Racing for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

Attachment 12.1.2 Local Water Management Strategy

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope of work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

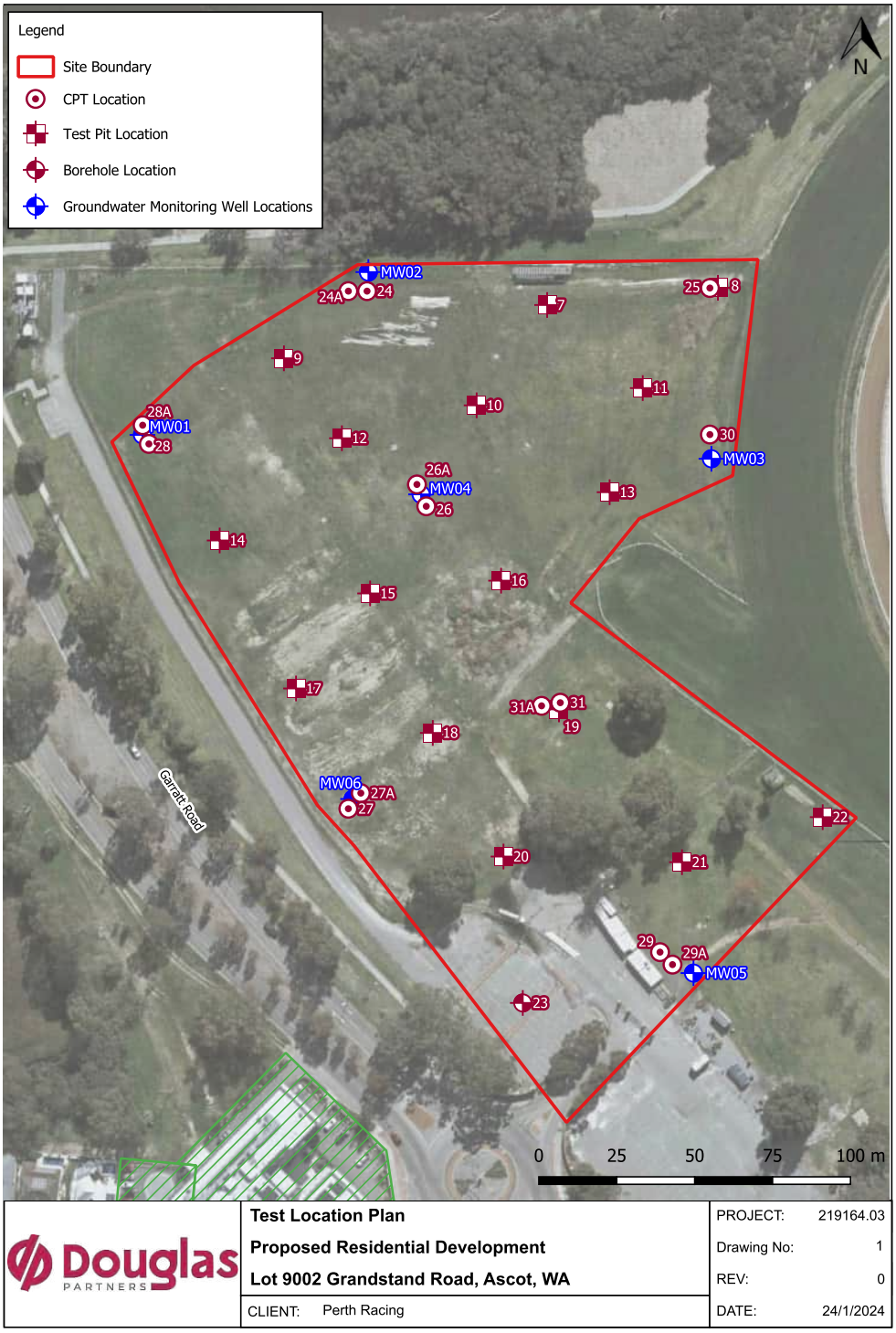
Appendix B

Test Location Plan

Test Pit and Borehole Logs

CPT Results

Attachment 12.1.2 Local Water Management Strategy



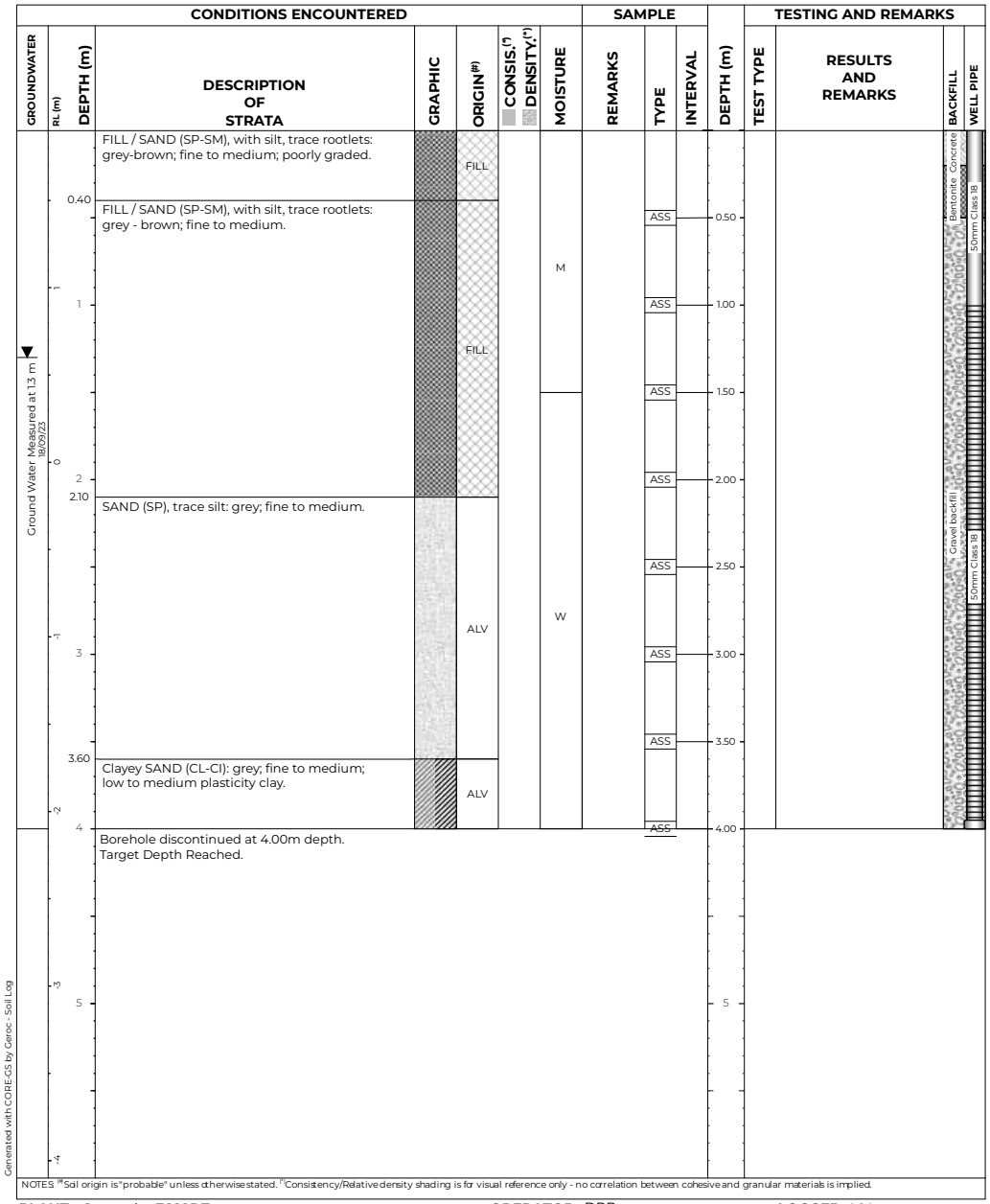
Attachment 12.1.2 Local Water Management Strategy

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 1.9 AHD
COORDINATE: E:397722.0, N:6466365.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 01
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

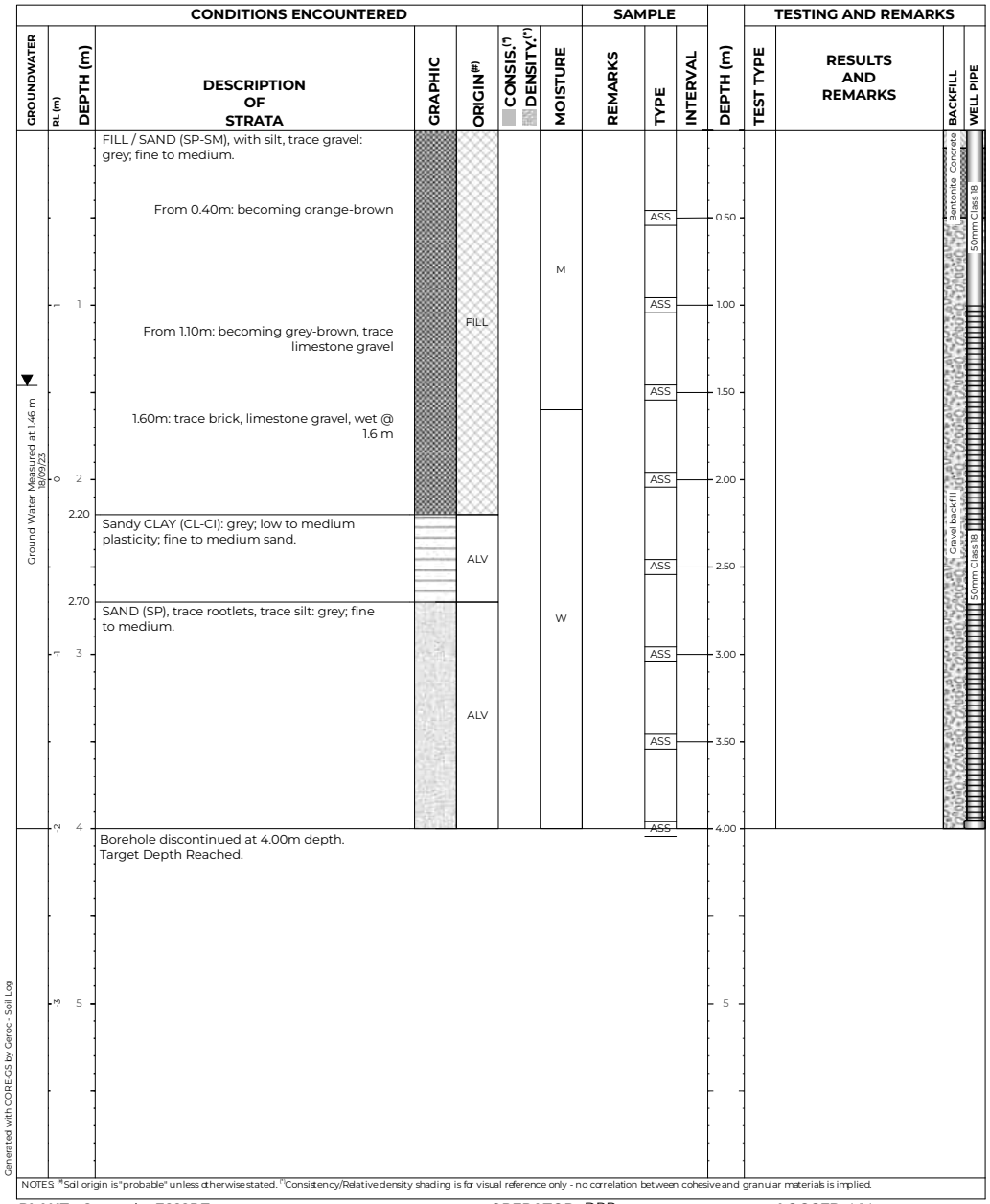
Attachment 12.1.2 Local Water Management Strategy

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397795.0, N:6466418.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 02
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Attachment 12.1.2 Local Water Management Strategy

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.2 AHD
COORDINATE: E:397905.0, N:6466358.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 03
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	3	0	FILL / SAND (SP), trace silt: orange; fine to medium. From 0.30m: becoming grey, trace clay, limestone gravel		FILL						0			Bentonite Concrete	50mm Class 18
	1	1									1				
	2	1.60	FILL / Clayey SAND (SC), trace gravel: grey; fine to medium; low to medium plasticity clay.		FILL						2			Gravel backfill	
▼ Ground Water Measured at 2.37 m 18/09/23	1	2.20	FILL / SAND (SP), trace silt: orange - grey; fine to medium. 2.80m: trace brick		FILL						3				50mm Class 18
	0	3.00	FILL / Clayey SAND (SC): grey; fine to medium; low to medium plasticity clay. 3.30m-3.50m: with bitumen layer		FILL						4				
	-1	3.60	FILL / CLAY (CL-CI), trace sand: grey - green; low to medium plasticity.		FILL						5				
	-2	4	Borehole discontinued at 4.00m depth. Target Depth Reached.												

NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log

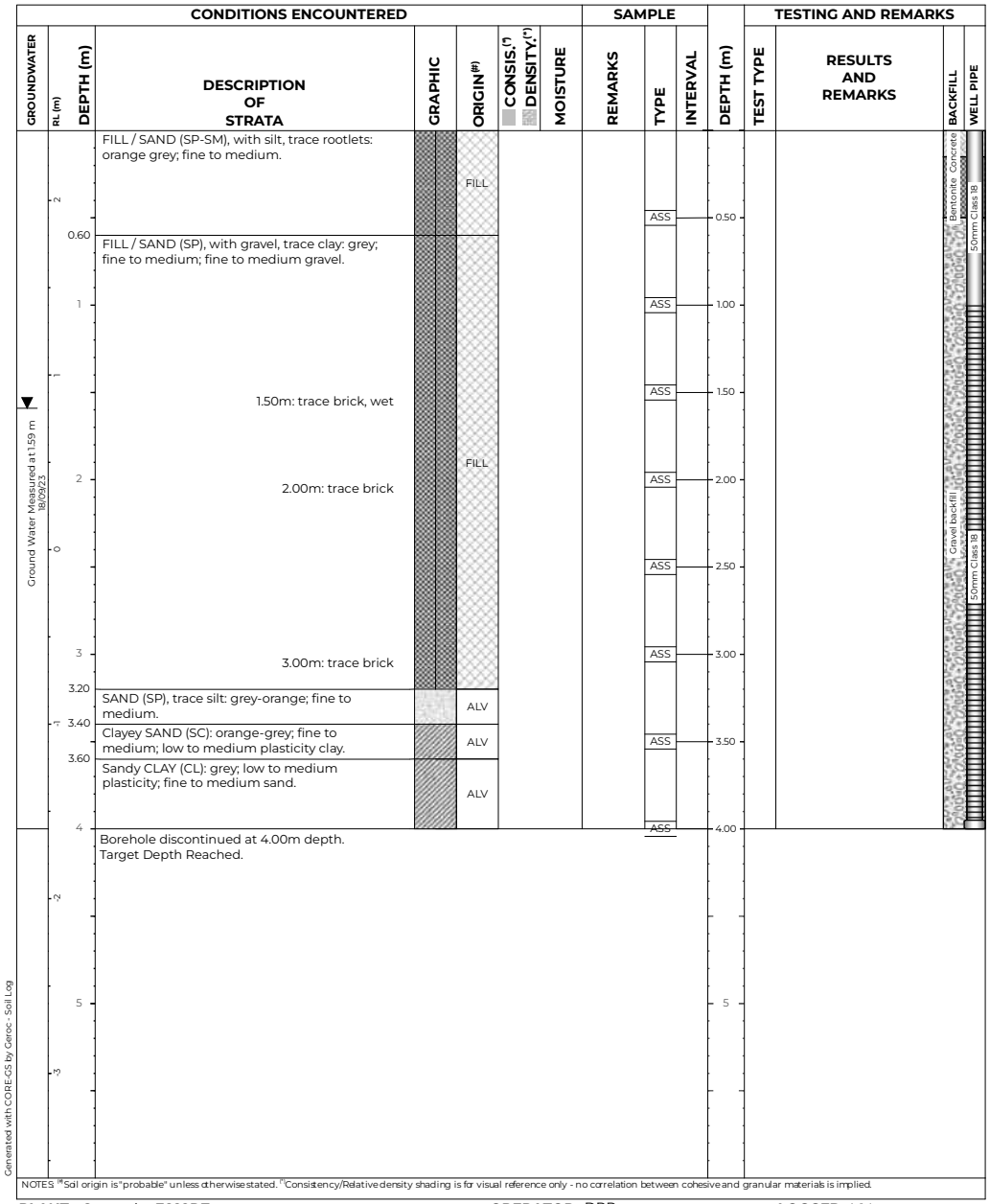
Attachment 12.1.2 Local Water Management Strategy

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397812.0, N:6466346.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 04
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

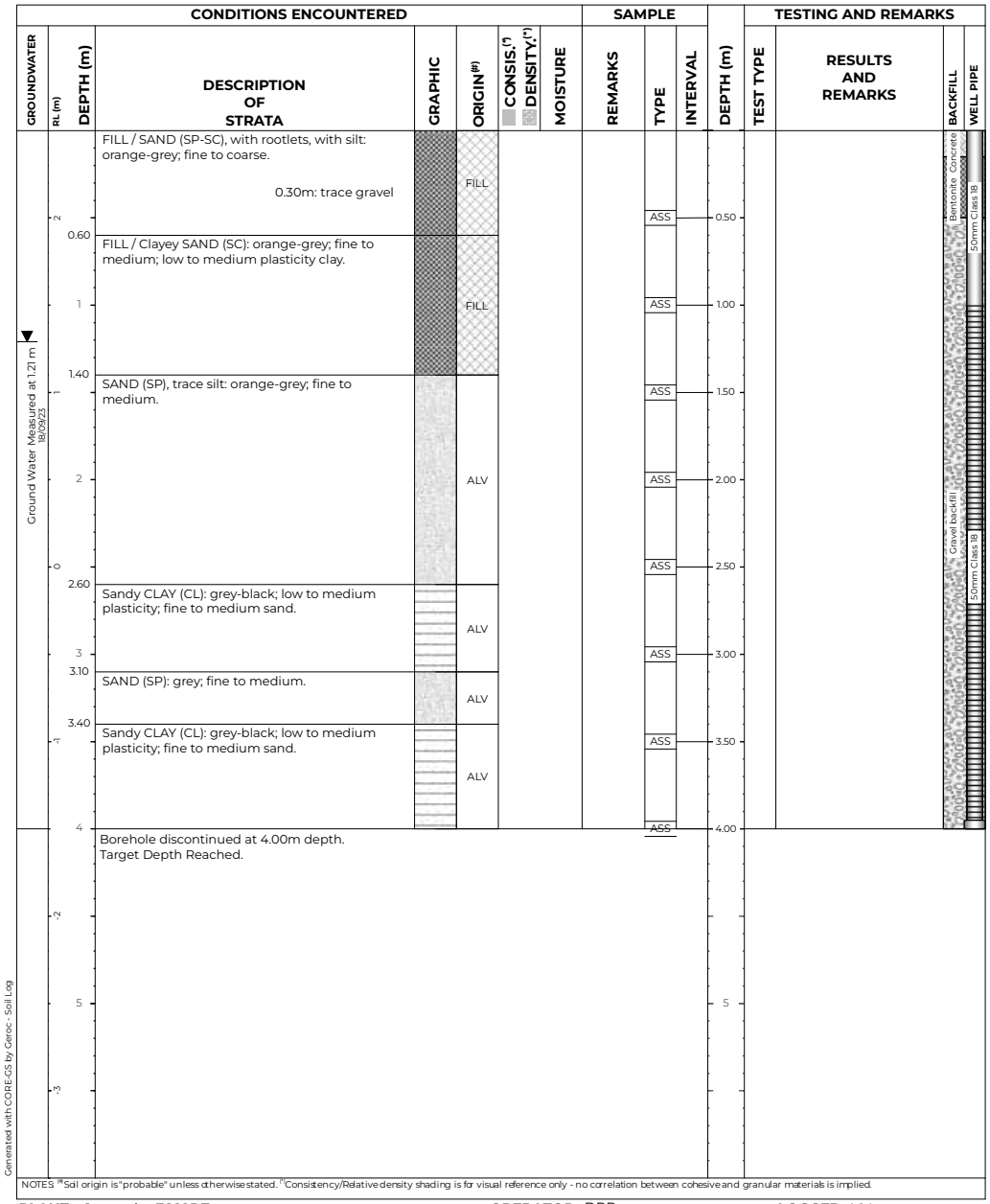
Attachment 12.1.2 Local Water Management Strategy

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.5 AHD
COORDINATE: E:397900.0, N:6466193.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 05
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

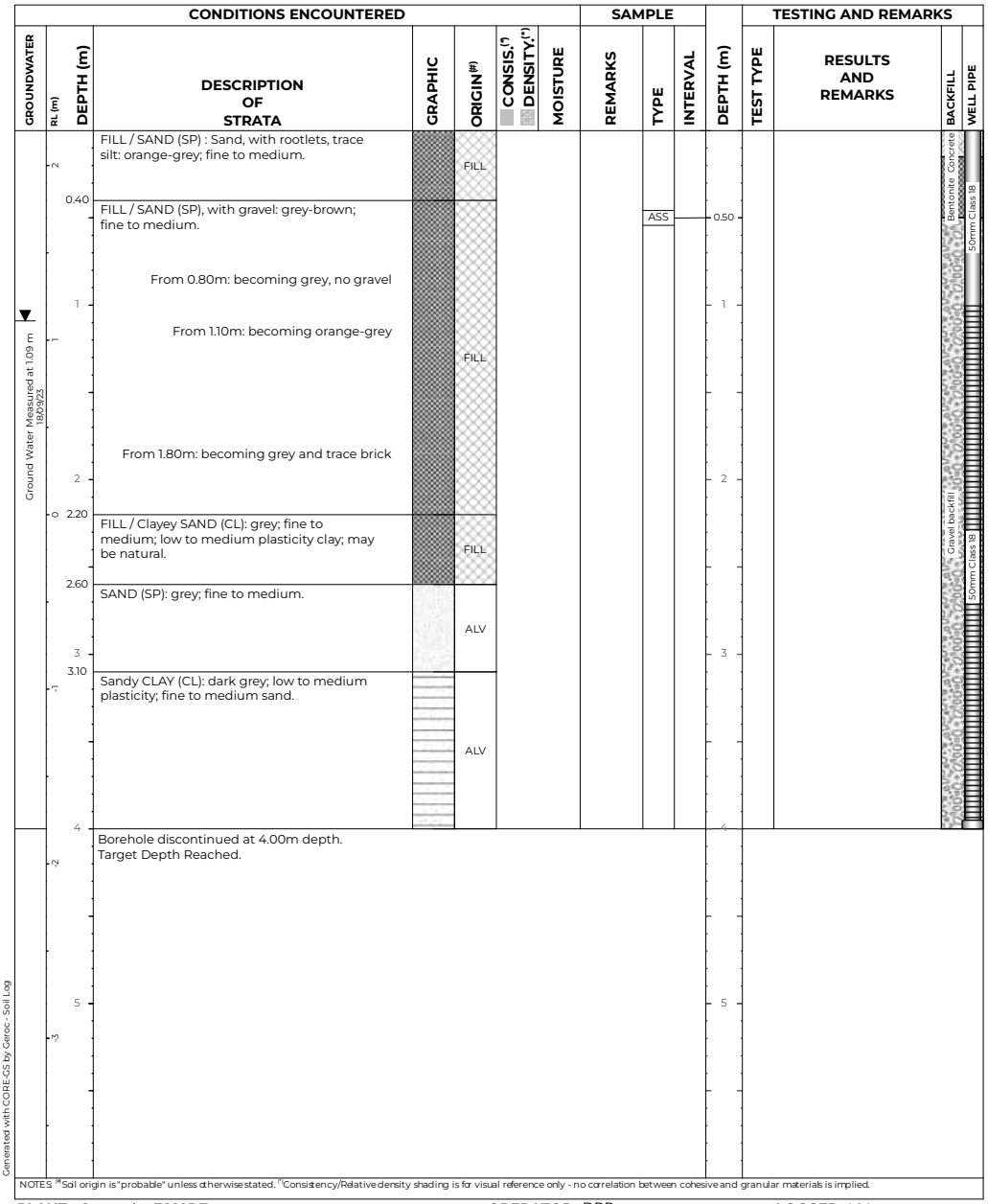
Attachment 12.1.2 Local Water Management Strategy

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397790.0, N:6466249.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 06
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



NOTES (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.9 AHD
COORDINATE: E:397852.9, N:6466410.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP07
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE / RESULTS AND REMARKS
	0	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium. From 0.17m: becoming orange		FILL	MD to VD	D to M		ES		0.10	PID <1ppm
		0.54m: trace geo-fabric						ES		0.40 / 0.50	PID <1ppm
	0.60	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand. 0.84m: trace geo-fabric		FILL							
	0.90 / 1	FILL / GRAVEL (GP-GM) : Gravel, with mulch, with sand: dark brown and dark grey-brown; with silt.		FILL				ES		1.00 / 1.10	PID <1ppm
	1.40	FILL / SAND (SP-SM), with silt: dark grey; fine to medium. 1.50m: trace PACM fragment From 1.60m-2.60m: with fragments of bricks, concrete and metal roofing sheetings		FILL	ND	M	ASB9, ASB10 AF/FA	D ES		1.50 / 1.60	PID <1ppm
09/11/23	1 / 2			FILL				ES		2.00 / 2.10	PID <1ppm
						W		ES		2.50 / 2.60	PID <1ppm
	0	Test Pit discontinued at 2.60m depth. (Collapsing conditions).									





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.3 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.6 AHD
COORDINATE: E:397905.7, N:6466414.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP08
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
			FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	VD	M		ES		0.10	PID	<1 ppm
			From 0.43m: becoming pale grey, trace gravel						ES		0.50 0.60	PID	<1 ppm
			From 1.20m: becoming grey						ES		1.00 1.10	PID	<1 ppm
		1.40	FILL / organic SAND (SP-SM), with silt, with gravel: dark grey-brown; fine to medium; trace fragments of brick and concrete.		FILL	ND		AF/FA ASB 8	D ES MAT		1.50 1.60	PID	<1 ppm
			1.55m-2.00m: with fragments of brick, concrete and PVC										
		1.80	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium.		FILL				D ES		2.00 2.10	PID	<1 ppm
			2.20m: trace metal sheet, PVC										
			2.40m: trace rubber pipe, metal bar						ES		2.50 2.60	PID	<1 ppm
			Test Pit discontinued at 2.70m depth. (Test Pit terminated due to slow digging).										

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NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397768.9, N:6466392.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP09
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2		FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES	0.10		PID	<1ppm
		0.45	FILL / Clayey SAND (SC): orange-brown; fine to medium; low to medium plasticity clay.		FILL				D ES	0.50 0.60		PID PID50	<1ppm 5 10 15 REFUSAL 25 25
		0.95 0.98	FILL / ASPHALTIC CONCRETE: black, 7 mm sized nominal aggregate.						ES	1.00 1.10		PID	<1ppm
	1		FILL / Silty SAND (SM): brown; fine to medium. From 1.15m: becoming grey-brown From 1.20m: with fragments of brick, concrete slab of 0.4 m in thickness, geo-fabric, metal bar and terracotta pipe 1.40m: trace metal sheet		FILL	ND	M		ES	1.50 1.60		PID	<1ppm
09/11/23	0	2	1.90m-2.10m: trace pockets of Clayey SAND SC						ES	2.00 2.10		PID	<1ppm
							W						
			Test Pit discontinued at 2.30m depth. (Collapsing conditions).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397829.1, N:6466375.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP10
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: bands of grey, orange-brown and pale grey; fine to medium.		FILL	MD to D		DUP 2	ES	0.10		PID	<1ppm
		0.70m: trace geo-fabric						ES	0.50 0.60		PID	<1ppm
	0.80	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL				ES	1.00 1.10		PID	<1ppm
	1											
	1.20	FILL / SAND (SP), trace rootlets, trace silt: grey -brown; fine to medium.		FILL	ND			ES	1.50 1.60		PID	<1ppm
	1	From 1.40m-1.80m: with fragments of brick and concrete										
		From 1.80m: becoming dark grey, trace fragments of brick and concrete										
	2							ES	2.00 2.10		PID	<1ppm
	0	Test Pit discontinued at 2.15m depth. (Test Pit terminated due to slow digging).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

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Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.1 AHD
COORDINATE: E:397881.2, N:6466387.1
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP11
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	3		FILL / SAND (SP-SM), with silt: grey and orange-brown; fine to medium.			VD	D to M		ES		0.10	PSP/150	5 10 15 REFUSAL 25 25
			From 0.35m: becoming grey						ES		0.50 0.60		
	1							DUP 3	D ES		1.00 1.10		
	2				FILL	ND	M						
			From 1.60m: becoming dark grey, trace fragments of brick						D ES		1.60 1.70		
			From 1.70m-2.40m: with fragments of brick and concrete										
		2	1.80m: piece of concrete boulder (1 m x 0.5 m) observed						ES		2.00 2.10		
			2.10m: trace plastic bottle, glass bottle, concrete rubble										
			2.30m: trace fragments of wooden plank and timer						D		2.30		
			Test Pit discontinued at 2.40m depth. (Test Pit terminated due to slow digging).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE.GS by Geroc - Soil Log with Photo

Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397785.4, N:6466366.6
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP12
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.						ES		0.10	PID	<1ppm
		From 0.20m: becoming yellow-brown		FILL	D to VD	D to M		ES		0.50	PID	<1ppm
	0.85 / 0.90	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL						0.60		
	1	FILL / SAND (SP), trace fragments of brick, scrap metal, timber and rubber cable, trace silt: dark grey-brown; fine to medium.						D		1.00	PID	<1ppm
		1.30m-1.80m: with fragments of plastic waste, insulation material, terracotta pipes and concrete, trace PACM fragments					AF/FA, ASB 6, ASB 7	ES		1.10		
				FILL	ND	M		ES		1.50 / 1.60	PID	<1ppm
	2	From 1.90m: becoming green-grey, trace pockets of CLAY CL-CI						B		2.00	PID	<1ppm
09/11/23	0							ES		2.10		
						W						
		Test Pit discontinued at 2.30m depth. (Collapsing conditions).										

PSP 25





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.8 AHD
COORDINATE: E:397872.7, N:6466350.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP13
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; 10% non-plastic fines. From 0.15m: becoming orange		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		0.70m: trace geo-fabric						D		0.50	PSP/ISO	5 10 15 25
	0.75							ES		0.60	PID	<1ppm
	1	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL				ES		1.00	PID	<1ppm
		1.20m: trace geo-fabric								1.10		
	1.30	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium.			ND	M		D		1.50	PID	<1ppm
		1.50m-2.40m: with fragments of bricks and concrete slab						ES		1.60		
	1			FILL				ES		2.00	PID	<1ppm
	2									2.10		
09/11/23						W		ES		2.50	PID	<1ppm
										2.60		
	0	Test Pit discontinued at 2.70m depth. (Collapsing conditions).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397745.6, N:6466334.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP14
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2 / 0.25	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		FILL / Silty SAND (SM): brown and grey-brown; weakly to moderately cemented.									DCP9/150	29 30
		0.65m: trace fragments of brick and glass						D		0.50	PID	<1ppm
		0.72m-2.00m: with framgnes of brick, metal sheet and insulation material						ES		0.60		
	1	0.92m: trace fragments of plastic waste, glass and limestone boulders						ES		1.00	PID	<1ppm
	1			FILL	ND	M				1.10		
								ES		1.50	PID	<1ppm
										1.60		
	2 / 0	2.00m: becoming gren-grey, trace fragments of timber, brick and concrete blocks, with pockets of Clayey SAND SC						ES		2.00	PID	<1ppm
		From 2.20m: with fragments of brick and scrap metal								2.10		
								D		2.40		
		Test Pit discontinued at 2.50m depth. (Test Pit terminated due to slow digging).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

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Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397794.3, N:6466319.4
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP15
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
			FILL / SAND (SP-SM), with silt, trace gravel and rootlets: orange-brown; fine to medium.						ES		0.10	PID	<1ppm
			From 0.24m: becoming grey		FILL	VD	D to M					DCP9/150	
			From 0.42m: becoming pale grey						D		0.50	PID	<1ppm
		0.75	FILL / Sandy GRAVEL (GP-GM), with silt: dark brown and grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND			ES		0.60		22
		0.95	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						D		1.00	PID	<1ppm
			1.20m: trace fragments of timber, terracotta pipe and scrap metal						ES		1.10		
			1.50m: trace redundant cable				M		ES		1.50	PID	<1ppm
			From 1.80m: becoming orange-brown		FILL	ND					1.60		
			2.00m: trace PACM pipe					AF/FA, ASB 5	ES		2.00	PID	<1ppm
			2.10m: trace fragments of timer								2.10		
08/11/23			From 2.40m: becoming dark grey				W		ES		2.50		
											2.60		
			Test Pit discontinued at 2.70m depth. (Test Pit flodded with water seepage).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.4 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397837.5, N:6466321.2
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP16
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.		FILL				ES		0.10	PID	<1ppm
	0.34 / 2	FILL / Sandy (GP-GM), with silt: grey; fine to medium sand.		FILL	ND	D to M		ES		0.50 0.60	PID	<1ppm
	0.84	0.80m: trace fragments of plastic waste										
	1	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.			MD to D			ES		1.00 1.10	PID	<1ppm
		1.50m: trace fragments of plastic waste		FILL		M		D ES		1.50 1.60	PID	<1ppm
	2	2.00m: trace metal plate (0.5 m x 0.5 m) 2.10m: with limestone boulders			ND			ES		2.00 2.10	PID	<1ppm
▼ 08/11/23	0					W		D ES		2.50 2.60	PID	<1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).										

DCP9/150 — 5 — 10 — 15





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NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397775.7, N:6466289.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP17
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE / RESULTS AND REMARKS
	0.15	FILL / SAND (SP-SM), with silt, trace rootlets: orange - grey; fine to medium.		FILL	L to VD	D to M		ES		0.10	PID <1ppm
		FILL / Sandy GRAVEL (GP-GM), with fragments of concrete, with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.									DCP9/150 25
				FILL				ES		0.50 0.60	PID <1ppm
	0.90	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						ES		1.00 1.10	PID <1ppm
		1.10m: trace fragments of plastic waste			ND	M	ASB 3	ES		1.50 1.60	PID <1ppm
		1.60m: trace metal sheets		FILL							
08/11/23		1.90m: piece of concrete block observed					ASB 4	ES		2.00 2.10	PID <1ppm
						W					
		Test Pit discontinued at 2.50m depth. (Collapsing conditions).									





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NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397816.0, N:6466272.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP18
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; weakly cemented.		FILL		D to M		ES		0.10	PID	<1ppm
	0.26	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND							
	0.45	FILL / SAND (SP), with fragments of brick and concrete, with clay: grey; fine to medium.					ASB 1	ES		0.50 0.60	PID	<1ppm
		0.50m-1.50m: with fragments of tile and brick, trace PACM fragments 0.75m: trace metal bar			MD to VD						DCP(N/150)	5 10 15
	1	1.00m: trace fragments of redundant cables, glass, geo-fabric and limestone blocks From 1.20m: with limestone boulders		FILL		M		D ES		1.00 1.10	PID	<1ppm
					ND							
								ES		1.40 1.50	PID	<1ppm
		Test Pit discontinued at 1.50m depth. (Test Pit terminated due to slow digging).										
	2									2		





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

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Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397856.8, N:6466280.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP19
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	0.20	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL			DUP 1	ES		0.10	PID	<1ppm
			FILL / Sandy GRAVEL (GP-GM), with silt: orange-brown; medium to coarse; fine to medium sand; Gravel is crushed limestone.		FILL	ND	D		D ES		0.50 0.60	PID	<1ppm
		0.70	FILL / SAND (SP-SM), with silt, trace gravel: grey-brown; fine to medium.										
			0.75m: trace concrete slab, fragments of brick and terracotta pipes										
	1		From 0.90m: with fragments of brick			MD			ES		1.00 1.10	PID	<1ppm
			From 1.20m: becoming grey, trace fragments of timber		FILL		M					PSD150	5 10 15
			From 1.60m: becoming grey-brown						ES		1.50 1.60	PID	<1ppm
09/11/23		1.90	FILL / SAND (SP), trace roots, trace silt: dark grey; fine to medium.			ND			ES		2.00 2.10	PID	<1ppm
	0				FILL		W						
			2.40m: trace fragments of sea shells						D ES		2.50 2.60	PID	<1ppm
			Test Pit discontinued at 2.60m depth. (Collapsing conditions).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397838.6, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP20
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE / RESULTS AND REMARKS
	0.05	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL				ES		0.10	PID <1ppm
		FILL / Sandy GRAVEL (GP-GM), with silt: yellow-brown; medium to coarse; fine to medium sand.		FILL		D to M					
	0.34	FILL / SAND (SP-SM), with silt, trace gravel: grey and orange-brown; fine to medium. 0.50m: with fragments of brick and concrete			MD to VD			ES		0.50 0.60	PID <1ppm
		0.80m: trace fragments of rubber waste and scrap metal						D ES		1.00 1.10	PID <1ppm
	1	From 1.20m: becoming dark grey, with fragments of brick 1.30m-2.10m: with hydrocarbon odour		FILL		M					
		1.50m: with pockets of Clayey SAND SC						D ES		1.50 1.60	PID 9.4ppm
	1.80	FILL / Clayey SAND (SC): dark grey; fine to medium; low to medium plasticity clay.			ND						
08/11/23	2	From 2.10m: becoming green-grey		FILL		W		ES		2.00 2.10	PID 1.4ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).						ES		2.50 2.60	PID 1.1ppm

PSP/m





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NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

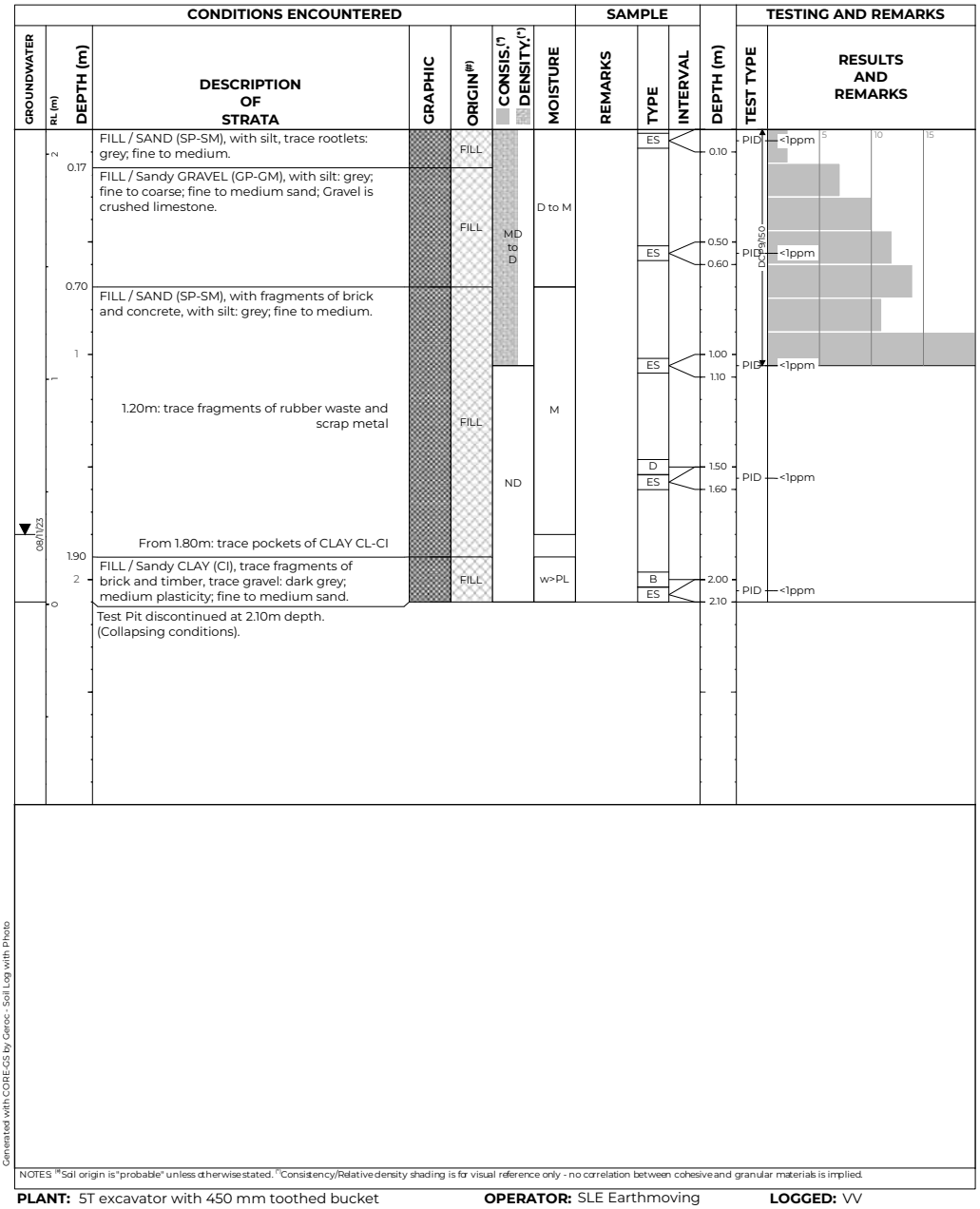
Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397896.5, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP21
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1



PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.2 Local Water Management Strategy

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.3 AHD
COORDINATE: E:397941.6, N:6466244.9
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP22
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0 / 2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	MD	D to M		ES	0.10	PID	<1ppm
		From 0.22m: becoming orange									
		From 0.40m: becoming brown						ES	0.50 0.60	PID	<1ppm
		From 0.70m: becoming dark grey-brown				M		ES	1.00 1.10	PID	<1ppm
	1.40 / 1	SAND (SP-SM), with silt: pale yellow-brown; fine to medium.		possibly ALV	ND			ES	1.50 1.60	PID	<1ppm
09/11/23		From 1.70m: becoming orange-grey				W		B ES	2.00 2.10	PID	<1ppm
	2 / 0	Test Pit discontinued at 2.20m depth. (Collapsing conditions).									

PSP/PP





NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.2 Local Water Management Strategy

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397844.9, N:6466181.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP23
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY:[*]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
		0.05	ASPHALT: black, 7 mm sized nominal aggregate.		FILL		D						
		0.15	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand; BASECOURSE, gravel is crushed rock.		FILL	ND							
		0.30	FILL / Sandy GRAVEL (GP-GM), with silt: red-brown; medium to coarse, angular to sub-angular; fine to medium sand; SUB-BASE, gravel is granitic and lateritic.		FILL		M		ES		0.50 0.60	PID	<1ppm
	2	0.65	FILL / Silty SAND (SM), trace gravel: brown; fine to medium; with pockets of Clayey SAND SC. 0.90m: trace fragments of brick			MD to D						DCP9/150	
		1	FILL / Clayey SAND (SC): orange-grey; fine to medium; low to medium plasticity clay.		FILL		M		D ES		1.00 1.10	PID	<1ppm
	1	1.40	FILL / SAND (SP), trace silt: grey; fine to medium; trace pockets of Clayey SAND SC. 1.80m: trace fragments of brick		FILL				ES		1.50 1.60	PID	<1ppm
08/11/23		1.90	FILL / Sandy CLAY (CI), trace gravel: dark grey; medium plasticity; fine to medium sand.		FILL	ND	W		D ES		2.00 2.10	PID	<1ppm
	0	2.20	FILL / SAND (SP-SM), with silt: dark grey; fine to medium.		FILL				D ES		2.50 2.60	PID	<1ppm
			Borehole discontinued at 2.60m depth. (Collapsing conditions).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
METHOD:
OPERATOR: SLE Earthmoving
LOGGED: VV
CASING: Nil

REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.7 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Generated with CORE-GS by Geroc - Soil Log with Photo

Appendix C

Geotechnical Laboratory Test Certificates

Attachment 12.1.2 Local Water Management Strategy

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ASTM D2974-14 (Test Method C)

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256-18262_1_ORG
Project:	Proposed Residential Development	*Sample No.*	WG23.18256-18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	Various See Below	*Date Tested:*	15/11/2023

TEST RESULTS - Organic Content

Sampling Method: Sampled by Client, Tested as Received

Testing Completed By: WGLS-LC

Furnace Temperature (°C): 440

Sample Number	Sample Identification	Ash Content (%)	Organic Content (%)
WG23.18256	TP13/1.5	98.4	1.6
WG23.18257	TP8/1.5 m	93.2	6.8
WG23.18258	TP19/2.5	98.5	1.5
WG23.18262	BH23/2.5 m	98.8	1.2

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 16/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

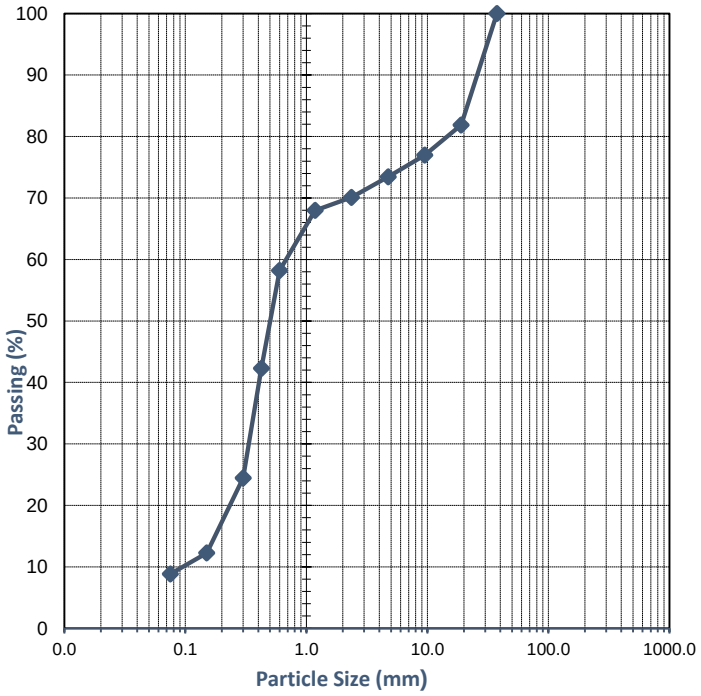
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18257_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18257
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP8/1.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	82
9.5	77
4.75	73
2.36	70
1.18	68
0.600	58
0.425	42
0.300	24
0.150	12
0.075	9



Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

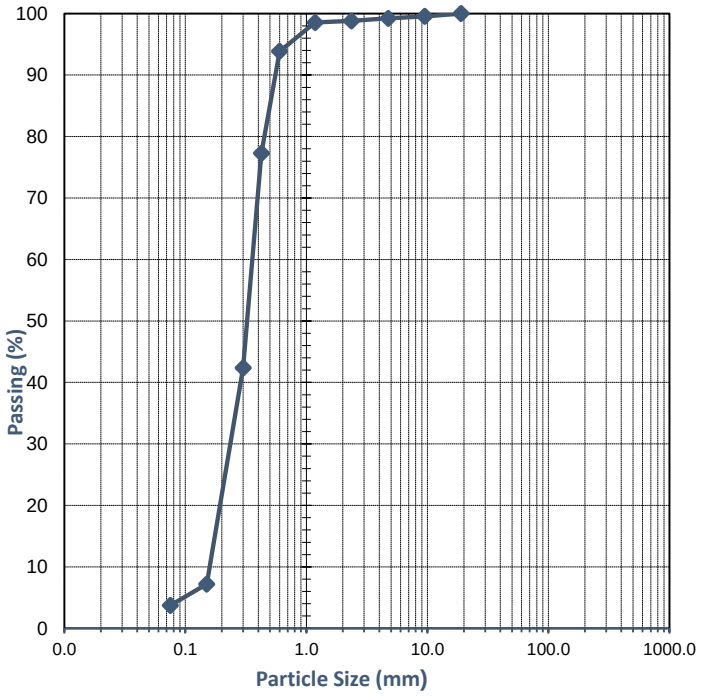
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18256
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP13/1.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	99
2.36	99
1.18	99
0.600	94
0.425	77
0.300	42
0.150	7
0.075	4



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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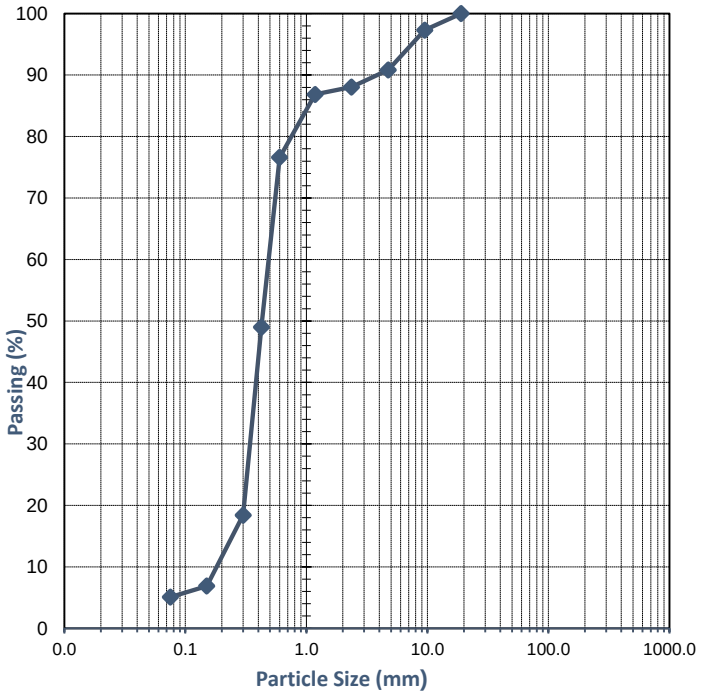
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18258_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18258
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP19/2.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	97
4.75	91
2.36	88
1.18	87
0.600	77
0.425	49
0.300	18
0.150	7
0.075	5



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

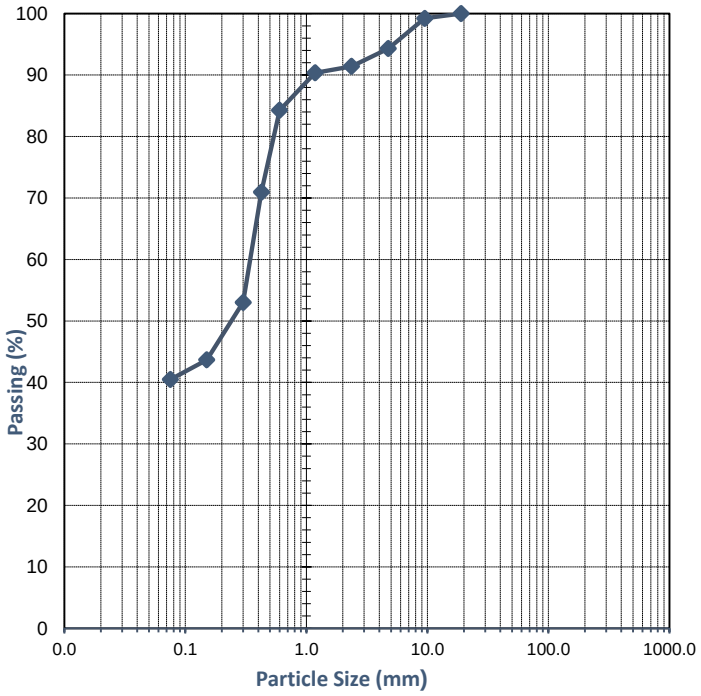
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	99
4.75	94
2.36	91
1.18	90
0.600	84
0.425	71
0.300	53
0.150	44
0.075	40



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**37**
AS 1289.3.2.1	**Plastic Limit (%)**	**24**
AS 1289.3.3.1	**Plasticity Index (%)**	**13**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**8.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet
Date: 20/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

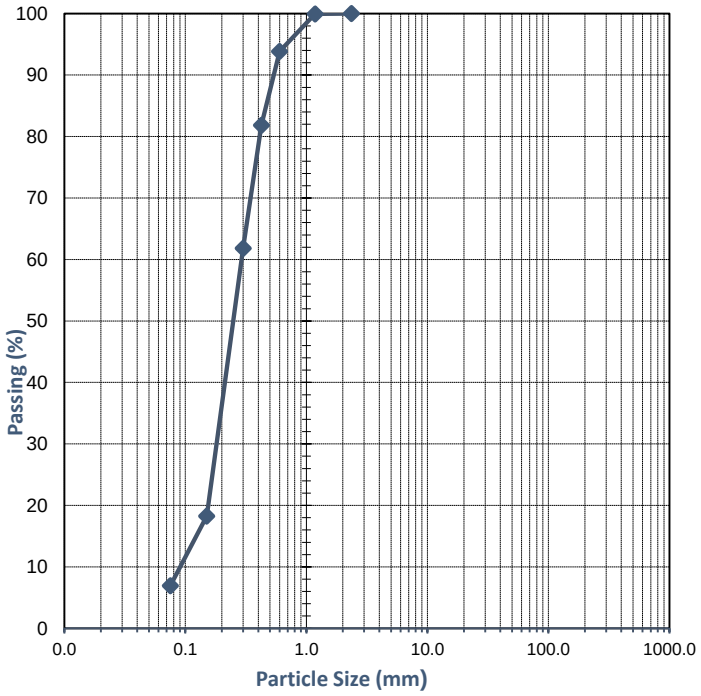
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/2023
Sample Identification:	TP22/2.0	*Date Tested:*	22/11 - 23/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	
2.36	100
1.18	100
0.600	94
0.425	82
0.300	62
0.150	18
0.075	7



Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 23/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP22/2.0	*Date Tested:*	23/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Matthew Lichon
Date: 24/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

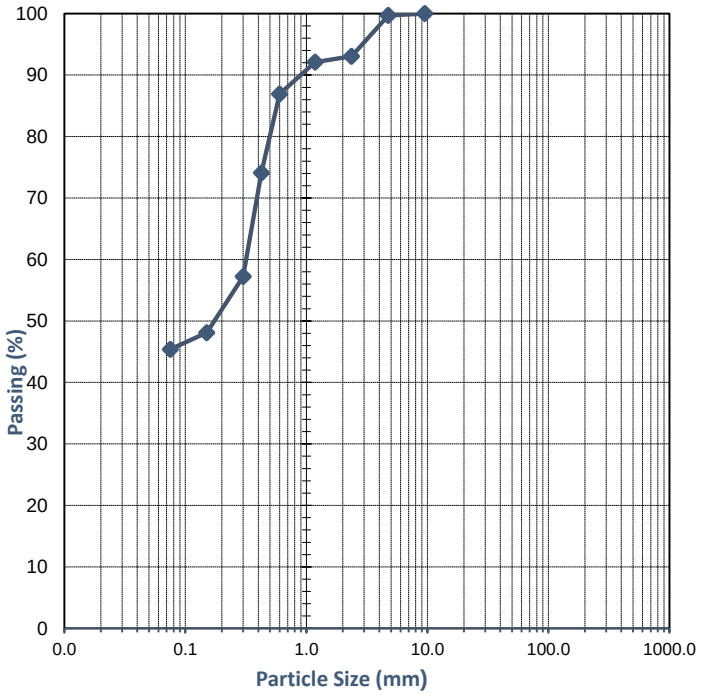
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	93
1.18	92
0.600	87
0.425	74
0.300	57
0.150	48
0.075	45



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**44**
AS 1289.3.2.1	**Plastic Limit (%)**	**22**
AS 1289.3.3.1	**Plasticity Index (%)**	**22**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**9.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet
Date: 20/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

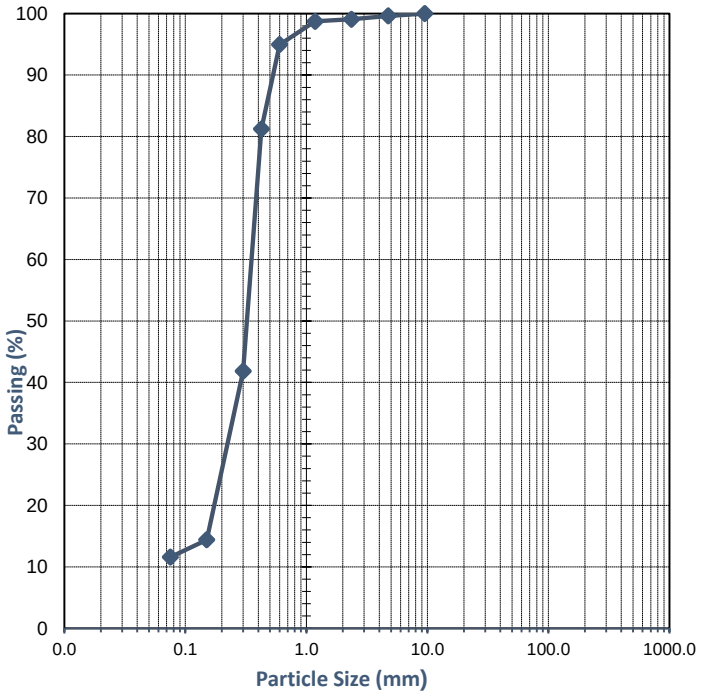
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18262_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	99
1.18	99
0.600	95
0.425	81
0.300	42
0.150	14
0.075	12



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

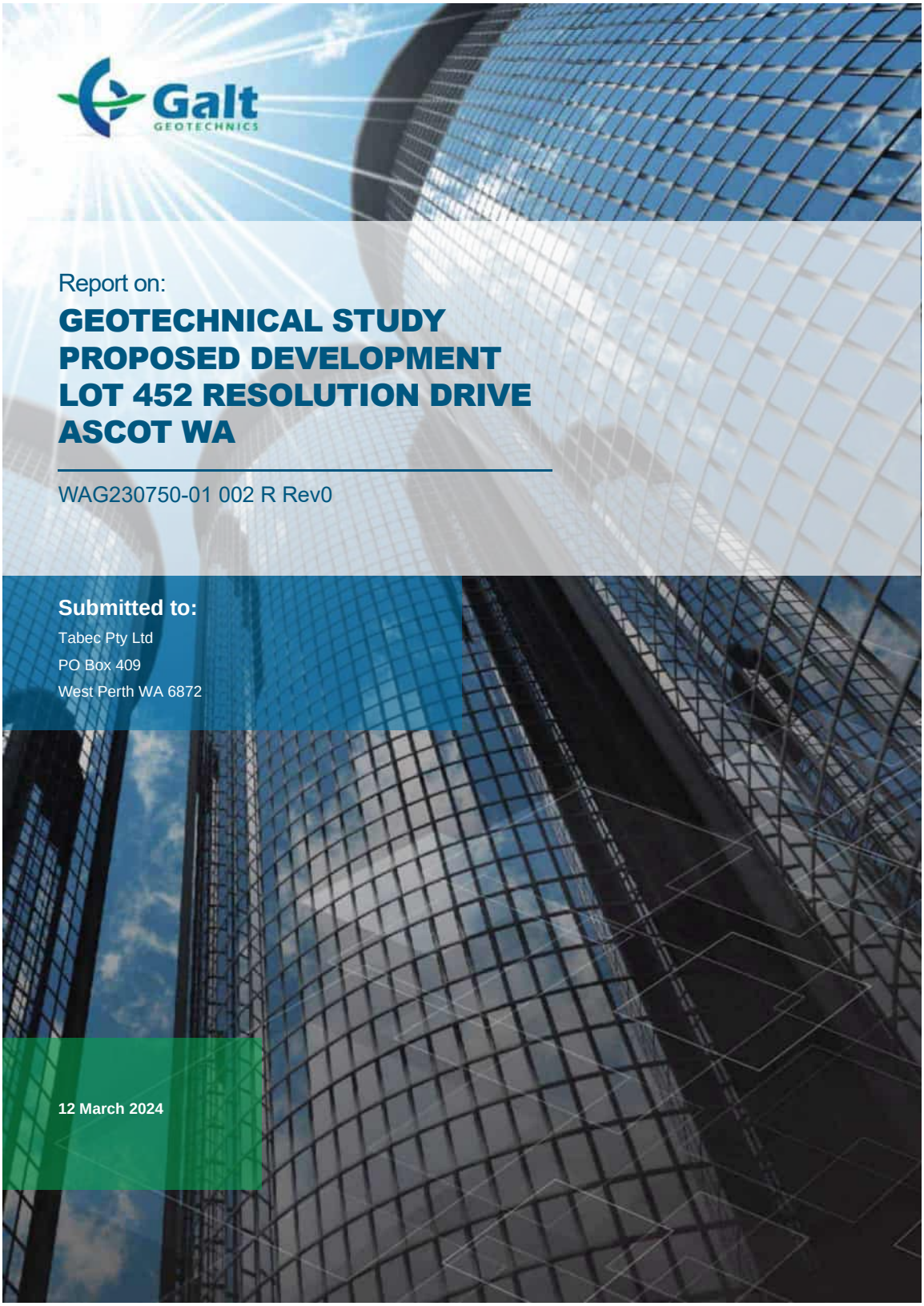
Date: 17/November/2023

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Attachment 12.1.2 Local Water Management Strategy



Attachment 12.1.2 Local Water Management Strategy

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4. PROJECT OBJECTIVES 2
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Figure 1: Site and Location Plan

Appendix A: Site Photographs
Appendix B: Cone Penetration Test Results
Appendix C: Machine Borehole and Monitoring Well Logs
Appendix D: Laboratory Test Results

Standard Geotechnical Definitions, Recommendations, Requirements and Limitations

Attachment 12.1.2 Local Water Management Strategy

1. INTRODUCTION

This report presents the outcomes of Galt Geotechnics' (Galt's) geotechnical study for the proposed development at Lot 452 Resolution Drive, Ascot ("the site").

This report is to be read in conjunction with the appended "Geotechnical Definitions, Recommendations, Requirements and Limitations". 'Clause GDR1', etc. refer to this Appendix, found at the back of this report.

2. KEY FINDINGS

Site Description

Table 1: Summary of Site

Item	Comment
Site Extent	Refer Figure 1.
Site Area	About 1.14 Ha.
Current Site Surface Levels[1]	About RL 3 m AHD.
Vegetation	Mature trees, shrubs and lawn in landscaped areas covering a large portion of the site.
Existing Infrastructure	Single Storey building (used by Perth Racing Security Services) with surrounding accessways, car parking and landscaped areas.
Site History[2]	**Prior to 1953**: two residences in northern portion of site. Remainder of site relatively clear. **1953 to 1985**: Relatively unchanged. Undeveloped portion of site used as laydown area, car park area, and to stockpile materials at different times. **1989**: Existing Perth Racing Security Services development (as described above) is present **1989 to Present**: Site relatively unchanged.

NOTES:
1. *Site level based on correspondence with client.*
2. *Site history based on aerial imagery (Landgate).*

3. PROPOSED DEVELOPMENT

Table 2: Summary of Proposed Development

Item	Comment
Proposed Development	Unknown, assumed subdivision for commercial/residential purposes.
Proposed Finished Level	Assumed within about 1 m of current ground levels.
Cut/Fill	Assumed ± 1 m with up to 5 m excavation to connect development to existing sewer.
Assumed Foundation Type	Shallow Footings.
Assumed Retaining Walls	Gravity walls up to 1 m in height.
Assumed Stormwater Disposal	Off site into council network.
Assumed Sewage Disposal	Off site via reticulated sewer.

NOTES:
1. *FFL – finished floor level*
2. *Proposed development details based on supplied information.*

4. PROJECT OBJECTIVES

The objectives of the study were to:

- Assess the geotechnical suitability of the site for the proposed development;

- Geotechnical opportunities and constraints relevant to the proposed development;
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks;
- Site preparation including possible reuse of existing soil as controlled fill;
- Excavation conditions;
- The likely site classification;
- Suitable foundation systems including preliminary design parameters;
- Preliminary design parameters for the design of retaining structures and batter slopes;
- Depth to groundwater at time of investigation; and
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

5. FIELDWORK

Fieldwork was carried out in the presence of a representative from Galt between the 8 and 14 February 2024 and comprised:

Table 3: Summary of Field Data

Type	Results Appendix	Summary	GDR Clause	Equipment Used	No. Tests	Depth Range (m)
Site Plan	Figure 1	-	-	Hand held GPS[1]	-	-
Photographs	A	-	-	-	-	-
Cone Penetration Tests (CPTs)	B	Section 8	GDR3.2	14-tonne truck	5	1.6 to 10.1
Machine Auger Boreholes (BH)	C	Section 8	GDR3.3	AMS Power Probe	4	0.7 to 6.5
Monitoring Well (MW)	C	Section 8	GDR3.3	AMS Power Probe	1	6.0

NOTES: ***1.*** *Hand held GPS is accurate to ±5 m.*

6. LABORATORY TESTING

Laboratory test certificates are presented in Appendix D, and summarised in Attached Tables 1 and 2.

7. SITE CONDITIONS

7.1. Geology

Table 4: Summary of Geology Mapping

Map Sheet	Map Scale	Mapped Soils	Typical Site Findings
Perth	50K	Guildford Formation, described as: "*SANDY SILT - strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.*"	**Thin topsoil** (landscaped areas) **and pavement materials** (car parks / access ways) **over FILL: SAND / SAND** to about 0.4 m to 0.9 m depth, **over Sandy CLAY / CLAY**.

7.2. Groundwater

Table 5: Summary of Groundwater Levels

Item	Date	Depth Range (m)	Elevation Range (m AHD)	Comment
Perth Groundwater Atlas	1997	-	3.0	Historical maximum
Department of Water and Environmental Regulation (DWER) Flood Mapping	-	-	2.7 to 2.9 (DWER mapped 1% AEP flood event level)	Portion of site along southern and south western site boundaries, and the northern side of Grandstand road are mapped as being part of flood fringe by DWER. **Advice on development within the defined flood event (DFE) floodplain is provided by DWER on a case by case basis. DWER recommends a minimum building floor level of 0.50 metres above this level** (**RL 3.4 m AHD**).
Site observations in MW01	February 2024	3.03	-	Based on highest recorded water levels in monitoring well.
Site observations in CPT test probes	February 2024	1.90 to 2.80	-	CPT probes may not have had sufficient time to recharge to hydrostatic levels.
Recommended Design	-	-	2.7 to 2.9	Groundwater likely to perch on clay soils at site. Proposed development must be designed for DWER DFE flood event.

NOTES: ***1.*** *Depths for site observations based on the site surface level at the time of investigation.*

8. GROUND MODEL

The encountered subsurface conditions are summarised as comprising:

- **Surficial Topsoil (in landscaped areas)** up to 0.3 m thick **and Hardstand Fill Layers** (in carparks and access ways); **overlying**
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Geotechnical design parameters for the generalised subsurface units described above are presented in Table 6.

Table 6: Geotechnical Model Units and Design Parameters

Unit Name	γ_{bulk} (kN/m^3)	ϕ' (°)	c' (kPa)	S_u (kPa)	E_v (MPa)	ν	k_0	Wall Friction=0		Wall Friction=0.5ϕ	
								k_a	k_p	k_a	k_p
Compacted Approved FILL	18	36	-	-	50	0.25	0.41	0.26	3.85	0.22	6.54
SAND / Silty SAND / Clayey SAND	18	35	-	-	25	0.3	0.43	0.27	3.69	0.24	6.08
Sandy CLAY / CLAY	18	21	0 to 5	150	30	0.45	Earth pressure coefficients can be calculated for undrained or drained conditions as outlined in GDR11.2.2 using Firm parameters (undrained) or Fines Content >35% & PI 40% (drained).				

NOTES:

1. *These units are a generalization of results from individual tests, which should be referred to for more information.*
2. *Conditions at CPT locations below depth of soil sample recovery are inferred (refer to clause GDR3.2)*
3. *Surficial topsoil and hardstand layers are not included as discrete units.*
4. *Compacted approved fill is as described in Table 7.*
5. *For all earth pressure coefficients (retaining wall design) refer to clause GDR11.2 for more detail and interpretation. Unit weights for retaining structure design should be as per GDR11.2 or 1 kN/m^3 greater than the values in the table above.*

γ_{bulk} – bulk unit weight
ϕ' – effective friction angle
S_u – undrained shear strength
c'– effective cohesion
E_v – vertical elastic modulus
ν – Poisson's Ratio
k_a – coefficient of active earth pressure (Coulomb – AS4678-2002, Appendix E)
k_p – coefficient of passive earth pressure (Coulomb – AS4678-2002, Appendix E)
k_0 – coefficient of at-rest earth pressure (Jaky)

9. GEOTECHNICAL ASSESSMENT

9.1. Summary

Table 7: Summary of Geotechnical Assessment

Type	Clause	Parameter	Comment
Site Suitability	-	-	We consider the site to be geotechnically suitable for the proposed subdivision development. Standard site preparation measures will apply. However, groundwater could impact construction if it occurs during winter. Flood levels will impact site levels (refer Table 5).
Construction Methodology and Suitability	-	-	Shallow footings in accordance with AS2870-2011 will be suitable for this site. Mass retaining will be suitable for retaining however, must be designed for potential flooding of the site. Stormwater disposal via infiltration is **not** suitable.
Site Classification (AS2870)	GDR5	S	Where **no less than 0.7 m of sand** (including insitu silty sand and clayey sand layers encountered in BH03 and BH04) is present **over in situ CLAY / Sandy CLAY.**
Site Subsoil Class (AS1170.4)	-	Ce	Base of superficial formation mapped to be about 25 m below ground.
Site Preparation	GDR6	-	**GDR6.2.1 Common Measures** followed by **GDR6.2.4 Clayey Sites** followed by **GDR6.2.5 Sand Topping Layer.**
Approved Fill	GDR8	-	**Approved Fill** for this site is to comprise **Permeable Sand**. Only relatively thin surficial layers of sand at the site (excluding topsoil) are suitable as approved fill. If additional fill is required, imported **Permeable Sand** will be needed. Although not classed as 'approved fill', where clay is encountered in trench excavations, this material could possibly be reused to backfill the same portion of the trench (excluding any special fill materials required around buried elements). However, this material will be difficult to work and moisture condition to near optimum (particularly if removed from below the groundwater table).
Compaction Control	GDR7	-	A PSP may be used for compaction control on **Permeable Sand.** Deemed to comply values for 'Tamala' sand in GDR7.4 are applicable. Where filling with clay is done (in trenches, etc), compaction control must be done with the NDG as outlined in GDR7.3 Nuclear Density Gauge.
Shallow Footings	GDR9	q_{all} = 100 kPa to 250 kPa	Design tables for shallow footings are presented in Section 9.2. Estimated settlements are not considered excessive. 70% of the settlement is expected to occur during construction.
Earth Pressure Coefficients	GDR11	Table 6	Earth pressure coefficients are presented in Table 6.
Unsaturated Hydraulic Conductivity	GDR13	-	On site disposal of stormwater unlikely to be suitable due to shallow depth to clay and potential for flooding adjacent the site. Off site disposal of stormwater likely to be required.
Pavement Subgrade CBR	GDR16	CBR = 10%	Subgrade to comprise compacted **Approved Fill no less than 0.6 m thick.**
Soil Aggressivity	GDR17	-	Refer Section 9.3
Batters	GDR12	**Temporary:** Sand: 1V:2H Clay: 1V:1H **Permanent:** 1V:3H	Batter angles apply to soil units (refer Table 6) above the water table, as per GDR12.3. Dewatering and possibly retention (i.e. shoring) required below the groundwater table.
Excavations	GDR12.1	20 Ton Excavator	Potential for obstructions (buried concrete, Soakwells etc…), cemented soils and surficial pavement layers must be considered when selecting earthmoving plant.

NOTES: 1. q_{all} – *allowable bearing pressure (maximum for all footings, refer to footing tables for further details)*

9.2. Shallow Footings

Table 8: Isolated Pad Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	120	< 5
0.5	1.0	130	< 5
1.0	1.0	240	5 - 10
1.0	2.0	250	10 - 15
1.0	3.0	250	20 - 25

NOTES:
1. d_e – *minimum embedment depth (below finished ground level or floor slab)*
2. *b – Footing breadth (footings assumed approximately square)*
3. q_{all} – *allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.*
4. *s – estimated settlement (excludes shrink/swell from site class)*
5. *Refer to GDR9*
6. *Groundwater assumed to be at ground level.*

Table 9: Isolated Strip Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	100	< 5
0.5	1.0	130	5 - 10
1.0	1.0	190	10 - 15
1.0	2.0	250	20 - 25

NOTES:
1. d_e – *minimum embedment depth (below finished ground level or floor slab)*
2. *b – Footing breadth (footings assumed long relative to breadth)*
3. q_{all} – *allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.*
4. *s – estimated settlement (excludes shrink/swell from site class)*
5. *Refer to GDR9*
6. *Groundwater assumed to be at ground level.*

9.3. Soil Aggressivity

Results of aggressivity testing on clay samples is summarised in Attached Table 2. The results indicate the clay is 'non aggressive' to concrete and steel (in accordance with AS2159-2009) with a AS3600-2009 classification of 'A1'.

Based on regional experience, we anticipate the sand will have the same aggressivity classifications as the underlying clay where above the groundwater. However, for concrete in sand below the water table, an AS2159-2009 'mild' classification, and AS3600-2009 'A2' classification is appropriate.

Groundwater was not tested.

10. CLOSURE

GALT GEOTECHNICS PTY LTD

Owen Woodland CPEng
Geotechnical Engineer

Tyrone Mardesic CPEng
Geotechnical Engineer

https://galtgeo.sharepoint.com/sites/wag230750/shared documents/01 tabec si/03 correspondence/wag230750-01 002 r rev0.docx

Attached Table 1: Summary of Geotechnical Index Test Results

Test Name	Sample Depth (m)	Soil Class (AS1726 2017)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PI (%)	LS (%)
BH03	1.5 - 2.2	CLAY (CI)	89	11	0	46	28	12.5
BH04	1.0 - 1.3	Sandy CLAY (CI)	54	43	3	34	20	8.5

Notes

1. *Particle size distribution (by mass)*
   Gravel: 2.36 mm – 63 mm *Sand: 0.075 mm – 2.36 mm* *Fines: <0.075 mm*
2. *Atterberg Limits*
   LL: Liquid limit *PI: Plasticity index* *LS: Linear shrinkage*
   NO: Not obtainable *NP: Non-plastic*

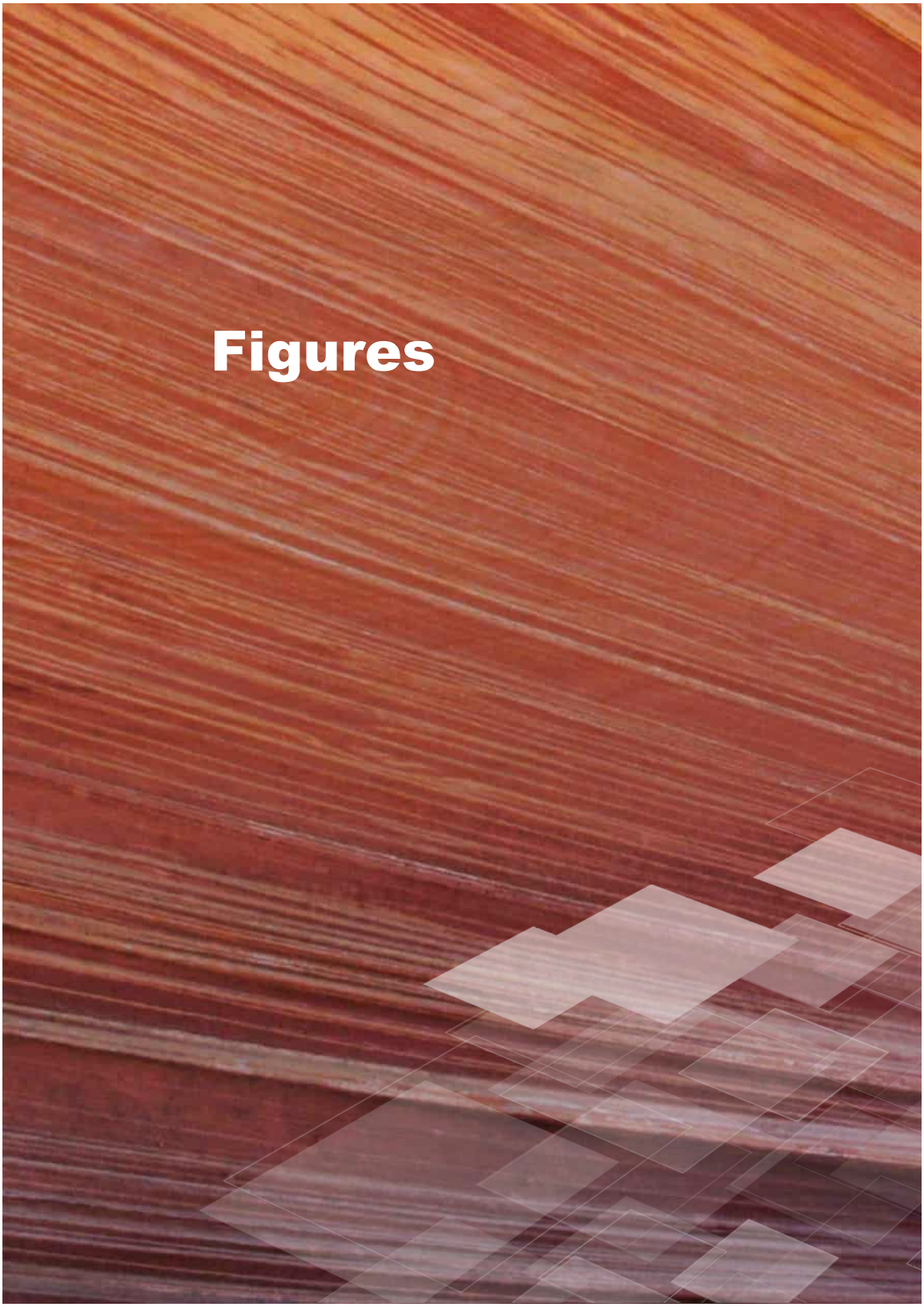
Attached Table 2: Summary of Chemical Test Results and Exposure Classification

Location	Sample Depth (m)	Soil Description	Soil Condition	pH	SO_4 (ppm)	Cl (ppm)	AS2159 Steel EC	AS2159 Concrete EC	AS3600 Concrete EC
BH03	1.5 - 2.2	CLAY (CI)	B	8.8	100	210	Non-Aggressive	Non-Aggressive	A1
BH04	1.0 - 1.3	Sandy CLAY (CI)	B	7.5	170	94	Non-Aggressive	Non-Aggressive	A1

NOTES:

1. *Soil condition*
   A – high permeability soils (sands and gravels) which are below water table. *B – Low permeability soils (silts and clays) and all soils above water table*
2. *Sulfate expressed as SO_4*
3. *Cl – Chloride*
4. *ER – Electrical Resistivity*
5. *EC – Exposure Classification*
5. *Exposure Classification for AS2159-2009 (for steel and concrete piles)*
   [Exposure Classification for AS3600-2009 (for buried concrete structures)]

Non-aggressive [A1]	*Mild [A2]*	*Moderate [B1]*	*Severe [B2]*	*Very Severe [C2]*

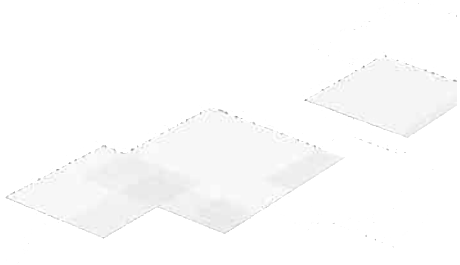

Figures

Attachment 12.1.2 Local Water Management Strategy




Appendices

Appendix A: Site Photographs



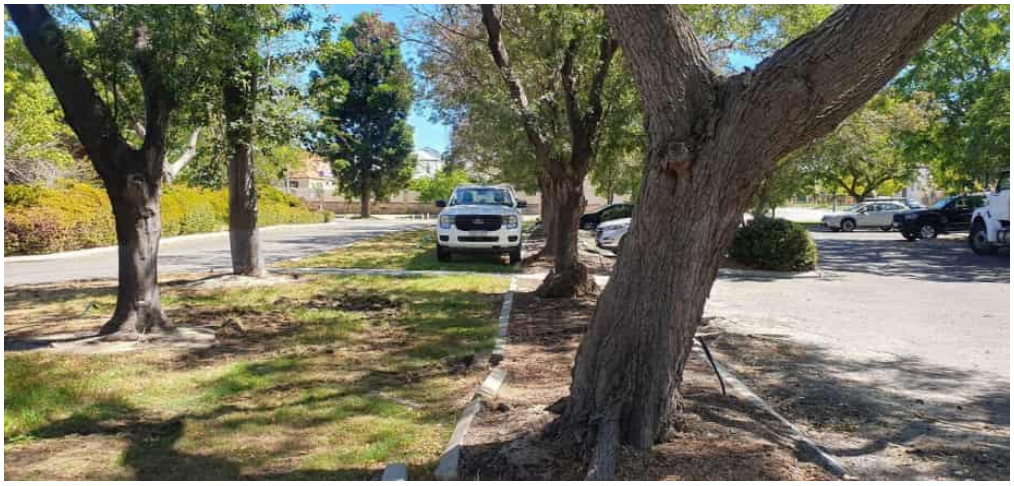
Attachment 12.1.2 Local Water Management Strategy

Photograph 1: Near CPT02 facing south



Attachment 12.1.2 Local Water Management Strategy

Photograph 2: Near CPT02 facing south west

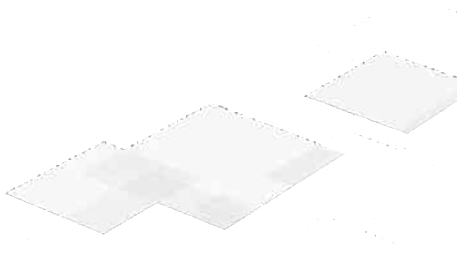


Photograph 3: Site photo from near northern portion of site



Attachment 12.1.2 Local Water Management Strategy

Appendix C: Machine Borehole and Monitoring Well Logs



Attachment 12.1.2 Local Water Management Strategy

EXPLANATORY NOTES TO BE READ WITH BOREHOLE AND TEST PIT REPORTS

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METHOD OF DRILLING OR EXCAVATION

AC	Air Core	E	Excavator	PQ3	PQ3 Core Barrel
AD/T	Auger Drilling with TC-Bit	EH	Excavator with Hammer	PT	Push Tube
AD/V	Auger Drilling with V-Bit	HA	Hand Auger	R	Ripper
AT	Air Track	HE	Hand Excavation	RR	Rock Roller
B	Bulldozer Blade	HQ3	HQ3 Core Barrel	SON	Sonic Rig
BH	Backhoe Bucket	N	Natural Exposure	SPT	Driven SPT
CT	Cable Tool	NMLC	NMLC Core Barrel	WB	Washbore
DT	Diatube	PP	Push Probe	X	Existing Excavation

SUPPORT

T	Timbering

PENETRATION EFFORT (RELATIVE TO THE EQUIPMENT USED)

VE	Very Easy	E	Easy	F	Firm
H	Hard	VH	Very Hard		

WATER

►	Water Inflow	▼	Water Level
◄	Water Loss (complete)		
◁	Water Loss (partial)		

SAMPLING AND TESTING

B	Bulk Disturbed Sample	P	Piston Sample
BLK	Block Sample	PBT	Plate Bearing Test
C	Core Sample	U	Undisturbed Push-in Sample
CBR	CBR Mould Sample		U50: 50 mm diameter
D	Small Disturbed Sample	SPT	Standard Penetration Test
ES	Environmental Soil Sample		Example: 3, 4, 5 N=9
EW	Environmental Water Sample		3,4,5: Blows per 150 mm
G	Gas Sample		N=9: Blows per 300 mm after
HP	Hand Penetrometer		150 mm seating interval
LB	Large Bulk Disturbed Sample	VS	Vane Shear; P = Peak
M	Mazier Type Sample		R = Remoulded (kPa)
MC	Moisture Content Sample	W	Water Sample

ROCK CORE RECOVERY

TCR = Total Core Recovery (%) $= \frac{CRL}{TCL} \times 100$

RQD = Rock Quality Designation (%) $= \frac{ALC>100}{TCL} \times 100$

TCL	Length of Core Run
CRL	Length of Core Recovered
ALC>100	Total Length of Axial Lengths of Core Greater than 100 mm Long

Attachment 12.1.2 Local Water Management Strategy

METHOD OF SOIL DESCRIPTION
BOREHOLE AND TEST PIT REPORTS

Galt GEOTECHNICS

GRAPHIC LOG & SOIL CLASSIFICATION SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

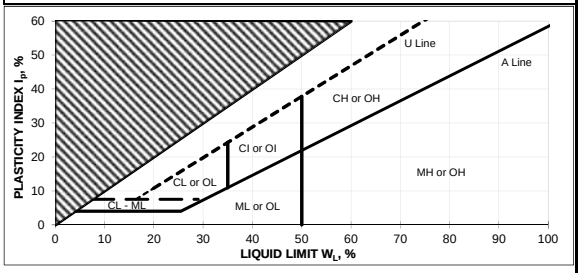
NOTE: Dual classification given for soils with a fines content between 5% and 12%.

SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).
NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name		**Particle Size (mm)**
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002

PLASTICITY - MODIFIED CASAGRANDE CHART - AS1726-2017



RESISTANCE TO EXCAVATION		
Symbol	**Term**	**Description**
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	**Term**
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	**Description**
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	**Term**	**Undrained Shear Strength (kPa)**
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	**Organic Content % of dry mass**
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	**Term**	**Density Index (%)**
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85

O:\Administration\Standard Forms and Documents\PMP17 Method of Soil Description-Rev6

Galt Form PMP17
December 2017

Attachment 12.1.2 Local Water Management Strategy

Galt

REPORT OF BOREHOLE: BH01/MW01

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

General comments: Monitoring Well Installed at this location

Drilling Method	Depth (m)	Water	Classification Code	Soil Origin	Graphic Log	Consistency/Density	Moisture	Material Description	Structural and Additional Observations	Well Diagram
90mm Solid Auger	0.3		SP	Natura			D	Natural SAND: dark brown and black, fine to coarse grained, with low plasticity clay, (trace organics present in upper 200mm).	(trace organics present in upper 200mm)	MW01
	0.45		SP	Natura		MD-D		Natural SAND: pale yellow, fine to coarse grained, trace low plasticity clay.		
	0.9		SP	Natura				Natural SAND: dark brown and black, fine to coarse grained, trace low plasticity clay.		
	1		CI	Natura		VSt-H		Natural Sandy CLAY: medium plasticity, brown and pale orange, fine grained sand, inorganic, clay is highly desiccated.	Clay is highly desiccated	
	2.3		SC	Natura				Natural Clayey SAND: low plasticity clay, brown and dark brown, fine to coarse grained, trace fine to medium sized gravel.		
	2.5		CI	Natura		VSt-H		Natural CLAY: medium plasticity, brown and pale orange, trace fine to medium grained sand, inorganic, clay is desiccated at shallower depths.	Clay is desiccated at shallower depths	
	3	▼								
	6							**BH01/MW01 Terminated at 6m (Target Depth GW @3.03m)**		

Backfill (Drill Spoil)
50mm PVC Solid
Bentonite (Sealed above Slotted PVC)
Filter Pack (Gravel Filter Medium Installed)
50mm PVC Slotted



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Attachment 12.1.2 Local Water Management Strategy

Galt

REPORT OF BOREHOLE: BH02

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
80mm Solid Auger				Natural		SP	Natural SAND: dark grey and black, fine to coarse grained, trace low plasticity clay, (trace organics present in upper 200mm).	M-D	MD-D		
			1				**BH02 refusal at 0.7m (Refusal on Desiccated Clay Groundwater not encountered)**				
			2								
			3								
			4								
			5								
			6								
			7								
			8								

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Attachment 12.1.2 Local Water Management Strategy

Galt

REPORT OF BOREHOLE: BH03

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.1	Topso		SP	Topsoil SAND: dark grey, fine to medium grained, trace medium plasticity clay, with roots / organics.	D	MD-D		
			0.25	Fill		SP	Fill SAND: brown, medium dense to dense, fine to medium grained, trace low plasticity clay.				
			0.4	Fill		GP	Fill Sandy GRAVEL: grey, medium dense to dense, fine to medium sized, fine to medium grained sand, trace low to medium plasticity clay.				
				Natura		SM	Natural Silty SAND: grey brown, fine to medium grained.				
			0.7	Natura		Cl	Natural CLAY: medium plasticity, grey, with fine to medium grained sand, inorganic, trace organics, clay is desiccated at shallow depths.		VSt-H		
			1								
			1.5	Natura		Cl	As above, brown, trace organics.				
			2								
			3								
			4	Natura		Cl	As above.	M			
			5								
			6				**BH03 Terminated at 6m (Target depth. Groundwater not encountered)**				
			7								
			8								



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Attachment 12.1.2 Local Water Management Strategy

Galt

REPORT OF BOREHOLE: BH04

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.25	Topsoil		SP	Topsoil SAND: grey, fine to medium grained, trace medium plasticity clay, trace / with organics.	D			
			0.5	Fill		SP	Fill SAND: brown, fine to medium grained, trace low plasticity clay.				
			1	Natural		SC	Natural Clayey SAND: medium plasticity clay, brown, fine to medium grained.				
			1.2	Natural		CI	Natural Sandy CLAY: medium plasticity, brown mottled red, fine to medium grained sand, trace fine to medium sized gravel, inorganic, clay is desiccated.		VSt-H		
			1.5	Natural		CI	Natural CLAY: medium plasticity, brown, with fine to medium grained sand, inorganic, clay is desiccated at shallow depths.				
			3	Natural		CI	As above.	M			
			4.5	Natural		CI	As above.	W			
			6.5				**BH04 Terminated at 6.5m (Target depth. Groundwater possibly at 4.5 m depth)**				



Page 1 of 1

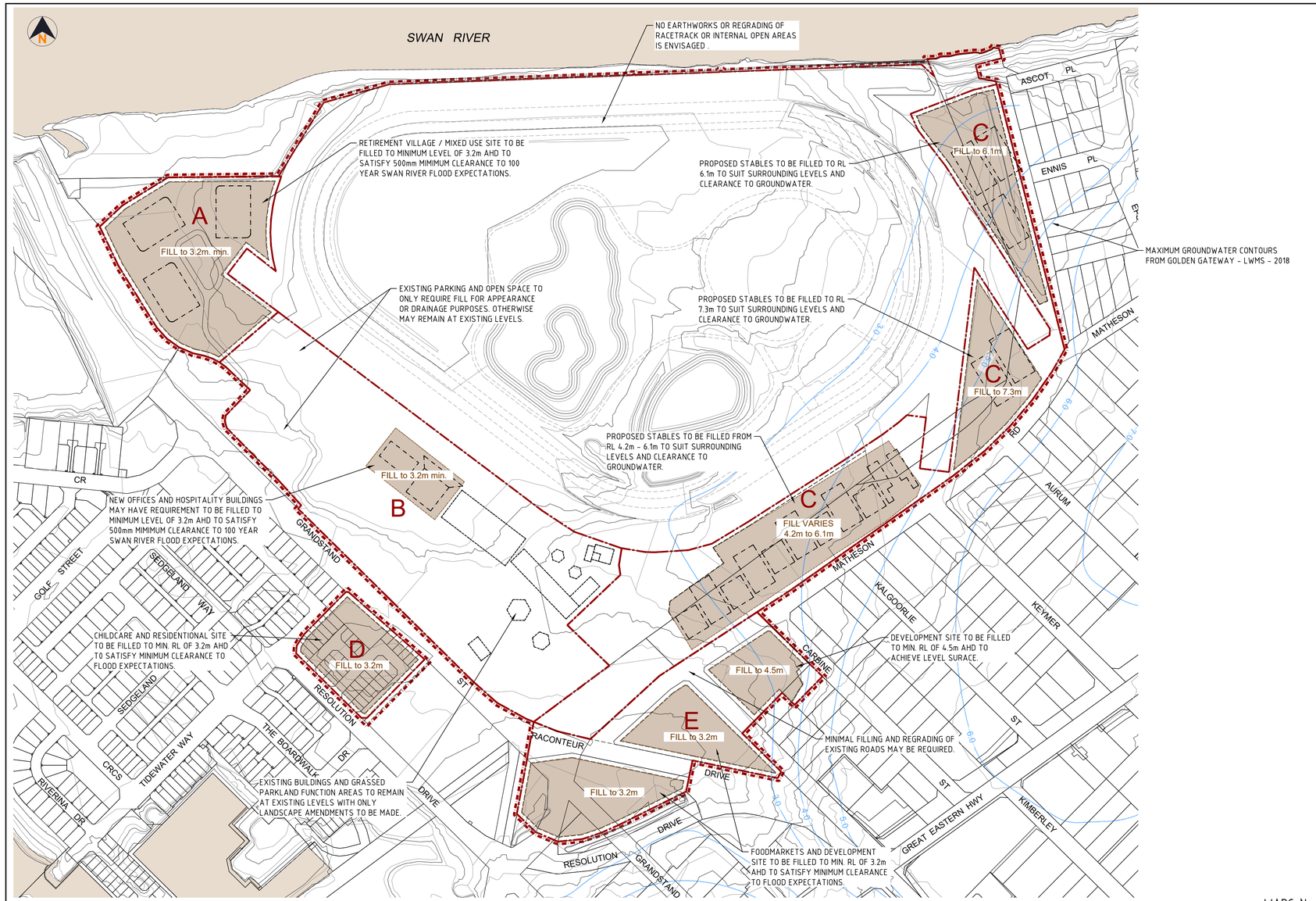
Attachment 12.1.2 Local Water Management Strategy

Appendix C

Preliminary Civil Drawing

Tabec 2024

Attachment 12.1.2 Local Water Management Strategy



WAPC No.

SCALE 1:2000 0 40 80 120

A1

No.	DATE	DRAWN	APPROVED	AMENDMENT
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PROJECT: ASCOT RACECOURSE - LOCAL STRUCTURE PLAN

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Attachment 12.1.2 Local Water Management Strategy

Appendix D

Modelling Assumption Report

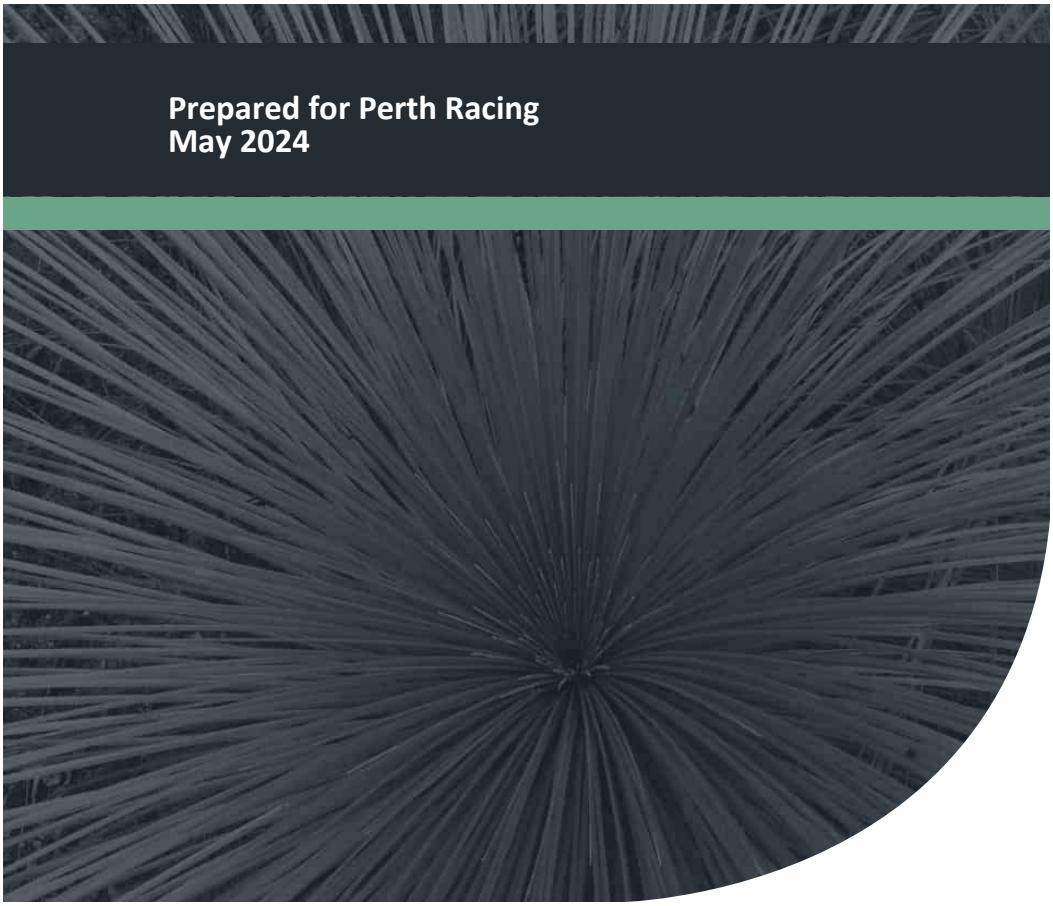
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Attachment 12.1.2 Local Water Management Strategy

Modelling Assumptions Report

Golden Gateway Local Structure Plan

Project No: EP23-109(03)



Attachment 12.1.2 Local Water Management Strategy

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Modelling Assumptions Report
Golden Gateway Local Structure Plan

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Modelling Assumptions Report
Golden Gateway Local Structure Plan

1 Background

Perth Racing (the 'proponent') proposed to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the Ascot Racecourse area. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse.

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2 Methodology

XPSWMM hydrologic and hydraulic modelling software (v21.3) was used to calculate the surface water runoff volumes within the road reserves and lots associated with the development of Ascot Racecourse.

The hydrologic component of the software uses the Laurenson non-linear runoff-routing method to simulate runoff from design storm events. Key assumptions regarding the hydrologic model include:

- Runoff is proportional to slope, area, infiltration and percentage of imperviousness of a catchment.
- Sub-catchment areas and slopes are determined from surveyed topographical data and earthworks plans.
- Infiltration rates and percentage imperviousness have been selected based on experience with model preparation for similar soil conditions.

Runoff from each sub-catchment is routed through the catchment using the hydraulic component of XPSWMM. Generally, assumptions associated with the hydraulic component of the model include:

- Virtual links (i.e. purely for model construction, not equivalent to flow path onsite) between nodes within a sub-catchment are given the length of 10 m and slope of 0.05 to minimise the lag time of conveying the water from a sub-catchment node to a 'storage' node, a 'dummy intermediate' node or a conduit/link.
- Links between sub-catchment storages act as conveyance channels (e.g. sheet flow within roads in a 1% annual exceedance probability (AEP)). These links are given lengths and slopes that are representative of the site conditions and actual pathway lengths between catchments.
- All channels are designed with a width of 5 m, roughness of 0.014 (Manning's n) and are trapezoidal in shape. This allows for easy conveyance and represents concrete pipes and road surfaces within the model.
- Where relevant median swales, bio-retention areas (BRAs), and flood storage areas (FSAs) are modelled as nodal-reservoirs with infiltration depth-rating curves to account for differential infiltration rates with changing depth.

2.1 Rainfall

The ensemble temporal patterns obtained from the Australian Rainfall and Runoff (AR&R) Data Hub (AR&R 2019) were used for the rainfall analysis.

Durations ranging between 15 min and 72 hours were tested, with the peak flood elevation being assessed as the determining result.

Following the process suggested by AR&R (Ball J et al. 2019), the highest mean duration was selected as the critical duration. AR&R also recommends that when it is not practical to run the entire ensemble array, the ensemble that produces the result closest to the mean (for the critical duration) should be adopted and provided in **Table 1**.

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Table 1: Critical Duration Analysis

Catchment	Critical Duration (20% AEP)	Critical Duration (10% AEP)	Critical Duration (1% AEP)
Precinct A	3 hour duration ensemble 4	3 hour duration ensemble 1	3 hour duration ensemble 1
Precinct C	30 min duration ensemble 6	30 min duration ensemble 7	30 min duration ensemble 8
Precinct D	1 hour duration ensemble 1	30 min duration ensemble 5	30 min duration ensemble 1
Precinct E	45 min duration ensemble 6	30 min duration ensemble 5	30 min duration ensemble 8

Attachment 12.1.2 Local Water Management Strategy

3 Pre-development model

The catchment parameters determined for Precinct D within the LWMS for the initial loss – continuous loss model have been adopted to account for catchment losses. The pre-development loss parameters used are given in **Table 2**.

Table 2: Pre-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Existing residential/Carpark	15	0.1	0.014

Catchment analysis for pre-development scenario was based on topographic contour data, site visit and aerial photography. Pre-development catchment area within Precinct D is 1.145 ha.

Attachment 12.1.2 Local Water Management Strategy

4 Post-development model

An initial loss continuing loss model was adopted to account for post-development catchment losses. The post-development catchment area, land types and loss values were based on the structure plan design, typical infiltration rates for the soils which occur onsite and based on project team experience. Post-development catchment areas and land types within the site were informed by sub-division plan provided by LPD surveyors. **Table 3** summarises the loss parameters used within the post-development model.

Table 3: Post-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Road Surface	1	0.1	0.02
Road Verge	9	1.5	0.05
Fully Impervious	1	0.1	0.02
Roof	1	0.1	0.02
Lot IMP	1	0.1	0.02
Gardens	25	2	0.05
POS	25	2	0.05
Precinct E Lots	15	0.1	0.014

A summary of post-development catchment information is provided in **Table 4** with the catchment plan and basin location shown in Figure 08 of the LWMS.

Table 4: Post-development catchment areas (ha)

Road reserve	Lots	Road Reserve	POS	Fully Impermeable	Child Care
Precinct A	0.714	0.606	1.360	0.330	-
Precinct C	-	5.903	-	-	-
Precinct D	0.526	0.421	-	-	0.199
Precinct E	3.622	0.365	0.219	-	-

The following assumptions were incorporated into the model:

- Precinct A
  - Lots will have 100% roof areas and road reserve contains 5% pervious verge and 95% impervious bitumen areas.
  - POS will be 100% pervious.
  - There is no current connection point for drainage to be exported from Precinct A.
  - 1 single basin/Flood storage area (FSA) for both treatment and flood mitigation.
  - Base of the FSA will need to be vegetated with reeds/rushes as per a biofilter.
  - FSA will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.

Attachment 12.1.2 Local Water Management Strategy

- A hydraulic conductivity of 1m/day is assumed.

- Precinct C
  - The existing portion of Precinct C already connected to the centre of the track (existing buildings and stables) and no change has been assumed.
  - Rest of the Precinct C were modelled as two separate catchments i.e., carpark and stables which are 95% impervious and 5% pervious.
  - 1m deep sub-surface storage has been designed to accommodate 1% AEP event.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.
  - The carpark in Precinct C that discharges to the southwest will discharge to Precinct E.

- Precinct D
  - Lots will have 50% roof areas, 45% paved areas and 5% pervious garden areas, the childcare has roof areas and Road reserve contains 20% pervious verge and 80% impervious bitumen areas.
  - 1m deep sub-surface storage has been designed to accommodate and detain upto 1% AEP events that will mimic pre-development flow of 0.4.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.

- Precinct E
  - The carpark in Precinct C discharges to Precinct E.
  - Outflow of pre-development Water Corporation (WC) drain is 0.95 m^3/s as per WC modelling.
  - All lots of Precinct E retain 15mm of rainfall.
  - Runoff above 15 mm rainfall up to the 1% AEP will be managed by a detention basin which will mimic pre-development 1% AEP peak flow of 0.463 m^3/s.
  - The basin will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.
  - A hydraulic conductivity of 1m/day is assumed.

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5 References

5.1 General references

The references listed below have been considered as part of preparing this document.

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M and Testoni I (Editors) 2019, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geoscience Australia).

5.2 Online references

Australian Rainfall and Runoff (AR&R) 2021, ARR Data Hub, viewed 1 December 2021, Available from: <https://data.arr-software.org/>.

Bureau of Meteorology (BoM) 2021a, Climate Data Online, viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

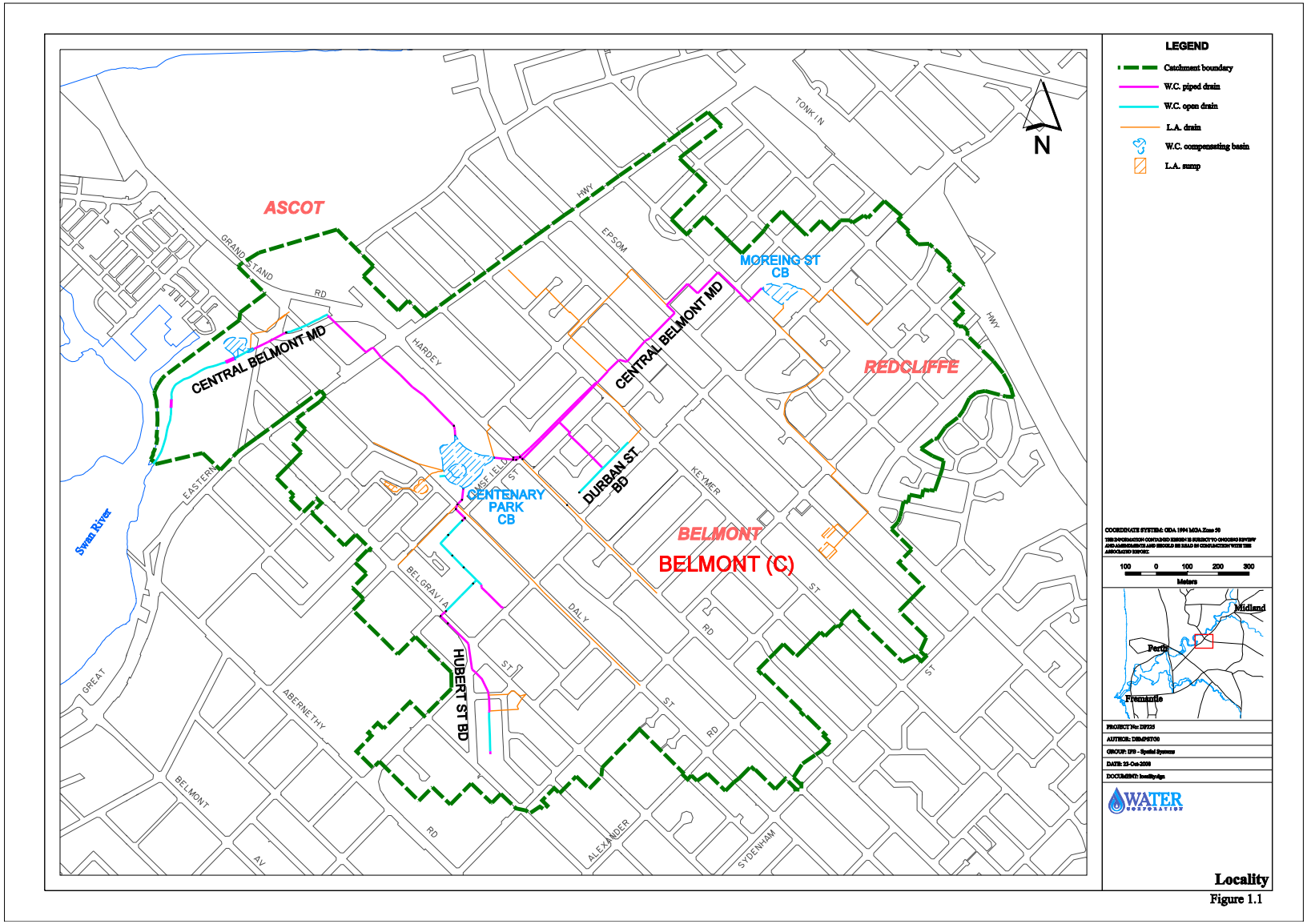
Bureau of Meteorology (BoM) 2021b, Design Rainfall Data System (2016), viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

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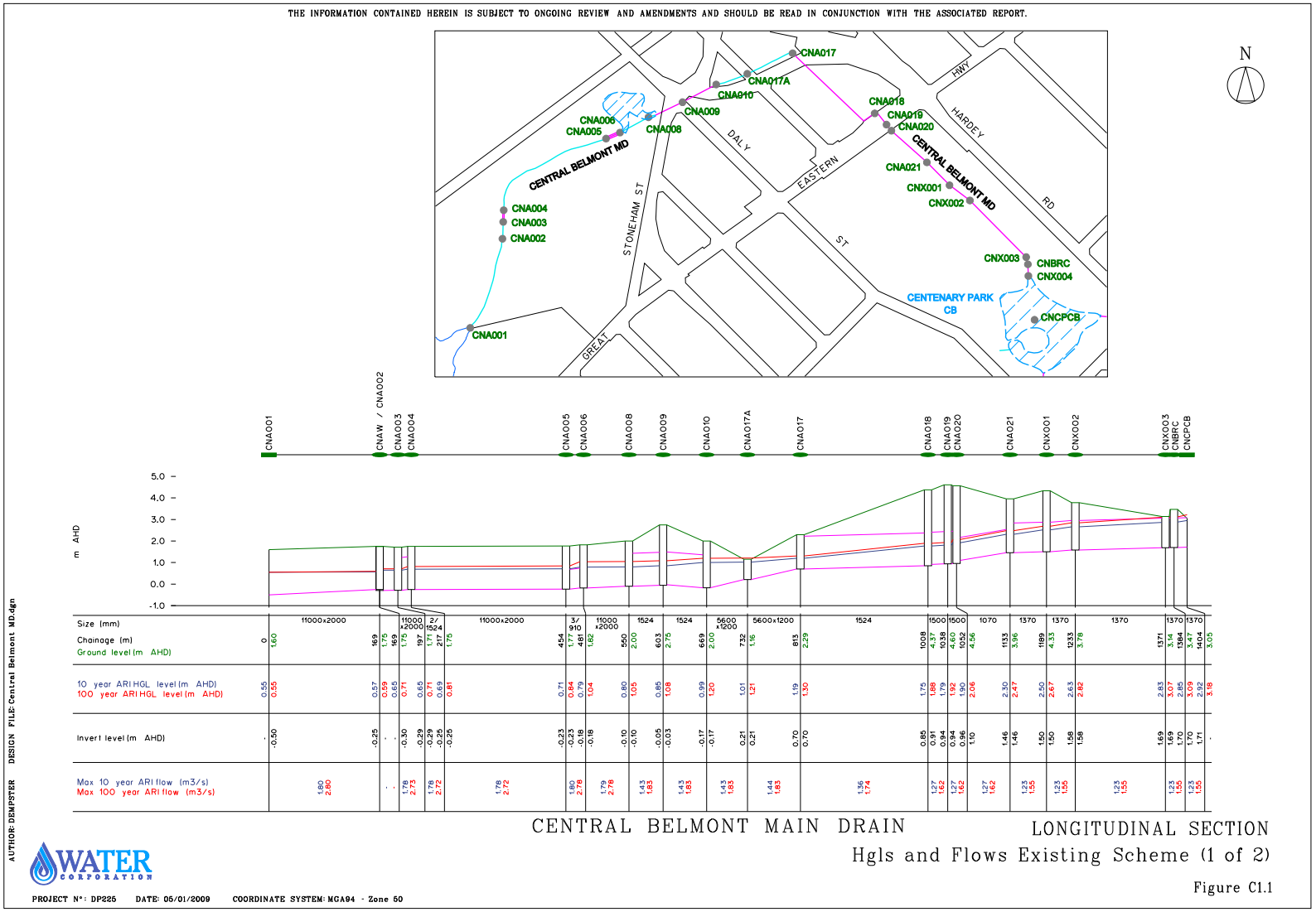
Appendix E

Central Belmont Main Drain Water Corporation

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Attachment 12.1.2 Local Water Management Strategy

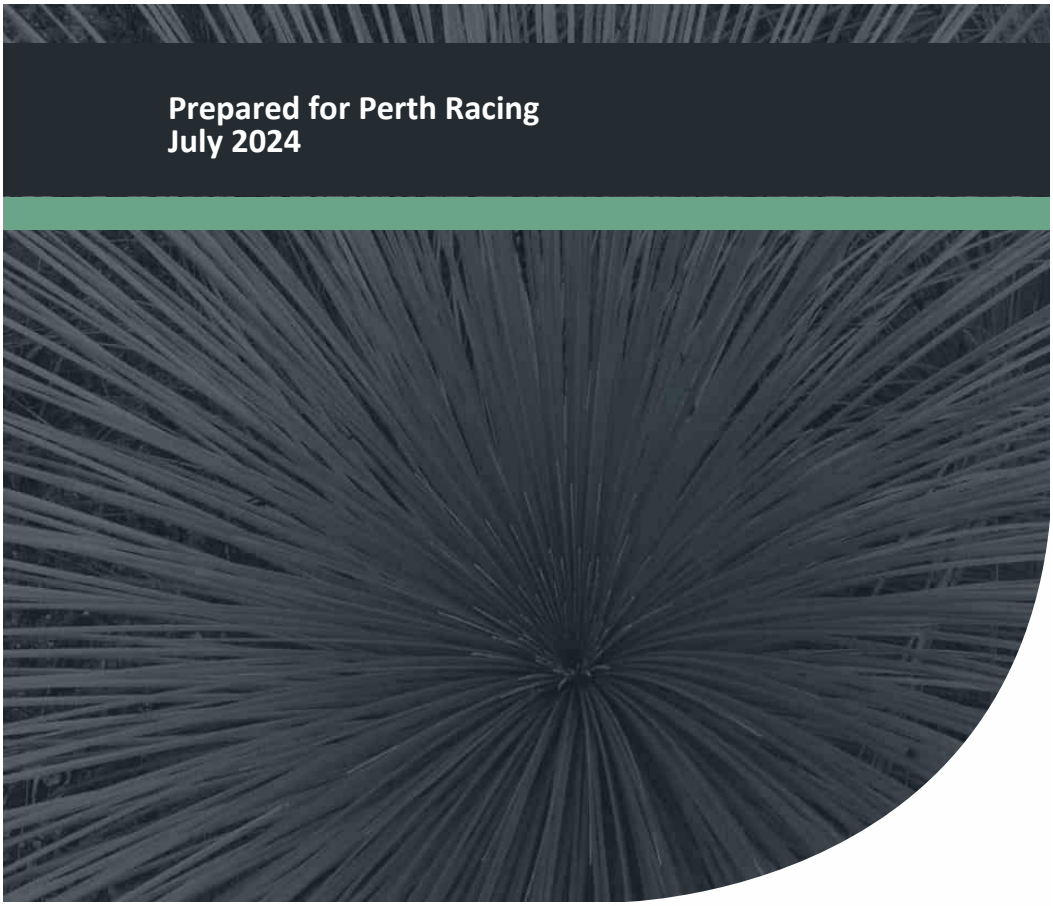


Attachment 12.1.3 Environmental Assessment Report

Environmental Assessment Report

Ascot Racecourse Structure Plan

Project No: EP23-109(05)



Attachment 12.1.3 Environmental Assessment Report

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Attachment 12.1.3 Environmental Assessment Report

Executive Summary

Perth Racing (the 'proponent') propose to progress a structure plan (SP) over an area of land in Ascot. The area is bounded by the Swan River to the north, Grandstand Road to the west and south, Matherson Road to the south and existing residential areas to the east, and is referred to herein as 'the site'. The site includes the Ascot Racecourse area. The site is located approximately 8.5km east of Perth central business district (CBD) and is approximately 62 ha in size, within the City of Belmont (CoB). The SP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse. The proponent additionally intends to progress a local planning scheme amendment for the site in parallel with the structure plan process.

The site is currently zoned 'Urban', 'Parks and Recreational', and 'Private Recreation' under the Metropolitan Regional Scheme (MRS). Under the Local Planning Scheme No. 15 (LPS 15), the site is currently zoned as 'Place of Public Assembly' and 'Mixed Use'. A small portion of the site is 'Parks and Recreation: water supply sewerage and drainage'.

This Environmental Assessment Report (EAR) supports the SP and is the principal supporting environmental document for the scheme amendment and SP process for the site. It includes a preliminary assessment of the proposed SP land uses, future management considerations and associated predicted environmental outcomes, against the applicable environmental factors as defined by the Environmental Protection Authority (EPA) policy framework.

The proponent has taken a range of measures to provide for the accommodation of environmental values within the Ascot SP. This is primarily achieved through the strategic location of public open space (POS) in the northern area of the site to retain intact native vegetation, as well as retention of existing wetland features located centrally within the site.

In this context, the SP has considered the identified environmental values within the site, including the proposed future retention of:

- Subtropical and temperate coastal saltmarsh TEC/PEC
- Native vegetation
- Fauna habitat.

As part of the future development process, considerations, approvals and management plans are likely to be necessary for individual proponents of development proposals within the Ascott SP, which would further minimise environmental impacts that have the potential to arise through development in accordance with the SP. The management framework and relevant considerations are summarised in **Table 1**.

Attachment 12.1.3 Environmental Assessment Report

Table 1: Summary of environmental management framework and relevant considerations

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision and/or Development	Construction
Flora and Vegetation	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Native Vegetation Clearing permit pursuant to Part V of the EP Act if clearing is required within the SP area and clearing is not exempt. • Preparation of a Conservation and Environment Management Plan (CEMP), where required.	Clearing Permit and compliance with approval conditions and management plans, in accordance with the EP Act.
Terrestrial Fauna	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Potential impacts to MNES (listed black cockatoo species) in relation to the EPBC Act and the need to consider referral in accordance with the *Matters of National Environmental Significance Significant Impact Guidelines* (DotE 2013). • Preparation of a fauna management plan, where required, to minimise impacts to fauna through the clearing and construction works.	Compliance with approval conditions and management plans, in accordance with the EP Act and EPBC Act, where required.
Acid Sulfate Soils	Environmental Assessment Report including preliminary investigations.	• Detailed ASS Investigation and Management Plan for intrusive works in areas mapped as 'Class 1: High to moderate risk' will likely be required in accordance with the WAPC's *Acid Sulfate Soils Planning Guidelines* (2008).	Implementation of ASS Management Plan.
Inland Waters	The LWMS prepared for the SP by Emerge Associates (2024b) (**Appendix E**).	• Detailed UWMPs will be required (most relevant to Precinct D) to support individual subdivision applications. Other precincts may be developed under Development Approval and therefore water management will likely be documented through Stormwater Management Plans (SMs). Both UWMPs and SMPs will be prepared in accordance with the *Better Urban Water Management* Framework. • Protection of the Swan River and associated Conservation Category Wetland (CCW) through consideration of hydrological processes and water quality management into design of future development areas to protect the adjacent Swan River and associated values. • Development Control Area (DCA) permit application for works within or affecting the DCA to the DBCA in accordance with the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007*.	Compliance with UWMP/SMP and DCA permit if necessary.

Attachment 12.1.3 Environmental Assessment Report

Table 1: Summary of environmental management framework and relevant considerations (continued)

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision	Construction
Social Surroundings	Preliminary investigations for Aboriginal Cultural Heritage. Transport Noise Assessment for the proposed SP (Lloyd George Acoustics 2023) in accordance with SPP 5.4.	• Detailed Acoustic Assessment and Management Plan (where required) or 'Quiet House Package A' implemented to upper floors of noise sensitive dwellings within Precinct E.	Section 18 approval may be required pursuant to the *Aboriginal Heritage Act 1972* prior to ground disturbing works. Compliance with noise management plan and appropriate house packages applied where appropriate.

Overall, a range of environmental impact mitigation measures (primarily impact avoidance and minimisation) are proposed within the SP layout and through the future environmental management framework. In this context, it is anticipated that implementation of the proposed SP can be suitably managed through future stages of the land use planning processes (including development) such that the EPA objectives for the relevant environmental factors can be achieved.

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Appendix A

Ascot Racecourse Structure Plan (ROWE Group Design, 2024)

Appendix B

Ascot Racecourse Precinct Plan (ROWE Group Design, 2024)

Appendix C

Draft Master Plan Concept (ROWE Group Design, 2024)

Appendix D

Flora, Vegetation and Fauna Assessment (Emerge Associates 2024a)

Appendix E

Local Water Management Strategy (Emerge Associates 2024b)

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
CoB	City of Belmont
DEC	Department of Environment and Conservation (now DER)
DEP	Department of Environmental Protection (now DER)
DER	Department of Environment Regulation
DFES	Department of Fire and Emergency Services
DoE	Department of Environment (now DER)
DoW	Department of Water
DPLH	Department of Planning, Lands and Heritage
EPA	Environmental Protection Authority
WAPC	Western Australia Planning Commission

Table A2: Abbreviations – General terms

General terms	
AHEF	Aboriginal Heritage Enquiry Form
BPA	Bushfire prone area
CBD	Central Business District
CCW	Conservation category wetland
EAR	Environmental Assessment Report
ESA	Environmentally sensitive area
MUW	Multiple use wetland
PEC	Priority ecological community
P3	Priority 3
REW	Resource enhancement wetland
SP	Structure Plan
SPP	State Planning Policy
T	Threatened
TEC	Threatened ecological community
UFI	Unique feature identifier

Attachment 12.1.3 Environmental Assessment Report

Table A3: Abbreviations –Legislation

Legislation	
AH Act	*Aboriginal Heritage Act 1972*
BAM Act	*Biosecurity and Agriculture Management Act 2007*
CS Act	*Contaminated Sites Act 2003*
EP Act	*Environmental Protection Act 1986*
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*

Table A4: Abbreviations – units of measurement

Units of measurement	
ha	Hectare
m	Metre
m AHD	m in relation to the Australian height datum
mBNS	m below natural surface

Attachment 12.1.3 Environmental Assessment Report

1 Introduction

1.1 Background

Perth Racing (the proponent) proposes to progress a structure plan (SP) over an area of land in Ascot to support and guide future development (the Ascot SP; referred to herein as 'the SP'). The SP area includes the existing Ascot Racecourse and is bounded by the Swan River to the north, Grandstand Road to the west and south, Matherson Road to the south and existing residential areas to the east (referred to herein as 'the site'; see **Figure 1**). The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within the City of Belmont (CoB). The SP layout is shown in **Appendix A** and consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse, as demonstrated below on **Plate 1**, **Figure 1**, and provided in **Appendix B**.

The proponent additionally intends to progress a local planning scheme amendment as well as the structure planning process in parallel for the site. The site is currently zoned 'Urban', 'Parks and Recreation', and 'Private recreation' under the Metropolitan Regional Scheme (MRS). Under the Local Planning Scheme No. 15 (LPS 15), the site is currently zoned as 'Place of Public Assembly' and 'Mixed Use'.

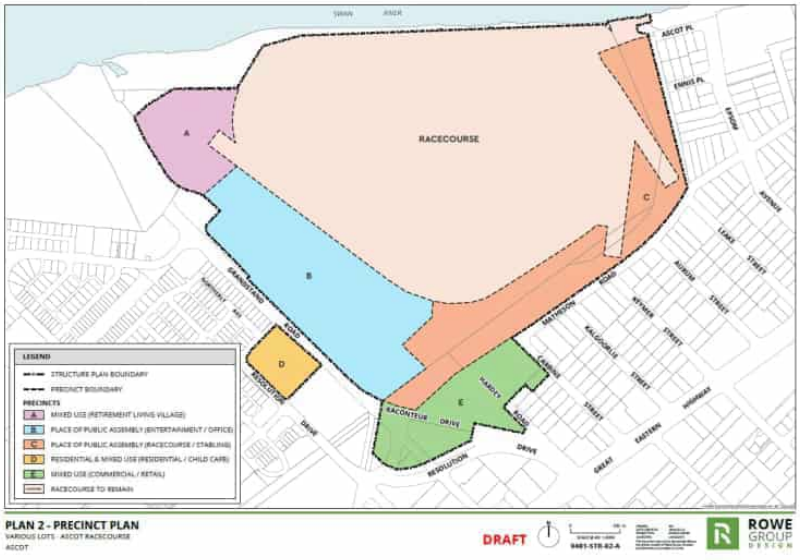


Plate 1: Ascot Racecourse Precinct Plan with proposed uses (draft)

Attachment 12.1.3 Environmental Assessment Report

1.2 Purpose of this report

The proponent engaged Emerge Associates (Emerge) to prepare an Environmental Assessment Report (EAR), with the intent to be the principal supporting environmental document for the local scheme amendment and SP process for the site. The EAR supports the structure planning process and provides a synthesis of information regarding the environmental values and attributes of the site. The EAR is consistent with the Western Australia Planning Commission's (WAPC) *Structure Plan Framework* (WAPC 2015) and:

- Identifies and assesses the existing environmental values and attributes of the site (**Section 2**).
- Discusses the land use planning context and the proposed SP, in the context of applicable statutory requirements under applicable legislation (**Section 3**).
- Provides an assessment of the proposed SP layout and land uses and predicted environmental outcomes against the applicable Environmental Protection Authority (EPA) environmental factors and objectives (**Section 4**).

1.3 Previous surveys and assessments

The following surveys, investigations and assessment reports were prepared to support preparation of the SP and are relevant to this EAR:

- Reconnaissance Flora, Vegetation, Fauna and Targeted Black Cockatoo Habitat Assessment (Emerge 2024a) (Appendix D)
- Ascot Racecourse Local Water Management Strategy (Emerge 2024b) (Appendix E)
- Transport Noise Assessment (Lloyd George Acoustics 2023).

An Environmental Report was prepared for the Draft Golden Gateway Local Structure Plan (LSP) in 2018 by Essential Environmental for the CoB (Essential Environmental 2018). The Draft Golden Gateway LSP is located immediately south of the site and is being progressed but has not been finalised. The Golden Gateway LSP no longer includes the site, and this SP is proposed to progress on Perth Racings landholdings exclusively. A review of the Golden Gateway LSP was undertaken as part of the preparation of this report to understand background information and context for the proposed SP.

The Draft Golden Gateway LSP provides contextual information for the proposed SP due to the proximity, and specifically through the following documents:

- Golden Gateway Bushfire Management Plan (Urbaqua 2018)
- Golden Gateway Local Structure Plan Environmental Report (Essential Environmental 2018)
- Golden Gateway Local Water Management Strategy (Essential Environmental 2018).

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2 Existing Environment

The outcomes of desktop and site-specific investigations undertaken by Emerge and others have informed the identification and assessment of the existing environmental attributes and values within the site and are discussed in the below **Section 2.1** to **Section 2.8**.

The Environmental Protection Authority (EPA) identifies a number of environmental principles, factors and objectives within the *Statement of Environmental Principles, Factors and Objectives* (EPA 2018), which are used to guide the determination of significant environmental impacts and whether impacts can be appropriately mitigated or managed. Existing environmental values have been described according to the applicable EPA environmental factor (where applicable to the site), which include:

- Landforms
- Terrestrial environmental quality
- Flora and vegetation
- Terrestrial fauna
- Inland waters
- Social surroundings.

2.1 Landforms

2.1.1 Landform, soils and geology

The site occurs on the Swan Coastal Plain, the geomorphic unit that characterises much of the Perth metropolitan area. The site is within the Pinjarra System with a portion of the site within the Bassendean System. The Pinjarra System is described as *poorly drained coastal plain with variable alluvial and aeolian soils*, whilst the older Bassendean Dune system is characterised by lower relief, with variable depth to groundwater, consisting of lower sandy hills interspersed with permanent and seasonal wetlands (Churchward and McArthur 1980; Gozzard 2011).

Geological Survey of Western Australia (Gozzard 2007) indicates that the site lies within the Swan River Terraces system having Guildford formation of Alluvial and leached yellow sand. As shown on **Figure 2**, the site soil types include:

- **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.
- **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some some fine to medium sand, soft when moist, variable clay content.
- **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin.

2.1.2 Topography

The site is generally flat with a slightly higher elevation in its eastern extent. The northern portion of the site, adjacent to the Swan River, lies at 0 m Australian Height Datum (mAHD). The remainder of the site is slightly elevated, ranging from 1 mAHD to the northwest to 7 mAHD to the east.

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The topographic contours of the site are shown on **Figure 3**.

2.2 Terrestrial Environmental Quality

2.2.1 Acid sulfate soils

Acid sulfate soils (ASS) refers to naturally occurring soils and sediment containing iron sulphide (iron pyrite) materials. In their natural state, present in waterlogged and/or anoxic conditions, ASS generally do not present any risk to the environment. However, when oxidised, ASS can pose issues through sulphuric acid production, which can present a range of risks for the surrounding environment, infrastructure, and human health.

The Department of Water and Environmental Regulation (DWER) provides broad-scale mapping indicating areas of potential ASS risk (DWER 2023). A review of the DWER mapping indicates that the majority of the site is considered to have 'high to moderate' risk of ASS occurrence and a small portion in the south is considered to have 'moderate to low' risk of ASS occurring within the 3 m of the natural surface.

The DWER ASS risk mapping is shown on **Figure 4**.

2.2.2 Potential site contamination

A review of the publicly available DWER Contaminated Sites Database indicates that no areas within the site are registered as a 'contaminated site' pursuant to the *Contaminated Sites Act 2003*. A basic summary of records (BSR) of Lot 9002 on DP60342 was requested from DWER which shows that Lot 9002 (including the racecourse, Precinct A and Precinct B) is classified as "possibly contaminated – investigation required" and the extent of which is shown on **Figure 4**Figure 4. The contamination is associated with the sites historical land use for horse racing and runoff from animal storage on the site and agistment in the surrounding areas causing the potential for contamination, including nutrient runoff. Monitoring and investigation is required to be reviewed by DWER and potentially re-classified and the proponent has commenced investigations to address this. The BSR notes that if groundwater is to be abstracted, analytical testing should be undertaken to determine if groundwater is suitable for its intended use.

2.2.3 Historical context

Historical aerial images available from 1953 and onwards (Landgate 2023) were reviewed and show that Ascot Racecourse has existed since prior to 1953 (**Plate 2**) and the associated racecourse infrastructure, including grandstands and stables were established between 1953 and 1977. Residential development to the south east of the site steadily increased between 1953 to 1995 and majority of residential development to the south west occurred between 1995 and 2005 (see **Plate 2** to **Plate 4**).

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Plate 2: 1953 aerial (Landgate 2023)



Plate 3: 2005 aerial (Landgate 2023)

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Plate 4: 2024 aerial (Landgate 2023)

2.3 Flora and Vegetation

2.3.1 Regional Context

Native vegetation within the site can be classified based on regional vegetation mapping. Heddle *et al.* (1980) mapping shows the site as comprising the 'Guildford' complex , which is described as 'open forest to tall open forest and woodland'. The site is within 'Bassendean association 1009',typically comprising a combination of *Corymbia calophylla*, *Eucalyptus wandoo* and *Eucalyptus marginata (DPIRD 2021).* This association was determined to have 16.4% remaining of its original pre-European extent within the Swan Coastal Plain, of which 0.02% is protected for conservation purposes (Government of Western Australia 2019).

The EPA's *Environmental Guidance for Planning and Development Studies* (EPA 2008) states that the loss of biodiversity caused by habitat fragmentation is significantly greater once a habitat type falls below 30% of its original extent. The Guidance also references the biodiversity conservation national objective and target of retaining 30% of the original extent of each vegetation association, and the states' minimum target of 10% for constrained urban areas such as the Swan Coastal Plain. The percentage remaining of the Bassendean vegetation association (16.4%) is below the 30% retention objective but above the 10% minimum retention target for the Swan Coastal Plain.

Vegetation is typically considered to represent an intact occurrence of its overarching vegetation complex when it is in 'good' or better condition. As outlined in **Section 2.3.4**, vegetation in some portions of the site has been assessed to be in 'good' or 'very good' condition; therefore, this indicates that these areas of remnant native vegetation within the site, is consistent with vegetation associations of the 'Guildford' formation.

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2.3.2 Site-specific investigations

Emerge completed a reconnaissance flora and vegetation survey for the site on 27 March 2023 in accordance with EPA's *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016; Emerge Associates 2024a). The survey boundary incorporated the entire site.

The survey included traversing the site on foot and recording composition and condition of vegetation. Photographs were taken during the survey to show particular site conditions. Prior to the field survey, information on the habitat preferences of threatened and priority flora species and communities were reviewed. Areas of potentially suitable habitat for threatened and priority flora species were opportunistically traversed along transects and searched for conservation significant species, as required.

The findings of the survey and the associated assessment report (Emerge Associates 2024a) is summarized below and is contained within **Appendix D.**

2.3.3 Vegetation units

Four vegetation units were identified within the site during the field survey and descriptions of each is provided below in **Table 2**. The associated vegetation mapping is shown in **Figure 5.**

Table 2: Description and extent of vegetation type identified within the site

Vegetation Community	Description	Area (ha)
Er	Woodland *Corymbia calophylla* over closed grass/forbland of pasture weeds and scattered native species (or absent).	1.12
Cc	Woodland *Eucalyptus rudis* over closed grass/forbland of pasture weeds and scattered native species (or absent)..	0.28
ErJkSt	Open woodland Eucalyptus rudis and occasional Melaleuca raphiophylla over sedgeland Juncus kraussii and Schoenoplectus tabernaemontani over low shrubland Suaeda australis over forbland Apium prostratum subsp. prostratum var. prostratum and Heliotropium curassavicum over grassland *Avena sp., Cynodon dactylon and * Paspalum vaginatum (or absent).	0.17
To	Fringing rushland of *Typha orientalis*, with occasional planted native and non-native trees, shrubs and/or non-woody vegetation, over closed grass/forbland of pasture weeds.	0.46
Non-native	Heavily disturbed areas comprising bare ground and weeds with occasional native trees and forbs and/or sealed ground and buildings.	56.62

2.3.4 Vegetation condition

The majority of the site was heavily disturbed with limited intact native vegetation present. The vegetation was therefore mostly determined to be in 'degraded – completely degraded' and 'completely degraded' condition with a small portion determined to be 'very good – good'. Vegetation condition is shown in **Figure 6** and detailed below in **Table 3**.

Table 3: Vegetation condition categories within the site

Condition category (Keighery (1994))	Size (ha)
Pristine	0
Excellent	0
Very good	0
Good – very good	0.07
Good	0
Degraded	1.04
Degraded – completely degraded	0.98
Completely degraded	56.57

2.3.5 Threatened and Priority Ecological Communities

Threatened Ecological Communities (TECs) are recognised as ecological communities that are rare or under threat and therefore warrant special protection.

At a Commonwealth level, TECs are afforded statutory protection under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and at a State level, TECs are afforded statutory protection under the *Biodiversity Conservation Act 2016* (BC Act). Under both Acts, TECs are listed as either 'critically endangered', 'endangered' or 'vulnerable', noting listing status may be different between Commonwealth and State frameworks.

Ecological communities that are not listed as threatened, but are otherwise considered rare or under threat, may be added to the Department of Biodiversity, Conservation and Attractions (DBCA) priority list (DBCA 2022, 2023). PECs are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority 4' (P4). Whilst PECs are not afforded statutory protection under the BC Act, they are recognised and categorised by the DBCA and are considered through State environmental approval processes.

The 'subtropical and temperate coastal saltmarsh' ecological community is listed as a TEC ('vulnerable') under the EPBC Act and as a PEC (P3) under the BC Act. The TEC/PEC was identified within a portion of the ErJkSt vegetation unit, located in a small part of the site to the north (**Figure 7**). A total of 0.07 ha of this TEC/PEC was mapped within the site. Only part of the ErJkSt vegetation unit represents the TEC/PEC with the remaining ErJkSt vegetation unit representing canopy overhang into the site with limited to no understory vegetation, which is not characteristic of the TEC/PEC.

2.3.6 Conservation significant flora

Flora species that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth and State level, flora species may be listed as 'threatened' pursuant to the EPBC Act and BC Act. However, listing status may be different between Commonwealth and State levels. Flora species that are not listed as threatened, but are otherwise considered rare or under threat, may be added to the DBCA priority list (DBCA 2022, 2023). Priority flora are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority

4' (P4). Whilst priority flora are not afforded statutory protection under the BC Act, they are recognised and categorised by the DBCA and are considered through approval processes.

The desktop search results identified a total of 100 flora species including 25 threatened and 75 priority flora species as occurring or potentially occurring within a 9 km radius of the site. Of these, two priority flora species (*Angianthus micropodioides* (P3) and *Aponogeton hexatepalus* (P4)) were considered to have 'high' or 'moderate' likelihood of occurrence within the site (Emerge Associates 2024a).

No threatened or priority flora species were recorded during the survey and suitable habitat for threatened or priority species was not considered to be present (Emerge Associates 2024a). The two threatened and priority flora species identified in the desktop assessment were not considered likely to occur due to lack of suitable habitat.

2.3.7 Weeds

The term 'weed' can refer to any plant that requires some form of action to reduce its effect on the economy, the environment, human health and amenity. At a State level, a particularly invasive or detrimental weed species may be listed as a 'declared pest' pursuant to the *Biosecurity and Agriculture Management Act 2007* (BAM Act), indicating that it warrants special management to limit its spread. At a Commonwealth level, the Australian government has compiled a list of 32 Weeds of National Significance (WoNS) (DoEE 2019c).

A total of 58 weed species were recorded during the field survey. One weed species recorded, (**Tamarix aphylla* (athel pine)), is listed as a declared pest. Athel pine is listed in the exempt keeping category, meaning management is not obliged.

2.3.8 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are prescribed protection under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and have been identified to protect native vegetation values of areas surrounding significant, threatened or scheduled flora, vegetation communities or ecosystems.

Within an ESA, no exemptions under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* apply and would indicate that the site is likely to support significant environmental values. However, exemptions under Schedule 6 of the *Environmental Protection Act 1986* (EP Act) apply, including any clearing in accordance with a subdivision approval under the *Planning and Development Act 2005* (a recognised exemption under the Schedule 6 of the *Environmental Protection Act 1986*).

The Swan River, located adjacent to the site, is also considered a "Conservation Category Wetland" and as such, a portion of the site (3.4 ha) is listed as an ESA (**Figure 8**).

A total of 1.10 ha of vegetation meeting the definition of 'native vegetation' pursuant to the EP Act occurs within the site, as shown in **Figure 7**. This is comprised of scattered flooded gum (*Eucalyptus rudis*) and marri (*Corymbia calophylla*) trees, and fringing vegetation (vegetation type ErJkSt).

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2.3.9 Bush Forever

The Government of Western Australia's *Bush Forever Policy* (Government of WA 2000) is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The objective of Bush Forever is to protect comprehensive representations of all original vegetation complexes by targeting a minimum of 10% of each for protection. Bush Forever areas represent regional ecosystems and habitat and have a vital role in conserving Perth's biodiversity.

No Bush Forever Sites occur within the site. The closest Bush Forever Site is Bush Forever Site 313 – Swan River Saltmarshes, Bayswater/Maylands, located approximately 100 m to the northwest of the site, separated by Grandstand and Garrett Road (see **Figure 8**).

2.3.10 Ecological linkages

Ecological linkages are linear landscape elements that allow the movement of fauna, flora and genetic material between areas of remnant habitat. The Perth Biodiversity Project, supported by the Western Australian Local Government Association have identified and mapped regional ecological linkages within the Perth Metropolitan Region (WALGA and PBP 2004). While the linkages generally align with areas of vegetation and Bush Forever areas, in many locations these linkages are not contiguous with vegetation coverage.

Ecological linkage ID 35 (Swan River) partially overlaps the northern portion of the site. However, most of the northern portion of the site does not support native vegetation due to historical clearing, and only a small portion remains within the northeast of the site.

Broadscale identified ecological linkages are shown in **Figure 8**.

2.3.11 City of Belmont Collective Local Biodiversity Strategy

In partnership with Town of Bassendean and City of Bayswater, the CoB developed a collective Local Biodiversity Strategy (LBS) as a commitment to the protection and enhancement of a network of local natural areas (LNAs).

LNAs across the three councils were ranked by viability using the Natural Area Initial Assessment templates detailed in the Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (WALGA, 2004). The viability assessment was used to determine the reserves of high biodiversity value that would benefit from increased protection status. The highest viability areas within the CoB were as follows:

- Goodwood Parade Estuarine Dampland
- Signall Hill
- Tomato Lakes Bushland.

No reserves deemed to have high biodiversity value, as outlined in the LBS, were identified as occurring within the site. As such, no LNAs need to be considered as part of future development within the site.

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2.4 Terrestrial Fauna

2.4.1 Site-specific surveys and investigations

In conjunction with the flora and vegetation assessment, Emerge Associates undertook a basic fauna and targeted black cockatoo survey, and the assessment boundary encompassed the entire site. The targeted black cockatoo survey extended beyond the SP area, and three potential habitat trees located adjacent to the site were identified outside the SP area. These trees are located beyond the SP area however the location of the trees are shown in Figure 7 of **Appendix D**.

Transects were traversed across the site, during the day, and the characteristics of fauna habitat and presence of fauna species was recorded. Microhabitats such as logs, rocks and leaf litter were investigated and evidence of species presence such as tracks, scats, skeletal remains, foraging evidence or calls was also noted. An opportunistic fauna species list was compiled and fauna habitat values were described, with particular reference to conservation significant fauna species that have the potential to occur within the site.

The findings of the survey and the associated assessment report (Emerge Associates 2024a) is summarised below and contained within **Appendix D.**

2.4.2 Fauna habitat

Emerge (2024) identified four habitat types within the site with most of the site (52.64 ha) described as 'cleared' (see **Table 4**). Habitat values in the site are limited by historical disturbance and are primarily suited to widespread fauna species with non-specific habitat requirements.

The fringing woodland fauna habitat, associated with the **ErJkSt** vegetation unit, was noted to provide a cover of native trees and understory cover of riparian vegetation that offers habitat for ground dwelling fauna. The fringing woodland is associated with the Swan River and extends into the northeast of the site. The scattered trees and shrubs habitat type comprised of large native trees was associated with vegetation units **Cc** and **Er** would provide value to native birds and other arboreal fauna (see **Figure 5**).

Table 4: Fauna habitats identified within the site

Fauna habitat	Description	Area (ha)
Fringing woodland	Native fringing vegetation consisting of a native tree overstorey and an understorey of sedges/rushes.	0.07
Wetland	Wetland waterbodies and associated riparian sedgeland/rushland.	3.72
Scattered trees and shrubs	Scattered native and non-native trees and shrubs, providing habitat mainly for avifauna.	5.45
Cleared	Predominantly grassy weeds, bare ground and built form.	52.64

Twenty-four fauna species were recorded within the site including two conservation significant fauna species.

2.4.3 Conservation significant fauna

Fauna species that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth and State level, fauna species may be listed as 'threatened' pursuant to the EPBC Act and BC Act, respectively. However, listing status may be different between Commonwealth and State levels. Fauna species that are not listed as threatened, but are otherwise considered rare or under threat, may be added to the DBCA priority list (DBCA 2022, 2023). Priority fauna are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority 4' (P4). Whilst priority fauna are not afforded statutory protection under the BC Act, they are recognised and categorised by the DBCA and are considered through environmental approval processes.

A total of 77 conservation significant fauna species were identified as occurring or potentially occurring within a 10 km radius of the site (Emerge Associates 2024a). Of these, 11 species were considered to have a 'moderate' or 'high' likelihood of occurrence within the site, including six migratory and/or specifically protected bird species, two threatened bird species, one priority bird species and two priority mammal species **Table 5**.

The field survey confirmed the 11 species identified from the desktop assessment have the potential to occur within the site. Based on observations of fauna habitat for migratory species, it was noted that occurrences of migratory species within the site are likely to be a flyover or for marginal foraging habitat due to the site and surrounding area lacking suitable habitat.

Rakali may utilise the Swan River and are likely to occasionally occur in the northern most portion of the site associated with the fringing woodland habitat type. Quenda may occur in understorey vegetation or where grasses provide dense cover.

One threatened species, *Zanda banksii naso* (forest red-tailed black cockatoo (FRTBC)) and one P4 species (*Oxyura australis* (blue-billed duck)) were recorded at the time of survey (Emerge Associates 2024a). FRTBC were observed foraging in the southern portion of the site in cape lilac (*Melia azedarach*), which were overhanging from adjacent private properties.

Table 5: Conservation significant fauna species with potential to occur within the site

Taxa	Common name	Conservation Status	
		EP Act	EPBC Act
Birds			
Zanda banksii naso[1]	Forest red-tailed black cockatoo	VU	VU
Zanda latirostris[2]	Carnaby's black cockatoo	EN	EN
Oxyura australis	Blue-billed duck	P4	-
Pandion haliaetus	Osprey	MI	MI
Apus pacificus	Pacific swift	MI	MI

[1] Previously *Calyptorhynchus*
[2] Previously *Calyptorhynchus*

Table 5: Conservation significant fauna species with potential to occur within the site (continued)

Taxa	Common name	Conservation Status	
		EP Act	EPBC Act
Calidris ruficollis	Red-necked stint	MI	MI
Plegadis falcinellus	Glossy Ibis	MI	MI
Thalasseus bergii	Crested tern	MI	MI
Falco peregrinus	Peregrine falcon	OS	-
Mammals			
Hydromys chrysogaster	Rakali	P4	-
Isoodon fusciventer	Quenda	P4	-

2.4.3.1 Black Cockatoos

Three threatened species of black cockatoo occur in the south-west of WA:

- *Zanda*[3] *latirostris* (Carnaby's black cockatoo) (CBC) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Zanda*[4] *baudinii* (Baudin's black cockatoo) (BBC) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) (FRTBC) which is listed as 'vulnerable' under the EPBC Act and the BC Act.

The site is within the modelled distribution of CBC and FRTBC (DAWE 2022) and are therefore these species have been considered further in this section. Additionally, FRTBC were observed during the survey, in cape lilac (*Melia azedarach*) overhanging the site boundary (Emerge Associates 2024a). The site does not lie within the modelled distribution of BBC and therefore, the species is not likely to occur and have not been considered further.

Black cockatoo habitat consists of breeding, roosting and foraging categories. Foraging and breeding habitat for CBC and FRTBC was identified. No roosts or evidence of roosts were observed. However, tall trees within the site have the potential to be roosting trees. Foraging and breeding habitat for CBC and FRTBC was identified.

Foraging habitat was identified and classified as either 'primary' or 'secondary' based on black cockatoo foraging preferences. Primary food plants were defined as those with historical and contemporary records of regular consumption by a black cockatoo species. Secondary food plants were defined as plant species that black cockatoo species have been recorded consuming occasionally or that, based on their limited extent or agricultural origin, should not be considered a sustaining resource.

A total of 1.27 ha of foraging habitat for CBC was recorded, of which 0.35 ha comprised primary foraging habitat. Primary foraging habitat included 0.28 ha of primary native foraging habitat

[3] Previously *Calyptorhynchus*
[4] Previously *Calyptorhynchus*

associated with *Corymbia calophylla,* 0.07 ha of primary non-native foraging habitat associated with *Pinus pinaster*. A total of 0.92 ha of secondary foraging habitat was recorded, including 0.41 ha of secondary native foraging habitat associated with *Acacia saligna*, *Jacksonia furcellata* and X*anthorrhoea* spp. and 0.51 ha of secondary non-native habitat associated with *Eucalyptus gomphocephala* (**Figure 9**).

A total of 0.84 ha of foraging habitat for FRTBC was recorded in the site, which comprises 0.28 ha of primary native habitat associated with *Corymbia calophylla,* 0.07 ha of secondary native foraging habitat associated with *Jacksonia furcellata* and 0.49 ha of non-native secondary habitat associated with *Eucalyptus gomphocephala* and *Eucalyptus camaldulensis* (see **Figure 10**).

The extent of foraging habitat by value category is detailed in **Table 6**.

Table 6: Foraging habitat recorded within the site

Foraging habitat	Black cockatoo species and area of foraging habitat (ha)	
	Carnaby's	Forest red-tailed
Primary native	0.28	0.28
Primary non-native	0.07	0
Secondary native	0.41	0.07
Secondary non-native	0.51	0.49
Total	**1.27**	**0.84**

Breeding habitat was identified through 'habitat trees' which are typically defined as a native eucalypt that is known to support (or with the potential to support) black cockatoo breeding. Habitat trees include species such as marri, jarrah, blackbutt, tuart, wandoo, salmon gum or to a lesser extent flooded gum, with a diameter at breast height (DBH) of greater than 50 cm (or DBH greater than 30 cm for wandoo or salmon gum). A total of 66 habitat trees were recorded during the fauna survey. Of these, 5 trees contained hollows potentially suitable for black cockatoo breeding and the remaining 61 habitat trees did not contain hollows potentially suitable for black cockatoo breeding. Hollow potential for breeding habitat was based on inspection from ground level, which could be further verified through more detailed hollow inspections (Emerge Associates 2024a). The location of the habitat trees within the site are shown on **Figure 11**.

2.5 Inland Waters

2.5.1 Surface water

The surface hydrology within the site is dominated by the Swan River, which is located adjacent to the site. During summer, the influence of the river is limited to the riverine fringe, while in winter levels rise and can extend inland. The 1 in 100-year flood and fringe level area (see **Figure 12**) shows that the north east corner and the north west corner of the site is within the floodway and the flood fringe area extends into the site.

Within the centre of the racecourse there are three lakes including an irrigation lake, a lined lake for overflow from the irrigation lake and a wetland lake, which is the largest lake and allows excess

water to flow under the grass track to the Swan River (Emerge Associates 2024b). The irrigation lake is filled from an adjacent production bore and provides irrigation for the racetrack and surrounding landscaped areas. The lined lake is sealed with a natural clay liner and is used to provide irrigation for landscaped areas and water features.

2.5.2 Groundwater

2.5.2.1 Regional groundwater

The *Water Register* (DWER 2023) indicates that groundwater beneath the site is a multi-layered system comprised of the following:

- City of Bayswater – Perth Superficial Swan unconfined aquifer
- Perth South – Perth Leederville confined aquifer
- Perth South – Perth Yarragadee confined aquifer.

The Perth Groundwater Map indicates (DWER 2023) that the groundwater level sits at 0.5 mAHD across the site. The groundwater clearance from southeast to northwest of the site ranges from 6.5 m to 0.5 m (**Figure 12**).

2.5.2.2 Site-specific groundwater monitoring

Groundwater monitoring has been undertaken within the SP area. There are two groundwater level and quality monitoring bores and one production bore within the Racecourse, which are monitored by Perth Racing.

Groundwater depth monitoring undertaken by D.C. Blandford & Associates Pty Ltd in 2001 (D.C Blandford & Associates 2001) indicated groundwater depths ranging between 2.03 mAHD to 0.16 mAHD at the site. Additional results from bore monitoring of the Ascot Racecourse undertaken by JDA in 2022 indicated that groundwater levels ranged from 2.06 m below natural surface (mBNS) to 0.34 mBNS.

Groundwater depth monitoring was undertaken within Precinct A where six monitoring wells were installed for the geotechnical investigation by Douglas Partners (2024). The groundwater depth varied from 1.09 m below ground level (mBGL) to 2.37 mBGL during January 2024 (Douglas Partners 2024). Groundwater depth monitoring was undertaken within Precinct D by Galt Geotechnics during the geotechnical investigation. The highest groundwater level was reported as 3.03 mBGL during February 2024 (Galt 2024).

Groundwater quality monitoring was also undertaken by D.C. Blandford & Associates Pty Ltd in 2001. Concentrations of total nitrogen, nitrate, total phosphorus, as well as pH indicated minor fluctuations throughout the year, but trends were generally consistent with previous results. Results indicated metals concentrations below laboratory detection limits, with the exception of one elevated nickel concentration detected.

Groundwater quality monitoring undertaken by JDA Consulting Hydrologists in 2022 (JDA 2022) indicated similar conditions to the 2001 results. Groundwater salinity and pH levels were below the trigger value and within the guideline limits. Concentrations of total nitrogen and total phosphorous were in exceedance but were generally consistent with historical trends at the site.

2.5.3 Wetlands

Wetlands include "*areas of seasonally, intermittently or permanently waterlogged soils or inundated land, whether natural or otherwise, fresh and saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries*" (Wetlands Advisory Committee 1977). Wetlands can further be recognised by the presence of vegetation associated with waterlogging or the presence of hydric soils such as peat, peaty sand or carbonate mud (Hill *et al.* 1996).

Wetlands of international significance (such as Ramsar wetlands) are afforded protection under the EPBC Act. No such wetlands occur within or in close proximity to the site.

At a regional level, DBCA maintains the Geomorphic Wetlands of the Swan Coastal Plain dataset (DBCA 2023), which categorises wetland features into management categories to guide land use and conservation, as outlined in **Table 7**. Wetland types are based on landform shape and water permanence, whilst management categories of wetlands are determined based on hydrological, biological and human use features.

Table 7: Geomorphic wetland management categories

Management Category	Description of wetland	Management objectives
Conservation Category Wetland (CCW)	Support high levels of attributes	Preserve wetland attributes and functions through reservation in national parks, crown reserves and state owned land. Protection provided under environmental protection policies.
Resource Enhancement Wetland (REW)	Modified or degraded but still supporting substantial attributes and functions	Restore wetland through maintenance and enhancement of wetland functions and attributes. Protection via crown reserves, state or local government owned land, environmental protection policies and sustainable management on private properties.
Multiple Use Wetland (MUW)	Few remaining important wetland attributes and functions but still provide important hydrological functions	Use, development and management considered in the context of water, town and environmental planning through land care.

The Geomorphic Wetlands of the Swan Coastal Plain dataset indicates three Multiple Use Category Wetland (MUW) areas (UFI 8424, UFI 8425 and UFI 8426) and one Resource Enhancement Wetland (REW) area (UFI 8423 are present within the site. After review of local surface water hydrology, the Geomorphic Wetlands of the Swan Coastal Plain dataset mapping and field observations (refer to **Figure 5** and **Figure 6** of Emerge Associates 2024b), it was determined that the area designated as an REW in the Geomorphic Wetlands of the Swan Coastal Plain dataset does not accurately reflect the conditions observed on ground.

The Swan River Estuary, situated outside the northern boundary of the site, is recognised as a "Conservation Category Wetland" (CCW) (UFI 1316 - Estuary waterbody) within the Geomorphic Wetlands of the Swan Coastal Plain dataset and has additional significant ecological, cultural and heritage values (DEC 2011). The riparian vegetation identified in Emerge Associates (2024a) is associated with the Swan River and extends into the northeast of the site. Riparian vegetation would provide habitat for waterbirds, including birds which nest in dense stands of sedges and rushes and those waterbirds which forage in mud flats along the river. In addition, the fringing vegetation would

provide habitat for both terrestrial and aquatic fauna species, including reptiles, small mammals, fish and invertebrates.

The location of the geomorphic wetlands is shown on **Figure 12.**

2.5.4 Public drinking water source areas

DWER proclaims Public Drinking Water Source Areas (PDWSAs) to protect identified drinking water sources, including surface water and groundwater sources (DoW 2009). They are proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 1947* as Water Reserves, Catchment Areas or Underground Water Pollution Control Areas.

No PDWSAs exist within or surrounding the site.

2.6 Social Surroundings

2.6.1 Aboriginal cultural heritage

An enquiry was submitted to the Department of Planning, Lands and Heritage (DPLH) through the Aboriginal Heritage Enquiry Form (AHEF), which identified Site 3753 partially intersects with the western edge of the site and Site 3756 is located immediately adjacent to the site (**Figure 13**). Details on these sites are shown below:

- Site ID 3753 – Registered site, Name: Perth, Type: Historical, mythological, hunting place, named place, natural feature.
- Site ID 3536 – Registered site, Name: Swan River, Type: Creation / Dreaming Narrative.

It should be noted that the Site 3753 boundary is a broader area and the exact area is not defined (**Figure 13**). Therefore, it is possible that the exact location of Site 3753 is outside the site boundary.

2.6.2 Non-Indigenous heritage

A review of the State Heritage Office database (Heritage Council WA 2022) was undertaken to determine presence of sites or features of non-indigenous heritage significance within the site at a federal, state and local government level.

The Ascot Racecourse Complex (place number 06123) is listed at a local level with the CoB and occurs across the racecourse itself, which is excluded from any development areas within the SP. A portion of the Ascot Racecourse Complex is also mapped across the site (Precinct A, B and C) and comprises original buildings and newly established buildings.

The following places occur in the surrounding area and are state or local listed places:

- Bristile Kilns (fmr), Belmont (place number 00868) (state)
- Garratt Road Bridge (place number 11342) (state)
- Ascot Residential & Stables Precinct (place number 16779) (local).

2.6.3 Surrounding land uses

The surrounding area is mostly residential, with the exception of commercial land and some public open space to the south and the Swan River and public open space to the north (**Figure 13**). A Parks and Recreation Reserve (reserved under the MRS), associated with the Swan River foreshore, extends along the northern boundary of the site and intersects with a portion of the site. This area includes part of the racecourse itself and vegetation within the northeast of the site. Both of these areas are planned to be retained as part of the SP.

No surrounding land uses are likely to cause amenity impacts associated with dust, gaseous or odour emissions.

Great Eastern Highway is less than 300 m south of the southern boundary of the SP which will require consideration of transport noise and management/mitigation in line with the State Planning Policy (SPP) 5.4 *Road and Rail Noise*. Precinct E falls within the SPP 5.4 area and requires further consideration regarding potential noise impacts.

2.7 Other Considerations

2.7.1 Bushfire hazards

Review of the Department of Fire and Emergency Services (DFES) Bushfire Prone Area (BPA) mapping (DFES 2021) indicated no Bushfire Prone Areas (BPA) within the site. The nearest BPA is greater than 500 m to the west of the site and therefore no further consideration to bushfire hazards is required.

2.8 Summary of Existing Environmental Values

Table 8 below summarises the existing environmental values occurring within the site, as identified and discussed previously in **Sections 2.1** to **2.7**.

Table 8: Summary of existing environmental values within the site relevant to EPA factors

EPA factor	Summary of existing environmental values within the site
Landforms	• No restricted landforms or unique geological features have been identified within the site. • The Swan River is located adjacent to the site.
Terrestrial environmental quality	• The majority of the site is considered to have high to moderate risk of ASS occurrence and a small portion in the south is considered to have moderate to low risk of ASS occurring within the 3 m of the natural surface. • Lot 9002 (including Precinct A and Precinct B) is classified as "possibly contaminated – investigation required" pursuant to the *Contaminated Sites Act 2003.*

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Table 8: Summary of existing environmental values within the site relevant to EPA factors (continued)

EPA factor	Summary of existing environmental values within the site
Flora and vegetation	• No threatened or priority flora species were recorded in the site. The threatened and priority flora species identified in the desktop assessment are not considered to occur in the site due to lack of suitable habitat. • The majority of the site is heavily disturbed (degraded to completely degraded) and limited native intact native vegetation is present. • One small patch of vegetation (vegetation community type ErJkSt) was identified in 'good – very good' condition. • A total of 0.07 ha of the 'subtropical and temperate coastal saltmarsh' TEC/PEC (listed as Vu under the EPBC Act and listed as P3 under the EP Act) occurs within the northern portion of the site adjacent to the Swan River. • A total of 1.1 ha of native vegetation as classified under the EP Act was mapped within the site.
Terrestrial fauna	• Eleven conservation significant fauna species were considered to have a 'moderate' or 'high' likelihood of occurrence within the site including six migratory and/or specifically protected bird species, two threatened bird species, one priority bird species and two priority mammal species. • One priority listed species, blue-billed duck (P4) was recorded during the survey (Emerge Associates 2024a). • As a result of historical disturbance, the site contains limited fauna habitat and is likely only utilised by fauna traversing through the wider area, especially birds. However, the small patch of 'Fringing Woodland' in the site's northeast may provide habitat value for smaller ground-dwelling fauna. **Black cockatoos** • CBC (EN) and FRTBC (VU) have the potential to occur within the site based on the desktop assessment undertaken. • FRTBC was observed foraging in the southern portion of the site in cape lilac (*Melia azedarach*), which were overhanging from adjacent private properties (Emerge Associates 2024a). • 66 potential black cockatoo habitat trees were recorded within the site. • A total of 1.27 ha of foraging habitat for CBC was recorded, of which 0.35 ha comprised primary foraging habitat. • A total of 0.84 ha of foraging habitat for FRTBC was recorded, of which 0.28 ha comprised primary foraging habitat.
Inland waters	• No CCWs have been identified within the site; however, the Swan River is a CCW and occurs immediately north of the site. • Three MUWs (UFI 8424, UFI 8425, UFI 8426) are mapped across the site. • One REW (UFI 8423) is mapped across the site, however, after review of local surface water hydrology, the Geomorphic Wetlands of the Swan Coastal Plain dataset mapping and field observations (refer to **Figure 5** and Figure 6 of Emerge Associates 2024b), it was determined that the area designated as an REW in the Geomorphic Wetlands of the Swan Coastal Plain dataset does not accurately reflect the conditions observed on ground.
Social surroundings	• Aboriginal Cultural Heritage Site 3753 partially overlaps with a portion of the west of the site and Site ID 3536 (Swan River) is located immediately north of the site. These places are associated with creation/dreaming narrative and is also associated with a mythological value. • The Ascot Racecourse Complex, place number 06123, occurs across the racecourse itself and Precinct A, B and C. • Noise and acoustic impact from Great Eastern Highway must be considered for Precinct E residential development.
Other considerations	• No Bushfire Prone Areas exist within the site.

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3 Proposed Land Use and the Planning and Approval Framework

3.1 Ascot Racecourse Proposed Development

The proposed zoning for the SP is in line with existing zoning in adjacent areas and aims to provide a framework of what might be considered appropriate from a land use planning perspective, and provides a framework for the future land use, subdivision and development within the site. Additionally, a master plan has been prepared which provides a detailed conceptual layout for proposed residential and commercial areas, the road network, public open spaces and other facilities (**Appendix C**). The master plan (**Appendix C**) indicates the following future land use per precinct as:

- The racecourse is proposed to remain, within which there is expected to be minimal future additional development.
- Precinct A is proposed to include a retirement living village.
- Precinct B includes the existing car parking and racecourse grandstand and is proposed to include additional car parking spaces and provide new buildings for offices/hospitality.
- Precinct C includes proposed stables, horse float parking and car parking.
- Precinct D includes a proposed residential area and childcare centre.
- Precinct E includes proposed equine and jockey services, car parking and pad site and potential retail and bulky goods.

The SP has been developed through an iterative and collaborative design process involving a variety of stakeholders, including a multi-disciplinary design team providing expertise in the following fields:

- Town planning and urban design
- Environmental planning
- Aboriginal heritage
- Hydrology
- Civil and geotechnical engineering
- Traffic engineering
- Economic analysis.

3.1.1 Environmental considerations of the structure plan

Environmental values and considerations have been addressed as part of the SP design process, which has culminated in the proposed SP and master plan layout provided in **Appendix A** and **Appendix C**.

As outlined above, the primary structural basis of the SP layout has generally been informed by the location and extent of the various existing district-scale land uses. This has provided a level of restriction to the ability for the SP layout to strategically respond to environmental values within the site. Notwithstanding, the proponent has taken a range of measures to provide for the future retention of significant environmental values where possible (i.e. where there remains flexibility in the layout design process).

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3.1.1.1 Public Open Space

The area reserved for Parks and Recreation in the northern extent of the SP, along the foreshore of the Swan River, has been retained as Parks and Recreation as part of the proposed land uses within the SP. Retention of this vegetation avoids direct impacts to the 0.07 ha of subtropical and temperate coastal saltmarsh TEC/PEC. In addition, this vegetation was identified as being in good to very good condition with potential to provide canopy cover and habitat for avian species as well as riparian vegetation for ground dwelling fauna.

3.1.1.2 Hydrology

To address the proximity of the Swan River and support the SP design and process, a Local Water Management Strategy (LWMS) has been prepared by Emerge Associates (2024b) to consider water sensitive urban design principles, flood storage requirements and a water conservation strategy. The principal management objective for hydrology within the site is to ensure that post-development environmental flows and/or hydrological cycles are maintained or improved upon pre-development conditions, especially regarding the Swan River located adjacent to the site and lake features within the site. Specifically, the LWMS has aimed to:

- Protect water quality in the Swan River by providing appropriate water quality treatment at source.
- Mitigate potential flooding within the SP area and immediate surrounds.
- Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater.
- Provide a broad level stormwater management framework to support future urban development.
- Incorporate appropriate best management practices into the drainage systems that address the environmental and stormwater management issues identified.
- Minimise transport of nutrients/pollutants to groundwater.
- Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area.
- Gain support from DWER, DBCA, CoB and Water Corporation for the proposed method to manage stormwater within the site.

3.1.1.3 Wetlands

A total of three MUW as per the Geomorphic Wetlands of the Swan Coastal Plain dataset exist within the site, specifically within the boundary of the Ascot Racecourse track. No considerations are required for MUWs however the planning and design of the SP does not intend to disturb the MUW.

One REW (UFI 8423) is mapped across the site, however, after review of local surface water hydrology, the Geomorphic Wetlands of the Swan Coastal Plain dataset mapping and field observations (refer to **Figure 5** and Figure 6 of Emerge Associates 2024b), it was determined that the area designated as a REW is unlikely represent a REW. Regardless, the planning and design of the SP has avoided the REW and no disturbance to the REW is anticipated.

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3.1.1.4 Conservation significant fauna

The SP design retains the most suitable fauna habitat, the fringing woodland habitat type which is associated with the remnant vegetation along the foreshore reserve. This vegetation was noted to provide habitat for conservation significant fauna species, including rakali and will be retained in the current SP design.

The black cockatoo foraging habitat identified by the field survey is patchily distributed across the site and interspersed with plant species not used by CBC or FRTBC. No signs of use were identified during the targeted black cockatoo survey, such as chew marks, droppings or moulted feathers within any of the habitat trees with hollow(s) in the site.

The potential foraging habitat and habitat trees for CBC and FRTBC within the site is unlikely to represent critical foraging or breeding habitat, given its small extent within an urban setting with minimal potentially suitable hollows and no evidence of use by CBC or FRTBC. Potential black cockatoo habitat trees identified will be opportunistically retained. The potential foraging and breeding habitat in the SP occurs within the 'Place of public assembly,' where future development is permitted to occur. Black cockatoo habitat will need to be considered as part of future subdivision and development approvals.

3.1.1.5 Aboriginal cultural heritage

Whilst not identified as occurring within the precinct areas, the Swan River (Site ID 3536) is a key Aboriginal cultural heritage site for consideration. The SP design retains the Parks and Recreation Reserve which excludes future development adjacent to the Swan River and protects this place of cultural heritage significance from potential development impacts.

No works associated with SP development are currently proposed to directly impact the Swan River, however, should any future proposed works impact the riverbank, foreshore or any other Aboriginal cultural heritage site, approval for the proposed works under Section 18 of the *Aboriginal Heritage Act 1972* would be required.

3.1.1.6 Non-Indigenous heritage

The Ascot Racecourse Complex (place 06123) includes the racecourse itself and the surrounding proposed precincts, excluding Precinct D, as outlined in the SP. The SP design proposes to retain the racecourse itself and does not propose development within the racecourse. The remaining part of the Ascot Racecourse Complex (place 06123) is within Precinct A, B, C and E. The SP design for these precincts allows for the development of additional facilities and renovation of current facilities.

3.2 Future planning and environmental approvals process

A key component of implementing the future development of any area is the relevant environmental management framework. Subject to approval and endorsement of the structure plan by the WAPC, development of the site will be progressed through subdivision and/or development approval/s. Where required, the environmental management requirements can be implemented through

applicable subdivision and/or development approval conditions. The future planning and environmental approvals process is discussed in this section.

3.2.1 Metropolitan Region Scheme

The site is currently zoned a combination of 'Urban,' 'Private Recreation' and 'Parks and Recreation' under the Metropolitan Region Scheme (MRS). The majority of surrounding land is zoned as 'Urban,' and land abutting the Swan River reserved for 'Parks and Recreation'. The MRS zoning of Precinct A area is currently 'Private Recreation' and lodgment of an MRS amendment may be required with the Western Australian Planning Commission (WAPC) to rezone the Precinct A area from 'Private Recreation' to be consistent with finalised land uses.Correspondingly, LPS 15 could be amended either through a concurrent or subsequent local scheme amendment (see further details regarding LPS 15 in **Section 3.2.2**).

Any scheme amendment request received and initiated by the responsible authority (WAPC), would be formerly referred to the EPA under Section 48A of the EP Act (unless exempt under Section 48AAA of the EP Act). This is discussed further in **Section 3.2.4**.

3.2.2 Local Planning Scheme No. 15

The site is currently zoned 'Public place of assembly' and 'Mixed Use' under the CoB LPS 15. The existing Ascot Racecourse covers the majority of the site, which attributes the 'Place of public assembly' zoning and the south of the site within part of Precinct E is zoned 'Mixed Use'.

The current LPS 15 zonings are inconsistent with the proposed land uses within Precinct A and Precinct D. As such, a local scheme amendment will be required to rezone Precinct A from 'place of public assembly' to 'retirement living/mixed use' and to rezone Precinct D from 'Place of Public Assembly' to 'Mixed Use'.

The Swan River foreshore is also subject to the *City of Belmont Foreshore Precinct Plan* (CoB 2018) which guides the future use and management of the Belmont foreshore and the development interface with the Parks and Recreation reserve.

3.2.3 *Environmental Protection Act* 1986 - Section 38 proposals

Section 38 of the EP Act enables any person to refer a 'proposal' (as opposed to a planning scheme, as per Section 48) likely to have a significant impact on the environment to the EPA, who then decide whether or not to assess the proposal. The SP area, or part thereof, will need to be considered in relation to Section 38 of the EP Act.

A preliminary assessment of the anticipated environmental outcomes as a result of the anticipated future urban development (based on the SP layout) has been undertaken against relevant EPA factors and objectives, which is outlined in **Section 4**. Based on this assessment, it is not considered likely that any future development within the SP would require referral to the EPA pursuant to Section 38 of the EP Act.

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3.2.4 *Environmental Protection Act 1986* - Section 48 scheme amendment referral

An amendment to a planning scheme (regional or local) is required to be referred to the EPA (unless exempt under Section 48AAA of the EP Act) to determine whether environmental assessment is required, pursuant to Section 48 of the EP Act. All amendments to a planning scheme are required to be referred to the EPA by the responsible authority (in this case, the WAPC) unless the amendment is exempt under Section 48AAA of the EP Act. Exemptions under Section 48AAA relate to amendments that seek changes to the planning scheme that do not relate to the environment and will not impact the environment and therefore do not require EPA consideration. Exemptions include:

- Amendments seeking to correct an administrative or minor error, amend a definition or correct a title in the planning scheme if it will not impact the operation of the scheme.
- Amendments seeking to classify an area of land as a reserve for Parks and Recreation or Regional Open Space.
- Amendments seeking to zone an area of land as a reserve if the land has been subdivided and developed by an approved redevelopment scheme and the redevelopment scheme no longer applies and the amendment is required to reflect a zone or reserve created in accordance with the approved redevelopment scheme.
- Amendments seeking to create, alter or remove a road reserve of a regional road if a clearing permit under Part V of the EP Act has been granted or if the impacts associated with construction of the road has been assessed under Part IV of the EP Act and a decision has been made that the proposal can be implemented.

The required scheme amendment for the SP will not be exempt under Section 48AAA of the EP Act. Upon referral on an amendment to a planning scheme, the EPA will make a decision on whether the proposed scheme amendment requires formal assessment and often consider significance in their assessment. The EPA may also provide informal advice on the proposed scheme amendment without formally assessing the scheme or determine that the proposed amendment is not capable of being environmentally acceptable. Areas of the SP area not assessed under Section 48A will need to be considered and referred under Section 38 of the EP Act if impacts to the environment are considered significant. As stated above, a preliminary assessment of the anticipated environmental outcomes as a result of the anticipated future urban development (based on the SP layout) has been undertaken against relevant EPA factors and objectives and is outlined in **Section 4**.

Section 48A outlines that any proposal likely to have a significant impact on the environment, but which is within an area and for a land use that is subject to an assessed scheme (i.e. a scheme for which a determination has been made by the EPA under Section 48A), is not required to be referred to the EPA under Section 38 of the EP Act.

Section 48A will only apply to the SP area which has undergone a scheme amendment (regional or local) through the Section 48A process and where the potential environmental impacts were considered by the EPA. The EPA may choose to provide advice at this time and defer assessment of environmental factors to subsequent stages of the planning process, which would mean Section 48A would not apply and referral under Section 38 would be required. Based on the assessment undertaken and the nature/layout of the SP it is unlikely that any future development within the SP extent would quire referral to the EPA pursuant to Section 38 of the EP Act.

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3.2.5 Environmental Protection Act 1986 – Part V Clearing Permits

Where native vegetation is required to be cleared within the site, this will likely be undertaken in accordance with a subdivision approval and associated authorised subdivision works, which will provide an exemption from the requirements for a native vegetation clearing permit. Should bulk earthworks or any other works be commenced within the site that requires clearing of native vegetation before subdivision approvals are gained, a clearing permit pursuant to Part V of the EP Act will be required.

In addition, and as part of subdivision, the WAPC may include a standard condition (model subdivision condition EN2) which requires:

Prior to the commencement of subdivisional works, measures being undertaken to identify any vegetation on the site worthy of retention, including any potential habitat or foraging trees for threatened fauna species, and protection measures implemented to ensure such vegetation is not impacted by subdivisional works (Local Government).

This can be used to ensure that vegetation retention opportunities (likely to be limited to mature trees) are considered through the subdivisional works process.

3.2.6 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides statutory protection for listed Matters of National Environmental Significance (MNES). The CBC is listed as endangered and FRTBC is listed as vulnerable under the EPBC Act. Any future development proposals within the SP should consider the requirements of the EPBC Act in relation to CBC and FRTBC and their habitat, which will primarily be in relation to the potential breeding habitat.

The subtropical and temperate coastal saltmarsh TEC is listed as vulnerable under the EPBC Act. TEC's listed in the vulnerable category are not considered matters of national environmental significance (MNES) for the purposes of Part 3 of the EPBC Act and therefore no further considerations to the TEC/PEC are required in relation to the EPBC Act.

Individual proponents of future development within the site will need to consider their obligations under the EPBC Act and the potential need to refer any proposed action that may have a significant impact on MNES. This would largely be limited to the consideration of potential impacts on listed black cockatoo species. While this would be considered on a proposal-by-proposal basis (and potentially progressed by different proponents), it is unlikely that the potential impacts on black cockatoo would be considered significant.

3.2.7 Swan and Canning River Development Control Area

The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and the Swan Canning River Park. Any proposed development on land adjacent to the river within the DCA and/or partly within DCA would be subject to assessment and approval by the DBCA through a permit application, under Part 5 of the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007*.

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4 Assessment of Predicted Environmental Outcomes

The predicted environmental outcomes that will need to be accommodated in the implementation of the proposed SP, through future development, have been assessed against the EPA objectives for each environmental factor relevant to the site (as listed in **Section 2**).

This is provided in **Table 9**, which considers the spatial layout responses of the SP and provision of POS intended to provide for the protection and conservation of existing environmental assets within the site. In addition, **Table 9** also outlines the future management of environmental values or considerations that will require further specific attention as part of the future development of the site.

A range of environmental impact mitigation measures (primarily impact avoidance and minimisation) are proposed within the SP layout and through the future environmental management framework. In this context, it is anticipated that implementation of any future development within the proposed SP can be suitably managed through future stages of the land use planning processes (including subdivision and development) such that the EPA objectives for the relevant environmental factors can be achieved.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Landforms	To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected.	The Swan River is located immediately adjacent to the north of the site. No development is proposed within the Swan River foreshore Reserve. Additionally, retention of the riparian vegetation associated with the Swan River in the northern portion of the site allows for protection of biological diversity and ecological integrity along the Swan River foreshore. Further responses associated with the Swan River in regard to hydrology are discussed below.	Future management considerations for the Swan River in regard to inland waters are discussed below.	No significant impacts likely
Terrestrial environmental quality	To maintain the quality of land and soils so that environmental values are protected.	There are no SP spatial responses to terrestrial environmental quality considerations, which primarily relate to ASS risk. To address Lot 9002 which is classified as "potentially contaminated – investigation required", investigations have been commenced by the proponent in preparation of anticipated subdivision or development approval conditions.	To facilitate development within the site, ASS investigations and management considerations for the site will likely be required (as a portion of the site is mapped as Class 1 'high to moderate' risk of ASS occurring within 3 m of the natural soil surface). Given the relatively shallow depths to groundwater within portions of the site, any dewatering that may be required for development works would likely trigger the need for a dewatering and ASS management plan. If required, any future ASS considerations will be identified and suitably managed by each proponent as part of the future development process in accordance with the WAPC's *Acid Sulfate Soils Planning Guidelines* (2008). Any future development within Lot 9002 will need to resolve the current CS Act classification, and this would involve the completion of investigations and any remediation that is identified as being required.	Any potential impacts associated with ASS can be suitably minimised at future development stages within the site. If determined to be required, an ASS management plan and dewatering management plans would be prepared and implemented as part of any works associated with subdivision or development works. Site contamination will be adequately investigated and remediation completed (if required) to resolve any site contamination risk.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Flora and vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	The SP layout has been designed to maintain the northern vegetated area within Parks and Recreation Reserve. This includes 0.07 ha of the subtropical and temperate coastal saltmarsh TEC/PEC. Retention of this vegetation in the northern portion of the site allows for protection of flora, vegetation, biological diversity and ecological integrity along the Swan River foreshore. Remaining vegetation within the site was recorded in 'degraded' to 'completely degraded' condition with minimal environmental value. As such, no additional SP vegetation retention provisions are considered necessary.	Should any works within the site that require clearing of native vegetation prior to subdivision approvals, a clearing permit pursuant to Part V of the EP Act will be required, unless otherwise exempt from a clearing permit. Subdivision approval and associated authorised subdivision works will provide an exemption from the requirements for a clearing permit. Future subdivision and/or development applications and approval conditions would consider vegetation retention where possible. Conditions associated with subdivision and/or development approvals often require the preparation of a Conservation and Environment Management Plan, which would further minimise potential impacts to retained flora and vegetation values during proposed construction in development stages.	Overall, the SP layout responds to flora and vegetation values where possible, primarily associated with retention of established vegetation along the Swan River foreshore. Protection of an area of subtropical and temperate coastal saltmarsh TEC/PEC is also a key outcome of this response.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Terrestrial fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	The SP layout has been designed to maintain the northern vegetated area within POS. Retention of this vegetation in the northern portion of the site allows for protection of biological diversity and ecological integrity along the Swan River foreshore. A total of 66 habitat trees potentially suitable for black cockatoo breeding were identified within the site, of which five contain potentially suitable hollows for black cockatoo breeding habitat. A total of 1.27 ha and 0.84 ha of foraging habitat (primary and secondary) for CBC and FRTBC, respectively, was recorded within the site. Of this, primary foraging habitat (native and non-native) comprised a total of 0.35 ha and 0.27 ha for CBC and FRTBC, respectively. The remaining area consisted of secondary foraging habitat. The foraging habitat is patchily distributed and is interspersed with plant species not used for CBC or FRTBC for foraging. No signs of use were identified during the targeted black cockatoo survey, such as chew marks, droppings or moulted feathers within any of the habitat trees with potential hollow(s). The potential foraging habitat and habitat trees for threatened black cockatoo species mapped within the site are unlikely to represent critical foraging or breeding habitat, given its small extent within an urban setting with minimal potentially suitable hollows and no evidence of use by CBC or FRTBC.	Where future development works within the site will result in potential impacts to MNES (including CBC and FRTBC), proponents will need to consider their EPBC Act obligations and need for referral, based on the specific impacts of their proposed action. Individual proposed actions can be addressed through preliminary self-assessment against the *Matters of National Environmental Significance Significant Impact Guidelines* (DotE 2013) in relation to any potential impacts on MNES. As part of future subdivision, there may be requirements to prepare a fauna management plan prior to works commencing for development involving clearing of native vegetation or any fauna habitat in order to minimise impacts to fauna during clearing and construction works. Fauna management plans can be prepared as required as part of future subdivision works and are often associated with conditions of subdivision and/or development approval. Conditions associated with subdivision and/or development approvals often require the preparation of a Conservation and Environment Management Plan, which would further minimise potential impacts to fauna during proposed construction in development stages.	Overall, the SP layout responds to terrestrial fauna values, primarily associated with retention of intact native vegetation along the northern border of the site, providing potential habitat for terrestrial fauna. Notwithstanding, impacts to MNES such as CBC and FRTBC are possible and EPBC Act obligations will need to be considered by proponents before development, depending on the nature and extent of the development and magnitude of likely impacts. In general, the extent of impact on black cockatoo is not likely to be considered significant.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Inland waters	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.	The *State Water Strategy for Western Australia* (Government of WA 2003) and *Better Urban Water Management* (WAPC 2008) endorses the promotion of integrated water cycle management and application of water sensitive urban design (WSUD) principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies. Whilst not a spatial response, a Local Water Management Strategy (LWMS) has been prepared by Emerge Associates for the site in line with water sensitive urban design principles, flood storage requirements and a water conservation strategy. The principal management objective for hydrology within the site is to ensure that post-development environmental flows and/or hydrological cycles are maintained or improved upon pre-development conditions, especially regarding the Swan River adjacent to the site and lake features retained within the site. Specifically, the LWMS has aimed to: • Protect water quality in the Swan River by providing appropriate water quality treatment at source. • Mitigate potential flooding within the SP area and immediate surrounds. • Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater. • Provide a broad level stormwater management framework to support future urban development. • Incorporate appropriate best management practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified.	A LWMS has been prepared to support the SP process. Detailed Urban Water Management Plans (UWMP) will be required in support of individual subdivision applications in accordance with the *State Water Strategy for Western Australia* (Government of WA 2003) and *Better Urban Water Management* (WAPC 2008). UWMPs will be most relevant most relevant to Precinct D. Other precincts may be developed under a Development Approval and therefore water management will likely be documented within a Stormwater Management Plan (SMP) also in accordance with *Better Urban Water Management* (WAPC 2008). Should any future developments propose to impact the Swan River CCW and as such impact the mapped ESA associated with the Swan River, wetland buffers and separation distances should be implemented in accordance with the draft *Guideline for the Determination of Wetland Buffer Requirements* (WAPC 2005) for protection of wetland values, habitat protection, edge effects and water quality management with relevant guidelines to protect wetland values, habitat and water quality. Where proposed development is within or adjacent to the Swan and Canning River Development Control Area (DCA), proponents will be required to submit a DCA permit application to the DBCA in accordance with the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007.*	The SP does not specifically respond to the inland waters environmental factor. However, the LWMS defines the intended hydrological management approach, which will be implemented during future development.

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Inland waters (continued)	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected (continued).	• Minimise transport of nutrients/pollutants to groundwater. • Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area. Three MUWs and one REW will be retained in the current SP design. Although an REW is mapped within the site, after review of local surface water hydrology, aerial imagery and field observations (refer to Figure 5 and Figure 6 of Emerge Associates 2024b), it was determined that the area designated as an REW in the Geomorphic Wetlands of the Swan Coastal Plain dataset does not accurately reflect the conditions observed on ground. However, the REW will be retained in the current SP design. The Swan River is a CCW and is located immediately adjacent to the site. The SP design avoids the CCW and associated ESA by retaining the Parks and Recreation Reserve which encompasses the CCW buffer area and values associated with the Swan River.		

Table 9: Summary of EPA environmental factors and objectives relevant to the proposed future land use (continued)

Environmental factor	EPA objective	Ascot Local Structure Plan spatial response	Future management considerations	Predicted environmental outcome
Social Surroundings	To protect social surroundings from significant harm.	Aboriginal Cultural Heritage (ACH) site 3536 (Swan River) is located immediately north of the site and ACH Site3753 has a minor overlap with the western boundary of the site. These sites are not considered to be potentially impacted by the proposed SP layout. However, should any future development propose to impact these sites, further consultation and AH Act requirements would be required. The Ascot Racecourse Complex (place 06123) is a non-indigenous heritage place, located within the site. The SP design proposes to retain the racecourse itself and excludes the racecourse from proposed development. The remaining part of the Ascot Racecourse Complex (place 06123) is within Precinct A, B and C. The SP design of these precincts allows for the development of additional facilities and renovation of current facilities. No responses are required in regard to noise and acoustics.	The Swan River is associated with Site 3536 and as such any future proposed works that may impact the riverbank and/or the foreshore will require approval under Section 18 of the *Aboriginal Heritage Act 1972*. Further requirements and consultation would be required to identify the extent of Site 3753 within the SP area and if future consideration is required in accordance with the *Aboriginal Heritage Act 1972*. Future development would need to consider the Ascot Racecourse Complex heritage site and can be addressed as part of any Development Approval process. A Transport Noise Assessment for the proposed SP was undertaken by Lloyd George Acoustics in November 2023 (Lloyd George Acoustics 2023) to understand the spatial responses that might be required to address potential noise and acoustic impacts in the SP from the adjacent Great Eastern Hwy. Based on the results, future proponents undertaking noise sensitive development in Precinct E could undertake further noise assessments to quantify actual noise levels from Great Eastern Highway, rather than using the screening assessment criteria. Alternatively, the screening assessment procedure could be adopted, resulting in requirements for a 'Quiet House Package A' to upper floors of noise sensitive dwellings within Precinct E. Future development would need to consider noise impacts from the racecourse and can be addressed as part of any Development Approval process.	Any potential impacts to social surroundings can be suitably mitigated through a range of impact avoidance and minimisation measures such that it is unlikely any significant residual impacts will occur.

Attachment 12.1.3 Environmental Assessment Report

5 Conclusions

The proponent has taken a range of measures to provide for the future retention of relevant environmental values within the Ascot SP. This is primarily achieved through the strategic location of the Parks and Recreation Reserve in the northern area of the site to preserve intact native vegetation.

In this context, the SP has been designed to respond to the identified environmental values within the site where possible, including the proposed retention of:

- Subtropical and temperate coastal saltmarsh TEC/PEC
- Fauna habitat
- Native vegetation.

A local scheme amendment will be required to rezone Precinct A from 'place of public assembly' to 'retirement living/mixed use' and to rezone Precinct D from 'Place of Public Assembly' to 'Mixed Use'.

Considerations, approvals and management plans may be necessary for each individual proponent for future development works, which would further minimise environmental impacts through development within the SP area. Environmental factors and the management framework considerations are summarised in **Table 10.**

Overall, a range of environmental impact mitigation measures (primarily impact avoidance and minimisation) are proposed within the SP layout and through the future environmental management framework. In this context, it is anticipated that implementation of the proposed SP can be suitably managed through future stages of the land use planning processes (including development) such that the EPA objectives for the relevant environmental factors can be achieved.

Attachment 12.1.3 Environmental Assessment Report

Table 10: Summary of Environmental Management Framework Considerations

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision and/or Development Approval	Construction
Flora and Vegetation	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Native Vegetation Clearing permit pursuant to Part V of the EP Act if clearing is required within the SP area and clearing is not exempt. • Preparation of a Conservation and Environment Management Plan (CEMP), where required.	Clearing Permit and compliance with approval conditions and management plans.
Terrestrial Fauna	Environmental Assessment Report including preliminary investigations (Emerge Associates 2024a) (**Appendix D**).	• Potential impacts to MNES in relation to the EPBC Act and need to consider the need for referral in accordance with the *Matters of National Environmental Significance Significant Impact Guidelines* (DotE 2013). • Preparation of a fauna management plan for any development within the SP area prior to works commencing for development involving clearing of native vegetation or any fauna habitat.	Compliance with approval conditions and management plans, in accordance with EPBC Act, where required.
Acid Sulfate Soils	Environmental Assessment Report including preliminary investigations.	• Detailed ASS Investigation and Management Plan for areas mapped as 'Class 1: High to moderate risk' will likely be required in accordance with the WAPC's *Acid Sulfate Soils Planning Guidelines* (2008).	Implementation of ASS Management Plan.
Inland Waters	The LWMS prepared for the SP by Emerge Associates (2024b) (**Appendix E**).	• Detailed UWMPs will be required (mostly relevant to Precinct D) to support individual subdivision applications. Other precincts may be developed under Development Approval and therefore water management will likely be documented through SMPs. Both UWMPs and SMPs will be prepared in accordance with the *Better Urban Water Management* Framework. • Protection of the Swan River CCW and ESA through consideration of hydrological processed and water quality management into design of future development areas to protect the adjacent Swan River and associated values. • DCA permit application for works within or affecting the DCA to the DBCA in accordance with the Swan and Canning Rivers Management Act 2006 and the Swan and Canning River Management Regulations 2007.	Compliance with UWMP/SMP and approved DCA permit.

Attachment 12.1.3 Environmental Assessment Report

Table 10: Summary of Environmental Management Framework Considerations (continued)

Environmental Factor	Management Framework and considerations		
	Local Structure Plan	Subdivision and/or Development Approval	Construction
Social Surroundings	Preliminary investigations for Aboriginal Cultural Heritage. Transport Noise Assessment for the proposed SP (Lloyd George Acoustics 2023) in accordance with SPP 5.4.	• Detailed Acoustic Assessment and Management Plan (where required) or 'Quiet House Package A' implemented to upper floors of noise sensitive dwellings within Precinct E. • Completion of any contamination investigations and identification of any remediation requirements within Lot 9002.	Approval pursuant to Section 18 of the *Aboriginal Heritage Act 1972* will be required prior to ground disturbing works if impacts to known sites are likely. Compliance with noise management plan and appropriate house packages applied where appropriate. Completion of remediation works (if required) for Lot 9002.

Attachment 12.1.3 Environmental Assessment Report

6 References

6.1 General references

The references listed below have been considered as part of preparing this document.

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Attachment 12.1.3 Environmental Assessment Report

Figures

Figure 1: Site Location

Figure 2: Site Geology

Figure 3: Topographic Contours

Figure 4: Acid Sulfate Soils

Figure 5: Vegetation Types

Figure 6: Vegetation Condition

Figure 7: Threatened Ecological Community and Native Vegetation under the EP Act

Figure 8: Bush Forever, Ecological Linkages and Environmental Sensitive Areas

Figure 9: Carnaby's Black Cockatoo Foraging Habitat

Figure 10: Forest Red-tailed Black Cockatoo Foraging Habitat

Figure 11: Black Cockcatoo Habitat Trees

Figure 12: Hydrological Features

Figure 13: Social Surroundings

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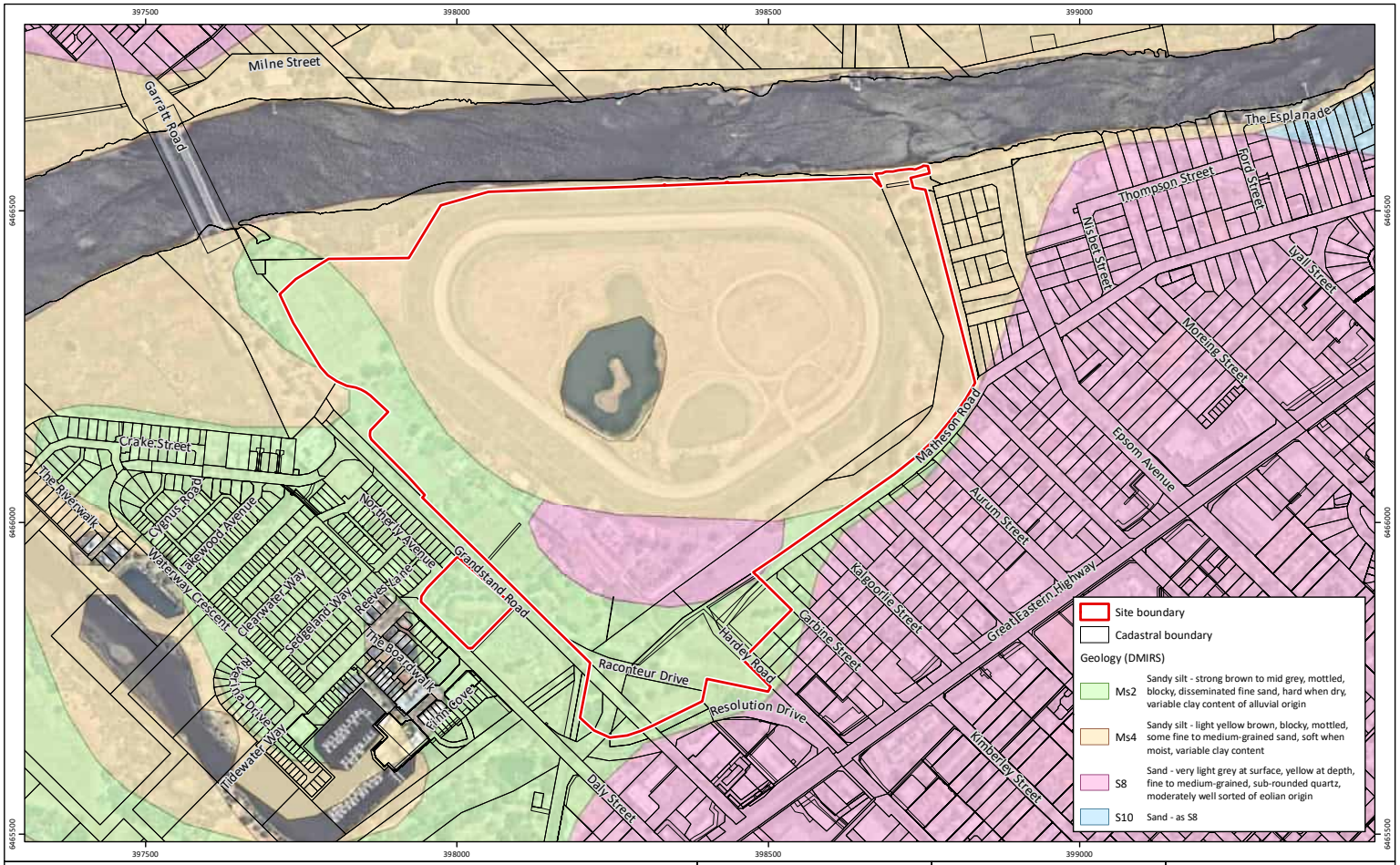


Figure 2: Site Geology

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan
Client: Perth Racing

Plan Number: EP23-109(05)--F07
Drawn: WJC
Date: 03/04/2024
Checked: EKB
Approved: JDH
Date: 29/04/2024

N

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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Figure 3: Topographic Contours

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Ascot Racecourse Structure Plan
Client: Perth Racing

Plan Number: EP23-109(05)--F08
Drawn: WJC
Date: 03/04/2024
Checked: EKB
Approved: JDH
Date: 29/04/2024

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GDA2020 MGA Zone 50

emerge ASSOCIATES

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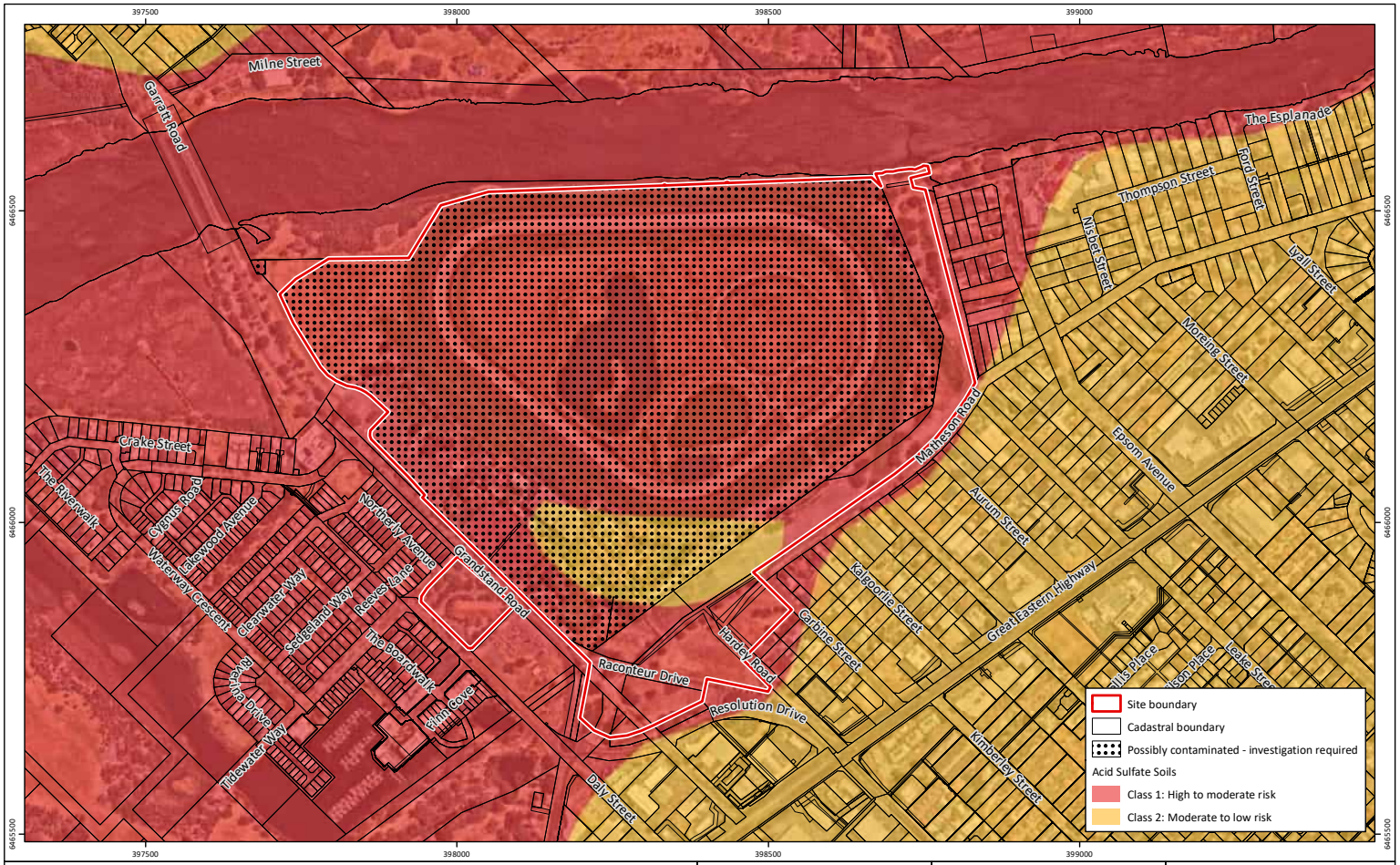


Figure 4: **Acid Sulfate Soils**

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan

Client: Perth Racing

Plan Number: EP23-109(05)--F09a
Drawn: WJC
Date: 22/07/2024
Checked: EKB
Approved: JDH
Date: 23/07/2024

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Figure 5: Vegetation Types

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan
Client: Perth Racing

Plan Number: EP23-109(05)--F10
Drawn: WJC
Date: 03/04/2024
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Date: 29/04/2024

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398000
398500
399000
6466500
6466000
Garratt Road
Ascot Place
Thompson Street
Ennis Place
Nisbet Street
Moreing Street
Epsom Avenue
Matheson Road
Leake Street
Aurum Street
Crake Street
Waterway Crescent
Cygnus Road
Lakewood Avenue
Northerly Avenue
Artesian Lane
Grandstand Road
Clearwater Way
Sedgeland Way
Reeves Lane
Mirror Lane
The Boardwalk
Racecourse Drive
Racquet Drive
Tidewater Way
Racquet Cove
Racquet Drive
Racquet Drive
Racquet Drive

Attachment 12.1.3 Environmental Assessment Report



Figure 7: **Threatened and Priority Ecological Community and Native Vegetation under the EP Act**

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan
Client: Perth Racing

Plan Number: EP23-109(05)--F12
Drawn: WJC
Date: 03/04/2024
Checked: EKB
Approved: JDH
Date: 01/05/2024

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GDA2020 MGA Zone 50

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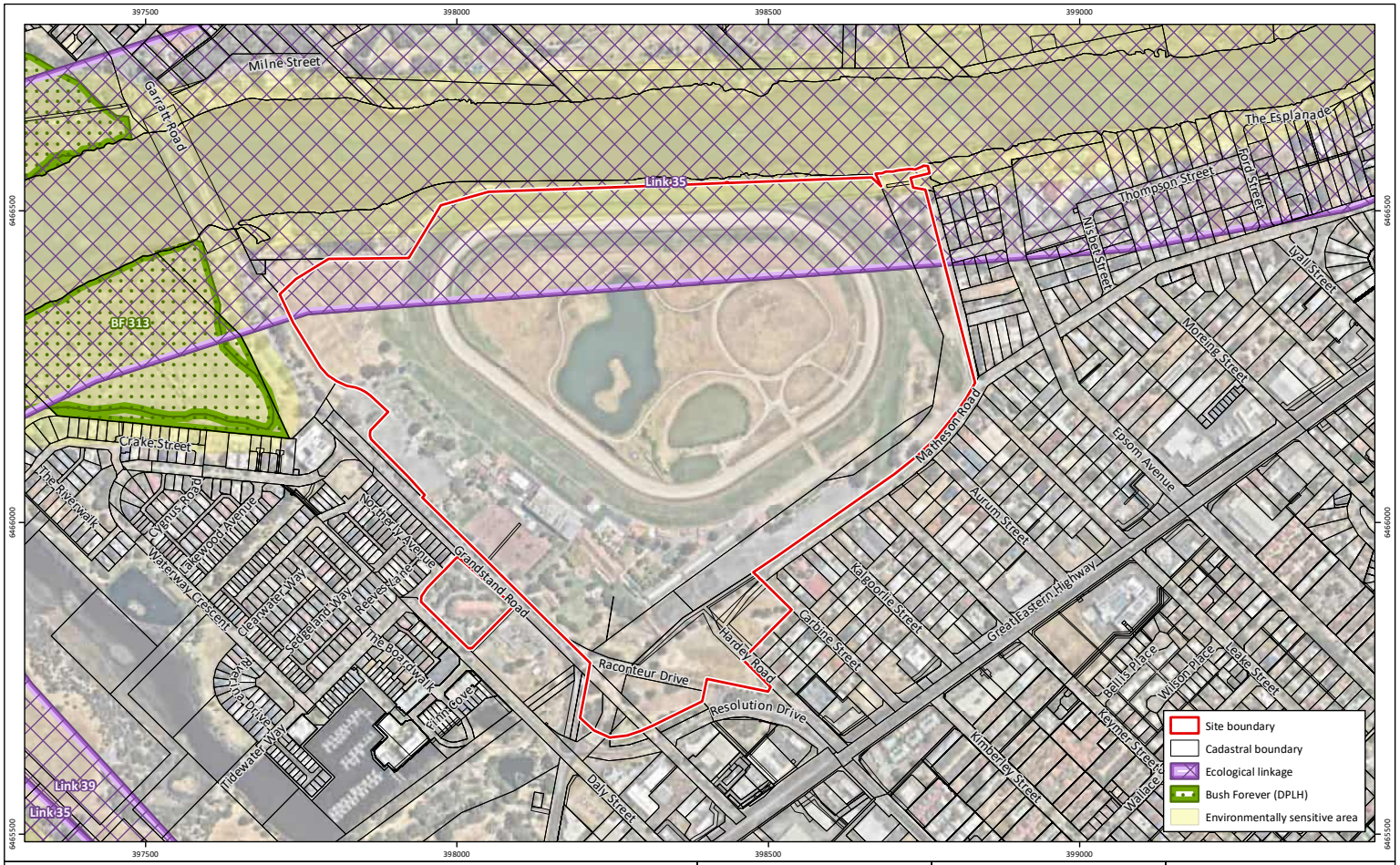


Figure 8: **Bush Forever, Ecological Linkages and Environmentally Sensitive Areas**

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan
Client: Perth Racing

Plan Number: EP23-109(05)--F13
Drawn: WJC
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398000
398500
399000
6466500
6466000
Garratt Road
Ascot Place
Thompson Street
Ennis Place
Nisbet Street
Moreing Street
Epsom Avenue
Matheson Road
Leake Street
Aurum Street
Kalgoorlie Street
Great Eastern Highway
Carbine Street
Hardey Road
Crake Street
Waterway Crescent
Cygnus Road
Lakewood Avenue
Northerly Avenue
Artesian Lane
Grandstand Road
Clearwater Way
Sedgeland Way
Reeves Lane
Mirror Lane
The Boardwalk
Racecourse Drive
Racquet Drive
Tidewater Way
Racquet Drive
Racquet Drive
Racquet Drive

Attachment 12.1.3 Environmental Assessment Report



Figure 10: **Forest Red-tailed Black Cockatoo Foraging Habitat**

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(05)--F21**
Drawn:	WJC
Date:	08/04/2024
Checked:	EKB
Approved:	JDH
Date:	29/04/2024

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Figure 11: Black Cockatoo Habitat Trees

Project:	Environmental Assessment Report Ascot Racecourse Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(05)--F22a**
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Date:	28/06/2024
Checked:	TDP
Approved:	RAW
Date:	01/07/2024

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GDA2020 MGA Zone 50

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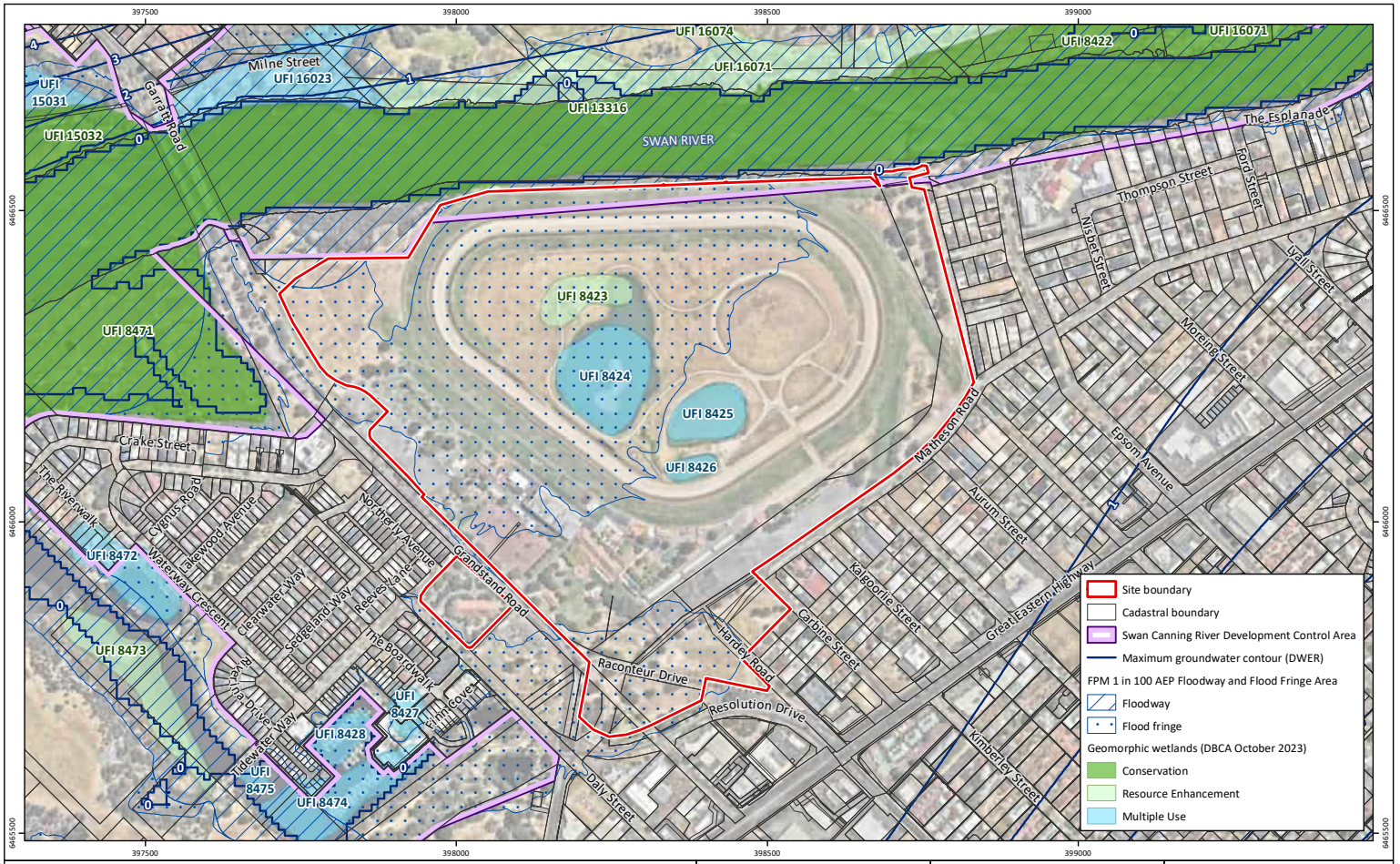


Figure 12: Hydrological Features

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Client:	Perth Racing

Plan Number:	**EP23-109(05)--F14**
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Date:	03/04/2024
Checked:	EKB
Approved:	JDH
Date:	01/05/2024

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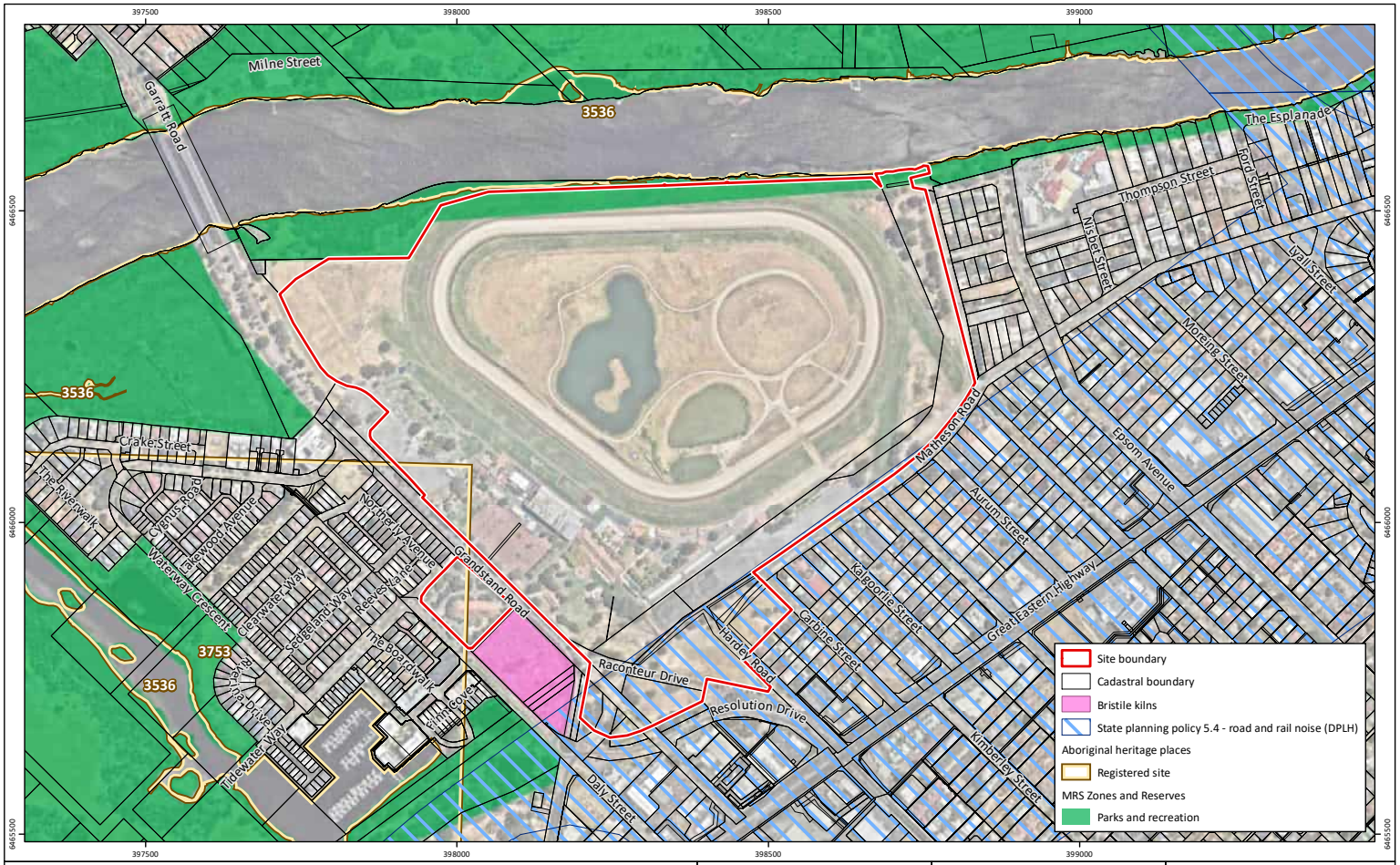


Figure 13: Social Surroundings

Project: Environmental Assessment Report
Ascot Racecourse Structure Plan
Client: Perth Racing

Plan Number: EP23-109(05)--F15a
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Date: 08/05/2024
Checked: EKB
Approved: JDH
Date: 09/05/2024

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GDA2020 MGA Zone 50

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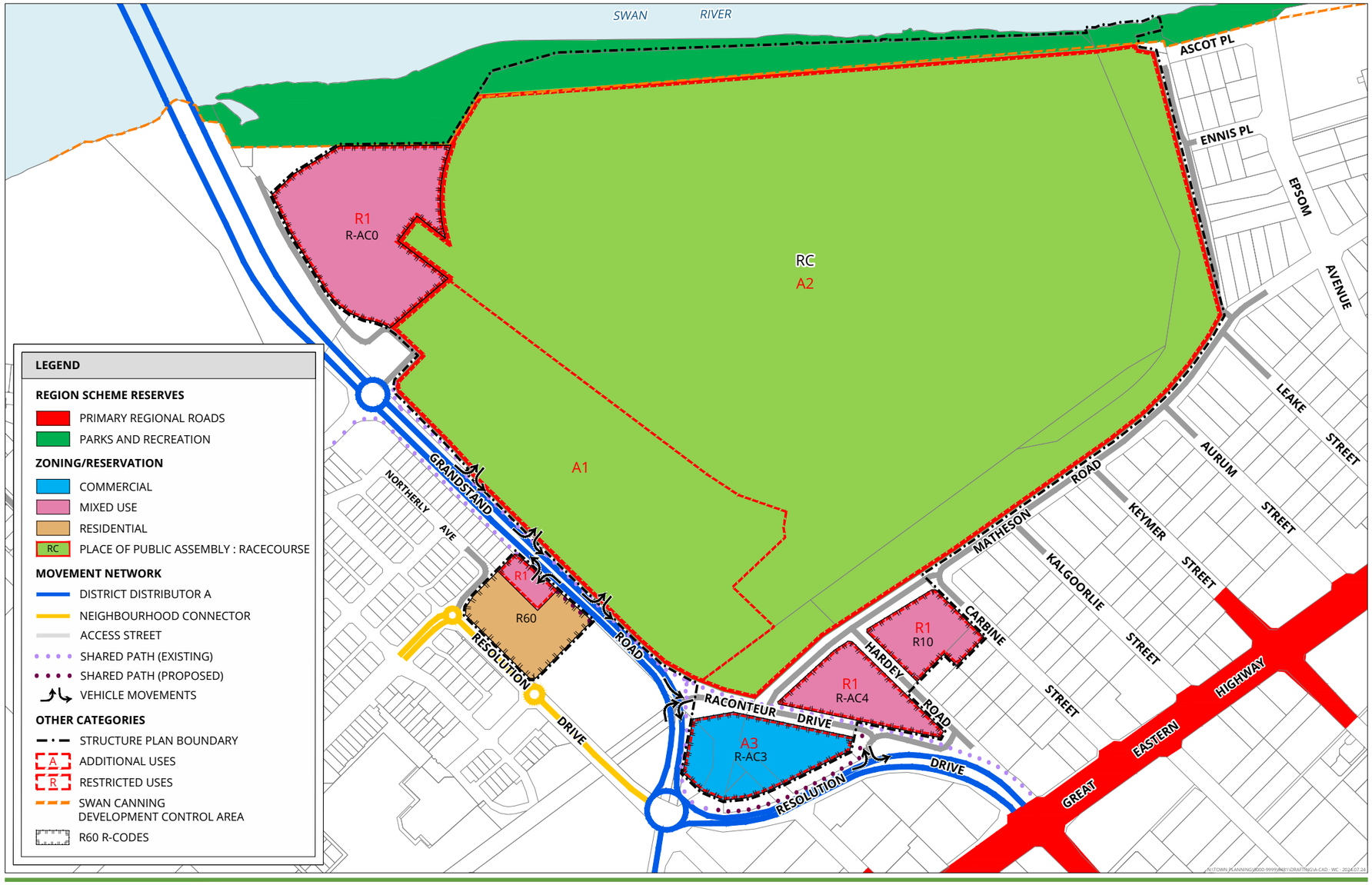
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Appendix A

Ascot Racecourse Structure Plan (ROWE Group Design, 2024)

emerge ASSOCIATES

Attachment 12.1.3 Environmental Assessment Report



PLAN 1 - STRUCTURE PLAN
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

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SCALE @ A3: 1:4000
9481-STR-01-G

DRAWN: WC
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CADASTRE: LANDGATE
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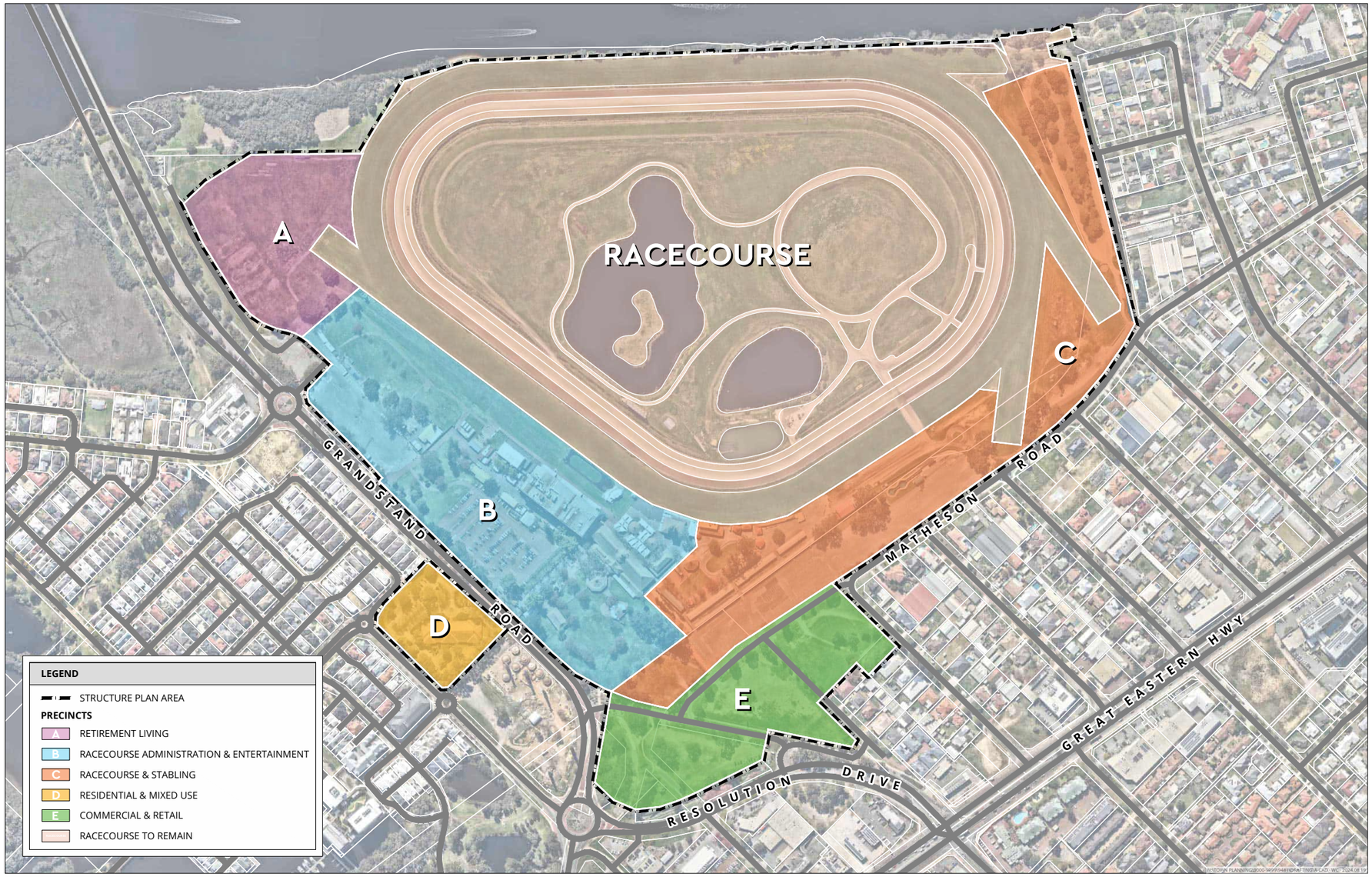
ROWE GROUP DESIGN

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Appendix B

Ascot Racecourse Precinct Plan (ROWE Group Design, 2024)

Attachment 12.1.3 Environmental Assessment Report



STRUCTURE PLAN PRECINCTS
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

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9481-FIG-02-C

DRAWN: WC
DATE CREATED: 2024.08.19
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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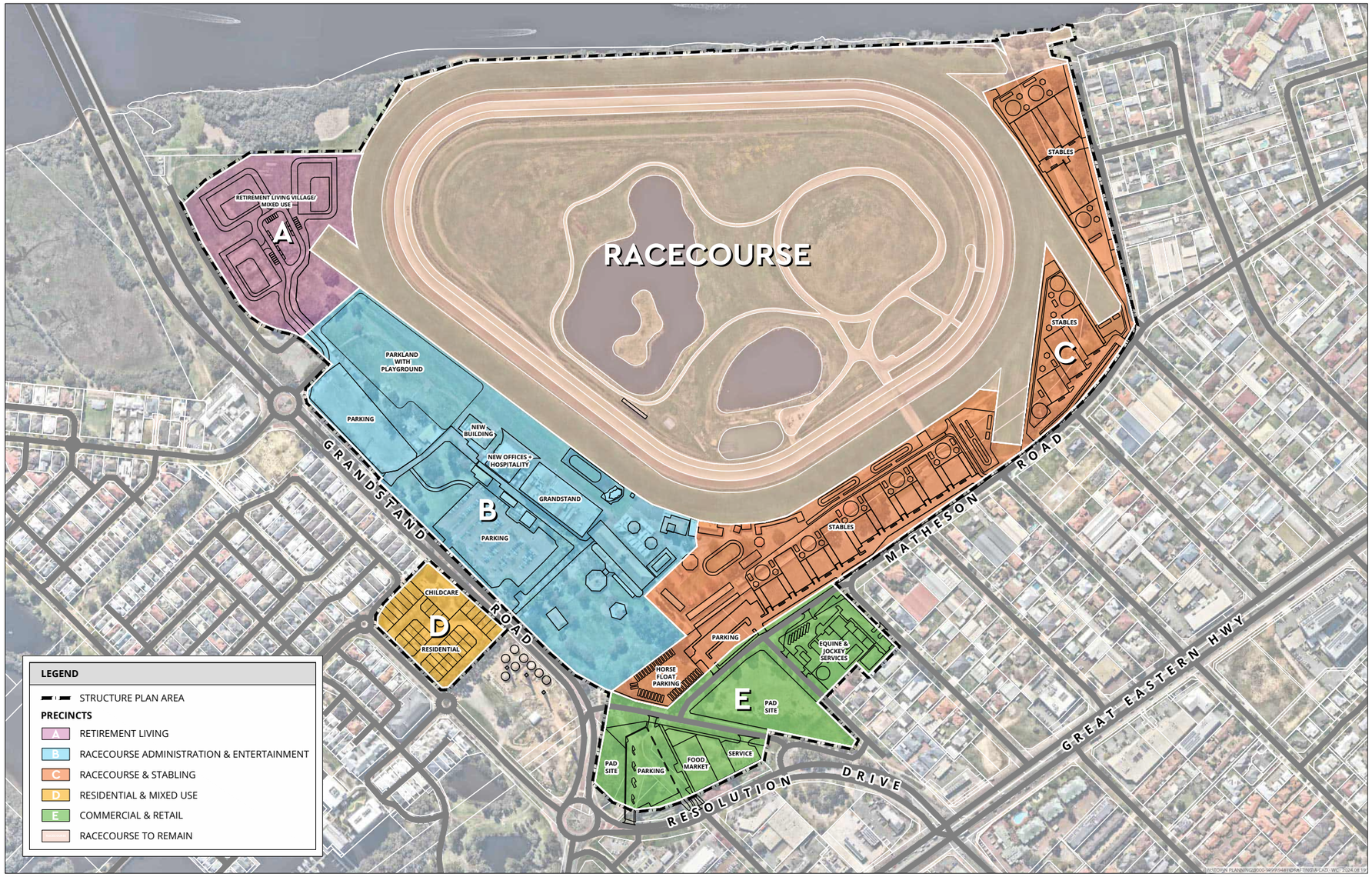
ROWE GROUP DESIGN

Attachment 12.1.3 Environmental Assessment Report

Appendix C

Draft Master Plan Concept (ROWE Group Design, 2024)

Attachment 12.1.3 Environmental Assessment Report



DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
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9481-CON-01-D

DRAWN: WC
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PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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Appendix D

Flora, Vegetation and Fauna Assessment (Emerge Associates 2024a)

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TECHNICAL MEMORANDUM

Flora, Vegetation and Fauna Assessment
Various lots, Grandstand Rd and Raconteur Dr, Ascot

PROJECT NUMBER	EP23-109(06)	**DOC. NUMBER**	EP23-109(06)—003A TDP
PROJECT NAME	Ascot Local Structure Plan	**CLIENT**	Perth Racing
AUTHOR	TDP/AJU	**REVIEWER**	RAW
VERSION	A	**DATE**	11/07/2024

1. INTRODUCTION

1.1. Project background

Emerge Associates (Emerge) were engaged by Perth Racing to undertake a flora, vegetation and fauna assessment at Lots 1, 3, 13, 50, 452, 7705 and 9002 Grandstand Rd and Lots 51 and 100 Raconteur Dr, Ascot, in the City of Belmont (herein referred to as the 'site').

The site is located approximately 5.5 kilometres (km) east of the Perth Central Business District within the City of Belmont. The site extends over approximately 61.8 hectares (ha) and is bounded by Matheson Rd to the east, Grandstand Rd to the west, Resolution Dr to the south, and the Swan River to the north. The location of the site is shown in **Figure 1**.

1.2. Purpose and scope of work

The flora, vegetation and fauna assessment was required to support the development of a Local Structure Plan (LSP) within the site. Specifically, the scope of work was to provide sufficient detail on the flora, vegetation and fauna values within the site to inform this process.

As part of the scope of work the following tasks were completed:

- Desktop review of relevant background information pertaining to the site and surrounds, including database searches for conservation significant flora, fauna and communities.
- A field survey to record flora, vegetation and fauna values.
- Identification of potential habitat for conservation significant flora and vegetation.
- Documentation of the desktop assessment, methodology, field surveys and results into a report.

2. Desktop assessment

A search was conducted for threatened, specially protected and priority flora and fauna that may occur or have been recorded within a 10 km radius of the site using NatureMap (DBCA 2023), *Protected Matters Search Tool* (DCCEEW 2023), *Atlas of Living Australia* (ALA 2023) and the Department of Biodiversity, Conservation and Attraction's (DBCA) conservation significant fauna and flora databases (reference no. FAUNA#8125/53-0323FL).

2.1. Likelihood of occurrence method

2.1.1. Flora and vegetation

The distribution and habitat preferences of threatened flora species and ecological communities listed in **Section 2** were reviewed against site context information[1] and preliminary survey results. Likelihood of occurrence of threatened flora species and ecological communities within the site was classified as 'high', 'moderate', 'low' or 'negligible' as outlined below in **Table 1**.

Table 1: Decision matrix for likelihood of occurrence of threatened and priority flora and ecological communities

		Distribution[1]	
		Reliable record within search area	No reliable record within search area (20 km)
Habitat	Suitable	High	Negligible
	Potentially suitable	Moderate	
	Unsuitable	Low	

[1]Reliable record defined as validated, recent (within the last ~40 years) and spatially accurate (refer DBCA search meta data) in order to exclude unverified range or habitat projections.

2.1.2. Fauna

The distribution and habitat preferences of the threatened and specially protected fauna species identified from **Section 2** was reviewed against site context[1] information and preliminary survey results. Likelihood of occurrence of threatened and specially protected fauna species within the site was classified as 'high', 'moderate', 'low', 'negligible' or 'nil' as outlined in **Table 2**. Noting some marine species were excluded due to lack of suitable habitat.

Table 2: Decision matrix for likelihood of occurrence of threatened, specially protected and priority fauna

		Reliable record[1]		Unreliable record[2]
		Access to site not impeded	Access to site impeded	
Habitat	Suitable	High	Low	Nil
	Potentially suitable	Moderate		
	Unsuitable	Negligible		

[1]Reliable record defined as DBCA or validated ALA record from the last ~20 years, [2]Unreliable record defined as record >20 years old or PMST prediction.

2.2. Likelihood of occurrence results

2.2.1. Threatened and priority flora

A total of 100 conservation significant flora species were identified from database searches as occurring or potentially occurring within 9km of the site. Based on background information available for the site and habitat preferences of the species, two priority flora species were considered to have a high or moderate likelihood of occurring within the site, as outlined in

[1] Including relevant Commonwealth documentation such as approved conservation advice, listing advice and other relevant literature.

Table 3. The complete likelihood of occurrence assessment is provided as **Appendix A**.

Table 3: Threatened or priority flora species with a high or moderate likelihood occurrence in the site

Species	Status		Life strategy	Flowering period
	WA	EPBC Act		
Angianthus micropodioides	P	P3	-	Nov-Dec or Jan-Feb
Aponogeton hexatepalus	P	P4	-	Jul-Oct

2.2.2. Vegetation

The database search results identified 13 TECs and 6 PECs as occurring or potentially occurring within a 10 km radius of the site. Information on these communities is provided in **Appendix C**.

Due to historical disturbance the likelihood of occurrence of any TEC or PEC was considered negligible.

2.2.3. Threatened, specially protected and priority fauna

A total of 77 conservation significant fauna species were identified from database searches as occurring or potentially occurring within 10 km of the site.

Two threatened, six specially protected and three priority species were classified as having a 'high' or 'moderate' likelihood of occurrence. The legislative or policy status and habitat preferences of these species are shown in **Table 4**.

The remainder of the conservation significant fauna species identified in the desktop assessment (66 species) were considered as having a 'low', 'negligible' or 'nil' likelihood of occurrence. Refer to **Table 4** and **Appendix D** for detail on individual species likelihood of occurrence.

Table 4: Summary of conservation significant fauna species with potential to occur in the site

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Birds				
Apus pacificus	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities.
Calidris ruficollis	Red-necked stint	MI	MI	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands (coastal and inland), saltfields, sewage ponds.
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	VU	Eucalypt and Corymbia forests, often in hilly interior. More recently also observed in more open agricultural and suburban areas including Perth metropolitan area. Attracted to seeding *Corymbia calophylla*, *Eucalyptus marginata*, introduced *Melia azedarach* and *Eucalyptus* spp. trees.
Falco peregrinus	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes.
Oxyura australis	Blue-billed duck	P4	-	Mainly deeper freshwater swamps and lakes; occasionally saltlakes and estuaries freshened by flood waters.

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Pandion haliaetus	Osprey	MI	MI	Coasts, estuaries, bays, inlets, islands, and surrounding waters; coral atolls, reefs, lagoons, rock cliffs, stacks.
Plegadis falcinellus	Glossy Ibis	MI	MI	Well-vegetated wetlands, wet pasture, ricefields, floodwaters, floodplains, brackish or occasionally saline wetlands, mangroves, mudflats and occasionally dry grassland.
Thalasseus bergii	Crested tern	MI	MI	Mainly blue-water seas (especially within 3 km of land), including southern estuaries in summer and autumn (when free of silt); also tidal creeks in north, but not penetrating far into larger estuaries.
Zanda latirostris	Carnaby's black cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of *Pinus* spp. Attracted to seeding *Banksia* spp., *Hakea* spp., *Eucalyptus* spp., *Corymbia calophylla*, *Grevillea* spp., and *Allocasuarina* spp.
Mammals				
Hydromys chrysogaster	Rakali	P4	-	Areas with permanent water, fresh, brackish or marine. Likely to occur in all major rivers and most of the larger streams as well as bodies of permanent water in the lower south-west. Intact riparian vegetation and associated bank stability is critical to their survival.
Isoodon fusciventer	Quenda	P4	-	Dense scrubby, often swampy, vegetation with dense cover up to one metre high.

3. Methods

3.1.1. Vegetation

Vegetation units were identified from information collected during the field survey in January 2024. The vegetation was described according to the dominant species present using the structural formation descriptions of the *National Vegetation Inventory System* (NVIS) (NVIS Technical Working Group 2017). The identified vegetation units were mapped on aerial photography during the field survey and boundaries were interpreted from aerial photography and notes taken in the field. Vegetation condition was mapped on aerial photography based on notes recorded during the field survey to define areas with differing condition and using the Keighery (1994) scale **Table 5**.

Table 5: Vegetation condition scale applied during the field assessment

Condition	Definition (Keighery 1994)
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation

Condition	Definition (Keighery 1994)
	structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

3.1.2. Threatened and priority ecological community

Areas of native vegetation potentially representing a TEC were assessed against key diagnostic characteristics and, if available, size and/or vegetation condition thresholds.

3.1.3. Native vegetation under the EP Act

Vegetation within the site that meets the definition of 'native vegetation' under the *Environmental Protection Act 1986* (EP Act) was mapped on aerial imagery.

3.1.4. Fauna habitat

Transects were traversed across the site, during the day, and the characteristics of fauna habitat and presence of fauna species was recorded. Microhabitats such as logs, rocks and leaf litter were investigated and secondary evidence of species presence such as tracks, scats, skeletal remains, foraging evidence or calls was also noted.

3.1.5. Black cockatoo habitat

Black cockatoo foraging, breeding and roosting habitat was assessed and mapped within the site.

Foraging habitat

Foraging habitat was identified by assessing vegetation in the site for plant species known to provide food for black cockatoos (Davies 1966; Saunders 1980; Johnstone and Storr 1998; Johnstone and Kirkby 1999; Groom 2011; Johnstone *et al.* 2011; DAWE 2022). Foraging habitat was classified as either 'native' or 'non-native' based on the predominant vegetation's naturalised status and in accordance with DAWE (2022).

It was also classified as either 'primary' or 'secondary' based on black cockatoo foraging preferences. Primary food plants were defined as those with historical and contemporary records of regular consumption by a black cockatoo species. Secondary food plants were defined as plants that black cockatoo species have been recorded consuming occasionally or that, based on their limited extent or agricultural origin, should not be considered a sustaining resource. A list of plant species classified as primary or secondary food plants is provided as **Appendix E**.

Each patch of foraging habitat was assigned a foraging value for each species of black cockatoo likely to occur within the site. As it is not always possible to separate out food plants from non-food plants,

mapped foraging habitat may also include vegetation comprising non-food plants. The proportion of non-food plants in mapped foraging habitat was minimised as far as practicable.

Evidence of black cockatoo foraging, such as chewed fruits, was searched for within the site and allocated to a black cockatoo species where possible.

Breeding habitat

Breeding habitat comprises 'habitat trees' which was defined as a native eucalypt that is typically known to support black cockatoo breeding such as marri, jarrah, blackbutt, tuart, wandoo, salmon gum or to a lesser extent flooded gum, with a DBH ≥50 cm or DBH ≥30 cm for wandoo or salmon gum.

All native eucalypts within the site that met the required DBH were recorded. Occasionally, native eucalypts were encountered that met DBH requirements but did not contain a trunk/branch of a sufficient size to support a hollow suitable for use by black cockatoos. For example, the tree may have been less than 3 m tall or had a trunk that forked between 1.3 m and 3 m in height and after the fork no limbs had a diameter of ≥50 cm or ≥30 cm for wandoo or salmon gum. These trees were not recorded as habitat trees as the likelihood they would form a suitable hollow was low.

Habitat trees were individually identified and the attributes outlined in **Table 6** were recorded for each tree.

Table 6: Attributes recorded for each habitat tree in the site

Attribute	Description
GPS location	The location was recorded using a handheld GPS unit
Tree species	Species and common name were identified
Diameter at breast height (DBH) (cm)	DBH was measured at breast height (1.3 m) using a diameter tape
Hollows potentially suitable for breeding by a black cockatoo	Number of hollows potentially suitable for breeding by a black cockatoo recorded (assessed from ground level only)

Each habitat tree was assigned to a category listed in **Table 7** based on current black cockatoo guidelines (DAWE 2022).

Table 7: Habitat tree categories (DAWE 2022)

Category	Specifications
Known nesting tree	Trees (live or dead but still standing) which contains a hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).
Suitable nesting tree	Trees with suitable nesting hollows present^, although no evidence of use. Note that any species of tree may develop suitable hollows for breeding.
Potential nesting tree	Trees that have a suitable DBH to develop a nest hollow, but do not currently have suitable nesting hollows. Trees suitable to develop a nest hollow in the future are 300-500 mm DBH. Note that many species of eucalypt may develop suitable hollows for breeding.

^Hollow determined to be suitable for use as breeding habitat by black cockatoos.

Roosting habitat

If present, groups of tall native and non-native trees were assumed to provide roosting habitat. The presence of active or historical roosts in these trees was determined through evidence of roosting activity, such as branch clippings, droppings or moulted feathers.

4. Results

4.1. Flora

4.1.1. Flora species inventory

A total of 58 weed species and 21 native species were recorded in the site during the field surveys. This comprises a total of 29 families and 60 genera. The dominant families containing native taxa were Myrtaceae (three native taxa) and Fabaceae (three native taxa). The family containing the most non-native taxa was Poaceae (thirteen non-native species).

A complete species list is provided in **Appendix B**.

4.1.2. Threatened and priority flora

No threatened or priority flora were recorded and none are considered likely to occur in the site due to the lack of suitable habitat.

4.1.3. Declared pests

One species listed as a declared pest (pursuant to s22(2) of the *Biosecurity and Agriculture Management Act 2007*), **Tamarix aphylla* (athel pine), was recorded within the site. Athel pine is listed in exempt keeping category meaning management is not obliged.

4.2. Vegetation

4.2.1. Vegetation units

Four vegetation units were identified within the site: Cc, Er, ErJkSt, and non-native.

A description and the area of each vegetation unit is provided in **Table 8** and representative photographs of each are provided in **Plate 1** to **Plate 4**. The location of each vegetation unit is shown in **Figure 2**.

Table 8: Vegetation unit present within the site

Vegetation Unit	Description	Area (ha)
Er	Woodland *Corymbia calophylla* over closed grass/forbland of pasture weeds and scattered native species (or absent) (**Plate 1**).	1.12
Cc	Woodland *Eucalyptus rudis* over closed grass/forbland of pasture weeds and scattered native species (or absent) (**Plate 2**).	0.28
ErJkSt	Open woodland *Eucalyptus rudis* and occasional *Melaleuca raphiophylla* over sedgeland *Juncus kraussii* and *Schoenoplectus tabernaemontani* over low shrubland *Suaeda australis* over forbland *Apium prostratum* subsp. *prostratum* var. *prostratum* and *Heliotropium curassavicum* over grassland **Avena* sp., *Cynodon dactylon* and **Paspalum vaginatum* (or absent) (**Plate 3**).	0.17

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Vegetation Unit	Description	Area (ha)
To	Fringing rushland of *Typha orientalis*, with occasional planted native and non-native trees, shrubs and/or non-woody vegetation, over closed grass/forbland of pasture weeds.	0.46
Non-native	Heavily disturbed areas comprising bare ground and weeds with occasional native trees and forbs and/or sealed ground and buildings (**Plate 4**).	56.62



*Plate 1: Vegetation unit **Er** in 'degraded' condition*



*Plate 2: Vegetation unit **Cc** in 'degraded' condition*



*Plate 3: Vegetation unit **ErJkSt** in 'good – very good' condition*



*Plate 4: Vegetation unit **Non-native** in 'completely degraded' condition*

4.2.2. Vegetation condition

The vegetation in the site occurred in 'good – very good', 'degraded', 'degraded - completely degraded' and 'completely degraded condition. The extent of vegetation by condition category is detailed in **Table 9** and shown in **Figure 3**.

Table 9: Vegetation condition categories within the site

Condition category (Keighery (1994))	Size (ha)
Pristine	0
Excellent	0
Very good	0
Good – very good	0.07
Good	0
Degraded	1.04
Degraded – completely degraded	0.98
Completely degraded	56.57

4.2.3. Threatened and priority ecological communities

The 'subtropical and temperate coastal saltmarsh' TEC which is listed as vulnerable under the EPBC Act was identified within a patch of ErJkSt the northern portion of the site as shown in **Figure 5**. A total of 0.07 ha of this TEC/PEC was mapped. Not all of the ErJkSt represents the TEC as some patches represent canopy overhang into the site with limited to no understory vegetation.

The 0.07 ha of coastal saltmarsh TEC vegetation mapped in the site also represents the State listed Priority 3 (P3) PEC of the same name.

4.2.4. Native vegetation under the EP Act

A total of 1.10 ha of vegetation meeting the definition of 'native vegetation' pursuant to the EP Act occurs within the site, as shown in **Figure 4**. This comprises of scattered flooded gum (*Eucalyptus rudis*) and marri (*Corymbia calophylla*) trees, and fringing vegetation **ErJkSt** (**Table 8**).

4.3. Fauna

4.3.1. Fauna habitat

Habitat values in the site are limited by historical disturbance and are primarily suited to widespread fauna species with non-specific habitat requirements.

The ErJkSt vegetation provides a cover of native trees and understory cover of riparian vegetation that would offer cover for ground dwelling fauna.

Large native trees associated with plant communities Cc and Er would also provide value to native birds and other arboreal fauna. The extent of fauna habitat is detailed in **Table 10** and shown in **Figure 5.**

Table 10: Fauna habitats identified within the site

Fauna habitat	Description	Area (ha)
Fringing woodland	Native fringing vegetation consisting of a native tree overstorey and an understorey of sedges/rushes.	0.07
Wetland	Wetland waterbodies and associated riparian sedgeland/rushland.	3.72

Scattered trees and shrubs	Scattered native and non-native trees and shrubs, providing habitat mainly for avifauna.	5.45
Cleared	Predominantly grassy weeds, bare ground and built form.	52.64

4.3.2. Fauna species inventory

Twenty-four fauna species were recorded within the site:

- *Aix sponsa* (wood duck)
- *Anas gracilis* (grey teal)
- *Anas superciliosa* (Pacific black duck)
- *Anhinga novaehollandiae* (Australasian darter)
- *Cacatua sanguinea* (little corella)
- *Calyptorhynchus banksii* (forest red-tailed black cockatoo)
- *Columba livia* (feral pigeon)
- *Corvus coronoides* (Australian raven)
- *Cygnus atratus* (black swan)
- *Eolophus roseicapilla* (galah)
- *Equus ferus* (horse)
- *Fulica atra* (Eurasian coot)
- *Grallina cyanoleuca* (magpie-lark)
- *Gymnorhina tibicen* (Australian magpie)
- *Malacorhynchus membranaceus* (pink-eared duck)
- *Microcarbo melanoleucos* (little pied cormorant)
- *Oxyura australis* (blue-billed duck)
- *Pelecanus conspicillatus* (Australian pelican)
- *Phalacrocorax sulcirostris* (little black cormorant)
- *Porphyrio porphyria* (purple swamphen)
- *Rhipidura leucophrys* (willie wagtail)
- *Spilopelia chinensis* (spotted dove)
- *Tadorna tadornoides* (Australian shelduck)
- *Threskiornis moluccus* (Australian white ibis)
- *Trichoglossus moluccanus* (rainbow lorikeet)

4.3.3. Conservation significant fauna

One threatened (forest red-tailed black cockatoo, (VU)) and one priority (blue-billed duck, (P4)) fauna species were recorded at the time of survey.

Zanda latirostris (Carnaby's black cockatoo (EN)) is considered to have a high likelihood of occurring in this site and is discussed further below in **Section 4.3.4**. Six additional conservation significant bird species not recorded during the survey have potential to occur within the site:

Apus pacificus (Pacific swift (MI)), and *Falco peregrinus* (peregrine falcon (OS)) are both highly mobile species that are sometimes recorded over urbanised areas. Any occurrence of these species is likely

to be a flyover or brief forage as the site and surrounding area lacks suitable habitat for breeding or persistence of any other kind. *Calidris ruficollis* (red-necked stint (MI)), and *Thalasseus bergii* (crested tern (MI)) are both shorebirds which may briefly utilise the site as marginal foraging habitat. *Plegadis falcinellus* (glossy ibis (MI)) are known to forage in wet grassland areas when nearby to water sources but this type of habitat is likely to provide a marginal foraging resource. *Pandion haliaetus* (osprey (MI)), have been recorded nesting nearby and are therefore likely to forage near or within the site.

Two priority 4 mammal species not recorded during the survey, *Hydromys chrysogaster* (rakali) and *Isoodon fusciventer* (quenda), could also occur in the site. Rakali may utilise the Swan River and so could occasionally occur in the northern most portion of the site associated with the ErJkSt vegetation. Quenda commonly occur in urban areas, particularly where understorey vegetation or grasses provide dense cover.

4.3.4. Black cockatoos

Forest red-tailed black cockatoo was observed foraging in the site in cape lilac (*Melia azedarach*) overhanging the site. The site lies within the modelled distribution of Carnaby's black cockatoo and therefore they may also occur. The site does not lie within the modelled distribution of Baudin's black cockatoo and therefore they are not likely to occur and have not been considered further.

4.3.4.1. Breeding habitat

A total of 66 black cockatoo habitat trees were recorded, of which five contained hollows potentially suitable for black cockatoo breeding based on inspection from ground level. Internal hollow inspection using a camera pole or drone would be required to confirm if hollows are suitable for breeding by black cockatoos. The remaining 61 habitat trees did not contain hollows suitable for black cockatoo breeding.

The habitat trees comprised four tuarts, eight marris and 54 *Eucalyptus rudis* (flooded gum) trees.

A summary of the habitat trees recorded within the site is provided in **Table 11** and the locations of habitat trees are shown in **Figure 7**.

Table 11: Habitat trees

Category	No. trees
Known nesting trees	0
Suitable nesting trees	5
Potential nesting trees	61
Total nesting trees	66

4.3.4.2. Roosting habitat

No roosts or evidence of roosting was observed in the site. Tall trees within the site represent potential roosting trees.

4.3.4.3. Foraging habitat

A total of 1.27 ha of foraging habitat for Carnaby's black cockatoo was recorded in the site, which comprised 0.28 ha of primary native foraging habitat associated with *Corymbia calophylla,* 0.07 ha of

primary non-native foraging habitat associated with *Pinus pinaster*, 0.41 ha of secondary native foraging habitat associated with *Acacia saligna*, *Jacksonia furcellata* and *Xanthorrhoea* spp. and 0.51 ha of secondary non-native habitat associated with *Eucalyptus gomphocephala*.

A total of 0.84 ha of foraging habitat for forest red-tailed black cockatoo was recorded in the site, which comprises 0.28 ha of primary native habitat associated with *Corymbia calophylla,* 0.07 ha of secondary native foraging habitat associated with *Jacksonia furcellata* and 0.49 ha of non-native secondary habitat associated with *Eucalyptus gomphocephala* and **Eucalyptus camaldulensis.*

The extent of foraging habitat by value category is detailed in **Table 12** and shown in **Figure 8** and **Figure 9**.

Table 12: Foraging habitat recorded within the site

Foraging habitat	Black cockatoo species and area of foraging habitat (ha)	
	Carnaby's	Forest red-tailed
Primary native	0.28	0.28
Primary non-native	0.07	0
Secondary native	0.41	0.07
Secondary non-native	0.51	0.49
Total	1.27	0.84

5. CONCLUSIONS

Outcomes of the assessment include the following:

- No threatened or priority flora species were recorded in the site. None of the threatened and priority flora species identified in the desktop assessment are considered to occur in the site due to lack of suitable habitat and/or because they were not recorded during the field survey.
- The majority of the site is heavily disturbed (degraded to completely degraded) and limited native intact native vegetation is present. One small patch of vegetation (ErJkSt) is identified in 'good – very good' condition.
- A total of 0.07 ha of the 'subtropical and temperate coastal saltmarsh' TEC/PEC occurs within the northern portion of the site adjacent to the Swan River.
- One threatened, forest red-tailed black cockatoo (EN), and one priority, blue-billed duck (P4), species were recorded in the site. A further nine conservation significant fauna species also have potential to occur in the site.
- As a result of historical disturbance, the site contains limited high-quality fauna habitat and is likely only utilised by fauna traversing through the wider area, especially birds. However, the small patch of 'fringing woodland' fauna habitat in the site's northeast (associated with vegetation type ErJkSt) may provide value for smaller ground-dwelling fauna.
- A total of 66 black cockatoo habitat trees were recorded of which five contained hollows potentially suitable for breeding. Internal hollow inspection would be required to confirm if these hollows are suitable for black cockatoo breeding.
- No evidence of roosting was recorded in the site. Tall trees in the site may represent potential roosting trees.
- A total of 1.27 ha of foraging habitat for Carnaby's black cockatoo and 0.84 ha of foraging habitat for forest red-tailed black cockatoo exists in the site.

6. REFERENCES

6.1. General references

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Keighery, B. 1994, *Bushland Plant Survey: A guide to plant community survey for the community*, Wildflower Society of WA (Inc), Nedlands.

NVIS Technical Working Group 2017, *Australian Vegetation Attribute Manual: National Vegetation Information System*, Department of the Environment and Energy, Canberra.

6.2. Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 6.1**, with access date information provided in **Table R 1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
DCCEEW (2023)	24 January 2024	Protected Matters Search Tool
DBCA (2023)	28 March 2023	NatureMap
ALA(2023)	24 January 2024	Spatial Portal - Atlas of Living Australia

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Figures

Figure 1: Site Location

Figure 2: Vegetation Units

Figure 3: Vegetation Condition

Figure 4: Threatened Ecological Community

Figure 5: Native Vegetation Under the EP Act

Figure 6: Fauna Habitat

Figure 7: Black Cockatoo Habitat Trees

Figure 8: Carnaby's Black Cockatoo Foraging Habitat

Figure 9: Forest Red-tailed Black Cockatoo Foraging Habitat

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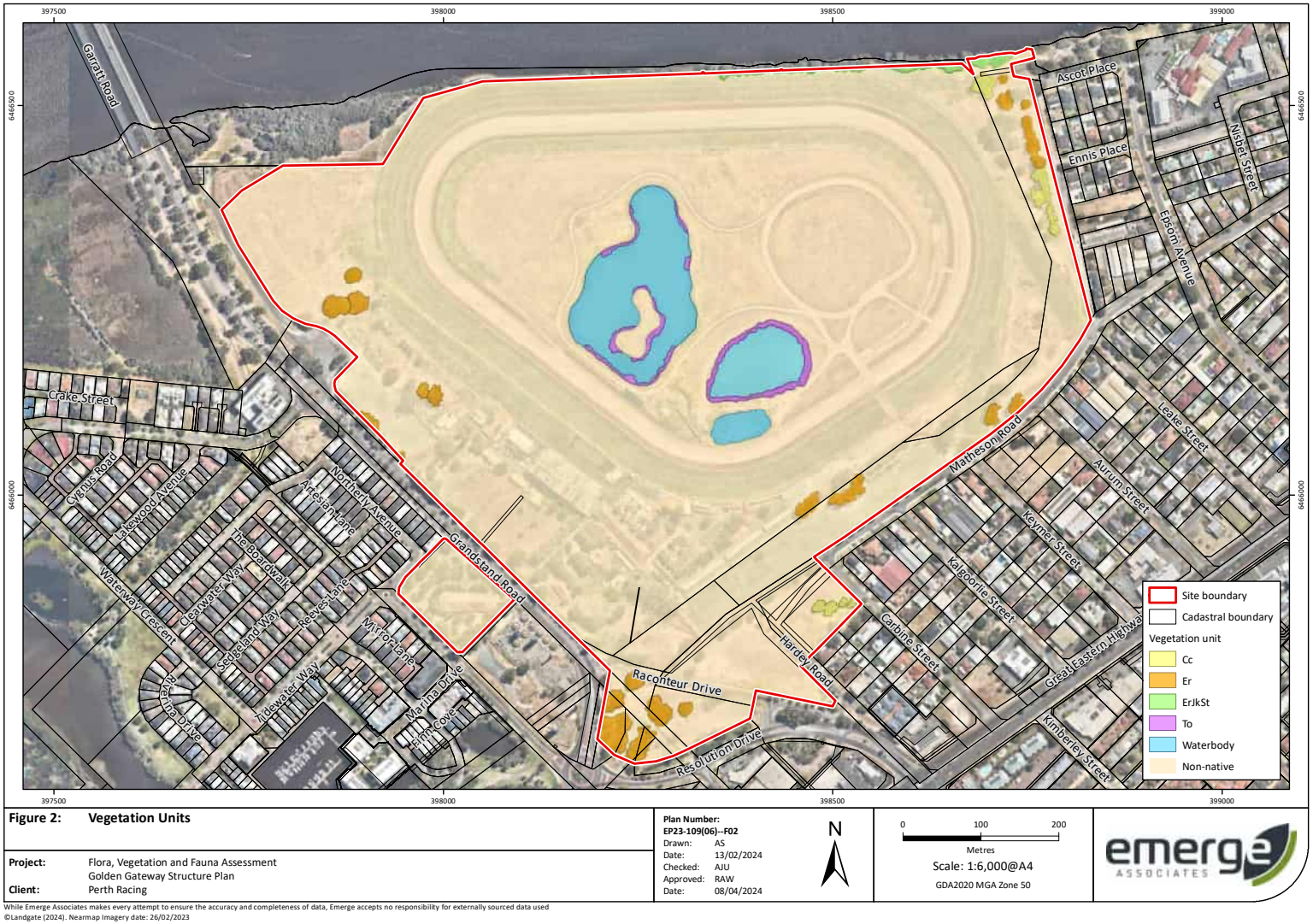


Figure 2: **Vegetation Units**

Project: Flora, Vegetation and Fauna Assessment
Golden Gateway Structure Plan

Client: Perth Racing

Plan Number: EP23-109(06)--F02
Drawn: AS
Date: 13/02/2024
Checked: AJU
Approved: RAW
Date: 08/04/2024

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Figure 3: Vegetation Condition

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(06)--F03

Drawn:	AS
Date:	13/02/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

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Figure 4: Threatened and Priority Ecological Community

Project: Flora, Vegetation and Fauna Assessment
Golden Gateway Structure Plan
Client: Perth Racing

Plan Number: EP23-109(06)--F04
Drawn: AS
Date: 13/02/2024
Checked: AJU
Approved: RAW
Date: 08/04/2024

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Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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Figure 5: **Native Vegetation Under the EP Act**

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(06)--F16**
Drawn:	WJC
Date:	04/04/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

N

0 100 200
Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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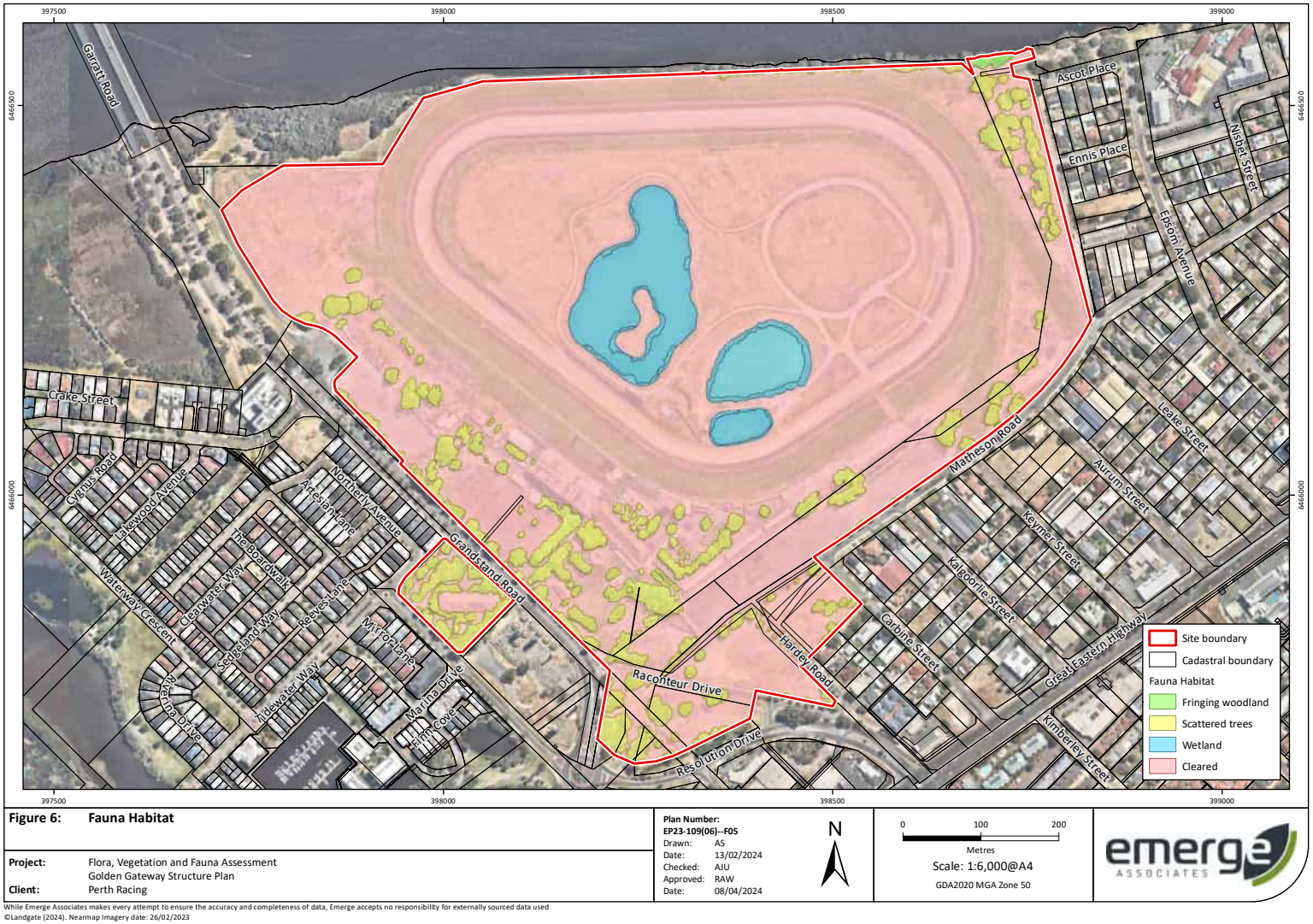


Figure 6: Fauna Habitat

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(06)--F05**
Drawn:	AS
Date:	13/02/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

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Figure 7: **Black Cockatoo Habitat Trees**

Project: Flora, Vegetation and Fauna Assessment
Golden Gateway Structure Plan

Client: Perth Racing

Plan Number: EP23-109(06)--F19a
Drawn: GAR
Date: 28/06/2024
Checked: TDP
Approved: RAW
Date: 01/07/2024

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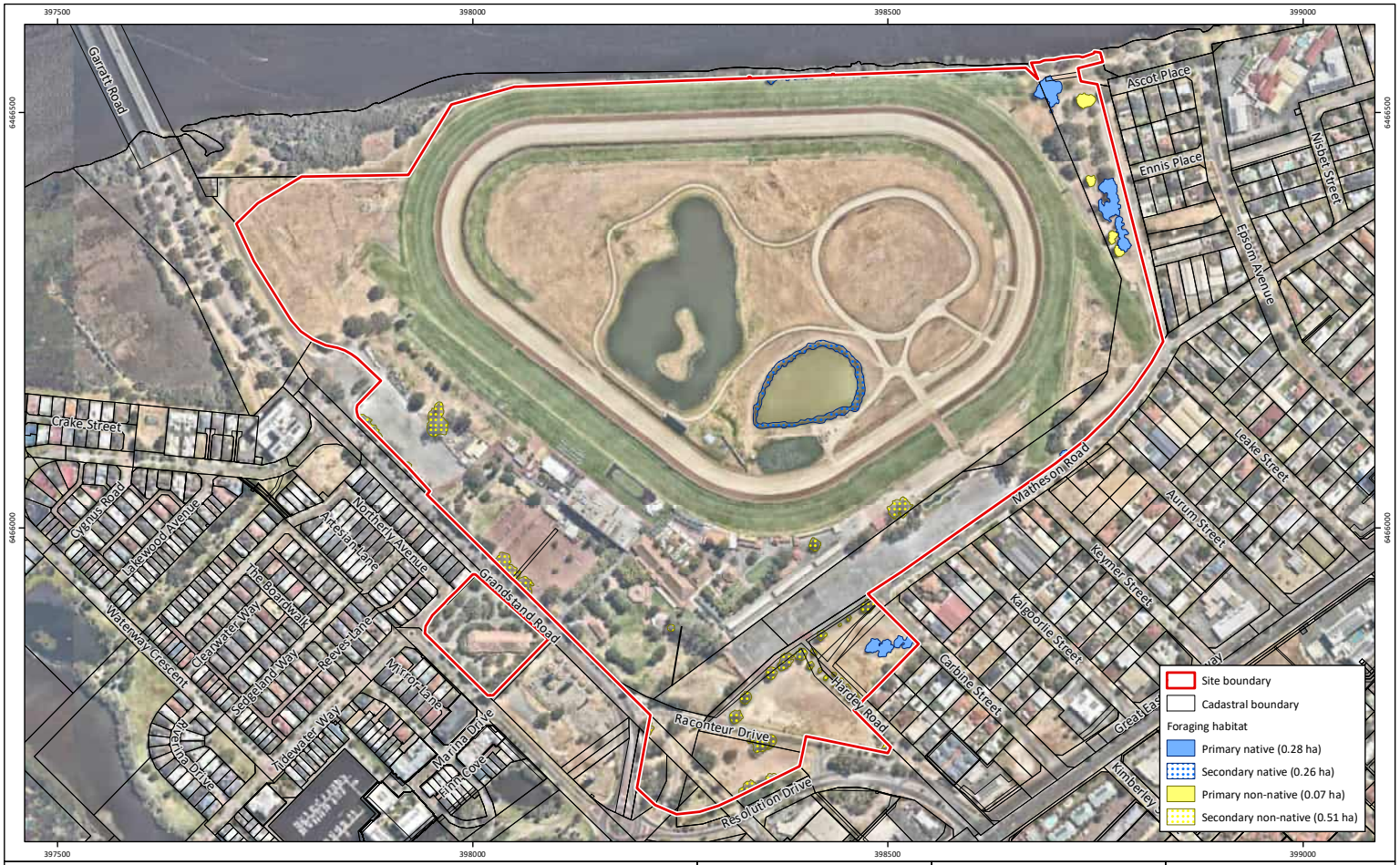


Figure 8: **Carnaby's Black Cockatoo Foraging Habitat**

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(06)--F17**
Drawn:	WJC
Date:	04/04/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

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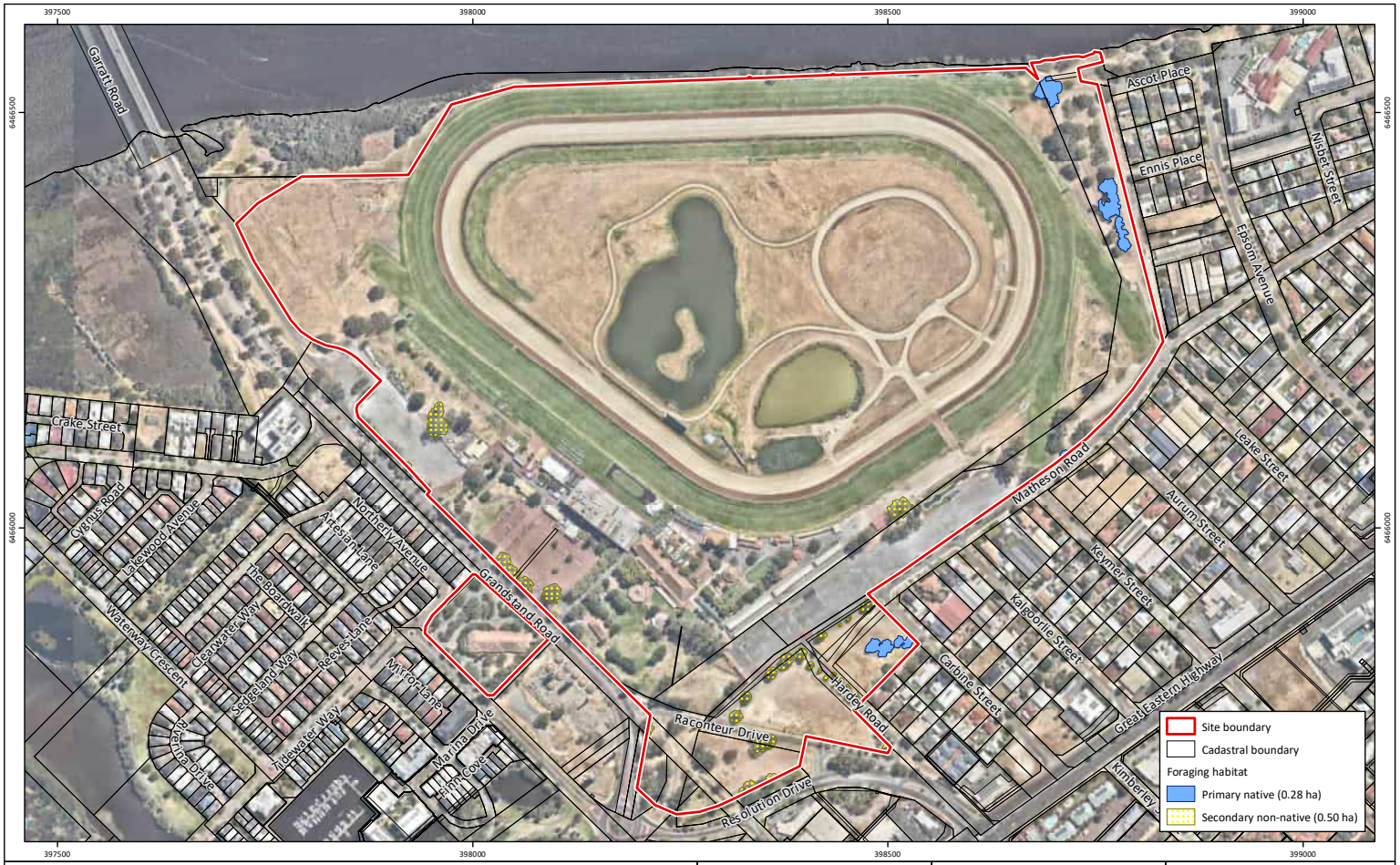


Figure 9: **Forest Red-tailed Black Cockatoo Foraging Habitat**

Project:	Flora, Vegetation and Fauna Assessment Golden Gateway Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(06)--F18**
Drawn:	WJC
Date:	04/04/2024
Checked:	AJU
Approved:	RAW
Date:	08/04/2024

N

0 100 200
Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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Appendix A

Conservation Significant Flora Likelihood of Occurrence

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Species name	Level of		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Calectasia cyanea	CR	CR	P	Heathland on white sand or laterite gravel over laterite. Known only from one population near Albany.	Jun-Oct	Low
Grevillea thelemanniana	CR	CR	P	Sand, sandy clay. Winter-wet low-lying flats.	May-Nov	Low
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	CR	CR	P	Low woodland on grey, clayey sand with lateritic pebbles (Pinjarra Plain) near winter wet flats.	Sep-Nov	Low
Caladenia huegelii	CR	EN	PG	Well-drained, deep sandy soils in lush undergrowth in a variety of moisture levels.	Sep-early Nov	Low
Calytrix breviseta subsp. breviseta	CR	EN	P	Seasonally wet sandy-clay soil on swampy flats	Oct-Nov	Low
Drakaea elastica	CR	EN	PG	Bare patches of sand within otherwise dense vegetation in low-lying areas alongside winter-wet swamps. Typically in banksia woodland or thickets of Kunzea glabrescens.	late Sep-Oct/Nov, survey Jul-Aug	Low
Eucalyptus x balanites	CR	EN	P	Light coloured sandy soils over laterite. Habitat consists of gently sloping heathlands; open mallee woodland over shrubland (Population 2) or heathland with emergent mallees (population 1)	Oct - Feb	Low
Trithuria occidentalis	CR	EN	A	Partly submerged on the edge of shallow winter-wet clay pans in very open shrubland.	Oct-Nov	Low
Diuris purdiei	EN	EN	PG	Sand to sandy clay soils in areas subject to winter inundation.	late September to mid-October, but only after a summer or early autumn fire (Brown et al., 1998)	Low
Grevillea curviloba subsp. incurva	EN	EN	P	Sand, sandy loam. Winter-wet heath.	Aug-Sep	Low
Macarthuria keigheryi	EN	EN	P	Low-lying winter-wet damp grey/white sands in open patches.	Sep-Dec or Feb-Mar	Low

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	WA	EPBC Act	strategy		period	occurrence
Thelymitra stellata	EN	EN	PG	Sandy loam, clay or gravel over laterite or gravel.	Sep-Nov	Low
Andersonia gracilis	VU	EN	P	Seasonally damp, black sandy clay flats near or on the margins of swamps.	Sep-Nov	Low
Banksia mimica	VU	EN	P	Flat to gentle slopes in grey and white sand in open woodlands.	Dec-Jan	Low
Drakaea micrantha	EN	VU	PG	Open sandy patches often adjacent to winter-wet swamps.	Sept- early Oct	Low
Acacia denticulosa	VU	VU	P	Sand, loam, clay. Granite outcrops, rarely on sandplains.	Sep-Oct	Low
Anigozanthos viridis subsp. Terraspectans	VU	VU	P	Grey sand, clay loam. Winter-wet depressions.	Aug-Sep	Low
Conospermum undulatum	VU	VU	P	Sand and sandy clay soils, on flat or gently sloping sites between the Swan and Canning Rivers	May-Oct	Low
Diuris drummondii	VU	VU	PG	In low-lying depressions in peaty and sandy clay swamps.	Nov-Jan	Low
Diuris micrantha	VU	VU	PG	Dark grey-black sandy clay-loam in winter wet depressions or swamps. Often in shallow standing water.	Aug/Sep- early Oct	Low
Eleocharis keigheryi	VU	VU	P	Clay or sandy loam in freshwater creeks and transient waterbodies such as seasonally wet clay pans.	Aug-Dec	Low
Eucalyptus rhodantha var. rhodantha	VU	VU	P	Grey/yellow/red sand over laterite. Undulating country, hillslopes.	Jul-Sep or Dec-Jan	Low
Morelotia australiensis	VU	VU	P	Sand over clay, winter wet depressions and drainage lines.	Nov-Dec	Low
Eremophila glabra subsp. chlorella	EN	-	P	Sandy clay. Winter-wet depressions.	Jul-Nov	Low
Hypocalymma magnificum	EN	-	P	Sandy loam, granite.	Aug-Nov (limited information)	Low
Bolboschoenus fluviatilis	P1	-	P	Floodplain with grey/brown wet sand.	Nov	Moderate
Calandrinia sp. Bayswater (C. Andrews s.n. 11/1902)	P1	-	Unknown	Unknown	Unknown	Low

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	WA	EPBC Act	strategy		period	occurrence
Drosera patens	P1	-	P	Sandy soils on margins of winter-wet depressions, swamps and lakes.	Aug-Dec	Low
Drosera x sidjamesii	P1	-	P	Along lake margins, close to winter high-water line	Nov-Dec or Jan-Mar	Low
Haloragis scoparia	P1	-	P	Clay in winter-wet areas.	May	Low
Hydrocotyle striata	P1	-	A	Sand and clay in springs and creeklines.	Nov	Low
Levenhookia preissii	P1	-	A	Grey or black, peaty sand. Swamps	Sep-Dec/Jan	Low
Ptilotus sericostachyus subsp. roseus	P1	-	P	Unknown. Seem to be associated with wetlands/rivers.	Sep-Dec	Moderate
Senecio gilbertii	P1	-	P	Peaty sand in swamps and on slopes.	Sep-Nov	Low
Thelymitra magnifica	P1	-	PG	Gravelly soil on stony ridges.	Sep-Oct	Low
Typhonium peltandroides	P1	-	P	Shallow sand amongst rough sandstone, red clay. Sides of gorges, vine thickets, rocky sites or along watercourses.	Dec or Jan-Feb	Low
Acacia benthamii	P2	-	P	Sand, typically on limestone breakaways	Aug - Sept	Low
Calothamnus macrocarpus	P2	-	P	Rocky quartzite soils, sand. Slopes.	Feb or Aug-Dec	Low
Chamelaucium floriferum subsp. diffusum	P2	-	P	Sand, clay. Frequently with outcropping granite.	Jan-Dec	Low
Eucalyptus educta	P2	-	P	Shallow soils. Granite rocks.	Apr	Low
Grevillea manglesii subsp. ornithopoda	P2	-	P	Red-brown loam over clay	Sep-Nov	Low
Hypocalymma inopinatum	P2	-	P	White sand on laterite. Shallow sandy loam Slopes and rises (limited information).	Nov? (limited information	Low
Johnsonia pubescens subsp. cygnorum	P2	-	P	Grey white yellow sands on flats and seasonally wet areas.	Sep	Low
Lepyrodia curvescens	P2	-	P	Sand, laterite. Seasonally inundated swampland.	Sep-Nov	Low
Melaleuca viminalis	P2	-	P	Sand, clay in creeklines and wetlands.	Oct-Dec	Moderate
Phyllangium palustre	P2	-	A	Winter-wet claypans, low-lying seasonal wetlands on clay	Oct-Nov	Low
Poranthera moorokatta	P2	-	A	Sandy or clay soils. Dampland or low sandy dunes.	Oct or Feb	Low
Thelymitra variegata	P2	-	P	Sandy clay, sand, laterite.	Jun-Sep	Low

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	WA	EPBC Act	strategy		period	occurrence
Thysanotus brachiatus	P2	-	P	Grey sand	Nov-Dec	Low
Adenanthos cygnorum subsp. chamaephyton	P3	-	P	Grey sand, lateritic gravel.	Jul or Sep to Dec or Jan	Low
Alyogyne sp. Great Victoria Desert (D.J. Edinger 6212)	P3	-	P	Unknown	Unknown	Low
Angianthus micropodioides	P3	-	A	Saline sandy soils on edge of rivers, depressions and clay pans.	Nov-Dec or Jan-Feb	Moderate
Babingtonia urbana	P3	-	P	Grey sand, lateritic gravel.	Jan-Mar	Low
Banksia pteridifolia subsp. vernalis	P3	-	P	White/grey sand over laterite.	Sep-Oct	Low
Beaufortia purpurea	P3	-	P	Lateritic or granitic soils on rocky slopes.	Oct-Feb	Low
Byblis gigantea	P3	-	P	Sandy-peat swamps. Seasonally wet areas.	Sep-Jan	Low
Carex tereticaulis	P3	-	P	Black peaty sand.	Sep-Oct	Low
Conostylis bracteata	P3	-	P	Sand, limestone. Consolidated sand dunes	Aug-Sep	Low
Cyathochaeta teretifolia	P3	-	P	Grey sand, sandy clay in swamps and creek edges.	Oct-Jan	Low
Dampiera triloba	P3	-	P	Damp peat/loam soil.	Aug-Dec	Low
Dicrastylis micrantha	P3	-	P	Red sand. Sandplains.	Sep-Dec	Low
Eryngium sp. Subdecumbens (G.J. Keighery 5390)	P3	-	A	Clay in seasonal wetlands.	Sep-Nov	Low
Haemodorum loratum	P3	-	P	Grey or yellow sand, gravel.	Nov	Low
Halgania corymbosa	P3	-	P	Gravelly soils, soils over granite.	Aug-Nov	Low
Hibbertia leptotheca	P3	-	P	Brown to white sand with limestone.	Aug-Sep	Low
Hypocalymma quadrangulare	P3	-	P	Sandy loam in depressions (limited infroamtion)	Jul-Sep (limited information)	Low
Isopogon autumnalis	P3	-	P	Yellow-grey sand.	Feb,Mar,Apr, May or June	Low
Jacksonia gracillima	P3	-	P	Sand, often adjacent to winter wet areas	Sep-Dec	Low
Lasiopetalum glutinosum subsp. glutinosum	P3	-	P	Brown clay loam on slopes	Sep-Dec	Low
Lasiopetalum membranaceum	P3	-	P	Sand over limestone	Sep-Dec	Low

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	WA	EPBC Act	strategy		period	occurrence
Meionectes tenuifolia	P3	-	P	Clay loam in seasonally wet areas.	Oct-Dec	Low
Myriophyllum echinatum	P3	-	A	Clay in winter-wet flats.	Nov	Low
Platysace ramosissima	P3	-	P	Sandy soils.	Oct-Nov	Low
Schoenus benthamii	P3	-	P	White, grey ands, sandy clay in winter wet flats and swamps	Oct-Nov	Low
Schoenus pennisetis	P3	-	A	Grey or peaty sand in swamps and winter-wet depressions.	Aug-Sep	Low
Stylidium aceratum	P3	-	A	Sandy soils in swamp heathland.	Oct-Nov	Low
Stylidium asteroideum	P3	-	P	Sand, clay, loam in winter wet areas.	Sep-Nov	Low
Stylidium paludicola	P3	-	P	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland	Oct-Dec	Low
Styphelia filifolia	P3	-	P	Brown over pale yellow sand.	Feb-Apr	Low
Thysanotus anceps	P3	-	P	White or grey sand, lateritic gravel, laterite.	Oct-Dec	Low
Verticordia venusta	P3	-	P	Yellow sand, sandy gravel. Sandplains.	Sep-Dec or Jan	Low
Aponogeton hexatepalus	P4	-	P	Mud. Freshwater: ponds, rivers, claypans.	Jul-Oct	Moderate
Calothamnus accedens	P4	-	P	Sandy soils over laterite.	Sep-Jan	Low
Calothamnus graniticus subsp. leptophyllus	P4	-	P	Clay over granite, lateritic soils. Hillsides.	Jun-Aug	Low
Cyanothamnus tenuis	P4	-	P	Laterite, stony soils, granite.	Aug-Nov	Low
Dodonaea hackettiana	P4	-	P	Sand, outcropping limestone.	Jul-Oct	Low
Drosera occidentalis	P4	-	P	Flat, brown/white/yellow moist sand/clay/peat, often near swamps.	Oct-Dec/Jan	Low
Eucalyptus caesia subsp. caesia	P4	-	P	Loam. Granite outcrops.	May-Sep	Low
Eucalyptus caesia subsp. magna	P4	-	P	Loam. Granite outcrops.	May-Sep	Low
Eucalyptus kruseana	P4	-	P	Sandy loam. Granite outcrops & hills.	Jun-Sep	Low
Grevillea pimeleoides	P4	-	P	Gravelly soils over granite. Rocky hillsides.	May-Nov	Low
Hydrocotyle lemnoides	P4	-	A	Floating in swamps.	Aug-Oct	Low

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	WA	EPBC Act	strategy		period	occurrence
Jacksonia sericea	P4	-	P	Calcareous and sandy soils on Swan Coastal Plain	Dec-Feb	Low
Lasiopetalum bracteatum	P4	-	P	Sandy clay, clay, lateritic gravel along drainage lines, creeks, gullies, granite outcrops.	Aug-Nov	Low
Ornduffia submersa	P4	-	A	Sandy clay in inundated wetland/creek.	Aug-Nov	Low
Schoenus griffinianus	P4	-	P	White sand	Sep-Oct	Low
Schoenus natans	P4	-	A	Aquatic, in winter-wet depressions.	Oct	Low
Stylidium longitubum	P4	-	A	Sandy clay, clay. Seasonal wetlands.	Oct-Dec	Low
Stylidium striatum	P4	-	P	Brown clay over laterite on hill slopes.	Oct-Nov	Low
Verticordia lindleyi subsp. Lindleyi	P4	-	P	Sand and sandy clay in winter wet areas.	May or Nov-Jan	Low

Note: CR=critically endangered, EN=endangered, VU=vulnerable, P1=Priority 1, P2=Priority 2, P3=Priority 3, P4=Priority 4, P=perennial, PG=perennial geophyte, A=annual.

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Appendix B

Flora Species Inventory

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Family	Status	Species
Amaranthaceae		
	*	*Amaranthus viridis*
	*	*Atriplex prostrata*
		Suaeda australis
Anacardiaceae		
	*	*Schinus terebinthifolia*
Apiaceae		
		Apium prostratum subsp. prostratum var. prostratum
Araliaceae		
	*	*Schefflera arboricola*
Araucariaceae		
	*	*Araucaria heterophylla*
Arecaceae		
	*	*Arecaceae sp.*
	*	*Phoenix canariensis*
	*	*Syagrus romanzoffiana*
	*	*Washingtonia filifera*
Asphodelaceae		
	Pl	*Xanthhorrea sp.*
Asteraceae		
	*	*Erigeron sp.*
	*	*Hypochaeris glabra*
	*	*Lactuca serriola*
	*	*Ursinia anthemoides*
Bignoniaceae		
	*	*Jacaranda mimosifolia*
Boraginaceae		
		Heliotropium curassavicum
Casuarinaceae		
		Casuarina ?cunninghamiana
		Casuarina obesa
	Pl	*Casuarina sp.*
Cyperaceae		
		Bolboschoenus caldwellii
	*	*Cyperus ?tenuiflorus*
	*	*Cyperus congestus*
	*	*Cyperus polystachyos*
		Lepidosperma longitudinale
		Schoenoplectus tabernaemontani
Fabaceae		
		Acacia saligna
	*	*Acacia iteaphylla*
		Kennendia prostrata
	*	*Tipuana tipu*
	*	*Trifolium michelianum*
		Viminaria juncea
Fabaeae		
	*	*Erythrina indica*

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Juncaceae		
		Juncus kraussii
Malvaceae		
	*	*Brachychiton populneus*
	*	*Malva sp.*
Moraceae		
	*	*Ficus macrophylla*
Myrtaceae		
	Pl	*Agonis flexuosa*
	Pl	*Callistemon sp.*
		Corymbia calophylla
	*	*Corymbia citriodora*
	*	*Corymbia cladocalyx*
	*	*Eucalyptus ?leptopoda*
	*	*Eucalyptus botryoides*
	*	*Eucalyptus camaldulensis*
	*	*Eucalyptus cladocalyx*
	Pl	*Eucalyptus gomphocephala*
	*	*Eucalyptus grandis*
	*	*Eucalyptus leucoxylon*
	*	*Eucalyptus maculata*
		Eucalyptus rudis
	*	*Eucalyptus sideroxylon*
	*	*Eucalyptus sp.*
		Melaleuca rhaphiophylla
	*	Myrtaceae sp.
Onagraceae		
	*	*Oenothera drummondii*
Pinaceae		
	*	*Pinus sp.*
Plantaginaceae		
	*	*Plantago lanceolata*
Plantanaceae		
	*	*Platanus ×hispanica*
Poaceae		
	*	*Avena barbata*
	*	*Bambusa sp.*
	*	*Briza maxima*
	*	*Cenchrus ciliaris*
	*	*Cortaderia selloana*
	*	*Cynodon dactylon*
	*	*Ehrharta calycina*
	*	*Ehrharta longiflora*
	*	*Ergagrostis curvula*
	*	*Melinis repens*
	*	*Paspalum dilatatum*
	*	*Paspalum vaginatum*
	*	*Setaria verticillata*
Polygonaceae		

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	*	*Persicaria ?decipiens*
	*	*Polygonum aviculare*
Rosaceae		
	*	*Rosa sp.*
Solanaceae		
	*	*Solanum nigrum*
Tamaricaceae		
	*	*Tamarix aphylla*
Typhaceae		
		Typha sp.

*=non-native, Pl=planted

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Appendix C

Conservation Significant Communities Likelihood of Occurrence

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Code	Community name	TEC/ PEC	Level of significance		Likelihood of occurrence
			State	EPBC Act	
SCP10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994))	TEC	EN	CR	Low
SCP07	Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson et al. (1994))	TEC	VU	CR	Low
Tuart woodlands	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	TEC/ PEC	P3	CR	Low
SCP3a	Corymbia calophylla - Kingia australis woodlands on heavy soils, Swan Coastal Plain (floristic community type 3a as originally described in	TEC	CR	EN	Moderate
SCP3c	Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))	TEC	CR	EN	Moderate
SCP20c	Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in in Gibson et al. (1994))	TEC	CR	EN	Low
SCP20b	Banksia attenuata and/or Eucalyptus marginata woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. (1994))	TEC	EN	EN	Low
SCP20a	Banksia attenuata woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994))	TEC	EN	EN	Low
Muchea Limestone	Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain	TEC	EN	EN	Low
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	TEC/ PEC	P3	EN	Low
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	TEC/ PEC	P3	VU	High
SCP02	Southern wet shrublands, Swan Coastal Plain (floristic community type 2 as originally described in Gibson et al. (1994)	TEC	EN	-	Low
SCP3b	Corymbia calophylla - Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al. (1994))	TEC	VU	-	Moderate
SCP22	Banksia ilicifolia woodlands	PEC	P3	-	Low
SCP21c	Low lying Banksia attenuata woodlands or shrublands	PEC	P3	-	Low
SCP23b	Swan Coastal Plain Banksia attenuata - Banksia menziesii woodlands	PEC	P3	-	Low
Note: TEC=threatened ecological community, PEC=priority ecological community, CR=critically endangered, EN=endangered, VU=vulnerable, P3=priority 3					

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Appendix D

Conservation Significant Fauna

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Birds					
Actitis hypoleucos	Common sandpiper	MI	MI	Edge of sheltered waters salt or fresh, e.g. estuaries, mangrove creeks, rocky coasts, near-coastal saltlakes (including saltwork ponds), river pools, lagoons, claypans, drying swamps, flood waters, dams and sewage ponds. Preferring situations where low perches are available (Johnstone & Storr 1998).	Nil
Anous tenuirostris melanops	Australian lesser noddy	EN	VU	Very common in blue-water seas around the Abrolhos (endemic to this area, accidental occurrences on lower west coast of Australia) (Johnstone and Storr 1998).	Nil
Apus pacificus	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities (Pizzey & Knight 2012).	Moderate
Botaurus poiciloptilus	Australasian bittern	EN	EN	In or over water, in tall reedbeds, sedges, rushes, cumbungi, lignum. Also occurs in ricefields, drains in tussocky paddocks and occasionally in saltmarshes and brackish wetlands (TSSC 2019).	Negligible
Cacatua pastinator pastinator	Muir's corella	CD	-	Wheat and sheep farming country with remnant native forest. Species is restricted to the south-west corner of WA, near Lake Muir (DPaW 2015).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Calidris acuminata	Sharp-tailed sandpiper	VU (MI)	VU (MI)	Occurs in tidal mudflats, saltmarshes and mangroves, as well as, shallow fresh, brackish or saline inland wetlands. It is also known from floodwaters, irrigated pastures and crops, sewage ponds, saltfields (Pizzey & Knight 2012).	Nil
Calidris alba	Sanderling	MI	MI	Mainly steeply shelving sandy beaches exposed to ocean swell. Also sandy inlets, estuarine sandbanks and near-coastal saltlakes (including saltwork ponds) (Johnstone & Storr 1998).	Nil
Calidris canutus	Red knot	EN	EN (MI)	Mud and sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds (Pizzey & Knight 2012).	Nil
Calidris ferruginea	Curlew sandpiper	CR	CR (MI)	Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater lakes and swamps. Also beaches and near-coastal sewage ponds (Johnstone & Storr 1988).	Negligible
Calidris melanotos	Pectoral sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also samphire flats around estuaries and saltlakes (Johnstone & Storr 1998).	Nil
Calidris ruficollis	Red-necked stint	MI	MI	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands (coastal and inland), saltfields, sewage ponds (Pizzey and Knight 2012).	Moderate

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Calidris subminuta	Long-toed stint	MI	MI	Mainly freshwater swamps (especially when drying and where vegetation is short), river pools, lagoons and claypans; also brackish pools, sewage ponds and samphire flats around estuaries and saltlakes (Johnstone & Storr 1988).	Nil
Calidris tenuirostris	Great knot	CR	CR (MI)	Mud or sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds (Johnstone & Storr 1988).	Negligible
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	VU	Eucalypt and Corymbia forests, often in hilly interior. More recently also observed in more open agricultural and suburban areas including Perth metropolitan area. Attracted to seeding Corymbia calophylla, Eucalyptus marginata, introduced Melia azedarach and Eucalyptus spp. trees (Johnstone et al. 2013).	High
Charadrius leschenaultii	Great sand plover	VU	VU (MI)	Wide sandy or shelly beaches, sandpits, tidal mudflats, reefs, sand cays, mangroves, saltmarsh, dune wilderness, bare paddocks, seldom far inland (Pizzey & Knight 2012).	Negligible
Dasyornis longirostris	Western bristlebird	EN	EN	Dense, low, closed coastal heaths. Open heaths with dense clumps of shrubs, eucalypt thickets and tall swampy heaths. Much reduced by fire, draining for agriculture, but may need fire for optimal status over 50-10+ years. Current range in WA confined to south coast from Albany to Hopetoun (Pizzey and Knight 2012).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Diomedea amsterdamensis	Amsterdam Island albatross	CR	EN (MI)	The Amsterdam albatross is a marine, pelagic seabird. It nests in open patchy vegetation (among tussocks, ferns or shrubs) near exposed ridges or hillocks (Weimerskirch et al. 1985). It sleeps and rests on ocean waters when not breeding (Marchant and Higgins 1990)	Nil
Diomedea epomophora	Southern royal albatross	VU	VU (MI)	Rare visitor to Western Australian seas; it breeds on subantarctic islands south of New Zealand (Johnstone and Storr 1998).	Nil
Diomedea exulans	Wandering albatross	VU	VU (MI)	Marine, pelagic and aerial species. It breeds on Macquarie Island and feeds in Australian portions of the Southern Ocean (DoE 2018).	Nil
Elanus scriptus	Letter-winged kite	P4	-	Open to sparsely wooded country and grassland near tree-lined streams or watercourses (Johnstone and Storr 1998).	Nil
Falco hypoleucos	Grey falcon	VU	-	Species occurs in arid and semi-arid Australia, where it inhabits timbered lowland plains. In particular Acacia shrublands and that are crossed by tree-lined water courses. Species has also been observed hunting in treeless areas and frequenting tussock grassland and open woodlands (TSSC 2020).	Nil
Falco peregrinus	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes (Johnstone and Storr 1998).	Moderate

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Hydroprogne caspia	Caspian tern	MI	MI	Mainly sheltered areas, estuaries (when not laden with silt) and tidal creeks; occasionally near-coastal saltlakes (including saltwork ponds) and brackish pools in lower courses of rivers; rarely fresh waters (DCCEEW 2023).	Negligible
Ixobrychus dubius	Australian little bittern	P4	-	Dense vegetation surrounding/within freshwater pools, swamps and lagoons, well screened with trees. Shelters in dense beds of Typha spp., Baumea spp. and tall rushes in freshwater swamps around lakes and along rivers (Johnstone and Storr 1998).	Negligible
Ixobrychus flavicollis australis	Black bittern	P2	-	Freshwater pools, swamps and lagoons, well-screened with trees. Occasionally feeding by day but mainly sheltering in dense waterside vegetation (Melaleuca spp., Eucalyptus camaldulensis, Pandanus spp. and long grass) (Johnstone and Storr 1998).	Nil
Leipoa ocellata	Malleefowl	VU	VU	Scrubs and thickets of Eucalyptus spp., Melaleuca lanceolata and Acacia linophylla; also other dense litter-forming shrublands. Attracted to fallen wheat in stubbles and along roads (Johnstone and Storr 1998).	Nil
Limosa lapponica	Bar-tailed godwit	MI	MI	Estuarine sand and mudflats and sandy beaches with loads of seaweed; also reef flats and near-coastal saltlakes (including saltwork and sewage ponds) (Johnstone and Storr 1998).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Limosa limosa	Black-tailed godwit	EN MI	EN (MI)	Tidal mudflats, estuaries, sewage ponds, shallow river margins, brackish or saline inland lakes, flooded pastures, airfields (Pizzey & Knight 2012).	Nil
Macronectes giganteus	Southern giant-petrel	MI	EN (MI)	Breeds on southern subantarctic and antarctic islands. May visit Western Australian waters from February to December (mostly June to September) (Johnstone and Storr 1998).	Nil
Macronectes halli	Northern giant petrel	MI	VU (MI)	Breeds on subantarctic islands. May visit Western Australian water from February to September (Johnstone and Storr 1998).	Nil
Numenius madagascariensis	Eastern curlew	CR	CR (MI)	Mainly tidal mudflats; also reef flats, sandy beaches and rarely near-coastal lakes (including saltwork ponds) (Johnstone and Storr 1998).	Nil
Oxyura australis	Blue-billed duck	P4	-	Mainly deeper freshwater swamps and lakes; occasionally saltlakes and estuaries freshened by flood waters (Johnstone and Storr 1998).	High
Pachyptila turtur subantarctica	Fairy prion	-	VU	Breeds on subantarctic islands and is presumed to frequent subtropical waters during non-breeding period (TSSC 2015).	Nil
Pandion haliaetus	Osprey	MI	MI	Coasts, estuaries, bays, inlets, islands, and surrounding waters; coral atolls, reefs, lagoons, rock cliffs, stacks (Pizzey & Knight 2012).	High

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Phoebetria fusca	Sooty albatross	EN	VU (MI)	Marine, pelagic species that tolerates a wide range of sea surface temperatures and salinities. breeds on subtropical and subantarctic islands in the Indian and Atlantic Oceans, on vegetated cliffs and steep slopes that are sheltered from prevailing winds, often amongst tussock grass (Pizzey & Knight 2012).	Nil
Platycercus icterotis xanthogenys	Western rosella (inland)	P4	-	Open eucalypt woodlands with heath understorey (Pizzey & Knight 2012).	Negligible
Plegadis falcinellus	Glossy Ibis	MI	MI	Well-vegetated wetlands, wet pasture, ricefields, floodwaters, floodplains, brackish or occasionally saline wetlands, mangroves, mudflats and occasionally dry grassland (Pizzey & Knight 2012).	Moderate
Pluvialis fulva	Pacific golden plover	MI	MI	Estuaries, mudflats, saltmarshes, mangroves; rocky reefs and stranded seaweed on ocean shores; margins of shallow open inland swamps; sewage ponds, short-grass paddocks, sportsgrounds, airfields, ploughed land (Pizzey & Knight 2012).	Nil
Pluvialis squatarola	Grey Plover	VU (MI)	VU (MI)	Mudflats, saltmarsh, tidal reefs and estuaries, rarely inland (Pizzey and Knight 2012).	Negligible
Rostratula australis	Australian painted snipe	EN	EN	Mainly shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (Marchant and Higgins 1993).	Negligible
Sternula nereis nereis	Australian fairy tern	VU	VU	Sheltered blue-water seas close to land, estuaries (when free of silt) and near-coastal lakes (Johnstone and Storr 1998).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Thalassarche cauta	Shy albatross	VU	VU (MI)	Scarce visitor (late May to mid-October) to southwestern and western seas. Breeds on islands off Tasmania and south New Zealand (Johnstone and Storr 1998).	Nil
Thalassarche impavida	Campbell albatross	VU	VU (MI)	Scarce visitor to south-western and western Australian seas. Breeds on Campbell Island (Pizzey & Knight 2012).	Nil
Thalassarche melanophris	Black-browed albatross	EN	VU (MI)	Seas of south and west coasts. Visitor to Western Australian mainland from January to early November (mostly May to September). Breeds on southern subantarctic and Antarctic islands (Johnstone and Storr 1998).	Nil
Thalassarche steadi	White-capped albatross	VU	VU (MI)	Scarce visitor (late May to mid-October) to southwestern and western seas. Breeds on islands off Tasmania and south New Zealand (Johnstone and Storr 1998).	Nil
Thalasseus bergii	Crested tern	MI	MI	Mainly blue-water seas (especially within 3 km of land), including southern estuaries in summer and autumn (when free of silt); also tidal creeks in north, but not penetrating far into larger estuaries (DCCEEW 2023).	Moderate
Tringa glareola	Wood sandpiper	MI	MI	Mainly shallow fresh waters (lagoons, swamps, claypans, river pools, dams, bore overflows and sewage ponds); occasionally brackish swamps, rarely saltlakes and estuaries (Pizzey & Knight 2012).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Tringa nebularia	Common greenshank	EN (MI)	EN (MI)	Mudflats, estuaries, saltmarshes, margins of lakes, wetlands, claypans (fresh and saline), commercial saltfields, sewage ponds (Pizzey & Knight 2012).	Nil
Tyto novaehollandiae novaehollandiae	Australian masked owl	P3	-	Forests, open woodlands, farmlands with large trees. E.g. river red gums, adjacent cleared country, timbered watercourses, paperbark woodlands and caves (Pizzey & Knight 2012).	Nil
Zanda baudinii	Baudin's black cockatoo	EN	EN	Mainly eucalypt forests. Attracted to seeding Corymbia calophylla, Banksia spp., Hakea spp., and to fruiting apples and pears (Johnstone and Storr 1998).	Negligible
Zanda latirostris	Carnaby's black cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of Pinus spp. Attracted to seeding Banksia spp., Hakea spp., Eucalyptus spp., Corymbia calophylla, Grevillea spp., and Allocasuarina spp. (Johnstone and Storr 1998).	High
Invertebrates					
Euoplos inornatus	Inornate trapdoor spider	P3	-	Has previously been recorded in jarrah forest, including near clay banks and granite outcrop. Most records are from the Darling scarp/Jarrah Forest Region, with limited records from the Swan Coastal Plain (DBCA 2020).	Nil
Hylaeus globuliferus	Woollybush bee	P3	-	Males are territorial and may be found perched on the growing tips of Adenanthos sp., Banksia sp. or Jacksonia sp. Has also been recorded visiting the flowers of Grevillea sp. (PaDIL 2022).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Idiosoma sigillatum	Swan Coastal Plain shield-backed trapdoor spider	P3	-	Widely distributed in sandy areas on the Swan Coastal Plain and on Rottnest Island (Prince 2003). Species predominantly recorded from remnant banksia woodland vegetation and heath on sandy soils (Rix et. al 2018).	Negligible
Leioproctus contrarius	a short-tongued bee	P3	-	Life history and habits are poorly documented/ unknown. It has been recorded only on flowers of Goodeniaceae and possibly Lechenaultia stenosepala (Bamford 2003).	Nil
Leioproctus douglasiellus	a short-tongued bee	EN	CR	Life history and habits are poorly documented/ unknown. It has been recorded only on the flowers of Goodenia filiformis and Anthotium junciforme (Houston 2000).	Negligible
Neopasiphae simplicior	a short-tongued bee	EN	CR	This species of native bee has been collected on flowers of Goodenia filiformis, Lobelia tenuior, Angianthus preissianus and Velleia sp. (Houston 2000).	Nil
Synemon gratiosa	Graceful sun-moth	P4	-	Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the preferred host plant Lomandra maritima. Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant L. hermaphrodita is widespread (DEC 2011).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Westralunio carteri	Carter's freshwater mussel	VU	VU	Occurs in greatest abundance in slower flowing streams with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots. Also occupies lentic systems including large water supply dams and even on-stream farm dams. Salinity tolerance quite low (Morgan et al. 2011).	Nil
Mammals					
Bettongia penicillata ogilbyi	Woylie	CR	EN	Woodlands and adjacent heaths with a dense understorey of shrubs, particularly Gastrolobium spp. (TSSC 2018).	Nil
Dasyurus geoffroii	Chuditch	VU	VU	Wide range of habitats from woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. Appears to utilise native vegetation along roadsides in the wheatbelt (DEC 2012).	Low
Dasyurus hallucatus	Northern quoll	EN	EN	Most abundant in rocky eucalypt woodland but occurs in range of vegetation types, mostly within 200 km of the coast (Menkhorst & Knight 2011).	Nil
Falsistrellus mackenziei	Western false pipistrelle	P4	-	High rainfall forests dominated by jarrah, karri, marri, and tuart. Occupies hollow logs for breeding and resting (Van Dyck and Strahan 2008). Also known to utilise Banksia woodland on the Swan Coastal Plain (Hosken and O'Shea 1995).	Nil

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Hydromys chrysogaster	Rakali	P4	-	Areas with permanent water, fresh, brackish or marine. Likely to occur in all major rivers and most of the larger streams as well as bodies of permanent water in the lower south-west (Christensen et al. 1984). Intact riparian vegetation and associated bank stability is critical to their survival (DWER 2023).	Moderate
Isoodon fusciventer	Quenda	P4	-	Dense scrubby, often swampy, vegetation with dense cover up to one metre high (DEC 2012)	Moderate
Macrotis lagotis	Bilby	VU	VU	Open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises and hummock grassland (spinifex) growing on sandplains and dunes, drainage systems, salt lake systems and other alluvial areas (DBCA 2017).	Nil
Myrmecobius fasciatus	Numbat	EN	EN	Generally dominated by Eucalyptus spp. that provide hollow logs and branches for shelter and termites for food (van Dyck & Strahan 2008).	Nil
Notamacropus irma	Western brush wallaby	P4	-	Dry sclerophyll forest, Banksia spp. woodlands and shrublands, typically favouring dense low vegetation that provides dense cover (Christensen and Strahan 1983).	Negligible
Phascogale tapoatafa wambenger	South-western brush-tailed phascogale	CD	-	Dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover (Triggs 2003).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Pseudocheirus occidentalis	Western ringtail possum	CR	CR	On the Swan Coastal Plain in Agonis flexuosa woodlands and Agonis flexuosa/ Eucalyptus gomphocephala forests. Also Eucalyptus marginata forests (DBCA 2017).	Nil
Reptiles					
Ctenotus delli	Dell's skink	P4	-	Jarrah and marri woodland with a shrub dominated understorey, sheltering in dense vegetation, inside grass trees and beneath rocks, sometimes in burrows (Nevill 2005).	Nil
Ctenotus gemmula	-	P3	-	Pale soils supporting heathlands and usually in association with Banksia spp. (Bush et al. 2010)	Nil
Ctenotus ora	Coastal plains skink	P3	-	Sandy substrates with low vegetation (including heath) in open Eucalyptus spp. and Corymbia calophylla woodland over Banksia spp. (Kay and Keogh 2012).	Nil
Lerista lineata	Perth slider	P3	-	Sandy coastal heath and low scrubland. Banksia spp. woodland, Eucalyptus gomphocephala open woodland over deep sands, and coastal dunes immediately adjacent to the beach (Wilson and Swan 2021).	Nil
Neelaps calonotos	Black-striped snake	P3	-	Coastal and near-coastal dunes, sandplains supporting heathlands and Banksia spp. woodlands (Bush et al. 2010).	Negligible
Pseudemydura umbrina	Western swamp tortoise	CR	CR	Clay based ephemeral swamps (Bush et al. 2010).	Negligible

Species name	Common name	Level of		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Pseudonaja affinis exilis	Rottnest Island dugite	P4	-	Subspecies found on Rottnest Island. Found in a wide range of habitats including coastal dunes, heathlands, scrublands, and woodlands, but tend to prefer sandy areas. More urban spaces that have been degraded also make an attractive habitat for these shy reptiles, with golf courses, industrial parks and agricultural country among areas listed as potential home environments (Wilson and Swan 2021).	Nil
Note: CR=critically endangered, EN=endangered, VU=vulnerable, CD=conservation dependent, MI=migratory, OS=other specially protected, P1=Priority 1, P2=Priority 2, P3=Priority 3, P4=Priority 4. Species with a high or moderate likelihood to occur within the site are shaded green.					

Conservation Significant Fauna Likelihood of Occurrence
Perth Racing Golden Gateway Structure Plan

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Attachment 12.1.3 Environmental Assessment Report

Appendix E

Black Cockatoo Foraging Plant Species List

Black Cockatoo Foraging Plants

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Acacia baileyana	Cootamundra wattle	Secondary	-	-	Groom 2011
Acacia pentadenia	Karri wattle	Secondary	-	-	Groom 2011
Acacia saligna	Orange wattle	Secondary	-	-	Groom 2011
Agonis flexuosa	Peppermint tree	Secondary	-	-	Groom 2011
Allocasuarina fraseriana	Sheoak	Secondary	Secondary	Secondary	Johnstone & Storr 1998; Johnstone *et al.* 2010; Johnstone 2017; DoEE 2017
Allocasuarina spp.		Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Anigozanthos flavidus	Tall kangaroo paw	-	Secondary	-	Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Araucaria heterophylla	Norfolk island pine	Secondary	-	-	Groom 2011; DoEE 2017
Banksia ashbyi	Ashby's banksia	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia attenuata	Slender banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia baxteri	Baxter's banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia carlinoides	Pink dryandra	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia coccinea	Scarlet banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia dallanneyi	Couch honeypot dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia ericifolia	Heath-leaved banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia fraseri		Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia gardneri	Prostrate banksia	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia grandis	Bull banksia	Primary	Secondary	-	Saunders 1980; Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia hookeriana	Hooker's banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia ilicifolia	Holly banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; Johnstone & Storr 1998; DoEE 2017
Banksia kippistiana		Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia leptophylla		Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia lindleyana	Porcupine banksia	Primary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Banksia littoralis	Swamp banksia	Primary	Secondary	-	Saunders 1980; Groom 2011Johnstone & Storr 1998; Johnstone *et al.* 2010; DoEE 2017
Banksia menziesii	Firewood banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia mucronulata	Swordfish dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia nivea	Honeypot dryandra	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia nobilis	Golden dryandra	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia praemorsa	Cut-leaf banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia prionotes	Acorn banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia prolata		Primary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Banksia quercifolia	Oak-leaved banksia	Primary	Secondary	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia sessilis	Parrot bush	Primary	Secondary	-	Saunders 1980; Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia speciosa	Showy banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia spp.		Primary	Secondary	-	Saunders 1979; DSEWPaC 2012; DoEE 2017
Banksia squarrosa	Pingle	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia tricuspis	Pine banksia	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia undata	Urchin dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia verticillata	Granite banksia	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Brassica campestris	Canola	Secondary	-	-	Groom 2011; DoEE 2017
Callistemon spp.		Secondary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Callistemon viminalis	Captain cook bottlebrush	Secondary	-	-	Groom 2011
Callitris sp.		Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Carya illnoinensis	Pecan	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; Groom 2014; DoEE 2017
Casuarina cunninghamiana	River sheoak	Secondary	-	-	Groom 2011
Citrullus lanatus	Pie or afghan melon	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Corymbia calophylla	Marri	Primary	Primary	Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Saunders 1979; Johnstone & Kirkby 2008
Corymbia citriodora	Lemon scented gum	Secondary	Secondary	Secondary	Johnstone *et al.* 2010; DSEWPaC 2012; Groom 2011; Johnstone 2017
Corymbia ficifolia	Red flowering gum	Secondary	-	-	Groom 2011
Corymbia haematoxylon	Mountain marri	Secondary	-	Secondary	Groom 2011; DoEE 2012; DoEE 2017
Corymbia maculata	Spotted gum	-	-	-	-
Darwinia citriodora	Lemon-scented darwinia	Secondary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Diospryros sp.	Sweet persimmon	Secondary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eremophila glabra	Tarbush	Secondary	-	-	Groom 2011
Erodium aureum		Secondary	-	-	Groom 2011
Erodium botrys	Long storksbill	Secondary	Secondary	-	Groom 2011; Johnstone & Storr 1998; Johnstone *et al.* 2010
Erodium spp.		Secondary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Eucalyptus caesia	Silver princess	Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone 2017
Eucalyptus camaldulensis	River red gum	-	-	Secondary	DoEE 2012; DoEE 2017
Eucalyptus decipiens	Red heart/moit	-	-	Secondary	Johnstone 2017
Eucalyptus diversicolor	Karri	-	-	Primary	Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998
Eucalyptus erythrocorys	Illyarrie	Secondary	-	Secondary	DSEWPaC 2012; DoEE 2017; Johnstone 2017, Johnstone *et al.* 2010
Eucalyptus gomphocephala	Tuart	Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus grandis	Flooded gum, rose gum	-	-	Secondary	DoEE 2012; DoEE 2017
Eucalyptus lehmannii	Bushy yate	-	-	Secondary	Johnstone 2017
Eucalyptus leucoxylon	Yellow gum	Secondary	-	-	Groom 2014

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Eucalyptus loxophleba	York gum	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus marginata	Jarrah	Primary	Secondary	Primary	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone 2017
Eucalyptus patens	Blackbutt	Primary	-	Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Groom 2011
Eucalyptus pleurocarpa	Tallerack	Secondary	-	-	Groom 2011
Eucalyptus preissiana	Bell-fruited mallee	Secondary	-	-	Groom 2011
Eucalyptus robusta	Swamp mahogany	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Eucalyptus salmonophloia	Salmon gum	Primary	-	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DSEWPaC 2012; DoEE 2017
Eucalyptus staeri	Albany blackbutt	-	-	Secondary	Johnstone & Storr 1998
Eucalyptus todtiana	Coastal blackbutt	Secondary	-	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; Johnstone & Kirkby 2008
Eucalyptus wandoo	Wandoo	Primary	Secondary	Primary	Saunders 1980; Johnstone *et al* . 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Ficus sp.	Fig	Secondary	-	-	Groom 2011
Grevillea armigera	Prickly toothbrushes	Primary	-	-	Groom 2011
Grevillea bipinnatifida	Fuschia grevillea	Primary	-	-	Groom 2011
Grevillea hookeriana	Red toothbrushes	Primary	-	-	Groom 2011
Grevillea hookeriana subsp. api	Black toothbrushes	Primary	-	-	Groom 2011
Grevillea paniculata	Kerosene bush	Primary	-	-	Groom 2011
Grevillea paradoxa	Bottlebrush grevillea	Primary	-	-	Groom 2011
Grevillea petrophiloides	Pink poker	Primary	-	-	Groom 2011
Grevillea robusta	Silky oak	Primary	-	-	Johnstone *et al.* 2010; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Grevillea spp.		Primary	-	-	Saunders 1979; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Grevillea wilsonii	Native fuchsia	-	Secondary	-	Johnstone *et al.* 2010
Hakea auriculata		Primary	-	-	Saunders 1980; Groom 2011
Hakea candolleana		Primary	-	-	Groom 2011
Hakea circumalata	Coastal hakea	Primary	-	-	Groom 2011
Hakea commutata		Primary	-	-	Groom 2011
Hakea conchifolia	Shell-leaved hakea	Primary	-	-	Groom 2011
Hakea costata	Ribbed hakea	Primary	-	-	Groom 2011
Hakea cristata	Snail hakea	Primary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Hakea cucullata	Snail hakea	Primary	-	-	Groom 2011
Hakea cyclocarpa	Ramshorn	Primary	-	-	Saunders 1980; Groom 2011
Hakea eneabba		Primary	-	-	Groom 2011
Hakea erinacea	Hedgehog hakea	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Hakea falcata	Sickle hakea	Primary	-	-	Groom 2011
Hakea flabellifolia	Fan-leaved hakea	Primary	-	-	Groom 2011
Hakea gilbertii		Primary	-	-	Saunders 1980; Groom 2011
Hakea incrassata	Golfball or marble hakea	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Hakea lasiantha	Woolly flowered hakea	Primary	-	-	Johnstone *et al* . 2010; Groom 2011
Hakea lasianthoides		Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Hakea laurina	Pin-cushion hakea	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Hakea lissocarpha	Honeybush	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea marginata		-	Secondary	-	Johnstone *et al.* 2010
Hakea megalosperma	Lesueur hakea	Primary	-	-	Groom 2011
Hakea multilineata	Grass leaf hakea	Primary	-	-	Groom 2011
Hakea neospathulata		Primary	-	-	Groom 2011
Hakea obliqua	Needles and corks	Primary	-	-	Saunders 1980; Groom 2011
Hakea oleifolia	Dungyn	Primary	-	-	Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Hakea pandanicarpa subsp. crassifolia	Thick-leaved hakea	Primary	-	-	Groom 2011
Hakea petiolaris	Sea urchin hakea	Primary	-	-	Groom 2011
Hakea polyanthema		Primary	-	-	Groom 2011
Hakea preissii	Needle tree	Primary	-	-	Groom 2011
Hakea prostrata	Harsh hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea psilorrhyncha		Primary	-	-	Groom 2011
Hakea ruscifolia	Candle hakea	Primary	Secondary	-	Saunders 1980; Groom 2011; Johnstone *et al.* 2010
Hakea scoparia	Kangaroo bush	Primary	-	-	Groom 2011
Hakea smilacifolia		Primary	-	-	Groom 2011
Hakea spp.		Primary	Secondary	-	Saunders 1979; DSEWPaC 2012; DoEE 2017
Hakea stenocarpa	Narrow-fruited hakea	Primary	Secondary	-	Johnstone et al. 2010; Groom 2011
Hakea sulcata	Furrowed hakea	Primary	-	-	Groom 2011
Hakea trifurcata	Two-leaved hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea undulata	Wavy-leaved hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea varia	Variable-leaved hakea	Primary	Secondary	-	Saunders 1980; Groom 2011
Harpephyllum caffrum	Kaffir plum	-	-	Secondary	Johnstone 2017
Helianthus annuus	Sunflower	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Hibiscus sp.	Hibiscus	Secondary	-	-	Groom 2011
Isopogon scabriusculus		Secondary	-	-	Groom 2011
Jacaranda mimosifolia	Jacaranda	Secondary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Jacksonia furcellata	Grey stinkwood	Secondary	-	-	Groom 2011
Kingia australis	Kingia	-	Secondary	-	Johnstone *et al.* 2010
Lambertia inermis	Chittick	Secondary	-	-	Johnstone & Storr 1998; Groom 2011
Lambertia multiflora	Many-flowered honeysuckle	Secondary	-	-	Saunders 1980; Groom 2011

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Liquidamber styraciflua	Liquid amber	Primary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; Groom 2014; Personal observation
Lupinus sp.	Lupin	Secondary	-	-	Saunders 1980; Groom 2011
Macadamia integrifolia	Macadamia	Primary	Secondary	-	Johnstone *et al.* 2010; Grooms 2011; Groom 2014
Malus domestica	Apple	Secondary	Secondary	-	Johnstone *et al* . 2010; Johnstone & Storr 1998; DSEWPaC 2012; DoEE 2017; Groom 2011
Melaleuca leuropoma		Secondary	-	-	Saunders 1980; Groom 2011
Melia azedarach	Cape lilac or white cedar	Secondary	-	Primary	Johnstone *et al.* 2010; Groom 2011
Mesomeleana spp.		Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Olea europea	Olive	-	-	Secondary	Johnstone 2017
Persoonia longifolia	Snottygobble	-	-	Secondary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Pinus canariensis	Canary island pine	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Pinus caribea	Caribbean pine	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Pinus pinaster	Pinaster or maritime pine	Primary	-	-	Groom 2011
Pinus radiata	Radiata pine	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Pinus spp.		Primary	Secondary	-	Johnstone & Storr 1998; Saunders 1979; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Protea 'Pink Ice'		Secondary	-	-	Groom 2011
Protea repens		Secondary	-	-	Groom 2011
Protea spp.		Secondary	-	-	Johnstone *et al.* 2010
Prunus amygdalus	Almond tree	Secondary	-	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Pyrus communis	European pear	-	Secondary	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Quercus spp.	Oak	-	Secondary	-	Johnstone *et al.* 2010

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Raphanus raphanistrum	Wild radish	Secondary	-	-	Groom 2011; DoEE 2017
Reedia spathacea		-	Secondary	-	Johnstone *et al.* 2010
Rumex hypogaeus	Doublegee	Secondary	-	-	Saunders 1980
Stenocarpus sinuatus		Secondary	-	-	Johnstone *et al.* 2010
Syzygium smithii	Lilly pilly	Secondary	-	-	Groom 2014
Tipuana tipu	Tipu or rosewood tree	Primary	-	-	Groom 2011, Groom 2014
Xanthorrhoea preissii	Grass tree	Secondary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Xylomelum occidentale	Woody pear	Secondary	-	-	Groom 2014

CBC=Carnaby's black cockatoo, BBC=Baudin's black cockatoo and FRTBC=Forest red-tailed black cockatoo

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Appendix E

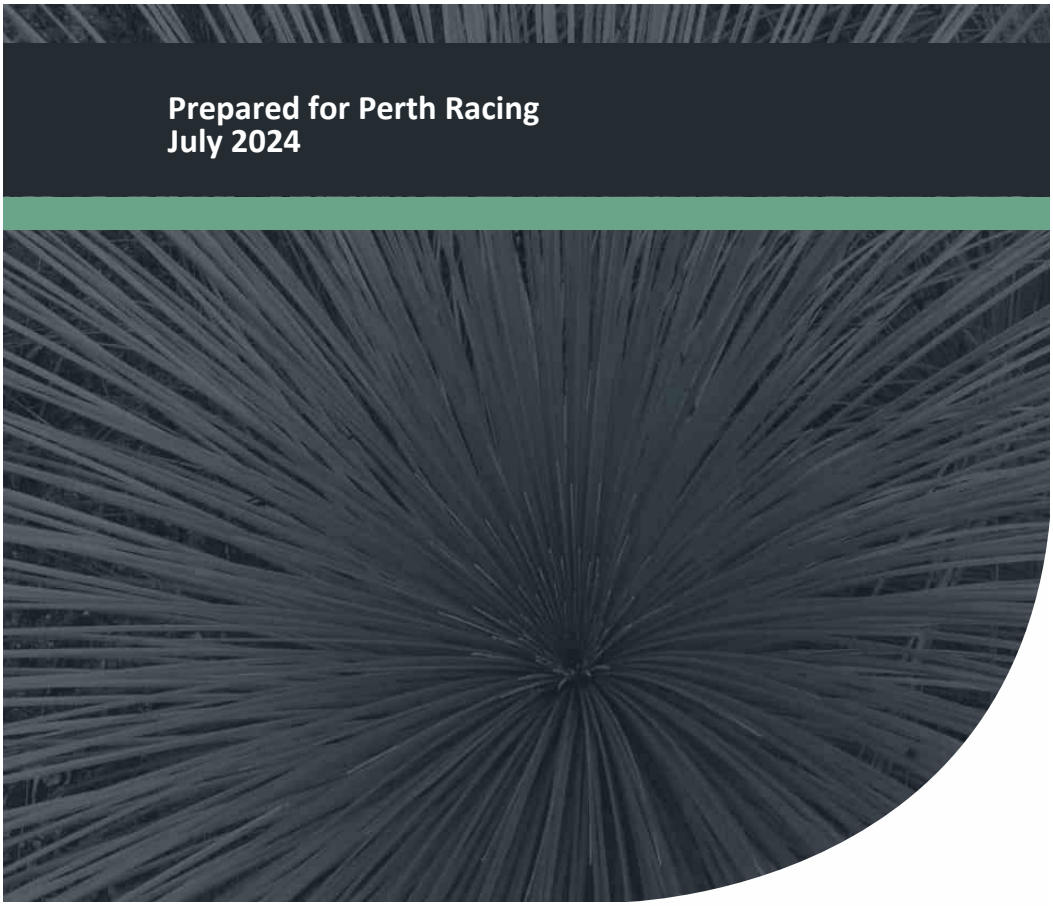
Local Water Management Strategy (Emerge Associates 2024b)

Attachment 12.1.3 Environmental Assessment Report

Local Water Management Strategy

Ascot Racecourse Local Structure Plan

Project No: EP23-109(03)



Attachment 12.1.3 Environmental Assessment Report

Document Control

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1	May 2024	Joyti Mabruk	JM	David Coremans	DPC
	For project team review				
A	May 2024	Joyti Mabruk	JM	David Coremans	DPC
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B	July 2024	Joyti Mabruk	JM	David Coremans	DPC
	For submission to Agencies				

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Attachment 12.1.3 Environmental Assessment Report

Executive Summary

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B (largely unchanged form existing), Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**. The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and City of Belmont (CoB). The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
  - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
  - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
  - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).
- The highest groundwater level beneath the site is reported 3.03 mBGL during February 2024 (Galt 2024), located beneath Precinct D.

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- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The Central Belmont Main Drain (CBMD), managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Matheson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the racecourse. These are understood to receive runoff from the Grandstand buildings in Precinct B and stables/buildings in Precinct C.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

The design criteria and the manner in which they are proposed to be achieved are presented in **Table E1**.

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Table E1: Water management criteria and compliance summary

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Water Conservation	WC1	For residential dwellings consumption target of 60 kL/person/year scheme water.	Provide advice to Precinct A and Precinct D residents on water conservation measures	Proponent	Point of sale
			RWTs can be utilised for non-potable uses	Lot owner	Post-house construction
			Promotion and use of WWG in lots within Precinct D and other open spaces across all precincts	Proponent/Lot owner	Point of sale/Post-house construction
			Promotion and use of water efficient appliances within Precinct A and Precinct D	Proponent/Lot owner	Point of sale/Post-house construction
			Mandate water efficient fittings within Precinct A and Precinct D	CoB	Building approval
	WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in all open spaces and verges	Proponent	Landscape design
			Open spaces designed to use no more than allocated groundwater		
			Minimise water requirements for open spaces and verge maintenance		
			Use of water efficient appliances within Precinct A and Precinct D	Lot owner	Post-house construction
			Use of WWG principles within Precinct A and Precinct D		
	WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the racecourse.	Proponent	Landscape design

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Stormwater Management	SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.	Lot owner/developer	Construction
	SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.	Proponent	Construction
			Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.	Proponent	Construction
	SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.95 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.	Proponent	Construction
	SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the basins.	Proponent	Detailed drainage design
	SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.	Proponent	Detailed drainage design
	SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the nutrient concentrations within surface water meet the regional water quality target.	Proponent	Detailed drainage design
	SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within POS and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use	Landscape/Maintenance Contactor/Proponent	Landscape Implementation/ Point of Sale
	SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.	Proponent	Detailed drainage design

Table E1: Water management criteria and compliance summary (Continued)

Management Aspect	Criteria Number	Criteria Description	Manner in which compliance will be achieved	Responsibility for implementation	Timing of implementation
Groundwater Management	GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, and subsoil drainage will be provided in the POS.	Proponent	Detailed drainage design
	GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.	Proponent	Detailed drainage design

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Central Belmont Main Drain Water Corporation

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Local Water Management Strategy

Ascot Racecourse Local Structure Plan

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
ANZECC	Australian and New Zealand Environment and Conservation Council
BoM	Bureau of Meteorology
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
CoB	City of Belmont
WC	Water Corporation of Western Australia (Water Corp)

Table A2: Abbreviations – General terms

General terms	
AEP	Annual exceedance probability
ASS	Acid sulfate soils
CCW	Conservation category wetland
CEMP	Construction Environmental Management Plan
DCA	Development Control Area
DMP	Drainage management plan
EC	Electrical conductivity
FMP	Foreshore management plan
LWMS	Local Water Management Strategy
MGL	Maximum groundwater level
MRS	Metropolitan Region Scheme
NWQMS	National Water Quality Management Strategy
POS	Public open space
SCWQIP	Swan and Canning Water Quality Improvement Plan
SRA	Swan River Alluvium
TDS	Total dissolved solids
TEC	Threatened ecological community
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids

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General terms	
TWL	Top water level
UFI	Unique feature identifier
UWMP	Urban Water Management Plan
WSUD	Water sensitive urban design
WWG	Water wise gardening

Table A3: Abbreviations – units of measurement

Units of measurement	
cm	centimetre
ha	hectare
m	metre
m^2	square metre
m^3	cubic metre
m^3 / s	cubic metres per second
mAHD	metres in relation to the Australian height datum
mBGL	metres below ground level
mm	millimetre
mS / cm	millisiemens per centimetre
µg/L	micrograms per litre
mg / L	milligrams per litre

Table A4: Terminology – design rainfall

Rainfall event	Annual exceedance probability (AEP)	Approximate equivalent average recurrence interval (ARI)
Small	1 exceedance year (EY) event (frequent)	1 in 1 year ARI event
Minor (residential purposes)	20% AEP event	1 in 5 year ARI event
Minor (commercial purposes)	10% AEP event	1 in 10 year ARI event
Major	1% AEP event	1 in 100 year ARI event

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1 Introduction

1.1 Background

Perth Racing (the 'proponent') proposes to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the existing Ascot Racecourse and Perth Racing Administration lot/building on Grandstand Road. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse. The layout of LSP and precinct plan is shown on **Figure 1** and provided in **Appendix A**.

1.2 Town planning context

The site is currently zoned "Urban", "Parks and Recreation", and "Private Recreation" under the Metropolitan Regional Scheme (MRS) (WAPC 2023b). Under the Local Planning Scheme (LPS) No. 15 (WAPC 2023a), the site is zoned as "RC – Place of Public Assembly: Racecourse", Mixed Use", "Parks and Recreation" and "Parks and Recreation: Water Supply Sewerage and Drainage".

1.3 Purpose of this report

This Local Water Management Strategy (LWMS) outlines the water management approach as required for the site by *Better Urban Water Management* (WAPC 2008b) and supports the Ascot Racecourse Structure Plan. It is intended to satisfy the expectations of the Department of Water and Environmental Regulation (DWER) and CoB. The LWMS also aids in achieving the goals and objectives outlined in the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d).

1.4 Policy Framework

There are a number of State Government legislation and policies of relevance to the site. These policies include:

- *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth Action Plan 2* (DWER 2023d)
- *Swan and Canning Rivers Management Act 2006* (Government of WA 2006)
- *Policy 49 – Planning for stormwater management affecting the Swan Canning Development Control Area* (DPaW 2016)
- *Local Planning Scheme No. 15 (City of Belmont)* (WAPC 2023a)
- *State Water Plan* (Government of WA 2007)
- *Draft State Planning Policy 2.9: Planning for Water Guidelines* (DPLH 2021)
- *State Planning Policy 2.10 Swan Canning River System* (WAPC 2006b)
- *Guidance Statement No. 33: Environmental Guidance for Planning and Development* (EPA 2008)
- *Liveable Neighbourhoods* (WAPC 2009a)
- *Planning Bulletin No. 64: Acid Sulfate Soils* (WAPC 2009b)

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In addition to the above policies, there are a number of published guidelines and standards available that provide direction regarding the water management characteristics that urban developments should aim to achieve. These are key inputs that relate either directly or indirectly to the site and include:

- *Better Urban Water Management* (WAPC 2008b)
- *Urban Water Management Plans: Guidelines for Preparing Plans and for Complying with Subdivision Conditions* (DoW 2008)
- *National Water Quality Management Strategy (NWQMS)* (ANZECC 2000)
- *Australian Runoff Quality* (Wong et al. 2006)
- *National Water Quality Management Strategy* (ANZECC 2000)
- *Stormwater Management Manual for Western Australia* (DoW 2007)
- *Decision Process for Stormwater Management in Western Australia* (DWER 2017)
- *Australian Rainfall and Runoff* (Ball J et al. 2019)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008)
- *Golden Gateway Structure Plan* (CoB 2019).

1.5 Previous Studies

1.5.1 Golden Gateway Local Water Management Strategy

The draft Golden Gateway LWMS (Essential Environmental 2018b) was prepared to support the Golden Gateway Structure Plan (CoB 2019) by Essential Environmental. The LWMS was prepared in consideration of *Better Urban Water Management* (WAPC 2008b) and *State Planning Policy 2.9: Water Resources* (WAPC 2006a). The key objectives and design criteria of the draft LWMS (Essential Environmental 2018b) included:

Water Conservation:

- Ensure the efficient use of all water resources in the redeveloped urban form and aim to achieve highest value use of fit-for-purpose water.
- Maintain opportunities for future generations by using water more efficiently.

Stormwater management:

- The first 15 mm of rainfall is to be retained within all lots through a combination of raingardens, water tanks and soakwell systems.
- Raingardens and tree-pits are to be installed in all new or upgraded streets to provide infiltration of the first 15 mm of rainfall.
- Minor event runoff from events larger than 15mm total depth are to be managed in accordance with serviceability requirements of the City of Belmont.
- Roads and public open spaces are to be designed to cater for the surface overflow for more severe storm events with habitable floors at least 0.3 m above the 1% AEP flood or storage level at any location.
- Habitable floors are to be constructed at least 0.5m above the 1% AEP flood level in the Swan River adjacent to the development area.

- Water quality treatment systems and stormwater management structures should be designed in accordance with the *Stormwater Management Manual for Western Australia* (DoW 2007) and *Australian Runoff Quality: A guide to water sensitive urban design* (Wong et al. 2006).

Groundwater management:

- Groundwater management systems are to be designed as free discharging under normal operating conditions.
- Flows from groundwater management systems are to be treated prior to discharge.

1.6 LWMS objectives

Whilst the criteria proposed in the Golden Gateway LWMS are relevant to some parts of the Ascot Racecourse structure plan area, it is not representative of all areas and site characteristics and therefore only partially applicable. This LWMS supports the Ascot Racecourse Structure Plan, which proposes an alternate layout (to the Golden Gateway Structure Plan) to some of the land uses surrounding the Ascot Racecourse. The design criteria and objectives proposed in this LWMS are generally based on those proposed in the Golden Gateway LWMS, though with additional consideration for site and Precinct- specific characteristics. This LWMS adopts the following major objectives:

- Protect water quality in the Swan River by providing appropriate water quality treatment at source.
- Mitigate potential flooding within the Structure Plan area and immediate surrounds.
- Take account of existing drainage infrastructure capacity and ensure that sufficient land is set aside to manage stormwater.
- Provide a broad level stormwater management framework to support future urban development.
- Incorporate appropriate best management practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified.
- Minimise development construction costs, which will result in reduced land costs for future home owners.
- Minimise transport of nutrients/pollutants to groundwater.
- Develop a non-potable water conservation strategy that will accommodate existing groundwater allocation constraints for the area.
- Gain support from DWER, DBCA, CoB and Water Corporation for the proposed method to manage stormwater within the site.

Detailed objectives for water management within the site are further discussed in **Section 4**.

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2 Proposed Development

A total of approximately 62.0 ha is proposed to be developed as shown on **Figure 1**. The Ascot Racecourse Structure Plan proposes six precincts with different objectives and character, and these include:

- **Precinct A –** Approximately 3.0 ha for retirement living/village and mixed use purposes
- **Precinct B –** Approximately 9.3 ha for the use of public assembly (i.e. entertainment/office purposes)
- **Precinct C –** Approximately 8.0 ha for the use of public assembly (i.e. racecourse/stabling purposes)
- **Precinct D –** Approximately 1.5 ha for residential/childcare purposes
- **Precinct E –** Approximately 4.2 ha for mixed use (i.e. commercial/retail purposes)
- **The Racecourse –** Approximately 36.0 ha of retained 'Place of Public Assembly: Racecourse' uses.

The proposed land uses surrounding Ascot Racecourse will be integrated into the Racecourse Precinct. Management of surface and groundwater will take a water sensitive urban design (WSUD) approach that will integrate the management of water within the Precincts with the Racecourse and immediately surrounding infrastructure.

The WSUD measures that will be adopted within the Structure Plan area will include:

- Bio-retention areas (BRAs) to meet water quality treatment requirements
- Subsurface infiltration cells that will facilitate at-source infiltration
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse
- Flood storage areas (FSAs) to provide flood detention, retention and infiltration as close to source as possible.

The WSUD approaches are further discussed in **Section 6**.The detailed concept plan and preliminary civil drawings are provided in **Appendix A** and **Appendix C**.

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3 Pre-development Environment

3.1 Sources of information

The following sources of information were used to provide a broad regional environmental context for the site:

- *Geological Survey of Western Australia* (Gozzard 2007)
- *Map Viewer Plus* (Landgate 2023)
- *Water Register* (DWER 2024c)
- *Perth Groundwater Map* (DWER 2024a)
- *Weather and Climate Statistics Data* (BoM 2024)
- *Acid Sulfate Soil Mapping* (DWER 2023a)
- *Water Information Reporting* (DWER 2024b).

In addition to the above information, site-specific investigations have been conducted. These have aimed at providing more detail to the existing regional information. These site-specific investigations and information have been available from the following sources:

- *Draft Golden Gateway Structure Plan* (CoB 2019)
- *Draft Golden Gateway LWMS* (Essential Environmental 2018b)
- *Draft Golden Gateway Environmental Report* (Essential Environmental 2018a)
- *Draft Infrastructure Assessment Report : Golden Gateway Precinct* (Cardno 2017)
- *Swan and Canning Water Quality Improvement Plan* (SCWQIP) (SWT 2009)
- *Swan and Canning Rivers Foreshore Assessment and Management Strategy* (SRT 2008).

3.2 Land use context

The site has been used as the Ascot Racecourse since 1892 (Landgate 2023). The northeast portion of the site is being used for horse racing and training purposes and the surrounding area is being used for stabling, training and entertainment venues which support the above purposes. Some portions of the site are predominantly cleared (e.g. Precinct A, Precinct E) and are occasionally used for parking or other temporary uses. The Precinct D area is used for commercial purposes, being the current Perth Racing administration building.

3.3 Climate

The site experiences a dry Mediterranean climate of hot dry summers and cool wet winters and is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August (BoM 2024). The region experiences rainfall for 84.8 days annually (on average).

3.4 Topography

The site is mostly flat with a slight downward slope from east to north and northwest, with a few low points. The variance in topography of the Precincts is described further as:

- The Racecourse slopes from Precinct C towards the Swan River with topography approximately 7 m Australian Height Datum (mAHD) to 1m AHD and from 7 mAHD (east) to 3 mAHD (west). There are a few local depressions (i.e., lakes and swale) observed within the centre of the racecourse.
- Precinct A has a generally flat topography of 2 mAHD with a high point of 3 mAHD to the west adjacent to Grandstand Road.
- Precinct B slopes from south to north (4 mAHD to 2 mAHD) and from west to east (3 mAHD to 2 mAHD). Precinct D and E are generally flat with a topography of 3 mAHD and 2 mAHD respectively.
- Parts of Precinct C (existing stables and buildings) drain towards the Racecourse, however most of Precinct C is currently carpark that drains towards Precinct E and the Southern Main Drain.
- Precinct D is generally flat with a topographic level 3 mAHD.
- Precinct E has a gentle slope from east to west. The topography of the precinct ranges from 4 mAHD to the east to 2 mAHD to the west.

The topographic contours of the site are shown on **Figure 2**.

3.5 Geotechnical conditions

3.5.1 Geology and soils

The Perth Metropolitan Region 1:50,000 Environmental Geology Series (Gozzard 1986) *and Sea to scarp - geology, landscape, and land use planning in the southern Swan Coastal Plain* (Gozzard 2011) describes that the site lies in the Swan River Terraces system, being underlain by the Guildford formation of alluvial and leached yellow sand. The regional geological mapping indicates that the site soils include:

- **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
- **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
- **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin

The regional geological mapping is shown on **Figure 3**.

3.5.2 Precinct A geotechnical investigation

A detailed geological investigation has been carried out in January 2024 (Douglas Partners 2024) for Precinct A (see **Appendix B**). This investigation generally confirms the regional geological mapping, and the ground conditions of Precinct A are described as:

- Uncontrolled Fill
  - Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL
  - Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY
- Overlying natural soils includes
  - Clayey soils including Clayey SAND and CLAY
  - Sandy soils including SAND and Silty SAND

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Douglas Partners (2024) concluded that if unmodified, Precinct A is considered unsuitable for on-site stormwater disposal due to the low permeability soils and shallow groundwater depth. To meet geotechnical requirements, stormwater should be managed by connecting to a suitable outflow (Douglas Partners 2024).

3.5.3 Precinct D geotechnical investigation

Galt has undertaken a geotechnical study in March 2024 (Galt 2024) for Precinct D (provided in **Appendix B**) and has described the Precinct D ground conditions as:

- **Surficial Topsoil** (in landscaped areas) up to 0.3 m thick and **Hardstand Fill Layers** (in carparks and access ways); overlying
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Whilst detailed geotechnical investigations have not been undertaken in each Precinct, it is expected that the soils encountered will be generally consistent with regional geological mapping and the investigations undertaken for Precincts A and D and will consist of generally shallow layers of sand overlying sandy clay of the Guildford formation. Such soils are unlikely to be suitable for onsite infiltration of all stormwater and onsite detention unless modified and stormwater management will need to be supplied with an outlet so that flood storage areas have a way to drain between storm events.

3.5.4 Acid sulfate soils

The acid sulfate soil (ASS) risk mapping (DWER 2023b) indicates that most of the site is considered to have a high to moderate risk of ASS occurring within the 3 m of the natural surface. Some portions of Precinct B, Precinct C and the Racecourse are mapped to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.

The ASS risk mapping is shown on **Figure 4**.

3.6 Environmental assets

3.6.1 Environmentally sensitive area

The northern portion of the site (along the Swan River) is identified as an environmentally sensitive area (ESA). ESAs are shown on **Figure 5**.

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3.6.2 Sewerage sensitive area

The entirety of the site is classified as a sewage sensitive area (SSA) by the *Government Sewerage Policy* (DPLH 2019). The two classifications of relevance to the site define a SSA as:

- a) Estuary catchments on the Swan and Scott Coastal Plains.
- f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.

3.6.3 Geomorphic wetlands

The *Geomorphic Wetlands of the Swan Coastal Plain* dataset indicates the following wetlands within the site:

- Multiple Use Category Wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
- Resource Enhancement Wetland (REW) area (UFI 8423)

The Swan River, situated immediately adjacent to the northern boundary of the site, is recognised as a "Conservation Category Wetland" (CCW) (UFI 1316 - Estuary waterbody) within the *Geomorphic Wetlands of the Swan Coastal Plain* dataset and has additional significant ecological, cultural and heritage values (DEC 2011).

The location of the geomorphic wetlands is shown on **Figure 5.**

3.7 Hydrology

3.7.1 Surface water

3.7.1.1 Water Resources

The dominant hydrological feature of the site is the Swan River estuary. The estuary is subject to marked seasonality, which controls the salinity of the site, and particularly the foreshore area. This seasonality is a result of the short winter rainfall patterns, a small tidal range and the landform of the estuary (Hodgkin and John 1986).

The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park (shown on **Figure 6**). Any proposed development on land adjacent river within the DCA and/or partly within DCA are subject to assessed and approved by the Department of Biodiversity, Conservation and Attraction (DBCA) under Part 5 of the *Swan and Canning Rivers Management Act 2006* and the *Swan and Canning River Management Regulations 2007* (CoB 2018).

Water management strategies will be needed to ensure protection (i.e. water quality improvement) of the Swan River. The catchments of the Swan Canning River system are the subject of the Swan Canning Water Quality Improvement Plan (SRT 2009) which contains catchment management measures and control actions.

The major event flood levels in the Swan River have been documented in recent studies undertaken on behalf of DWER (DWER 2023c).These flood levels, along with the extent of floodway/floodplain

are shown in the DWER online floodplain mapping tool. This tool indicates that the anticipated 1% AEP flood level adjacent to the site is 2.8 mAHD – noting that this level includes consideration for future climate change. The extent of floodway/floodplain from the Swan River adjacent to the site is shown on **Figure 6**.

3.7.1.2 Lakes

There are three lakes within the racecourse including:

- **Irrigation lake** – located adjacent to the Production Bore 1 (PB01) and has a volume of 6,000 m^3 to 7,000 m^3. Water is pumped out from PB01 into the lake, and irrigation water is drawn from the Irrigation Lake. During winter the Irrigation Lake overflows into the adjacent Lined Lake. The current irrigation demand for the Racecourse is approximately 3,000 m^3/day, there is no shortage of irrigation water supply as the lake has sufficient storage capacity. The top water level (TWL) of the Irrigation Lake is approximately 3.1 mAHD.
- **Lined Lake** – this Lake is sealed with a natural clay liner and fed via a 225 mm overflow pipe from the Irrigation Lake. The Lined Lake overflows into the Wetland Lake. The elevation of the Lined Lake is approximately 2.1 mAHD.
- **Wetland lake** – is the largest of the three lakes and has approximately 2.6 ha of surface area. The Wetland Lake has a TWL of approximately 0.4 mAHD. Two overflow pipes at the northern end of the Wetland Lake allow excess water within the Lake to flow to the Swan River.

Peak water levels within the Lined Lake and Wetland Lake were predicted for a 10% AEP storm event (Evangelisti & Associates 1997). The peak water level for was 2.68 mAHD in the Lined Lake which then discharged to the Wetland Lake. The Wetland Lake discharged to the Swan River after reaching the peak water level of 0.53 mAHD. The lakes are connected by 450 mm RCP pipes. The outfall into the Swan River is directed via two pipes (450 mm RCP and 375 mm RCP). The pipes are fitted with headwall and tidal control gate to mitigate inundation from the Swan River (Evangelisti & Associates 1997).

The location of the lakes and overflow pipes are shown on **Figure 6**.

3.7.1.3 Drainage network systems

The Central Belmont Main Drain (CBMD) is managed by the Water Corporation and is the regional drainage system and has a catchment area of 189 ha and which discharges into the Swan River. Catchment plans for the CBMD indicate that inflow from the site occurs in the southwestern corner of Precinct E, where an open drain connects to the CBMD at node CAN008 as shown in **Appendix E** and **Figure 6**.

The CoB has a local drainage piped network located beneath Hardey Road adjacent to Precinct C and which discharges to the CBMD within Precinct E. A larger local CoB network extends along Matheson Road to the East. This is currently connected to the 900 mm pipe that discharges northwards to the lined lake within the centre of the racecourse.

CoB local drainage pipes also exist beneath Grandstand Road adjacent to Precinct A however there is no current connection between Precinct A and the local drainage network. The same network also extends past/adjacent to Precinct D along the northern end of Resolution Drive, however there is no

current connection from Precinct D to the local pipe network. The pipe network along Resolution Drive includes a 450 mm and 525 mm pipe which are understood to discharges into the CBMD. Whilst the CoB catchment has not been modelled to determine peak flows under differing storm durations, an estimate can be made based on the capacity of the pipes which discharge to the CBMD. The combined capacity of the two existing pipes is estimated to be 0.62 m^3/s, and therefore the allowable discharge from Precinct C and Precinct E is estimated to be 0.33 m^3/s.

Within the Racecourse an existing swale is being used around the racecourse to convey water from the track into the central Wetland Lake.

The location of the swales within the Racetrack Precinct and outlet to Swan River from the Wetland Lake is shown on **Figure 6**.

3.7.2 Groundwater

3.7.2.1 Groundwater Resource

The groundwater beneath the site is a multi-layered system comprised of the following:

City of Bayswater – Perth Superficial Swan unconfined aquifer. The Superficial Aquifer is approximately 20 m thick under the Ascot Racecourse, with the base of the aquifer under the racecourse at approximately - 20 mAHD (Davidson, 1995). The aquifer is recharged directly by rainfall and from the Swan River.

King Park Aquifer. The Kings Park Aquifer is 155 m thick starting from - 20 mAHD and is recharged laterally from the adjacent northern Mirrabooka Aquifer and Superficial Aquifer. The Kings Park Aquifer comprises 2 members: the Mullaloo Sandstone and Como Sandstone. Only the Mullaloo Sandstone member is present at the Ascot site (Davidson, 1995). The Mullaloo Sandstone member is underlain by the Kardinya Shale confining bed of the Osborne Formation.

The groundwater salinity in the aquifer in 1995 was mapped as 500 mg/L to 1,000 mg/L TDS (Davidson, 1995). However, data in recent years indicates the aquifer salinity levels are increasing due to saltwater intrusion.

Perth South – Perth Leederville confined aquifer is below -160 mAHD and is approximately 370 m thick. In the Ascot area the Leederville Aquifer is confined but further to the south and north of Perth it is hydraulically connected to the Superficial Aquifer. The Leederville Aquifer comprises of four formations under the Ascot Racecourse, namely Henley Sandstone, Pinjar Member, Wanneroo Member and the Mariginiup Member.

Groundwater flow is generally westwards through the Leederville Aquifer. Lateral discharge can occur to the Kings Park Aquifer but depends on levels of abstraction in the Leederville Aquifer adjacent to the discharge area.

Generally, groundwater salinity in the Leederville Aquifer can be divided into an upper and a lower zone. The upper zone is generally fresh with salinity ranging from 250 to 1,000 mg/L. Salinity in the lower zone (below -400 mAHD) ranges from 1,000 mg/L to greater than 3,000 mg/L.

Groundwater is abstracted from an artesian production bore (PB1) assigned to the Leederville Aquifer to meet the irrigation demand of the Racecourse and surrounds. The bore is located adjacent the Irrigation Lake at the south corner of the Ascot Racecourse track. The bore is screen in the upper Leederville Formation which extends between -160 mAHD and -400 mAHD.

The allocation status of aquifers is further discussed in **Section 5.1.2**.

3.7.2.2 Groundwater levels

Perth Groundwater Map indicates (DWER 2023e) that the regional groundwater level sits at 0.5 m AHD across the site. Therefore, the groundwater clearance from southeast to northwest of the site ranges from 6.5 m to 0.5 m.

There are two groundwater level and quality monitoring bores (Bore1 and Bore2) and one production bore (PB1) within the Racecourse (see **Figure 2**) which are monitored by Perth Racing. Groundwater levels in these are monitored monthly.

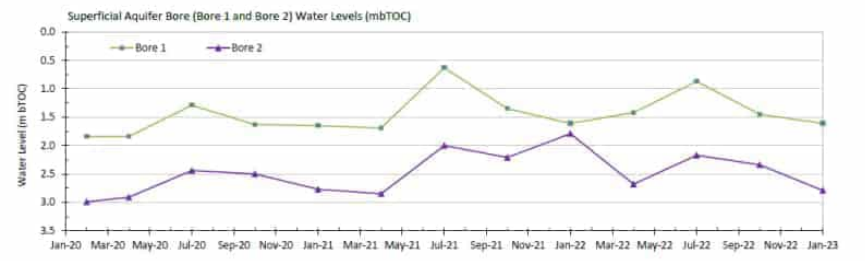


Plate 1: Groundwater levels within the Superficial Aquifer at Bore1 and Bore2 (JDA 2023)

Plate 1 depicts the groundwater levels observed within the Racecourse which clearly indicates the rise and fall of groundwater levels seasonally. The peak groundwater level at Bore 1 and Bore 2 were recorded 1.26 m AHD and 1.70 m AHD respectively, during August 2022.

Monitoring has recently been undertaken within Precinct A. Six monitoring wells were installed for the Precinct A geotechnical investigation. The groundwater depth below the surface of the Precinct A (during January 2024) varied from 1.09 m below ground level (mBGL) to 2.37 mBGL (Douglas Partners 2024).

Monitoring has also recently been undertaken within Precinct D by Galt Geotechnics during the geotechnical investigation. The highest groundwater level beneath Precinct D is reported as 3.03 mBGL during February 2024 (Galt 2024).The various monitoring data/sources have been collated to prepare estimated maximum groundwater contours beneath the site. These have also considered the surface elevation of swales adjacent to the racetrack and the reported TWL of the Wetland Lake. The regional groundwater levels are shown in **Figure 2,** with spot heights recorded at the various locations also provided. It is noted that these do not necessarily represent the annual maximum groundwater levels at all parts of the site given the various timing of measurement of groundwater. Notwithstanding the variability of timing, it is likely that the management of stormwater (and in

particular infiltration) will more likely be influenced by localised soil conditions than seasonal peak groundwater levels in the superficial aquifer.

3.7.2.3 Groundwater quality

Water quality monitoring was conducted monthly at PB1 and quarterly at Bore1 (JDA 2023). Water quality parameters those were analysed during the monitoring period include:

Monitoring Bore (Bore1)

- EC
- pH
- TDS
- Total phosphorus (TP)
- Filterable Reactive Phosphorus or Phosphorus in Orthophosphate (PO_4-P)
- Total Nitrogen (TN)
- Nitrogen in Total Oxidised Nitrogen (NO_x-N)
- Nitrogen in Ammonia (NH_3-N)
- Total Kjeldahl Nitrogen (TKN)

Production Bore (PB1)

- Electrical conductivity (EC)
- pH
- Total Dissolved Solids (TDS)

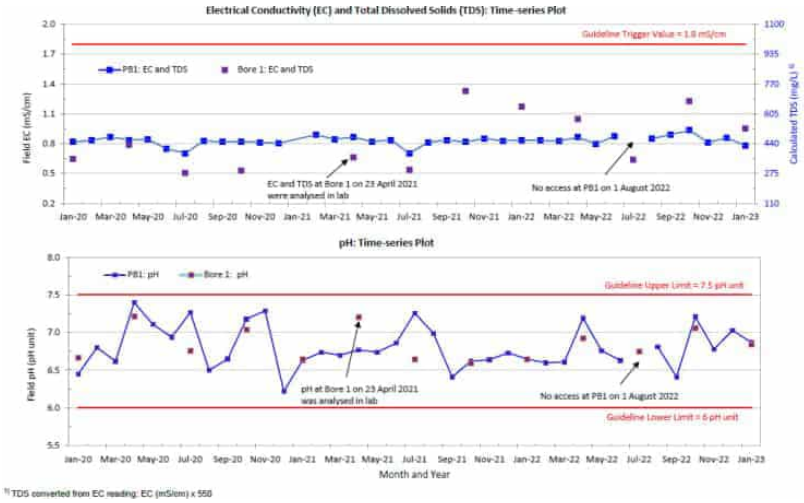


Plate 2: Water Quality (EC, TDS and pH) Monitoring results (JDA 2023)

Plate 2 and **Plate 3** illustrate the water quality of the groundwater within the site is generally consistent over the monitoring periods with typically low variance in parameters tested. EC, TDS and

pH values did not display any exceedances of the trigger values. However, TN and TP regularly exceeded the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L (respectively). It is also noted a large exceedance in TN occurred in August 2022 however this does not appear to be representative of long-term values.



Plate 3: Water Quality (TN and TP) Monitoring results (JDS 2023)

3.8 Summary of existing environment

In summary, the environmental investigations conducted to date indicate that:

- The site is being used for horse racing, mixed uses (i.e. car park, stables and entertainment/hospitality venues, and commercial). Some portions of the site are only used infrequently (e.g. for parking or events).
- The site is located in an area of moderate to high rainfall, receiving 756.3 mm on average annually with the majority of rainfall received between June and August.
- The majority of the site has a relatively flat topography of 1 mAHD at the northwest (along the Swan River) and 2 mAHD to the south and rising to 7 mAHD to the east of the site.
- The site is within the Swan River Terraces system and displays Guildford formation soils of alluvial and leached yellow sand described as:
  - **Ms2 –** Sandy Silt: Strong brown to mid grey, mottled, blocky, fine sand, hard when dry, variable clay content of alluvial origin
  - **Ms4 –** Sandy Silt: light yellow brown, blocky, mottled some fine to medium sand, soft when moist, variable clay content
  - **S8 –** Sand: very light grey at surface, yellow at depth, fine to medium-grained, sub rounded quartz, moderately well sorted of eolian origin
- The groundwater depth below the surface of Precinct A varies from 1.09 m mBGL to 2.37 mBGL (Douglas Partners 2024).

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- The highest groundwater level beneath Precinct D is reported 3.03 mBGL during February 2024 (Galt 2024).
- Most of the site is considered to have a high to moderate risk of ASS occurring, however some portions of Precinct B, Precinct C and the Racecourse are considered to have a moderate to low risk of ASS occurring within the 3 m of the natural surface.
- The northern portion of the site along the Swan River is identified as an ESA.
- The entirety of the site is classified as a SSA and classified as:
  - a) Estuary catchments on the Swan and Scott Coastal Plains.
  - f) The area is <1 km up-groundwater-gradient and 250 m down-gradient of a significant wetland; or where the groundwater gradient is unknown within 1 km of the significant wetland.
- The following wetlands are located within the site and these are classified as:
  - Multiple Use category wetland (MUW) area (UFI 8424, UFI 8425, UFI 8426).
  - Resource Enhancement wetland (REW) area (UFI 8423).
- The dominant hydrological feature of the site is the Swan River estuary. The northern boundary of the site falls within the Swan Canning Development Control Area (DCA) (CoB 2018) and Swan Canning River Park.
- The floodway of the Swan River is immediately adjacent to but not within the site. The 1% AEP flood elevation of the Swan River adjacent to the site is 2.8 mAHD.
- There are two existing major drainage network systems within or adjacent to the site include:
  - The CBMD, managed by the Water Corporation. This currently receives runoff from Precinct C (via the CoB drainage network) and Precinct E.
  - The CoB local piped drainage network, which exists along Mathieson Road, Grandstand Road and the northern portion of Resolution Drive.
- There are three lakes (Irrigation Lake, Lined Lake and Wetland Lake) located within the centre of the Racecourse. These are understood to receive runoff from the grandstand buildings in Precinct B and stables/buildings in Precinct C.
- Allowable discharge to the CBMD from the local drainage network is 0.95 m^3/s based on Water Corporation modelling.
- The groundwater beneath the site is a multi-layered system consisting of the Superficial, Kings Park Formation, Leederville and Yarragadee aquifers.
- Regional groundwater mapping indicates that the groundwater levels across the site are at approximately 0.5 m AHD.
- Local groundwater level monitoring indicates that annual maximum groundwater levels (recorded in August 2022) were measured at 1.26 m AHD and 1.70 m AHD at Bore 1 and Bore 2 respectively. Groundwater levels in adjacent areas included Precinct A levels at 1.09 mBGL to 2.37 mBGL and Precinct D levels of approximately 3.03 mBGL.
- Water quality monitoring indicates that EC, TDS and pH values do not exceed guideline trigger values. However, TN and TP concentrations continually exceed the ANZECC guideline trigger value of 1.2 mg/L and 0.065 mg/L respectively.

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4 Design Criteria and Objectives

This section outlines the objectives and design criteria that this LWMS and future management plans must achieve. The water management strategy includes water conservation, groundwater management and stormwater management.

4.1 Integrated water cycle management

Better Urban Water Management (WAPC 2008a) endorses the promotion of integrated water cycle management and application of WSUD principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies.

The key principles of integrated water cycle management include:

- Considering all water sources, including wastewater, stormwater and groundwater
- Integrating water and land use planning
- Allocating and using water sustainably and equitably
- Integrating water use with natural water processes
- Adopting a whole catchment integration of natural resource use and management.

Integrated water cycle management addresses not only physical and environmental aspects of water resource use and planning, but also integrates other social and economic concerns. Water management design objectives should therefore seek to deliver better outcomes in terms of:

- Potable water consumption
- Stormwater quality management
- Groundwater management.

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving environments. The existing environmental context of the site has been discussed in **Section 3** of this document. Guidance regarding environmental values and criteria is provided by a number of national and state policies/guidelines and site-specific studies undertaken in and around the site. These were detailed in **Section 1.4** and **Section 1.5** respectively.

4.2 Water conservation

This LWMS proposes the following water conservation criteria:

Criteria WC1 For residential dwellings, consumption target of 60 kL/person/year.

Criteria WC2 Ensure the efficient use of all water resources

Criteria WC3 Non-potable irrigation water to be sourced from existing groundwater licences held over the area.

The manner in which this objective will be achieved is further detailed in **Section 5**.

4.3 Stormwater management

The principle behind stormwater management at the site is to mimic the pre-development hydrological conditions and utilise existing infrastructure where sensible to do so, as described in **Section 3.7**. This principle and the guidance documents discussed in **Section 1.4** and **Section 1.5** and have guided the stormwater management criteria.

Criteria SW1 Retain and treat the first 15 mm of rainfall as close to source as possible and within site.

Criteria SW2 Detain up to 1% AEP rainfall event on-site.

Criteria SW3 Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.

Criteria SW4 Finished floor levels must have a minimum of 300 mm clearance above the 1 % AEP TWL in the FSA.

Criteria SW5 All lots must have a minimum of 500 mm clearance above the 1 % AEP flood level in the Swan River.

Criteria SW6 Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.

Criteria SW7 Reduce nutrient loads by applying appropriate non-structural measures.

Criteria SW8 Design infiltration areas to avoid creating mosquito habitat.

The manner in which these objectives will be achieved is further detailed in **Section 6**.

4.4 Groundwater management

The principle behind the groundwater management strategy is to maintain the existing groundwater hydrology. The groundwater management criteria for the site include:

Criteria GW1 Surface based infiltration structures should have 300 mm clearance above the MGL.

Criteria GW2 Habitable floor levels should have a clearance to the MGL of at least 1.2 m.

The manner in which the groundwater management objectives will be achieved is further detailed in **Section 7**.

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5 Water Conservation Strategy

5.1 Fit for purpose water use

Conservation of water through fit-for-purpose use and best management practices is encouraged so that scheme water is not wasted. Fit-for-purpose describes the use of water that is of a quality suitable for the required use of the water. Fit-for-purpose principles have been utilised in the water conservation strategy for the site and will achieve **Criteria WC1**.

5.1.1 Scheme water supply

Scheme water will be supplied by the Water Corporation Integrated Water Supply System. Scheme water is proposed to be used for all potable uses. Scheme water will also service some external uses, where fit-for-purpose alternatives are not available.

5.1.2 Groundwater

As discussed in **Section 3.7.2.1**, the site is located beneath a multi-layered system comprising of the Superficial Swan, Kings Park Formation, Leederville and Yarragadee aquifers.

The proponent holds a groundwater allocation from the Perth South Leederville confined aquifer for the following:

- GWL 178519 - 347,000 kL

This licence will be used to meet the irrigation requirements for the Racecourse Precinct, Precinct A, Precinct B and part of Precincts C and E.

The above-mentioned measure will achieve **Criteria WC3**.

5.1.3 Rainwater tanks

Rainwater tanks (RWTs) can be used within private lots to harvest roof runoff. This water is considered non-potable but can be used to supplement non-potable water uses.

5.2 Lot scale water conservation measures

This LWMS proposes that the water conservation measures to be adopted would include RWTs, waterwise principles for lot scale gardens and within estate landscaping (WWG) and water efficient fixtures and appliances (WEFA) to ensure that the residential portion of the development minimises the use of water. These are summarised in the following sections.

5.2.1 Rainwater tanks

The use of RWTs will not be mandated, and the stormwater quantity management strategy does not rely on their use. They are therefore only considered to be a water conservation measure. Given that rainwater tanks will not be mandated or supplied by the proponent, it has been assumed that these would be implemented by 7.5% of households within Precinct D. Whilst they may be considered for

Precinct A they are not proposed to be taken up in other Precincts. The assumed uptake rate has been based on data obtained from the Australian Bureau of Statistics (ABS 2013). It is assumed (for the purposes of the water balance analysis) that all rainwater tanks have a capacity of 3 kL.

5.2.2 Water efficient fixtures and appliances

Water conservation strategy for the site proposes the use of WEFA. Water efficient fittings will be mandated through the building licence, while uptake of water efficient appliances can be encouraged by State and Local Government rebates in addition to education from the proponent at point of sale. WEFA are relevant to Precinct A and Precinct D. It is assumed that water efficient appliances will be implemented by 40% of households within Precinct A and Precinct D, which has been based on data obtained from the Australian Bureau of Statistics (ABS 2013, 2014).

5.2.3 Waterwise gardens

Landscape packages will not be provided as a part of the land sale contract. Lot scale waterwise gardening principles (WWG) are only relevant for Precinct D. These will be achieved by promoting Waterwise gardening principles (WWG) (WC 2003) at the time of sale of land within Precinct D. It is assumed that 75% of households in Precinct D will implement WWG principles within lot gardens (ABS 2013). WWG principles include:

- Soil to be improved with soil conditioner certified to Australian Standard (AS) 4454 to a minimum depth of 150 mm where turf is to be planted and a minimum depth of 300 mm for garden beds.
- The irrigation system shall be designed and installed according to best water efficient practices:
  - The controller must be 'hydrozoned'.
  - Emitters must disperse coarse droplets or be subterranean.
- Garden beds to be mulched to 75mm with a product certified to AS4454.
- Increasing community awareness of water conservation by promoting Waterwise practices, fixtures and fittings at the point of sale.

WWG principles will also be considered for Precinct A and Precinct E, however it is anticipated that these areas will have minimal irrigated landscaping to which this would apply. The current approach to irrigation within the Racecourse Precinct, Precinct B and Precinct C adopts a range of water conservation measures (including non-irrigated area and retention of existing trees/vegetation) to ensure that Perth Racing operates within the available groundwater allocation. This approach is not proposed to be significantly modified.

The above measures will assist in achieving **Criteria WC1** and **WC2**.

5.3 Water use analysis

5.3.1 Lot scale water use analysis

A water use analysis has been undertaken for Precinct D to estimate the expected individual residential lot water use to demonstrate the effectiveness of the water conservation strategy. The water use analysis has been based on the rates and calculation methodology presented in the Water

Corporation (2011) spreadsheet *AltWaterSupply_Water_Use_Model.xls*. This spreadsheet has been adapted to model the effects of using the water conservation measures proposed, and key assumptions include:

- Lot area has been based on a conceptual lot layout (see **Appendix A**).
- Average residency of 2.6 people per single lot dwelling. This value has been calculated from data provided by ABS for new housing developments in Perth (ABS 2022).
- Assumed up-take rates include:
  - 100% uptake of water efficient fittings
  - 40% uptake of water efficient appliances
  - 7.5% uptake of RWTs
  - 55% uptake of WWG principles.

The results of the water balance indicate that if households in Precinct A and Precinct D adopt the proposed water conservation measures (e.g. efficient fittings, RWT, WWG principals) at typical uptake rates they will use an average of 33.0 kL/year/person. This achieves the water target of no more than 60 kL/year/person of scheme water and satisfies **Criteria WC1**.

5.4 Wastewater management

The wastewater generated from the site will be managed by connecting the development to the Water Corporation deep sewer network.

5.5 Water conservation management criteria compliance

A summary of the proposed water conservation management criteria and how these are addressed is provided within **Table 1.**

Table 1: Water conservation management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
WC1	Residential consumption target of 60 kL/person/year scheme water.	Provide advice to residents in Precinct A and Precinct D on water conservation measures
		RWTs can be utilised for non-potable uses within Precinct D
		Promotion and use of WWG in lots within Precinct D
		Promotion and use of water efficient appliances to Precinct A and Precinct D
		Mandate water efficient fittings within Precinct A and Precinct D
WC2	Ensure the efficient use of all water resources.	Use of waterwise landscaping principles in open spaces
		Open spaces designed to use no more than allocated groundwater
		Minimise water requirements for open space and verge maintenance
		Use of water efficient appliances within Precinct A and Precinct D
		Use of WWG principles in lots in Precinct D

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Table 2: Water conservation management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
WC3	Non-potable irrigation water to be sourced from existing groundwater licences held over the area.	The proponent holds a groundwater Licence with an allocation of 347,000 kL per annum which will meet the irrigation requirements of the Racecourse and surrounding Precincts.

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6 Stormwater Management

The principle behind the stormwater management strategy for the site is to maintain the existing hydrology by detaining, retaining and treating runoff from the small rainfall event (i.e. first 15 mm) as close to source as possible and detaining/retaining the major event (1% AEP) on site prior to discharge to either the centre of the Racecourse (i.e. self-retained) or to the CBMD the pre-development outflow rates. Due to the existing soil conditions (See **Section 3.5**), the site is not well suited for structural controls utilising infiltration of stormwater unless modified. However, given that fill will be utilised to ensure that habitable floor levels are above the 1% AEP flood elevation of the Swan River, final elevations will be approximately 4 mAHD. Where fill is used to achieve this there will be sufficient clearance to MGL and permeability of soils to adopt WSUD measures which utilise infiltration.

WSUD measures proposed will vary across the Precincts and will include:

- BRAs to achieve water quality treatment (Precincts A, C, D and E)
- FSAs to detain runoff prior to discharge to the adjacent road network system
- Subsurface infiltration cells that will facilitate at-source infiltration (Precinct D)
- Flood storage integrated into existing surface water bodies located centrally within the Racecourse (for Precinct A and C)
- FSAs to provide flood detention and infiltration as close to source as possible (Precinct E).

The overall approach to precinct drainage is shown on **Figure 7**.

The WSUD measures that will be implemented as a part of the development are described in the following sections. Precinct B has been assumed to be self-retained and a portion of Precinct C (already connected to the Lakes in the centre of the track) has been assumed to be the same as it is now. Surface runoff modelling undertaken using XPSWMM has been used to inform the design of stormwater infrastructure as detailed in the following sections. Assumptions used to represent the post-development environment are provided in the modelling assumptions report in **Appendix D**.

6.1 Lot scale drainage measures

Lots within Precinct D and Precinct E will retain the first 15 mm rainfall event runoff within soakwells/soakage which will need a capacity of 150 m^3/ha. Lot storage is the responsibility of the lot owner and will be assessed as part of the building approval process prior to construction.

The use of soakwells/soakage areas will assist in achieving **Criteria SW1**.

6.2 Development drainage measures

6.2.1 Bio-retention areas

Runoff from the first 15 mm of rainfall will be captured and retained within a vegetated BRA located in open spaces. The BRA is assumed to have a depth of 500 mm with 1:3 side slopes. Treatment of

runoff will be provided through interaction with vegetation and adsorption to sand particles through infiltration prior to reaching groundwater.

The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10). This will be finalised prior to detailed design. The location of the BRA will either be in a drainage reserve, an open space or they may be within the centre of the Racecourse as a separate treatment area (separate from the existing Lakes). The sizing and spatial requirements of BRAs will be confirmed in the detailed designs.

The use of BRA will assist in achieving **Criteria SW1, SW6,** and **SW8**.

6.2.2 Flood detention/storage

An FSA will be utilised to detain runoff above the first 15 mm and up to the 1% AEP rainfall event. To achieve this, the invert of the FSA will have sufficient clearance above groundwater 300 mm. FSAs are assumed to be 1.2 m depth with 1:6 side slope and will be integrated into POS or drainage reserve, and will overflow to the Water Corporation drainage network. The sizes and spatial requirements for the FSA will be confirmed in the detailed designs and development stages.

The use of an FSA will assist in achieving **Criteria SW1, SW2, SW4,** and **SW6.**

6.2.3 Subsurface storage

Surface runoff generated by lots, stables and hardstand/carpark areas will be directed into sub-surface storage. Precinct D will have an independent drainage pipe network within individual precincts which convey flows to downstream sub-surface retention structures.

These structures have been sized to accommodate up to the 1% AEP rainfall event and have been designed as a 1 m deep structure. The detailed configurations could be modified to suit site constraints. These will either be location beneath road reserve/verge or beneath an open space and will require an overflow connection to the local (CoB) drainage network to ensure that they can dry out. The sizes and spatial requirements for the subsurface storages are provided in **Table 2** and illustrated in **Figure 7A**: Precinct A Stormwater Management Plan

Figure 7B: Precinct C Stormwater Management Plan

Figure .

The use of the sub-surface storage will assist in achieving **Criteria SW1, SW2,** and **SW6.**

6.2.4 Lake storage

Precinct A and Precinct C (stables) will first direct runoff to a bio-retention areas, however overflow from these will be catered for in the Wetland Lake. In a 1% AEP storm event an additional 78 mm of depth will occur within the Wetland Lake from both Precincts.

As indicated in **Section 3.7.1.2**, the Wetland Lake is connected/discharges to the Swan River via a 375 mm and 450 mm culvert. These are not proposed to be modified. The combined nominal flow capacity of the 375 mm and 450 mm pipes is approximately 0.4 m^3/s. The inlet, length, grade, etc of

these pipes is not proposed to be modified and therefore the current overflow regime from the site to the Swan River will remain unchanged.

The use of the Wetland Lake storage will assist in achieving **Criteria SW1, SW2, SW3,** and **SW6.**

6.3 Precinct based drainage approach

6.3.1 Precinct A

There is no current connection point for drainage to be exported from site to the local CoB network. Runoff will therefore need to be managed within Precinct A and the Racecourse. Precinct A will require a single BRA that will address treatment of water quality; this will be located within Precinct A as close to source as possible. The BRA should have the following characteristics:

- Base will be vegetated with reeds/rushes as per a biofilter
- 1:3 side slopes
- Depth of 300 – 500 mm pending final design
- Volume of the BRA will need to achieve 194 m^3
- Nominal surface area of 450 m^2.

In addition to the volume achieved by the BRA, in a major (1% AEP) storm event a further 1,345m^3 of flood retention storage will be required. The proposed earthwork level of Precinct A (4.0 mAHD) means that it is possible to direct runoff exceeding BRA capacity to the Wetland Lake in the centre of the Racecourse. This approach will add approximately 52 mm to the central 2.6 ha Wetland Lake.

The volumes of storage required and locations of storage across the Precincts is summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7A**.

6.3.2 Precinct B and Racecourse

As indicate previously, there are no substantial changes proposed to Precinct B. Precinct B currently manages surface runoff within the precinct and adjacent Racecourse, largely via at source infiltration, swales around the perimeter of the track surface and the existing lake system Precinct B and the Racecourse are proposed to be retained largely as is.

As indicated in **Section 3**, the Wetland Lake currently has a piped overflow connection to the Swan River. This overflow pipe(s) reportedly rarely overflow and can be controlled via a structure at the outlet (which also prevents tidal influence on the Wetland Lake). The Wetland Lake has a 2.6 ha surface area, and therefore can provide significant volume of stormwater retention in the event of a major storm event. There are no new connections proposed to the Swan River and there are no changes proposed to the management approach currently taken for the Wetland Lake and the current piped outlets.

6.3.3 Precinct C

Precinct C is the existing stables area, adjacent carparks and future stables areas along the south and east of the Structure Plan area. The existing buildings currently either infiltrate runoff at source or

discharge to the Lined Lake in the centre of the Racecourse. This approach is proposed to be retained.

Surface runoff generated by hardstand/carpark areas of Precinct C will be directed and discharged towards Precinct E via the existing connections to the CoB drainage network along Matheson Road or via the existing pipe connection in the southwest of the Structure Planning area to the existing connection to the CBMD (Water Corporation drainage system) within Precinct E.

The drainage requirements for the southern (carpark) portion of Precinct C are therefore detailed with those proposed for Precinct E.

For the two currently undeveloped portions of Precinct C (future stables along the south and east of the Structure Plan area), the post-development drainage system will collect the runoff from these areas and direct them to the centre of the Racecourse. Initial treatment will be provided by a BRA which accommodates 418 m^3, with a nominal surface area of 924 m^2.

Runoff exceeding the capacity of the BRA (which will be 684 m^3) will be directed to the Wetland Lake. The direction of major event stormwater runoff to the Wetland Lake will add 26 mm to the top water level of the Wetland Lake.

The volumes required to be treated and for flood mitigation for Precinct C are summarised in **Table 2**. The approach to water management in Precinct A is shown in **Figure 7B**.

6.3.4 Precinct D

As indicated in **Section 6.1**, private lots and the childcare building within Precinct D are assumed to retain the first 15 mm within the lot boundary, most likely within soakwells, which should be appropriate given that some measure of imported fill will be required to meet clearance above regional flood levels. Based on the density of lots proposed in Precinct and lack of open space, this precinct will need 42 m^3 of subsurface storage to accommodate and detain the 1% AEP storm event to ensure that the post development peak flow rates will mimic the pre -development conditions. This is assumed to be located adjacent to Resolution Drive as shown in **Figure 7C**. The outflow from this Precinct will likely be predominantly overland flow once the first 15 mm of storage has reached capacity, however a low flow to ensure that these can adequately drain between storm events is recommended.

The volumes required to be treated and for flood mitigation for Precinct D are summarised in **Table 2**.

6.3.5 Precinct E

Surface runoff from across Precinct E (inclusive of Precinct C hardstand/carpark) will be conveyed via the drainage network firstly to a BRA for water quality treatment and then this will overflow to an FSA (detention drainage structure) at the south western corner of Precinct E for detention of the 1% AEP storm event. Overflow from Precinct E basin will discharge into the CBMD (Water Corporation drainage system) at existing flow rates. The Water Corporation surface runoff modelling of the CBMD indicates that the local drainage network contributes 0.95 m^3/s at node CNA008. This is understood to be contributed to by existing 450 mm and 525 mm pipes beneath Resolution Drive and therefore it is assumed that 0.62 m^3/s is taken up by the existing pipe network, and approximately 0.33 m^3/s of

capacity is available to convey runoff from Precinct C, Precinct E and upstream contributing catchments.

The volumes required to be treated and for flood mitigation for Precinct E are summarised in **Table 2**. The approach to water management in Precinct E is shown in **Figure 7D**.

6.3.6 Precinct drainage summary

The requirements for water quality treatment within the Precincts is summarised in **Table 2**.

Table 2: Precinct drainage summary

Precinct	First 15 mm requirement (m^3)	Location of first 15 mm	1% AEP flood mitigation requirement (m^3)	Location of 1% AEP flood mitigation requirement	1% AEP outflow from site
Precinct A	194	BRA located within Precinct A	1,345	Wetland Lake, centre of Racecourse	0
Precinct B	No change to existing	Precinct B	No change to existing	Precinct B	Self-retained
Precinct C (Stables)	418	BRA located in the centre of the Racecourse	684	Wetland Lake in centre of Racecourse	0
Precinct C (carpark)	Combined with Precinct E volumes	BRA in Precinct E	Combined with Precinct E volumes	FSA in Precinct E	
Precinct D	28	Subsurface storage cells beneath road reserve/drainage reserve	42	Subsurface storage cells beneath road reserve/drainage reserve	0.402 m^3/s to local drainage network/road pavement
Precinct E	365	Southwest corner of Precinct E, adjacent to FSA	930	South west corner of Precinct E	0.32 m^3/s to CBMD

There will be no new connections to the Swan River or to the CBMD, and the existing flow regimes at these outlet points will be maintained. Specifically with regard to overflow from the Wetland Lake which occurs via gravity, the peak flow rates that the existing 375 mm and 450 mm pipes are capable of achieving (approximately 0.4 m^3/s) will not change given that the inlet, length, grade and outlet of these pipes is not proposed to be modified.

Precinct D will require a connection to the local drainage network, however the outflow rate will be nominal, and has not been accounted for when sizing the subsurface storage cells within Precinct D. The direction of runoff from Precinct A and a portion of Precinct C to the centre of the Racecourse will require a BRA with a surface area of 1,105 m^2 (for Precinct C) and will add a total of 78 mm depth to the top water levels within the Wetland Lake.

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The precinct areas and a summary of the approach to surface water management are shown on **Figure 7**.

6.3.7 Non-structural measures

A number of non-structural measures will be implemented to help reduce nutrient loads within stormwater runoff. These measures include:

- Minimising fertiliser use to establish and maintain vegetation within POS and road verges.
- Street sweeping at regular intervals.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- Minimising the use of turf within open spaces.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.
- Education of residents regarding fertiliser use and nutrient absorbing vegetation species within lots.

The above measures will assist in achieving **Criteria SW7**.

6.3.8 Earthwork levels

Finished floor levels of the entire development will be set at minimum of 4.0 mAHD (See **Appendix C**) which will assist in achieving **Criteria SW5**.

6.4 Stormwater criteria compliance

A summary of the proposed stormwater design criteria and how these are addressed is provided in **Table 3**.

Table 3: Stormwater management criteria compliance

Criteria number	Criteria description	Manner in which compliance will be achieved
SW1	Retain and treat the first 15 mm of rainfall as close to source as possible	Lots within Precinct D and Precinct E to retain the first 15 mm of rainfall on lot in soakwells/soakage. Lot storage will be the responsibility of the lot owners.
SW2	Retain up to 1% AEP rainfall event on-site.	Runoff up to the 1% AEP to be detained within the FSA in Precinct A. Precinct A and a portion of Precinct C will ultimately discharge to the centre of the track.
		Runoff up to 1% AEP to be managed with the sub-surface storage in Precinct D.
SW3	Post-development critical 1% AEP peak flows leaving the site to mimic pre-development peak flows.	Runoff up to 1% AEP event to be detained in the detention basin and subsurface storage which will maintain the pre-development peak flow of 0.32 m^3/s from Precinct E and 0.463 m^3/s from Precinct D respectively.
SW4	Finished floor levels must have a minimum of 300 mm clearance above the 1% AEP TWL in the FSA.	It is anticipated that the FSA and detention basin invert will be set so that the habitable floor levels must have a

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		minimum of 300 mm clearance above the 1% AEP TWL in the basins.
SW5	All lots must have a minimum of 500 mm clearance above the 1% AEP flood level in the Swan River.	The 1% AEP flood level in the Swan River is 2.8 mAHD. The preliminary bulk earthworks concept provided in shows that finished floor level will be at 4.0 mAHD.
SW6	Nutrient concentrations within surface water discharging from the site to the Swan River are to meet regional water quality targets.	BRA will be designed so that after treatment the long term nutrient concentrations within surface water meet the regional water quality targets.

Table 4: Stormwater management criteria compliance (Continued)

Criteria number	Criteria description	Manner in which compliance will be achieved
SW7	Reduce nutrient loads by applying appropriate non-structural measures	• Minimise use of fertilisers within open space and road verges. • Street sweeping at regular intervals. • Use of drought tolerant turf species. • Education of residents regarding fertiliser use
SW8	Design infiltration areas to avoid creating mosquito habitat	Stormwater infrastructure will be designed to ensure all runoff is infiltrated within 96 hours.

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7 Groundwater Management

7.1 Groundwater management approach

The principle behind groundwater management is to maintain the existing hydrology across the site, provide appropriate protection from groundwater inundation, and maintain or improve existing groundwater quality.

7.2 Groundwater level management

The regional groundwater map (DWER 2023e), localised measurement of groundwater and the surface contours of the site (see **Section 3.4** and **Figure 2**) indicate that there is sufficient clearance to groundwater beneath the site to facilitate infiltration of stormwater runoff, on the basis that fill is being imported to raise finished levels to 4.0 mAHD.

Whilst the underlying parent soils have demonstrated generally low permeability, the earthworks approach will require import of fill to 4.0 mAHD to achieve clearance above the 1% AEP flood level in the Swan River for Precinct A, Precinct D and Precinct E. Therefore, stormwater will be encouraged to infiltrate at source wherever possible to minimise stormwater runoff and to adopt an at-source approach to management of runoff where possible. This will occur within soakwells, permeable portions of lots and BRAs which will have at least 300 mm of clearance above the MGL. The above-mentioned measure will assist in achieving **Criteria GW1**.

For Precinct C (stables) runoff will be directed to the centre of the racetrack. The stables facilities do not require a specific separation from groundwater, and in order to accommodate equine uses the land between buildings/facilities should be as flat as possible. The most appropriate response is therefore to accommodate stormwater quality treatment and flood retention within the centre of the racetrack. Given the low permeability of soils in the centre of the racetrack, the BRA is unlikely to achieve separation from groundwater or the low permeability soil layer. This is however considered acceptable as it is consistent with the presence of the three Lakes currently within the centre of the racetrack.

The control of groundwater by subsoil drainage is not proposed due to requirements to provide adequate clearance above the 1% AEP flood levels and the proximity of the Swan River. Rather, groundwater separation requirements will be achieved by the use of imported fill as described above. The earthworks strategy provided in **Appendix C** shows that all habitable floor levels will be greater than 1.2 m above the MGL. The above-mentioned measure will assist in achieving **Criteria GW2**.

As previously discussed, there are no changes proposed to the form of development within Precinct B or to the Racecourse. These areas are currently managed by the swales aligned with the existing racetrack which control soil moisture conditions in these areas, and which discharge to the Wetland Lake. This approach will be retained in the post-development environment.

7.3 Groundwater quality management

Whilst not specified in a design criterion, the main objective for groundwater quality management is to maintain or improve the existing groundwater quality. This can be achieved by reducing the total nutrient load into the groundwater that originates from the site. Groundwater that originates from the site is surface runoff that has infiltrated into the soil profile. Therefore, improving groundwater quality can be achieved by treatment of the surface runoff prior to infiltrating to groundwater.

The reduction of nutrient load to the groundwater will be achieved by:

- Retention of existing trees within open spaces wherever possible.
- Directing stormwater to a vegetated (with native wetland species) BRA.
- The BRA will be underlain by material with an appropriate PRI (nominally a PRI of 20 at 150 mm or equivalent). It is acceptable for this to be achieved with a thicker layer of lower PRI soil (e.g. 300 mm of PRI 10).
- Minimise fertiliser use to establish and maintain vegetation within open space areas and road verges.
- Ongoing management of nutrient application to Precinct B and the Racecourse.
- Precinct A to adopt a similar nutrient application management regime as that currently applied to Precinct B.
- The use of turf will be minimised, however where adopted a drought tolerant turf species that require minimal water, and nutrients will be used.
- Roll-on turf will be used within the open space areas and road verges, to prevent the high nutrient input requirement during establishment of the turf.
- Garden beds should not be immediately adjacent to BRAs to reduce nutrient transportation into these infiltration areas.
- Active management of equine waste within Precinct C and the Racecourse. This includes manual collection and remove of manure from site.

The above measures will improve the quality of water prior to it infiltrating into the underlying groundwater.

7.4 Groundwater criteria compliance summary

A summary of the proposed groundwater quantity design criteria and how these are addressed within the site is provided in **Table 4**.

Table 4: Groundwater criteria compliance summary

Criteria number	Criteria description	Manner in which compliances will be achieved
GW1	Surface based infiltration should have 300 mm clearance above MGL.	Basin inverts will be set at 300 mm above the MGL, the exception being the BRA in the centre of the racetrack.
GW2	Finished floor levels should have a clearance to the MGL of at least 1.2 m.	Lots will be set at least 1.2 m above the MGL.

8 Subdivision and Urban Water Management Plans

The requirements to undertake preparation of more detailed water management plans to support subdivision is generally imposed as a condition of subdivision. This will be most relevant to Precinct D. Other precincts may be developed under a Development Approval and therefore water management will likely be documented within a Stormwater Management Plan (SMP). The development of future UWMP/SMPs should follow *Urban Water Management Plans: Guidelines for preparing plans and for Complying with Subdivision Conditions* (DoW 2008).

While strategies have been provided within this LWMS that address planning for water management within the site, it is a logical progression that future subdivision designs and the supportive UWMP/SMP will clarify details not provided within the LWMS. The main areas that will require further clarification within future UWMP/SMPs may include (pending which precinct is being addressed):

- Extent of land uses within Precincts
- Connection to local and Main Drainage networks
- Surface runoff modelling
- Implementation of water conservation strategies
- Non-structural water quality improvement measures
- Management and maintenance requirements
- Construction period management strategy.

These are further detailed in the following sections. As stated above, ongoing (post-development) monitoring of groundwater will be detailed in the UWMP/SPM, however in this LWMS is outlined broadly in **Section 9**.

8.1 Extent of land uses within Precincts

It is expected that the layout and extent of land uses within Precincts may evolve over time. Future water planning documents will need to be updated to align with the most up to date spatial plans for each Precinct. Changes to the spatial plans will likely have an implication on the size of stormwater infrastructure and possibly their location, and should be revised and clarified in future UWMP/SMPs.

8.2 Connection to local and Main Drainage networks

This LWMS has made assumptions regarding connectivity to the CoB local drainage network and to the Water Corporation's CBMD. These are assumptions are made based on the information available at the time of preparing this LWMS and may need to be revised pending feedback from these agencies. This could result in updates to surface runoff modelling (see **Section 8.3**).

8.3 Surface runoff modelling

It is acknowledged that the water management strategies documented in this LWMS are based upon broad-scale assumptions and to some extent regional data. These assumptions are considered

adequate for development of this LWMS and are of an appropriate level of detail. However, verification of proposed subdivision drainage designs will be undertaken once the specific basin designs and extent of inclusion of finer scale WSUD elements are confirmed.

It is expected that future UWMP/SMPs will update surface runoff modelling as appropriate, and this may result in evolution of the spatial layout of the structure plan/future subdivisions or detailed civil design approach.

8.4 Implementation of water conservation strategies

The non-potable water needs from the Precincts are to be accommodated from the existing groundwater allocation and therefore, track water usage is a significant consideration. Notwithstanding licensed volumes available, there is minimal new open space areas proposed within the Precincts that would demand significant additional groundwater allocation, and it is therefore anticipated that non-potable water needs can be met by the existing licence held by Perth Racing.

A number of potential measures to conserve water have been presented within this LWMS. These water conservation strategies will be incorporated into design and the on-going maintenance of the Precinct A, B and C open spaces and where relevant. Landscape concept design measures that will be incorporated into the water conservation strategy will be further detailed within the future UWMP/SMPs produced for the development.

The manner in which the developer intends to promote water conservation measures discussed in this LWMS to future lot owners will also be discussed within the future UWMP/SMPs.

8.5 Non-structural water quality improvement measures

Guidance for the development and implementation of non-structural water quality improvement measures is provided within the *Stormwater Management Manual for Western Australia* (DWER 2022). Some measures will be more appropriately implemented by CoB for local roads, such as street sweeping, however many can be implemented relatively easily within the design and maintenance of the subdivision and the open space areas. It is expected that any privately managed development areas (e.g. Precinct A, Precinct B and Precinct C) will be managed by Perth Racing or another appropriate management body, and that the management of areas exposed to equine uses (Precinct C and the Racecourse) will continue to adopt contemporary best practice nutrient management.

Future UWMP/SMPs will provide an implementation plan/timing/responsibility for measures such as street sweeping, public education (through measures such as signage that may be implemented to raise awareness), etc.

8.6 Management and maintenance requirements

The management measures to be implemented to address surface water quality (such as the use of vegetation within WSUD assets) will require ongoing maintenance. It is therefore expected that the future UWMP/SMPs will detail management and maintenance procedures that will set out required maintenance actions (e.g. gross pollutant removal), timing (e.g. how often it will occur), locations (e.g. exactly where it will occur) and responsibilities (e.g. who will be responsible for carrying out the

actions). Given that approval from the CoB will be sought for the proposed measures, it is anticipated that consultation will be undertaken and referral to guiding policies and documents will be made.

8.7 Construction period management strategy

It is anticipated that the construction stage will require some management of various aspects (e.g. soil erosion, sedimentation of downstream water bodies, dust, surface runoff, noise, traffic etc.). The management measures undertaken for construction management will be addressed either in the future UWMP/SMPs or a separate Construction Management Plan (CMP).

9 Monitoring

9.1 Post-development monitoring

The post-development monitoring of water quality should be undertaken within groundwater immediately upstream and downstream of BRAs within Precinct A, Precinct C and Precinct E. It should also be undertaken at the outlet to or adjacent to the subsurface detention system in Precinct D. This should be undertaken via shallow groundwater bores installed immediately upstream and immediately downstream based on local groundwater flow direction, based on information available at the time (or in the case of Precinct D it could be at the outlet from the subsurface storage cells).

The monitoring should also consider and be generally consistent in the approach with the monitoring undertaken to comply with conditions of Groundwater Licence GWL 178519.

The WSUD measures (BRAs) should also be monitored to ensure their continued effectiveness. This should occur at the outlets from BRAs prior to their discharge to the Wetland Lake. It is noted that this may be difficult to achieve as it will require a rainfall event > 15 mm and to be timed to occur when overflow is occurring or alternatively auto samplers could be employed.

Monitoring of the outlet to the Swan River from the Wetland Lake is not proposed to be undertaken given the infrequent nature of overflow from the Lake to the River. Further, the Lake intersects shallow groundwater and any discharge from the pipes to the River is likely to be influenced by local groundwater quality.

9.1.1 Trigger values

The water quality targets from the *National Water Quality Management Strategy* (ANZECC and ARMCANZ 2000) and the trigger criteria are acknowledged as long term targets for the site, being 1.2 mg/L for TN and 0.065 mg/L for TP. However, it is also recognised that recent site monitoring undertaken (and reported in **Section 3**) shows repeated exceedances of the NWQMS default trigger criteria. Therefore, short term trigger values are proposed based on the approximate average nutrient concentrations measured in groundwater, and these are shown in **Table 5**.

Table 5: Post-development trigger values

Analyte	pH	EC (uS/cm)	TN (mg/L)	TP (mg/L)
Value	6-7.5	1800	3.0	0.15

Monitoring should be undertaken on a quarterly basis and should include:

- pH
- Conductivity
- Dissolved oxygen
- Temperature
- Nutrients (TN, TP)
- Nutrient Species (Ammonium, NH_4, Oxides of nitrogen, NO_x ortho-phosphorous (ORP))

9.1.2 Condition monitoring

It is proposed that the overall condition of the Precincts will be monitored on a bi-annual basis. This monitoring will be implemented after the completion of the civil and landscaping works and will continue for a period of two years.

A visual assessment will be undertaken to monitor the overall condition of the Precincts, with the aim to ascertain that the maintenance activities are achieving the overall management objectives for the development. The parameters that will be monitored include:

- Gross pollutants
- Terrestrial weeds
- Irrigation
- Vegetation density
- Paths, benches, walkways and other infrastructure.

The management and maintenance objectives will be detailed within future UWMPs along with details of the corresponding monitoring program.

9.1.3 Contingency Action Plan

If the results from the initial monitoring occasion indicate that nutrient concentrations exceed the nominated (short term) trigger values, a number of contingency measures may be employed.

The first action that should be undertaken if groundwater trigger criteria are exceeded is to repeat the monitoring to remove the potential for sampling error. If the repeat monitoring still shows results which breach the trigger value, the next action will be to compare the upstream (incoming) nutrient concentrations with the outgoing (downstream) nutrient concentrations. If the downstream nutrient concentrations are >50% higher than the upstream nutrient concentrations, the following actions should be undertaken:

- Review open space nutrient application practices to identify source if possible.
- Conduct surveillance of Precincts and drainage infrastructure to determine any other potential and obvious nutrient inputs.
- Remove source if possible (i.e. fertiliser input, etc.).
- Remove sediment–bound nutrients by removing basin sediments.
- Manual removal of plant material from BRAs to facilitate further nutrient uptake.

If the downstream nutrient concentrations are found to be generally consistent with the upstream concentrations the next action will be to conduct a site – specific comparison of long-term background data presented in this LWMS. There is some amount of variability (temporally) in nutrient concentrations experienced across the site, and this is the reason for the proposed short and long term trigger values. The comparison of measured values to trigger values and historical monitoring data should then be used as a management tool to determine if the trigger values should be revised.

Following the implementation of the above contingency measures the groundwater quality will be re – sampled. If the results of the analysis still show water quality characteristics which breach the trigger values an additional set of upstream/downstream monitoring bores may be installed. The

additional bores would be sampled as per the ongoing sampling regime already being undertaken for the first two bores. If the additional locations demonstrate results consistent with the initial monitoring, an assessment will be undertaken as to whether the results are representative of a broader site management concern, and whether any additional contingency actions need to be implemented onsite.

9.2 Reporting

A post-development monitoring report will be prepared on conclusion of the two-year monitoring period and will be provided to CoB on request. This will be undertaken per Precinct once development within the Precinct has occurred. Interim results (spreadsheet) can be provided to either CoB, DWER or DBCA on request during the monitoring program.

10 Implementation

10.1 Roles and responsibility

The LWMS provides a framework that the proponent can utilise to assist in establishing stormwater management methods that have been based upon site-specific investigations, are consistent with relevant State and Local Government policies and have been endorsed by DWER, DBCA and CoB. The responsibility for working within the framework established within the LWMS rests initially with the proponent, although it is anticipated that a future UWMP/SMP will be developed in consideration of other relevant policies and documents. A summary of roles and responsibilities relevant to the current and future planning stages and ongoing management of the site is summarised in **Table 6**.

Table 6: Roles and responsibilities for various planning stages

Stakeholder	Perth Racing	City of Belmont	Water Corporation	DWER	DBCA	WAPC
LWMS preparation	√					
LWMS review and advice		√	√	√	√	
LWMS approval				√		√
UWMP/SMP & civil design preparation	√					
UWMP/SMP review and approval		√				
Precinct implementation	√					
Post development Precinct management	√					
Public roads/open space ongoing management	√	√				

10.2 Funding

The proponent will fund all subdivision, civil and landscape works within the public realm (roads and open spaces) and within Precincts that are being privately managed (Precinct A, Precinct B and Precinct C). Development of individual lots will be the responsibility of the lot owner at the lot-scale development application stage.

10.3 Review

It is not anticipated that this LWMS will be reviewed unless the Ascot Racecourse Structure plan undergoes significant change post-lodgement of the LWMS. If the proposed layout of the

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development is substantially modified, the surface runoff modelling undertaken for this LWMS may need to be reviewed and the criteria revised to ensure that all are still appropriate.

The next stage of water management for most of the Precincts is UWMP preparation to support subdivision (relevant to Precinct D) or SMP preparation to support Development Approval (relevant to all other precincts). The UWMP/SMP is largely an extension of the LWMS, as it should provide detail to the designs proposed within this LWMS and will demonstrate compliance with the criteria proposed in **Section 4**. Regardless of whether a UWMP or SMP is prepared, these should be prepared as per *Better Urban Water Management*.

The next stage of development following the UWMP is single lot development. It is recognised that certain elements of the LWMS and the UWMP will not be implemented until this late stage, and that there is little or no statutory control that can be applied to ensure the implementation of any remaining measures. While the remaining measures are unlikely to be enforced at this stage their implementation could be encouraged by the CoB through policy (or modification of these where necessary), building licence or awareness programs (such as the Water Corporation Waterwise program).

11 References

11.1 General references

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11.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 11.1**, with access date information provided in **Table R1**.

Table R1 Access dates for online references

Reference	Date accessed	Website or dataset name
(ABS 2013)	19/4/2024	ABS: Water Use and Conservation Data
(ABS 2014)	19/4/2024	ABS: Energy Use and Conservation Data
(DWER 2023a)	12/04/2024	Acid Sulfate Soil Risk Map
(BoM 2024)	12/04/2024	Climate Data
(Landgate 2023)	31/01/2024	Landgate Map Viewer Plus
(WAPC 2023a)	11/12/2023	Local Planning Scheme No. 15 Map
(DWER 2024a)	12/04/2024	Perth Groundwater Map
(DWER 2024b)	12/04/2024	Water Information Reporting
(DWER 2024c)	12/04/2024	Water Register
(DWER 2023c)	26/04/2024	FPM Floodplain Area (DWER-020)

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Figures

Figure 1: Site Location

Figure 2: Topographic and Groundwater Contours

Figure 3: Geological Mapping

Figure 4: Acid Sulfate Soil Mapping

Figure 5: Environmental Assets

Figure 6: Hydrological Features

Figure 7: Ascot LSP Precinct Plan surface water management

Figure 7A: Precinct A Stormwater Management Plan

Figure 7B: Precinct C Stormwater Management Plan

Figure 7C: Precinct D Stormwater Management Plan

Figure 7D: Precinct E Stormwater Management Plan

Attachment 12.1.3 Environmental Assessment Report



Figure 1: Site Location

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(03)--F23**
Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

emerge ASSOCIATES

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Figure 2: **Topographic and Groundwater Contours**

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number: EP23-109(03)--F24
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 100 200 300
Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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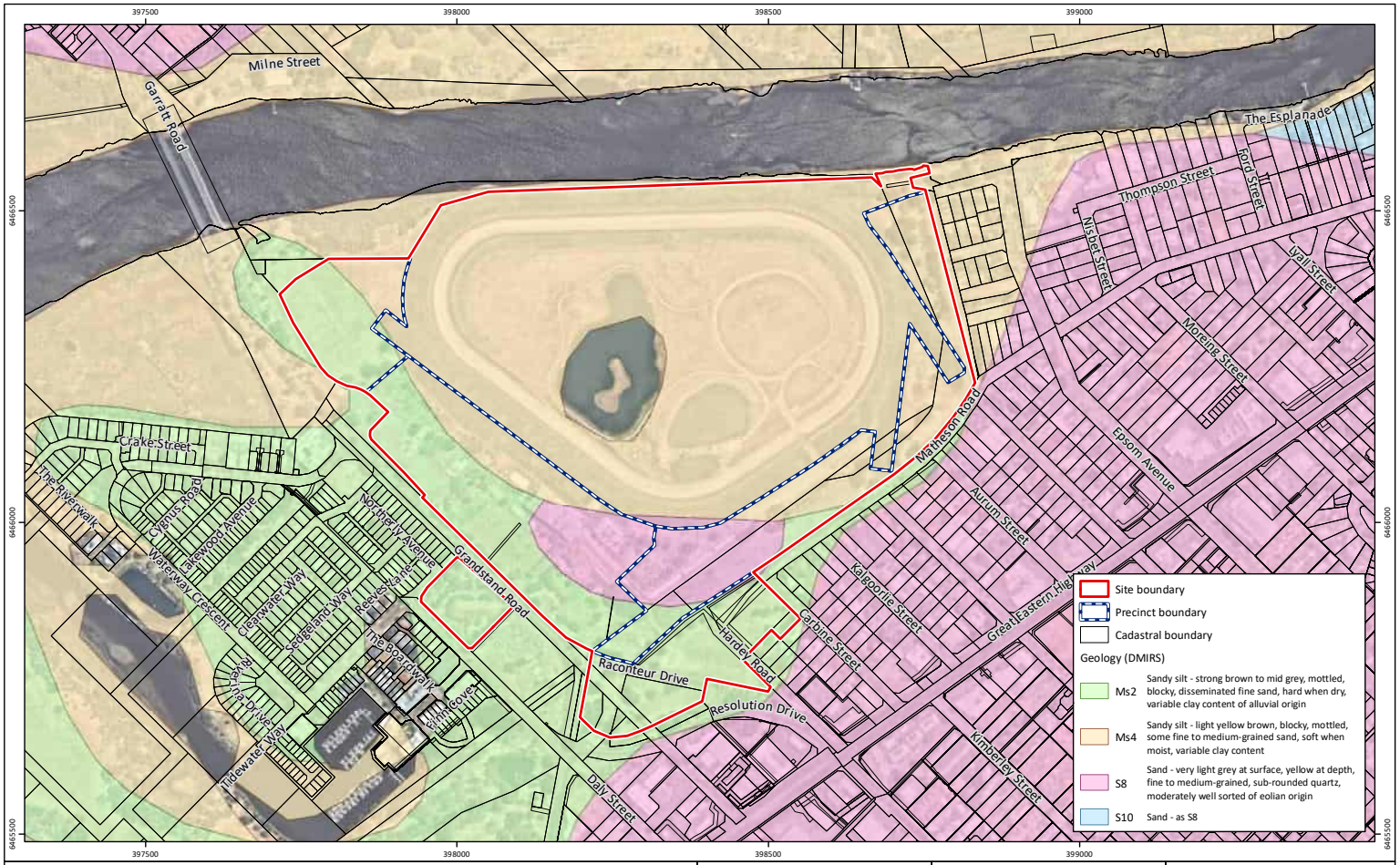


Figure 3: Geological Mapping

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number: EP23-109(03)--F25

Drawn:	WJC
Date:	26/04/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

N

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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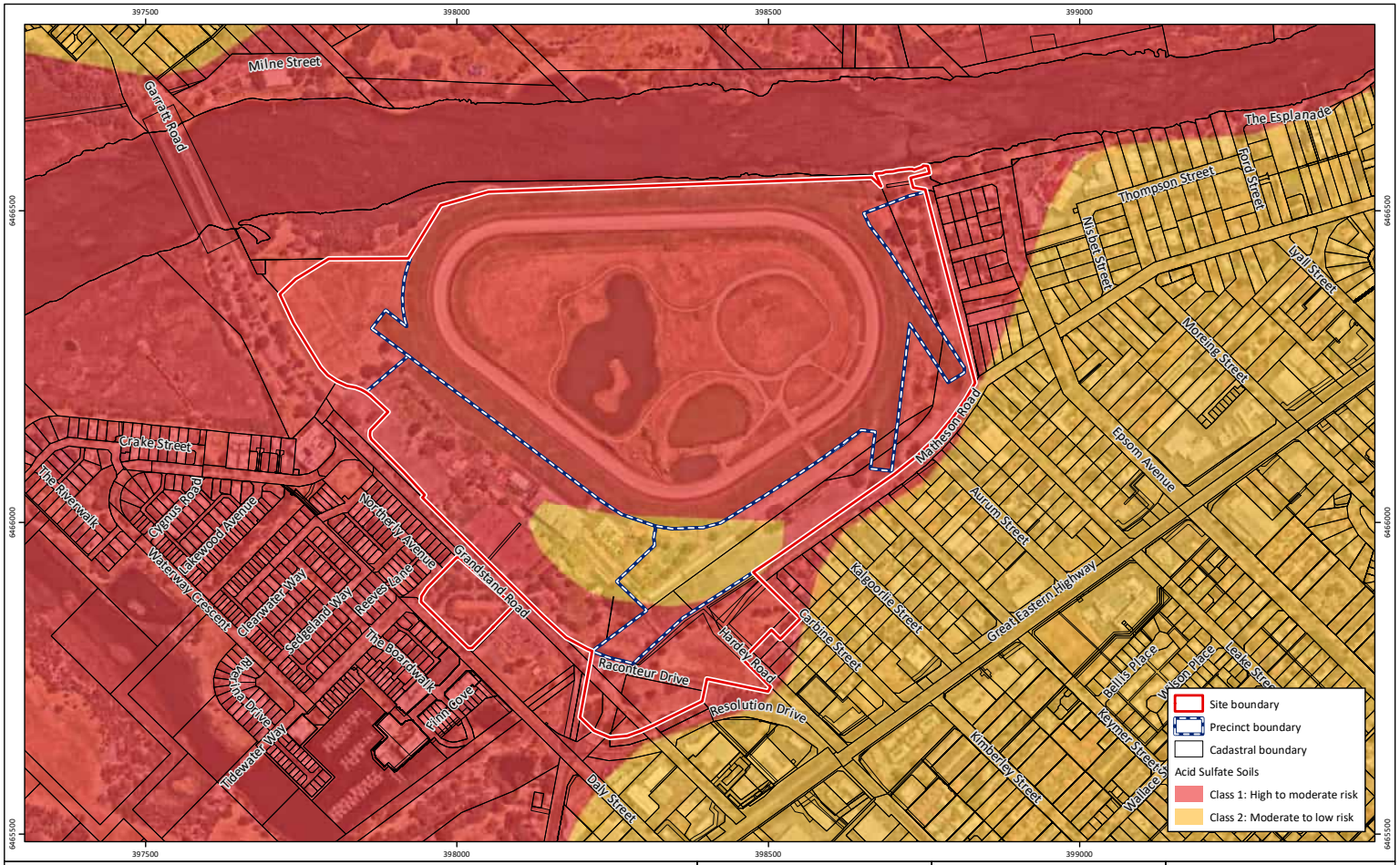


Figure 4: **Acid Sulfate Soil Mapping**

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number: EP23-109(03)--F26
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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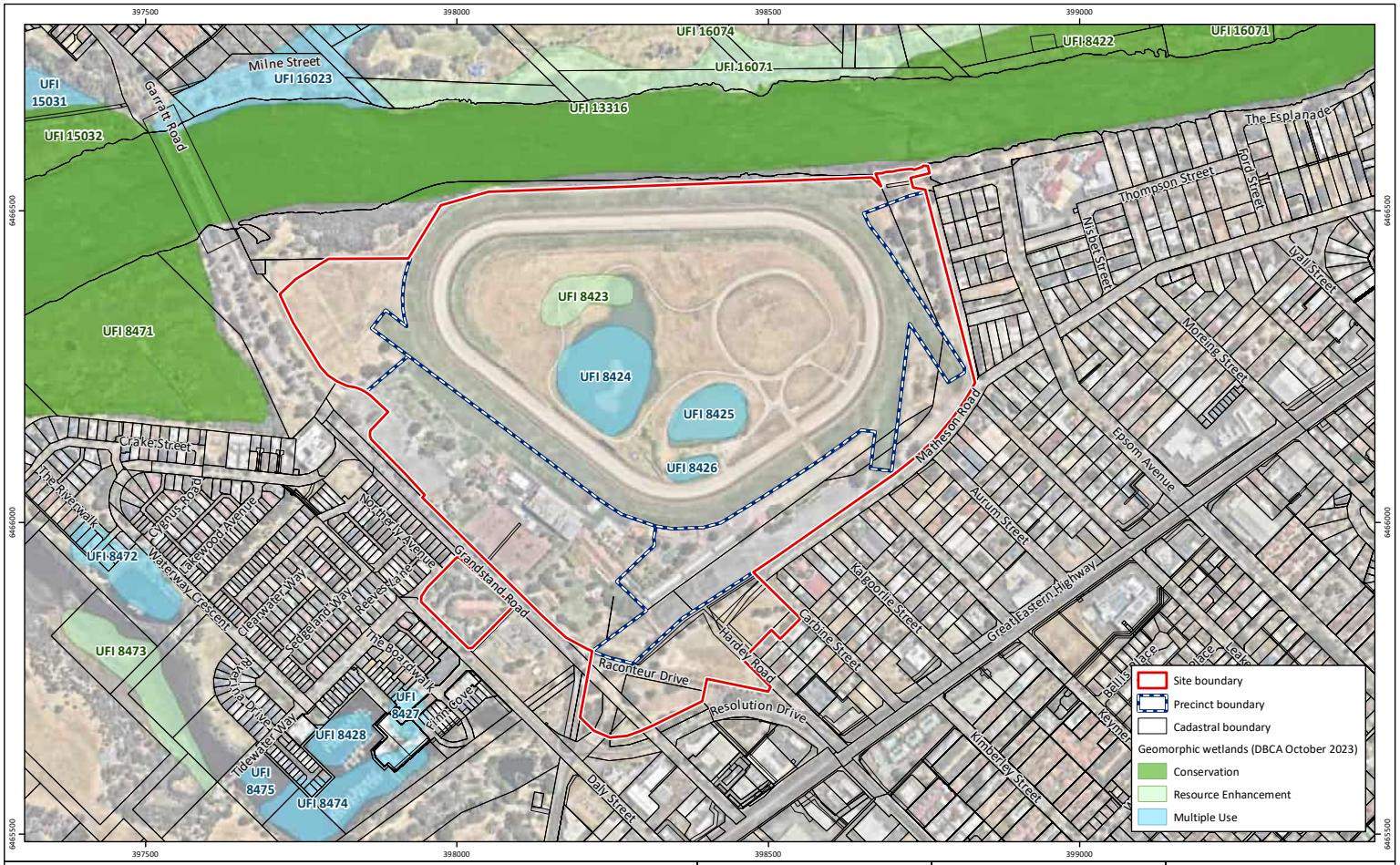


Figure 5: Environmental Assets

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number: EP23-109(03)--F27
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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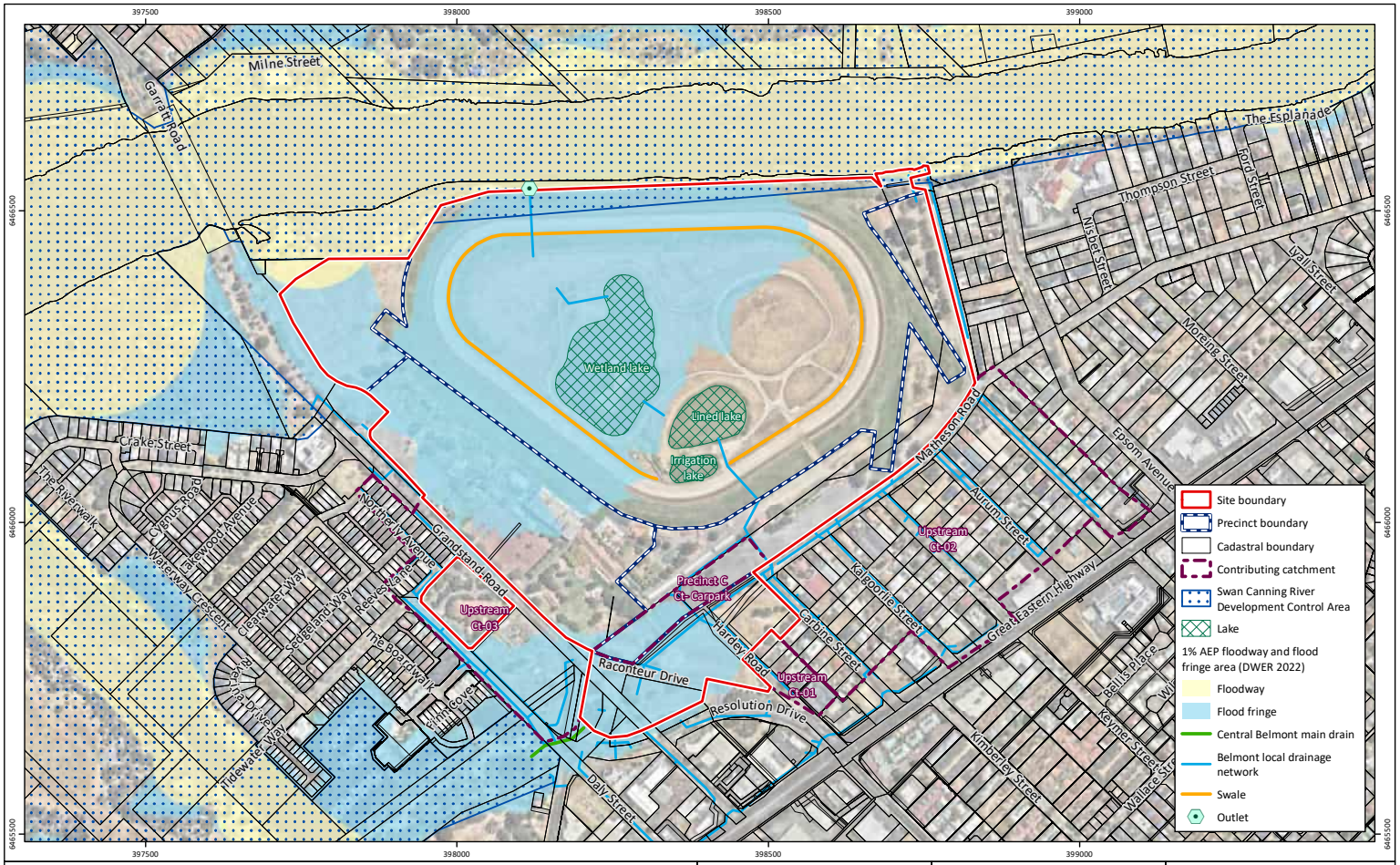


Figure 6: Hydrological Features

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number: EP23-109(03)--F28
Drawn: WJC
Date: 26/04/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

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Metres
Scale: 1:8,000@A4
GDA2020 MGA Zone 50

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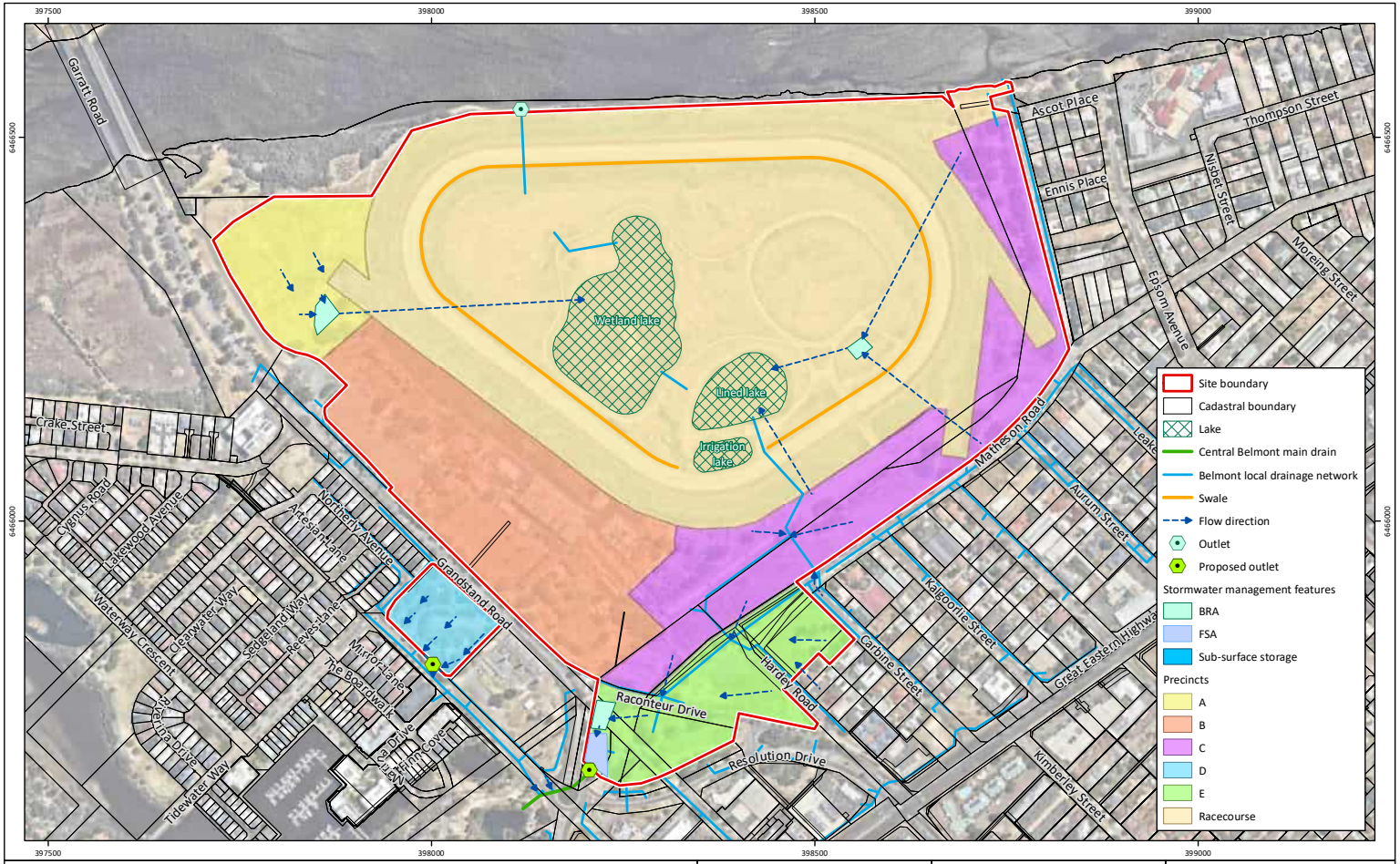


Figure 7: Ascot LSP Precinct Plan

Project:	Local Water Management Plan Golden Gateway Local Structure Plan
Client:	Perth Racing

Plan Number:	**EP23-109(03)--F29**
Drawn:	WJC
Date:	01/05/2024
Checked:	JM
Approved:	DPC
Date:	17/05/2024

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Metres
Scale: 1:6,500@A4
GDA2020 MGA Zone 50

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Figure 7A: Precinct A Stormwater Management Plan

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number: EP23-109(03)--F32
Drawn: WJC
Date: 01/05/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

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Metres
Scale: 1:2,500@A4
GDA2020 MGA Zone 50

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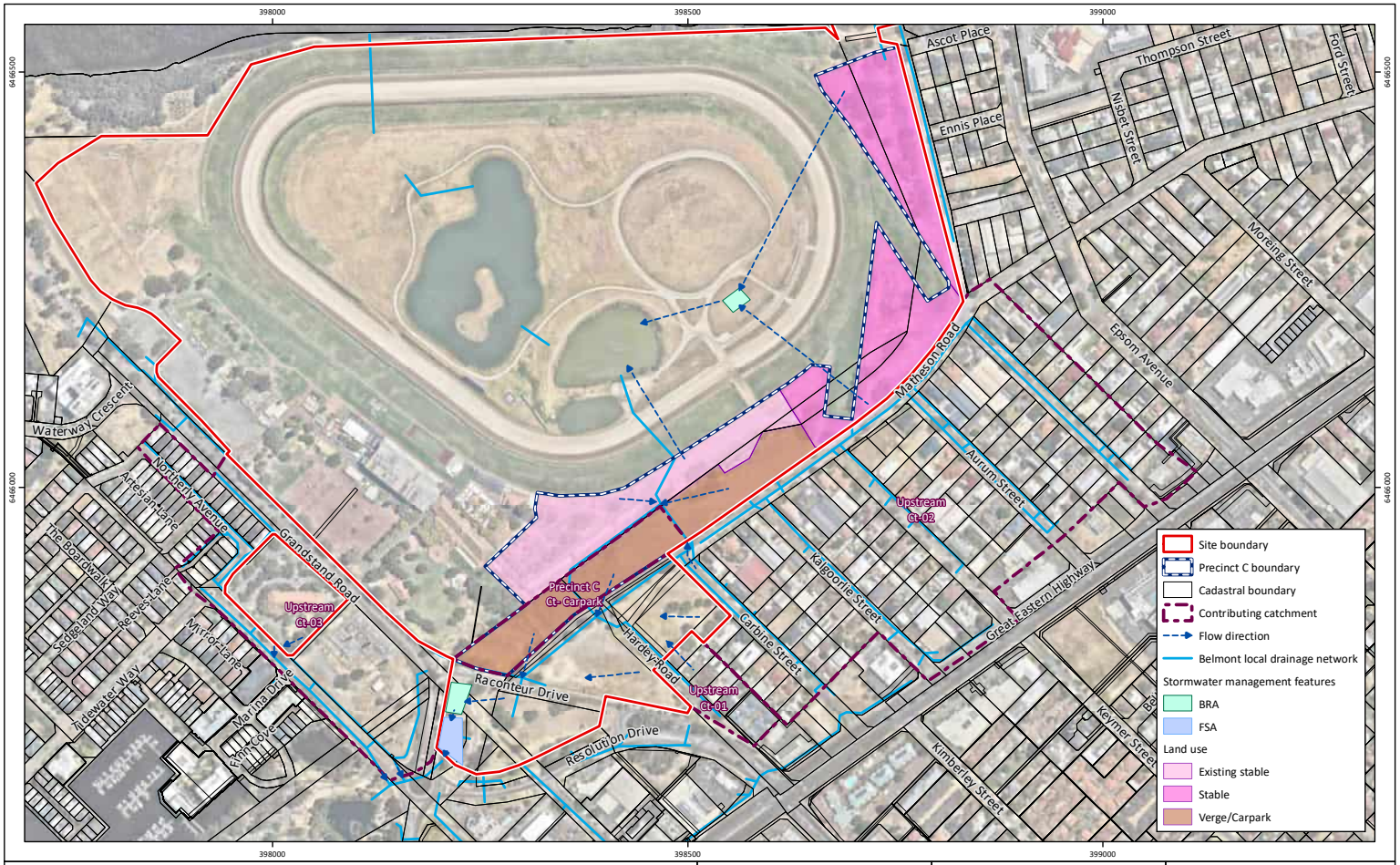


Figure 7B: Precinct C Stormwater Management Plan

Project: Local Water Management Plan
Golden Gateway Local Structure Plan
Client: Perth Racing

Plan Number: EP23-109(03)--F33
Drawn: WJC
Date: 01/05/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

N

0 100 200
Metres
Scale: 1:6,000@A4
GDA2020 MGA Zone 50

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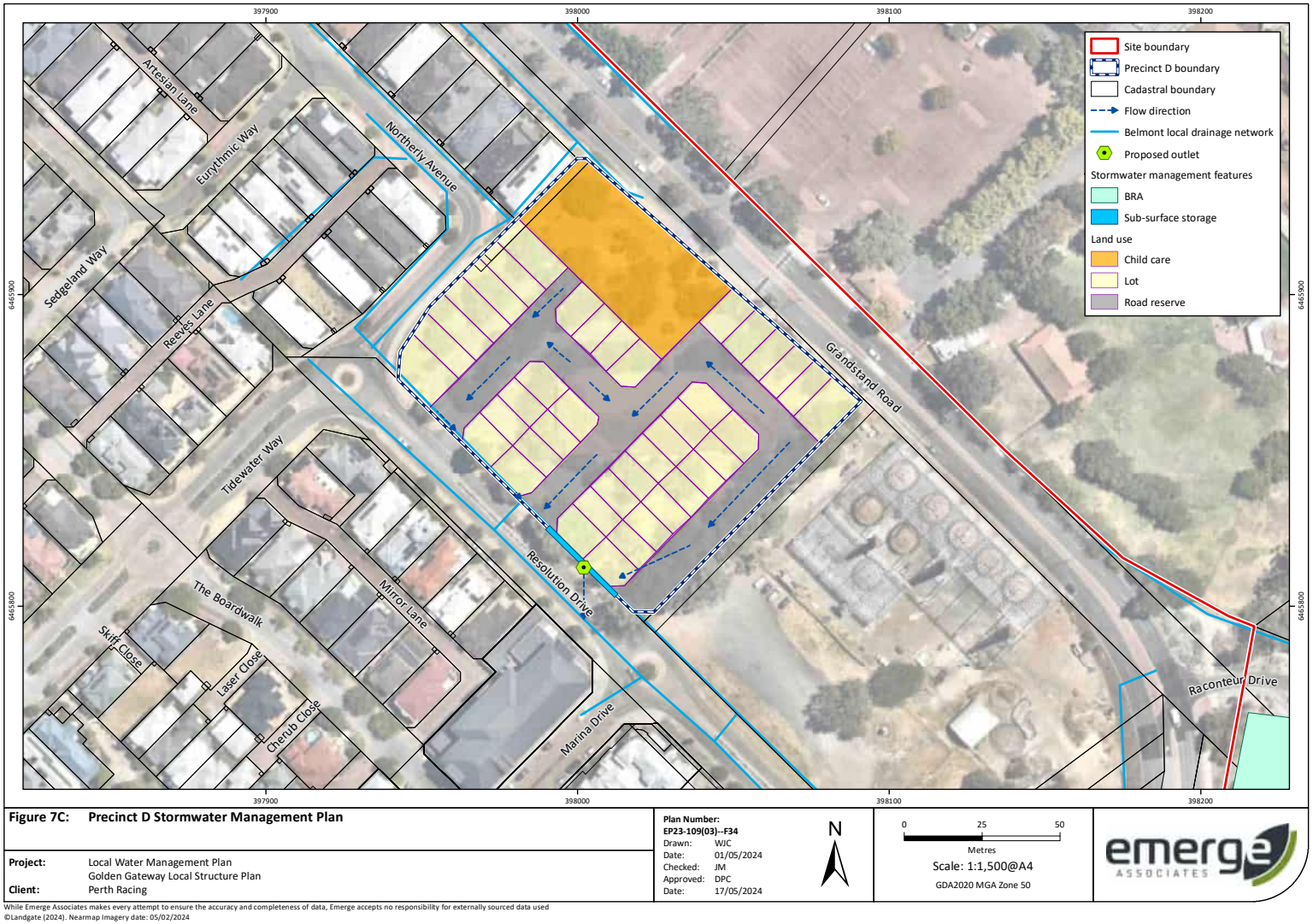


Figure 7C: Precinct D Stormwater Management Plan

Project: Local Water Management Plan
Golden Gateway Local Structure Plan

Client: Perth Racing

Plan Number: EP23-109(03)--F34
Drawn: WJC
Date: 01/05/2024
Checked: JM
Approved: DPC
Date: 17/05/2024

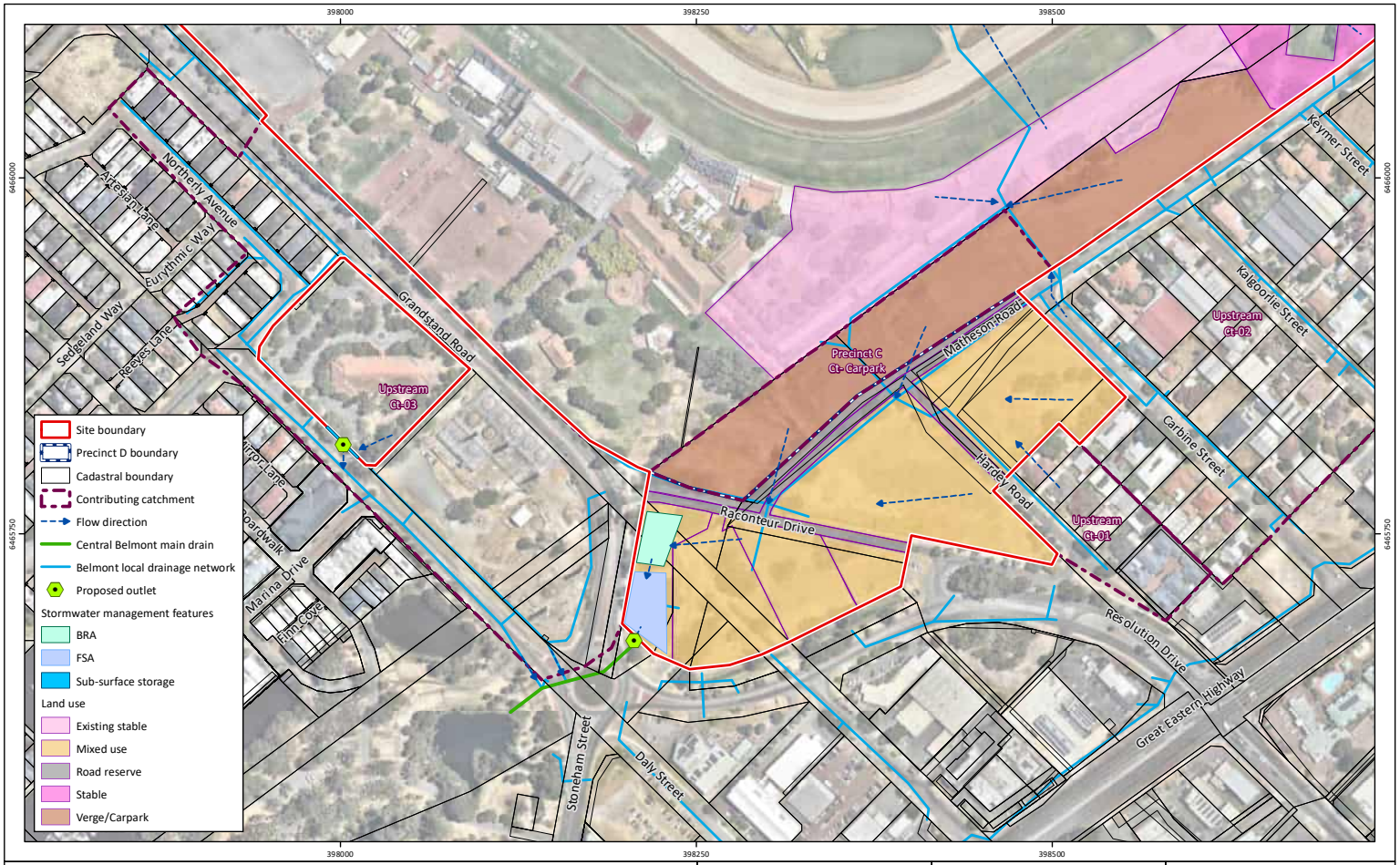
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Metres
Scale: 1:1,500@A4
GDA2020 MGA Zone 50

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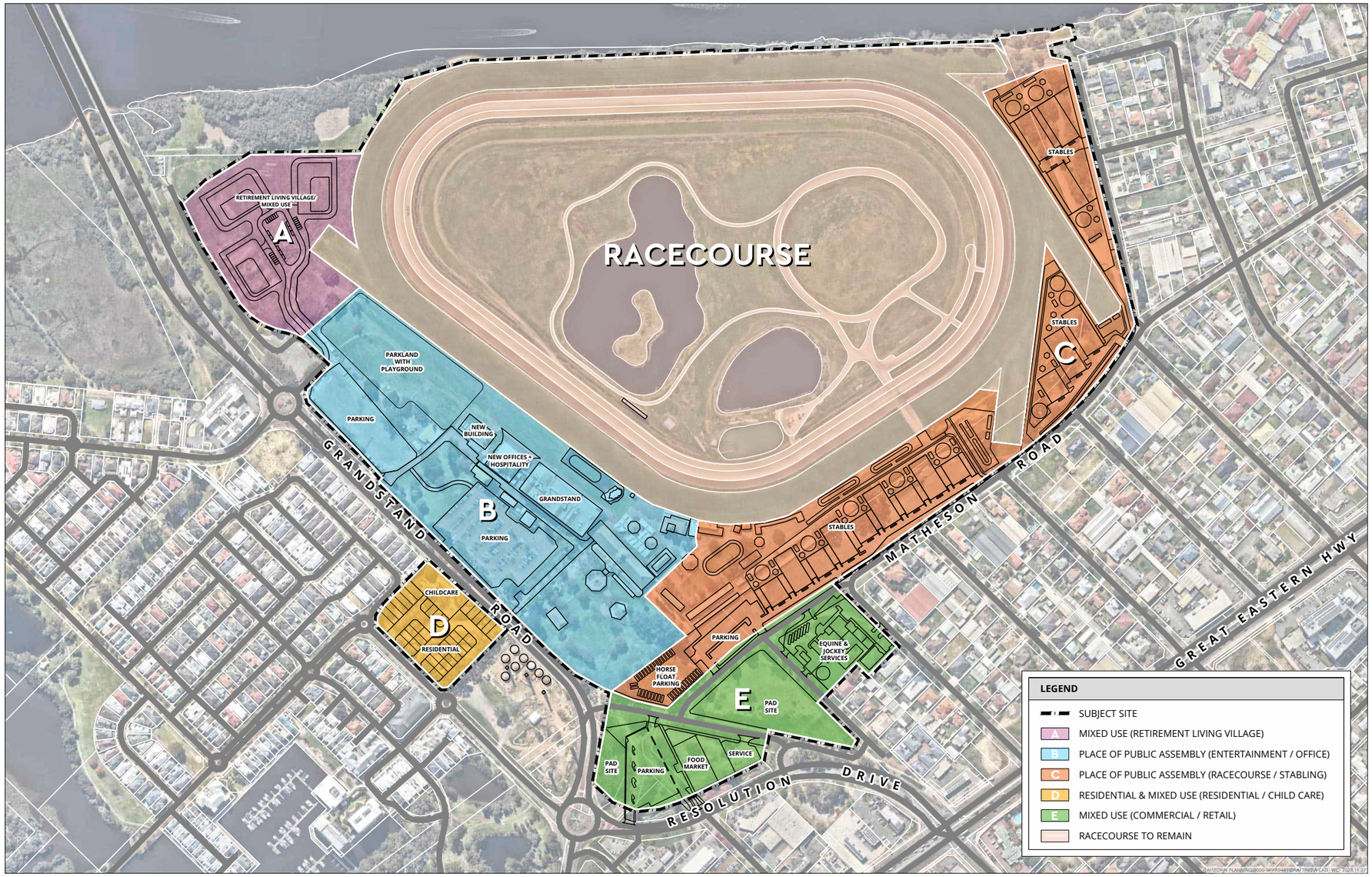
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Appendix A

Concept plan

ROWE Group Design (2023)

Attachment 12.1.3 Environmental Assessment Report



DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

DRAFT

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0 100 m
SCALE @ A3: 1:4000

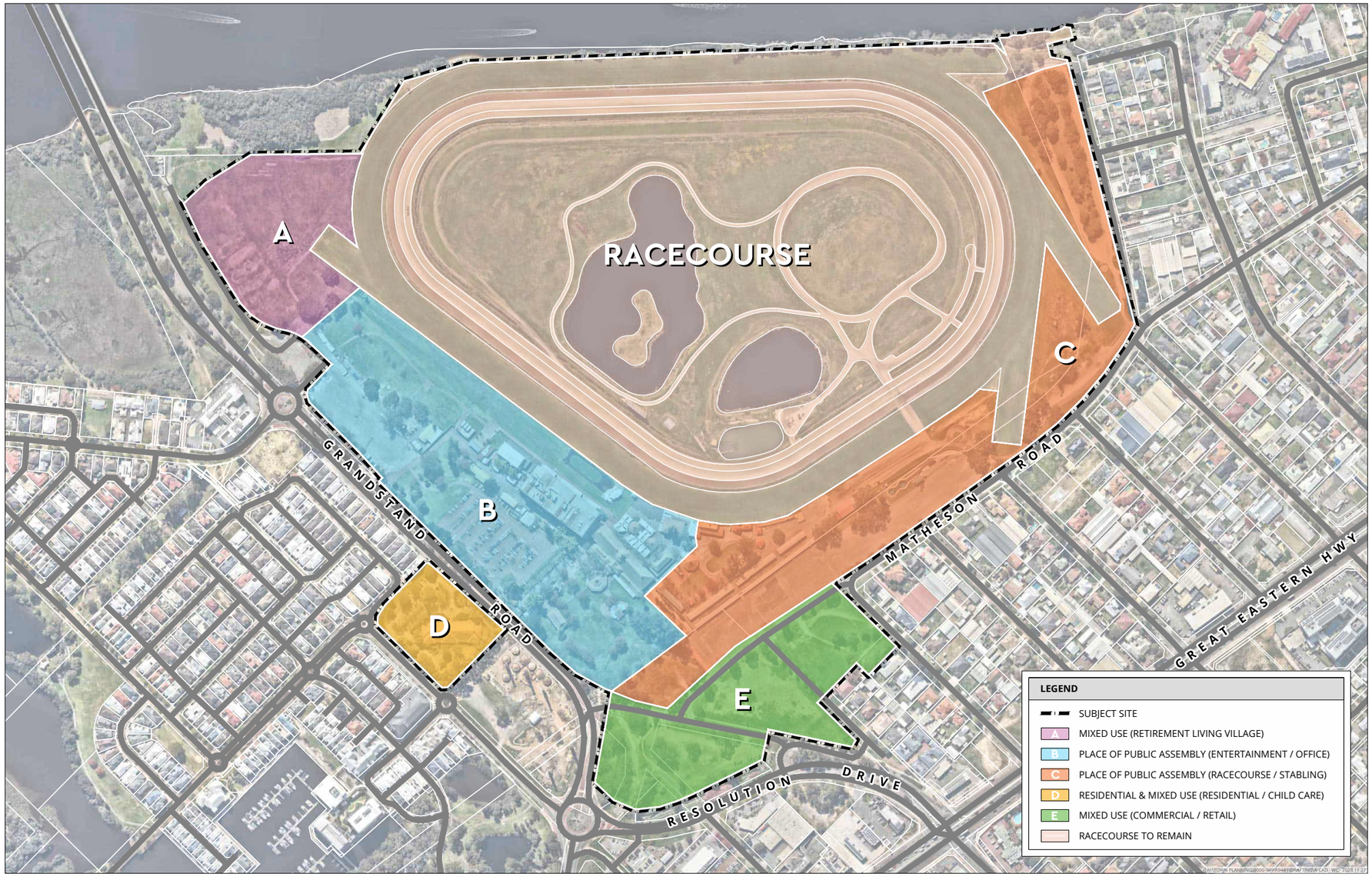
9481-CON-01-C

DRAWN: WC
DATE CREATED: 2023.11.27
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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STRUCTURE PLAN PRECINCTS
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

DRAFT

N

0 100 m
SCALE @ A3: 1:4000
9481-FIG-02-B

DRAWN: WC
DATE CREATED: 2023.11.27
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831

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Appendix B

Geotechnical Reports

Precinct A – Douglas Partners 2024

Precinct D – Galt 2024

Attachment 12.1.3 Environmental Assessment Report

Douglas PARTNERS

GROUNDED EXPERTISE

Report on Preliminary Geotechnical Investigation

Proposed Residential Development

Part of Lot 9002 Grandstand Road, Ascot WA

Prepared for Perth Racing

Project 219164.03

25 January 2024

Attachment 12.1.3 Environmental Assessment Report

Douglas Partners Pty Ltd
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(08) 9204 3511

Document History
Details

Project No.	219164.03
Document Title	Report on Preliminary Geotechnical Investigation
Site Address	Part of Lot 9002 Grandstand Road, Ascot WA
Report Prepared For	Perth Racing
Filename	219164.03.R.001.Rev0

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Venkat Vallurapalli/Brendan Divilly	Frederic Verheyde	25 January 2024

Distribution of Copies

Status	Issued to
Revision 0	Perth Racing

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature	Date
Author	25 January 2024
Reviewer	25 January 2024

FS604853

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

Attachment 12.1.3 Environmental Assessment Report

Douglas PARTNERS | GROUNDED EXPERTISE

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Appendix A: About This Report

Appendix B: Test Location Plan

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Test Pit and Borehole Logs

CPT Results

Appendix C: Geotechnical Laboratory Test Certificates

FS604853

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Attachment 12.1.3 Environmental Assessment Report

Report on Preliminary Geotechnical Investigation
Proposed Residential Development
Part of Lot 9002 Grandstand Road, Ascot WA

1. Introduction

This report presents the results of a preliminary geotechnical investigation undertaken for a proposed residential development across Part of Lot 9002 Grandstand Road, Ascot WA. The investigation was commissioned by Mr. James Oldring of Perth Racing in a signed order to proceed dated 8 August 2023 and was undertaken in accordance with Douglas' proposal dated 8 May 2023.

It is understood that Perth Racing is evaluating the feasibility of developing the northwest portion of Lot 9002 for possible residential use (the 'site').

The objective of the investigation is to assess the subsurface soil and groundwater conditions at across the site to provide preliminary comments on:

- The geotechnical suitability of the site for the proposed development.
- Geotechnical opportunities and constraints relevant to the proposed development.
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks.
- Site preparation, including the possible reuse of existing soil as controlled fill.
- Excavation conditions.
- The likely site classification in accordance with the requirements of AS 2870-2011.
- Appropriate earthquake design factor for the site, in accordance with AS 1170.4-2007.
- Suitable foundation systems, including preliminary design parameters.
- Preliminary design parameters for the design of retaining structures and batter slopes.
- Depth to groundwater at the time of the investigation.
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

The investigation included eight cone penetration tests, 16 test pits and one borehole excavated and drilled as a part of detailed site investigation (for contamination), and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on the items listed above.

The investigation was conducted concurrently with a detailed site investigation (for contamination), which has been reported under separate cover (219164.01.R.001.Rev0). The detailed site investigation (for contamination) report should be read in conjunction with this report.

2. Site Description

The site comprises an irregular shaped area, approximately 36.2 ha in size, that covers a part of Lot 9002 Grandstand Road, within the Ascot Racecourse.

At the time of the field work, the majority of the site was vacant and vegetated with short grass. A few mature trees, about 5 m to 10 m in height, occupied the southern part of the site. A parking lot and small loading area were located at the south-western corner of the site. Some fly-tipped rubbish, including fences and posts, were observed at several locations across the site.

According to publicly available LiDAR data (DEM derived to 5 m), the topography across Lot 9002 is relatively flat with existing surface levels ranging from approximately RL 2 m relative to the Australian Height Datum (AHD) in the western part of the site to RL 3.5 in the north-eastern corner of the site.

The Perth 1: 50 000 Environmental Geology sheet indicates that shallow sub surface conditions beneath the western two thirds of the site comprise sandy silt of the Guildford Formation, and beneath the north-eastern corner and eastern corner of the site comprise alluvium.

The Perth Groundwater Atlas (2004) indicates that in May 2003, the groundwater level beneath the site was less than RL 1 m, or between approximately 1.0 m and 2.5 m below the existing surface level. The Atlas also indicates that the groundwater flow direction beneath the site in May 2003 was approximately northwest towards the Swan River.

The published acid sulfate soil risk mapping indicates that the site is located within an area which is mapped as "*high to moderate risk of acid sulfate soils occurring within 3 m of natural soil surface*".

3. Field Work Methods

Field work for the investigation was carried out between 11 October and 9 November 2023 and comprised:

- The excavation of 16 test pits.
- The drilling of one borehole.
- Perth sand penetrometer (PSP) or Dynamic cone penetrometer (DCP) testing adjacent to each test pit or borehole location.
- The performance of cone penetration tests at 8 locations (CPT24 to CPT31A). A total of 14 CPTs were undertaken after repeating CPTs at some locations in attempt to achieve greater testing depth following shallow refusal in uncontrolled fill.

The test pits (locations 7 to 22) were excavated using a 5-tonne excavator, equipped with 450 mm toothed bucket, and the borehole (location 23) was drilled using a 250 mm diameter power auger attached to the same excavator. The ground conditions at each test pit and borehole were logged in accordance with Australian Standard (AS 1726, 2017) by a geo-environmental engineer from Douglas. Soil samples were recovered from selected locations for subsequent laboratory testing.

Dynamic cone penetrometer (DCP) and Perth sand penetrometer (PSP) tests were undertaken adjacent to the test pit and borehole locations in accordance with Australian Standards (AS 1289.6.3.3, 1997; AS 1289.6.3.2, 1997) to assess the in-situ density of the shallow soils.

The CPTs use a 36 mm diameter instrumented cone with a following 130 mm long friction sleeve attached to rods of the same diameter, pushed continuously at a rate of 20 mm/sec into the soil by hydraulic thrust from a truck rig. Strain gauges in the cone and sleeve measure resistance to penetration and friction along the sleeve during penetration. This data is recorded on a computer and analysed to assess the type, properties and condition of the materials penetrated. The CPT's were pushed to termination depths of up to 20.2 m. Upon withdrawing the CPT probe, each test hole was dipped in an attempt to measure groundwater levels. CPTs were repeated at several test locations to attempt achieving greater testing depth following shallow CPT refusal on inferred hard foreign inclusions in the uncontrolled fill.

Test locations were determined using a handheld GPS and site features and are marked on Drawing 1, Appendix B. Surface elevations were recorded using a differential GPS with a reported accuracy of 0.1 m.

4. Field Work Results

4.1 Ground Conditions

The logs of the ground conditions and results of the field testing are presented in Appendix B, together with notes defining descriptive terms and classification methods, in Appendix A.

- **Uncontrolled FILL**
    - **Granular FILL - SAND, Organic SAND, Gravelly SAND, Silty SAND and Sandy GRAVEL (SP, SP-SM, SM and GP-GM)** – generally sandy fill (or gravelly material associated with pavement layers at location 23), uncontrolled (apart from the pavement layers), from surface to depths of between 0.6 m and 3.6 m depth, encountered at all locations. A layer of organic sandy fill layer was observed between 1.4 m and 1.8 m depth at location TP8. The sandy fill was generally loose to medium.
    - **Cohesive FILL - Clayey SAND, Sandy CLAY, CLAY (SM, SC, CI and CL-CI)** – generally stiff to very stiff, either underlying the aforementioned sandy fill material or interbedded within layers of sandy fill, encountered at test pit locations 9, 20, 21, 23, and CPT locations 24, 24A, 29 and 29A.

  A considerable amount of foreign inclusions such as fragments of brick, glass, timber, geo-fabric, concrete, plastic, rubber, scrap metal, terracotta pipes, redundant cables and PACMs were observed at all test pit locations, except location 22. A layer of asphalt was encountered at 0.95 m depth at TP9. The fill materials across the site are uncontrolled.

  It is noted that the fill extended below groundwater level at many locations.

Overlying natural soils including:

- **Clayey soils including Clayey SAND and CLAY** – ranging between very soft to soft and stiff to very stiff, encountered under the fill materials at CPTs 25, 30 and 31A to depths between 4.2 m and 14.9 m.
- **Sandy soils including SAND and Silty SAND** – underlying and interbedded within the above clayey soils at CPTs 25, 30 and 31A. The sand was generally very loose and loose to medium dense to depths between 10.5 m and 14.9 m, becoming medium dense and dense below.

4.2 Groundwater

Groundwater level observations between 18 September and 9 November 2023 are summarised in Table 1 and are shown on the logs in Appendix B.

The test holes were immediately backfilled following sampling, which precluded longer-term monitoring of groundwater levels. Six monitoring wells (MW01 to MW06) were installed as part of the preliminary environmental investigation (reported separately) and groundwater observations available from these wells at the time of report writing have been included in Table 1.

Table 1: Summary of Groundwater Levels

Location	Date of Measurement	Ground Surface Level [1] (m AHD)	Groundwater Depth (m)	Groundwater Level [2] (RL m AHD)
MW01	18 September 2023	1.9	1.30	0.6
MW02		2.0	1.46	0.5
MW03		3.2	2.37	0.8
MW04		2.4	1.59	0.8
MW05		2.5	1.21	1.3
MW06		2.2	1.09	1.1
TP7	9 November 2023	2.9	2.30	0.6
TP9		2.1	2.10	0.0
TP12		2.1	2.10	0.0
TP13		2.8	2.50	0.3
TP15		2.2	2.40	-0.2
TP16		2.6	2.50	-0.1
TP17		2.2	2.10	0.1
TP19		2.2	1.80	0..4
TP20		2.0	2.10	-0.1
TP21		2.1	1.80	0.3
TP22		2.3	1.80	0.5
BH23		2.4	1.70	0.7
CPT25	11 October 2023	3.4	3.00	0.4
CPT28		1.9	1.30	0.6
CPT29A		2.3	2.20	0.1
CPT30		3.2	2.80	0.4
CPT31A		2.1	2.00	0.1

Notes for Table 1: [1]: Surface level measured using a differential GPS.
[2]: Groundwater Level = Surface Level – Groundwater Depth.

It should be noted that groundwater levels are affected by climatic conditions and land usage and will therefore vary with time. In addition, owing to the proximity of the Swan River, the groundwater levels are expected to be impacted by the tidal river conditions and river flood levels.

5. Laboratory Testing

A geotechnical laboratory testing programme was carried out by a NATA accredited laboratory and comprised:

- the particle size distributions on seven samples;
- the Atterberg Limits and linear shrinkage on three samples; and
- the organic content on four samples.

Results of the laboratory testing are summarised in Tables 2. The test certificates are presented in Appendix C.

Table 2: Results of Laboratory Testing for Soil Identification

Location	Depth (m)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)	OC (%)	Material
TP8	1.5	9	61	30	-	-	-	-	6.8	FILL / Organic SAND SP-SM, with gravel and silt
TP13	1.5	4	95	1	-	-	-	-	1.6	FILL / SAND SP, trace gravel and silt
TP19	2.5	5	83	12	-	-	-	-	1.5	FILL / SAND SP, trace gravel and silt
TP21	2.0	40	51	9	37	24	13	8.5	-	Sandy CLAY CI, medium plasticity, trace gravel
TP22	2.0	7	93	0	NO	NP	NP	-	-	SAND SP-SM, with silt
TP23	2.0	45	48	7	44	22	22	9.5	-	FILL / Sandy CLAY CI, medium plasticity, trace gravel
TP23	2.5	12	87	1	-	-	-	-	1.2	FILL / SAND SP-SM, with silt, trace gravel

Notes: Fines = Finer than 75 µm.
Sand = Between 2.36 mm and 75 µm.
Gravel = Larger than 2.36 mm.
LL – liquid limit PL – plastic limit PI – plasticity index LS – linear shrinkage
OC – organic content NO – not obtainable NP – non plastic

6. Proposed Development

At the time of preparing this report, the details for the proposed development were not yet available. Notwithstanding, it is understood that the proposed development is likely to be residential and, given the location, is presumed would likely be multistorey and possibly include a basement level.

7. Comments

7.1 Site Suitability

The investigation indicates that the site is generally underlain by uncontrolled fill overlying very soft to stiff clayey materials and very loose sandy soils becoming medium dense and dense with depth as described in Section 4.1 above.

From a geotechnical standpoint, there are several significant geotechnical constraints that will adversely impact on any development of the site including;

- Deep uncontrolled fill, unsuitable to support shallow foundations, and will impact on construction activities associated with deep piled foundations.
- Deep very soft and very loose natural soils under the uncontrolled fill, unsuitable to support shallow foundations.
- Shallow groundwater which will make earthworks across the site any possible remediation works of the above difficult. It should be noted that the abovementioned uncontrolled fill and soft soils both extend below groundwater.

Owing to the significant geotechnical constraints, any possible development will likely require a piled foundation solution into the medium dense and dense sandy soils, encountered below depths of approximately 10 m to 15 m. Additional geotechnical investigation will be required to confirm the foundation design and suitable pile design parameters. Also, noting that any proposed additional loading of the ground (for instance from the placement of fill to raise site levels, if proposed) would generate further consolidation of the soft soils underlying the site and cold result in some possible significant ground settlement. Therefore, surcharging areas (by placing temporary fill prior to construction of any structure) outside the proposed building envelopes might also be required during the site preparation to manage the risk of differential settlements between proposed buildings and adjacent ground, following their construction.

7.2 Site Classification

The shallow ground conditions beneath the site comprise uncontrolled fill materials and deep loose and soft soil deposits. Based on the results of the investigation and in accordance with Australian Standard (AS 2870, 2011), a site classification of 'Class P' applies to the site, owing to the presence of the uncontrolled fill and deep loose and soft soil.

7.3 Site Seismic Classification

Owing to the uncontrolled fill and deep very loose and very soft soil deposits across the site, an earthquake design soil sub-class of Ee is considered appropriate for this site in accordance with Australian Standard (AS 1170.4, 2007). The Hazard Factor (Z) for the site is 0.09, according to Australian Standard (AS 1170.4, 2007). Due to the deep loose soil below the water table, the site also has a significant potential for liquefaction. An assessment on the liquefaction potential of the site should be considered during any detailed investigation, when more details can be collected on the extent of deep loose soils.

7.4 Excavation Conditions

The encountered ground conditions generally comprise uncontrolled fill, with some large foreign inclusions within the fill, extending below groundwater. Conventional earthmoving equipment (such as large excavators, say at least 20 t) should be generally suitable for shallow excavations in the surficial uncontrolled fill. Shallow groundwater is likely to impact excavations across the site.

The majority of the uncontrolled fill encountered during this preliminary investigation is considered to be geotechnically unsuitable for re-use as structural fill in its current condition. Any further consideration to reuse the uncontrolled fill would require some specific geotechnical provisions, such as screening and disposing its unsuitable components. Separating the re-useable granular components (e.g. the sandy fill) from its cohesive components (e.g. clayey fill) might also prove to be practically difficult. Owing to the significant variability of uncontrolled fill materials across the site, any re-use potential from a geotechnical standpoint should be confirmed on-site by a geotechnical engineer. Some environmental considerations (i.e. contamination) are also anticipated to be required. Overall, at this stage of the study, the reuse of the encountered uncontrolled fill should be considered to be associated with some significant constraints that might preclude such reuse.

7.5 Slope Stability

During construction, it is recommended that temporary batter slopes across the site are maintained flatter than 2:1 (H:V) if not retained. This batter angle is valid provided no surcharge loads (including live loads such as vehicles and machinery) apply at the top of the slope. In uncontrolled fill materials, a safe batter angler not steeper than 3:1 (H:V) is recommended for design for slopes not greater than 3 m in height, however, owing to variability of the uncontrolled fill materials, this value should be adjusted during construction based on the encountered conditions.

The design of unpropped flexible or rigid walls should be undertaken using a triangular pressure distribution and the earth pressure parameters given in Table 4. In addition to the soil pressure, wall design should also allow for external loads such as buildings, live loads and hydrostatic pressure. Owing to the likely significant settlements associated with the uncontrolled fill and deep soft soils, the requirement to adopt a piles foundation system to support proposed retaining walls is anticipated.

Table 4: Preliminary Soil Parameters for Earth Retaining Design

Soil Type and Density	Soil Unit Weight Above Water γ (kN/m^3)	Submerged Soil Unit Weight γ' (kN/m^3)	Drained Angle of Friction Φ' (°)	Undrained Shear Strength Cu (kPa)	Coefficient of Earth Pressure – Active K_a	Coefficient of Earth Pressure – Passive K_p	Coefficient of Earth Pressure – at Rest K_0
Uncontrolled Fill Materials	16	6	28	-	0.36	2.7	0.5

It should be noted that the passive earth pressure coefficient (second last column of Table 4) is an ultimate value and does not incorporate a factor of safety. Because the stress-strain relationship curve for lateral loading is not linear, relatively large strains are required to mobilise full passive pressure, but only relatively small strains are required to mobilise half the passive pressure, therefore it would be prudent to incorporate a factor of safety of at least 2 for uncontrolled fill materials, to derive design values from the ultimate values.

7.6 Foundation Options

Shallow footings are not considered suitable across this site, owing to the significant thickness of uncontrolled fill and deep loose and soft soils.

7.6.1 Piles

It is anticipated that a piled foundation system, with deep bored piles that penetrate the deep loose and soft soils into the medium dense and dense sandy soils at depth, would likely be required for any foundations on-site.

Bored piles will require temporary or permanent casing throughout the uncontrolled fill materials, noting that possible obstructions within the uncontrolled might cause some difficulties when driving the casing or drilling the pile hole. This pile type will involve soil excavation to target founding level and hence would produce spoil that needs to be handled and disposed of in a suitable manner, which will need to also be considered from an environmental standpoint.

Installation through the uncontrolled fill materials could be affected by the possible presence of large, hard inclusions and the design of the pile installation methodology should take this possibility into consideration.

The settlement of the uncontrolled fill will exert negative skin friction on the piles, which the piles will need to be designed to accommodate or be constructed in sleeves.

Additional deep geotechnical boreholes will be required across the site to inform on the pile design.

7.6.1 Controlled Modulus Columns

Controlled modulus columns could be installed as an alternative to conventional pile foundations, allowing shallow footings to be used whilst controlling settlements to acceptable limits.

Installation of controlled modulus columns involves displacing a column of material using a reverse flight auger, densifying the soil around the auger, and backfilling the resulting hole with cement ground under moderate pressure to create a 'hard' inclusion in the ground. The columns are typically 250 mm to 500 mm in diameter. Column spacings of columns typically 1.8 m to 2.5 m but would need input from a specialist ground improvement contractor. Columns can be installed to depths of up to 50 m, so could penetrate to the base of the uncontrolled fill and deep loose and soft soils. However, if large hard inclusions such as concrete slabs or beams, are encountered then the auger may experience refusal, as the CPTs did at several locations during the preliminary geotechnical investigation.

A load transfer platform, such as a granular, well compacted fill layer, possibly reinforced with geogrid or geotextile, would be needed to transfer loads from shallow foundations to the columns.

One main benefit of this ground improvement option (compared to piling) would be to minimise differential settlement across the site and notably between buildings and surrounding grounds. However, it would likely be limited to low level development (say 2 to 3 level buildings), and this option is anticipated to likely be prohibitively expensive, with likely significant mobilisation and installation costs. The advice of a specialist ground improvement contractor, such as Menard Oceania, is suggested to be sought to further assess the suitability of this ground improvement to the proposed development.

7.7 Pavement Construction

The uncontrolled fill across the site does not form a suitable subgrade material for pavement in its current condition. Depending on the expected loading of proposed pavement, the requirement for some over-excavation of uncontrolled fill is likely. Construction should involve the use of a geo-composite layer (such as Global Synthetics' Combigrid) across the base of the over-excavation, overlain by a 500 mm thick layer of compacted crushed limestone, placement of a layer of geogrid (such as Global Synthetics' Secugrid), and a further 500 mm of compacted sand fill. The base of the constructed floating pavement footprint should be at least 2 m wider on each side than the total pavement width (4 m wider in total) to account for a suitable batter and transfer of load. Standard flexible pavements could then be constructed on the 1 m thick raft of stiffened subgrade. Placement of the initial base layer of composite geogrid may be difficult across areas of exposed uncontrolled fill. As such, depending on the site conditions, a 300 mm thick capping layer of clean fill may be required.

Regardless of the above site preparation, some settlement of the pavement should be expected over its service life and should be considered in the selection of the pavement surfacing. The use of pavers should be considered as such surfacing treatment would deform without cracking. Alternatively, a bituminous seal should be preferred over say an asphalt, owing to greater flexibility and to decrease maintenance and repair requirements, noting however that seals are less resistant than asphalt to shearing forces from tyres of turning heavy vehicles. The use a specialised asphalt, such as a stone mastic asphalt, could also be considered, noting it would be less resistant to the risk of cracking than a seal. Some allowance for regular maintenance and repairs should be allowed during the serviceability of the pavement.

7.8 Stormwater Drainage

Owing to the occurrence of low permeability soils and groundwater at shallow depth, the site is considered unsuitable for on-site stormwater disposal. It is suggested that stormwater is controlled using positive drainage or a subsoil drainage network, connected to a suitable outflow.

7.9 Additional Geotechnical Investigation

Additional geotechnical investigation across the site, by way of deep geotechnical boreholes (as a minimum), further CPT and additional laboratory testing, should be undertaken to help refine the ground model, provide pile design parameters, confirm suitable bearing strata for piles, and assess the soil aggressivity and exposure classification for piles. It is recommended that the detailed investigation programme be developed once some details of the proposed development

are known, if possible, in order to target specific geotechnical issues associated with the development.

The investigation covered in this report should be considered preliminary and as noted in selected sections of the report, additional detailed geotechnical testing at a greater testing frequency is anticipated once the project design has progressed.

8. References

AS 1170.4. (2007). *Structural Design Actions, Part 4: Earthquake Actions in Australia.* Reconfirmed 2018. Incorporating Amendments 1 & 2: Standards Australia.

AS 1289.6.3.2. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - 9kg dynamic cone penetrometer test.* Reconfirmed 2013: Standards Australia.

AS 1289.6.3.3. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - Perth sand penetrometer test.* Reconfimed 2013: Standards Australia.

AS 1726. (2017). *Geotechnical Site Investigations.* Standards Australia.

AS 2159. (2009). *Piling - Design and Installation.* Standards Australia.

AS 2870. (2011). *Residential Slabs and Footings.* Standards Australia.

9. Limitations

Douglas Partners (DP) has prepared this report for this project at Part of Lot 9002 Grandstand Road, Ascot WA in accordance with DP's proposal dated 8 May 2023 and acceptance received from Mr James Oldring in a signed services order dated 8 August 2023. The work was carried out under DP's Engagement Terms. This report is provided for the exclusive use of Perth Racing for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

Attachment 12.1.3 Environmental Assessment Report

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope of work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

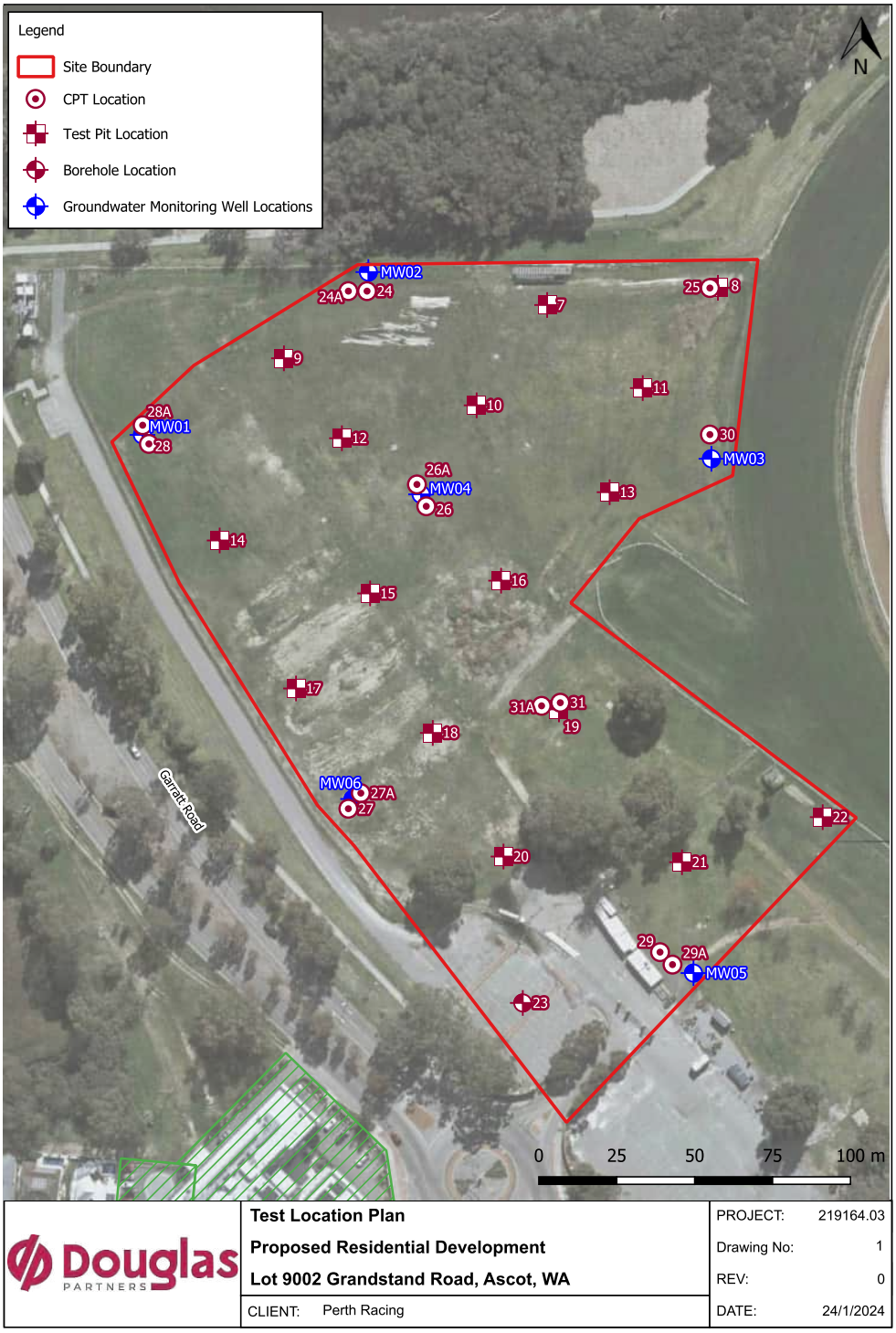
Appendix B

Test Location Plan

Test Pit and Borehole Logs

CPT Results

Attachment 12.1.3 Environmental Assessment Report



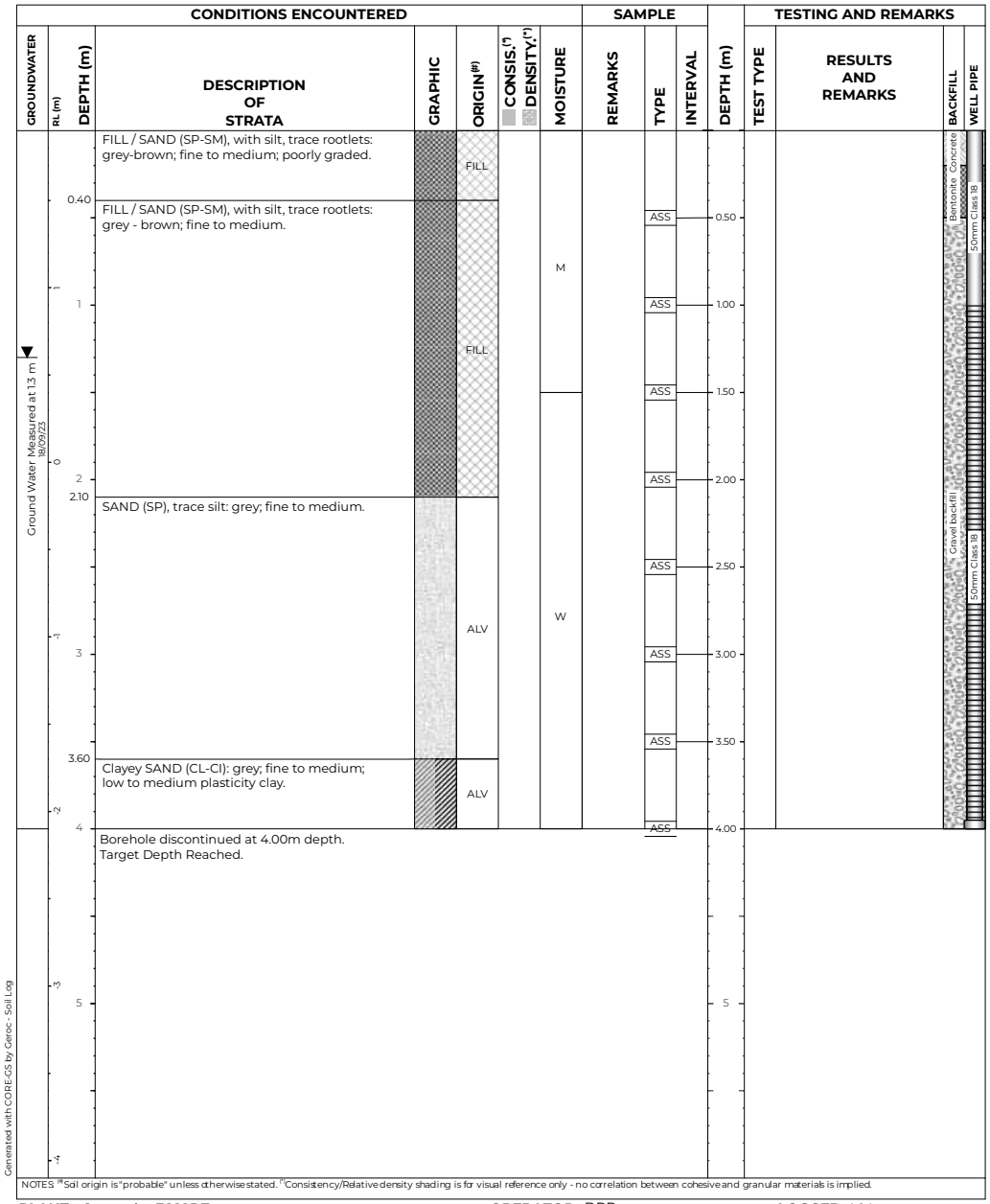
Attachment 12.1.3 Environmental Assessment Report

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 1.9 AHD
COORDINATE: E:397722.0, N:6466365.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 01
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Attachment 12.1.3 Environmental Assessment Report

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397795.0, N:6466418.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 02
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL / WELL PIPE
			FILL / SAND (SP-SM), with silt, trace gravel: grey; fine to medium.											Bentonite Concrete
			From 0.40m: becoming orange-brown				M		ASS		0.50			Gravel backfill 50mm Class 18
	1		From 1.10m: becoming grey-brown, trace limestone gravel		FILL				ASS		1.00			
▼ Ground Water Measured at 1.46 m 18/09/23			1.60m: trace brick, limestone gravel, wet @ 1.6 m						ASS		1.50			
	0	2							ASS		2.00			
		2.20	Sandy CLAY (CL-CI): grey; low to medium plasticity; fine to medium sand.		ALV				ASS		2.50			
		2.70	SAND (SP), trace rootlets, trace silt: grey; fine to medium.				W		ASS		3.00			
	-1	3			ALV				ASS		3.50			
	-2	4	Borehole discontinued at 4.00m depth. Target Depth Reached.						ASS		4.00			
	-3	5									5			

NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.3 Environmental Assessment Report

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.2 AHD
COORDINATE: E:397905.0, N:6466358.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 03
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	3	0	FILL / SAND (SP), trace silt: orange; fine to medium. From 0.30m: becoming grey, trace clay, limestone gravel		FILL						0			Bentonite Concrete	
	2	1									1			Gravel backfill	50mm Class 18
	1	1.60	FILL / Clayey SAND (SC), trace gravel: grey; fine to medium; low to medium plasticity clay.		FILL						2				
	0	2.20	FILL / SAND (SP), trace silt: orange - grey; fine to medium. 2.80m: trace brick		FILL						3				
Ground Water Measured at 2.37 m 18/09/23	-1	3.00	FILL / Clayey SAND (SC): grey; fine to medium; low to medium plasticity clay. 3.30m-3.50m: with bitumen layer		FILL										
	-2	3.60	FILL / CLAY (CL-CI), trace sand: grey - green; low to medium plasticity.		FILL						4				
	-3	4	Borehole discontinued at 4.00m depth. Target Depth Reached.												
	-4	5									5				

NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

Generated with CORE-GS by Geroc - Soil Log

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.3 Environmental Assessment Report

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397812.0, N:6466346.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 04
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	2	0.60	FILL / SAND (SP-SM), with silt, trace rootlets: orange grey; fine to medium.		FILL				ASS		0.50			Bentonite Concrete	
			FILL / SAND (SP), with gravel, trace clay: grey; fine to medium; fine to medium gravel.						ASS		1.00			50mm Class 18	
Ground Water Measured at 1.59 m 18/09/23	1		1.50m: trace brick, wet						ASS		1.50			Gravel backfill	
	0	2	2.00m: trace brick		FILL				ASS		2.00			50mm Class 18	
									ASS		2.50				
	-1	3	3.00m: trace brick						ASS		3.00				
		3.20	SAND (SP), trace silt: grey-orange; fine to medium.		ALV										
		3.40	Clayey SAND (SC): orange-grey; fine to medium; low to medium plasticity clay.		ALV				ASS		3.50				
		3.60	Sandy CLAY (CL): grey; low to medium plasticity; fine to medium sand.		ALV										
	-2	4	Borehole discontinued at 4.00m depth. Target Depth Reached.						ASS		4.00				
	-3	5									5				

NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE-GS by Geroc - Soil Log

Douglas PARTNERS

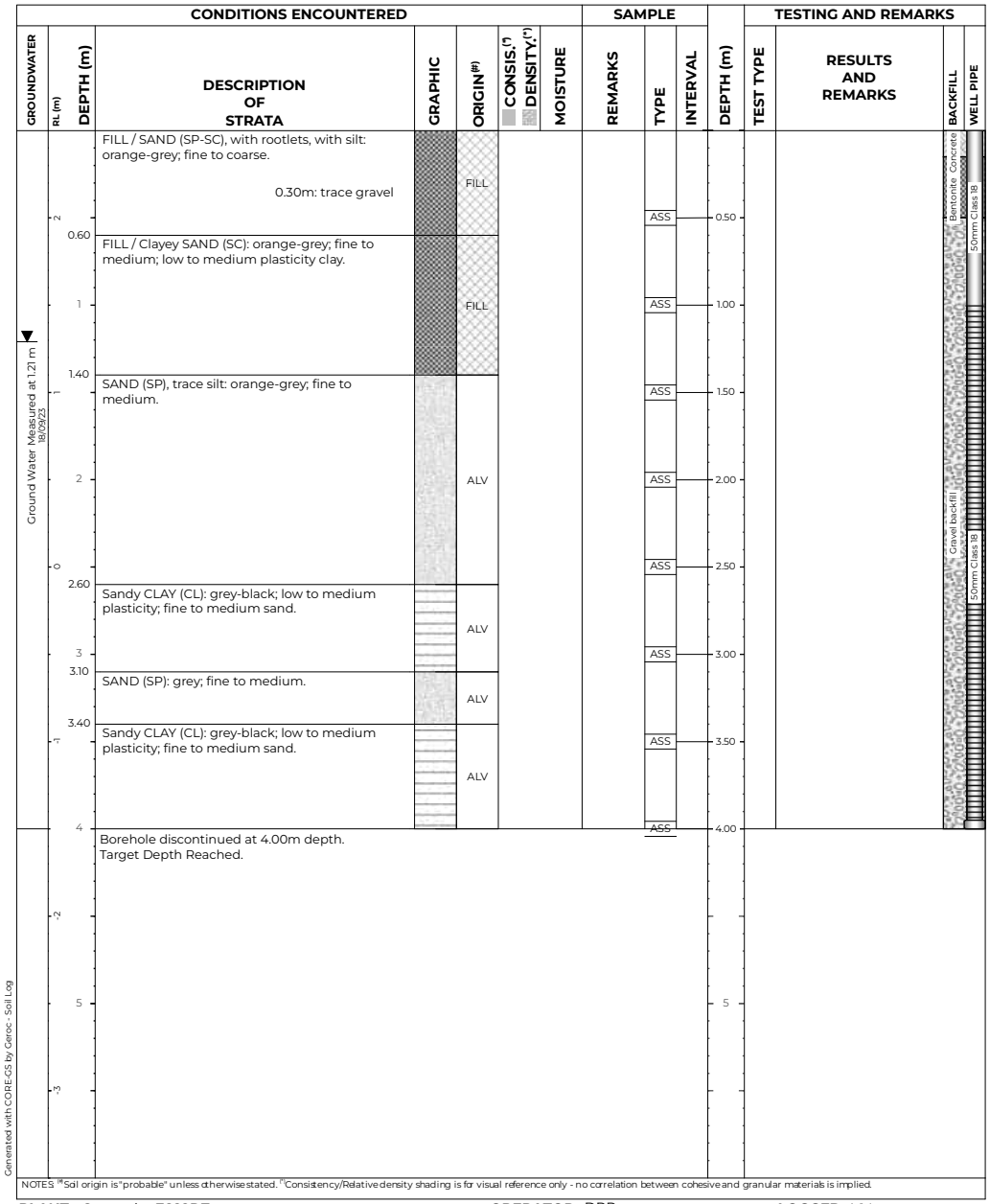
Attachment 12.1.3 Environmental Assessment Report

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.5 AHD
COORDINATE: E:397900.0, N:6466193.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 05
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



PLANT: Geoprobe 7822DT
OPERATOR: DPP
LOGGED: VV
METHOD: Direct Push Probing
CASING: Nil
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

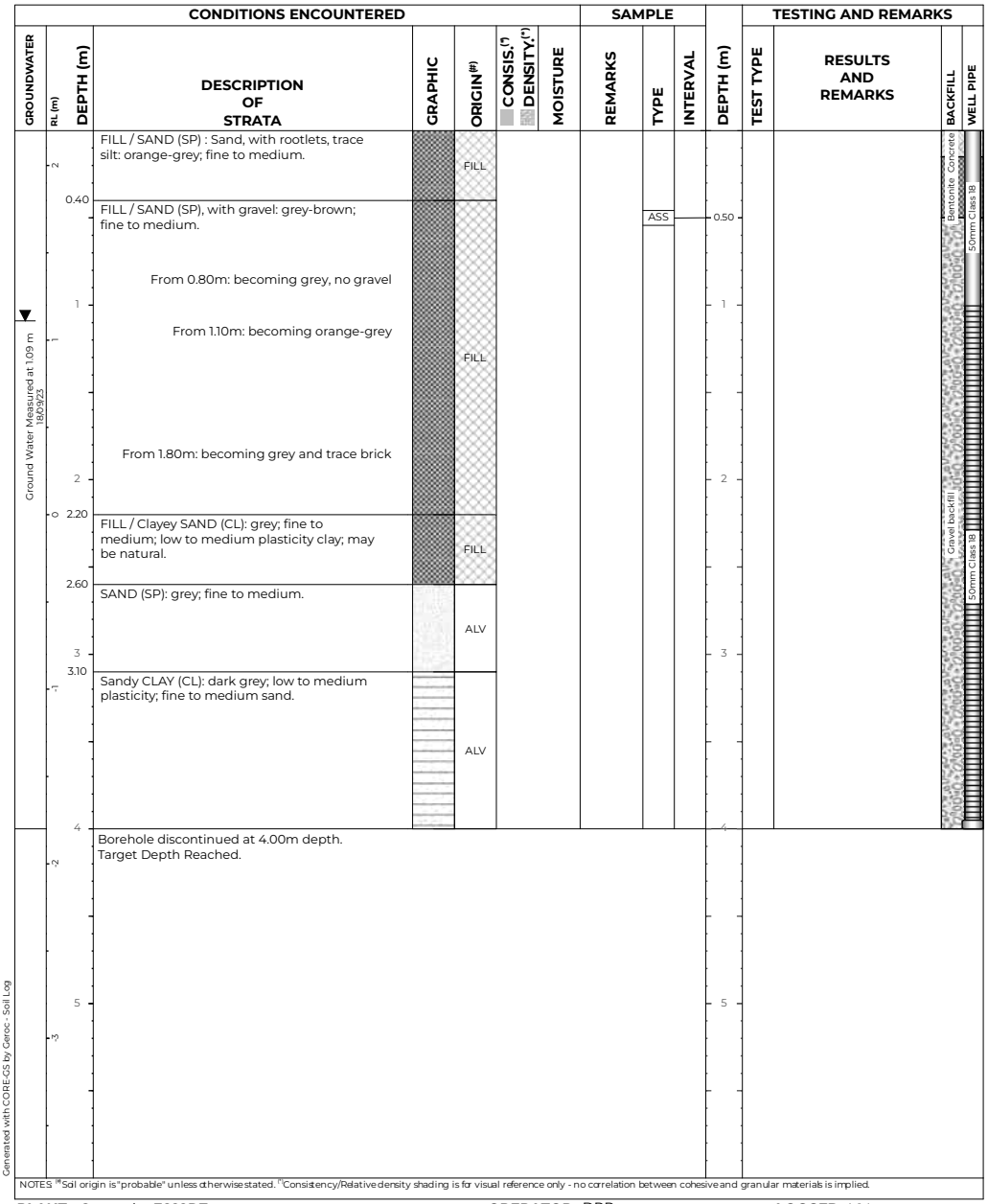
Attachment 12.1.3 Environmental Assessment Report

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397790.0, N:6466249.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: MW 06
PROJECT No: 219164.01
DATE: 11/09/23
SHEET: 1 of 1



NOTES (#)Soil origin is "probable" unless otherwise stated. (*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Geoprobe 7822DT
METHOD: Direct Push Probing
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.

OPERATOR: DPP

LOGGED: VV
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions

Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.9 AHD
COORDINATE: E:397852.9, N:6466410.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP07
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE / RESULTS AND REMARKS
	0	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium. From 0.17m: becoming orange		FILL	MD to VD	D to M		ES		0.10	PID <1ppm
		0.54m: trace geo-fabric						ES		0.40 / 0.50	PID <1ppm
	0.60	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand. 0.84m: trace geo-fabric		FILL							
	0.90 / 1	FILL / GRAVEL (GP-GM) : Gravel, with mulch, with sand: dark brown and dark grey-brown; with silt.		FILL				ES		1.00 / 1.10	PID <1ppm
	1.40	FILL / SAND (SP-SM), with silt: dark grey; fine to medium. 1.50m: trace PACM fragment From 1.60m-2.60m: with fragments of bricks, concrete and metal roofing sheetings		FILL	ND	M	ASB9, ASB10, AF/FA	D / ES	1.50 / 1.60		PID <1ppm
09/11/23	2			FILL				ES		2.00 / 2.10	PID <1ppm
						W		ES		2.50 / 2.60	PID <1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).									





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.3 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Generated with CORE.GS by Geroc - Soil Log with Photo

Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.6 AHD
COORDINATE: E:397905.7, N:6466414.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP08
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
			FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	VD	M		ES		0.10	PID	<1 ppm
			From 0.43m: becoming pale grey, trace gravel						ES		0.50 0.60	PID	<1 ppm
		1	From 1.20m: becoming grey						ES		1.00 1.10	PID	<1 ppm
		1.40	FILL / organic SAND (SP-SM), with silt, with gravel: dark grey-brown; fine to medium; trace fragments of brick and concrete.		FILL	ND		AF/FA ASB 8	D ES MAT		1.50 1.60	PID	<1 ppm
			1.55m-2.00m: with fragments of brick, concrete and PVC										
		1.80	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium.		FILL				D ES		2.00 2.10	PID	<1 ppm
			2.20m: trace metal sheet, PVC										
			2.40m: trace rubber pipe, metal bar						ES		2.50 2.60	PID	<1 ppm
			Test Pit discontinued at 2.70m depth. (Test Pit terminated due to slow digging).										

PSP/ISO — 5 10 15 — Refusal 20





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397768.9, N:6466392.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP09
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2		FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES	0.10		PID	<1ppm
		0.45	FILL / Clayey SAND (SC): orange-brown; fine to medium; low to medium plasticity clay.		FILL				D ES	0.50 0.60		PID PDPT50	<1ppm 5 10 15 REFUSAL 25 25
		0.95 0.98	FILL / ASPHALTIC CONCRETE: black, 7 mm sized nominal aggregate.										
	1		FILL / Silty SAND (SM): brown; fine to medium. From 1.15m: becoming grey-brown From 1.20m: with fragments of brick, concrete slab of 0.4 m in thickness, geo-fabric, metal bar and terracotta pipe 1.40m: trace metal sheet		FILL	ND	M		ES	1.00 1.10		PID	<1ppm
									ES	1.50 1.60		PID	<1ppm
09/11/23	0	2	1.90m-2.10m: trace pockets of Clayey SAND SC						ES	2.00 2.10		PID	<1ppm
							W						
			Test Pit discontinued at 2.30m depth. (Collapsing conditions).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397829.1, N:6466375.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP10
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: bands of grey, orange-brown and pale grey; fine to medium.		FILL	MD to D		DUP 2	ES		0.10	PID	<1ppm
		0.70m: trace geo-fabric						ES		0.50	PID	<1ppm
	0.80	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL						0.60		
	1							ES		1.00	PID	<1ppm
	1.20	FILL / SAND (SP), trace rootlets, trace silt: grey -brown; fine to medium.		FILL	ND					1.10		
	1	From 1.40m-1.80m: with fragments of brick and concrete						ES		1.50	PID	<1ppm
		From 1.80m: becoming dark grey, trace fragments of brick and concrete								1.60		
	2							ES		2.00	PID	<1ppm
		Test Pit discontinued at 2.15m depth. (Test Pit terminated due to slow digging).								2.10		
	0											

PSP





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NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 3.1 AHD
COORDINATE: E:397881.2, N:6466387.1
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP11
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	3		FILL / SAND (SP-SM), with silt: grey and orange-brown; fine to medium.			VD	D to M		ES		0.10	PSP/150	5 10 15 REFUSAL 25 25
			From 0.35m: becoming grey						ES		0.50 0.60		
		1						DUP 3	D ES		1.00 1.10		
	2				FILL	ND	M						
			From 1.60m: becoming dark grey, trace fragments of brick						D ES		1.60 1.70		
			From 1.70m-2.40m: with fragments of brick and concrete										
		2	1.80m: piece of concrete boulder (1 m x 0.5 m) observed						ES		2.00 2.10		
			2.10m: trace plastic bottle, glass bottle, concrete rubble										
			2.30m: trace fragments of wooden plank and timer						D		2.30		
			Test Pit discontinued at 2.40m depth. (Test Pit terminated due to slow digging).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397785.4, N:6466366.6
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP12
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.						ES		0.10	PID	<1ppm
		From 0.20m: becoming yellow-brown		FILL	D to VD	D to M		ES		0.50	PID	<1ppm
	0.85 / 0.90	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL						0.60		
	1	FILL / SAND (SP), trace fragments of brick, scrap metal, timber and rubber cable, trace silt: dark grey-brown; fine to medium.						D		1.00	PID	<1ppm
		1.30m-1.80m: with fragments of plastic waste, insulation material, terracotta pipes and concrete, trace PACM fragments					AF/FA, ASB 6, ASB 7	ES		1.10		
				FILL	ND	M		ES		1.50 / 1.60	PID	<1ppm
	2	From 1.90m: becoming green-grey, trace pockets of CLAY CL-CI						B		2.00	PID	<1ppm
09/11/23	0							ES		2.10		
						W						
		Test Pit discontinued at 2.30m depth. (Collapsing conditions).										

PSP/PID: 5, 10, 15, 25





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.8 AHD
COORDINATE: E:397872.7, N:6466350.7
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP13
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; 10% non-plastic fines. From 0.15m: becoming orange		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		0.70m: trace geo-fabric						D		0.50	PSP/ISO	5 10 15 25
	0.75							ES		0.60	PID	<1ppm
	1	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL				ES		1.00	PID	<1ppm
		1.20m: trace geo-fabric								1.10		
	1.30	FILL / SAND (SP), trace gravel, fragments of brick and concrete, trace silt: dark grey; fine to medium.			ND	M		D		1.50	PID	<1ppm
		1.50m-2.40m: with fragments of bricks and concrete slab						ES		1.60		
	1			FILL								
	2							ES		2.00	PID	<1ppm
										2.10		
09/11/23 ▼						W		ES		2.50	PID	<1ppm
										2.60		
	0	Test Pit discontinued at 2.70m depth. (Collapsing conditions).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397745.6, N:6466334.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP14
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.25	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	D to VD	D to M		ES		0.10	PID	<1ppm
		FILL / Silty SAND (SM): brown and grey-brown; weakly to moderately cemented.									DCP9/150	29 30
		0.65m: trace fragments of brick and glass						D		0.50	PID	<1ppm
		0.72m-2.00m: with framgnes of brick, metal sheet and insulation material						ES		0.60		
	1	0.92m: trace fragments of plastic waste, glass and limestone boulders						ES		1.00	PID	<1ppm
				FILL	ND	M				1.10		
								ES		1.50	PID	<1ppm
										1.60		
	2	2.00m: becoming gren-grey, trace fragments of timber, brick and concrete blocks, with pockets of Clayey SAND SC						ES		2.00	PID	<1ppm
		From 2.20m: with fragments of brick and scrap metal								2.10		
								D		2.40		
		Test Pit discontinued at 2.50m depth. (Test Pit terminated due to slow digging).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397794.3, N:6466319.4
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP15
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.00	FILL / SAND (SP-SM), with silt, trace gravel and rootlets: orange-brown; fine to medium.						ES		0.10	PID	<1ppm
		From 0.24m: becoming grey		FILL	VD	D to M					DCP9/150	
		From 0.42m: becoming pale grey						D		0.50	PID	<1ppm
								ES		0.60		22
	0.75	FILL / Sandy GRAVEL (GP-GM), with silt: dark brown and grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND							
	0.95	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						D		1.00	PID	<1ppm
								ES		1.10		
		1.20m: trace fragments of timber, terracotta pipe and scrap metal										
		1.50m: trace redundant cable				M		ES		1.50	PID	<1ppm
										1.60		
		From 1.80m: becoming orange-brown		FILL	ND							
		2.00m: trace PACM pipe					AF/FA, ASB 5	ES		2.00	PID	<1ppm
		2.10m: trace fragments of timer								2.10		
08/11/23		From 2.40m: becoming dark grey				W						
								ES		2.50		
										2.60		
		Test Pit discontinued at 2.70m depth. (Test Pit flodded with water seepage).										





NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

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PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.4 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397837.5, N:6466321.2
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP16
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
			FILL / SAND (SP-SM), with silt, trace gravel and rootlets: grey; fine to medium.		FILL				ES		0.10	PID	<1ppm
	2	0.34	FILL / Sandy (GP-GM), with silt: grey; fine to medium sand.		FILL	ND	D to M		ES		0.50 0.60	PID	<1ppm
			0.80m: trace fragments of plastic waste										
		0.84	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.										
	1					MD to D			ES		1.00 1.10	PID	<1ppm
			1.50m: trace fragments of plastic waste		FILL		M		D ES		1.50 1.60	PID	<1ppm
	0	2	2.00m: trace metal plate (0.5 m x 0.5 m) 2.10m: with limestone boulders			ND			ES		2.00 2.10	PID	<1ppm
▼ 08/11/23							W		D ES		2.50 2.60	PID	<1ppm
			Test Pit discontinued at 2.60m depth. (Collapsing conditions).										

DCP9/150





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NOTES [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.5 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397775.7, N:6466289.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP17
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.15	FILL / SAND (SP-SM), with silt, trace rootlets: orange - grey; fine to medium.		FILL	L to VD	D to M		ES		0.10	PID	<1ppm
		FILL / Sandy GRAVEL (GP-GM), with fragments of concrete, with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.									DCP9/150	25
				FILL				ES		0.50 0.60	PID	<1ppm
	0.90	FILL / SAND (SP), with fragments of brick and concrete, trace silt: grey; fine to medium.						ES		1.00 1.10	PID	<1ppm
		1.10m: trace fragments of plastic waste			ND	M	ASB 3	ES		1.50 1.60	PID	<1ppm
		1.60m: trace metal sheets		FILL								
08/11/23		1.90m: piece of concrete block observed					ASB 4	ES		2.00 2.10	PID	<1ppm
						W						
		Test Pit discontinued at 2.50m depth. (Collapsing conditions).										





NOTES [#] Soil origin is "probable" unless otherwise stated. [*] Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397816.0, N:6466272.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP18
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium; weakly cemented.		FILL		D to M		ES		0.10	PID	<1ppm
	0.26	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand.		FILL	ND							
	0.45	FILL / SAND (SP), with fragments of brick and concrete, with clay: grey; fine to medium.					ASB 1	ES		0.50 0.60	PID	<1ppm
		0.50m-1.50m: with fragments of tile and brick, trace PACM fragments										
	1	0.75m: trace metal bar 1.00m: trace fragments of redundant cables, glass, geo-fabric and limestone blocks		FILL	MD to VD	M		D ES		1.00 1.10	PID	<1ppm
		From 1.20m: with limestone boulders			ND							
								ES		1.40 1.50	PID	<1ppm
	2	Test Pit discontinued at 1.50m depth. (Test Pit terminated due to slow digging).								2		





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
No free groundwater observed.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.2 AHD
COORDINATE: E:397856.8, N:6466280.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP19
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE				TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] / DENSITY:[*]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	0.20	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL			DUP 1	ES		0.10	PID	<1ppm
		FILL / Sandy GRAVEL (GP-GM), with silt: orange-brown; medium to coarse; fine to medium sand; Gravel is crushed limestone.		FILL	ND	D		D ES		0.50 0.60	PID	<1ppm
	0.70	FILL / SAND (SP-SM), with silt, trace gravel: grey-brown; fine to medium.		FILL	MD	M		ES		1.00 1.10	PID	<1ppm
		0.75m: trace concrete slab, fragments of brick and terracotta pipes										
		From 0.90m: with fragments of brick										
		From 1.20m: becoming grey, trace fragments of timber										
▼ 09/11/23		From 1.60m: becoming grey-brown						ES		1.50 1.60	PID	<1ppm
	1.90	FILL / SAND (SP), trace roots, trace silt: dark grey; fine to medium.		FILL	ND	W		ES		2.00 2.10	PID	<1ppm
		2.40m: trace fragments of sea shells						D ES		2.50 2.60	PID	<1ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).										

PSD50: 5, 10, 15





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:397838.6, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP20
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.(*) DENSITY:(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE / RESULTS AND REMARKS
	0.05	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL				ES		0.10	PID <1ppm
		FILL / Sandy GRAVEL (GP-GM), with silt: yellow-brown; medium to coarse; fine to medium sand.		FILL		D to M					
	0.34	FILL / SAND (SP-SM), with silt, trace gravel: grey and orange-brown; fine to medium. 0.50m: with fragments of brick and concrete			MD to VD			ES		0.50 0.60	PID <1ppm
		0.80m: trace fragments of rubber waste and scrap metal									
	1			FILL				D ES		1.00 1.10	PID <1ppm
		From 1.20m: becoming dark grey, with fragments of brick 1.30m-2.10m: with hydrocarbon odour				M					
		1.50m: with pockets of Clayey SAND SC						D ES		1.50 1.60	PID 9.4ppm
	1.80	FILL / Clayey SAND (SC): dark grey; fine to medium; low to medium plasticity clay.			ND						
08/11/23	2	From 2.10m: becoming green-grey		FILL		W		ES		2.00 2.10	PID 1.4ppm
		Test Pit discontinued at 2.60m depth. (Collapsing conditions).						ES		2.50 2.60	PID 1.1ppm

PSP(s)





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NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 2.1 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:397896.5, N:6466231.5
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP21
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m) / RL (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE / RESULTS AND REMARKS
	0.17	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL				ES		0.10	PID <1ppm
		FILL / Sandy GRAVEL (GP-GM), with silt: grey; fine to coarse; fine to medium sand; Gravel is crushed limestone.		FILL	MD to D	D to M		ES		0.50 0.60	PID <1ppm
	0.70	FILL / SAND (SP-SM), with fragments of brick and concrete, with silt: grey; fine to medium.						ES		1.00 1.10	PID <1ppm
		1.20m: trace fragments of rubber waste and scrap metal		FILL	ND	M		D ES		1.50 1.60	PID <1ppm
08/11/23		From 1.80m: trace pockets of CLAY CL-CI									
	1.90	FILL / Sandy CLAY (CI), trace fragments of brick and timber, trace gravel: dark grey; medium plasticity; fine to medium sand.		FILL		w>PL		B ES		2.00 2.10	PID <1ppm
		Test Pit discontinued at 2.10m depth. (Collapsing conditions).									

NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

TEST PIT LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.3 AHD
COORDINATE: E:397941.6, N:6466244.9
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP22
PROJECT No: 219164.01
DATE: 09/11/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED								SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m) / DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[^] / DENSITY.[^]	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
	2	FILL / SAND (SP-SM), with silt, trace rootlets: grey; fine to medium.		FILL	MD	D to M		ES		0.10	PID	<1ppm
		From 0.22m: becoming orange										
		From 0.40m: becoming brown						ES		0.50	PID	<1ppm
		From 0.70m: becoming dark grey-brown								0.60		
	1					M		ES		1.00	PID	<1ppm
	1									1.10		
	1.40	SAND (SP-SM), with silt: pale yellow-brown; fine to medium.		possibly ALV	ND			ES		1.50	PID	<1ppm
09/11/23		From 1.70m: becoming orange-grey								1.60		
	2					W		B		2.00	PID	<1ppm
								ES		2.10		
	0	Test Pit discontinued at 2.20m depth. (Collapsing conditions).										

PSP/PID





NOTES [#]Soil origin is "probable" unless otherwise stated. [^]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
OPERATOR: SLE Earthmoving
LOGGED: VV
METHOD:
REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.8 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

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Attachment 12.1.3 Environmental Assessment Report

BOREHOLE LOG

CLIENT: Perth Racing
PROJECT: Proposed Residential Development
LOCATION: 71 Grandstand Road, Ascot, WA 6104

SURFACE LEVEL: 2.4 AHD
COORDINATE: E:397844.9, N:6466181.0
DATUM/GRID: MGA2020 Zone 50
DIP/AZIMUTH: 90°/---°

LOCATION ID: TP23
PROJECT No: 219164.01
DATE: 08/11/23
SHEET: 1 of 1

GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN[#]	CONSIS.[*] DENSITY.[*]	MOISTURE	REMARKS	SAMPLE TYPE	SAMPLE INTERVAL	DEPTH (m)	TESTING AND REMARKS: TEST TYPE	RESULTS AND REMARKS
		0.05	ASPHALT: black, 7 mm sized nominal aggregate.		FILL								
		0.15	FILL / Sandy GRAVEL (GP-GM), with silt: grey; medium to coarse, angular to sub-angular; fine to medium sand; BASECOURSE, gravel is crushed rock.		FILL	ND	D						
		0.30	FILL / Sandy GRAVEL (GP-GM), with silt: red-brown; medium to coarse, angular to sub-angular; fine to medium sand; SUB-BASE, gravel is granitic and lateritic.		FILL		M		ES		0.50 0.60	PID	<1ppm
	2	0.65	FILL / Silty SAND (SM), trace gravel: brown; fine to medium; with pockets of Clayey SAND SC. 0.90m: trace fragments of brick			MD to D							
		1	FILL / Clayey SAND (SC): orange-grey; fine to medium; low to medium plasticity clay.		FILL		M		D ES		1.00 1.10	PID	<1ppm
		1.40	FILL / SAND (SP), trace silt: grey; fine to medium; trace pockets of Clayey SAND SC.		FILL				ES		1.50 1.60	PID	<1ppm
08/11/23	1		1.80m: trace fragments of brick			ND							
		1.90	FILL / Sandy CLAY (CI), trace gravel: dark grey; medium plasticity; fine to medium sand.		FILL		W		D ES		2.00 2.10	PID	<1ppm
		2.20	FILL / SAND (SP-SM), with silt: dark grey; fine to medium.		FILL				D ES		2.50 2.60	PID	<1ppm
	0		Borehole discontinued at 2.60m depth. (Collapsing conditions).										

DCP9/150





NOTES [#]Soil origin is "probable" unless otherwise stated. [*]Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: 5T excavator with 450 mm toothed bucket
METHOD:
OPERATOR: SLE Earthmoving
LOGGED: VV
CASING: Nil

REMARKS: Surface lvel surveyed using a differential GPS with a reported accuracy of +/- 0.1 m.
Groundwater encountered at 1.7 m depth.

Refer to explanatory notes for symbol and abbreviation definitions

Douglas PARTNERS

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Appendix C

Geotechnical Laboratory Test Certificates

Attachment 12.1.3 Environmental Assessment Report

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - ASTM D2974-14 (Test Method C)

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256-18262_1_ORG
Project:	Proposed Residential Development	*Sample No.*	WG23.18256-18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	Various See Below	*Date Tested:*	15/11/2023

TEST RESULTS - Organic Content

Sampling Method: Sampled by Client, Tested as Received

Testing Completed By: WGLS-LC

Furnace Temperature (°C): 440

Sample Number	Sample Identification	Ash Content (%)	Organic Content (%)
WG23.18256	TP13/1.5	98.4	1.6
WG23.18257	TP8/1.5 m	93.2	6.8
WG23.18258	TP19/2.5	98.5	1.5
WG23.18262	BH23/2.5 m	98.8	1.2

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 16/November/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

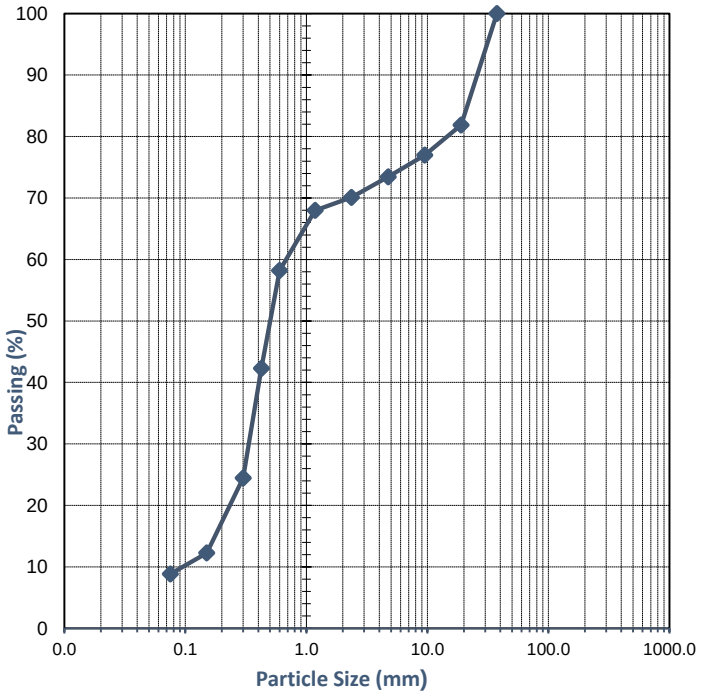
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18257_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18257
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP8/1.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	82
9.5	77
4.75	73
2.36	70
1.18	68
0.600	58
0.425	42
0.300	24
0.150	12
0.075	9



Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 17/November/2023

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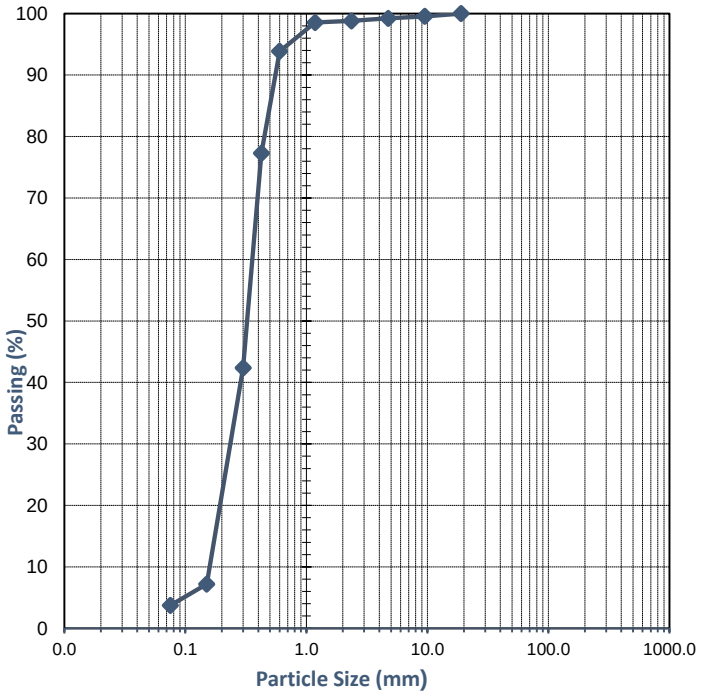
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18256_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18256
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP13/1.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	100
4.75	99
2.36	99
1.18	99
0.600	94
0.425	77
0.300	42
0.150	7
0.075	4



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

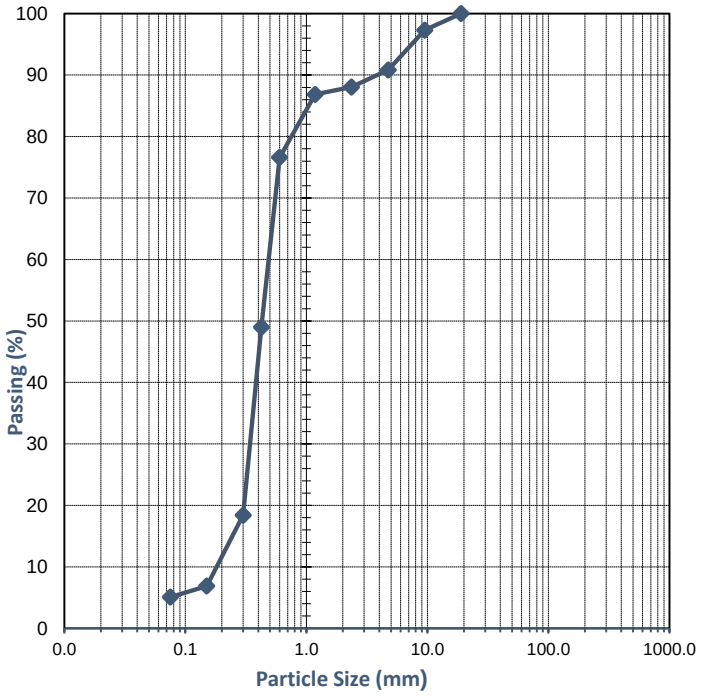
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18258_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18258
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP19/2.5	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	97
4.75	91
2.36	88
1.18	87
0.600	77
0.425	49
0.300	18
0.150	7
0.075	5



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

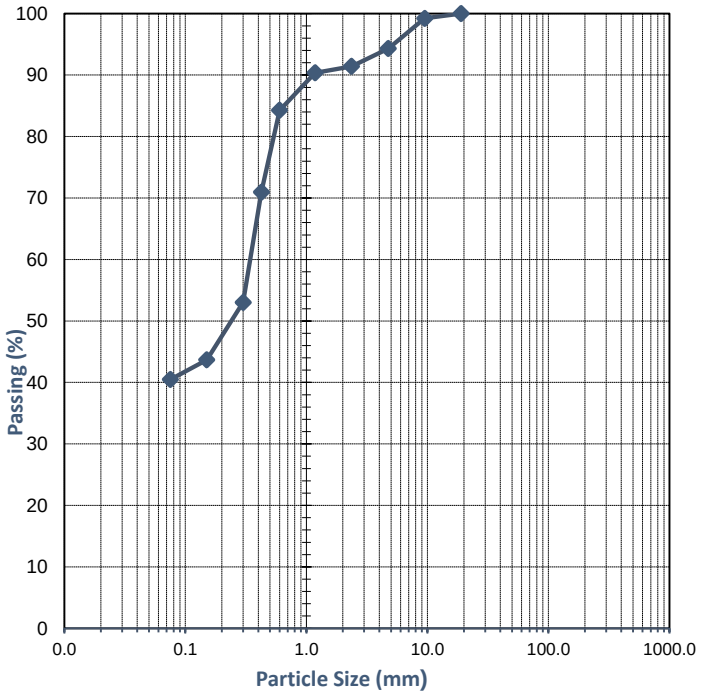
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	100
9.5	99
4.75	94
2.36	91
1.18	90
0.600	84
0.425	71
0.300	53
0.150	44
0.075	40



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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Attachment 12.1.3 Environmental Assessment Report

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18259_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18259
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP21/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**37**
AS 1289.3.2.1	**Plastic Limit (%)**	**24**
AS 1289.3.3.1	**Plasticity Index (%)**	**13**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**8.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet
Date: 20/November/2023

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SOIL | AGGREGATE | CONCRETE | CRUSHING

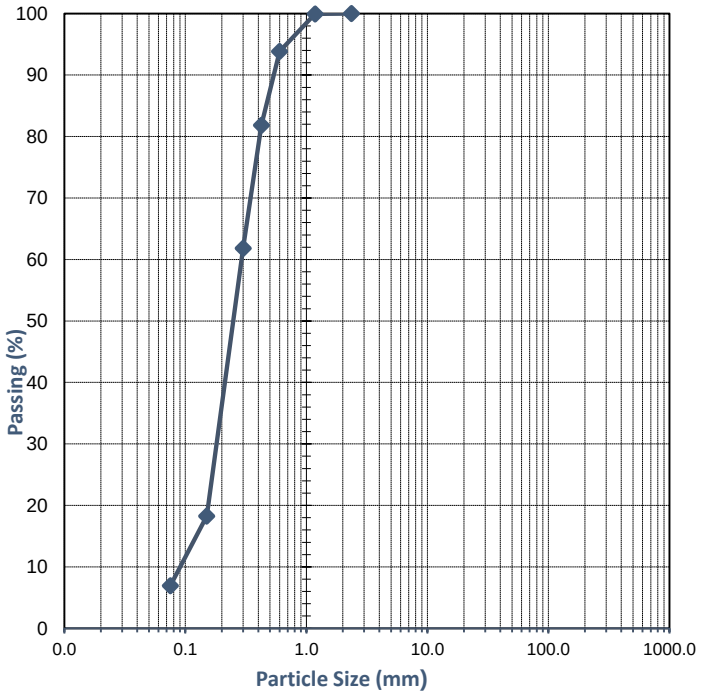
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/2023
Sample Identification:	TP22/2.0	*Date Tested:*	22/11 - 23/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	
2.36	100
1.18	100
0.600	94
0.425	82
0.300	62
0.150	18
0.075	7



Comments:

Approved Signatory:

Name: Natasha Bielawski

Date: 23/November/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18260_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18260
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	TP22/2.0	*Date Tested:*	23/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Matthew Lichon
Date: 24/November/2023

NATA **Accreditation No. 20599**
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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

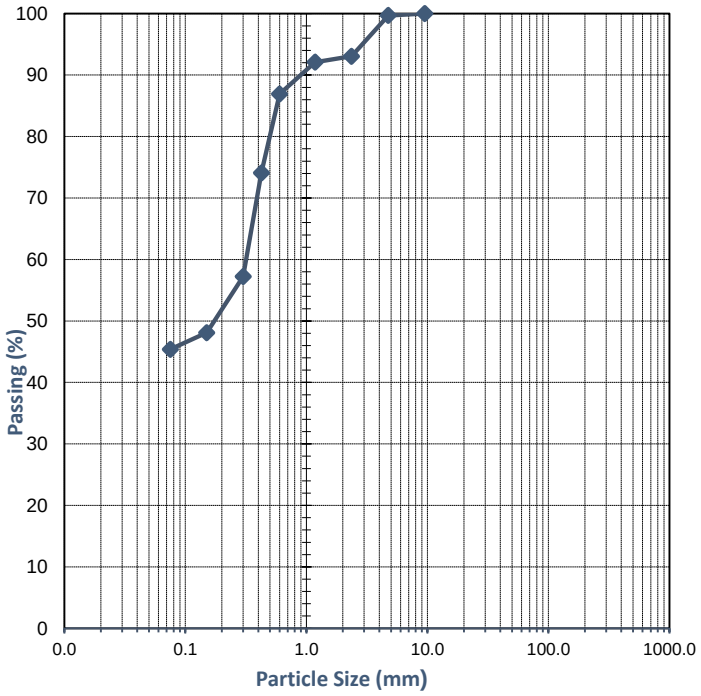
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	93
1.18	92
0.600	87
0.425	74
0.300	57
0.150	48
0.075	45



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

Date: 17/November/2023

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18261_1_PI
Project:	Proposed Residential Development	*Sample No.*	WG23.18261
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.0 m	*Date Tested:*	17/11/2023

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**44**
AS 1289.3.2.1	**Plastic Limit (%)**	**22**
AS 1289.3.3.1	**Plasticity Index (%)**	**22**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**9.5**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**Curled**

Comments:

Approved Signatory:

Name: Madhav Basnet
Date: 20/November/2023

NATA **Accreditation No. 20599**
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Attachment 12.1.3 Environmental Assessment Report

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

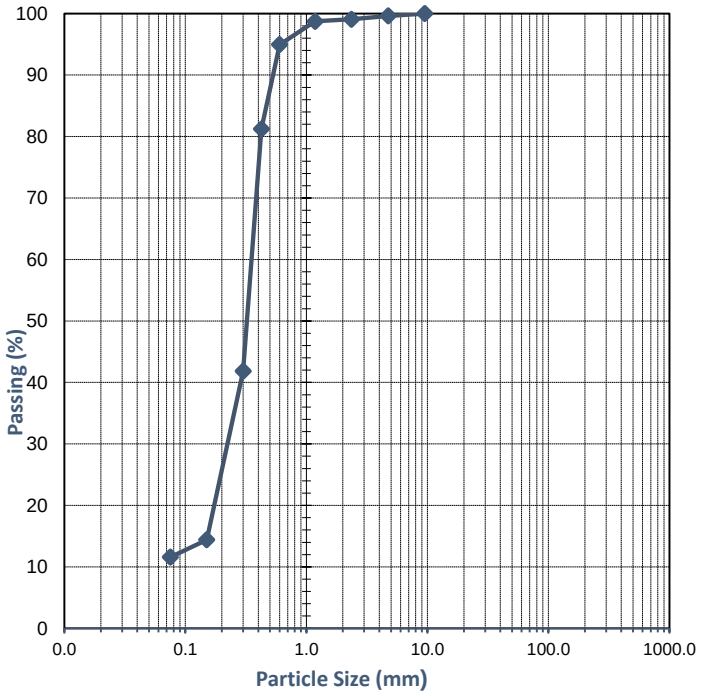
TEST REPORT - AS 1289.3.6.1

Client:	Perth Racing	*Ticket No.*	S11610
Client Address:	-	*Report No.*	WG23.18262_1_PSD
Project:	Proposed Residential Development	*Sample No.*	WG23.18262
Location:	Lot 9002 Grandstand Rd, Ascot	*Date Sampled:*	08/11 - 09/11/23
Sample Identification:	BH23/2.5 m	*Date Tested:*	16/11 - 17/11/2023

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	99
1.18	99
0.600	95
0.425	81
0.300	42
0.150	14
0.075	12



Comments:

Approved Signatory: Cody O'Neill

Name: Cody O'Neill

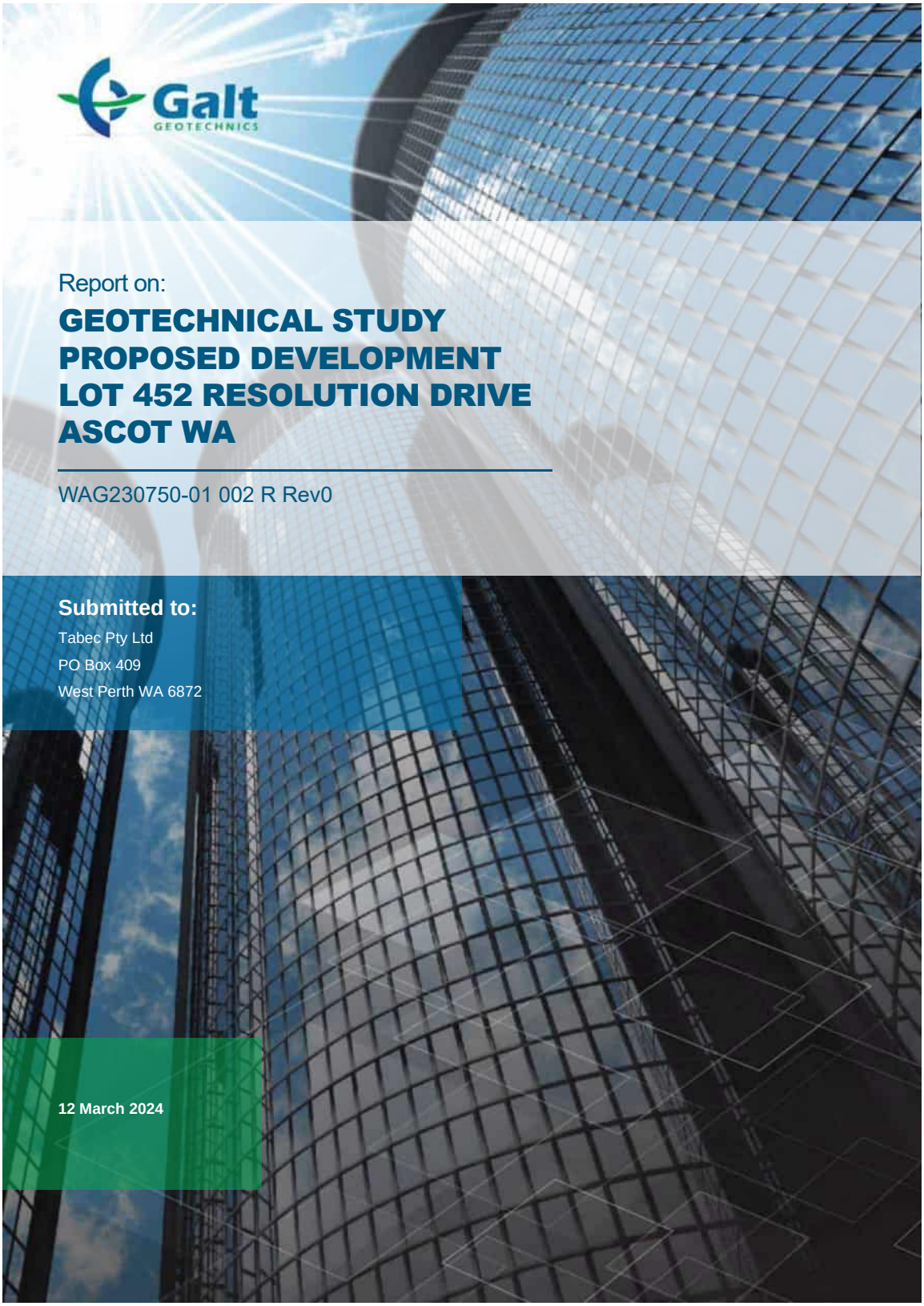
Date: 17/November/2023

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Attachment 12.1.3 Environmental Assessment Report



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Standard Geotechnical Definitions, Recommendations, Requirements and Limitations

Attachment 12.1.3 Environmental Assessment Report

1. INTRODUCTION

This report presents the outcomes of Galt Geotechnics' (Galt's) geotechnical study for the proposed development at Lot 452 Resolution Drive, Ascot ("the site").

This report is to be read in conjunction with the appended "Geotechnical Definitions, Recommendations, Requirements and Limitations". 'Clause GDR1', etc. refer to this Appendix, found at the back of this report.

2. KEY FINDINGS

Site Description

Table 1: Summary of Site

Item	Comment
Site Extent	Refer Figure 1.
Site Area	About 1.14 Ha.
Current Site Surface Levels[1]	About RL 3 m AHD.
Vegetation	Mature trees, shrubs and lawn in landscaped areas covering a large portion of the site.
Existing Infrastructure	Single Storey building (used by Perth Racing Security Services) with surrounding accessways, car parking and landscaped areas.
Site History[2]	**Prior to 1953**: two residences in northern portion of site. Remainder of site relatively clear. **1953 to 1985**: Relatively unchanged. Undeveloped portion of site used as laydown area, car park area, and to stockpile materials at different times. **1989**: Existing Perth Racing Security Services development (as described above) is present **1989 to Present**: Site relatively unchanged.

NOTES: ***1.*** *Site level based on correspondence with client.*

2. *Site history based on aerial imagery (Landgate).*

3. PROPOSED DEVELOPMENT

Table 2: Summary of Proposed Development

Item	Comment
Proposed Development	Unknown, assumed subdivision for commercial/residential purposes.
Proposed Finished Level	Assumed within about 1 m of current ground levels.
Cut/Fill	Assumed ± 1 m with up to 5 m excavation to connect development to existing sewer.
Assumed Foundation Type	Shallow Footings.
Assumed Retaining Walls	Gravity walls up to 1 m in height.
Assumed Stormwater Disposal	Off site into council network.
Assumed Sewage Disposal	Off site via reticulated sewer.

NOTES: ***1.*** *FFL – finished floor level*

2. *Proposed development details based on supplied information.*

4. PROJECT OBJECTIVES

The objectives of the study were to:

- Assess the geotechnical suitability of the site for the proposed development;

- Geotechnical opportunities and constraints relevant to the proposed development;
- Areas of foundation risk including the presence of aggressive soils and strategies to address identified risks;
- Site preparation including possible reuse of existing soil as controlled fill;
- Excavation conditions;
- The likely site classification;
- Suitable foundation systems including preliminary design parameters;
- Preliminary design parameters for the design of retaining structures and batter slopes;
- Depth to groundwater at time of investigation; and
- Recommendations on additional geotechnical investigation at detailed design phase or to address specific ground conditions encountered.

5. FIELDWORK

Fieldwork was carried out in the presence of a representative from Galt between the 8 and 14 February 2024 and comprised:

Table 3: Summary of Field Data

Type	Results Appendix	Summary	GDR Clause	Equipment Used	No. Tests	Depth Range (m)
Site Plan	Figure 1	-	-	Hand held GPS[1]	-	-
Photographs	A	-	-	-	-	-
Cone Penetration Tests (CPTs)	B	Section 8	GDR3.2	14-tonne truck	5	1.6 to 10.1
Machine Auger Boreholes (BH)	C	Section 8	GDR3.3	AMS Power Probe	4	0.7 to 6.5
Monitoring Well (MW)	C	Section 8	GDR3.3	AMS Power Probe	1	6.0

NOTES: ***1.*** *Hand held GPS is accurate to ±5 m.*

6. LABORATORY TESTING

Laboratory test certificates are presented in Appendix D, and summarised in Attached Tables 1 and 2.

7. SITE CONDITIONS

7.1. Geology

Table 4: Summary of Geology Mapping

Map Sheet	Map Scale	Mapped Soils	Typical Site Findings
Perth	50K	Guildford Formation, described as: "*SANDY SILT - strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.*"	**Thin topsoil** (landscaped areas) **and pavement materials** (car parks / access ways) **over FILL: SAND / SAND** to about 0.4 m to 0.9 m depth, **over Sandy CLAY / CLAY**.

7.2. Groundwater

Table 5: Summary of Groundwater Levels

Item	Date	Depth Range (m)	Elevation Range (m AHD)	Comment
Perth Groundwater Atlas	1997	-	3.0	Historical maximum
Department of Water and Environmental Regulation (DWER) Flood Mapping	-	-	2.7 to 2.9 (DWER mapped 1% AEP flood event level)	Portion of site along southern and south western site boundaries, and the northern side of Grandstand road are mapped as being part of flood fringe by DWER. **Advice on development within the defined flood event (DFE) floodplain is provided by DWER on a case by case basis. DWER recommends a minimum building floor level of 0.50 metres above this level** (**RL 3.4 m AHD**).
Site observations in MW01	February 2024	3.03	-	Based on highest recorded water levels in monitoring well.
Site observations in CPT test probes	February 2024	1.90 to 2.80	-	CPT probes may not have had sufficient time to recharge to hydrostatic levels.
Recommended Design	-	-	2.7 to 2.9	Groundwater likely to perch on clay soils at site. Proposed development must be designed for DWER DFE flood event.

NOTES: ***1.*** *Depths for site observations based on the site surface level at the time of investigation.*

8. GROUND MODEL

The encountered subsurface conditions are summarised as comprising:

- **Surficial Topsoil (in landscaped areas)** up to 0.3 m thick **and Hardstand Fill Layers** (in carparks and access ways); **overlying**
- **FILL: SAND / SAND (SP)**, fine to medium grained, sub-rounded to sub-angular, yellow / brown / grey layers, includes trace gravel / Sandy GRAVEL layers, trace / with fines, some typically medium dense to dense, extending to depths of about 0.4 m to 0.9 m; overlying
- **In BH03 and BH04 only: Silty SAND / Clayey SAND (SM/SC)** fine to medium grained, sub-rounded to sub-angular, brown / grey, low to medium plasticity fines, some typically medium dense to dense, extending to depths of about 0.7 m to 1.2 m; overlying
- **Sandy CLAY / CLAY (CI)**, medium plasticity, brown / orange / grey, trace sand to sandy, trace gravel in some zones, desiccated, CPT traces indicate presence of occasional sand layers, typically very stiff to hard, extending to the maximum depth investigated of 10 m.

Geotechnical design parameters for the generalised subsurface units described above are presented in Table 6.

Table 6: Geotechnical Model Units and Design Parameters

Unit Name	γ_{bulk} (kN/m^3)	ϕ' (°)	c' (kPa)	S_u (kPa)	E_v (MPa)	ν	k_0	Wall Friction=0		Wall Friction=0.5ϕ	
								k_a	k_p	k_a	k_p
Compacted Approved FILL	18	36	-	-	50	0.25	0.41	0.26	3.85	0.22	6.54
SAND / Silty SAND / Clayey SAND	18	35	-	-	25	0.3	0.43	0.27	3.69	0.24	6.08
Sandy CLAY / CLAY	18	21	0 to 5	150	30	0.45	Earth pressure coefficients can be calculated for undrained or drained conditions as outlined in GDR11.2.2 using Firm parameters (undrained) or Fines Content >35% & PI 40% (drained).				

NOTES:

1. *These units are a generalization of results from individual tests, which should be referred to for more information.*
2. *Conditions at CPT locations below depth of soil sample recovery are inferred (refer to clause GDR3.2)*
3. *Surficial topsoil and hardstand layers are not included as discrete units.*
4. *Compacted approved fill is as described in Table 7.*
5. *For all earth pressure coefficients (retaining wall design) refer to clause GDR11.2 for more detail and interpretation. Unit weights for retaining structure design should be as per GDR11.2 or 1 kN/m^3 greater than the values in the table above.*

γ_{bulk} – bulk unit weight
ϕ' – effective friction angle
S_u – undrained shear strength
c'– effective cohesion
E_v – vertical elastic modulus
ν – Poisson's Ratio
k_a – coefficient of active earth pressure (Coulomb – AS4678-2002, Appendix E)
k_p – coefficient of passive earth pressure (Coulomb – AS4678-2002, Appendix E)
k_0 – coefficient of at-rest earth pressure (Jaky)

9. GEOTECHNICAL ASSESSMENT

9.1. Summary

Table 7: Summary of Geotechnical Assessment

Type	Clause	Parameter	Comment
Site Suitability	-	-	We consider the site to be geotechnically suitable for the proposed subdivision development. Standard site preparation measures will apply. However, groundwater could impact construction if it occurs during winter. Flood levels will impact site levels (refer Table 5).
Construction Methodology and Suitability	-	-	Shallow footings in accordance with AS2870-2011 will be suitable for this site. Mass retaining will be suitable for retaining however, must be designed for potential flooding of the site. Stormwater disposal via infiltration is **not** suitable.
Site Classification (AS2870)	GDR5	S	Where **no less than 0.7 m of sand** (including insitu silty sand and clayey sand layers encountered in BH03 and BH04) is present **over in situ CLAY / Sandy CLAY.**
Site Subsoil Class (AS1170.4)	-	Ce	Base of superficial formation mapped to be about 25 m below ground.
Site Preparation	GDR6	-	**GDR6.2.1 Common Measures** followed by **GDR6.2.4 Clayey Sites** followed by **GDR6.2.5 Sand Topping Layer.**
Approved Fill	GDR8	-	**Approved Fill** for this site is to comprise **Permeable Sand**. Only relatively thin surficial layers of sand at the site (excluding topsoil) are suitable as approved fill. If additional fill is required, imported **Permeable Sand** will be needed. Although not classed as 'approved fill', where clay is encountered in trench excavations, this material could possibly be reused to backfill the same portion of the trench (excluding any special fill materials required around buried elements). However, this material will be difficult to work and moisture condition to near optimum (particularly if removed from below the groundwater table).
Compaction Control	GDR7	-	A PSP may be used for compaction control on **Permeable Sand.** Deemed to comply values for 'Tamala' sand in GDR7.4 are applicable. Where filling with clay is done (in trenches, etc), compaction control must be done with the NDG as outlined in GDR7.3 Nuclear Density Gauge.
Shallow Footings	GDR9	q_{all} = 100 kPa to 250 kPa	Design tables for shallow footings are presented in Section 9.2. Estimated settlements are not considered excessive. 70% of the settlement is expected to occur during construction.
Earth Pressure Coefficients	GDR11	Table 6	Earth pressure coefficients are presented in Table 6.
Unsaturated Hydraulic Conductivity	GDR13	-	On site disposal of stormwater unlikely to be suitable due to shallow depth to clay and potential for flooding adjacent the site. Off site disposal of stormwater likely to be required.
Pavement Subgrade CBR	GDR16	CBR = 10%	Subgrade to comprise compacted **Approved Fill no less than 0.6 m thick.**
Soil Aggressivity	GDR17	-	Refer Section 9.3
Batters	GDR12	**Temporary:** Sand: 1V:2H Clay: 1V:1H **Permanent:** 1V:3H	Batter angles apply to soil units (refer Table 6) above the water table, as per GDR12.3. Dewatering and possibly retention (i.e. shoring) required below the groundwater table.
Excavations	GDR12.1	20 Ton Excavator	Potential for obstructions (buried concrete, Soakwells etc…), cemented soils and surficial pavement layers must be considered when selecting earthmoving plant.

NOTES:
1. q_{all} – allowable bearing pressure (maximum for all footings, refer to footing tables for further details)

9.2. Shallow Footings

Table 8: Isolated Pad Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	120	< 5
0.5	1.0	130	< 5
1.0	1.0	240	5 - 10
1.0	2.0	250	10 - 15
1.0	3.0	250	20 - 25

NOTES:
1. d_e – minimum embedment depth (below finished ground level or floor slab)
2. b – Footing breadth (footings assumed approximately square)
3. q_{all} – allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.
4. s – estimated settlement (excludes shrink/swell from site class)
5. Refer to GDR9
6. Groundwater assumed to be at ground level.

Table 9: Isolated Strip Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	100	< 5
0.5	1.0	130	5 - 10
1.0	1.0	190	10 - 15
1.0	2.0	250	20 - 25

NOTES:
1. d_e – minimum embedment depth (below finished ground level or floor slab)
2. b – Footing breadth (footings assumed long relative to breadth)
3. q_{all} – allowable bearing pressure (peak). Limited to keep estimated settlements less than 25 mm. Higher q_{all} may be possible if higher settlements can be tolerated – refer queries to us.
4. s – estimated settlement (excludes shrink/swell from site class)
5. Refer to GDR9
6. Groundwater assumed to be at ground level.

9.3. Soil Aggressivity

Results of aggressivity testing on clay samples is summarised in Attached Table 2. The results indicate the clay is 'non aggressive' to concrete and steel (in accordance with AS2159-2009) with a AS3600-2009 classification of 'A1'.

Based on regional experience, we anticipate the sand will have the same aggressivity classifications as the underlying clay where above the groundwater. However, for concrete in sand below the water table, an AS2159-2009 'mild' classification, and AS3600-2009 'A2' classification is appropriate.

Groundwater was not tested.

Attachment 12.1.3 Environmental Assessment Report

10. CLOSURE

GALT GEOTECHNICS PTY LTD

Owen Woodland CPEng
Geotechnical Engineer

Tyrone Mardesic CPEng
Geotechnical Engineer

https://galtgeo.sharepoint.com/sites/wag230750/shared documents/01 tabec si/03 correspondence/wag230750-01 002 r rev0.docx

Attachment 12.1.3 Environmental Assessment Report

Attached Table 1: Summary of Geotechnical Index Test Results

Test Name	Sample Depth (m)	Soil Class (AS1726 2017)	Fines (%)	Sand (%)	Gravel (%)	LL (%)	PI (%)	LS (%)
BH03	1.5 - 2.2	CLAY (CI)	89	11	0	46	28	12.5
BH04	1.0 - 1.3	Sandy CLAY (CI)	54	43	3	34	20	8.5

Notes

1. *Particle size distribution (by mass)*
   Gravel: 2.36 mm – 63 mm *Sand: 0.075 mm – 2.36 mm* *Fines: <0.075 mm*
2. *Atterberg Limits*
   LL: Liquid limit *PI: Plasticity index* *LS: Linear shrinkage*
   NO: Not obtainable *NP: Non-plastic*

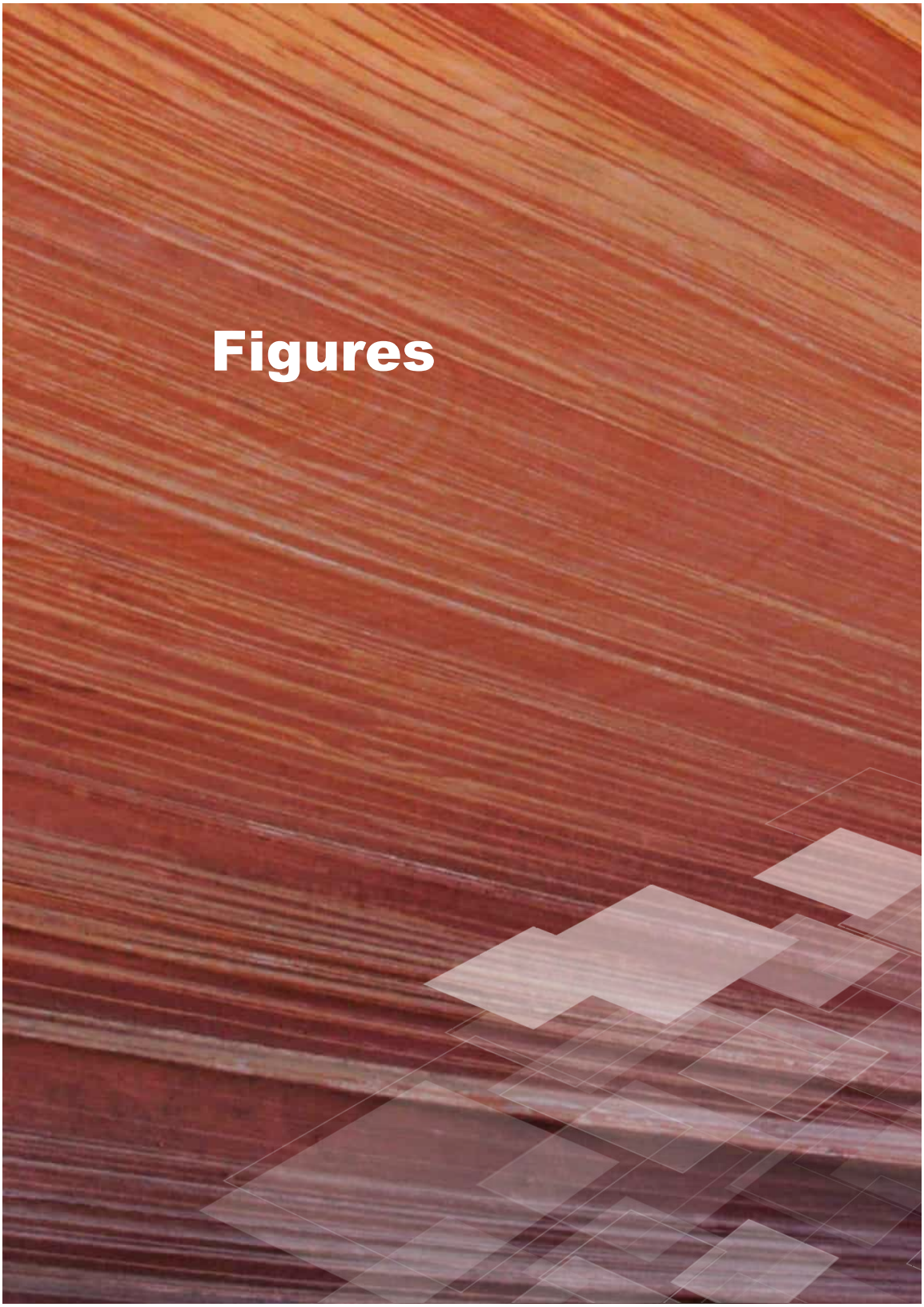
Attached Table 2: Summary of Chemical Test Results and Exposure Classification

Location	Sample Depth (m)	Soil Description	Soil Condition	pH	SO_4 (ppm)	Cl (ppm)	AS2159 Steel EC	AS2159 Concrete EC	AS3600 Concrete EC
BH03	1.5 - 2.2	CLAY (CI)	B	8.8	100	210	Non-Aggressive	Non-Aggressive	A1
BH04	1.0 - 1.3	Sandy CLAY (CI)	B	7.5	170	94	Non-Aggressive	Non-Aggressive	A1

NOTES:

1. *Soil condition*
   A – high permeability soils (sands and gravels) which are below water table. *B – Low permeability soils (silts and clays) and all soils above water table*
2. *Sulfate expressed as SO_4*
3. *Cl – Chloride*
4. *ER – Electrical Resistivity*
5. *EC – Exposure Classification*
5. *Exposure Classification for AS2159-2009 (for steel and concrete piles)*
   [Exposure Classification for AS3600-2009 (for buried concrete structures)]

Non-aggressive [A1]	*Mild [A2]*	*Moderate [B1]*	*Severe [B2]*	*Very Severe [C2]*


Figures

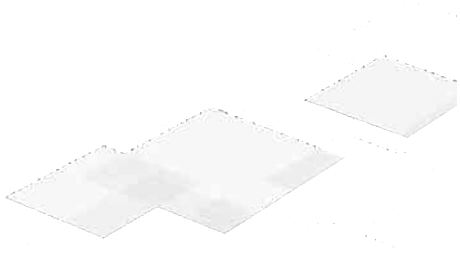
Attachment 12.1.3 Environmental Assessment Report



Attachment 12.1.3 Environmental Assessment Report



Appendix A: Site Photographs



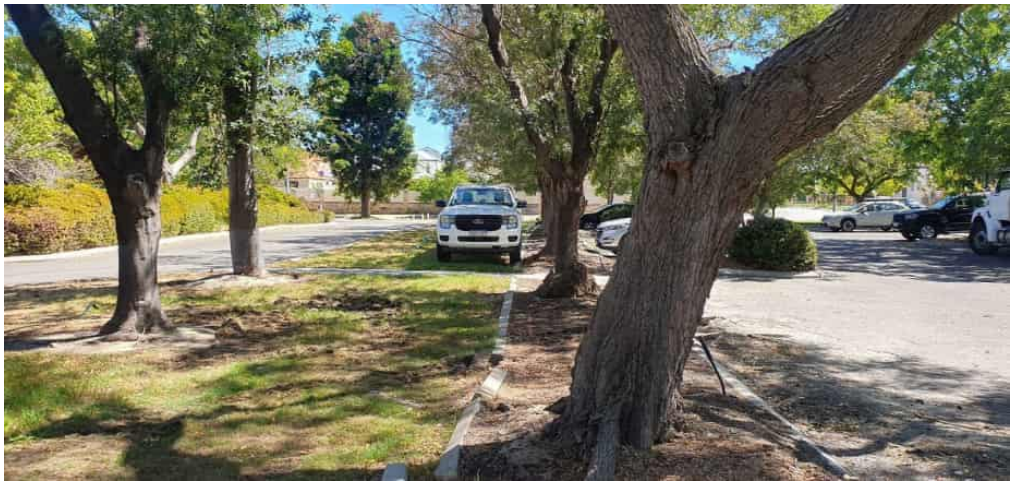
Attachment 12.1.3 Environmental Assessment Report

Photograph 1: Near CPT02 facing south



Attachment 12.1.3 Environmental Assessment Report

Photograph 2: Near CPT02 facing south west

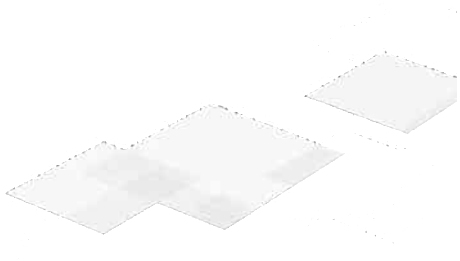


Attachment 12.1.3 Environmental Assessment Report

Photograph 3: Site photo from near northern portion of site



Appendix C: Machine Borehole and Monitoring Well Logs



Attachment 12.1.3 Environmental Assessment Report

EXPLANATORY NOTES TO BE READ WITH BOREHOLE AND TEST PIT REPORTS

METHOD OF DRILLING OR EXCAVATION

AC	Air Core	E	Excavator	PQ3	PQ3 Core Barrel
AD/T	Auger Drilling with TC-Bit	EH	Excavator with Hammer	PT	Push Tube
AD/V	Auger Drilling with V-Bit	HA	Hand Auger	R	Ripper
AT	Air Track	HE	Hand Excavation	RR	Rock Roller
B	Bulldozer Blade	HQ3	HQ3 Core Barrel	SON	Sonic Rig
BH	Backhoe Bucket	N	Natural Exposure	SPT	Driven SPT
CT	Cable Tool	NMLC	NMLC Core Barrel	WB	Washbore
DT	Diatube	PP	Push Probe	X	Existing Excavation

SUPPORT

T	Timbering

PENETRATION EFFORT (RELATIVE TO THE EQUIPMENT USED)

VE	Very Easy	E	Easy	F	Firm
H	Hard	VH	Very Hard		

WATER

►	Water Inflow	▼	Water Level
◄	Water Loss (complete)		
◁	Water Loss (partial)		

SAMPLING AND TESTING

B	Bulk Disturbed Sample	P	Piston Sample
BLK	Block Sample	PBT	Plate Bearing Test
C	Core Sample	U	Undisturbed Push-in Sample
CBR	CBR Mould Sample		U50: 50 mm diameter
D	Small Disturbed Sample	SPT	Standard Penetration Test
ES	Environmental Soil Sample		Example: 3, 4, 5 N=9
EW	Environmental Water Sample		3,4,5: Blows per 150 mm
G	Gas Sample		N=9: Blows per 300 mm after
HP	Hand Penetrometer		150 mm seating interval
LB	Large Bulk Disturbed Sample	VS	Vane Shear; P = Peak
M	Mazier Type Sample		R = Remoulded (kPa)
MC	Moisture Content Sample	W	Water Sample

ROCK CORE RECOVERY

TCR = Total Core Recovery (%) $= \frac{CRL}{TCL} \times 100$

RQD = Rock Quality Designation (%) $= \frac{ALC>100}{TCL} \times 100$

TCL	Length of Core Run
CRL	Length of Core Recovered
ALC>100	Total Length of Axial Lengths of Core Greater than 100 mm Long

Attachment 12.1.3 Environmental Assessment Report

METHOD OF SOIL DESCRIPTION
BOREHOLE AND TEST PIT REPORTS

Galt GEOTECHNICS

GRAPHIC LOG & SOIL CLASSIFICATION SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

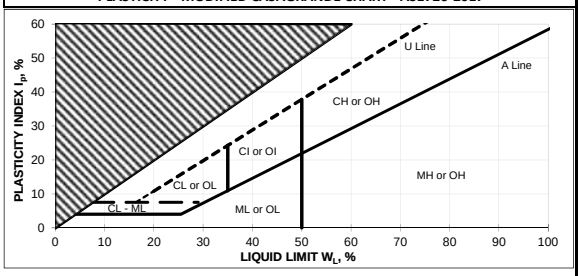
NOTE: Dual classification given for soils with a fines content between 5% and 12%.

SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).
NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name		**Particle Size (mm)**
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002

PLASTICITY - MODIFIED CASAGRANDE CHART - AS1726-2017



RESISTANCE TO EXCAVATION		
Symbol	**Term**	**Description**
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	**Term**
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	**Description**
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	**Term**	**Undrained Shear Strength (kPa)**
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	**Organic Content % of dry mass**
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	**Term**	**Density Index (%)**
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85

O:\Administration\Standard Forms and Documents\PMP17 Method of Soil Description-Rev6

Galt Form PMP17
December 2017

Attachment 12.1.3 Environmental Assessment Report

Galt

REPORT OF BOREHOLE: BH01/MW01

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

General comments: Monitoring Well Installed at this location

Drilling Method	Depth (m)	Water	Classification Code	Soil Origin	Graphic Log	Consistency/Density	Moisture	Material Description	Structural and Additional Observations	Well Diagram
90mm Solid Auger	0.3		SP	Natura			D	Natural SAND: dark brown and black, fine to coarse grained, with low plasticity clay, (trace organics present in upper 200mm).	(trace organics present in upper 200mm)	MW01
	0.45		SP	Natura		MD-D		Natural SAND: pale yellow, fine to coarse grained, trace low plasticity clay.		
	0.9		SP	Natura				Natural SAND: dark brown and black, fine to coarse grained, trace low plasticity clay.		
	1		CI	Natura		VSt-H		Natural Sandy CLAY: medium plasticity, brown and pale orange, fine grained sand, inorganic, clay is highly desiccated.	Clay is highly desiccated	
	2.3		SC	Natura				Natural Clayey SAND: low plasticity clay, brown and dark brown, fine to coarse grained, trace fine to medium sized gravel.		
	2.5		CI	Natura		VSt-H		Natural CLAY: medium plasticity, brown and pale orange, trace fine to medium grained sand, inorganic, clay is desiccated at shallower depths.	Clay is desiccated at shallower depths	
	3	▼								
	6							**BH01/MW01 Terminated at 6m (Target Depth GW @3.03m)**		

Backfill (Drill Spoil)
50mm PVC Solid
Bentonite (Sealed above Slotted PVC)
Filter Pack (Gravel Filter Medium Installed)
50mm PVC Slotted



Page 1 of 1

Attachment 12.1.3 Environmental Assessment Report

Galt

REPORT OF BOREHOLE: BH02

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: MDS
Project	: Proposed Development	UTM	:	Logged Date	: 08/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
80mm Solid Auger				Natural		SP	Natural SAND: dark grey and black, fine to coarse grained, trace low plasticity clay, (trace organics present in upper 200mm).	M-D	MD-D		
			1				**BH02 refusal at 0.7m (Refusal on Desiccated Clay Groundwater not encountered)**				
			2								
			3								
			4								
			5								
			6								
			7								
			8								

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Galt

REPORT OF BOREHOLE: BH03

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.1	Topso		SP	Topsoil SAND: dark grey, fine to medium grained, trace medium plasticity clay, with roots / organics.	D	MD-D		
			0.25	Fill		SP	Fill SAND: brown, medium dense to dense, fine to medium grained, trace low plasticity clay.				
			0.4	Fill		GP	Fill Sandy GRAVEL: grey, medium dense to dense, fine to medium sized, fine to medium grained sand, trace low to medium plasticity clay.				
				Natura		SM	Natural Silty SAND: grey brown, fine to medium grained.				
			0.7	Natura		CI	Natural CLAY: medium plasticity, grey, with fine to medium grained sand, inorganic, trace organics, clay is desiccated at shallow depths.		VSt-H		
			1								
			1.5	Natura		CI	As above, brown, trace organics.				
			2								
			3								
			4	Natura		CI	As above.	M			
			5								
			6				**BH03 Terminated at 6m (Target depth. Groundwater not encountered)**				
			7								
			8								



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Attachment 12.1.3 Environmental Assessment Report

Galt

REPORT OF BOREHOLE: BH04

Job No	: WAG230750-01	Easting	: 0.00	Sheet	: 1 OF 1
Client	: Tabec	Northing	: 0.00	Logged	: PA
Project	: Proposed Development	UTM	:	Logged Date	: 14/02/2024
Location	: Lot 452 Resolution Drive, Ascot	Drill Rig	: AMS Super Rig	Checked	: TM
Contractor	: Galt Geotechnics	Inclination	: -90 deg	Checked Date	: 25/02/2024

Drilling Method	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
90mm Solid Auger			0.25	Topsoil		SP	Topsoil SAND: grey, fine to medium grained, trace medium plasticity clay, trace / with organics.	D			
			0.5	Fill		SP	Fill SAND: brown, fine to medium grained, trace low plasticity clay.				
			1	Natural		SC	Natural Clayey SAND: medium plasticity clay, brown, fine to medium grained.				
			1.2	Natural		CI	Natural Sandy CLAY: medium plasticity, brown mottled red, fine to medium grained sand, trace fine to medium sized gravel, inorganic, clay is desiccated.		VSt-H		
			1.5	Natural		CI	Natural CLAY: medium plasticity, brown, with fine to medium grained sand, inorganic, clay is desiccated at shallow depths.				
			3	Natural		CI	As above.	M			
			4.5	Natural		CI	As above.	W			
			6.5				**BH04 Terminated at 6.5m (Target depth. Groundwater possibly at 4.5 m depth)**				



Page 1 of 1

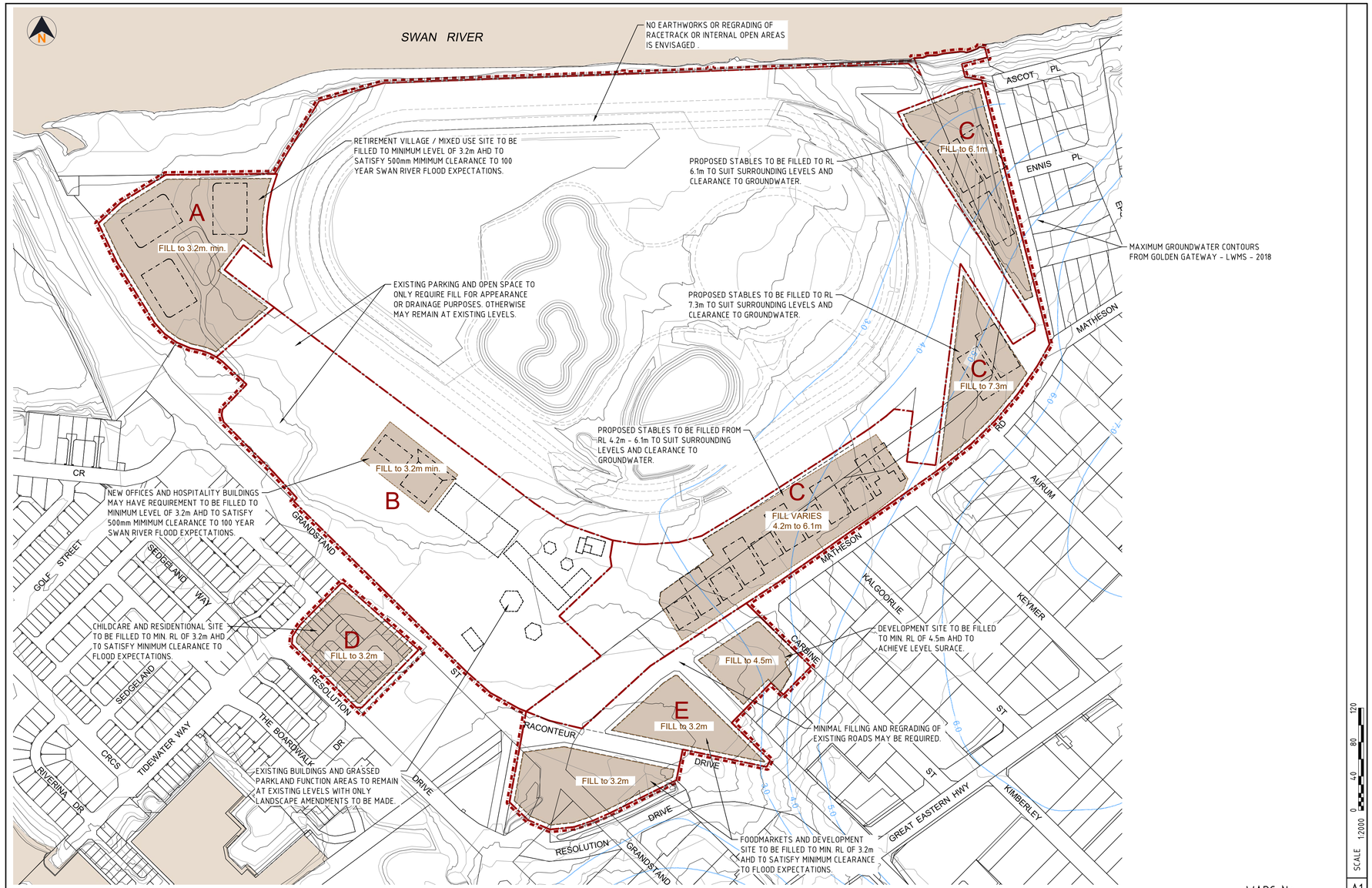
Attachment 12.1.3 Environmental Assessment Report

Appendix C

Preliminary Civil Drawing

Tabec 2024

Attachment 12.1.3 Environmental Assessment Report



No.	DATE	DRAWN	APPROVED	AMENDMENT
C	21.06.24	PK	JZ	MINIMUM FILL LEVELS AMENDED IN LINE WITH THE LWMS
B	18.06.24	PK	JZ	PRELIMINARY ISSUE FOR INFORMATION ONLY
A	24.01.24	PK	JZ	PRELIMINARY ISSUE FOR REVIEW

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COLOUR
This drawing is required to be printed in full colour. Failure to do so may result in loss of information.

CLIENT: PERTH RACING

DESIGNED	CHECKED	APPROVED
PK	JZ	
DRAWN	CHECKED	DATE
PK	JZ	

TABEC Civil Engineering Consultants
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www.tabec.com.au

PROJECT: ASCOT RACECOURSE - LOCAL STRUCTURE PLAN
TITLE: EARTHWORKS CONCEPT PLAN
DRAWING NUMBER: 2541-00-100
ISSUE: C

Plot Date: 21/06/24 - 14:17 Cad File: C:\2025\data\25-2025\2541 - Ascot Racecourse LSP_2024\CAD\CAD\2541-EW-100.dwg Plotted By: jkeenan

Attachment 12.1.3 Environmental Assessment Report

Appendix D

Modelling Assumption Report

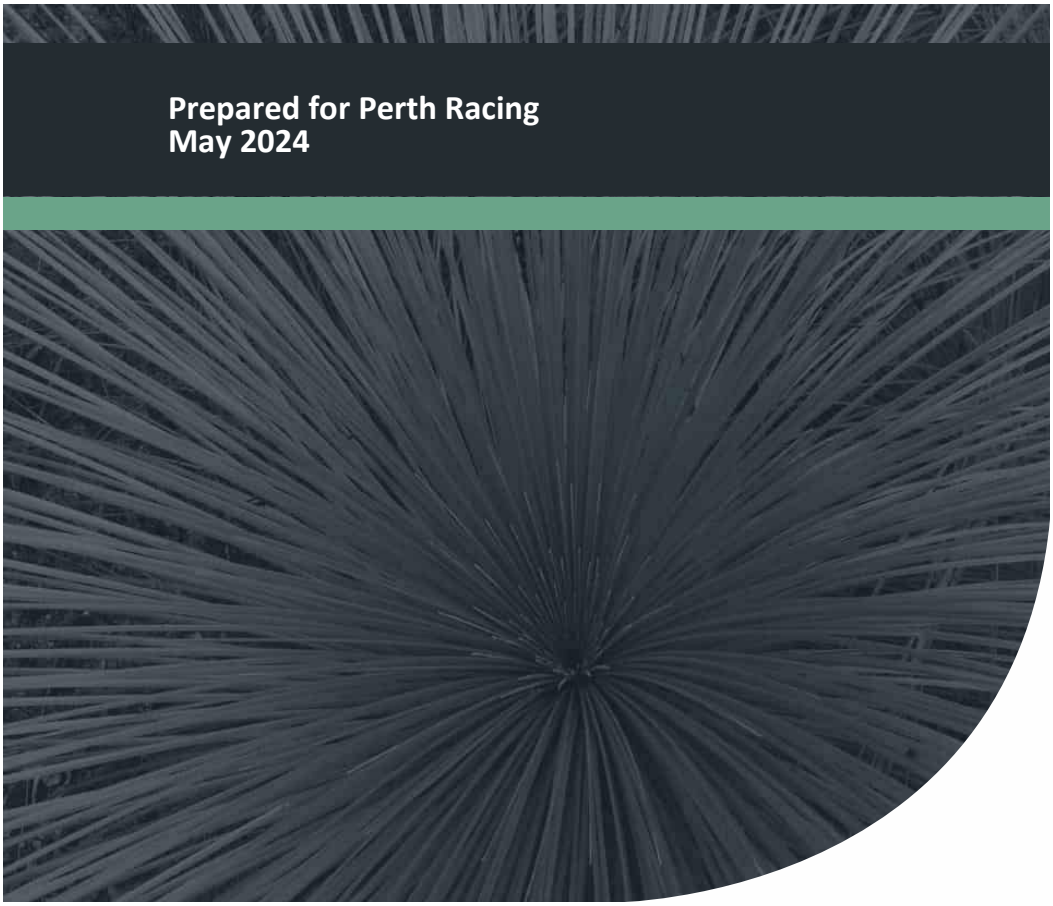
Emerge Associates 2024

Attachment 12.1.3 Environmental Assessment Report

Modelling Assumptions Report

Golden Gateway Local Structure Plan

Project No: EP23-109(03)



Attachment 12.1.3 Environmental Assessment Report

Document Control

Doc name:	Modelling Assumptions Report Golden Gateway Local Structure Plan				
Doc no.:	EP23-109(03)--008 JM				
Version	Date	Author		Reviewer	
1	May 2024	Joyti Mabruk	JM	David Coremans	DPC
	Appendix to the LWMS				

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Attachment 12.1.3 Environmental Assessment Report

1 Background

Perth Racing (the 'proponent') proposed to progress a local structure plan (LSP) over its landholdings in Ascot. The area is bounded by the Swan River to the North, Grandstand Road to the west and south, Matheson Road and Resolution Drive to the south and residential areas to the east, referred to herein as 'the site'. The structure plan area also includes the Ascot Racecourse area. The site is located approximately 8.5 km east of Perth central business district (CBD) and is approximately 62 ha in size, within City of Belmont (CoB). The LSP consists of six precincts: Precinct A, Precinct B, Precinct C, Precinct D, Precinct E, and the racecourse.

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2 Methodology

XPSWMM hydrologic and hydraulic modelling software (v21.3) was used to calculate the surface water runoff volumes within the road reserves and lots associated with the development of Ascot Racecourse.

The hydrologic component of the software uses the Laurenson non-linear runoff-routing method to simulate runoff from design storm events. Key assumptions regarding the hydrologic model include:

- Runoff is proportional to slope, area, infiltration and percentage of imperviousness of a catchment.
- Sub-catchment areas and slopes are determined from surveyed topographical data and earthworks plans.
- Infiltration rates and percentage imperviousness have been selected based on experience with model preparation for similar soil conditions.

Runoff from each sub-catchment is routed through the catchment using the hydraulic component of XPSWMM. Generally, assumptions associated with the hydraulic component of the model include:

- Virtual links (i.e. purely for model construction, not equivalent to flow path onsite) between nodes within a sub-catchment are given the length of 10 m and slope of 0.05 to minimise the lag time of conveying the water from a sub-catchment node to a 'storage' node, a 'dummy intermediate' node or a conduit/link.
- Links between sub-catchment storages act as conveyance channels (e.g. sheet flow within roads in a 1% annual exceedance probability (AEP)). These links are given lengths and slopes that are representative of the site conditions and actual pathway lengths between catchments.
- All channels are designed with a width of 5 m, roughness of 0.014 (Manning's n) and are trapezoidal in shape. This allows for easy conveyance and represents concrete pipes and road surfaces within the model.
- Where relevant median swales, bio-retention areas (BRAs), and flood storage areas (FSAs) are modelled as nodal-reservoirs with infiltration depth-rating curves to account for differential infiltration rates with changing depth.

2.1 Rainfall

The ensemble temporal patterns obtained from the Australian Rainfall and Runoff (AR&R) Data Hub (AR&R 2019) were used for the rainfall analysis.

Durations ranging between 15 min and 72 hours were tested, with the peak flood elevation being assessed as the determining result.

Following the process suggested by AR&R (Ball J et al. 2019), the highest mean duration was selected as the critical duration. AR&R also recommends that when it is not practical to run the entire ensemble array, the ensemble that produces the result closest to the mean (for the critical duration) should be adopted and provided in **Table 1**.

Attachment 12.1.3 Environmental Assessment Report

Table 1: Critical Duration Analysis

Catchment	Critical Duration (20% AEP)	Critical Duration (10% AEP)	Critical Duration (1% AEP)
Precinct A	3 hour duration ensemble 4	3 hour duration ensemble 1	3 hour duration ensemble 1
Precinct C	30 min duration ensemble 6	30 min duration ensemble 7	30 min duration ensemble 8
Precinct D	1 hour duration ensemble 1	30 min duration ensemble 5	30 min duration ensemble 1
Precinct E	45 min duration ensemble 6	30 min duration ensemble 5	30 min duration ensemble 8

Attachment 12.1.3 Environmental Assessment Report

3 Pre-development model

The catchment parameters determined for Precinct D within the LWMS for the initial loss – continuous loss model have been adopted to account for catchment losses. The pre-development loss parameters used are given in **Table 2**.

Table 2: Pre-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Existing residential/Carpark	15	0.1	0.014

Catchment analysis for pre-development scenario was based on topographic contour data, site visit and aerial photography. Pre-development catchment area within Precinct D is 1.145 ha.

Attachment 12.1.3 Environmental Assessment Report

4 Post-development model

An initial loss continuing loss model was adopted to account for post-development catchment losses. The post-development catchment area, land types and loss values were based on the structure plan design, typical infiltration rates for the soils which occur onsite and based on project team experience. Post-development catchment areas and land types within the site were informed by sub-division plan provided by LPD surveyors. **Table 3** summarises the loss parameters used within the post-development model.

Table 3: Post-development loss parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Road Surface	1	0.1	0.02
Road Verge	9	1.5	0.05
Fully Impervious	1	0.1	0.02
Roof	1	0.1	0.02
Lot IMP	1	0.1	0.02
Gardens	25	2	0.05
POS	25	2	0.05
Precinct E Lots	15	0.1	0.014

A summary of post-development catchment information is provided in **Table 4** with the catchment plan and basin location shown in Figure 08 of the LWMS.

Table 4: Post-development catchment areas (ha)

Road reserve	Lots	Road Reserve	POS	Fully Impermeable	Child Care
Precinct A	0.714	0.606	1.360	0.330	-
Precinct C	-	5.903	-	-	-
Precinct D	0.526	0.421	-	-	0.199
Precinct E	3.622	0.365	0.219	-	-

The following assumptions were incorporated into the model:

- Precinct A
  - Lots will have 100% roof areas and road reserve contains 5% pervious verge and 95% impervious bitumen areas.
  - POS will be 100% pervious.
  - There is no current connection point for drainage to be exported from Precinct A.
  - 1 single basin/Flood storage area (FSA) for both treatment and flood mitigation.
  - Base of the FSA will need to be vegetated with reeds/rushes as per a biofilter.
  - FSA will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.

Attachment 12.1.3 Environmental Assessment Report

- A hydraulic conductivity of 1m/day is assumed.

- Precinct C
  - The existing portion of Precinct C already connected to the centre of the track (existing buildings and stables) and no change has been assumed.
  - Rest of the Precinct C were modelled as two separate catchments i.e., carpark and stables which are 95% impervious and 5% pervious.
  - 1m deep sub-surface storage has been designed to accommodate 1% AEP event.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.
  - The carpark in Precinct C that discharges to the southwest will discharge to Precinct E.

- Precinct D
  - Lots will have 50% roof areas, 45% paved areas and 5% pervious garden areas, the childcare has roof areas and Road reserve contains 20% pervious verge and 80% impervious bitumen areas.
  - 1m deep sub-surface storage has been designed to accommodate and detain upto 1% AEP events that will mimic pre-development flow of 0.4.
  - A hydraulic conductivity of 1m/day is assumed.
  - The storage configuration could be changed/modified to suit site layout/constraints.

- Precinct E
  - The carpark in Precinct C discharges to Precinct E.
  - Outflow of pre-development Water Corporation (WC) drain is 0.95 m^3/s as per WC modelling.
  - All lots of Precinct E retain 15mm of rainfall.
  - Runoff above 15 mm rainfall up to the 1% AEP will be managed by a detention basin which will mimic pre-development 1% AEP peak flow of 0.463 m^3/s.
  - The basin will have 1:6 side slopes and maximum depth 1.2m in a 1% AEP – to avoid the need for fencing or access control.
  - A hydraulic conductivity of 1m/day is assumed.

Attachment 12.1.3 Environmental Assessment Report

5 References

5.1 General references

The references listed below have been considered as part of preparing this document.

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M and Testoni I (Editors) 2019, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geoscience Australia).

5.2 Online references

Australian Rainfall and Runoff (AR&R) 2021, ARR Data Hub, viewed 1 December 2021, Available from: <https://data.arr-software.org/>.

Bureau of Meteorology (BoM) 2021a, Climate Data Online, viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

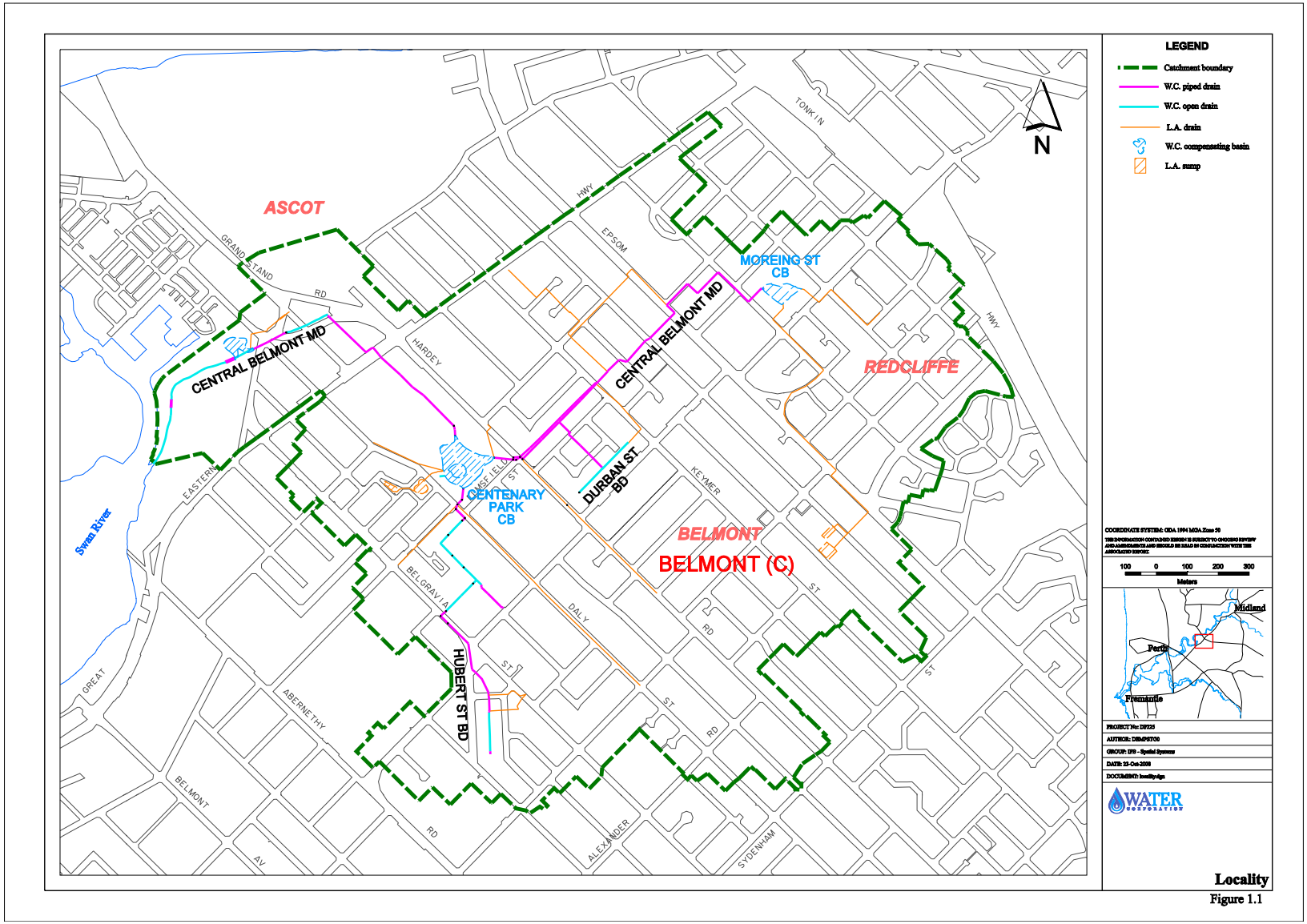
Bureau of Meteorology (BoM) 2021b, Design Rainfall Data System (2016), viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

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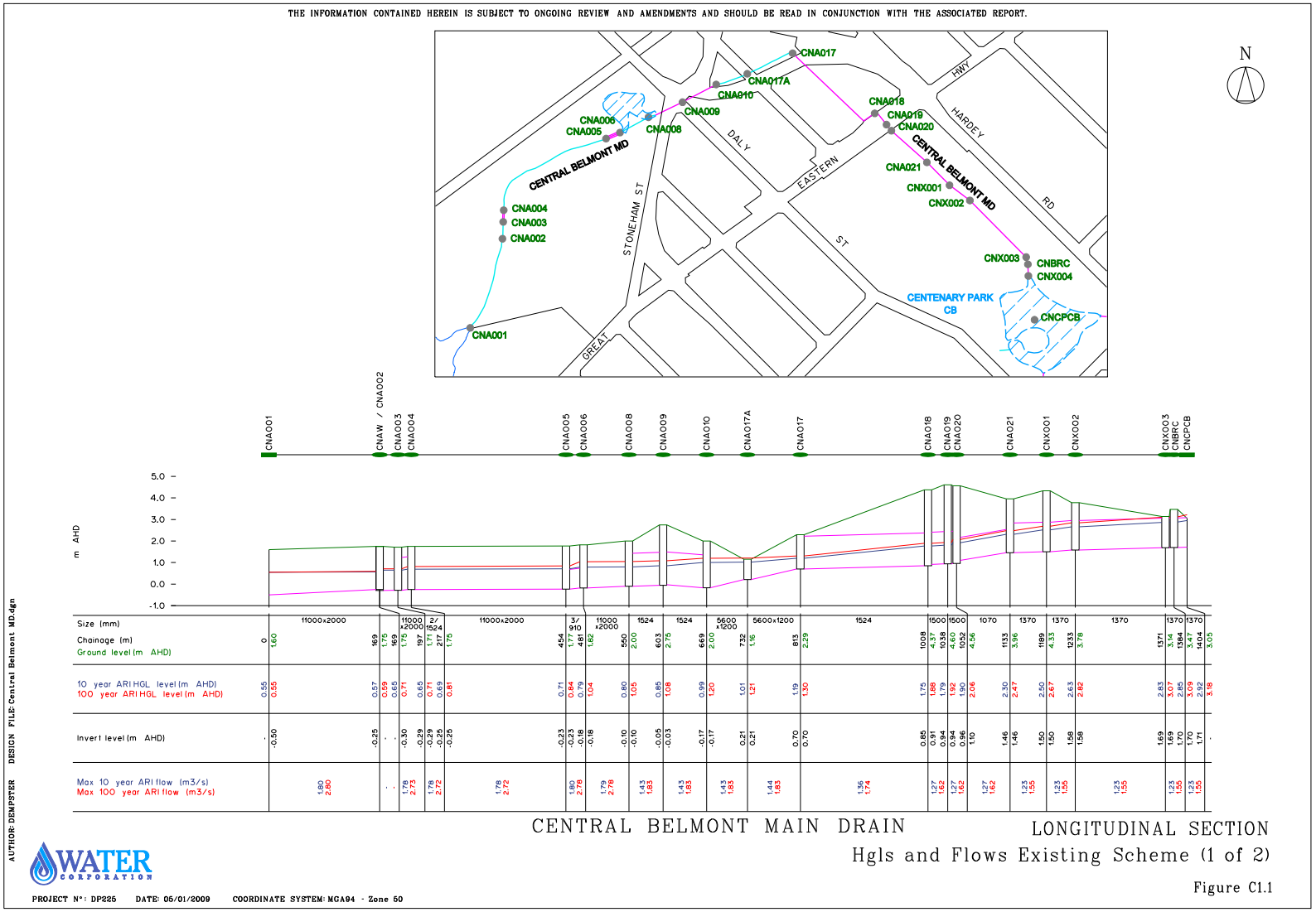
Appendix E

Central Belmont Main Drain Water Corporation

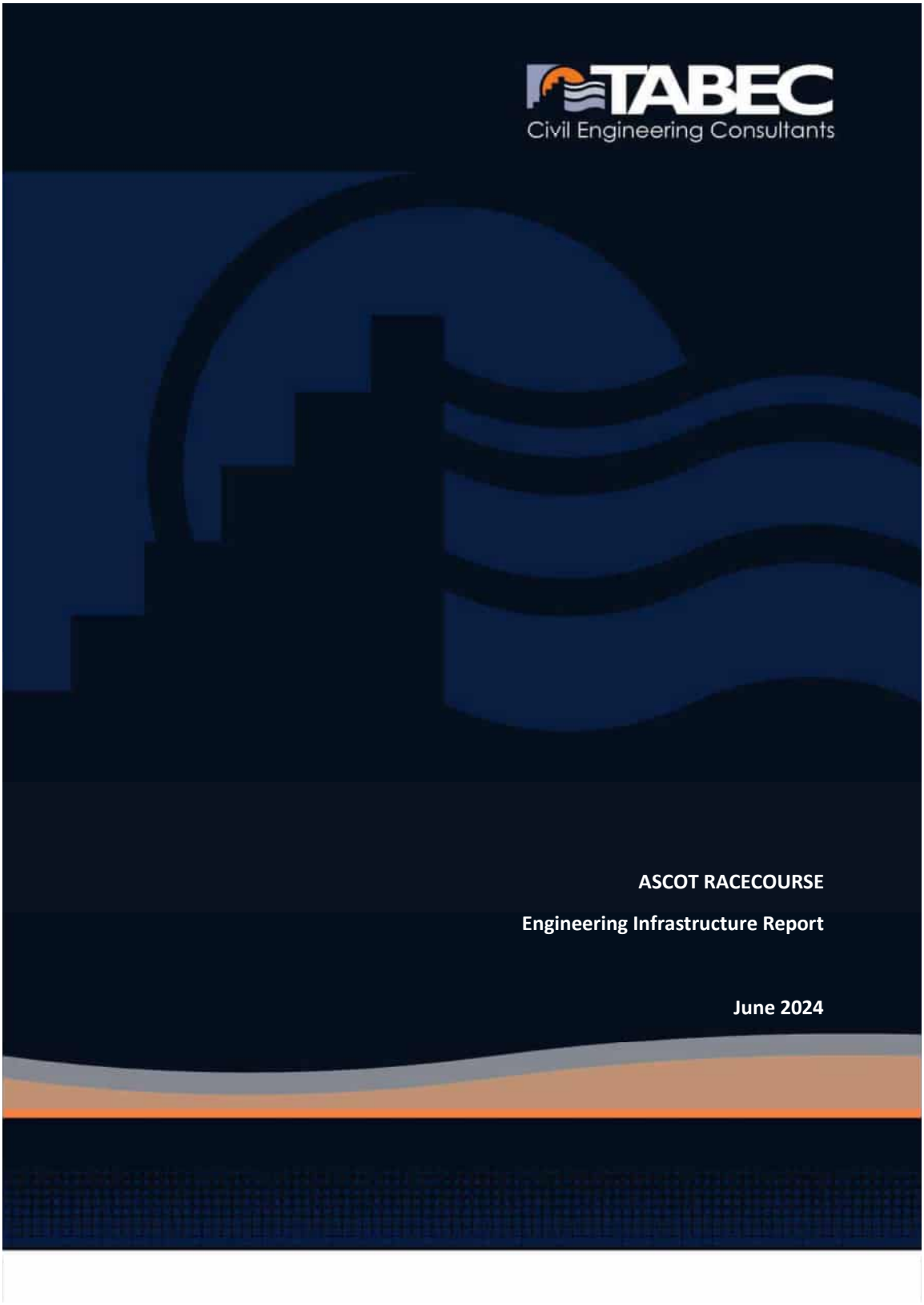
Attachment 12.1.3 Environmental Assessment Report



Attachment 12.1.3 Environmental Assessment Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report

CLIENT: **PERTH RACING C/O DAVISON ADVISORY**

PROJECT: **ASCOT RACECOURSE – LOT 9002 GRANDSTAND ROAD, ASCOT**

TITLE: **ENGINEERING INFRASTRUCTURE REPORT**

DOCUMENT REVIEW				
Revision	Date Issued	Written By	Reviewed By	Approved By
REV A	5/06/2024	J. ZIELINSKI	B. SMITH	B. SMITH
REV 0	4/07/2024	J. ZIELINSKI	B. SMITH	B. SMITH

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Attachment 12.1.4 Engineering Servicing Report

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Attachment 12.1.4 Engineering Servicing Report

1 INTRODUCTION

This report has been prepared by TABEC Pty Ltd to provide broad servicing and infrastructure advice for the Ascot Racecourse and surrounding sites located at Lot 9002 Grandstand Road, Ascot.

The report provides civil engineering advice on the capability and future requirements of the development plan area to support the proposed residential and commercial land uses and the civil engineering influences on the development form. This report has been based on the civil engineering aspects, including earthworks, roads, drainage, wastewater and utility services required to support the development.

The investigation and preparation of the report are based on preliminary advice from the various service Authorities, desktop reviews and site investigations where appropriate. The report is supported by additional consultants and their inputs which are listed in the references. The information is current as of June 2024 and is subject to change as development proceeds around the subject land.

Figure 1 illustrates the location of the site, identified on the aerial image.



Figure 1 – Site Location and Aerial Image (2024 MNG Access)

2 THE STUDY AREA

The Ascot Racecourse is situated within the City of Belmont and is located in the proximity of Grandstand Road, Resolution Drive, Matheson Road, Ennis Place and the Swan River. The existing racecourse and its surrounding facilities are currently operational.

The subject site has been split into five precincts to assist with differentiating the various proposed uses across the lots. TABEC's understanding of these five precincts has been included below:



Figure 2 - Preliminary Structure Plan (Rowe Group Design)

Precinct A	• Retirement Living Village/Mixed Use – Apartments and a café (300m2) • 3 buildings, which will cater for a total of 330-390 dwellings.
Precinct B	• Racecourse Administration Office and Entertainment (No change to current zoning) • Office space – 680m2 NLA • Upper floor will be hospitality venue – 1000m2 in size
Precinct C	• Racecourse and on-course stabling facility (No change to current zoning) • Existing Racecourse to remain • 3 new on-course stabling complexes providing ~400 stables
Precinct D	• Childcare and residential (R60) • Childcare site – 2100m3 for 70-90 children. • Residential development will yield ~41 lots
Precinct E	• Approx 3,400m² retail floorspace • Approx 7000m² of non-retail commercial floorspace • Equine welfare centre

Whilst Precincts A, B and C are adjacent to the racecourse, Precinct D (Lot 452) and Precinct E are located outside of the racecourse lot 9002. Precinct D is surrounded by existing residential land use, and to the southeast, interfaces to the heritage-listed Ascot Kilns.

Precinct E is currently fragmented and consists of multiple lots and road reserve corridors. The Resolution Drive and Grandstand Rd road reserves within the subject site are not currently being utilised as public access streets, however, the existing reserve along the south boundary of the site and Lot 51 is a drainage reserve and is to remain, hence being excluded from the assembly development proposal.



Figure 3 - Precinct E Land Assembly (Rowe Group)

2.1 Landform / Topography

In reviewing the available Water Corporation contour information, the Ascot Racecourse Course (Lot 9002) has its lowest elevation of approximately 2mAHD at the northwest area of the site (Precinct A), which is adjacent to the Swan River and foreshore reserve. The Ascot Racecourse lot grades up to its highest elevation of approximately 7.5mAHD at the east corner of the site (Precinct C) adjacent to Matheson Road. The existing levels of Precinct C grade from this high point, down to approximately 3mAHD at the west interface near Raconteur Drive.

The existing internal surface levels of Precinct B within Lot 9002 range between 4mAHD at the south, to 2mAHD near Precinct A. Whilst no survey data is available for the adjacent road reserves, Precinct B is anticipated to be higher than the adjacent road levels at Grandstand Road, which then grades down to approximately 2mAHD towards to track.

The centre of the racetrack of Lot 9002 is generally lower than the surrounding racecourse site, with the levels and aerial imagery showing localized depressions with multiple lakes. Drawings from Evangelisti & Associates Engineering Drawings, dated 1997, show the depths of existing drainage Lake 1 (Wetland) and Lake 2 (Lined) being RL 1.0m and RL -0.75m respectively, with the top of lake water level ranging from RL 0.4m and 2.1m. The third existing lake does not serve a drainage purpose but serves as a source of irrigation water, with this overtopping into the drainage lakes at a top of water level of 3.1mAHD.

The Swan River Foreshore Reserve is located along the northern boundary of Lot 9002, and the levels steeply grade away from the track edge from approximately 3mAHD to 0mAHD at the northern boundary.

In reviewing contour information available from Water Corporation at Lot 452 Grandstand Road (Precinct D), the existing levels increase from 3.0mAHD to approximately 4.0mAHD closer to the centre of the lot at the existing building location, with the surrounding road reserve levels ranging between 2.5mAHD and 3mAHD. This site currently has existing mature trees and shrubs located across the Lot.

Fragmented areas of Precinct E have approximate levels grading from 4mAHD near the east at Raconteur Drive entry, down to approximately 2mAHD at the west. The site is generally flat with some trees and vegetation, however, there is an existing swale within the reserve south of the site along Resolution Drive with its swale base closer to 1.0mAHD. The perimeter of this swale is currently fenced onsite.

Contours of the site have been included below in Figure 4.

Attachment 12.1.4 Engineering Servicing Report

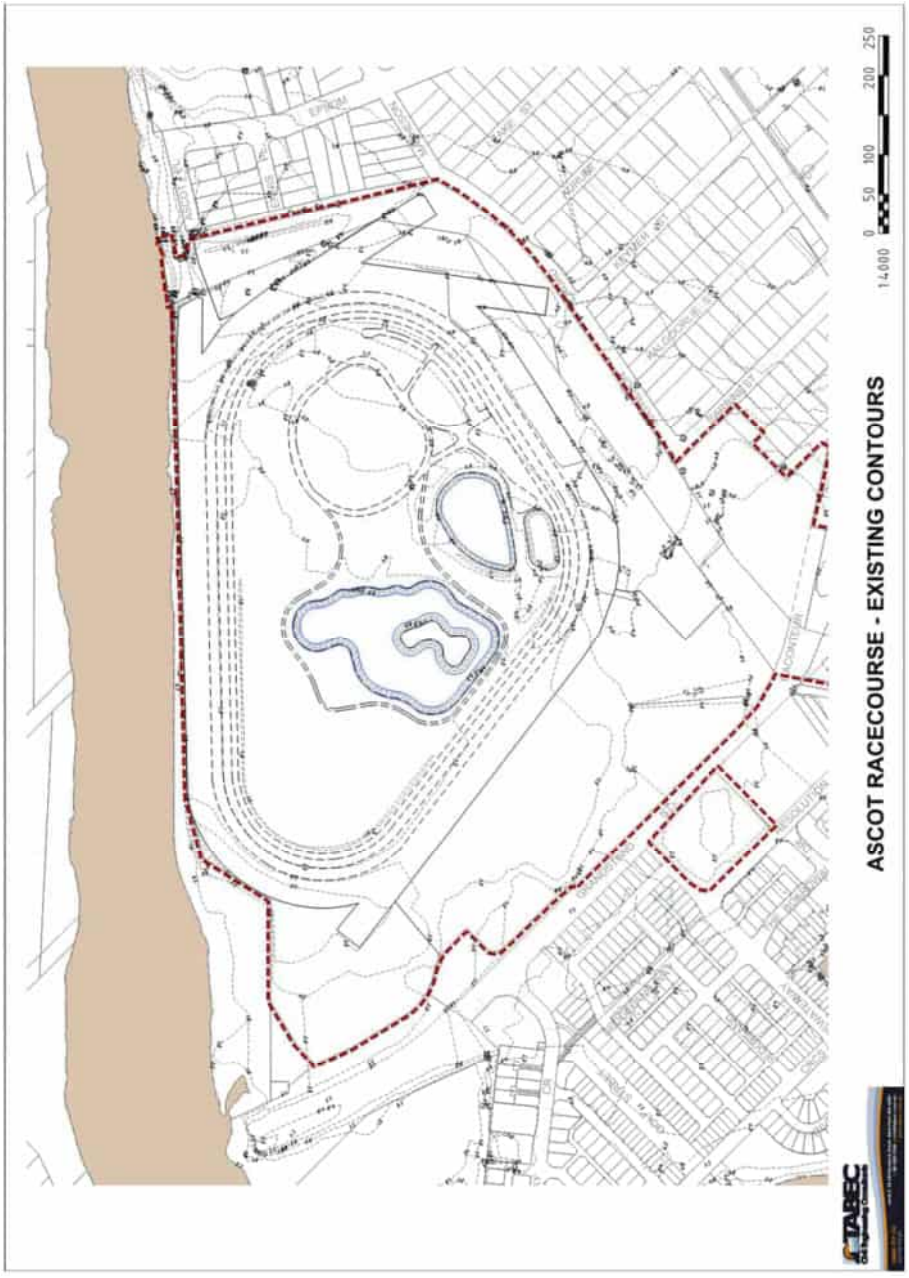


Figure 4 – Existing ground contours (TABEC 2024)

2.2 Ground Conditions and Ground Water

Geology mapping for the area has been identified as Pinjarra System, with poorly drained coastal plains and variable alluvial and aeolian soils.

Generally, the historical maximum groundwater contours are published by the Department of Water and Environment Regulation (DWER). The Golden Gateway Local Structure Plan Draft document (Essential Environmental 2018) shows maximum groundwater level (MGL) contours ranging from approximately 5mAHD located at the southeast area of the site, and generally fall to approximately 0.5mAHD along the Swan River and northwest of the site.

It is anticipated that there may be insufficient clearance above the published groundwater contours to development levels, and additional fill may be required to satisfy minimum groundwater clearance of 1.2m above MGL at Precinct A, Precinct D and Precinct E for residential and commercial purposes. This would be subject to further investigation on final development requirements and land uses.

Flood levels due to the Swan River have been previously investigated by DWER, with online floodplain mapping indicating flood levels in proximity to the Swan River at 2.8mAHD. All lots must have a minimum 500mm elevation above this Swan River flood level and a minimum of 300mm clearance above the 1% AEP top of water level of drainage basins.

Further geotechnical investigations have been undertaken across Precinct A, C and Precinct D to better understand the subsurface soil and groundwater conditions across the various sites, with this summarised below.

Precinct A

Douglas Partners carried out a site geotechnical investigation at Precinct A in January 2024 (Report reference 219164.03). From the field works, the subsurface conditions of this site were found to comprise uncontrolled fill, made up of sandy gravel material, loose sands, and clay, with the inclusion of foreign unsuitable materials such as brick, glass, scrap metals, concrete, rubber, pipes, and potential asbestos containing materials. In some locations, this uncontrolled fill extended below the groundwater level.

Natural materials found at the site underneath the uncontrolled fill, ranged from clayey sand, between depths of 4.2m to 14.9m, and sandy soils between 10.5m and 14.9m. Both materials ranged from very soft or loose, to dense and stiff.

Given the shallow ground conditions at Precinct A consisting of uncontrolled fill and deep loose and soft soils, the current site classification is Class P. Douglas Partners have therefore suggested shallow footings are not suitable and have anticipated a piled foundation system into deeper insitu soils would be necessary.

Groundwater levels at various locations within Precinct A have been measured over September, October and November 2023. From the assessment, the groundwater level ranged from -0.2m AHD (November) at the centre of the site, to 1.3m AHD (September) located at the site's southern boundary. The groundwater fluctuated inconsistently throughout the site, and these findings are not a clear representation of the maximum groundwater level.

Precinct B

Whilst no geotechnical investigation has been undertaken for Precinct B, the underlying material is anticipated to be consistent with those underlying ground conditions found at Precinct A and Precinct C. Based on adjacent geotechnical investigations at nearby Precincts, it could be anticipated that silty sand,

clay and clayey sands existing beneath surface level. Further geotechnical assessment will be required to ensure adequate treatment of ground conditions before further development within Precinct B, and to check conditions relating to uncontrolled fill, which is evident at Precinct A and Precinct C.

Precinct C

Douglas Partners carried out a site geotechnical assessment at Precinct C in December 2023 (Report reference 219164.02) for the proposed stables at Ascot Racecourse.

From the investigation, ground conditions differ depending on the test location within the site. Generally, uncontrolled fill was uncovered at most test locations with this depth ranging between 0.25m and 2.5m. Some test locations also observed unsuitable foreign materials such as plastic wrap, concrete and brick fragments. Sand and silty-sand can be uncovered below the uncontrolled fill to a depth of 2.5m, along with clayey sand and clay.

The uncontrolled material across Precinct C has led Douglas Partners to suggest piled foundations, with the site Classification currently Class P. Details of piled foundations can be found within the geotechnical report.

Notwithstanding, the site can be re-classified to Class S, provided that the site preparation is undertaken with the geotechnical recommendations. Areas of over-excavation to achieve Class S may uncover groundwater, and therefore dewatering may be required for earthworks and site preparation.

Groundwater levels at Precinct C have been measured onsite in September 2023, with the depth of groundwater fluctuating at each location. From the assessment, the groundwater level ranged considerably from 0.4m AHD (MW51) at the site near Aurum Street, to 5.6m AHD (BH39) located approximately 100m from the MW51 test pit, and therefore does not provide a clear and consistent overview of the groundwater throughout this area.

Precinct D

Galt Geotechnics carried out a site geotechnical assessment at Precinct D Lot 452 Resolution Drive, in March 2024 (REF WAG230750-01 002 R1) for the proposed residential and commercial development site.

The subsurface soil profile from the testing found sand fill to a depth of 0.4m to 0.9m depth, over sandy clay and clay material. At boreholes BH03, and BH04, layers of silty sand and clayey sand up to 0.7m thick extending to 1.2m depths were also found.

The site classification is considered Class S, where no less than 0.7m of sand and clayey sand layers are present over insitu clay and sandy clay.

Groundwater at the site in February 2024 was found to be approximately 1.9m to 3.03m depth below surface. Galt has suggested there is perched ground water between 2.7mAHD and 2.9mAHD. Whilst that the design level be 0.5m above DWER flood level events, which is a finished level of 3.4m AHD, adequate clearance would still need to be managed to groundwater.

Precinct E

No geotechnical investigation has been undertaken within Precinct E to confirm underlying soil conditions; however, it is anticipated ground conditions would be consistent with the natural material from the geotechnical investigations, and geological mapping.

2.3 Acid Sulfate Soils

The Ascot Racecourse and surrounding land are mapped as having a known high risk of encountering potential acid sulfate soils. As indicated in Figure 5, there is a reference to higher-risk areas in red within the site at depths within 3m of the surface. No acid sulfate soils were discovered during geotechnical testing at Precincts A, Precinct C, or Precinct D.



Figure 5 – MNG Access - Acid Sulfate Soils Risk Mapping (2024)

3 SITEWORKS

Siteworks for the development generally comprise the clearing of existing vegetation, stripping of topsoil and pavement, and the earth working of the existing ground surface to facilitate a required form of development.

The siteworks at Precinct A will be subject to the footing requirements due to the existing loose soils and uncontrolled fill beneath the surface. Due to groundwater conditions, remediation works may be difficult, therefore a pile foundation system has been suggested within the geotechnical report which may remove the requirement to remove underlaying uncontrolled fill. However, due to the settlement that may occur due to the soft and loose materials, it is anticipated that surcharging of the site may be necessary to reduce differential ground settlement, which could be carried out through temporary fill.

To achieve Class S at Precinct C, which will allow light-loaded structures to be constructed with shallow footings, site preparation will include 0.15m topsoil stripping and grubbing of existing vegetation, and over-excavation earthworks to achieve a minimum of 0.8m of sand separation above reactive clayey soils.

It is also important that there are no loose underlying soils to a depth not less than 1.5m below the foundation level to avoid settlement of the development.

3.1 Demolition and Remediation

Precinct A is free from structures and therefore demolition works are not anticipated to be required.

Depending on the final scope for Precinct B, Precinct C and Precinct E, demolition of existing car parking pavement and redundant asphalt roads within these areas may be required.

The demolition of the existing buildings, pavements and associated infrastructure within Precinct D will be required to enable the proposed residential and commercial development at this location. Whilst no asbestos was detected in any of the geotechnical samples at Precinct D, it should be noted that the adjacent northern road reserve, Northerly Ave, has been identified as remediated for restricted use, which may suggest potential asbestos-impacted fill below the surface.

4 EARTHWORKS

The preliminary earthwork pad levels have been reviewed by TABEC to demonstrate how the proposed development levels may be accommodated, given constraints due to groundwater, flooding and interface levels. Generally, earthworking of all proposed precincts will be required, whether this is in the form of remediation works due to subsurface soils or import fill to lift the development levels. Each precinct site will require site preparation, potential demolition, and stripping of existing pavements, vegetation and topsoil, after which the exposed ground will be proof compacted.

Due to existing groundwater hydrology and flood levels, which are discussed further in the LWMS prepared by Emerge (EP23-109, May 2024), the report recommends:

- Surface-based infiltration structures have a minimum 300mm clearance above the maximum groundwater level (MGL)
- Habitable floor levels should have a clearance to a maximum groundwater level (MGL) of at least 1.2m
- Finished floor levels must have a minimum 300mm clearance above the 1% AEP event, top of water level at storage basins.
- All lots to have a minimum of 500mm clearance above the 1% AEP flood level in the Swan River.

These drainage requirements and minimum flood elevation requirements will likely govern the finished floor-level requirements of the five Precincts. TABEC concept earthworks levels have been provided in Figure 6, with these levels to be refined during detailed design.

Precinct A

It is anticipated that the existing surface levels of Precinct A will be lifted to accommodate clearance to flooding, with the minimum finished levels at this location being approximately 3.2mAHD. With existing surface levels surrounding Precinct A being in the order of 2mAHD, the development will require further consideration on how the additional ~1-2m level difference may be accommodated and whether retaining walls are required, or if there is sufficient area to enable battering. Precinct A has a road reserve on the western boundary, and foreshore on the northern boundary, so any batter encroachment into these lots will require further discussion and approval with the relevant authorities.

Precinct B

As existing levels within Precinct B currently look to be conveying overland drainage towards the racecourse, any changes in levels are only anticipated to be those to lift new offices and hospitality levels. In Figure 6, TABEC has nominated the future building floor level at RL3.2 to satisfy flood levels.

Precinct C

Finished development levels at Precinct C will vary as it will be subject to tying into the existing road network at Raconteur Drive, Matheson Road, Ennis Place and the existing levels at the racecourse. Given the purposes of Precinct C, steep grades and level differences/retaining will likely need to be designed out to serve its purposes as on-course stabling and to facilitate horse movements.

It is anticipated that the future stable finish levels will be at approximately 4m AHD at the west and grade up to 6m AHD to the east in the proximity of Keymer Road, which is consistent with the grade of Matheson Road. These levels also tie in with the existing levels of the internal racecourse.

The private internal access road between the proposed stables and Matheson Road will be marginally lower than the stables floor levels by approximately 200mm, and grade consistently with the stable level steps.

The proposed stables to the east near Leake Street will need to be a minimum of 6.9m AHD, which will allow for internal sewer servicing of the site, and also provide clearance to groundwater levels. To tie in with the existing road reserve on Matheson Road, it is expected that these stables and the internal road will grade to approximately 7.4m AHD to the east.

The northeast development area of Precinct C adjacent to an existing reserve, will match in with existing interface levels. To satisfy sewer servicing and flood levels, it is anticipated that the level of this area of Precinct C will be approximately 6.1m AHD.

Precinct D

It is anticipated that additional sand fill will be required for Precinct D ensure sufficient separation for flood levels, and ground water levels. Precinct D will need to satisfy as a minimum habitable floor level of 3.2mAHD, however, the geotechnical investigation by GALT (February 2024) has identified perched ground water between 2.7mAHD and 2.9mAHD. Emerge Associates have recommended 1.2m clearance above maximum ground water level (MGL) to finish floor level which may increase the habitable floor level higher than the flooding requirements to approximately 4.0m AHD.

Further review of these finish levels will be required on further investigation of the maximum ground water, and drainage and subsoil drainage design which would ultimately determine the finish development levels.

Attachment 12.1.4 Engineering Servicing Report

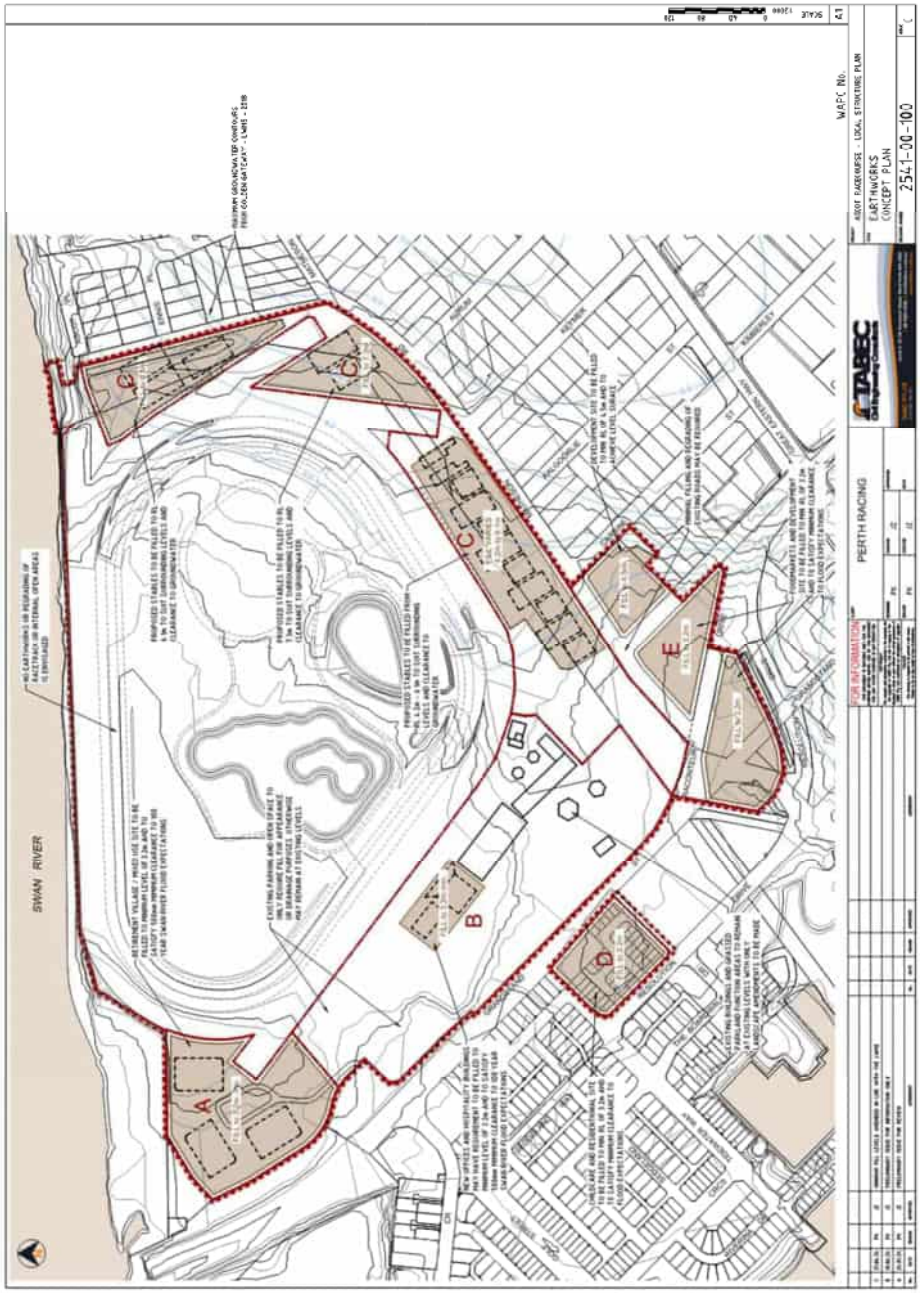


Figure 6 – TABEC Concept Earthwork levels for precincts (June 2024)

5 ROADS AND TRAFFIC

5.1 Existing Road Network

Surrounding Lot 9002 and Precincts A, B and C, are existing roads that are suitable to provide future access for these proposed developments. Lot 9002 is surrounded by Grandstand Road (Distributor A), Raconteur Drive (Access Road) and Matheson Road (Access Road). The Main Roads WA (MRWA) road database shown in Figure 7, indicates that Grandstand Road is operated and maintained by the MRWA with a speed limit of 60km/hr, with the other access roads being controlled by the City of Belmont. Whilst the east boundary of the site is located against a road reserve, no road currently exists with this being a sand/limestone track.

The existing roundabout at Grandstand Road and Waterway Cres currently provides access to Precincts A and B, and the existing car parks. There is also gated access from Grandstand Drive into Precinct B car parks at three other locations before reaching the Raconteur Drive intersection.

Matheson Road will remain as it currently is, and serve as the primary access for Precinct C, however, access to the northeast stables will be solely from Ennis Place as the only sealed road entry to this location.

Lot 100, located in Precinct E, currently has multiple private roads through this site. Raconteur Drive off Grandstand Road can provide vehicle access through to Resolution Drive, however this does have vehicle gates to restrict access at both boundaries. The intersection of Grandstand Road and Raconteur Drive is currently a left in, left out, however, does allow a right turn in from vehicles travelling north via a split in the median island. Two other existing roads within Lot 100 are fenced to reduce unauthorised access, with these being extensions of Matheson Road and Hardey Road.

Precinct D is located between Grandstand Road and Resolution Drive (Local Distributor), with access to the existing admin building being located at both Grandstand Road as a left in, left out, or via Resolution Drive. The existing median island on Grandstand Road restricts those vehicles travelling south from turning onto the car park.



Figure 7 – Main Roads WA GIS Road Hierarchy (MRWA 2024)

The land assembly at Precinct E as per Figure 3, will require further consideration for access to future commercial development. Resolution Drive has a raised centre median between the roundabout to Great Eastern Highway which currently restricts vehicle movements. This section of Resolution Drive is a Distributor A road and is controlled by Main Roads WA, with direct development access onto this road requiring MRWA approval.

6 STORMWATER DRAINAGE

Details of the stormwater and drainage strategy, flooding, and water treatments have been detailed within the LWMS prepared by Emerge Associates (EP23-109, 2024).

There are predominantly two significant drainage systems to convey stormwater within the LSP area to the Swan River. The first is the Central Belmont Main Drain which is managed by Water Corporation, and the second is the local drainage system located near Matheson Road, which conveys water from the surrounding road reserves into the lake system at the centre of the race course via a 900mm pipe.

The lakes system is interconnected, with flows discharging from this into the Swan River via a 450mm and 375mm concrete pipe at peak water level within the wetland lake of 0.53mAHD (Evangelisti & Associate 1997). The outlet is controlled to restrict tidal influence on the internal lake systems.

Whilst Grandstand Road has a pit and pipe network consisting of 450mm and 525mm concrete pipes, Precinct A does not currently have access to a stormwater connection, and as part of future development, it would be anticipated that drainage from this site would need to be treated and captured within Precinct A and the racecourse. Infiltration rates at Precinct A are low due to existing soils, however, with the increased level of the site and import fill to achieve flood level requirements, this may allow for some storage and bio-retention swale to infiltrate at source.

Precinct B currently captures and infiltrates water at source, with overland flow being graded towards the existing track. There was no evidence of Precinct B overflowing into the existing road reserve at Grandstand Road.

Consistent with the current drainage design onsite, the proposed stables and car park at Precinct C are anticipated to be a combination of infiltration at source where levels and soil conditions allow, and discharge to the lake system. The geotechnical assessment (Douglas Partners 2024) suggests this site is unsuitable for on-site stormwater disposal due to the shallow clay which may be impervious for drainage purposes. It could be expected that this clayey sub-surface will pond, and water will move laterally on this surface. Further investigation is required as part of the detailed design on the infiltration opportunities and discharge locations, and requirements for bio-retention swales to treat stormwater. The proposed car parks to the southwest of Precinct C are likely to flow towards the Water Corporation drainage system in Precinct E due to the low levels of the area being unable to convey stormwater to the lakes.

Precinct E, adjacent to Water Corporation's Belmont Main Drain, is anticipated to be treated via bio-retention swale before overflowing to a proposed detention basin storage for the 1% AEP event. Overflow from this basin will be into the Water Corporation's drainage system. (Emerge Associates 2024)

Whilst Precinct D has an existing 525mm and 300mm drainage pipe network along Resolution Drive, it is anticipated that there will be stormwater storage and infiltration at the site, with a 1% AEP event discharging into the local drainage network on Resolution Drive. Further investigation will be required during design to determine the final location for stormwater detention before entering Resolution Drive, as no POS has been identified for Precinct D.

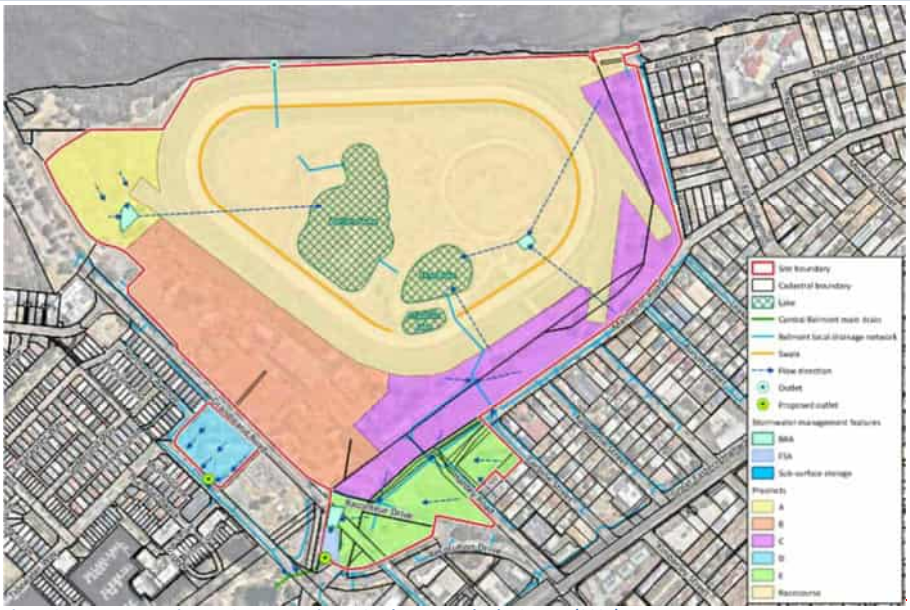


Figure 8 – Emerge Associates - Concept Drainage Catchments and Lake System (2024)

7 WASTEWATER

Water Corporation planning information was requested for the five precincts at Ascot Racecourse.

Precinct A

Precinct A is located off the existing Grandstand Service Road in proximity to the Waterway Cres roundabout. Whilst there is an existing sewer in proximity to Precinct A located at Waterway Cres, it is anticipated that this existing pipe network will not have sufficient cover below finish ground levels to extend from its current location, across Grandstand Road, and into the development. Therefore, alternative options have needed to be considered for wastewater servicing.

The first possible option would be to convey wastewater away from Precinct A and the future aged care site to the existing wastewater pump station to the east located on Ascot Place. This would require a private pump station within Precinct A, and approximately 950m of DN100 pressure main through the Ascot Racecourse lot adjacent to the Swan River and into a new gravity pipe system which would then discharge into the pump station. Given the pressure main would be crossing lot boundaries between Precinct A, and Ascot Racecourse, this would need to be reviewed further with Water Corporation to ensure the proposal is acceptable, and that the relevant easements/agreements are in place to protect these new sewer assets.

Alternatively, there is an opportunity to extend the 225mm sewer up Grandstand Road from the Marina Drive/Resolution Drive roundabout. This existing sewer is at RL-2.09m, and therefore should have sufficient depth to be extended and still service Precinct A if the development is earthworked higher closer to approximately 4m AHD. The connection to this wastewater catchment would trigger downstream upgrades due to capacity issues, with the existing 225mm sewer on Great Eastern Highway requiring an upgrade to a 300mm sewer as per Figure 10.

Attachment 12.1.4 Engineering Servicing Report



Figure 9 – Existing Gravity Wastewater Reticulation Services (Water Corporation)



Figure 10 – Existing Gravity Wastewater Reticulation Services (Water Corporation)

Precinct B

In reviewing existing internal sewer plumbing for Lot 9002 (Ascot Racecourse), there is an existing sewer connection located at Raconteur Drive, at Access Chamber T3030. The sewer connection at this location currently services Precinct B, and a portion of the proposed Precinct C area. Whilst these two precincts are currently connected to the sewer at Raconteur Drive, Water Corporation has advised that there is no record of this connection, and the wastewater flows from this precinct have not been included in their planning assumptions. If wastewater flows from Precincts B and C are substantially increasing, further discussions are likely required to identify the increased flow of wastewater anticipated from the new developments.

According to the sewer flimsy as-cons acquired from Building and Energy Western Australia, the private sewer pipework from Precinct B to the existing Water Corporation main is located partially through Precinct E, Lots 13, and Lot 100 as per Figure 12. At the time of this report, all three lots are owned by the same entity. If the Precinct E land assembly proceeds and/or ownership of any of these lots is transferred, it may be necessary to divert the internal plumbing out of Lot 100 or Lot 13. In this instance, the Water Corporation sewer main may need to be extended to provide a sewer service connection that does not traverse other private lots.

Precinct C

Precinct C for the proposed on-course stabling facilities, will cover the outer edge of the Ascot Racecourse, from Raconteur Drive through to Ascot Place near the existing waste water pump station site. Due to this distance, multiple sewer connections will be required to adequately service the site as shown on Figure 11, with the service boundaries being subject to detailed design and finish levels.

Subject to Water Corporation's acceptance of private sewer crossing lot boundaries with the same ownership and final levels, the west portion of Precinct C (C1) between Kalgoorlie Street and Raconteur Drive will likely be conveyed to the west to the existing internal sewer. This is due to the existing levels of the site and Matheson Road, which generally grade lower as the site gets closer to Raconteur Drive.

There is an existing sewer connection available from Kalgoorlie Street with a connection invert level of 3.48m AHD, which is anticipated to service C2 with sufficient cover to finish levels.

New sewer lot connections will be required for both C3 and C4 areas within Precinct C, with the sewer invert levels into the site anticipated to be in the order of 3.30m AHD and 2.3m AHD respectively. The existing levels within C3 grade from approximately 6.5m to 7.2m AHD at the eastern boundary of C3. The C4 area has an existing surface level of approximately 5.6m AHD, which will likely require sand structural fill to approximately 6.1mAHD to be serviced with sewer.

Attachment 12.1.4 Engineering Servicing Report



Figure 11 – Existing Gravity Wastewater Reticulation Services (Water Corporation)

Precinct D

There is an existing sewer main located on the southern corner of Precinct D, located near the intersection of Marina Drive and Resolution Drive. Water Corporation has advised that a sewer connection to this existing 225mm PVC main is possible for the proposed residential development. The levels of this existing main are at an invert level -2.09mAHD and has sufficient depth to service the site.

The existing sewer junction to Lot 452 is anticipated to service the existing building within the lot, and will likely require removal as part of the development of Precinct D.

Precinct E

There is an existing 225mm PVC sewer south of Precinct E, located along Resolution Drive which ranges from approximately -0.02m AHD to 0.49m AHD at access chamber T3030 located at Raconteur Drive Link. The existing sewer main continuing northeast from this access chamber is located within Lot 100 which is private land. Whilst no easement currently exists over this portion of the Water Corporation pipe, it could be anticipated that this would be required as part of future amalgamation or development in the future.

The depth of this existing sewer should be sufficient to service the future development at Precinct E subject to the final lot layout allowing access to this existing main. As seen from Figure 12, Lots 51 and Lot 100 can be serviced from the existing main, however, the existing drainage reserve R45069 will require consideration when extending the sewer to service Lot 51.

The wastewater servicing of Lot 1 will require further investigation, but the Water Corporation sewer main could likely need to be extended to this site, possibly from Lot 52 at Resolution Drive.



Figure 12 – Existing Gravity Wastewater Reticulation Services (Water Corporation)

Notwithstanding the advice outlined above, if the developer intends to upgrade or extend the sewer reticulation for any reason, they will be responsible for funding reticulation extensions to service the proposed lot with a gravity connection, which shall be designed and constructed to Water Corporation specifications. Standard Water Corporation infrastructure contributions will apply on a per-lot basis.

8 WATER SUPPLY

Advice was sought from Water Corporation regarding the established water reticulation system within the area and if service upgrades are required for the proposed development. Water Corporation has advised that the existing water reticulation in the area may be utilised to service the proposed Precincts depending on final water usage requirements, however, it should be noted that Precincts B and C are not currently included within the current Water Corporation planning assumptions.

Precinct A and Precinct B

Depending on the potable water capacity requirements for Precinct A, the existing 200dia water main located in the western verge of Waterway Cres and Grandstand roundabout should provide adequate supply to the proposed high-density developments. This 200mm water main would need to be extended to the development site from Grandstand Road to provide supply.

According to Water Corporation's database, Precinct B has an existing 100mm diameter water main feeding into the site with a 100mm meter and multiple existing 100mm fire services. The existing water main size along Grandstand Rd is 100mm PVC, therefore, if additional water is required and the supply needs to increase, an upgrade of this existing 100mm water main would be required which would require further investigation by Water Corporation.



Figure 13 - Existing Water Mains in proximity of Precincts

Precinct C and D

Precinct C has access to an existing 100mm water main located along the south verge of Matheson Road which has been constructed of varying materials (PVC, Asbestos Concrete, Cast Iron, Steel). Access to this main is readily available, however, if greater supply is required above what the 100mm diameter pipework supplied within the area, further investigation would be required with Water Corporation to increase the size of the water main to Precinct C.

Precinct D has an existing 150mm water main on the west verge of Resolution Drive, and a 100mm main on Grandstand Road, both of these providing adequate opportunity for connection and water supply.

Precinct E

There is an existing DN915mm steel water distribution main located along the eastern verge of Grandstand Road on the 2.1m alignment which also runs through the centre of Precinct E within the existing road reserve. A smaller existing DN100mm cast iron water main also conveys potable water through Precinct E within this road reserve corridor, with these mains being built in 1949 and 1987 respectively. Depending on the final use of Precinct E, it could be expected that as part of assembling the

lots in Precinct E, the Distribution Water Main and the DN100 CI main, may need to be relocated outside of the proposed lots, and reinstalled on their ultimate alignment within remaining road reserves. If these water main assets are to remain in their current location, Water Corporation would need to accept an easement over these assets with the DN915 and 100CI mains requiring 10 and 5m easements respectively.

It is anticipated that the existing DN100 cast iron water main will be suitable for water servicing. The existing DN915 steel distribution main located on the northern verge of Grandstand Road, and through Precinct E, would not be available for connection to the proposed development.

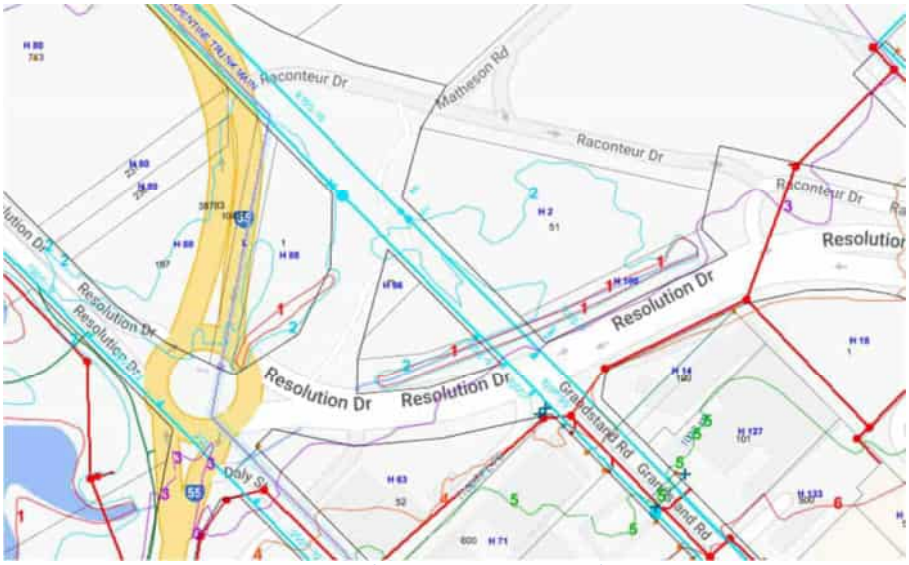


Figure 14 - Existing Water reticulation in Precinct E (Water Corporation Esinet 2024)

Whilst Water Corporation did not advise TABEC of any necessary upgrade of the old water pipe network, any modification to these existing pipes may result in the requirement to upgrade old cast iron water mains. Final upgrade requirements of the existing infrastructure will be clarified once water usage requirements are understood, and modelling has been undertaken by Water Corporation.

9 POWER SUPPLY

9.1 Power Requirements

The preliminary power requirements have been reviewed based on the proposed development at each of the precincts. It is estimated that the development equates to a total power requirement of 5.4MVA, with the new proposed developments within the precincts requiring the additional 4.2MVA. The existing developments within the precincts are estimated to be using 80% of the 1.5MVA currently available.

Load Type	Anticipated HV infrastructure required
Precinct A	1 x 1000kVA Transformer
Precinct B	**Existing** 1000kVA transformer and switchgear may be adequate **Existing** 500kVA transformer located near the grassed parkland function area may be adequate
Precinct C	**Existing** may be adequate subject to further review.
Precinct D	1 x 315kVA transformer
Precinct E	2 x 1000kVA and 1 x 315kVA transformers

The estimated load summary has been calculated as follows:

Precinct	Development Type	Approx. sqm / No. of Units	Average kVA / sqm	Approx Total kVA	
Precinct A	Retirement Living	390	3.1	1209	
	Commercial	300	140	42	**1251**
Precinct B	Office	680	140	95.2	
	Hospitality	1000	140	140	**235.2**
Precinct C	Stables	6400	10	64	**64**
Precinct D	Childcare	2100	75	157.5	
	Residential	41	4.7	192.7	**350.2**
Precinct E	Site 1 Retail	3400	140	476	
	Site 1 Office	2500	140	350	
	Site 1 Parking	5500	10	55	**881**
	Site 2 retail	7100	140	994	
	Site 2 Parking	3500	10	35	**1029**
	Site 3 Equine	5000	75	375	**410**
Total				**4185.4**	**kVA**
				5822.76	**Amps**

The anticipated additional power demand from the development is estimated to be in the order of 4.2MVA (4,200kVA).

9.2 Feeder Capacity

Western Power's (WP) Network Capacity Mapping tool indicates that the area is serviced by the Belmont Zone Substation and has more than 30MVA of power available on the network. Note that this information is unconfirmed by Western Power until such time as an application is being made to WP for connection.

To access the additional capacity in the network supplied at the Belmont Zone Substation, it is anticipated that 2 additional power feeders may need to be installed, 2.5km from the Belmont Substation Site to the development to adequately service the ultimate required supply.

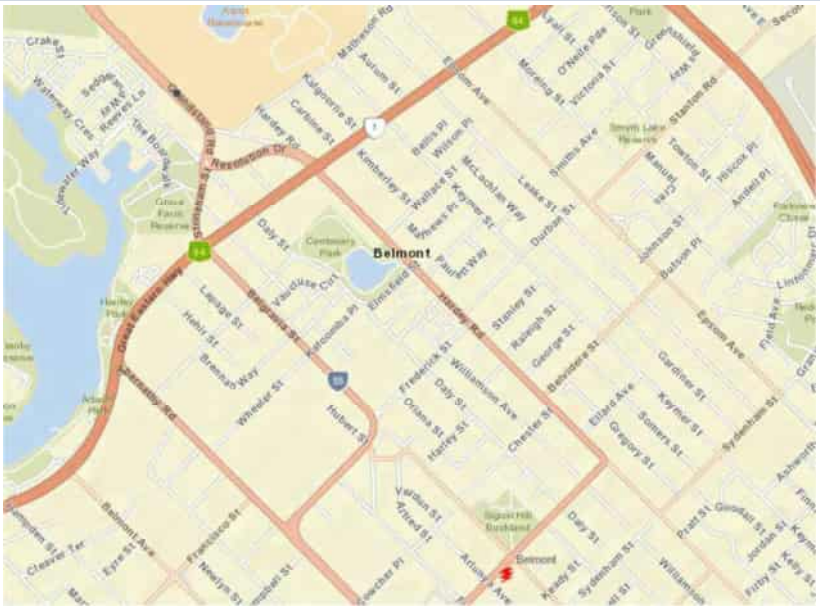


Figure 15 - WP Substation Site (Western Power Mapping 2024)

9.3 Existing Distribution Power Network

The Western Power Network Mapping tool (NCMT) and DBYD has indicated that there is high voltage (HV) servicing this development area. Existing 132kV overhead power is also located along Matheson Road, and along the east of Lot 9002.

There are also high voltage distribution cables surrounding the sites, with these being overhead power along Matheson Road, which transitions to underground at Resolution Drive, and north up Grandstand Road as seen within Figure 16.

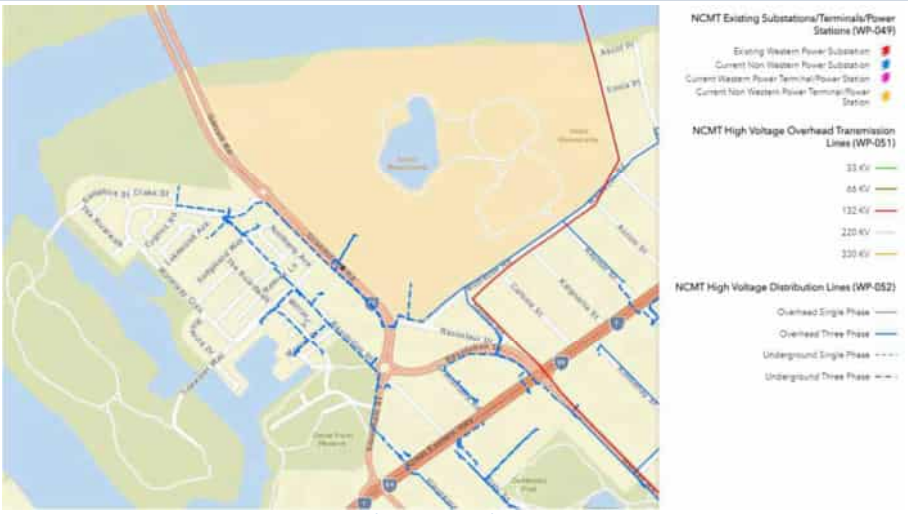


Figure 16 – NCMT Network Existing Power Services (Western Power)

10 COMMUNICATIONS

Ascot Racecourse is currently surrounded by NBN service in the area with FTTN Technology. It is expected with new developments or upgrades, that FTTP will be available.

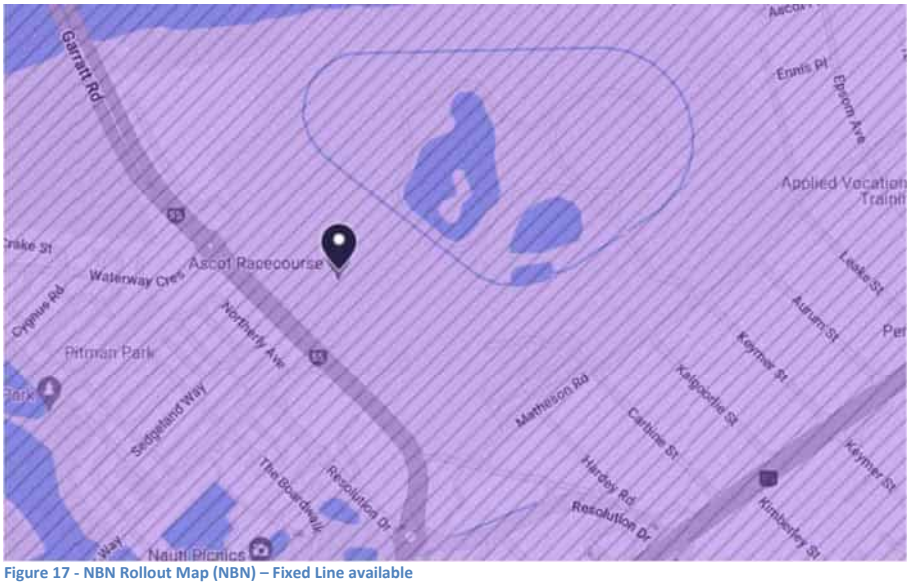


Figure 17 - NBN Rollout Map (NBN) – Fixed Line available

The Dial Before you Dig information shows Precinct D has existing Optus fibre optic assets within the site, which have been installed within the north west boundary of the lot. Precinct D also has Telstra and Vocus assets entering the lot from Grandstand Road and from Resolution Drive respectively.

Further discussion will required with the communication providers to determine whether these existing comms assets will impede the proposed development at this site, and whether relocation or removal of this asset is required.

11 GAS SUPPLY

There is existing medium pressure 155 PVC 1.5 (MAOP 70kPa) gas mains located along Matheson Road and up Grandstand Road until Precinct D which are available for connection to Precinct C, Precinct D and Precinct E if required.

ATCO has completed high level modelling based on similar business connection types as those nominated developments within each precinct. The modelling was based on:

- Connection to MAOP 70kPa network
- MP Metro 25 – Severe Winter
- Full load at 350scmh (≈12000MJ/hr)
- Full connection by 2025
- Potential mains extension required for connections to Precinct A and B

Based on this modelling, the existing gas mains adjacent to Precinct D and Precinct E should be sufficient to service these residential and commercial developments.

Precinct A will require a gas mains extension to the retirement village if this development is to utilise gas, however, ATCO have not expressed any concerns with servicing capacity issues.

The supply of gas is not a WAPC subdivision condition and there is no obligation on the developer to install gas as part of the development.



Figure 18 – Existing ATCO Gas Network map (ATCO Gas)

In reviewing the Dial Before You Dig information, an existing 150 PVC gas main traverse through Precinct D, along the south east boundary. From the information available, this pipe does not look to be

operational, however, further discussions with ATCO Gas are required on whether this needs to be relocated, or removed.

12 CONCLUSION

Based on the infrastructure review, there does not appear to be engineering-related constraints preventing the development of the five precincts. Notwithstanding, there are a number of design issues and construction challenges to be resolved in further detail within the next phases of development.

The advice received from servicing authorities and investigations to date indicate each aspect can be resolved to support the development proposal.

13 RECOMMENDATIONS

Since this report is based on preliminary servicing advice and investigations, it is recommended that each Authority be kept informed as the planning progresses and concept engineering designs are refined. Communicating the proposed time frames for the precinct development is also important.

There are a number of project-related issues and challenges that require further consideration, with some of these to be assessed as part of the next phase, such as:

- further investigation and discussion on the preferred Precinct A sewer servicing methodology;
- the upgrade/relocation requirements of existing water mains if deemed necessary for Precinct E or to provide adequate servicing to Precinct B or C. If required, early engagement with Water Corporation is recommended to coordinate scope within Water Corporations capital works program;
- bio-retention locations within the centre racecourse for Precincts A, and C;
- drainage basin/storage location at Precinct D;
- existing communications assets removal or relocation within Precinct D;
- power servicing to each development sites with overlapping lots and boundaries
- understanding development timeframes for precincts, due to the limited power capacity within the existing network prior to additional HV feeders being required to the site.

The information contained within the report is preliminary in nature, has been completed based on a high-level desktop assessment, and has relied on preliminary planning advice from servicing authorities where appropriate. There are no site investigations, reports or other consultants' input unless stated within the report, which would ordinarily provide a more substantial servicing review for the purpose of supporting subdivision applications.

14 REFERENCES

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15 APPENDIX A – DBYD INFORMATION

Attachment 12.1.4 Engineering Servicing Report

Job No 36962243

BEFORE YOU DIG www.byda.com.au

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference
Precinct E

Address
2 Raconteur Drive
Ascot WA 6104

Notes/description
-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900614	ATCO Gas Australia	1300 926 755	NOTIFIED
240900610	NBN Co (WA)	1800 687 626	NOTIFIED
240900607	Optus (WA)	1800 505 777	NOTIFIED
240900612	Telstra (WA)	1800 653 935	NOTIFIED
240900609	TPG Telecom (WA)	1800 786 306	NOTIFIED
240900608	Vocus (WA)	1800 262 663	NOTIFIED
240900613	Water Corporation	13 13 95	NOTIFIED
240900611	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

Attachment 12.1.4 Engineering Servicing Report

ATCO UNDERGROUND ASSET DETAILS ASSETS AFFECTED

GAS DIVISION

ASSETS AFFECTED – see accompanying Plan

Job No: **36962243**
Sequence No: **240900614**
Date of Issue: 21 June 2024
Phone: **1300 926 755**

Justin Zielinski
ATCO Gas Australia
54 Havelock Street
West Perth
WA 6005

BYDA Utility Registration Name: Private
BYDA Location: **2 Raconteur Drive Ascot WA 6104**

ATTENTION: This response to your enquiry has been interpreted from details in your requested DBYD picture location request only (not any street address you gave). It is your duty to ensure the accompanying plan/s match your geographical area of works.

IF YOU SEE, HEAR, SMELL OR OTHERWISE DETECT GAS,
LEAVE THE IMMEDIATE AREA AND THEN CALL 13 13 52

Our records indicate that ATCO gas infrastructure ***IS PRESENT*** in the vicinity of and/or surrounding area of the above enquiry. This response relates only to ATCO assets. Your Duty of Care requires that personnel **Must** at all times comply with, and have on site, this information sheet and the accompanying plan(s). All plans are subject to this information sheet. You should refer to the ATCO Self-service Portal (Link Here) or if unsure, contact ATCO on **1300 926 755** during business hours.

All information provided is to be used as a guide only (see Disclaimer item **5**). It does not absolve you or third parties from your Duty of Care obligations, including to take additional precautions where work has the potential to impact on gas assets, public safety or the environment, or from your duties at law (including Reg 3.21 of the Occupational Safety and Health Regulations 1996).

WARNINGS

- No works of any type within 15 metres of any **CRITICAL GAS ASSET** infrastructure without prior approval from ATCO
- **NO HOT WORK** within 15 metres of any gas infrastructure except in compliance with applicable laws & *Australian Standard 1674.* **Do Not** let heat sources or hot works impact on any gas infrastructure and take into consideration that the ground or adjacent structures may also be capable of transmitting heat so as to circumvent protection afforded by a heat shield or barrier
- **DANGER** - Gas can cause asphyxiation and is flammable. Keep all ignition sources well away (e.g., flames, matches/ lighters, sparks, electrical devices, vehicles or engines, mobile phones, cameras)
- Gas pipes **Must Not** be unsupported or left without adequate cover or protection without prior approval from ATCO
- Damage to the pipe coating or pipe itself can be very dangerous if not given immediate attention. Report any damage to ATCO immediately on **13 13 52**. **Do Not** attempt to repair any damaged gas infrastructure
- No alteration or removal of live or abandoned gas infrastructure without prior written approval from ATCO
- Any abandoned or proposed gas infrastructure indicated on the gas plans **Must** be treated as live
- Never assume the location or depth of any gas infrastructure. Pipes may not follow straight lines or maintain a constant depth. Always check carefully (e.g., by careful hand digging of potholes)
- Unauthorised repairs or tampering with gas infrastructure may result in prosecution under the *Energy Operators (Powers) Act 1979*. ATCO Gas Australia reserves all rights to recover compensation for loss or damage to its gas infrastructure or other property including for indirect or consequential losses.

Attachment 12.1.4 Engineering Servicing Report

PLANS:

Plans provided are current for **30 days only** from date of request. You must use current plans at all times.

Plans do not show all gas service lines (which connect gas mains to individual meter positions). See condition **3.c)** below.

If plan shows **additional detail** symbols (*) or ( ) in the area of proposed works it is **your duty** to obtain that further detail from the number below.

Plans (including the location of pipes, services, infrastructure and boundaries) are **approximate only**. You **Must** use safe and proper procedures – including **potholing** (see condition **4** below).

Plans are not a guide as to gas availability for connection purposes.

To call ATCO: **Weekdays from 7.30am to 3.30pm, call – 1300 926 755 After hours, weekends and emergencies, call – 13 13 52**

CONDITIONS FOR WORKS IN THE VICINITY OF ATCO ASSETS

1. Compliance with Warnings

You **Must** comply with the Warnings contained in this information sheet and the accompanying plan(s).

2. Compliance with 'Working around Gas Infrastructure' Document (Link Here) applicable laws and duty of care

All work (including but not limited to using Excavator's Augers, Directional, drilling machines, 'Ditch Witch' type trenching machine, Loader, Dozer, Skid Steer (Bob Cat)) **Must** comply with all applicable requirements in the 'Working around Gas Infrastructure' Document and with all applicable laws and Australian Standards. All due care must be exercised to locate any gas infrastructure in the vicinity and when conducting any works near them.

3. All Gas Infrastructure

All work that may have any impact upon any gas infrastructure (see **3.a)**, **b)** and **c)** below for examples) should be carefully planned with notification to ATCO well in advance of commencement. Contact ATCO on **1300 926 755** or visit Atco's online self-service portal (Link Here). Amongst other things, this includes excavation of or near gas pipelines, boring/drilling, crossings of pipelines (including by other underground infrastructure e.g. drains, power cables, etc.), road works and structural installations. In addition:

a) Critical Asset

No works of any type are permitted within 15 meters of these pipelines without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco online Self-service portal (Link Here)

You **Must** ascertain the location of any Critical Asset, in relation to your proposed work by:

- Locating a straight line between two marker danger signs, and
- Assessing the distance from this line to your proposed work area.

ATCO may require stand-by supervision during your works and will advise of attendance requirements.

b) Non Critical Assets

These pipelines are installed in most streets throughout the Perth metro area and several country centers. Main valves, regulator sets, and test points also exist at intervals along these pipelines. Where work may impact upon these pipelines or assets then ATCO **Must** be contacted as per item **3** above.

c) Gas Services and Meters

If a gas meter is installed on a property, an underground gas service pipe will run from the meter position to the gas main in the street. Plans do not show all gas service lines (with the exception of Critical Assets), but their presence must be anticipated. Most gas meter boxes installed since 1996 will include a sticker giving approximate guidelines for the gas service line location. All due care must be exercised to locate any gas services in the vicinity and when conducting any works near them.

4. Compliance with Safe Work Practices

It is your responsibility to have and comply with adequate safe work practices and procedures. Without limiting your obligations:

PLAN The complete & current Before you Dig Australia documentation and plans must always be on site & referred to for the duration of work. Refer to regulation 3.21 of the Occupational Safety and Health Regulations 1996 and the Utility Providers "Code of Practice" for further useful information.

PREPARE Prepare by reviewing the Before you Dig Australia Documentation and contacting ATCO if you need assistance. Look for onsite ATCO asset and infrastructure clues such as pit lids, marker posts and meters. No works of any type are permitted within 15 meters of a **CRITICAL ASSET** without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco website Self Service portal (Link Here) and allow suitable

processing time. Atco recommends engaging a BYDA Certified Locator which includes undertaking electronic location prior to potholing.

POTHOLE Using current Before you Dig Australia plans, all gas pipes should be located (including any deviation in the direction of a gas pipe) by exposing them by careful digging using a HAND SHOVEL. Where the proposed work is parallel to a gas pipeline, pothole every 10 meters along the entire route. Damage to the pipe coating or to the pipe itself can create a very dangerous situation if not given immediate attention. If damage does occur, it **Must** be reported to ATCO immediately on Ph. **13 13 52**.

PROTECT Supervise and monitor all excavations near gas infrastructure using a dedicated spotter. Where any gas infrastructure is required to be exposed, adequate protection of the gas infrastructure is required to prevent potential damage. Also implement appropriate controls when conducting 'hot work' (in accordance with AS 1674) in the vicinity of the ATCO infrastructure such as; isolation; separation distance; the placement of an effective non-combustible barrier of sufficient size and thermal resistance for the intensity, type and duration of heat exposure; gas monitoring; monitoring the environment surrounding the ATCO infrastructure to ensure it is not being impacted by the work, and other controls as necessary.

PROCEED You should **only proceed** with your excavation work after you have planned, prepared, potholed (unless prohibited) and have protective measures in place. All locations markers/pegs are to be removed on completion of works. If you are unsure, **DO NOT** Proceed. Call ATCO on **1300 926 755**

5. Disclaimer and Further Terms

a) Nothing in this document, any accompanying plan or the 'Additional Information for Working around Gas Infrastructure' (AGA-O&M-PR24) (together called "**Documents**") purports to exclude or modify any term, condition or warranty to the extent that by law it cannot lawfully be excluded or modified by agreement or notice, including but not limited to those contained in Schedule 2 of the *Competition and Consumer Act* 2010 (Cth) and corresponding provisions of any state legislation.

b) If any of ATCO, or their respective related entities, officers, employees, agents, contractors or advisers (together called "**Associates**") is liable for a breach of a term, condition or warranty described in paragraph **5.a)** above, its liability is, to the fullest extent permitted by law, limited to any one or more of the following as it determines in its absolute discretion:

i) in relation to goods supplied by them, replacing or repairing the goods, supplying an equivalent item, paying the cost of replacing or repairing the goods or paying the cost of acquiring or hiring an equivalent item; and

ii) in relation to services supplied by them, the re-supply of the services or the payment of the cost of having the services re-supplied.

c) Subject to paragraphs **5.a)** and **b)**, but otherwise despite any other provision in the Documents, no representation or warranty is made or given (whether expressly or by implication) by any of ATCO or their respective Associates in respect of any information contained or referred to in any of the Documents or in any other communication from ATCO concerning any of the Documents or the subject matter of any of the Documents ("Information"). In particular, but without limiting the generality of the foregoing limitation, none of ATCO or their respective Associates makes any warranty or representation as to the truth, accuracy, completeness, reliability, currency, timeliness, quality or fitness for any purpose of or the standard of care taken in the preparation of any Document or Information (including, but not limited to, the accuracy of the scale of, or the location of anything or symbol shown on, any plan or diagram).

d) Subject to paragraphs **5.a)** and **b)**, to the maximum extent permitted by law, none of ATCO or their respective Associates is liable to any person or other body ("**Recipient**") who receives or otherwise obtains access to all or any part or parts of the Documents or Information, in any way (including, but not limited to, liability for negligence, breach of statutory duty or lack of care) in respect of any cost, expense, damages, loss or liability, including, but not limited to:

i) any financial or economic loss, cost, expense or damage, including but not limited to loss of production, loss of profit, loss of revenue, loss of use, loss of contract, loss of goodwill or loss of business opportunity;

ii) any new or increased costs or expenses, including but not limited to financing or operating costs;

iii) any failure to achieve any actual or anticipated saving in respect of any cost or expense;

iv) any cost, expense, damage or loss resulting from any liability of the Recipient to any other person or body howsoever and whensoever arising, suffered or incurred by the Recipient in relation to, or in connection with, the disclosure to them of, or use of, or reliance on, all or any

part or parts of the Documents or Information.

e) By using any Document or Information, each Recipient is taken to represent and warrant to ATCO that the Recipient will comply with the conditions and other terms referred to in the Documents or Information, including but not limited to conditions that:

i) the Recipient **Must** comply with the conditions in numbered paragraphs **1** to **4** above and this paragraph **5**;

ii) as between ATCO and each Recipient, ATCO owns the Information and all rights and title in and to the Information are to remain vested in ATCO;

iii) no Recipient has any right, title or interest in the Information or, except as expressly provided for in the Documents, any license or right to copy, alter, modify, publish or otherwise use or deal with the Information without prior written approval from ATCO;

iv) ATCO makes no representation and gives no warranty as to its right to disclose any Information;

v) the Recipient relies on any Information entirely at its own risk and expense;

vi) the Recipient **Must** undertake its own independent due diligence and investigations in relation to the Information;

vii) none of ATCO or their respective Associates owes the Recipient any duty of care in respect of the Information; and

viii) none of ATCO or their respective Associates is under any obligation to correct, update or revise any Documents or Information.

GAS MAIN AND SERVICE IDENTIFICATION

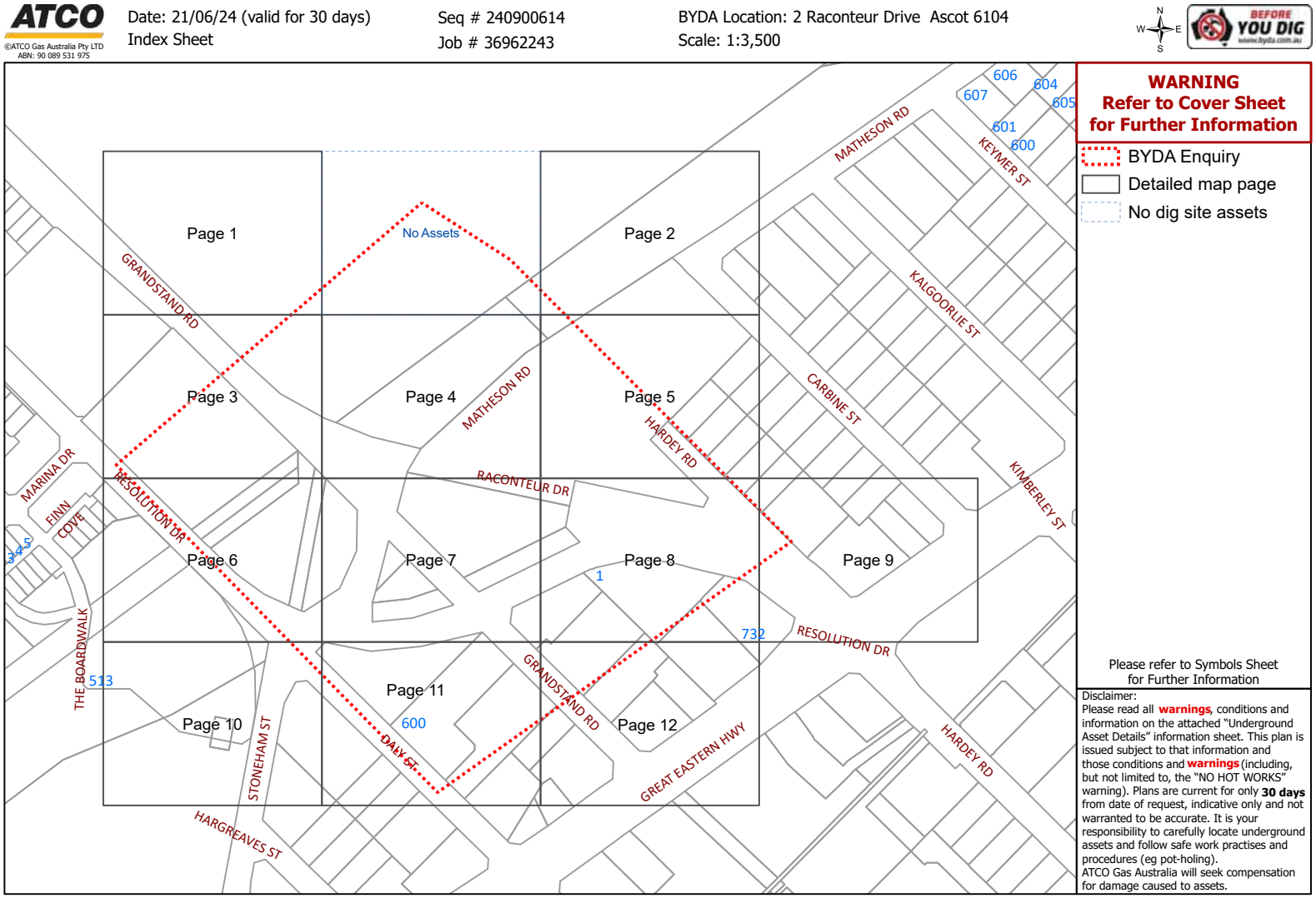
LEGEND

1. Critical Asset (See **WARNINGS** page 1)
2. Pipe Diameter (millimetres)
3. Pipe Material
   CI = Cast Iron PE = Polyethylene
   GI = Galvanised Iron PVC = PVC
   ST = Steel
4. Alignment (in metres from property line)
5. Pressure in main (MP 70 kPa = Medium Pressure and MAOP (Maximum Allowable Operating Pressure)
6. Off-line Service – service may not be straight line to meter. (**WARNING – OLS may not always be shown on plan**. See item **Error: Reference source not found** above)
7. Service Valve in the vicinity
   (**NOTE:** Service Valve may be **"BURIED"**)
8. Pre-laid Service laid in Common Trench
9. Main Status: (See **WARNINGS** page 1)
   9a. AB = Abandoned Mains
   9b. PROP = Proposed Mains
10. Customer Connection: Does not indicate actual location of Meter Position
    D2 (D = Domestic & 2 = Number of Meters)
    C1 (C = Commercial & 1 = Number of Meters)
11. **Additional detail available and Must be obtained if within area of proposed works – see page 2 above.**
12. Depth of Cover (DOC) in metres.

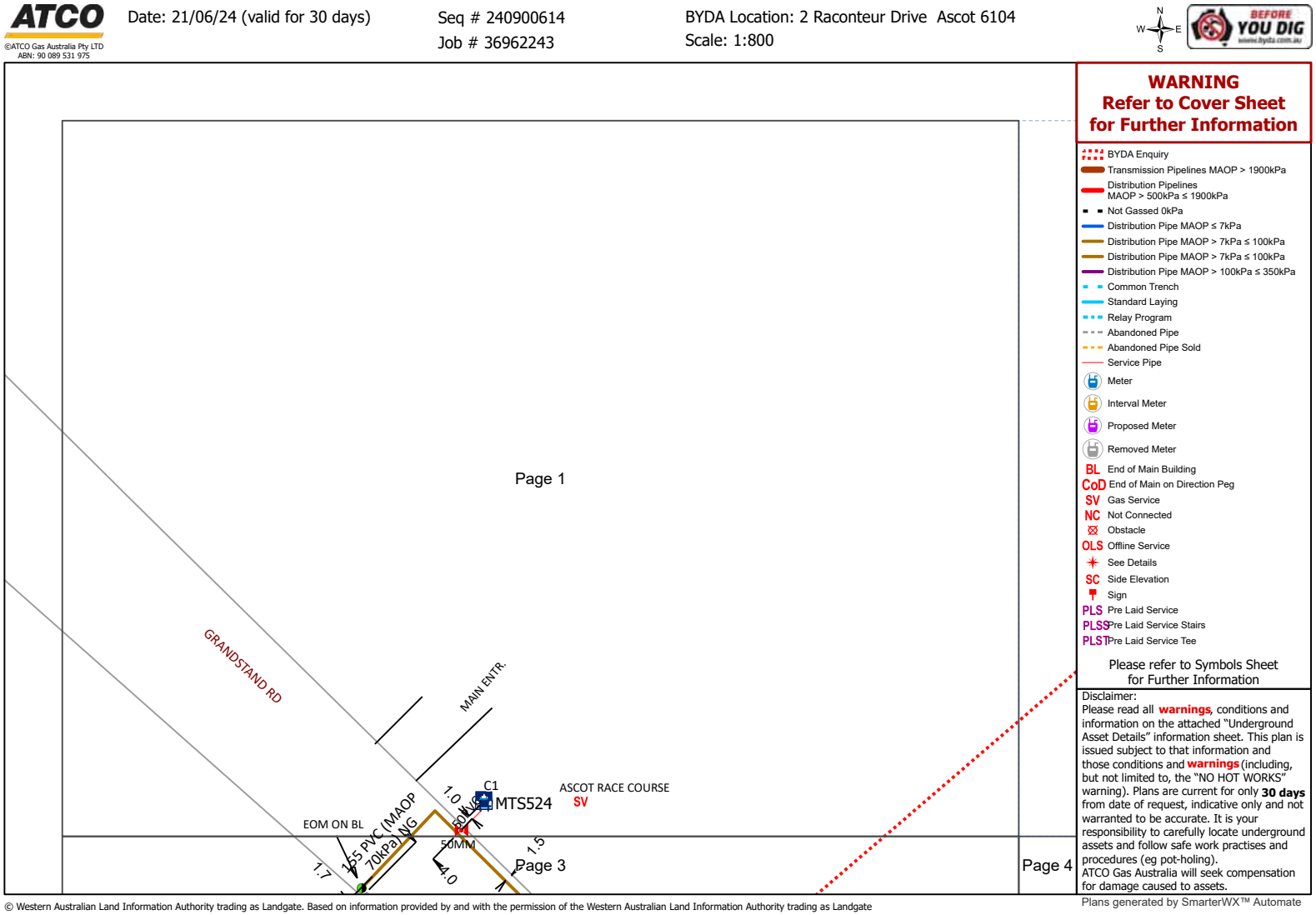


IF UNSURE, PLEASE CONTACT ATCO ON **1300 926 755**

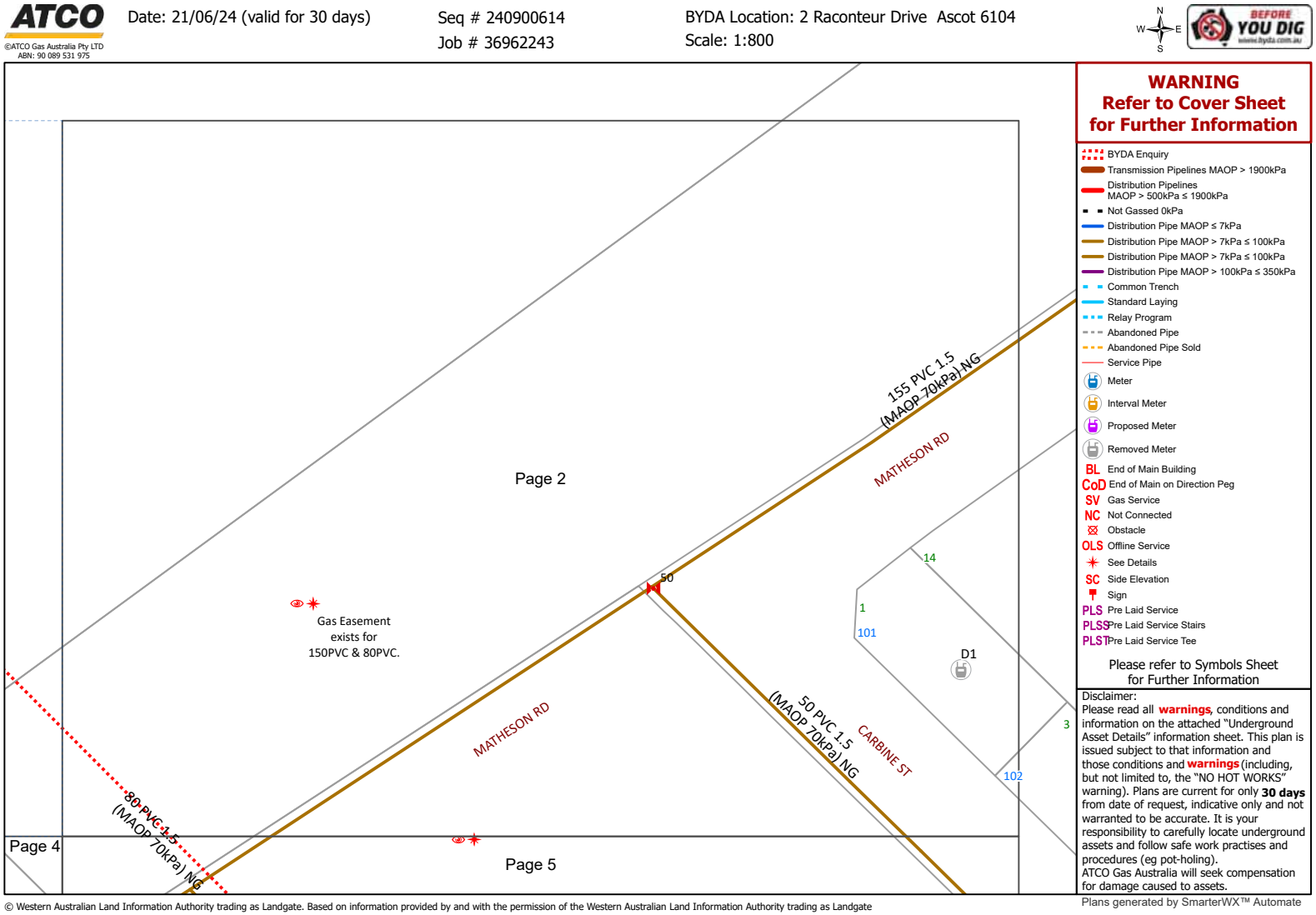
Attachment 12.1.4 Engineering Servicing Report



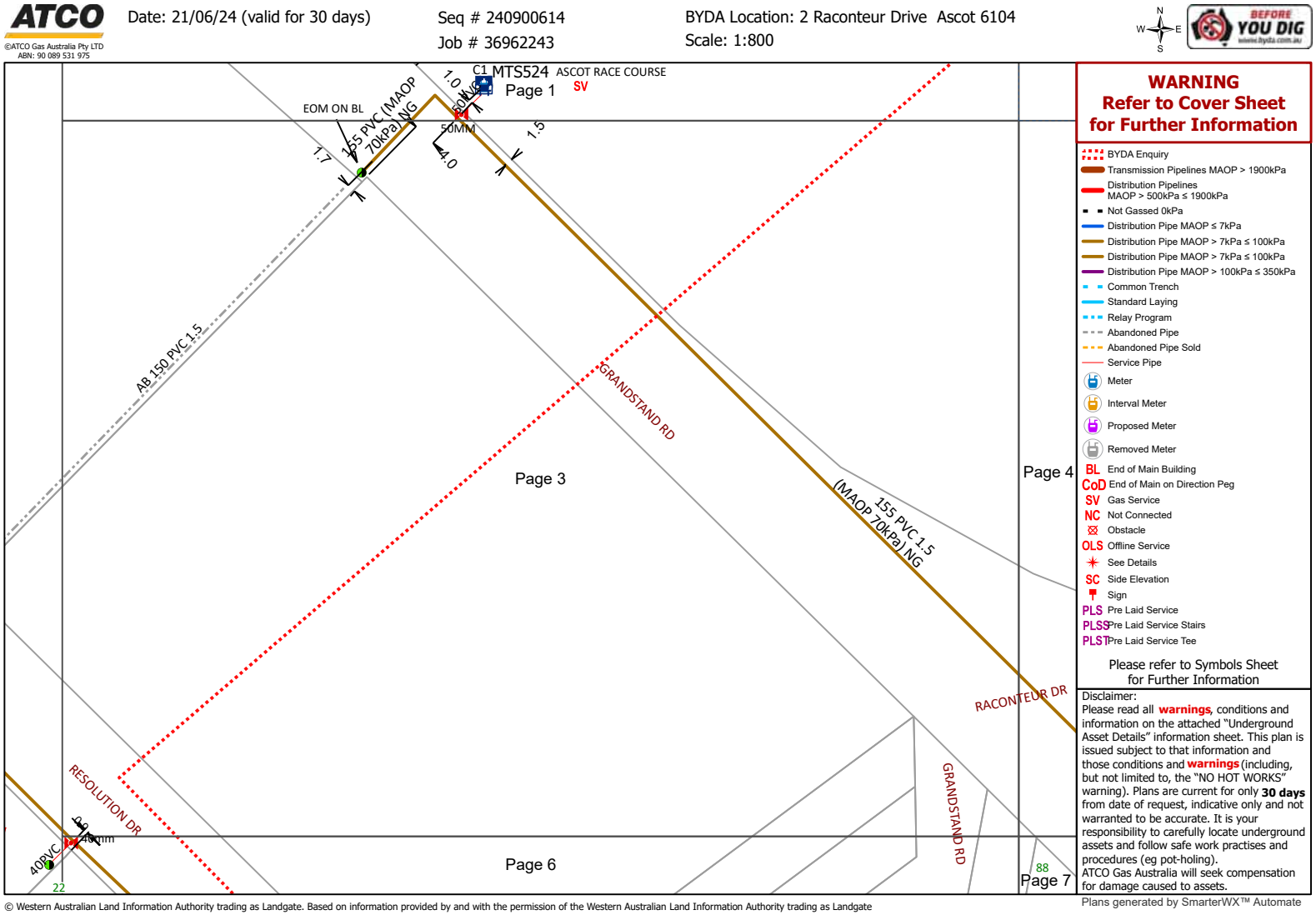
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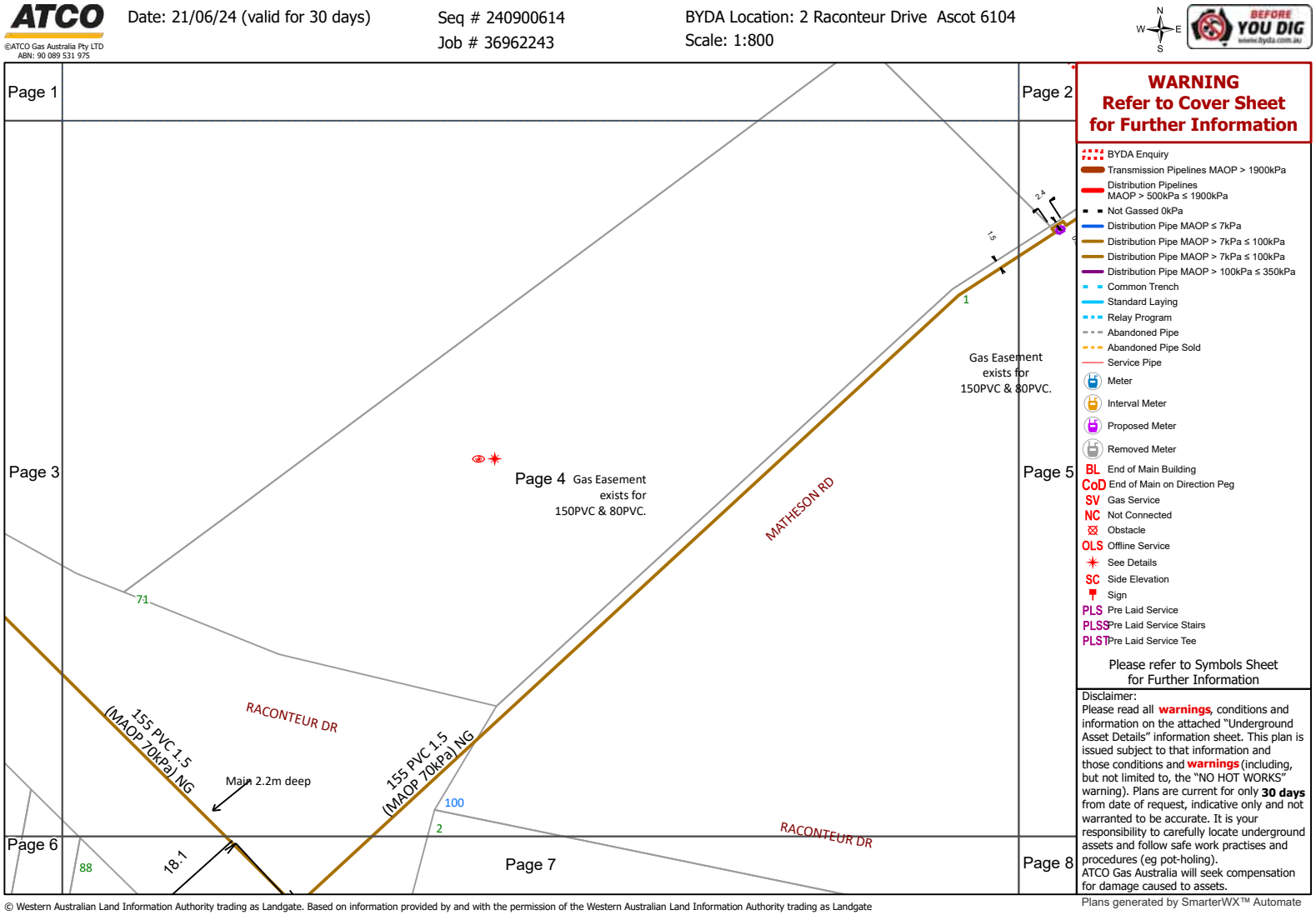
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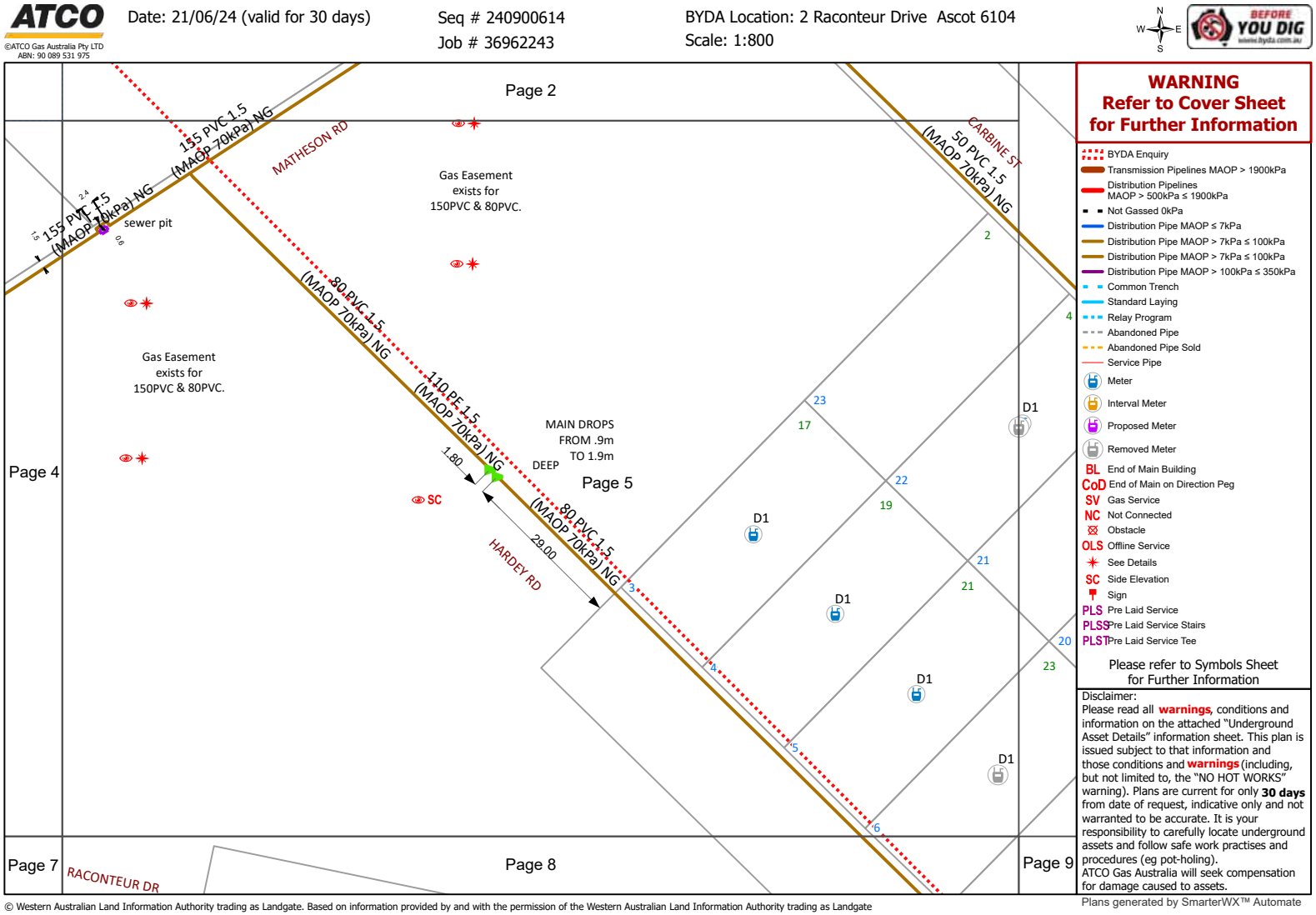
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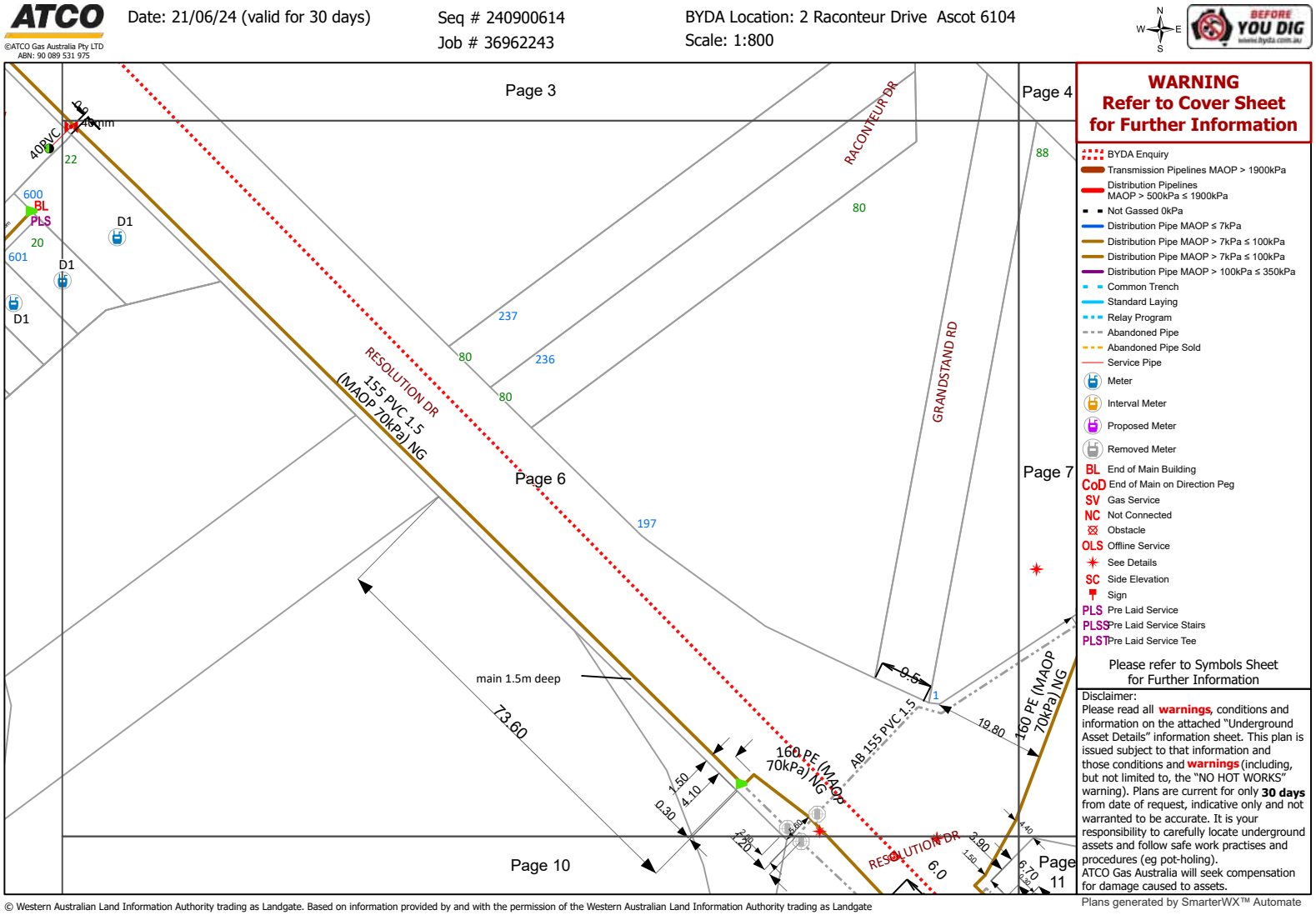
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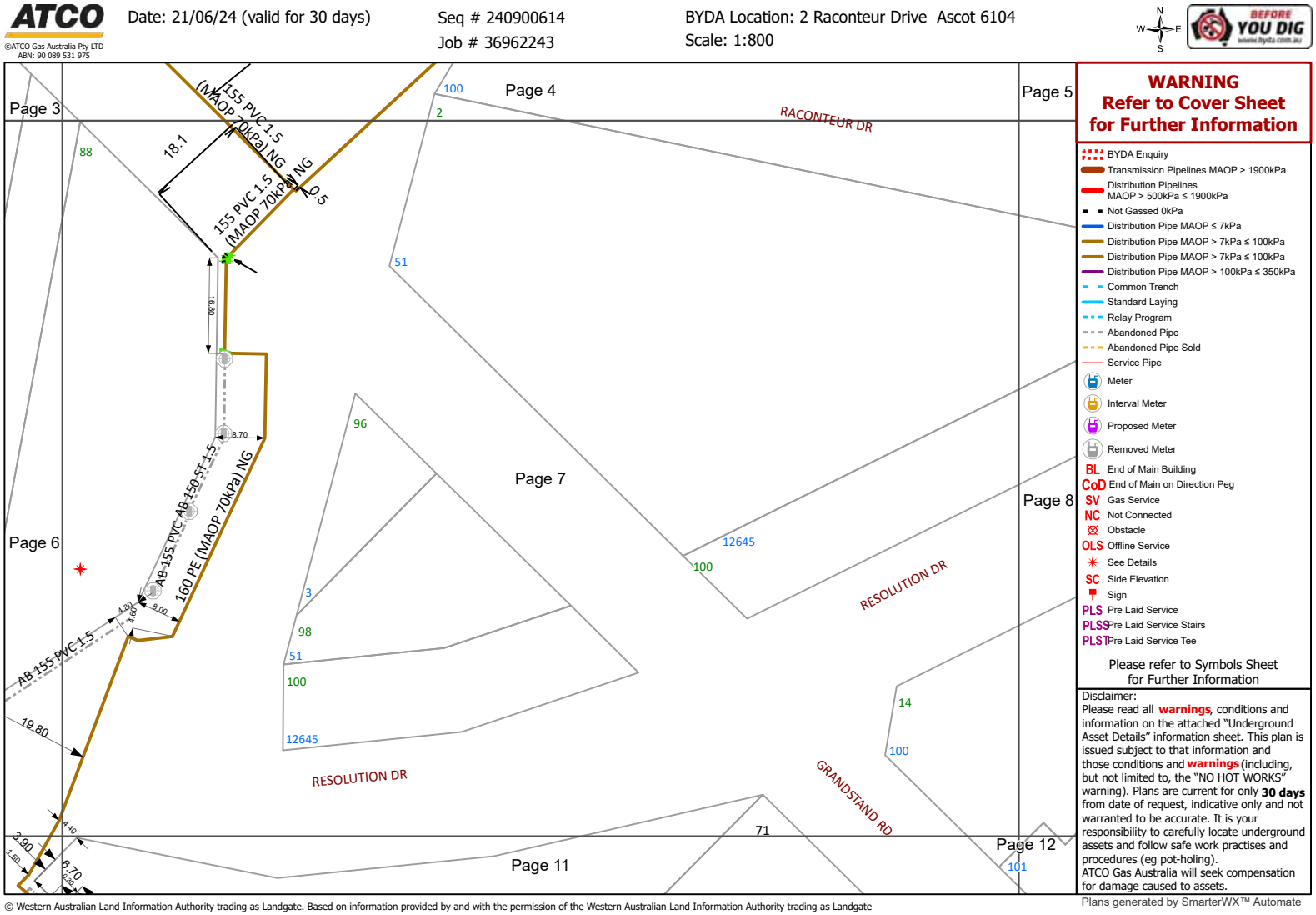
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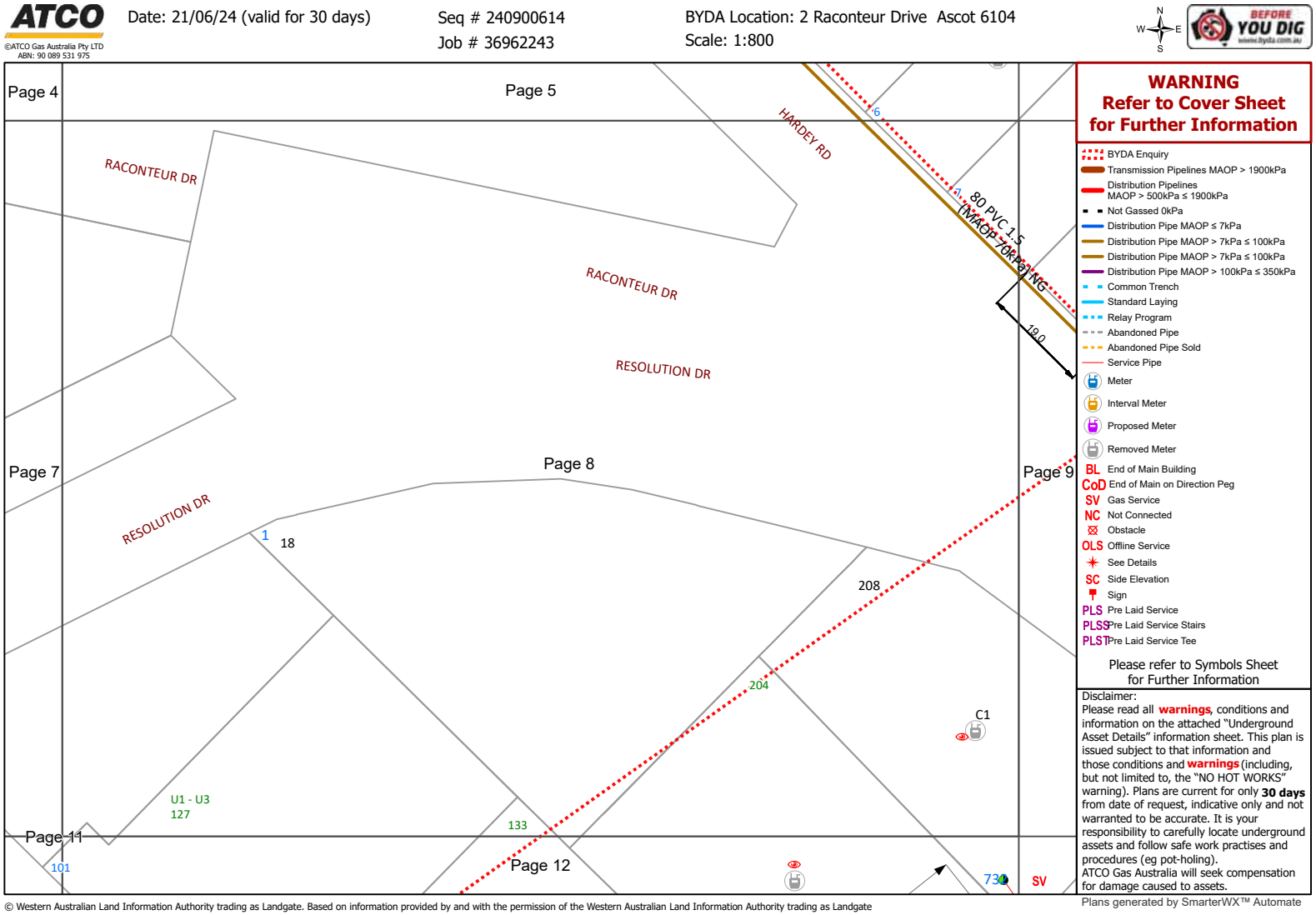
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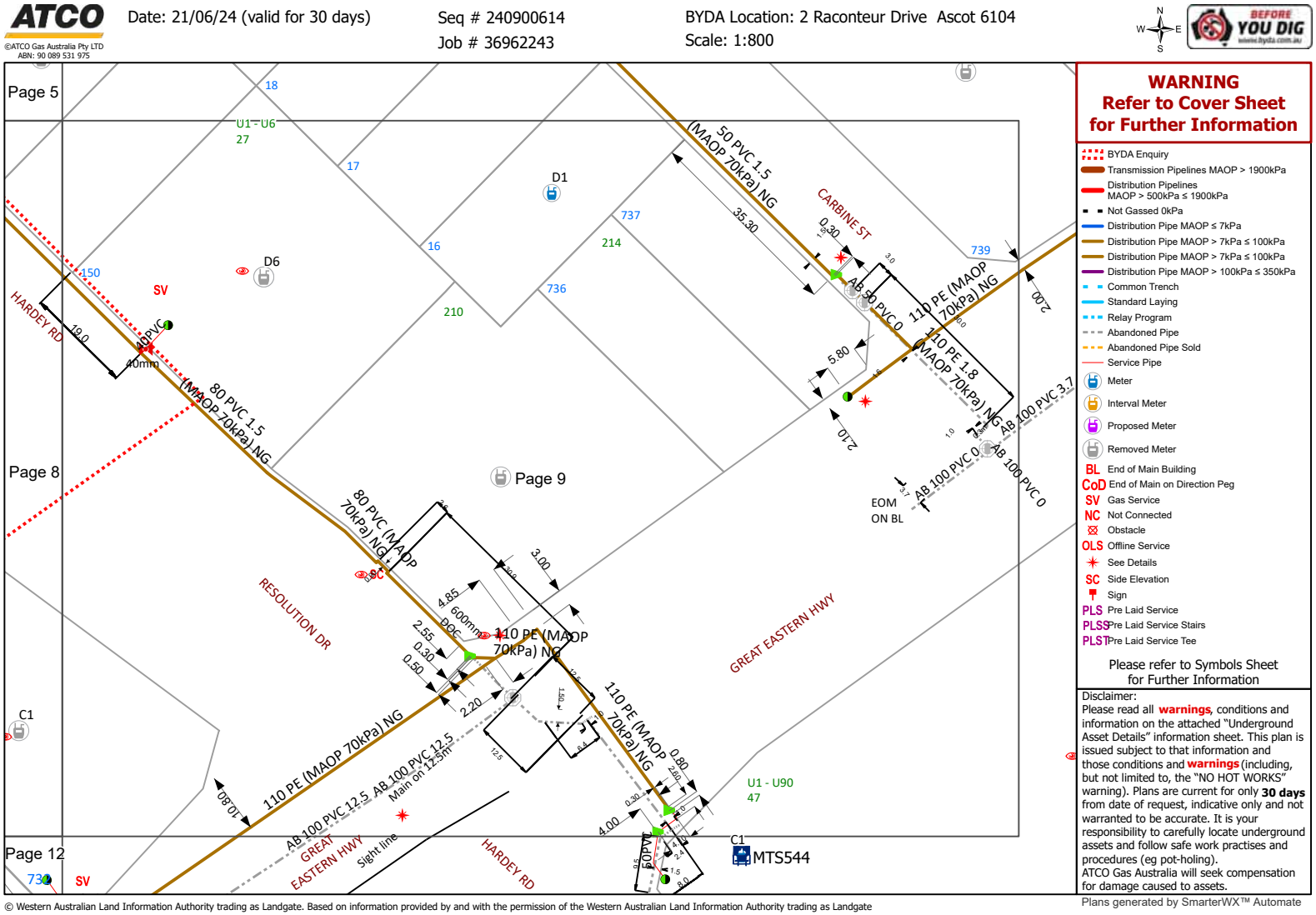
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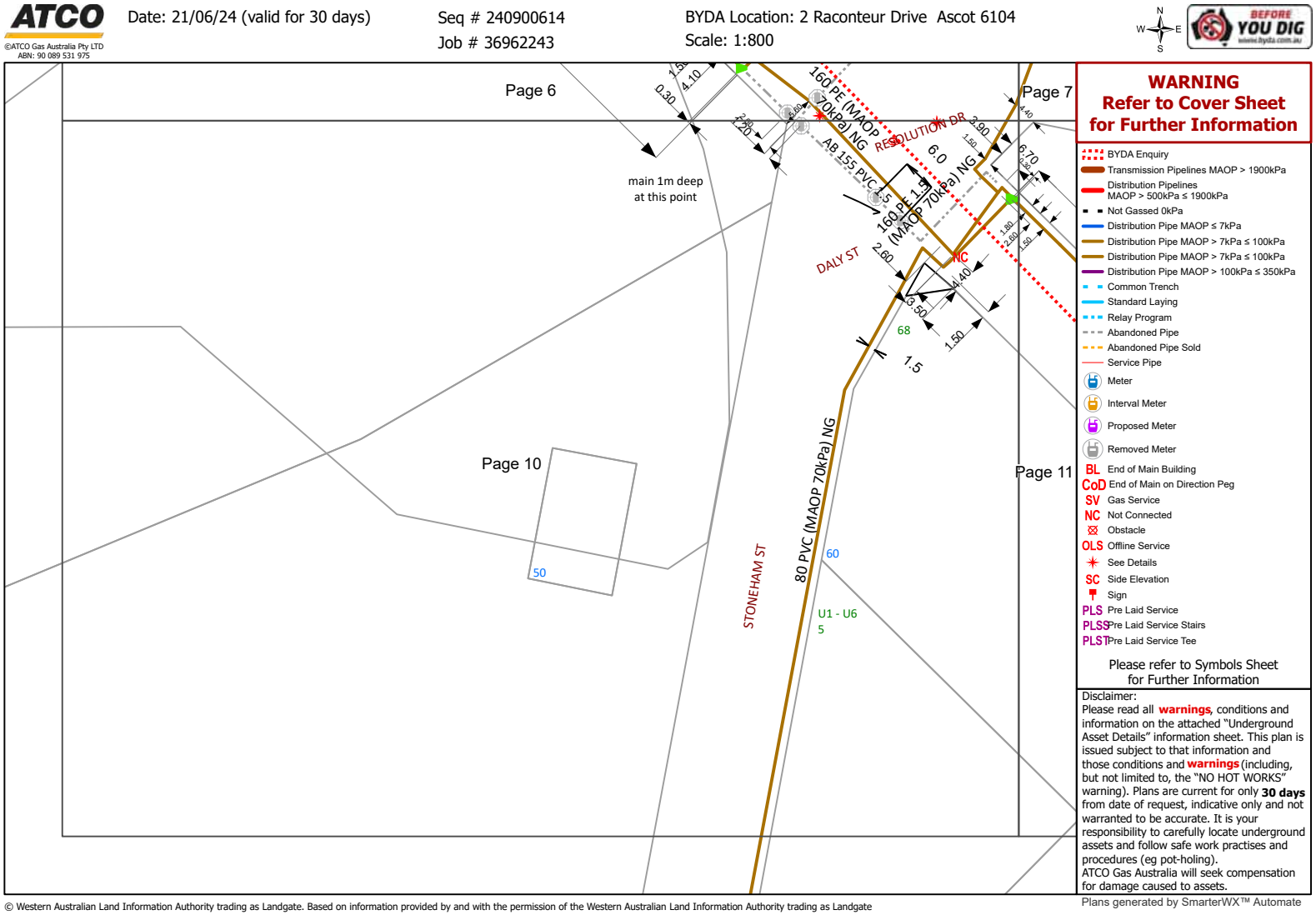
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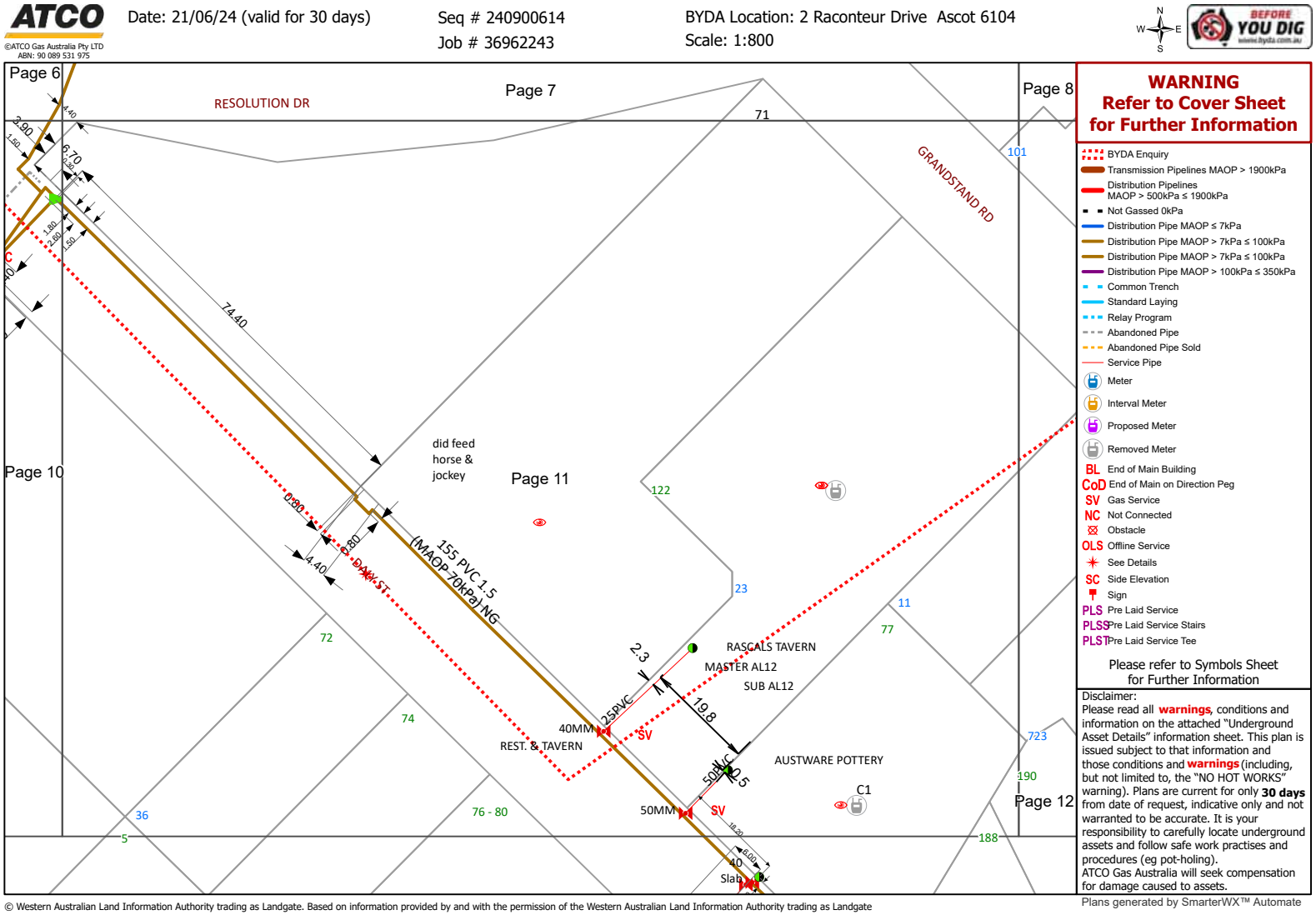
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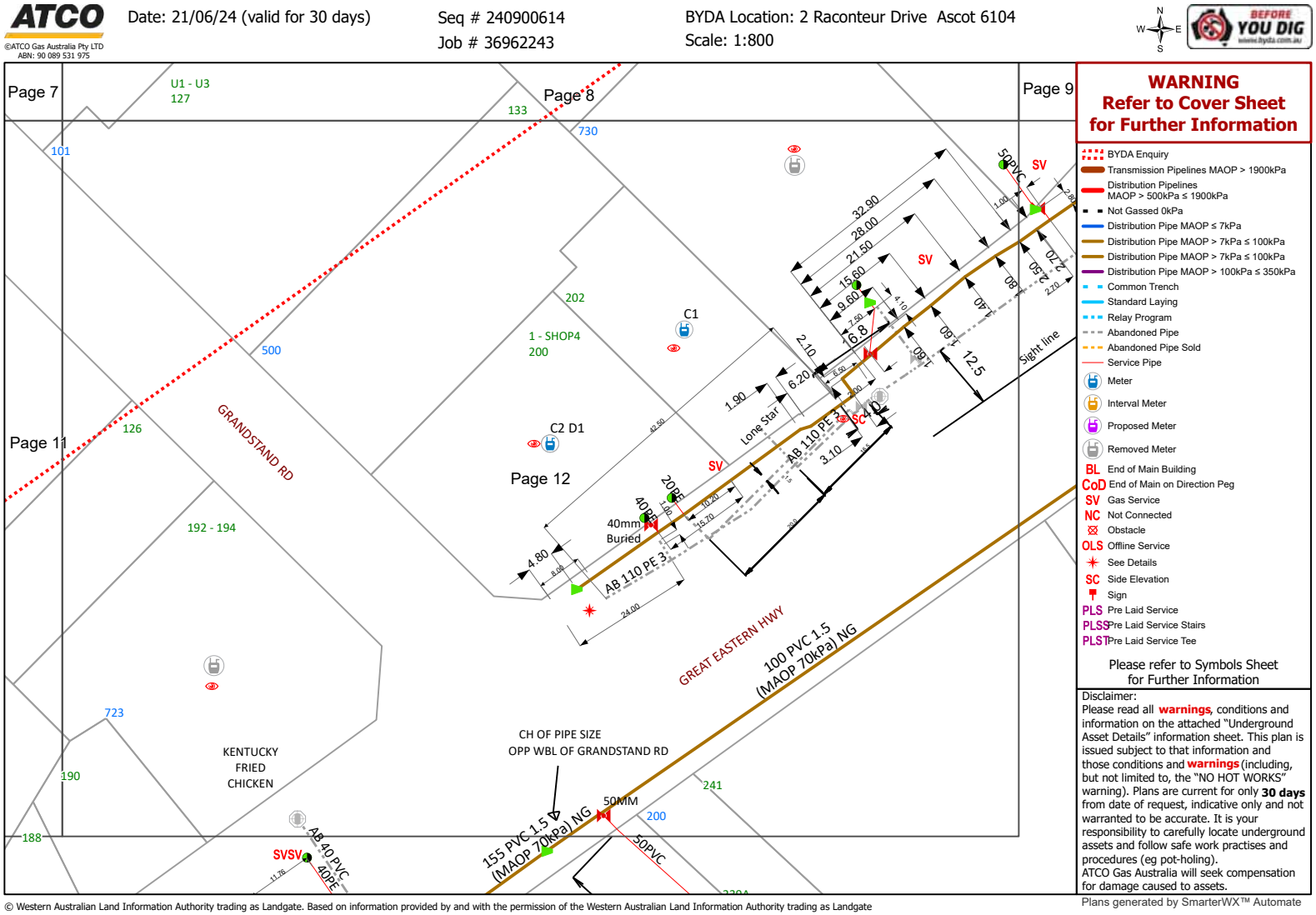
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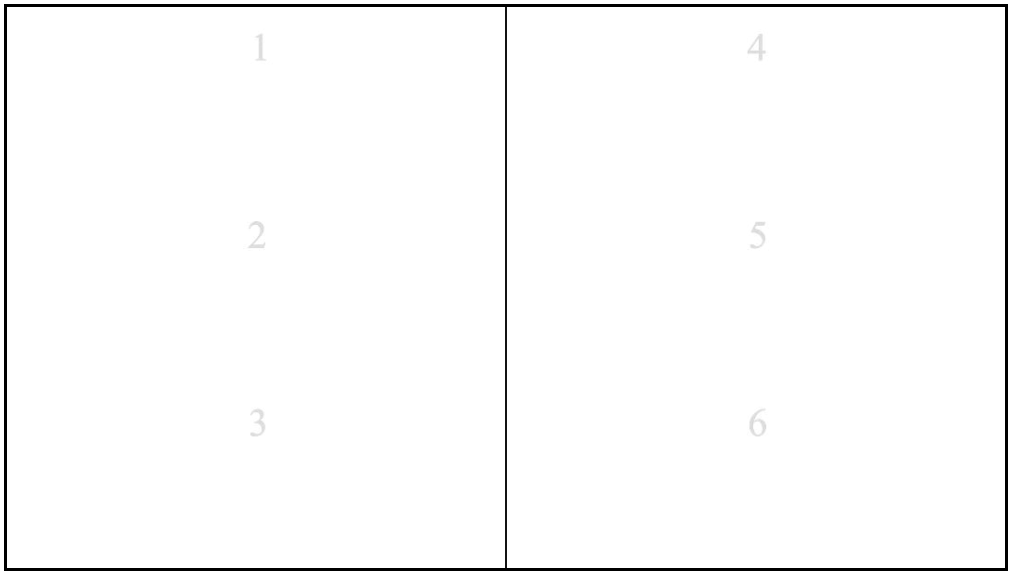


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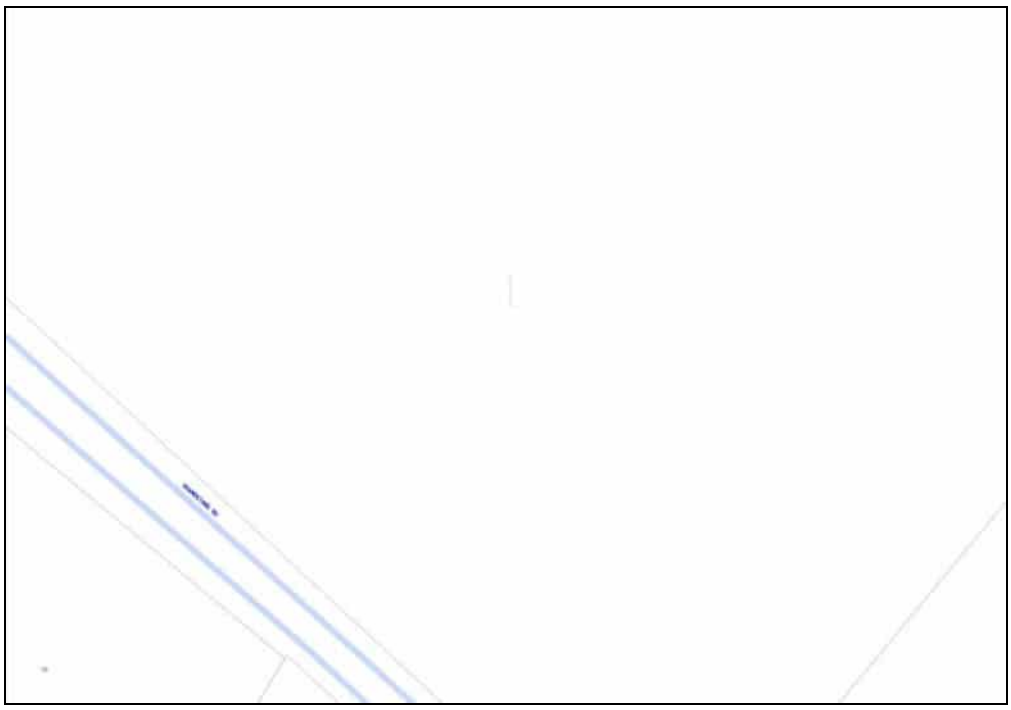
To:	Justin Zielinski
Phone:	Not Supplied
Fax:	Not Supplied
Email:	jzielinski@tabec.com.au

Dial before you dig Job #:	36962243
Sequence #	240900610
Issue Date:	21/06/2024
Location:	2 Raconteur Drive , Ascot , WA , 6104

Indicative Plans are tiled below to demonstrate how to layout and read nbn asset plans



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Emergency Contacts

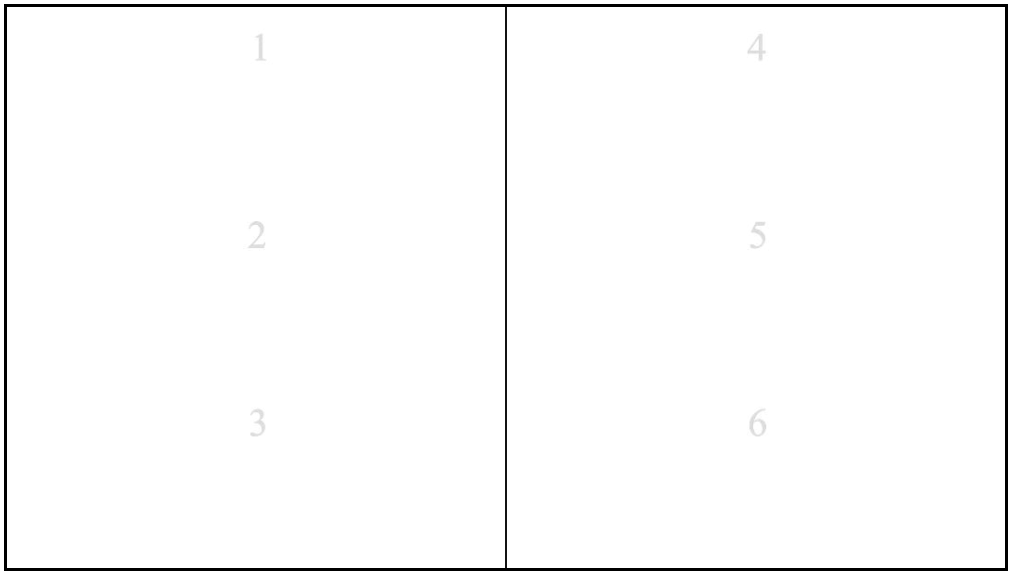
You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

Attachment 12.1.4 Engineering Servicing Report

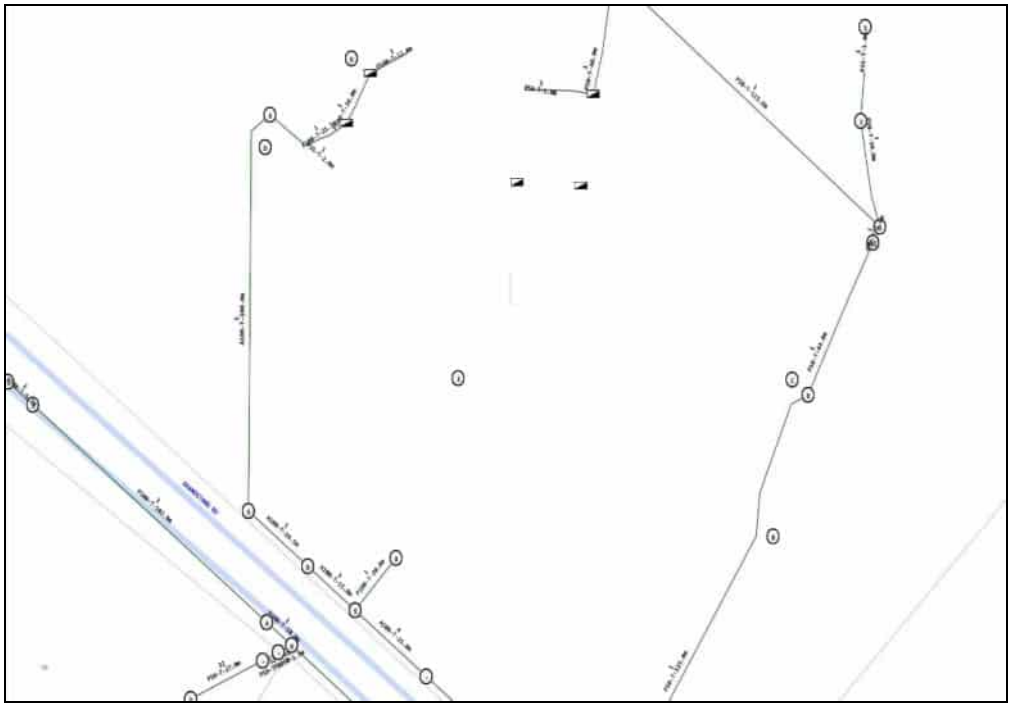
To:	Justin Zielinski
Phone:	Not Supplied
Fax:	Not Supplied
Email:	jzielinski@tabec.com.au

Dial before you dig Job #:	36962243
Sequence #	240900610
Issue Date:	21/06/2024
Location:	2 Raconteur Drive , Ascot , WA , 6104

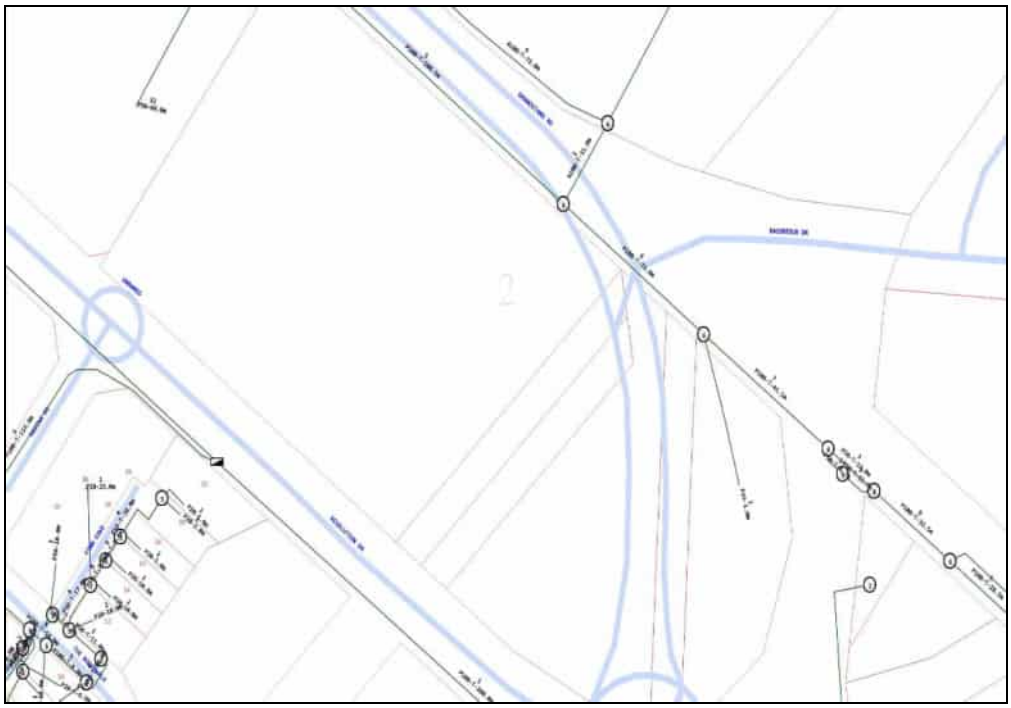
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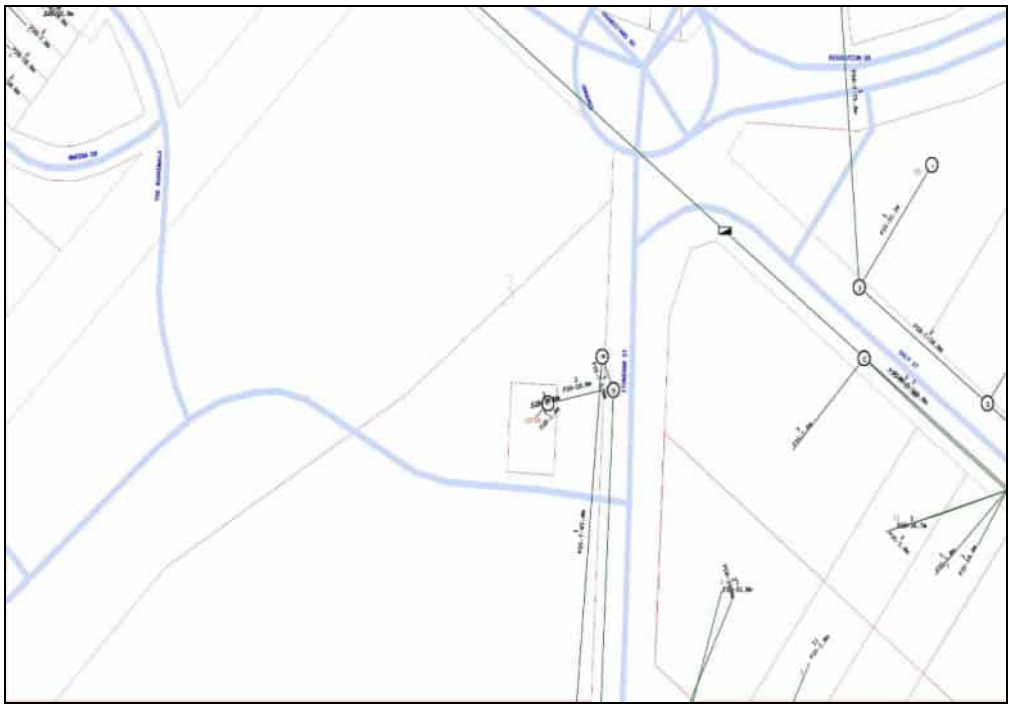
Attachment 12.1.4 Engineering Servicing Report



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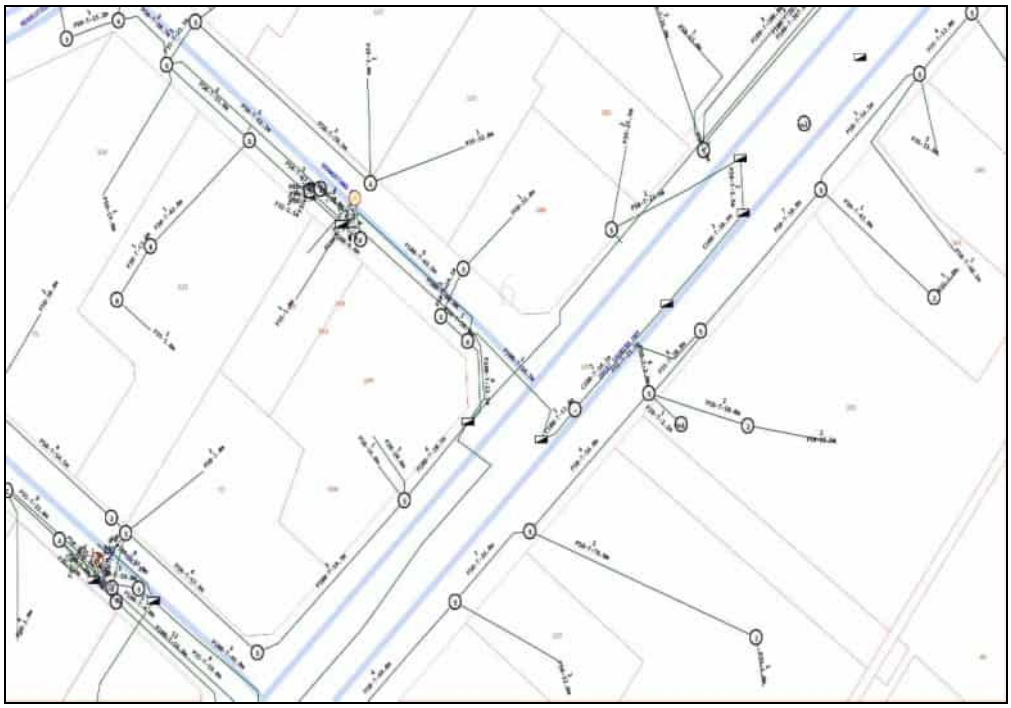
Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



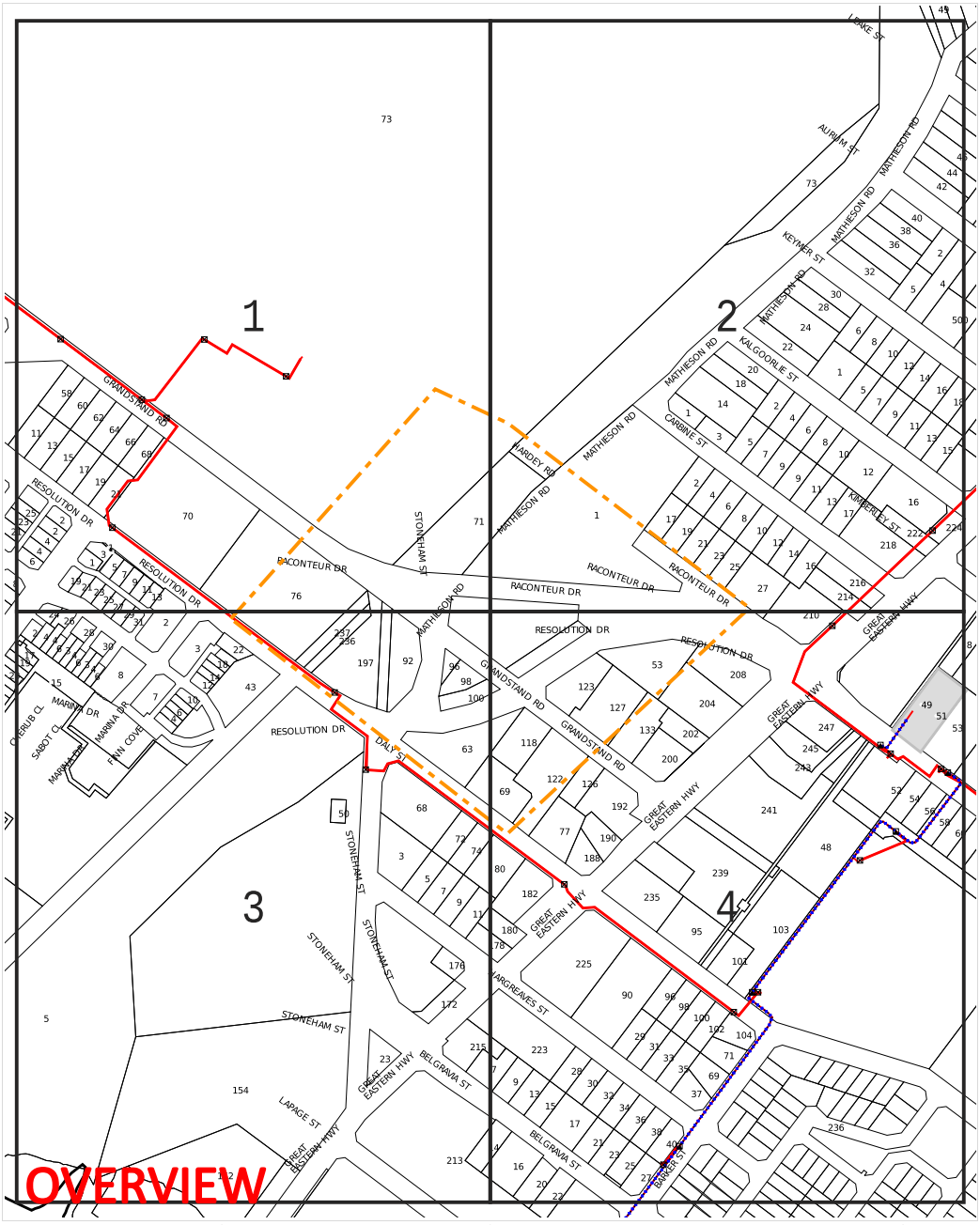
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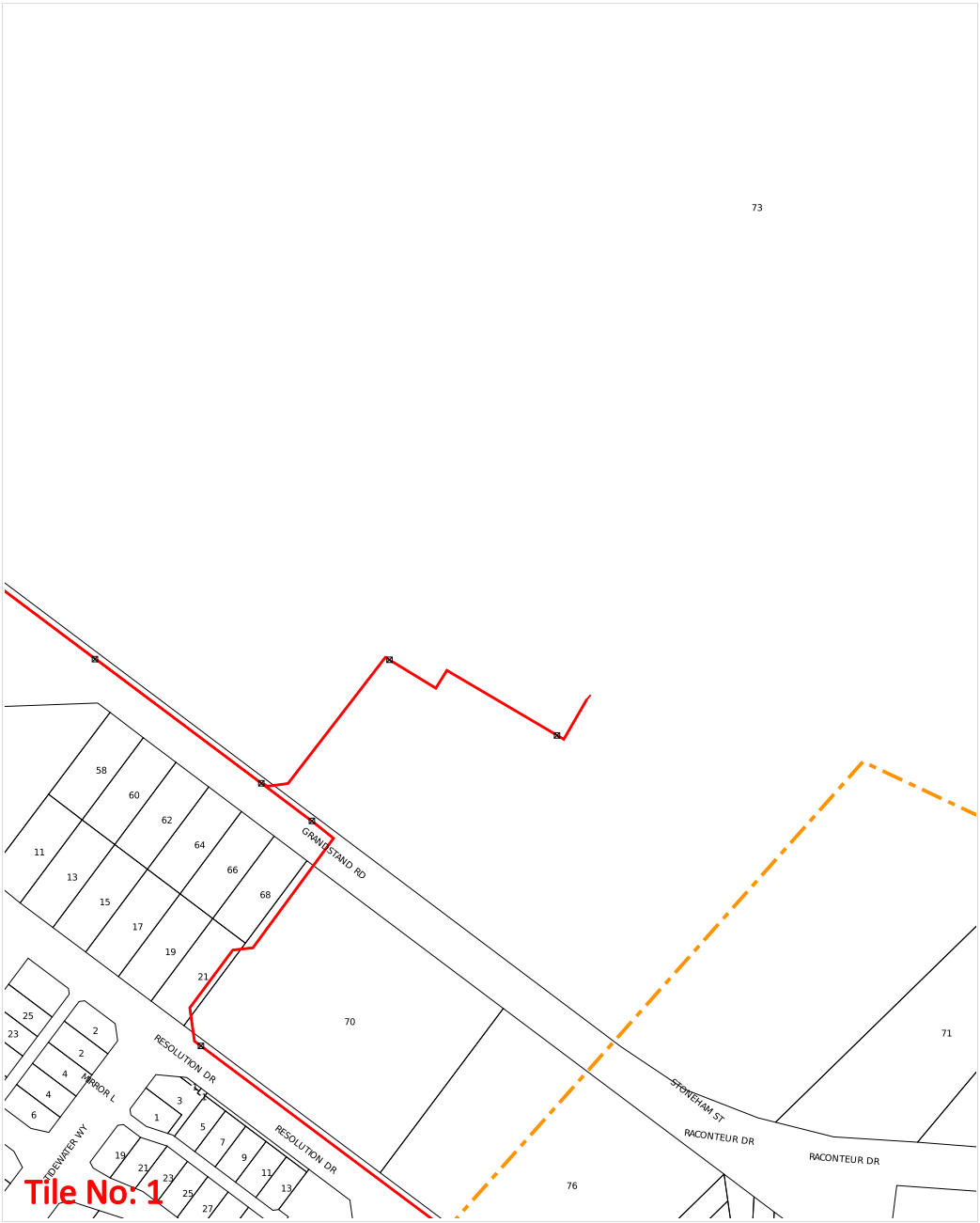
Sequence Number: 240900607

Date Generated: 21 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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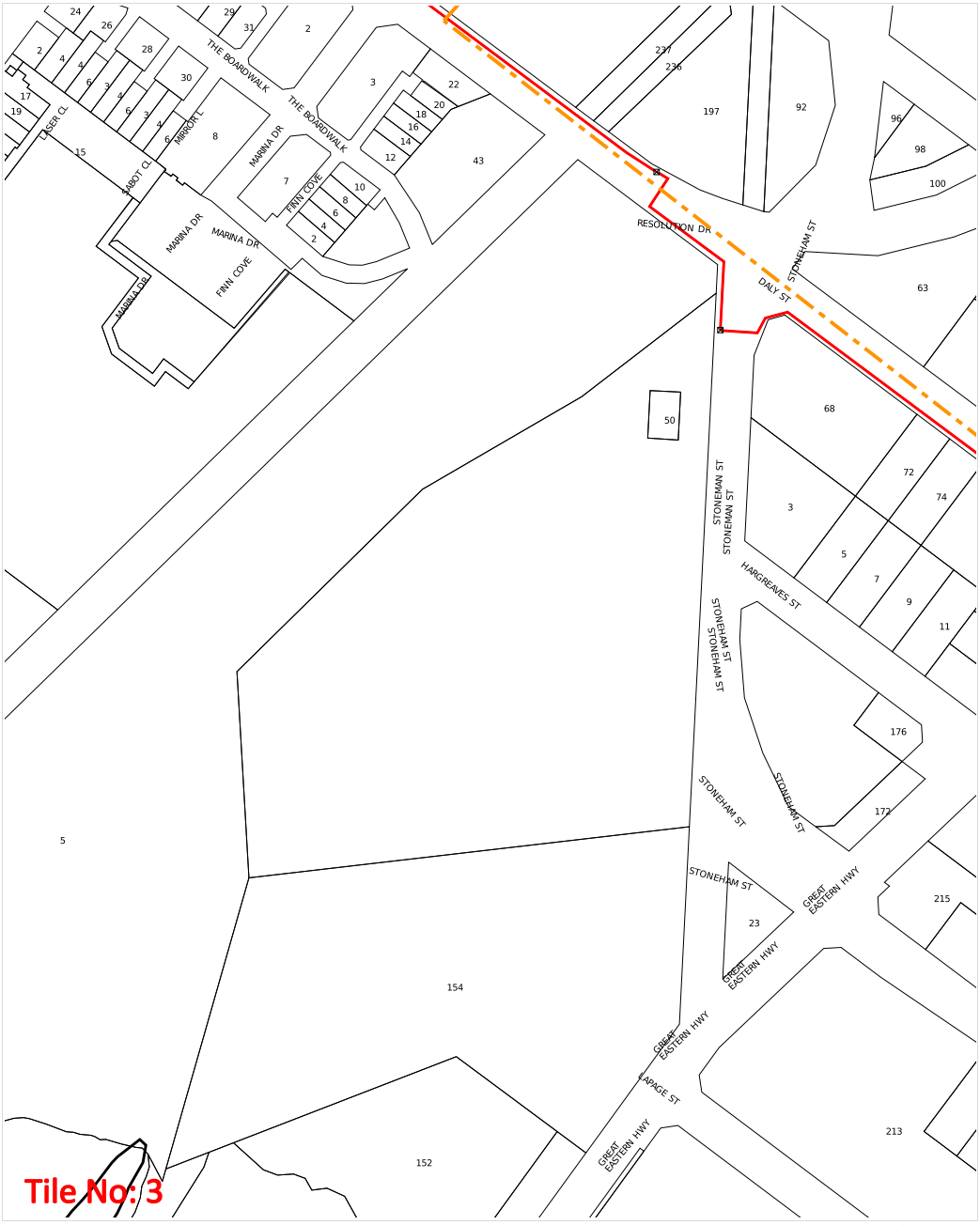
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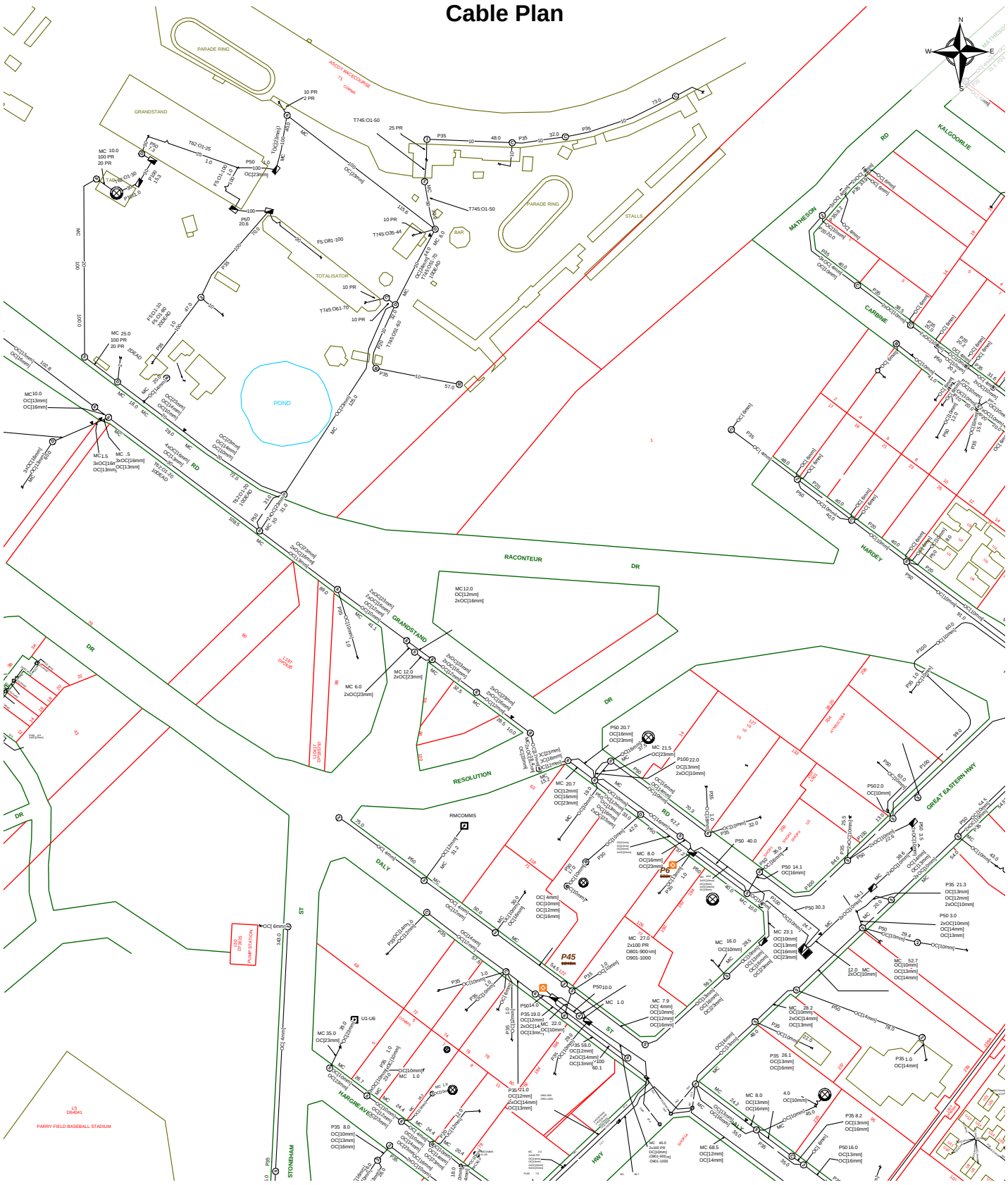
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For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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Attachment 12.1.4 Engineering Servicing Report

Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900612
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:39	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

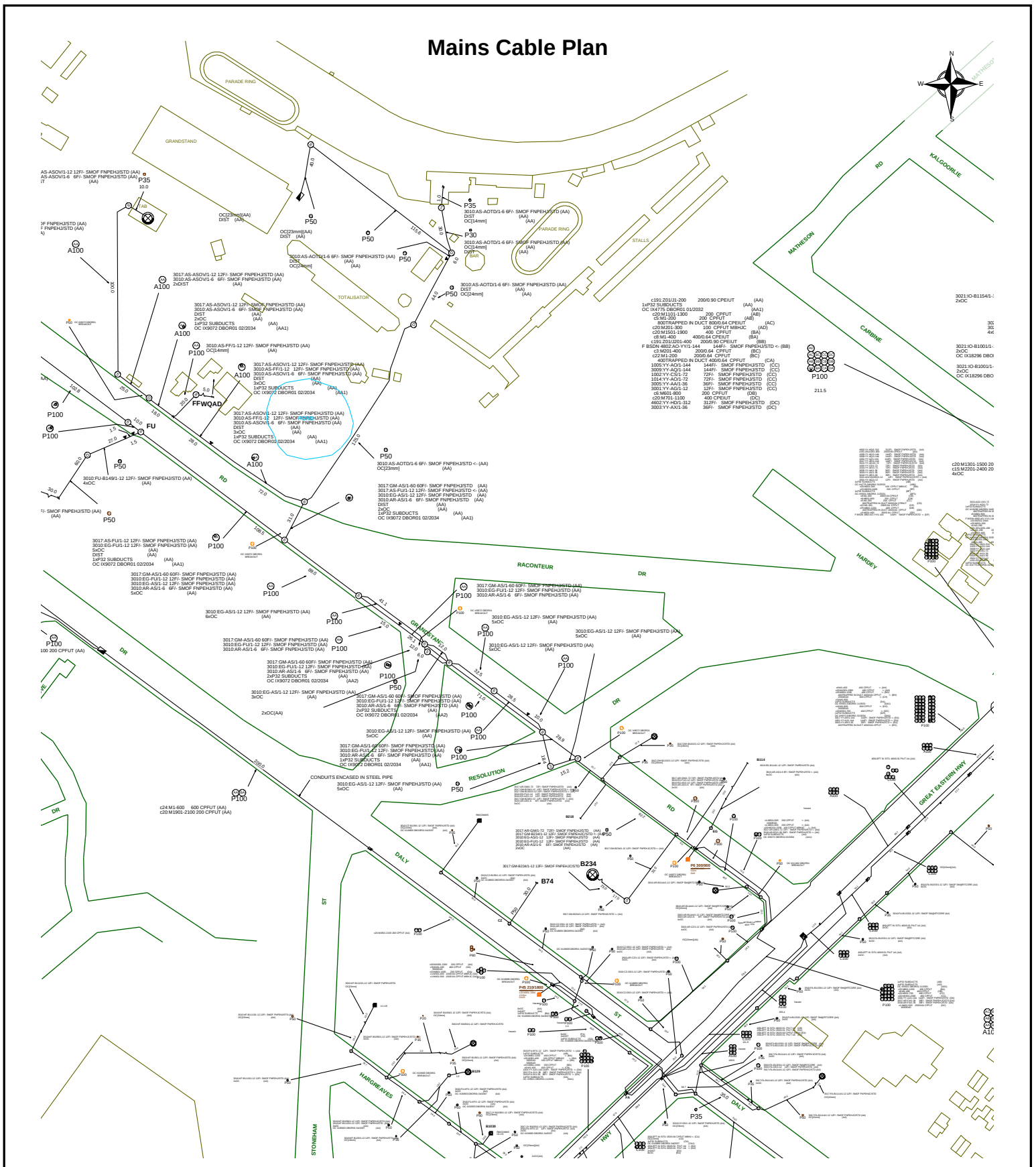
WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

Attachment 12.1.4 Engineering Servicing Report

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900612
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:45	

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
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Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
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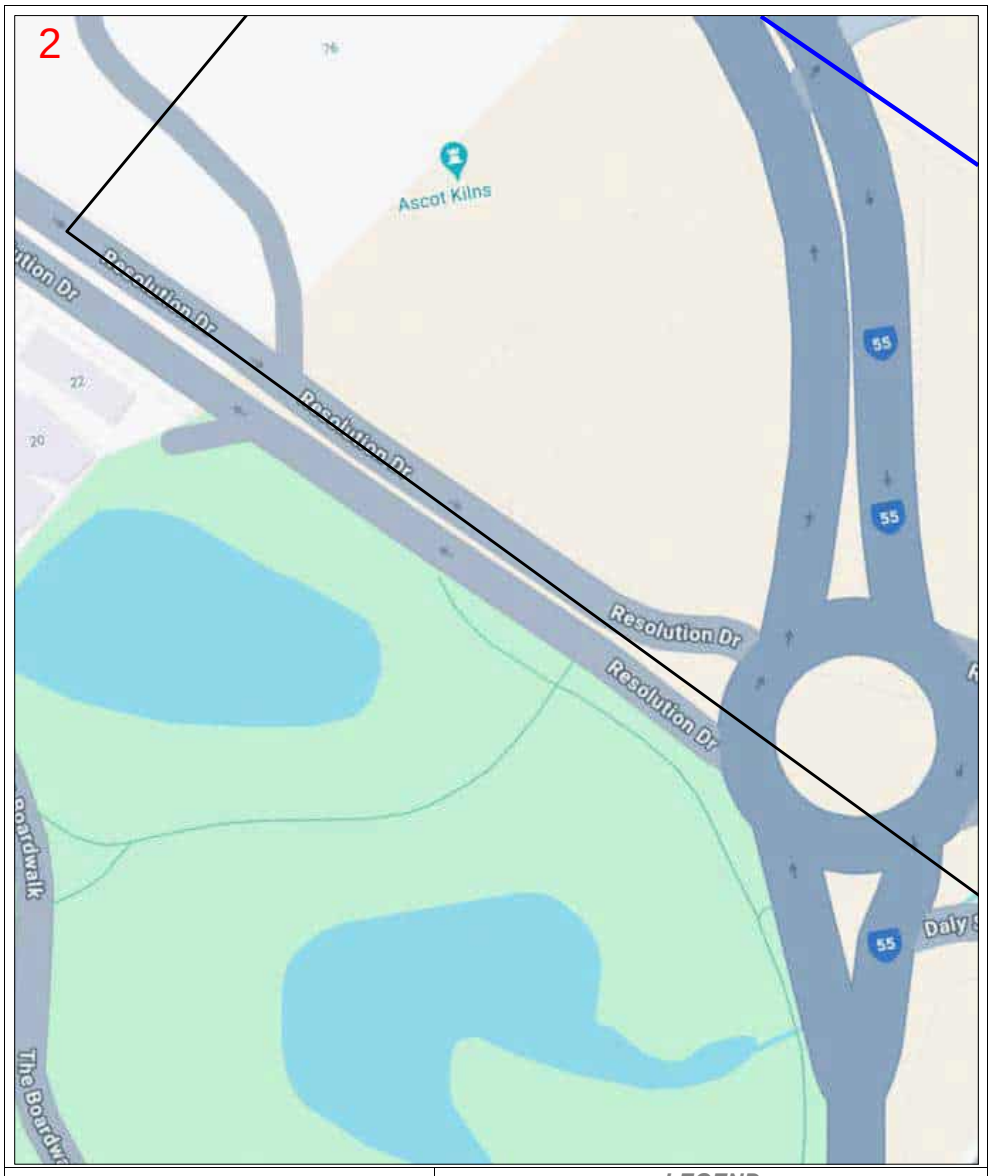
Page 2 of 2

Attachment 12.1.4 Engineering Servicing Report



Page 3

Attachment 12.1.4 Engineering Servicing Report



Enquiry Number: 240900609

Map Sheet: 2

Scale: 1: 750

0 0.008km

N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Enquiry Number: 240900609

Map Sheet: 3

Scale: 1: 750

0 0.008km

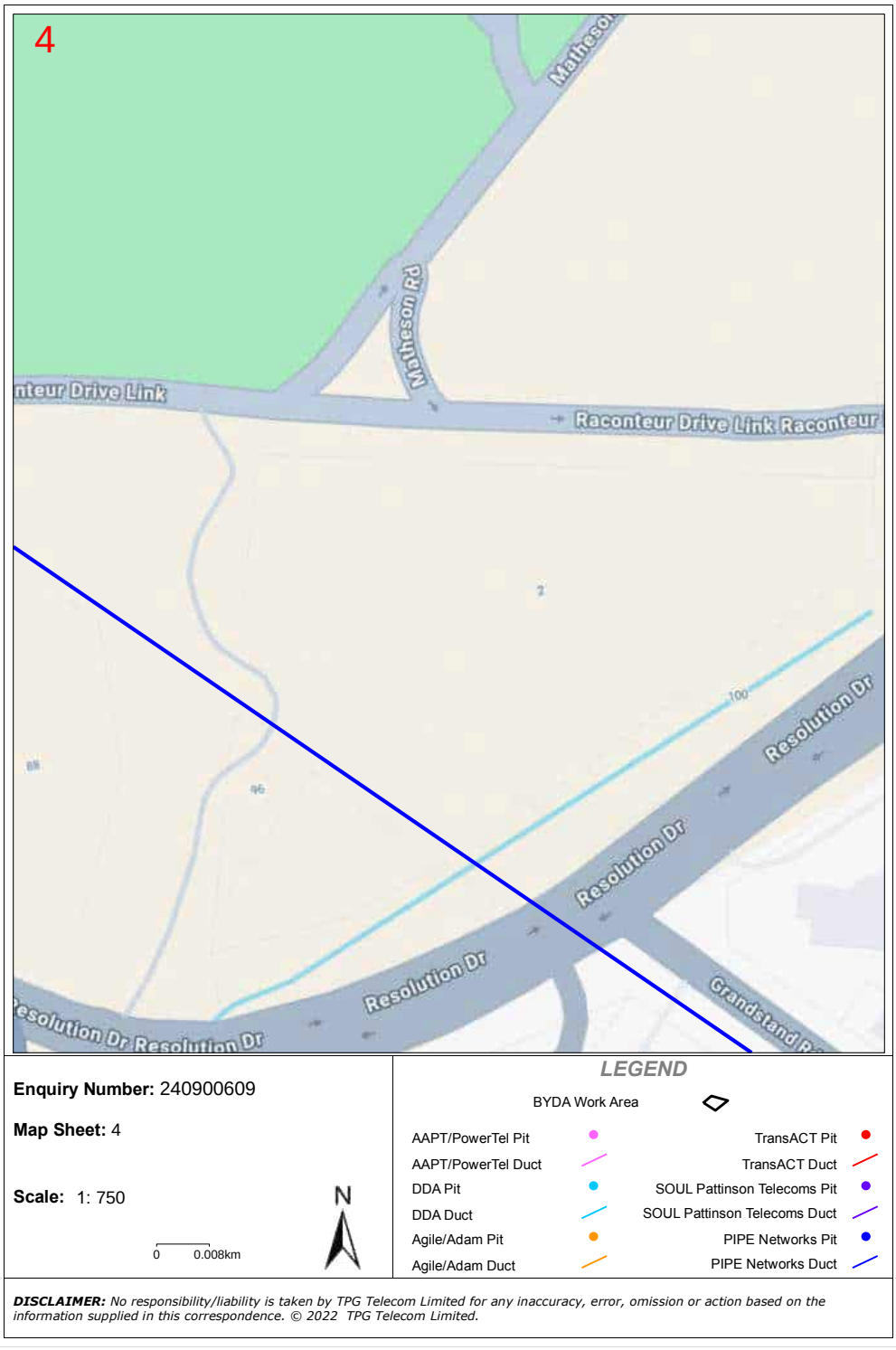
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LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

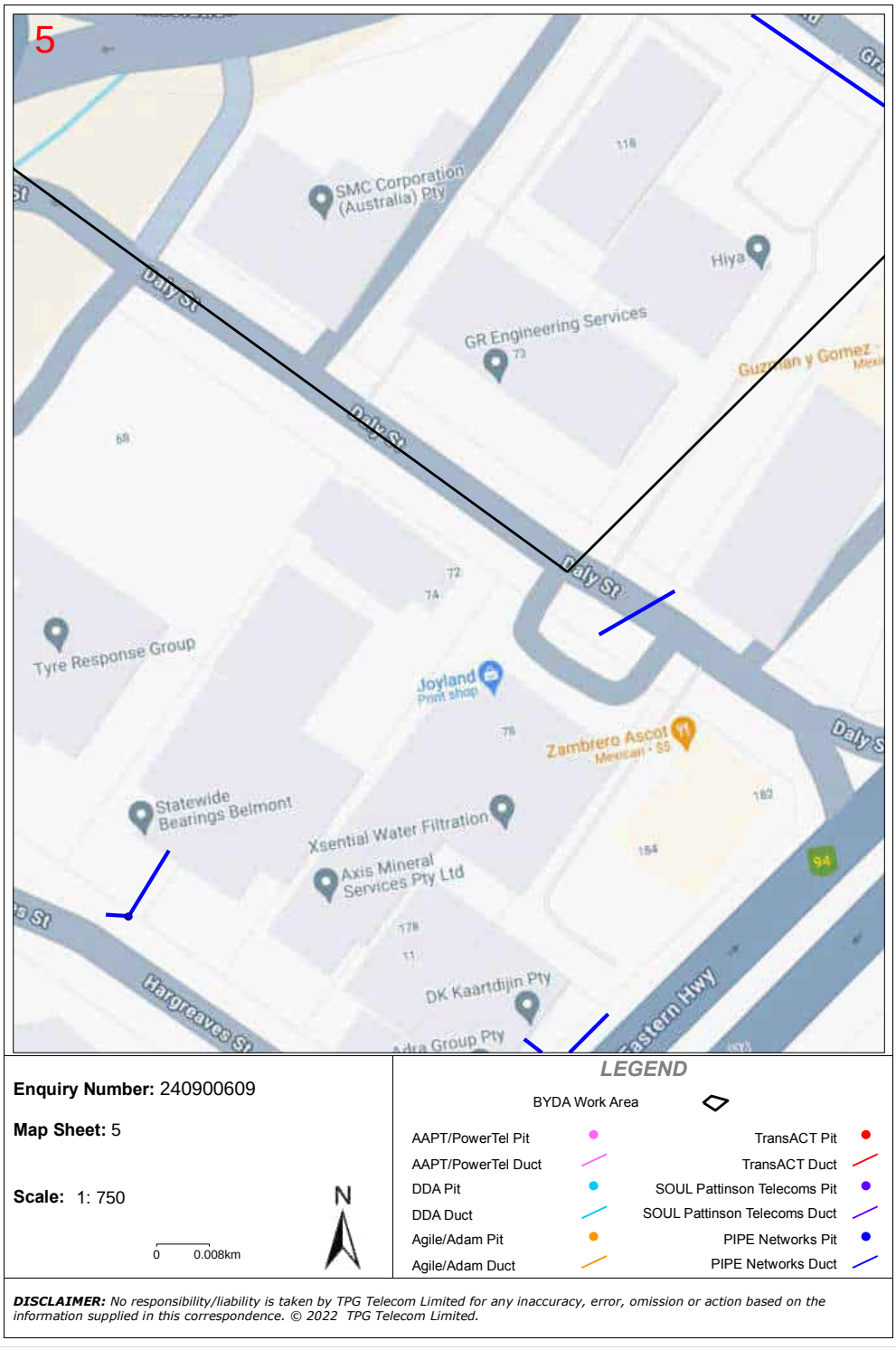
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Page 6

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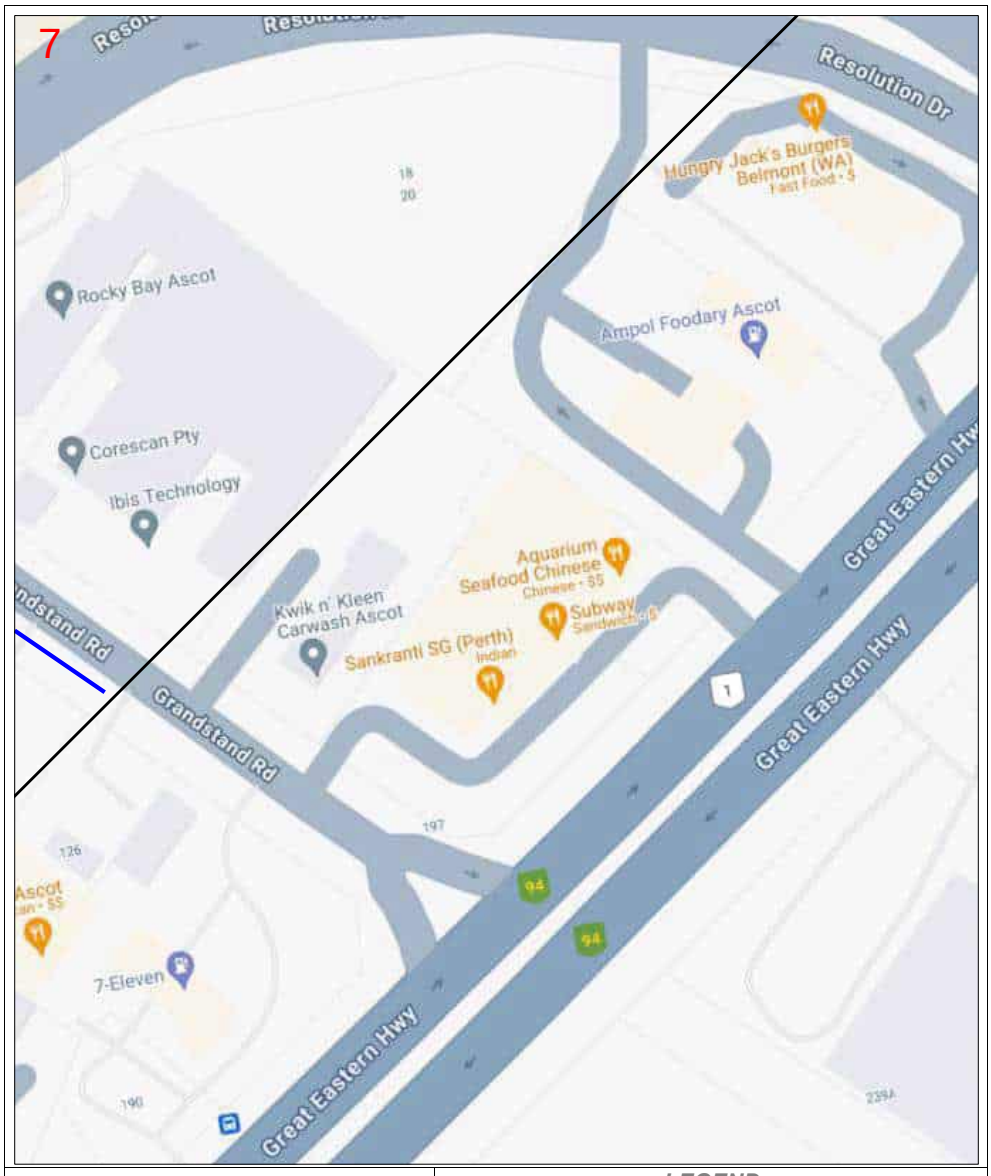
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Attachment 12.1.4 Engineering Servicing Report



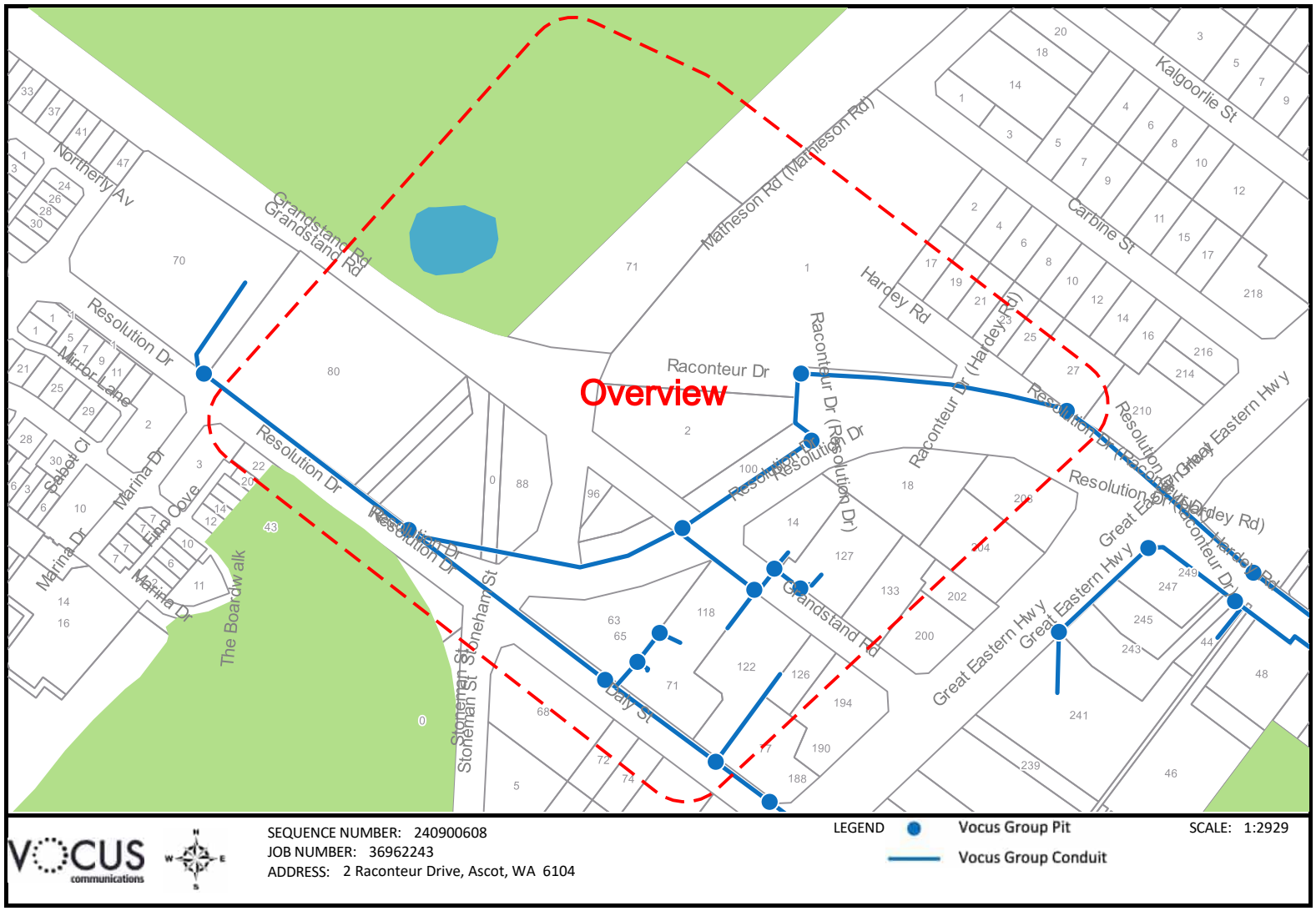
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Attachment 12.1.4 Engineering Servicing Report



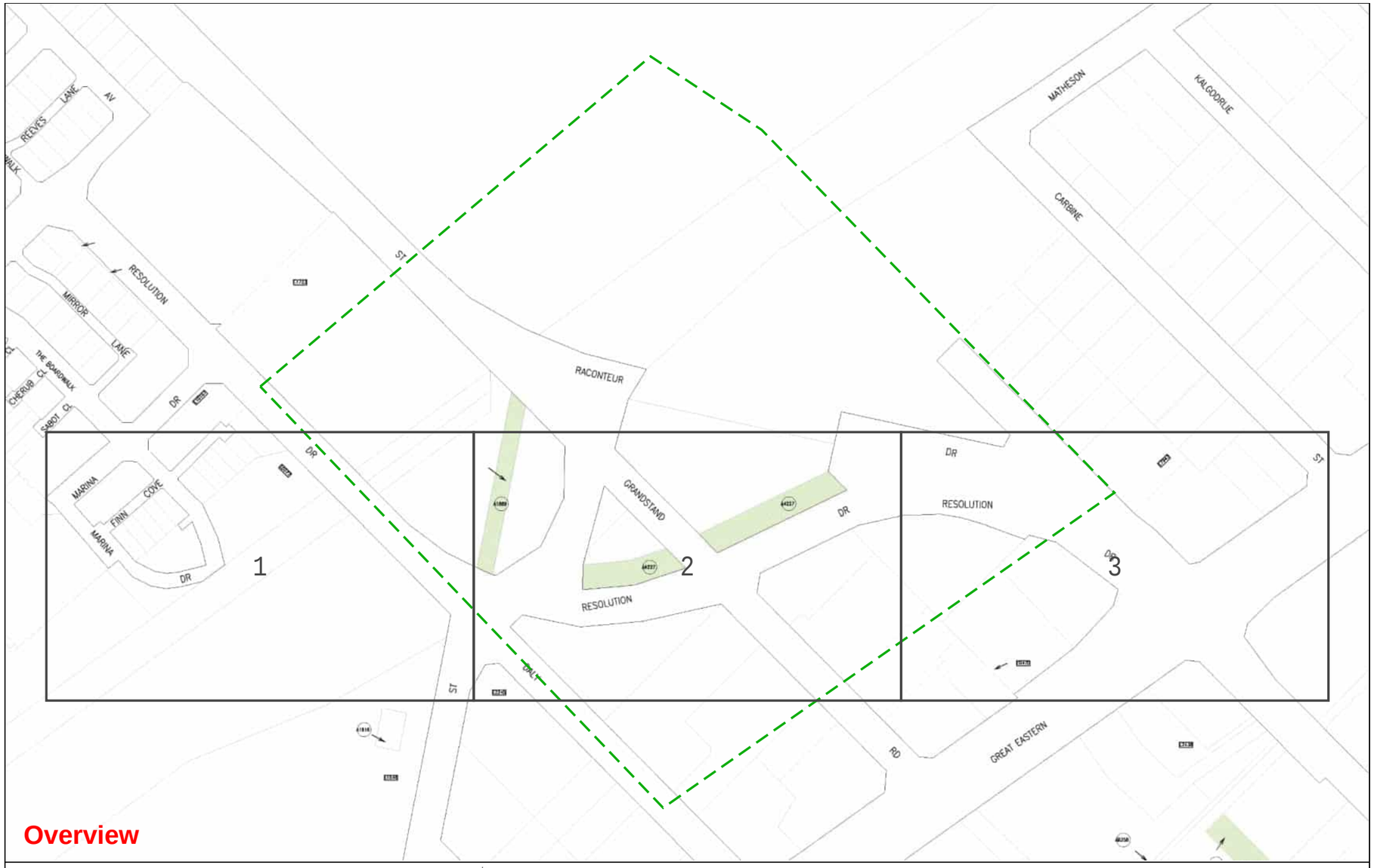
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The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.

Attachment 12.1.4 Engineering Servicing Report



Overview

WATER CORPORATION

Scale: 1:2392
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024

N

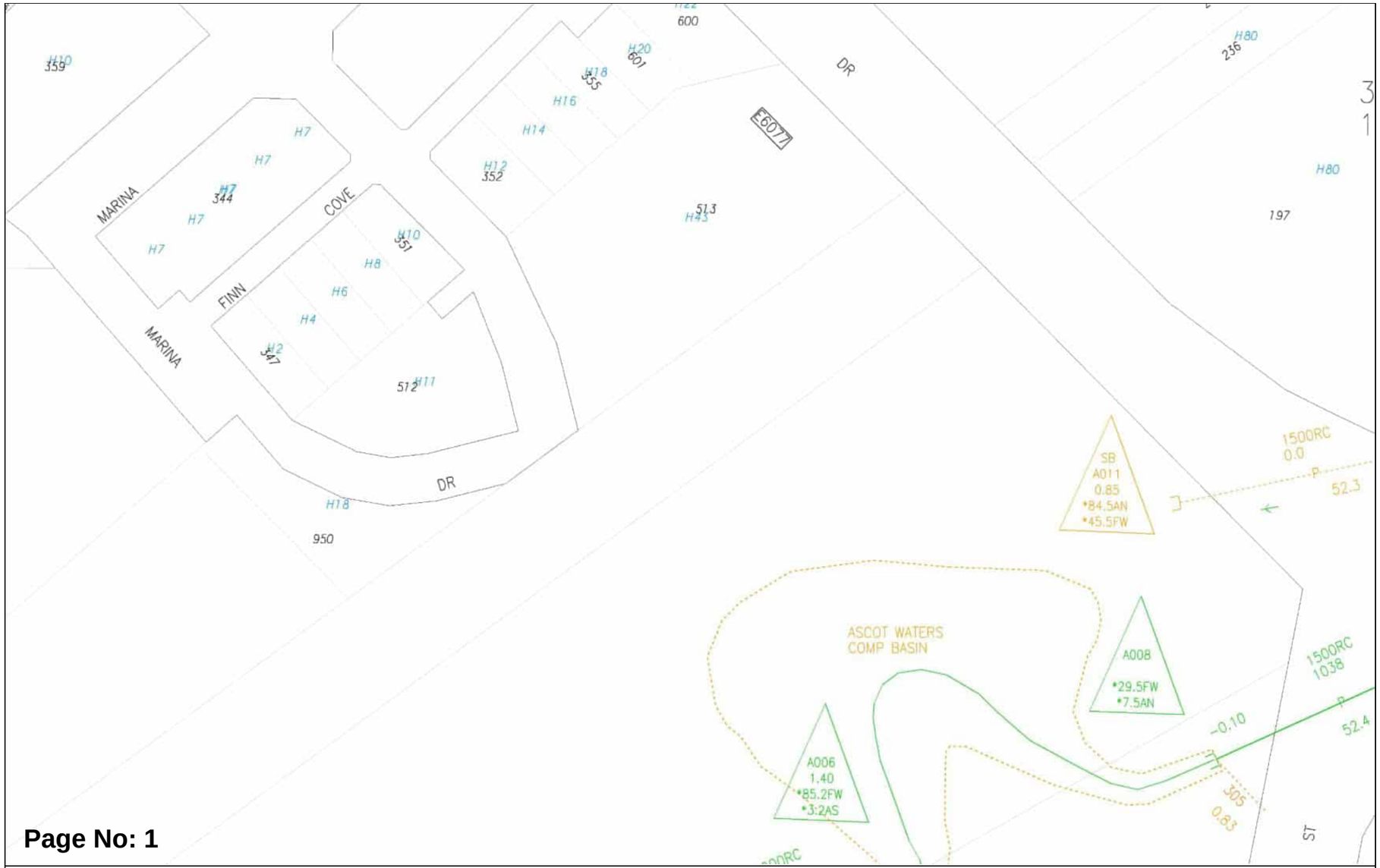
Drainage

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Water Corp - Non-critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



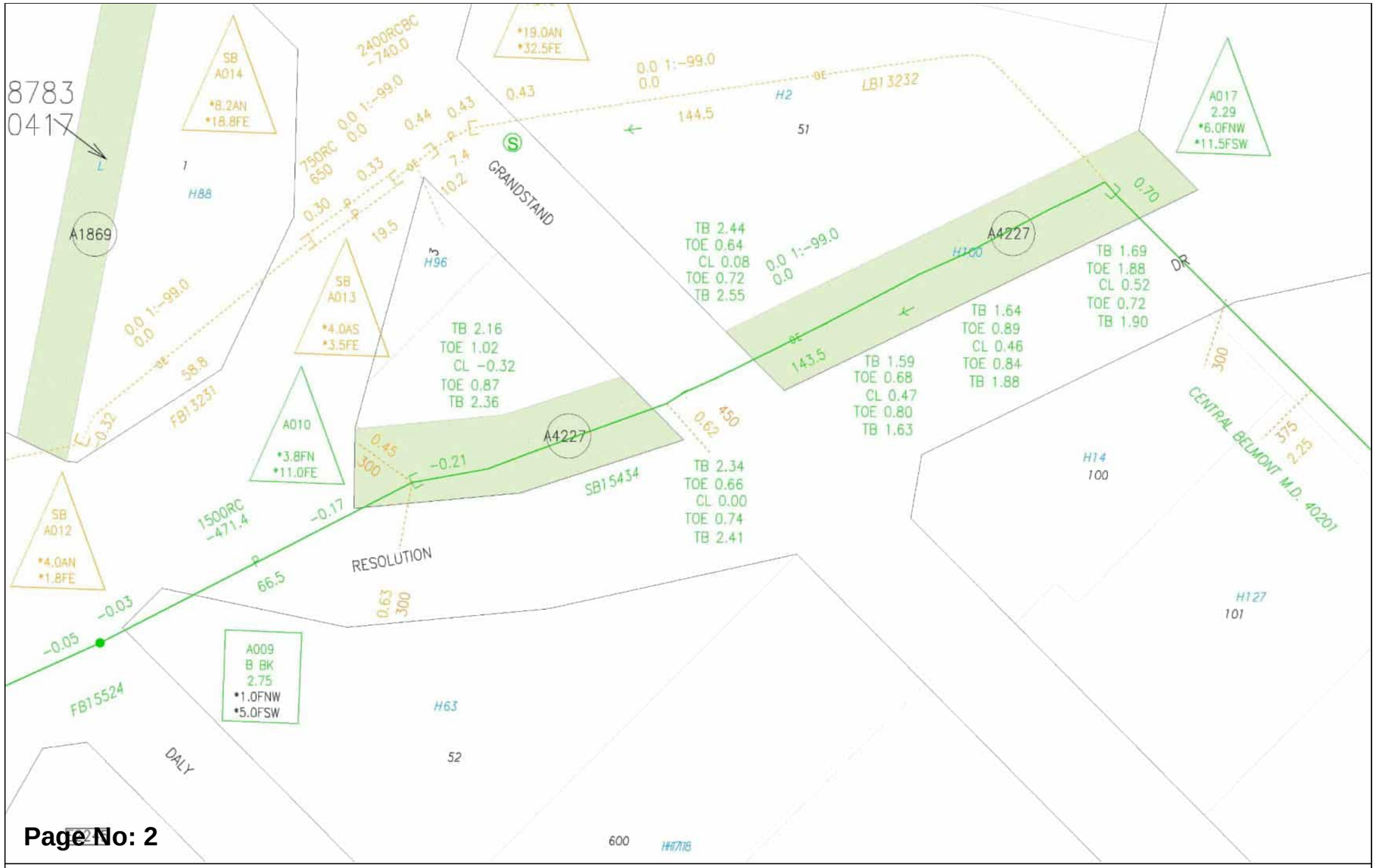
Page No: 1

Scale:	1:750
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Sequence No.:	240900613
Print Date:	21 Jun 2024

Drainage

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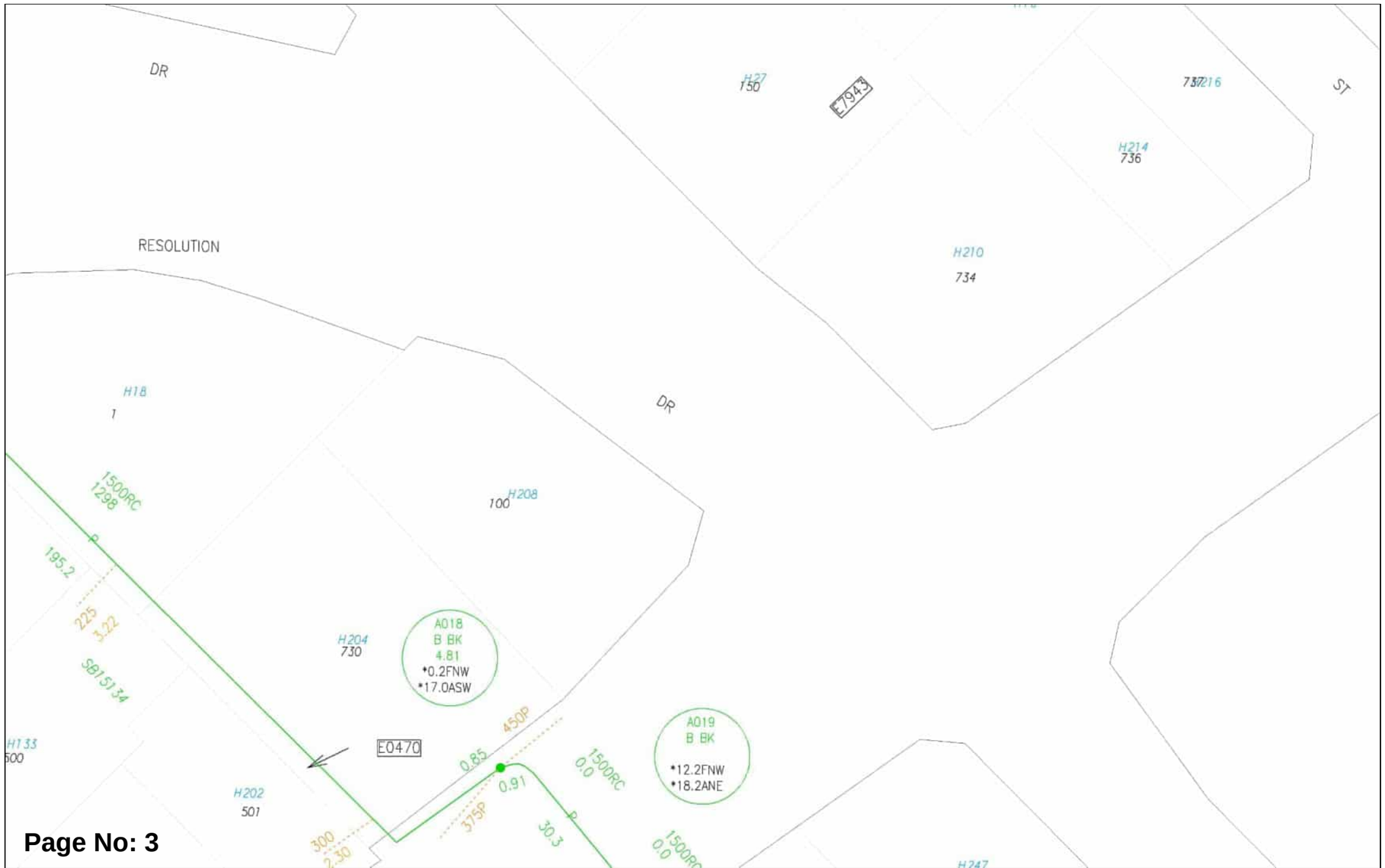
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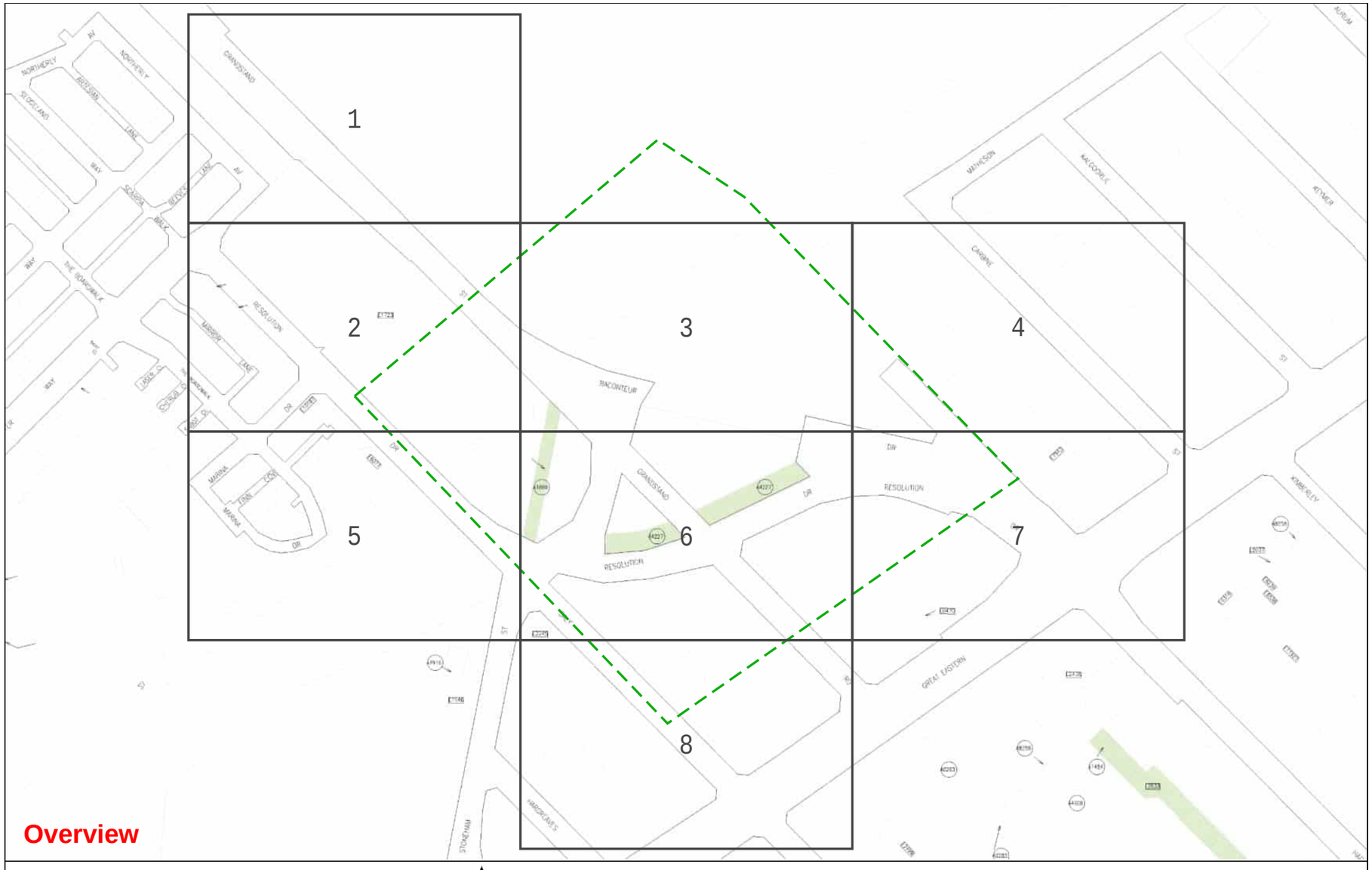
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WATER CORPORATION

Scale: 1:3075
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Sequence No.: 240900613
Print Date: 21 Jun 2024

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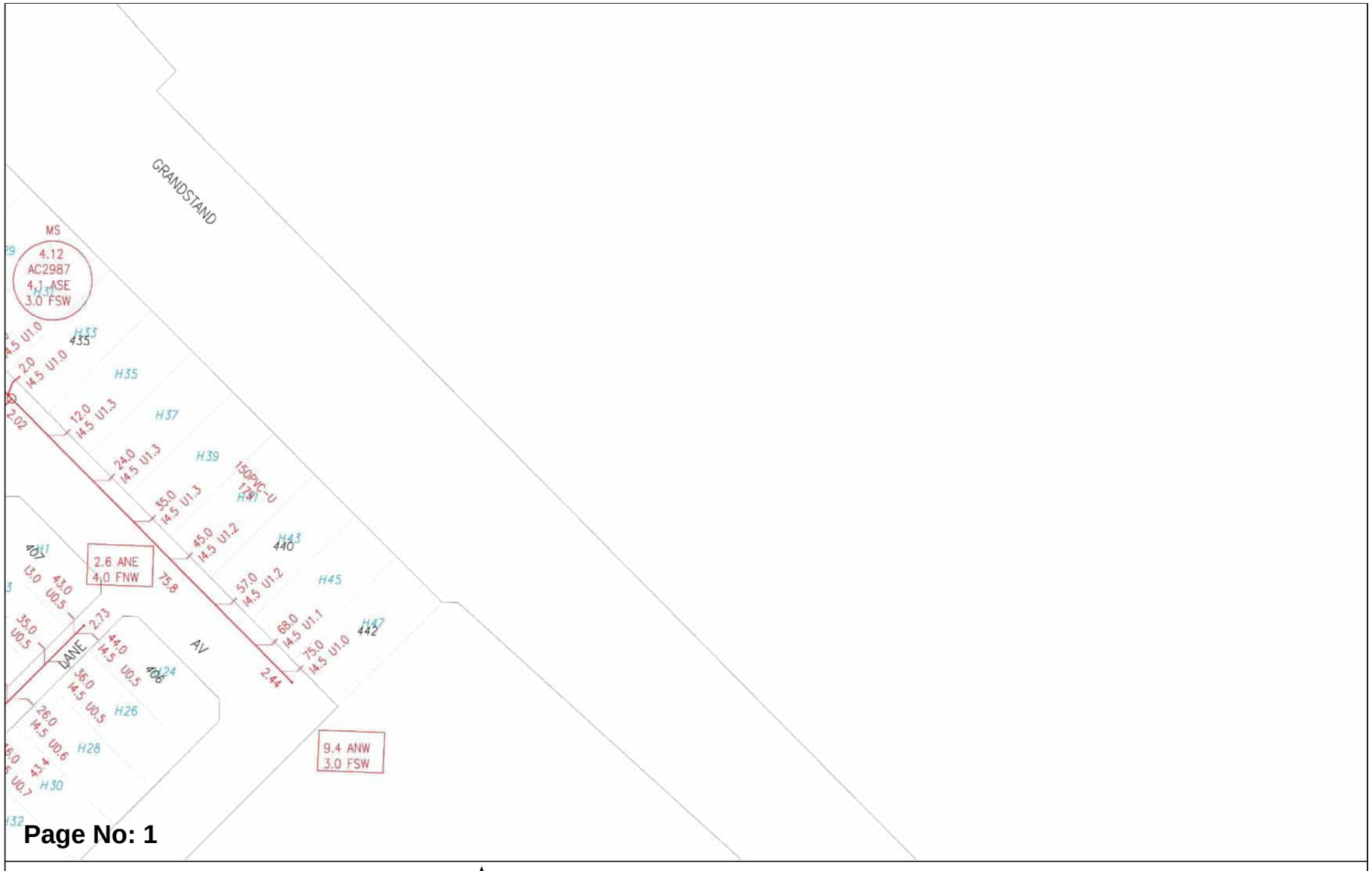
Sewer

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Scale:	1:750
Job No.:	36962243
Sequence No.:	240900613
Print Date:	21 Jun 2024

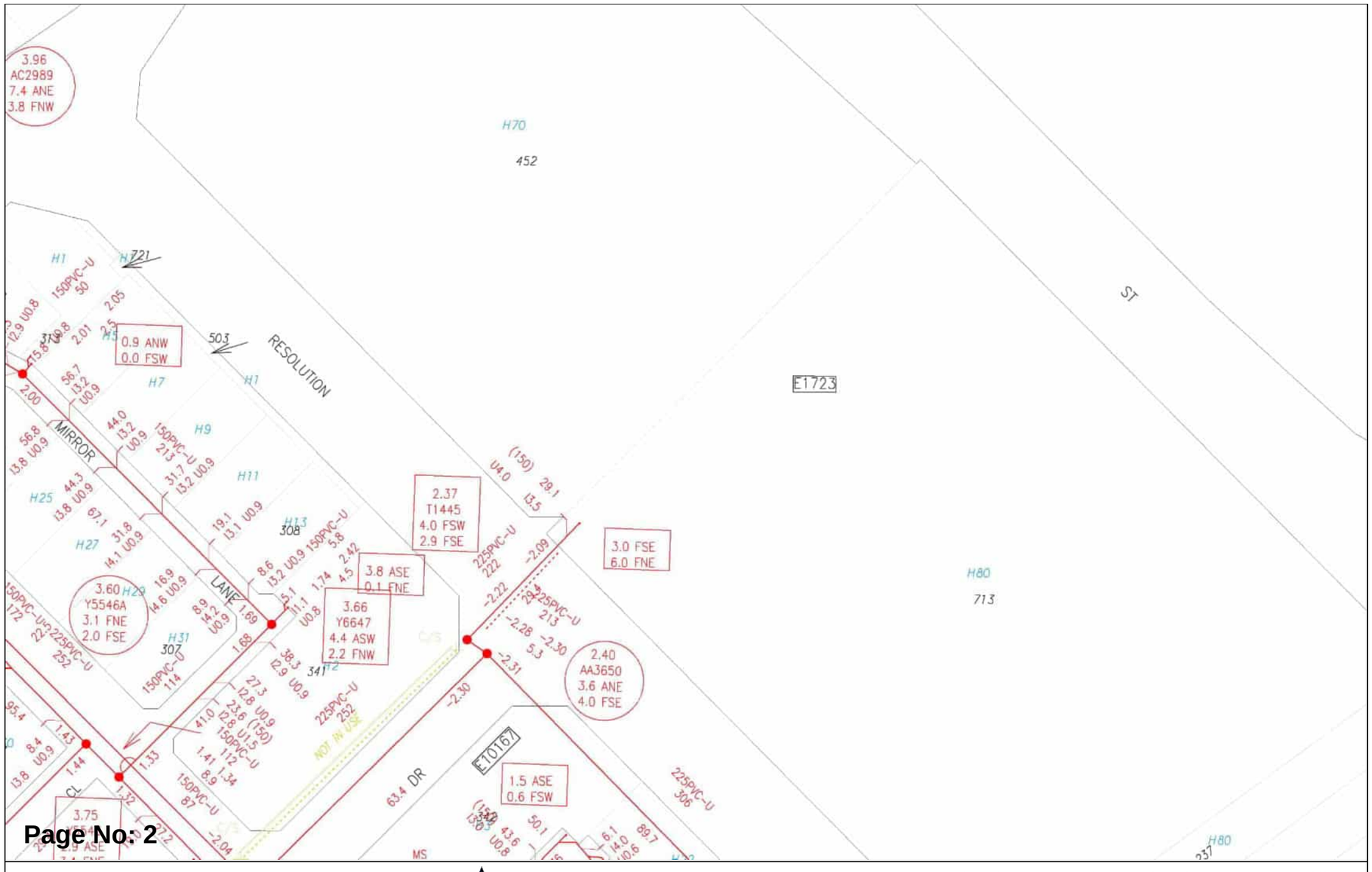
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Page No: 2

WATER CORPORATION

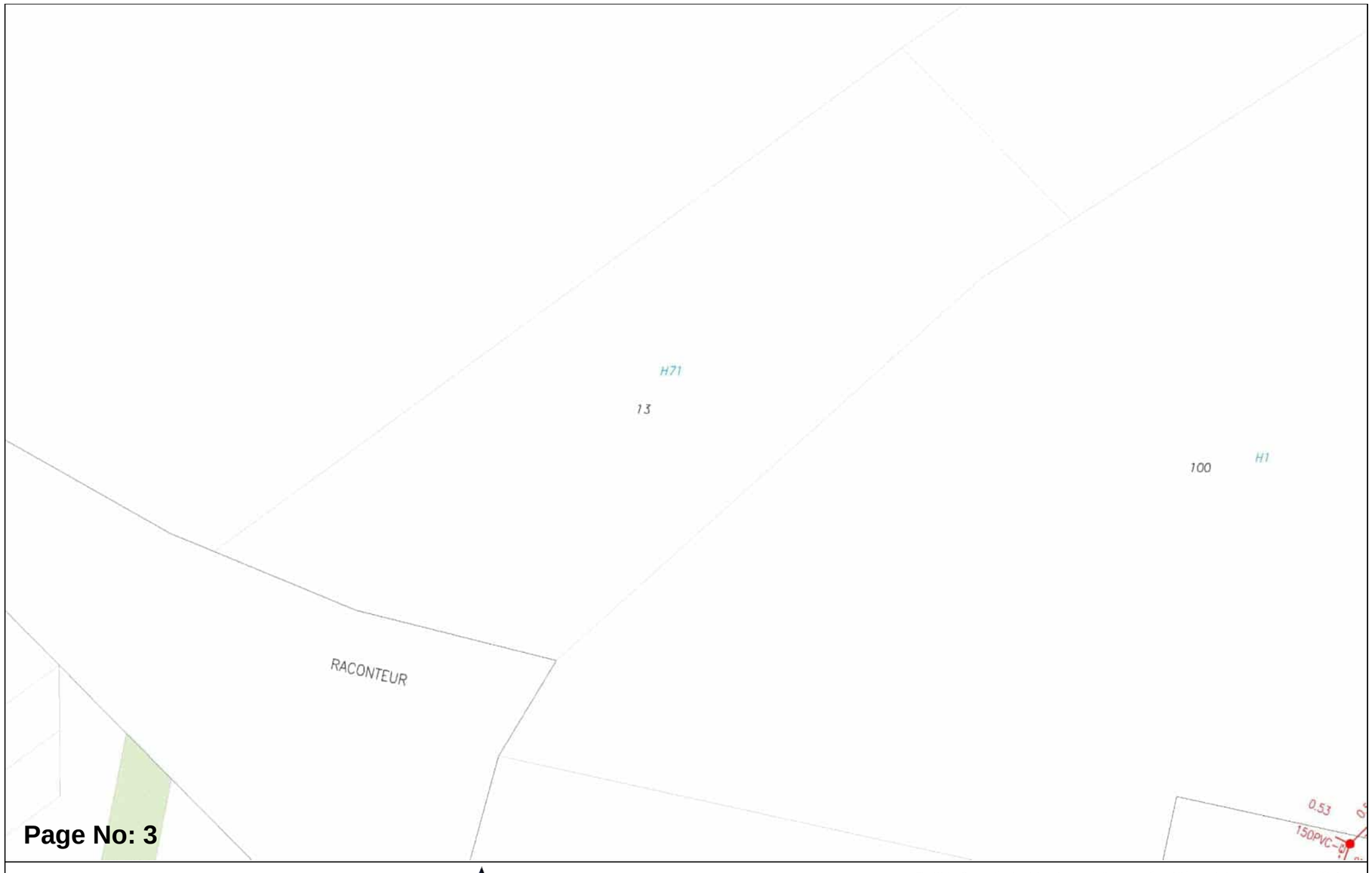
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Page No: 3

WATER CORPORATION

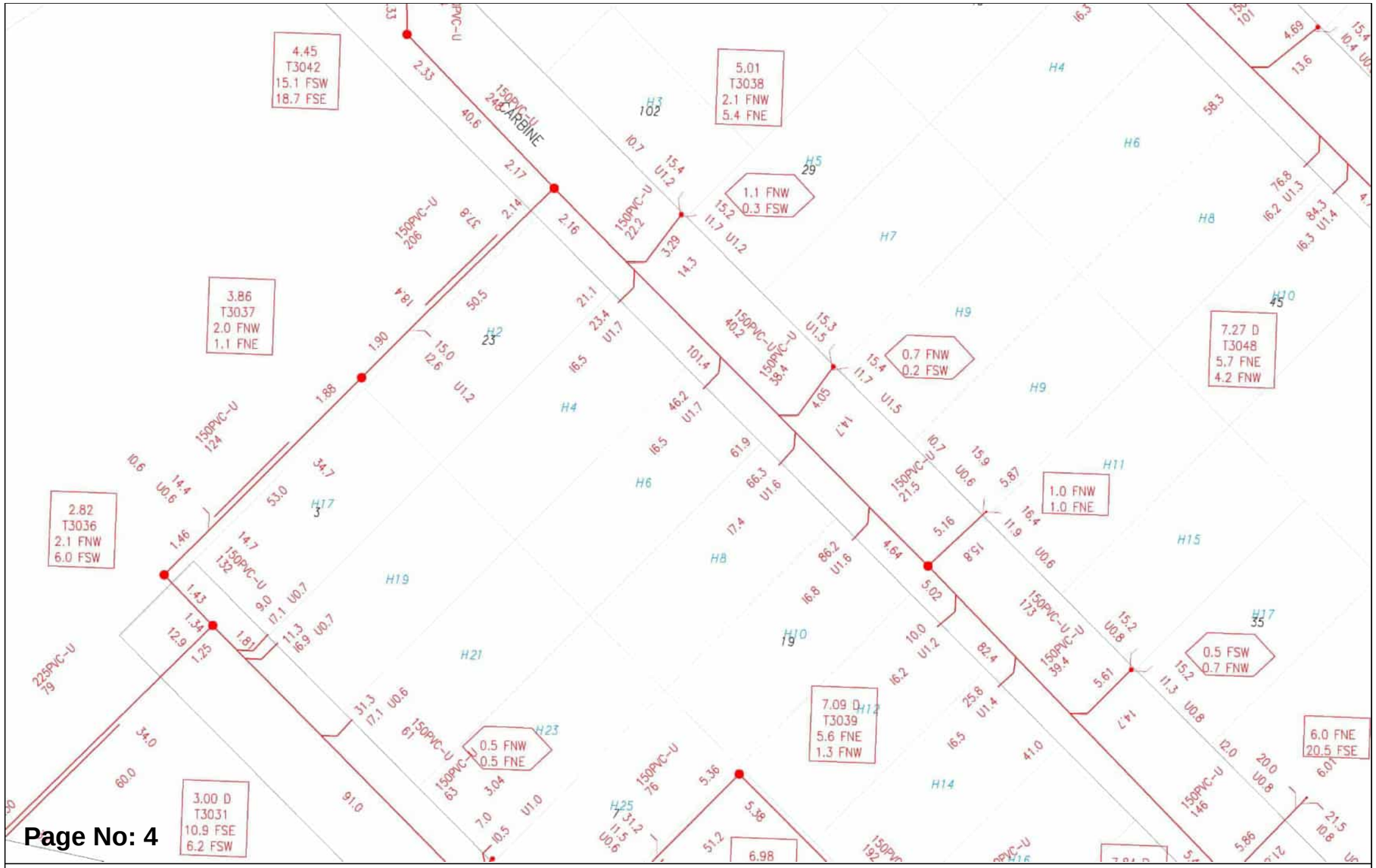
Scale: 1:750
Job No.: 36962243
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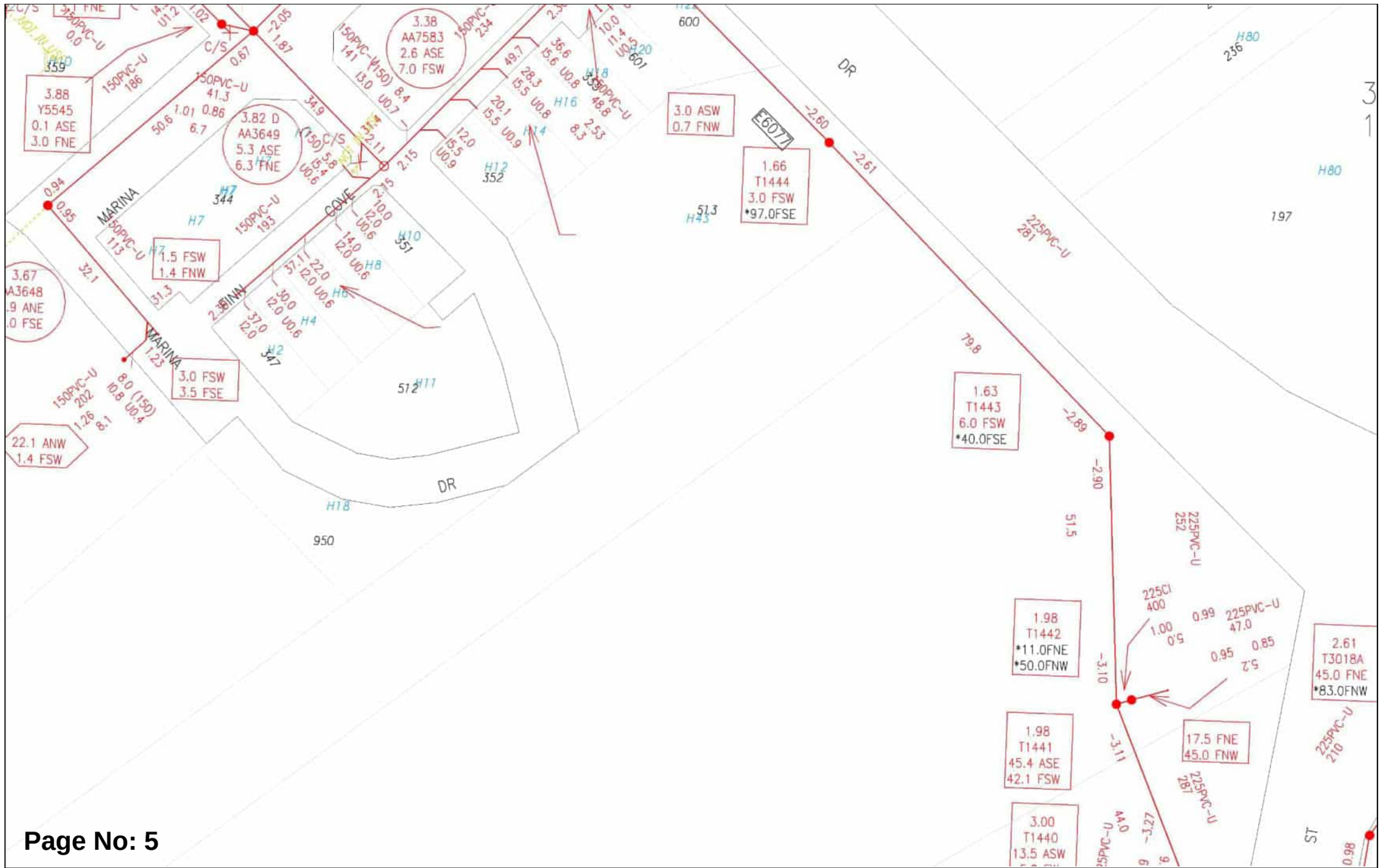
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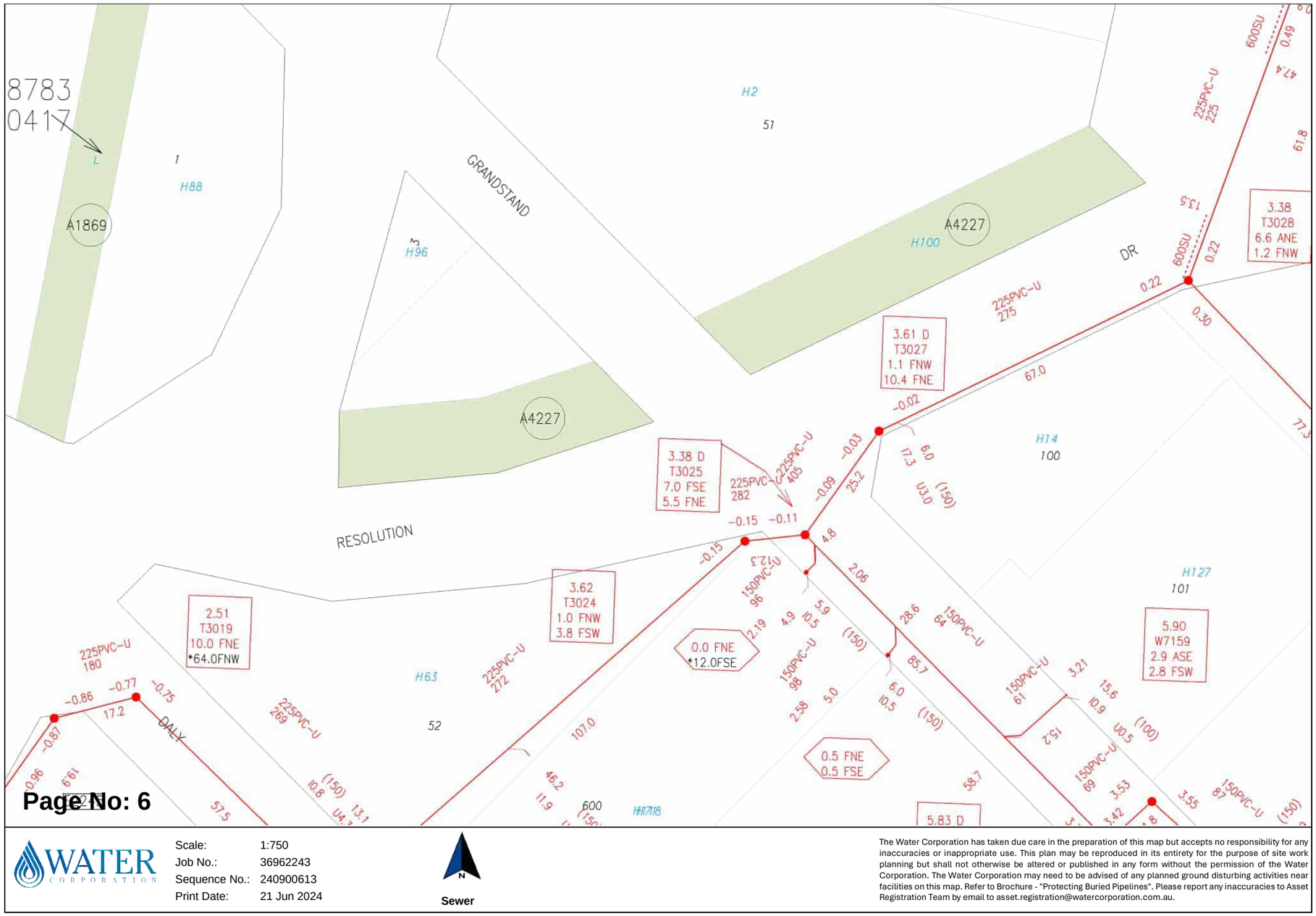


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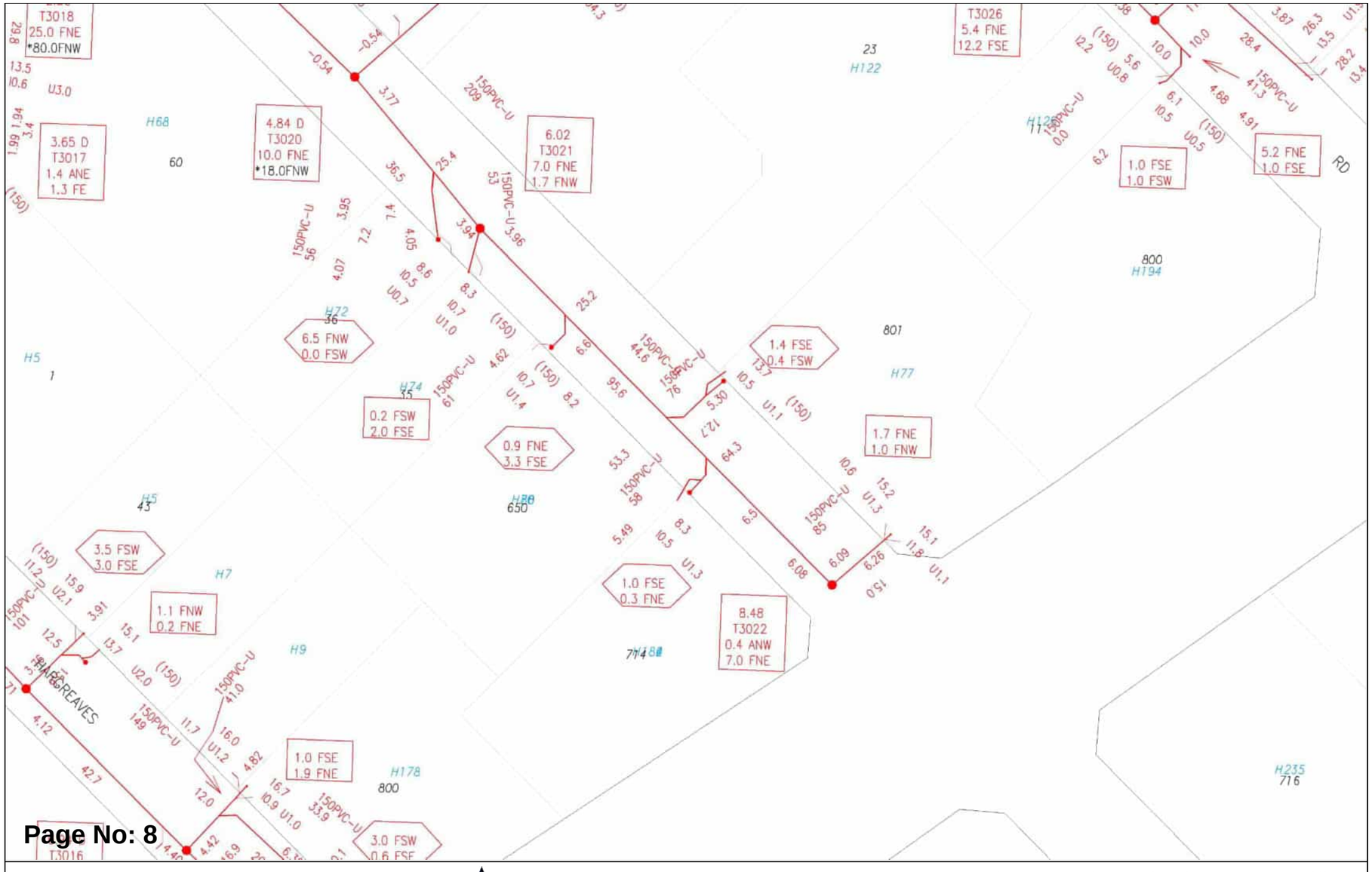
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Attachment 12.1.4 Engineering Servicing Report



Page No: 8

Scale: 1:750
Job No.: 36962243
Sequence No.: 240900613
Print Date: 21 Jun 2024

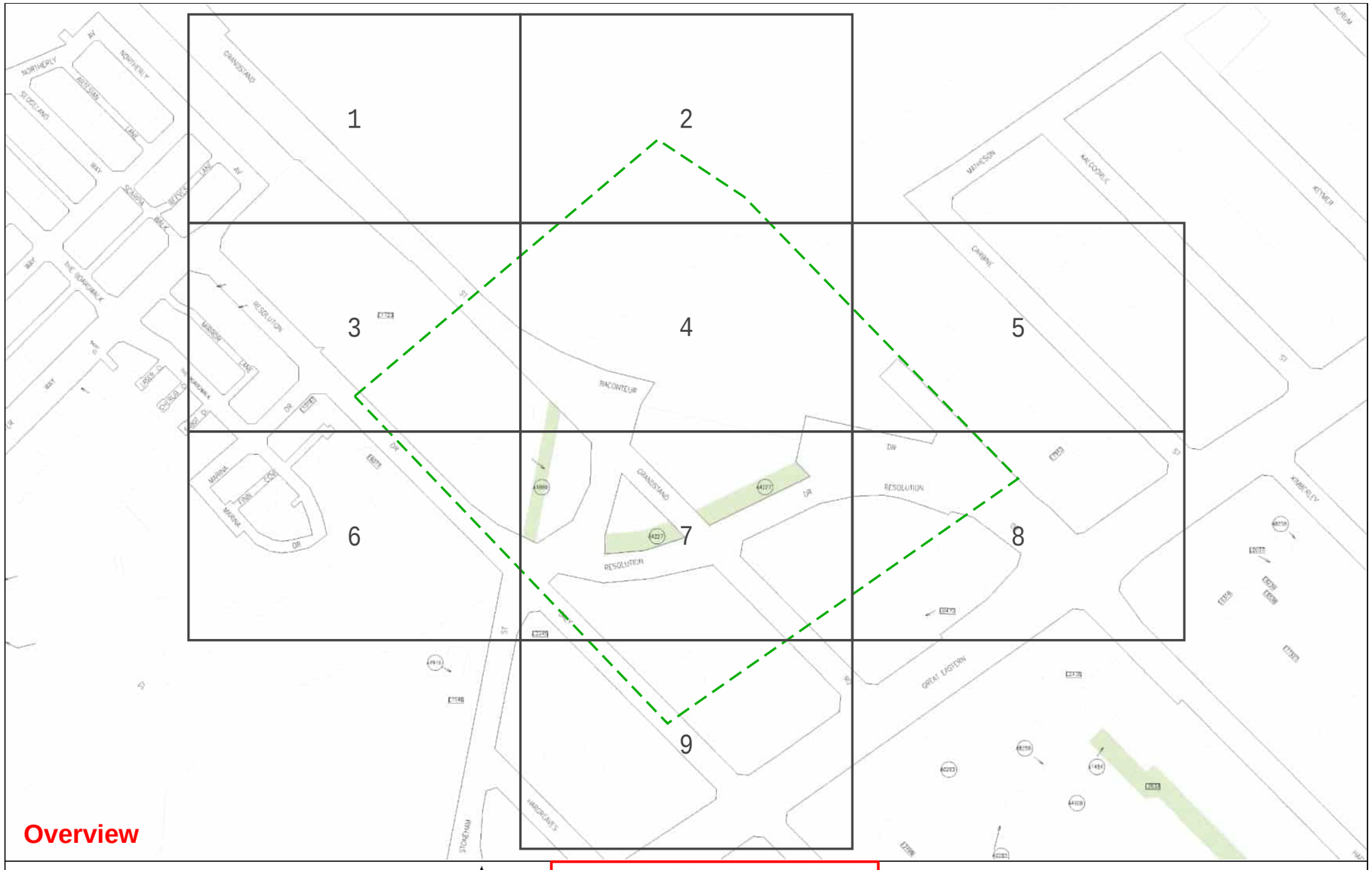
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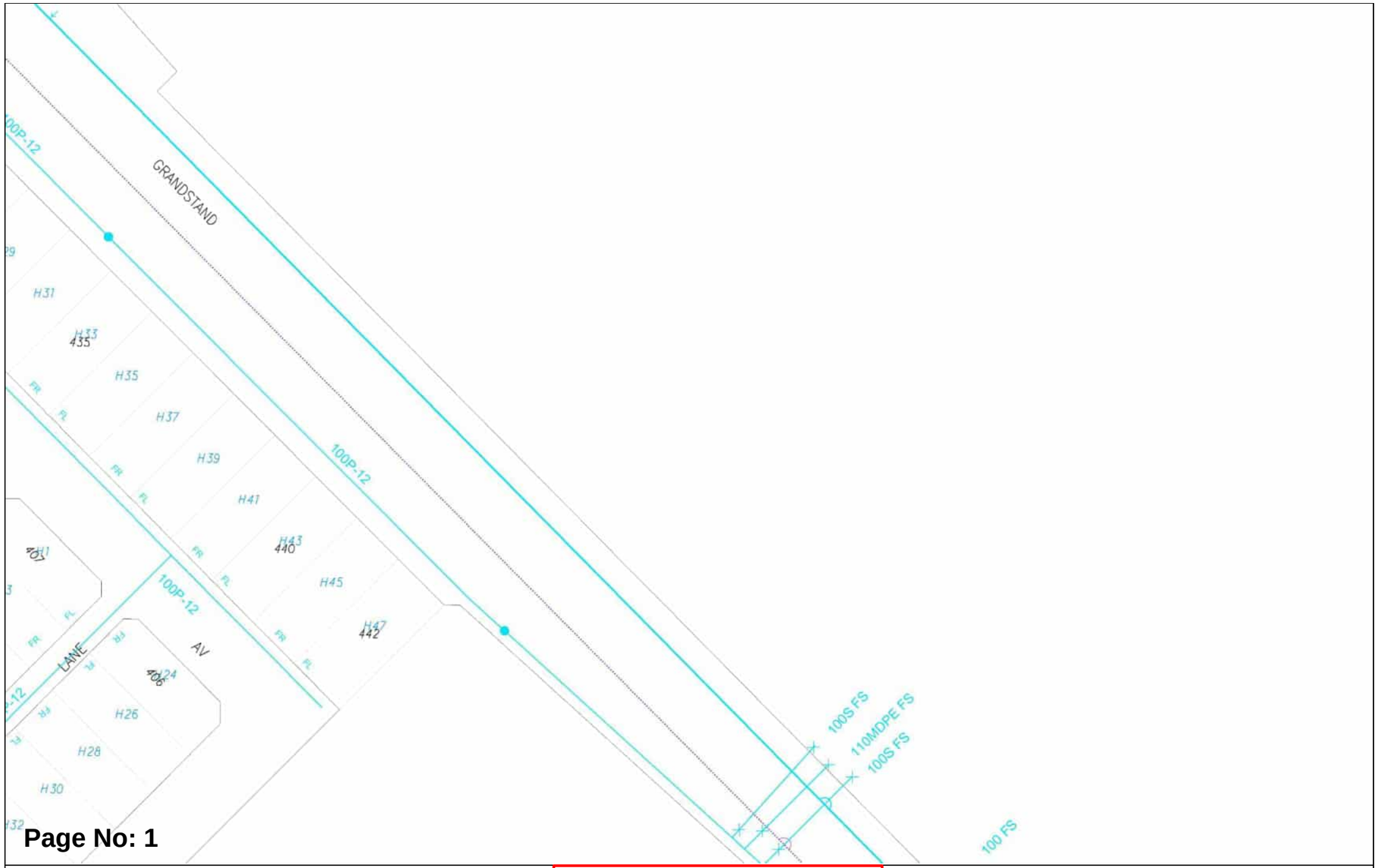
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Attachment 12.1.4 Engineering Servicing Report



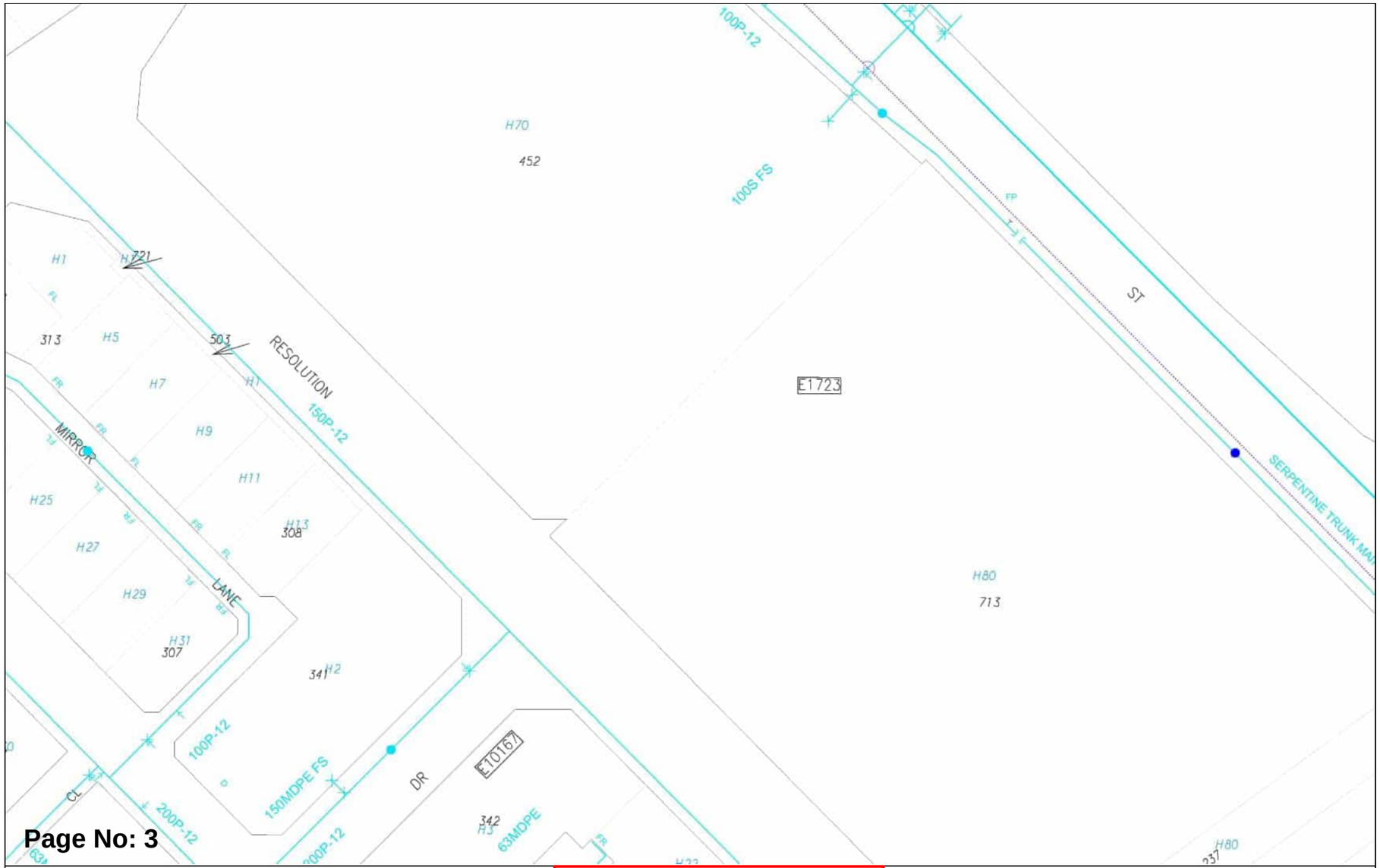
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Page No: 2

Scale:	1:750	Water	WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED Apply for approval to work near our assets at: Working near assets (watercorporation.com.au) Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.
Job No.:	36962243		
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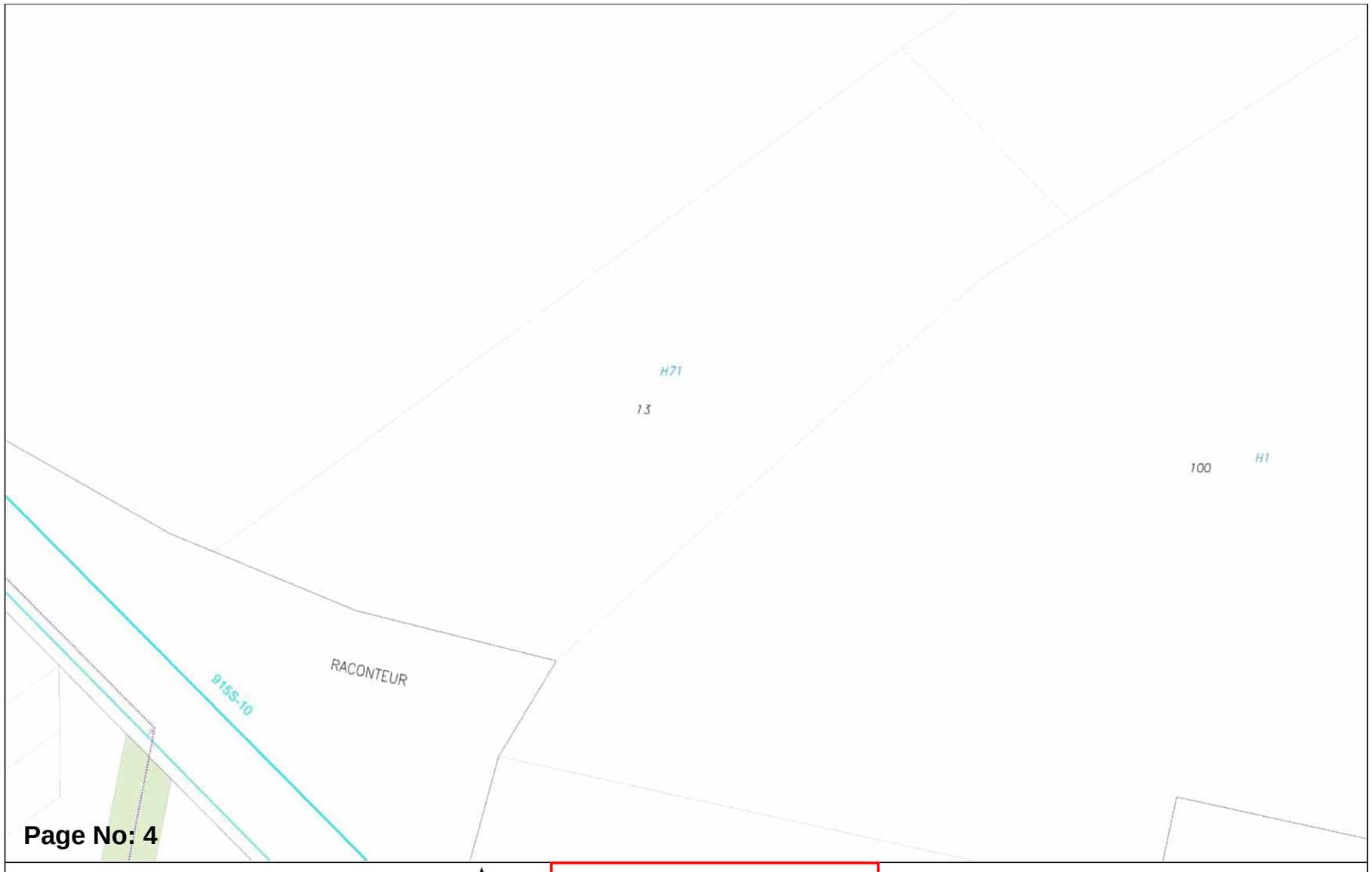
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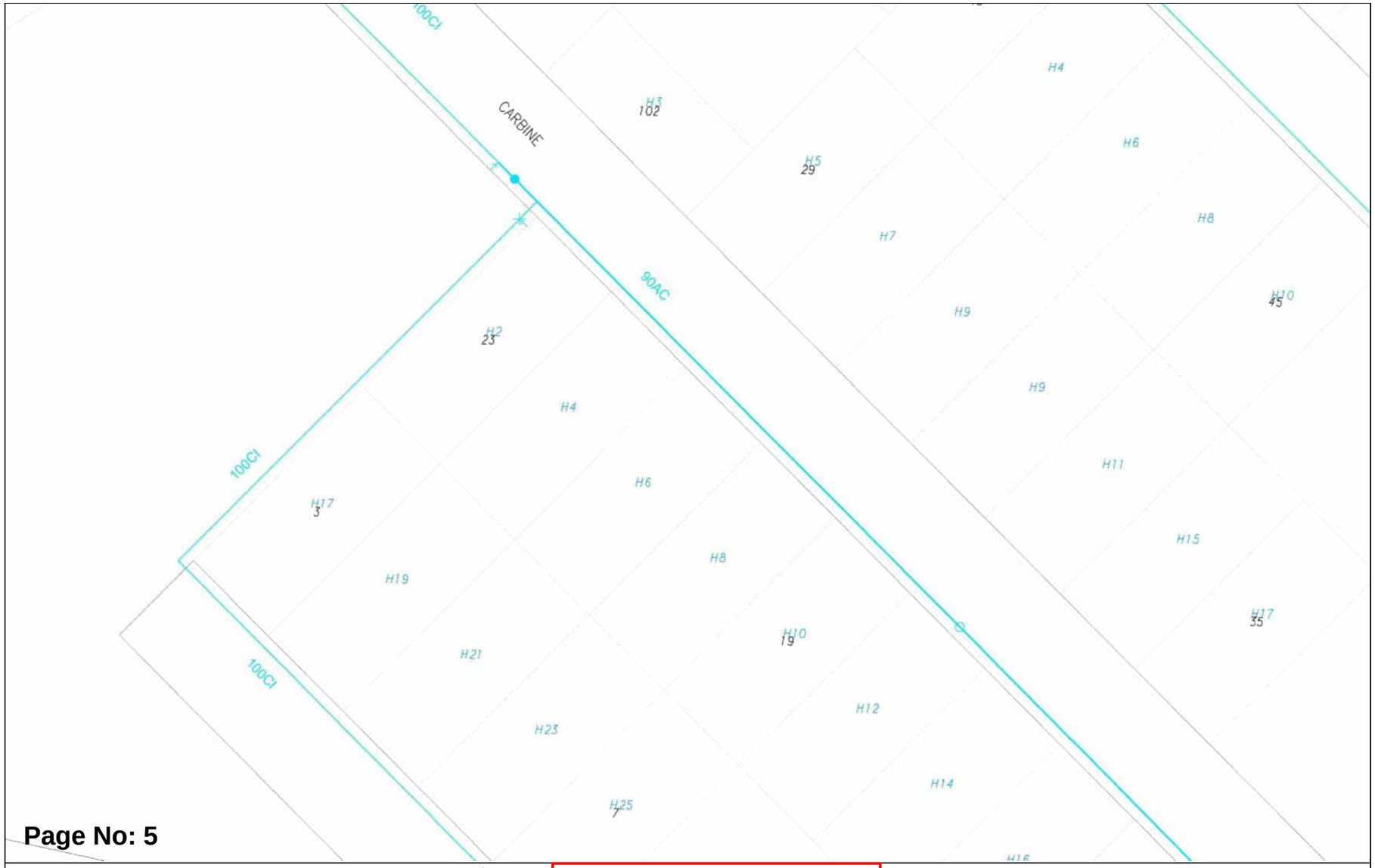
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Attachment 12.1.4 Engineering Servicing Report



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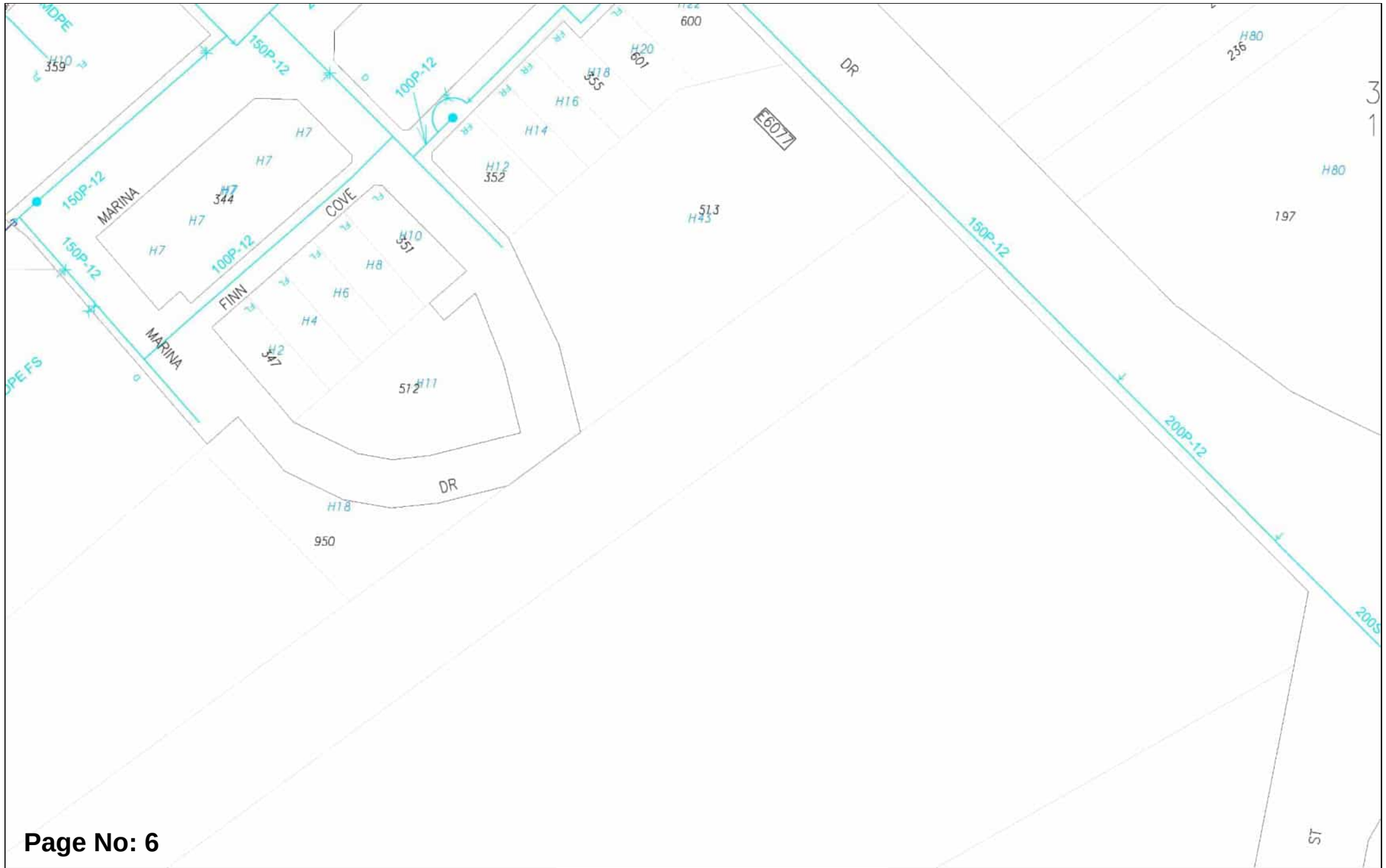
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WATER CORPORATION	Scale: 1:750 Job No.: 36962243 Sequence No.: 240900613 Print Date: 21 Jun 2024	Water	WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED Apply for approval to work near our assets at: Working near assets (watercorporation.com.au) Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.	The Water Corporation has taken due care in the preparation of this map but accepts no responsibility for any inaccuracies or inappropriate use. This plan may be reproduced in its entirety for the purpose of site work planning but shall not otherwise be altered or published in any form without the permission of the Water Corporation. The Water Corporation may need to be advised of any planned ground disturbing activities near facilities on this map. Refer to Brochure - "Protecting Buried Pipelines". Please report any inaccuracies to Asset Registration Team by email to asset.registration@watercorporation.com.au.

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Water Corp - Critical Plan.docx (21 May 2024)

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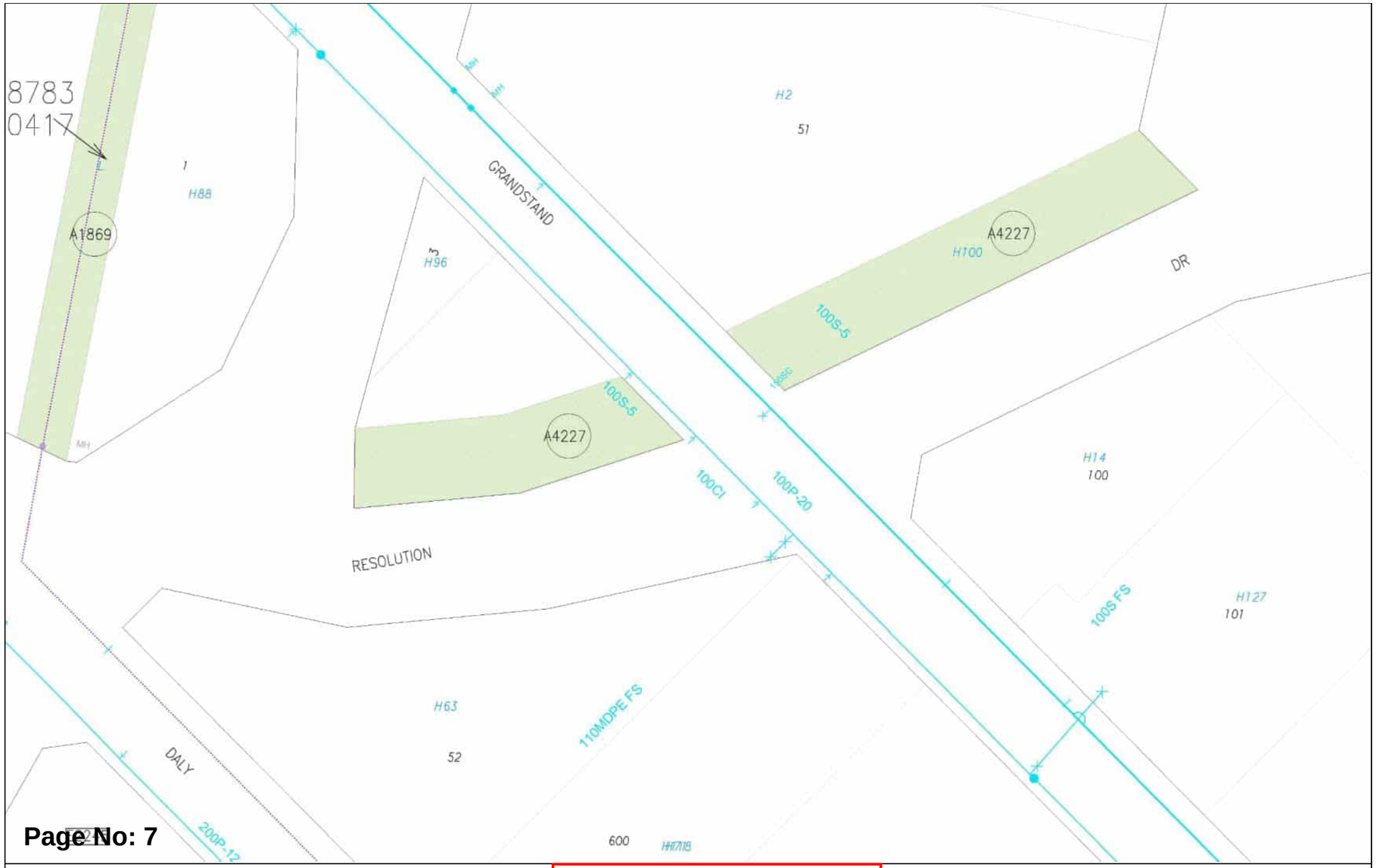
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Water Corp - Critical Plan.docx (21 May 2024)

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WATER CORPORATION	Scale:	1:750	
	Job No.:	36962243	
	Sequence No.:	240900613	
	Print Date:	21 Jun 2024	

Water

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Apply for approval to work near our assets at:

Working near assets (watercorporation.com.au)

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WATER CORPORATION

Scale:	1:750
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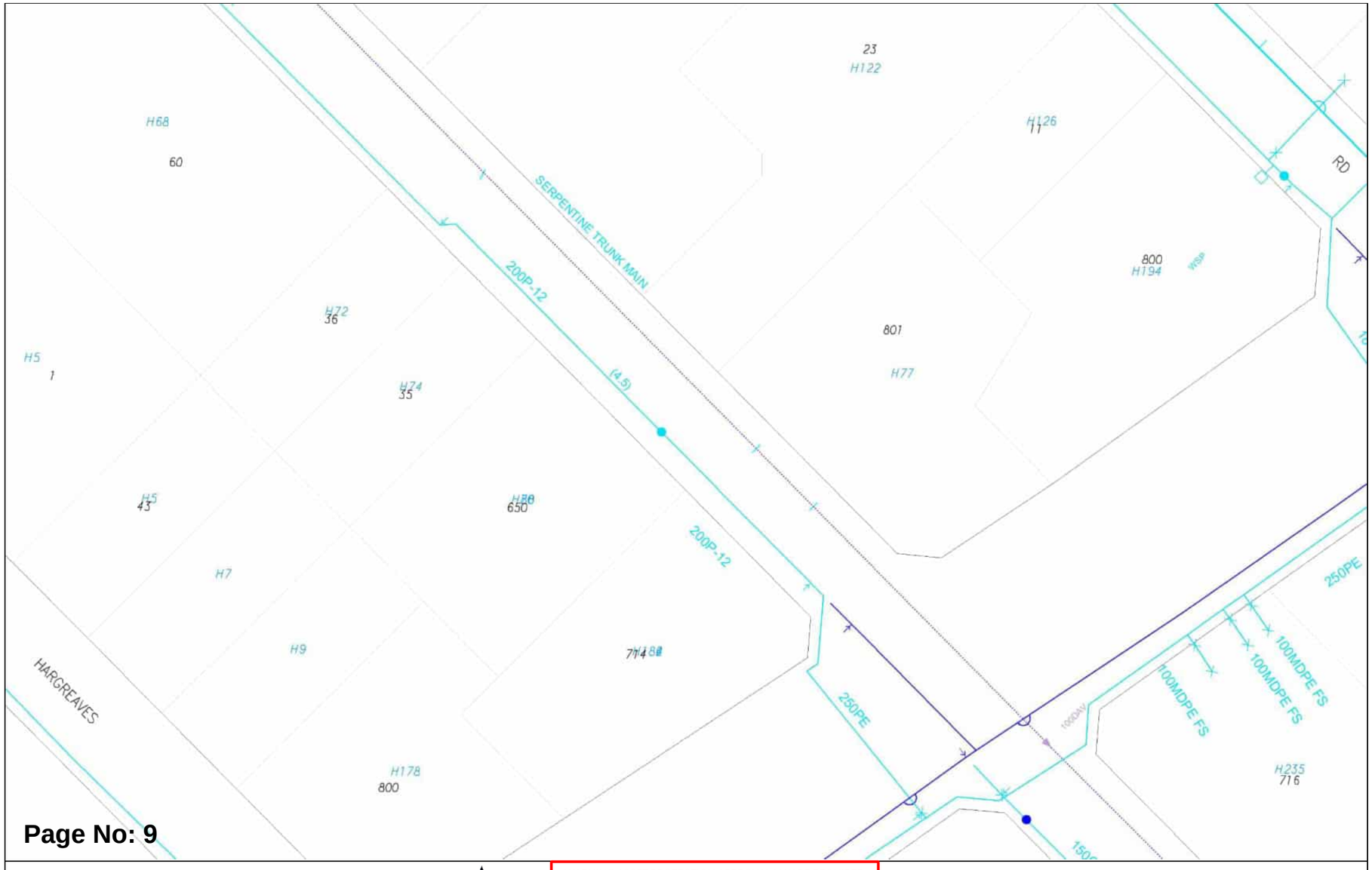
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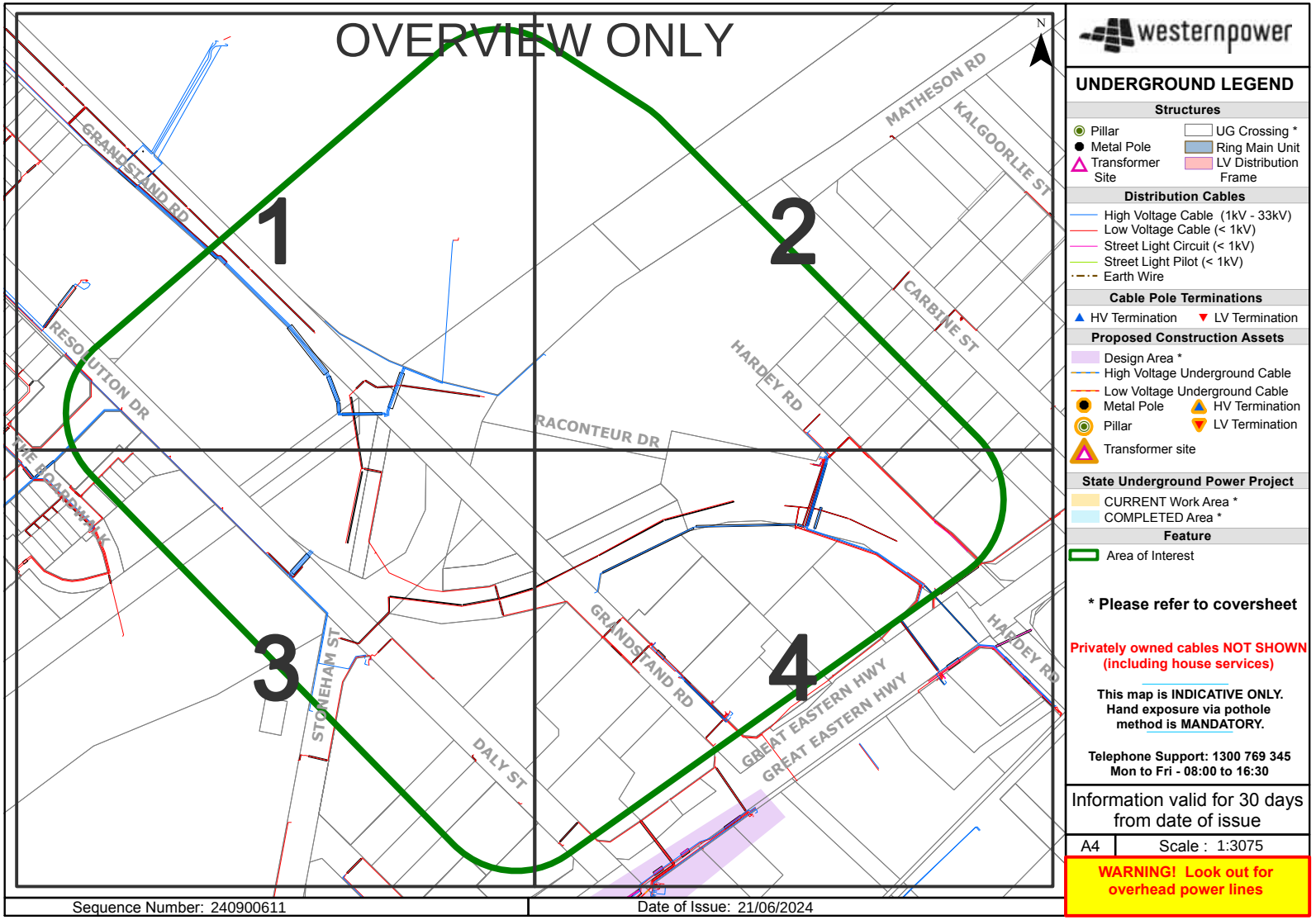
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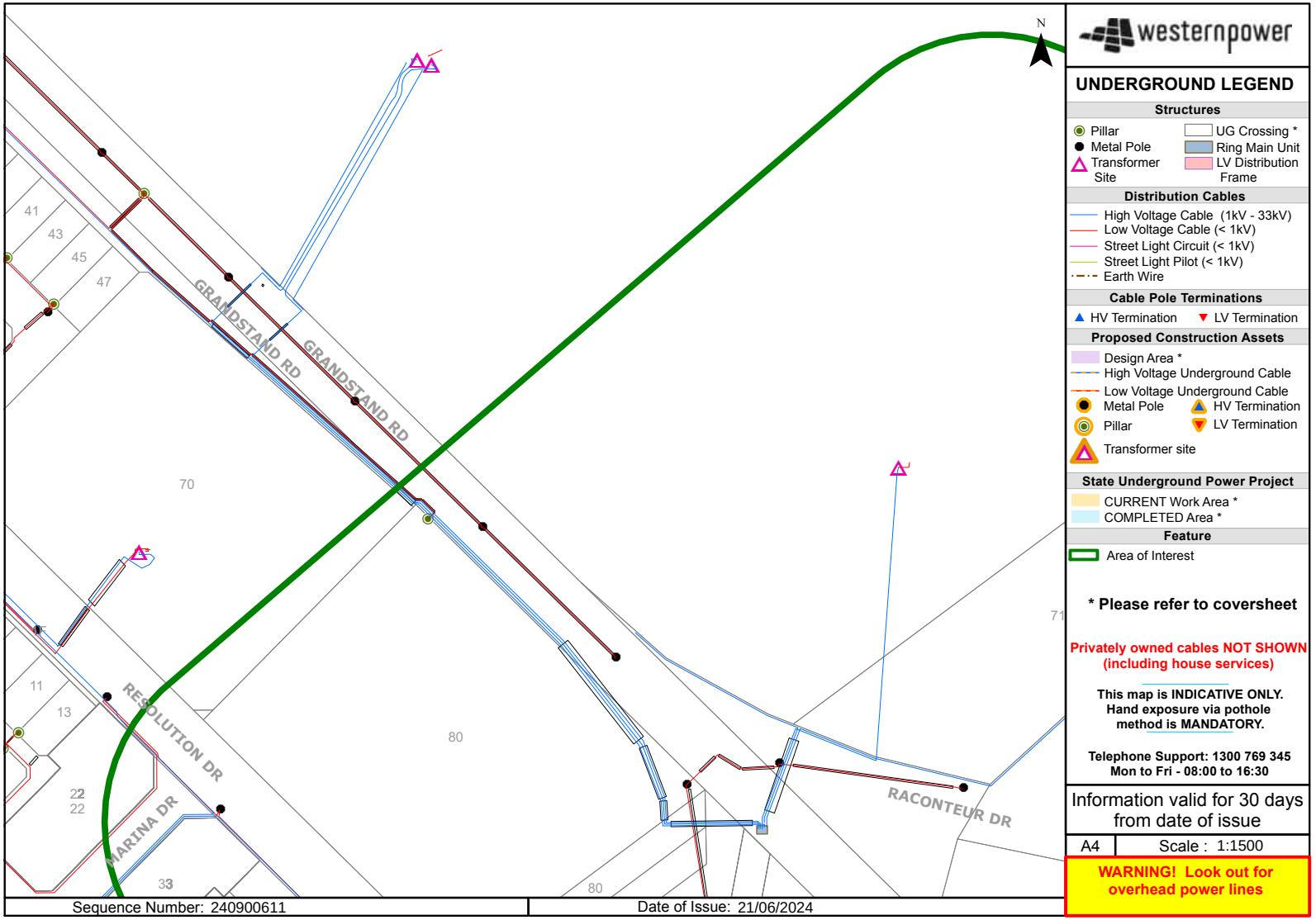
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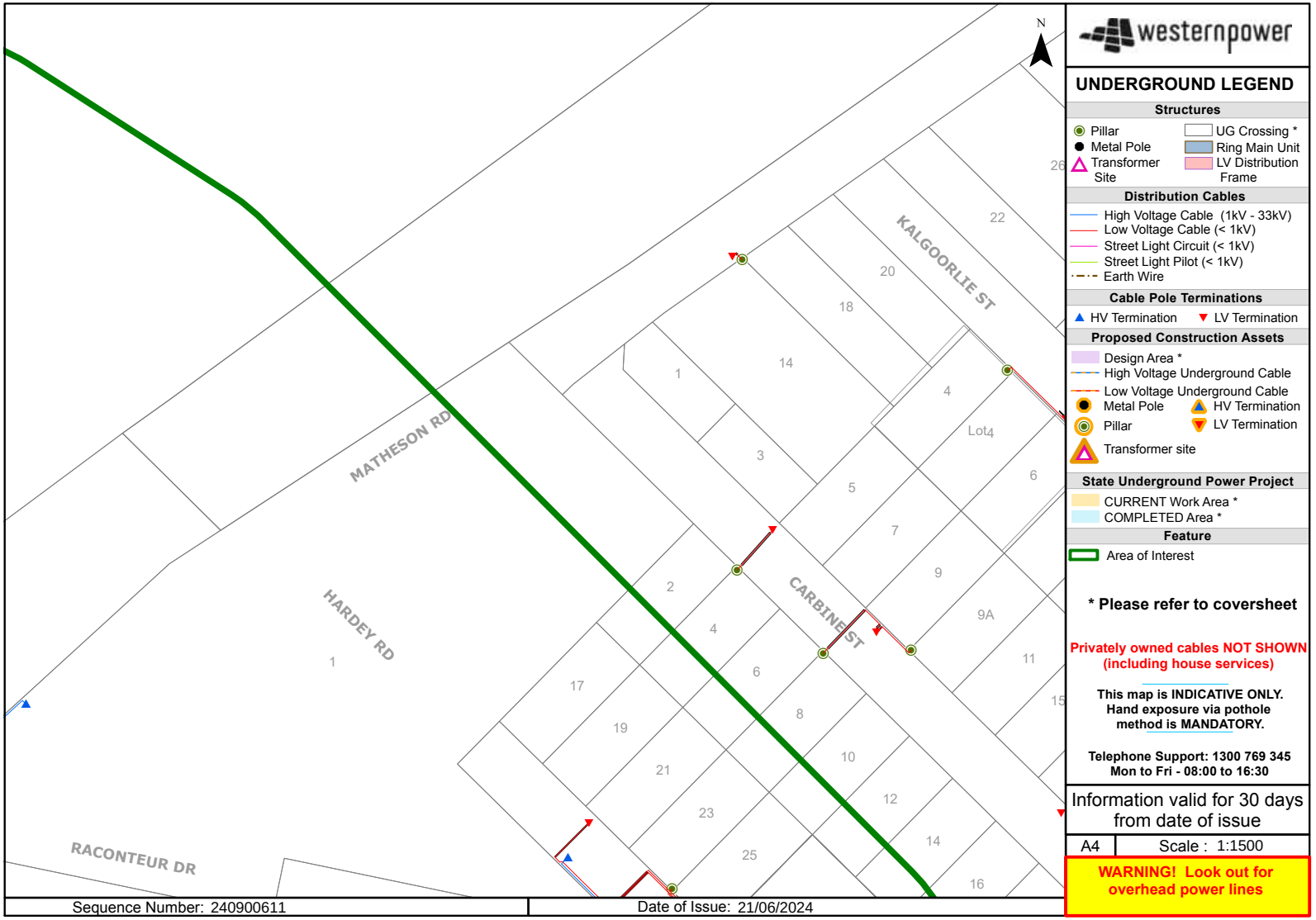
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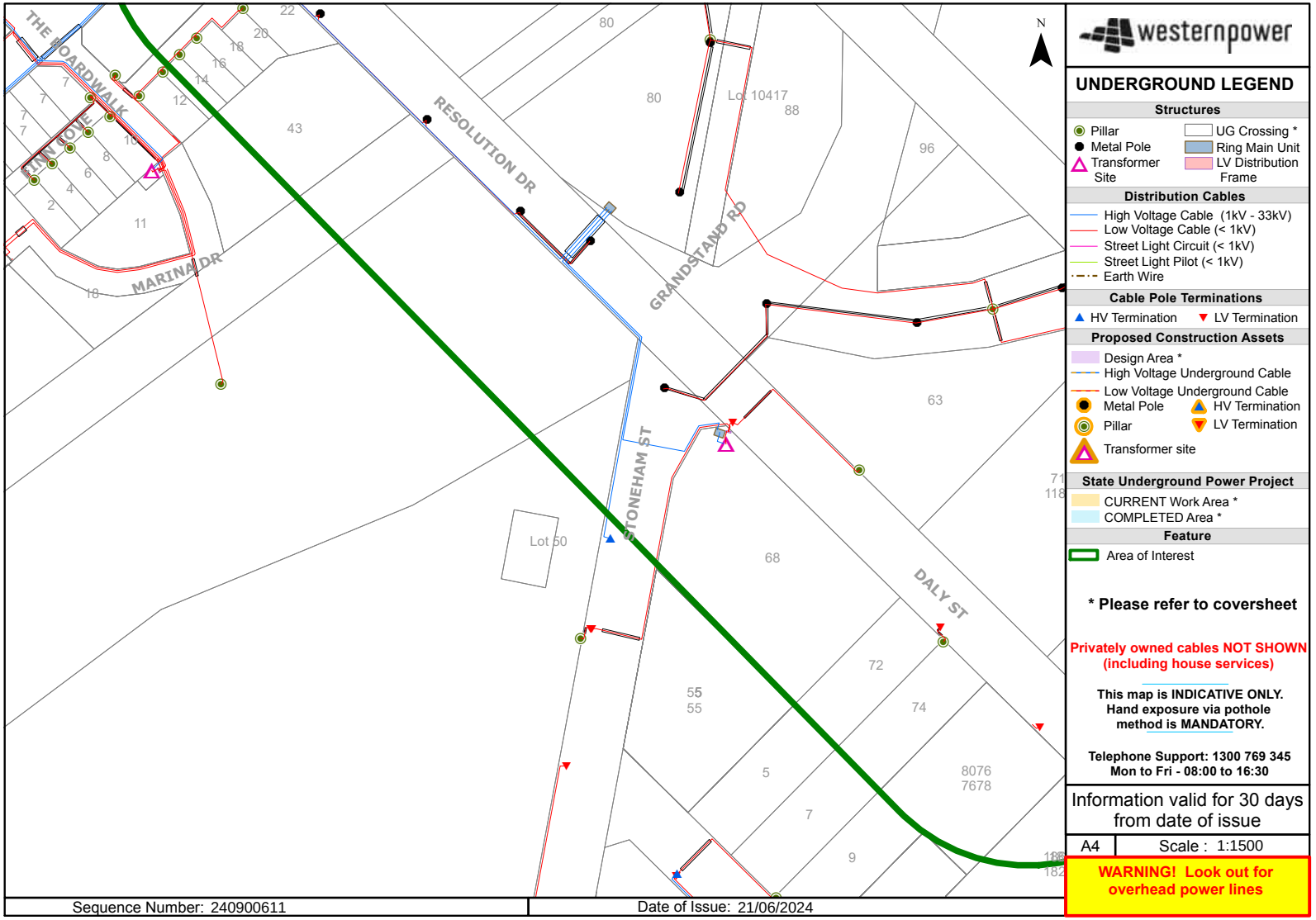
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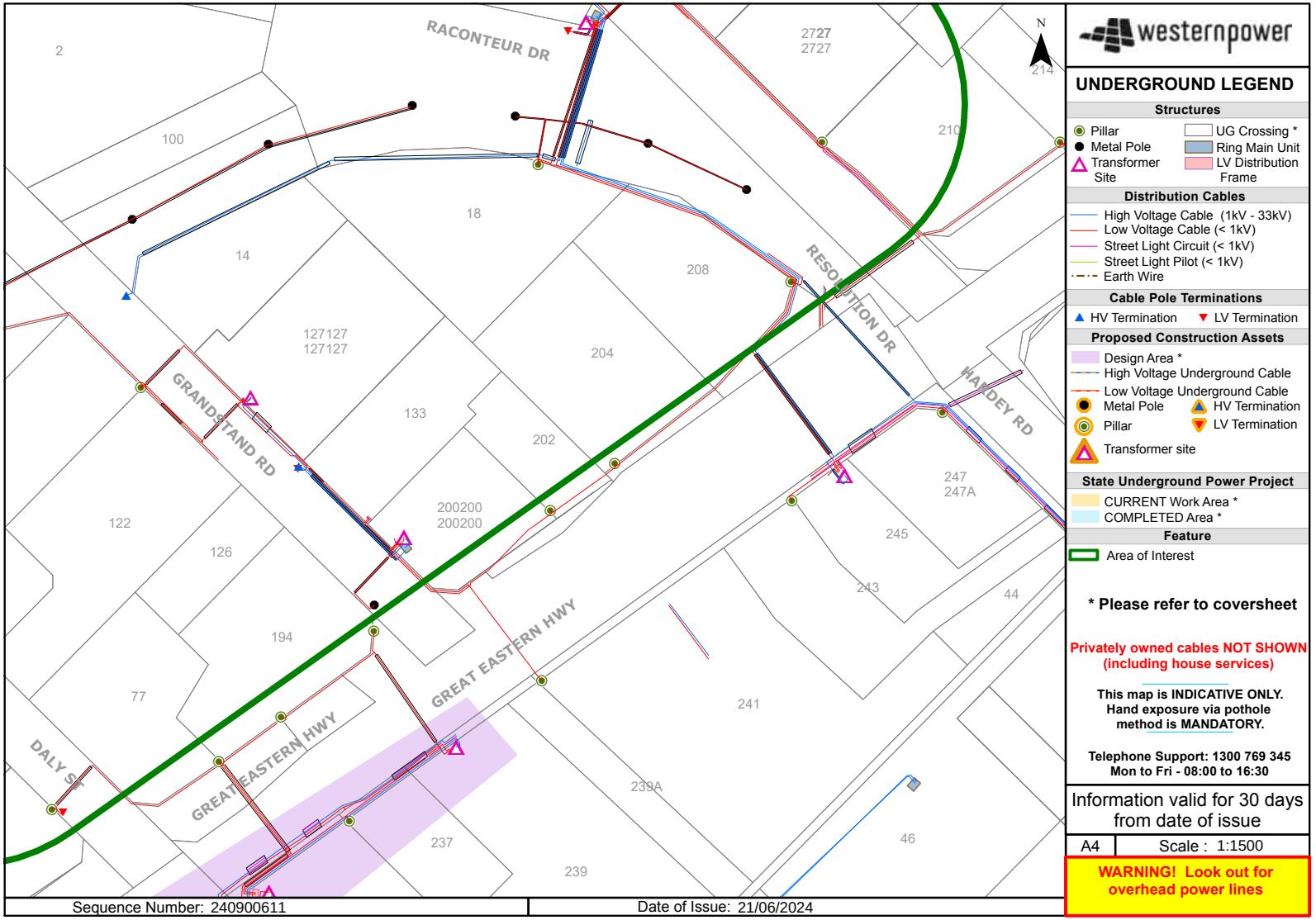
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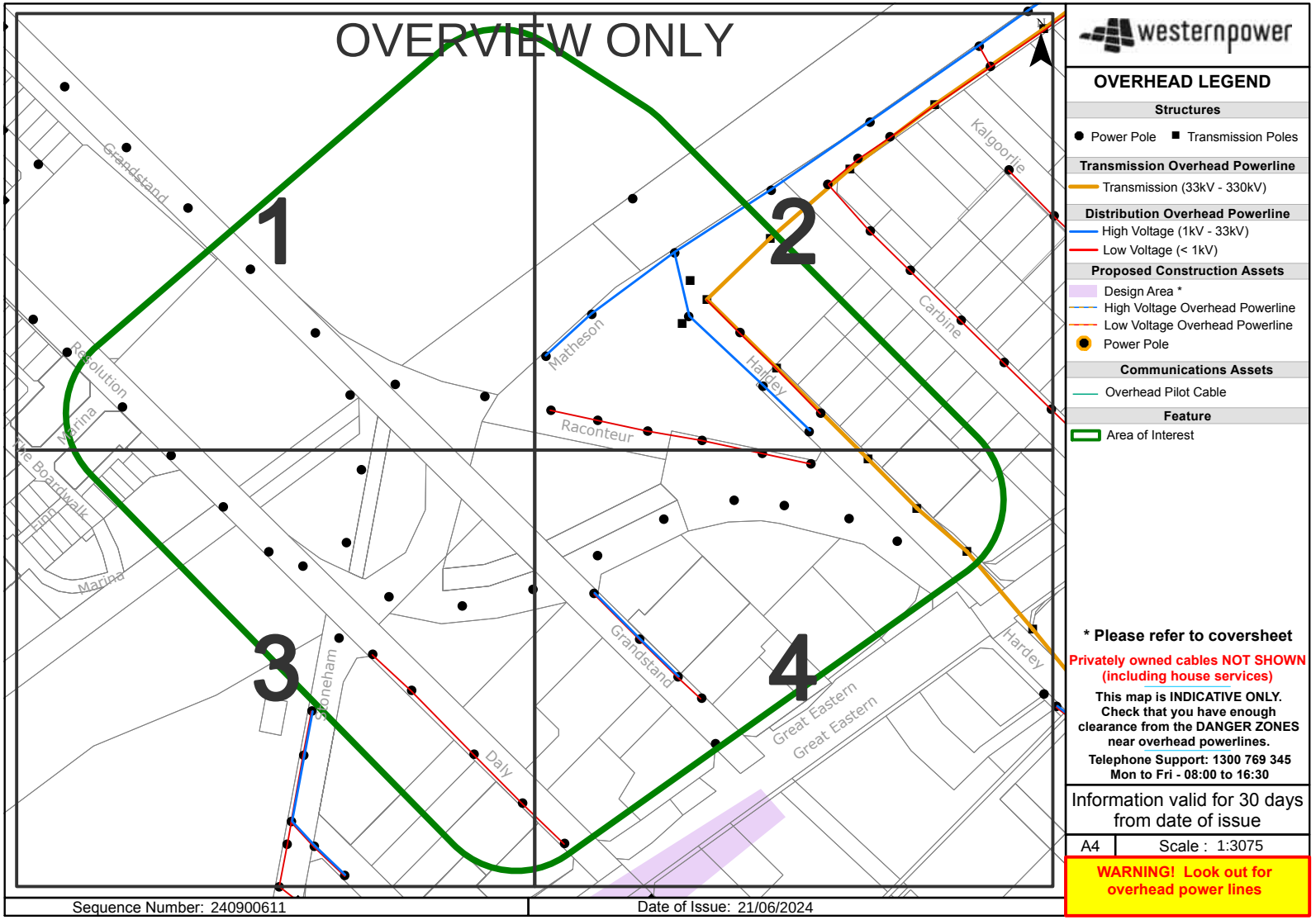
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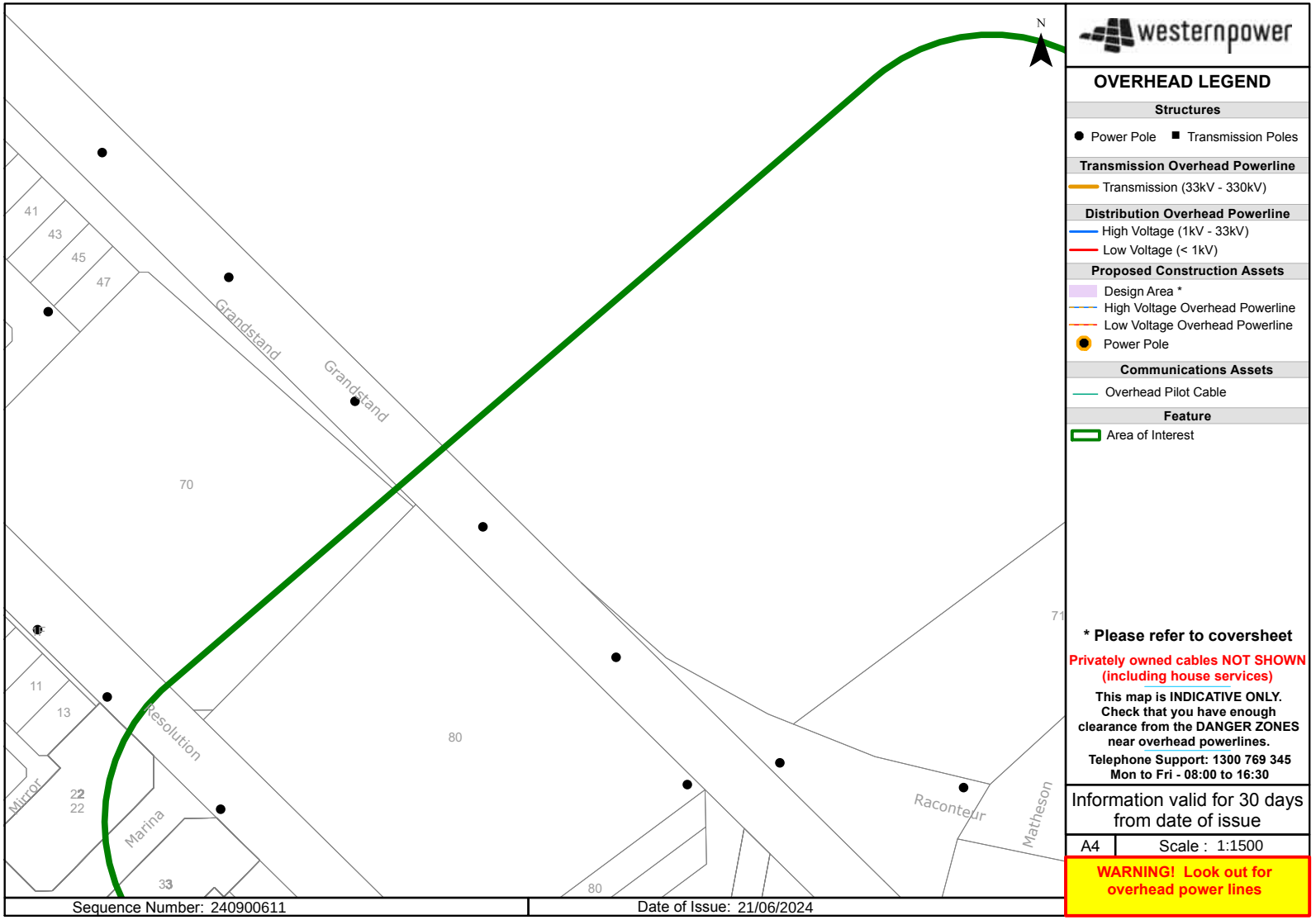
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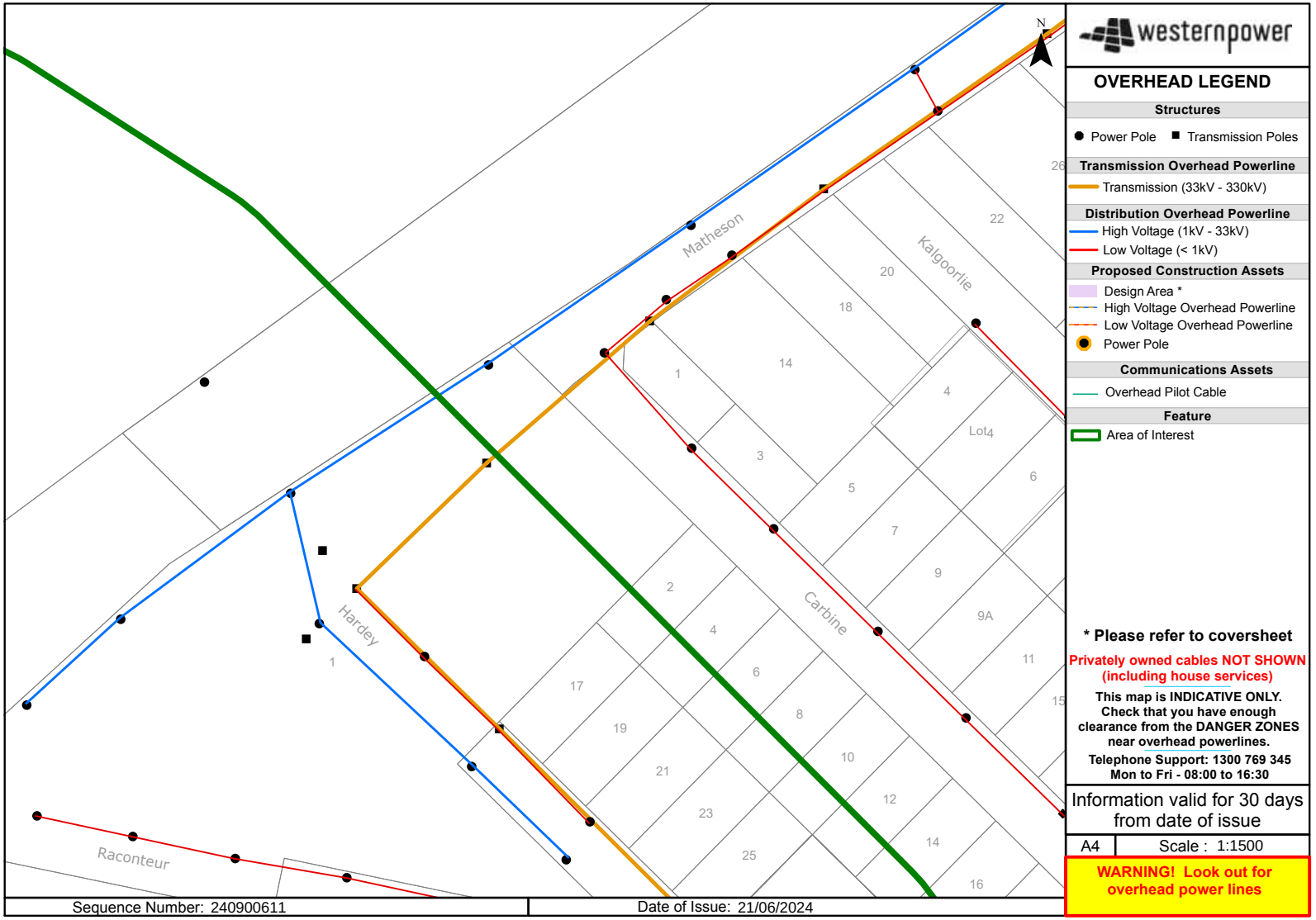
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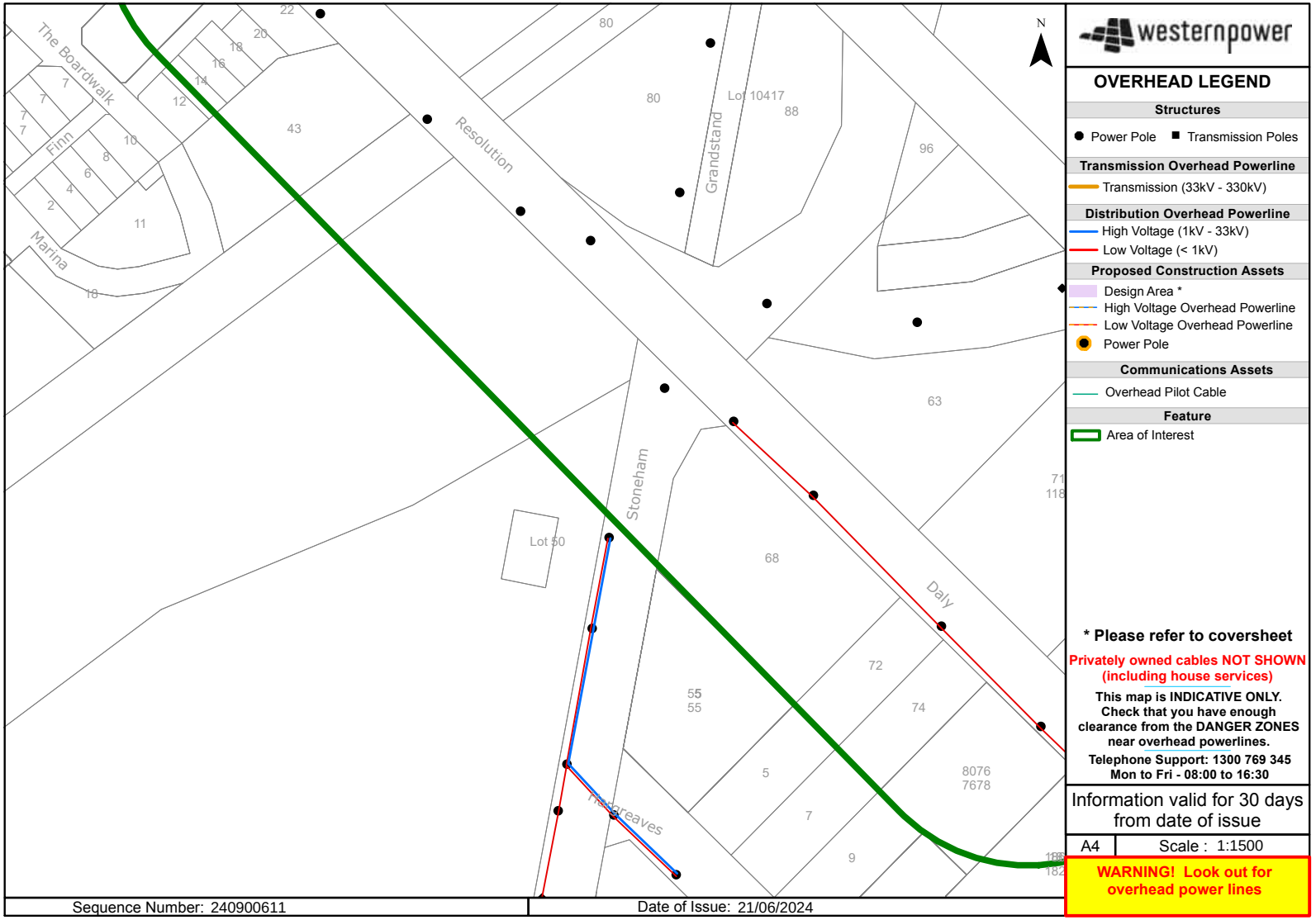
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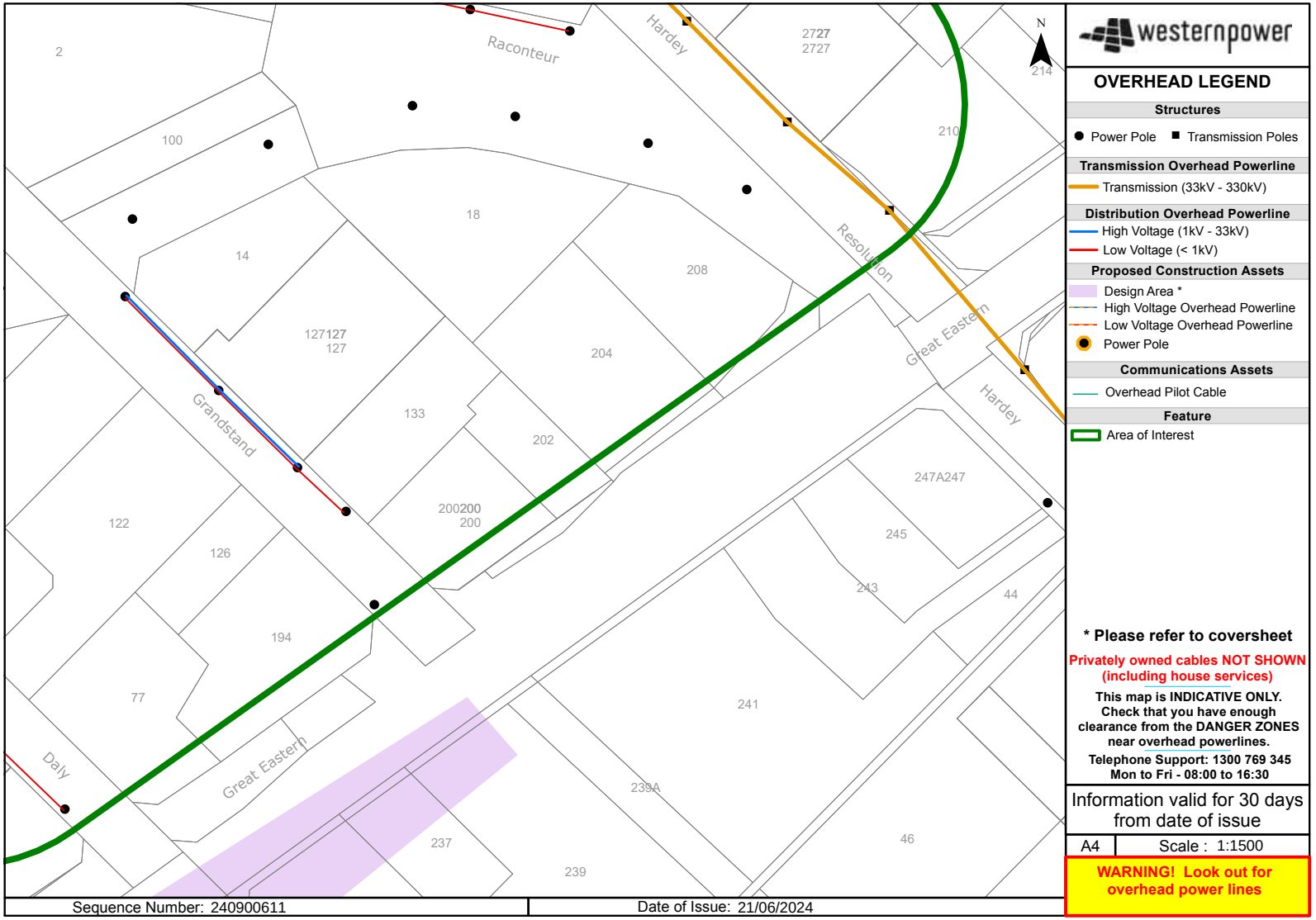
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Attachment 12.1.4 Engineering Servicing Report

Job ID 36962243

Precinct E

End of document

This document may exclude some files (eg. DWF or ZIP files)

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Attachment 12.1.4 Engineering Servicing Report

Job No 36962238

BEFORE YOU DIG www.byda.com.au

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference
Preinct D

Address
70 Grandstand Road
Ascot WA 6104

Notes/description
-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900580	ATCO Gas Australia	1300 926 755	NOTIFIED
240900576	NBN Co (WA)	1800 687 626	NOTIFIED
240900574	Optus (WA)	1800 505 777	NOTIFIED
240900578	Telstra (WA)	1800 653 935	NOTIFIED
240900575	Vocus (WA)	1800 262 663	NOTIFIED
240900579	Water Corporation	13 13 95	NOTIFIED
240900577	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

Attachment 12.1.4 Engineering Servicing Report

ATCO UNDERGROUND ASSET DETAILS ASSETS AFFECTED

GAS DIVISION

ASSETS AFFECTED – see accompanying Plan

Job No: **36962238**
Sequence No: **240900580**
Date of Issue: 21 June 2024
Phone: **1300 926 755**

Justin Zielinski
ATCO Gas Australia
54 Havelock Street
West Perth
WA 6005

BYDA Utility Registration Name: Private
BYDA Location: **70 Grandstand Road Ascot WA 6104**

ATTENTION: This response to your enquiry has been interpreted from details in your requested DBYD picture location request only (not any street address you gave). It is your duty to ensure the accompanying plan/s match your geographical area of works.

IF YOU SEE, HEAR, SMELL OR OTHERWISE DETECT GAS,
LEAVE THE IMMEDIATE AREA AND THEN CALL 13 13 52

Our records indicate that ATCO gas infrastructure ***IS PRESENT*** in the vicinity of and/or surrounding area of the above enquiry. This response relates only to ATCO assets. Your Duty of Care requires that personnel **Must** at all times comply with, and have on site, this information sheet and the accompanying plan(s). All plans are subject to this information sheet. You should refer to the ATCO Self-service Portal (Link Here) or if unsure, contact ATCO on **1300 926 755** during business hours.

All information provided is to be used as a guide only (see Disclaimer item **5**). It does not absolve you or third parties from your Duty of Care obligations, including to take additional precautions where work has the potential to impact on gas assets, public safety or the environment, or from your duties at law (including Reg 3.21 of the Occupational Safety and Health Regulations 1996).

WARNINGS

- No works of any type within 15 metres of any **CRITICAL GAS ASSET** infrastructure without prior approval from ATCO
- **NO HOT WORK** within 15 metres of any gas infrastructure except in compliance with applicable laws & *Australian Standard 1674.* **Do Not** let heat sources or hot works impact on any gas infrastructure and take into consideration that the ground or adjacent structures may also be capable of transmitting heat so as to circumvent protection afforded by a heat shield or barrier
- **DANGER** - Gas can cause asphyxiation and is flammable. Keep all ignition sources well away (e.g., flames, matches/ lighters, sparks, electrical devices, vehicles or engines, mobile phones, cameras)
- Gas pipes **Must Not** be unsupported or left without adequate cover or protection without prior approval from ATCO
- Damage to the pipe coating or pipe itself can be very dangerous if not given immediate attention. Report any damage to ATCO immediately on **13 13 52**. **Do Not** attempt to repair any damaged gas infrastructure
- No alteration or removal of live or abandoned gas infrastructure without prior written approval from ATCO
- Any abandoned or proposed gas infrastructure indicated on the gas plans **Must** be treated as live
- Never assume the location or depth of any gas infrastructure. Pipes may not follow straight lines or maintain a constant depth. Always check carefully (e.g., by careful hand digging of potholes)
- Unauthorised repairs or tampering with gas infrastructure may result in prosecution under the *Energy Operators (Powers) Act 1979*. ATCO Gas Australia reserves all rights to recover compensation for loss or damage to its gas infrastructure or other property including for indirect or consequential losses.

Attachment 12.1.4 Engineering Servicing Report

PLANS:

Plans provided are current for **30 days only** from date of request. You must use current plans at all times.

Plans do not show all gas service lines (which connect gas mains to individual meter positions). See condition **3.c)** below.

If plan shows **additional detail** symbols (*) or ( ) in the area of proposed works it is **your duty** to obtain that further detail from the number below.

Plans (including the location of pipes, services, infrastructure and boundaries) are **approximate only**. You **Must** use safe and proper procedures – including **potholing** (see condition **4** below).

Plans are not a guide as to gas availability for connection purposes.

To call ATCO: **Weekdays from 7.30am to 3.30pm, call – 1300 926 755 After hours, weekends and emergencies, call – 13 13 52**

CONDITIONS FOR WORKS IN THE VICINITY OF ATCO ASSETS

1. Compliance with Warnings

You **Must** comply with the Warnings contained in this information sheet and the accompanying plan(s).

2. Compliance with 'Working around Gas Infrastructure' Document (Link Here) applicable laws and duty of care

All work (including but not limited to using Excavator's Augers, Directional, drilling machines, 'Ditch Witch' type trenching machine, Loader, Dozer, Skid Steer (Bob Cat)) **Must** comply with all applicable requirements in the 'Working around Gas Infrastructure' Document and with all applicable laws and Australian Standards. All due care must be exercised to locate any gas infrastructure in the vicinity and when conducting any works near them.

3. All Gas Infrastructure

All work that may have any impact upon any gas infrastructure (see **3.a)**, **b)** and **c)** below for examples) should be carefully planned with notification to ATCO well in advance of commencement. Contact ATCO on **1300 926 755** or visit Atco's online self-service portal (Link Here). Amongst other things, this includes excavation of or near gas pipelines, boring/drilling, crossings of pipelines (including by other underground infrastructure e.g. drains, power cables, etc.), road works and structural installations. In addition:

a) Critical Asset

No works of any type are permitted within 15 meters of these pipelines without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco online Self-service portal (Link Here)

You **Must** ascertain the location of any Critical Asset, in relation to your proposed work by:

- Locating a straight line between two marker danger signs, and
- Assessing the distance from this line to your proposed work area.

ATCO may require stand-by supervision during your works and will advise of attendance requirements.

b) Non Critical Assets

These pipelines are installed in most streets throughout the Perth metro area and several country centers. Main valves, regulator sets, and test points also exist at intervals along these pipelines. Where work may impact upon these pipelines or assets then ATCO **Must** be contacted as per item **3** above.

c) Gas Services and Meters

If a gas meter is installed on a property, an underground gas service pipe will run from the meter position to the gas main in the street. Plans do not show all gas service lines (with the exception of Critical Assets), but their presence must be anticipated. Most gas meter boxes installed since 1996 will include a sticker giving approximate guidelines for the gas service line location. All due care must be exercised to locate any gas services in the vicinity and when conducting any works near them.

4. Compliance with Safe Work Practices

It is your responsibility to have and comply with adequate safe work practices and procedures. Without limiting your obligations:

PLAN The complete & current Before you Dig Australia documentation and plans must always be on site & referred to for the duration of work. Refer to regulation 3.21 of the Occupational Safety and Health Regulations 1996 and the Utility Providers "Code of Practice" for further useful information.

PREPARE Prepare by reviewing the Before you Dig Australia Documentation and contacting ATCO if you need assistance. Look for onsite ATCO asset and infrastructure clues such as pit lids, marker posts and meters. No works of any type are permitted within 15 meters of a **CRITICAL ASSET** without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco website Self Service portal (Link Here) and allow suitable

processing time. Atco recommends engaging a BYDA Certified Locator which includes undertaking electronic location prior to potholing.

POTHOLE Using current Before you Dig Australia plans, all gas pipes should be located (including any deviation in the direction of a gas pipe) by exposing them by careful digging using a HAND SHOVEL. Where the proposed work is parallel to a gas pipeline, pothole every 10 meters along the entire route. Damage to the pipe coating or to the pipe itself can create a very dangerous situation if not given immediate attention. If damage does occur, it **Must** be reported to ATCO immediately on Ph. **13 13 52**.

PROTECT Supervise and monitor all excavations near gas infrastructure using a dedicated spotter. Where any gas infrastructure is required to be exposed, adequate protection of the gas infrastructure is required to prevent potential damage. Also implement appropriate controls when conducting 'hot work' (in accordance with AS 1674) in the vicinity of the ATCO infrastructure such as; isolation; separation distance; the placement of an effective non-combustible barrier of sufficient size and thermal resistance for the intensity, type and duration of heat exposure; gas monitoring; monitoring the environment surrounding the ATCO infrastructure to ensure it is not being impacted by the work, and other controls as necessary.

PROCEED You should **only proceed** with your excavation work after you have planned, prepared, potholed (unless prohibited) and have protective measures in place. All locations markers/pegs are to be removed on completion of works. If you are unsure, **DO NOT** Proceed. Call ATCO on **1300 926 755**

5. Disclaimer and Further Terms

a) Nothing in this document, any accompanying plan or the 'Additional Information for Working around Gas Infrastructure' (AGA-O&M-PR24) (together called "**Documents**") purports to exclude or modify any term, condition or warranty to the extent that by law it cannot lawfully be excluded or modified by agreement or notice, including but not limited to those contained in Schedule 2 of the *Competition and Consumer Act* 2010 (Cth) and corresponding provisions of any state legislation.

b) If any of ATCO, or their respective related entities, officers, employees, agents, contractors or advisers (together called "**Associates**") is liable for a breach of a term, condition or warranty described in paragraph **5.a)** above, its liability is, to the fullest extent permitted by law, limited to any one or more of the following as it determines in its absolute discretion:

i) in relation to goods supplied by them, replacing or repairing the goods, supplying an equivalent item, paying the cost of replacing or repairing the goods or paying the cost of acquiring or hiring an equivalent item; and

ii) in relation to services supplied by them, the re-supply of the services or the payment of the cost of having the services re-supplied.

c) Subject to paragraphs **5.a)** and **b)**, but otherwise despite any other provision in the Documents, no representation or warranty is made or given (whether expressly or by implication) by any of ATCO or their respective Associates in respect of any information contained or referred to in any of the Documents or in any other communication from ATCO concerning any of the Documents or the subject matter of any of the Documents ("Information"). In particular, but without limiting the generality of the foregoing limitation, none of ATCO or their respective Associates makes any warranty or representation as to the truth, accuracy, completeness, reliability, currency, timeliness, quality or fitness for any purpose of or the standard of care taken in the preparation of any Document or Information (including, but not limited to, the accuracy of the scale of, or the location of anything or symbol shown on, any plan or diagram).

d) Subject to paragraphs **5.a)** and **b)**, to the maximum extent permitted by law, none of ATCO or their respective Associates is liable to any person or other body ("**Recipient**") who receives or otherwise obtains access to all or any part or parts of the Documents or Information, in any way (including, but not limited to, liability for negligence, breach of statutory duty or lack of care) in respect of any cost, expense, damages, loss or liability, including, but not limited to:

i) any financial or economic loss, cost, expense or damage, including but not limited to loss of production, loss of profit, loss of revenue, loss of use, loss of contract, loss of goodwill or loss of business opportunity;

ii) any new or increased costs or expenses, including but not limited to financing or operating costs;

iii) any failure to achieve any actual or anticipated saving in respect of any cost or expense;

iv) any cost, expense, damage or loss resulting from any liability of the Recipient to any other person or body howsoever and whensoever arising, suffered or incurred by the Recipient in relation to, or in connection with, the disclosure to them of, or use of, or reliance on, all or any

part or parts of the Documents or Information.

e) By using any Document or Information, each Recipient is taken to represent and warrant to ATCO that the Recipient will comply with the conditions and other terms referred to in the Documents or Information, including but not limited to conditions that:

i) the Recipient **Must** comply with the conditions in numbered paragraphs **1** to **4** above and this paragraph **5**;

ii) as between ATCO and each Recipient, ATCO owns the Information and all rights and title in and to the Information are to remain vested in ATCO;

iii) no Recipient has any right, title or interest in the Information or, except as expressly provided for in the Documents, any license or right to copy, alter, modify, publish or otherwise use or deal with the Information without prior written approval from ATCO;

iv) ATCO makes no representation and gives no warranty as to its right to disclose any Information;

v) the Recipient relies on any Information entirely at its own risk and expense;

vi) the Recipient **Must** undertake its own independent due diligence and investigations in relation to the Information;

vii) none of ATCO or their respective Associates owes the Recipient any duty of care in respect of the Information; and

viii) none of ATCO or their respective Associates is under any obligation to correct, update or revise any Documents or Information.

GAS MAIN AND SERVICE IDENTIFICATION

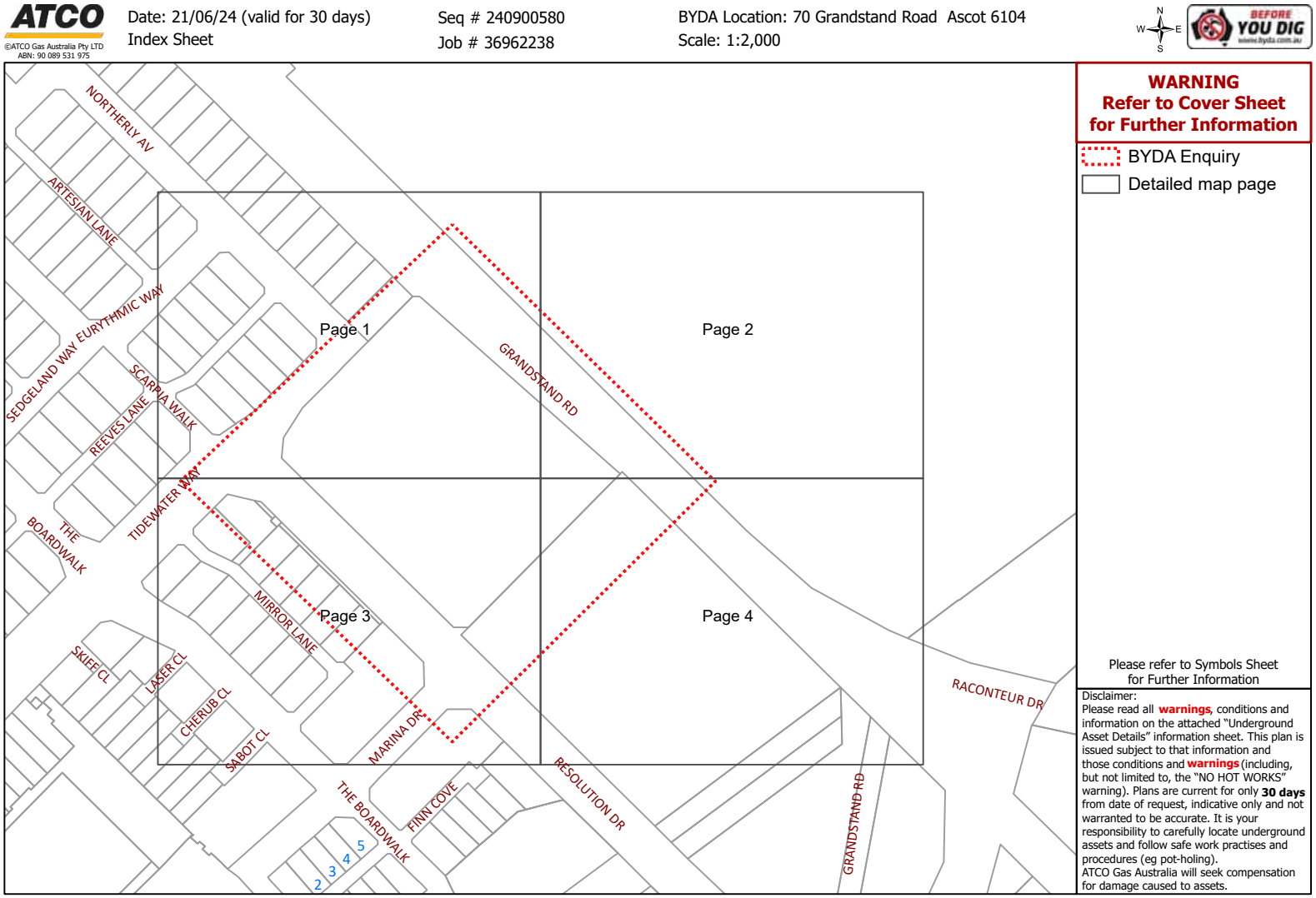
LEGEND

1. Critical Asset (See **WARNINGS** page 1)
2. Pipe Diameter (millimetres)
3. Pipe Material
   CI = Cast Iron PE = Polyethylene
   GI = Galvanised Iron PVC = PVC
   ST = Steel
4. Alignment (in metres from property line)
5. Pressure in main (MP 70 kPa = Medium Pressure and MAOP (Maximum Allowable Operating Pressure)
6. Off-line Service – service may not be straight line to meter. (**WARNING – OLS may not always be shown on plan**. See item **Error: Reference source not found** above)
7. Service Valve in the vicinity
   (**NOTE:** Service Valve may be **"BURIED"**)
8. Pre-laid Service laid in Common Trench
9. Main Status: (See **WARNINGS** page 1)
   9a. AB = Abandoned Mains
   9b. PROP = Proposed Mains
10. Customer Connection: Does not indicate actual location of Meter Position
    D2 (D = Domestic & 2 = Number of Meters)
    C1 (C = Commercial & 1 = Number of Meters)
11. **Additional detail available and Must be obtained if within area of proposed works – see page 2 above.**
12. Depth of Cover (DOC) in metres.



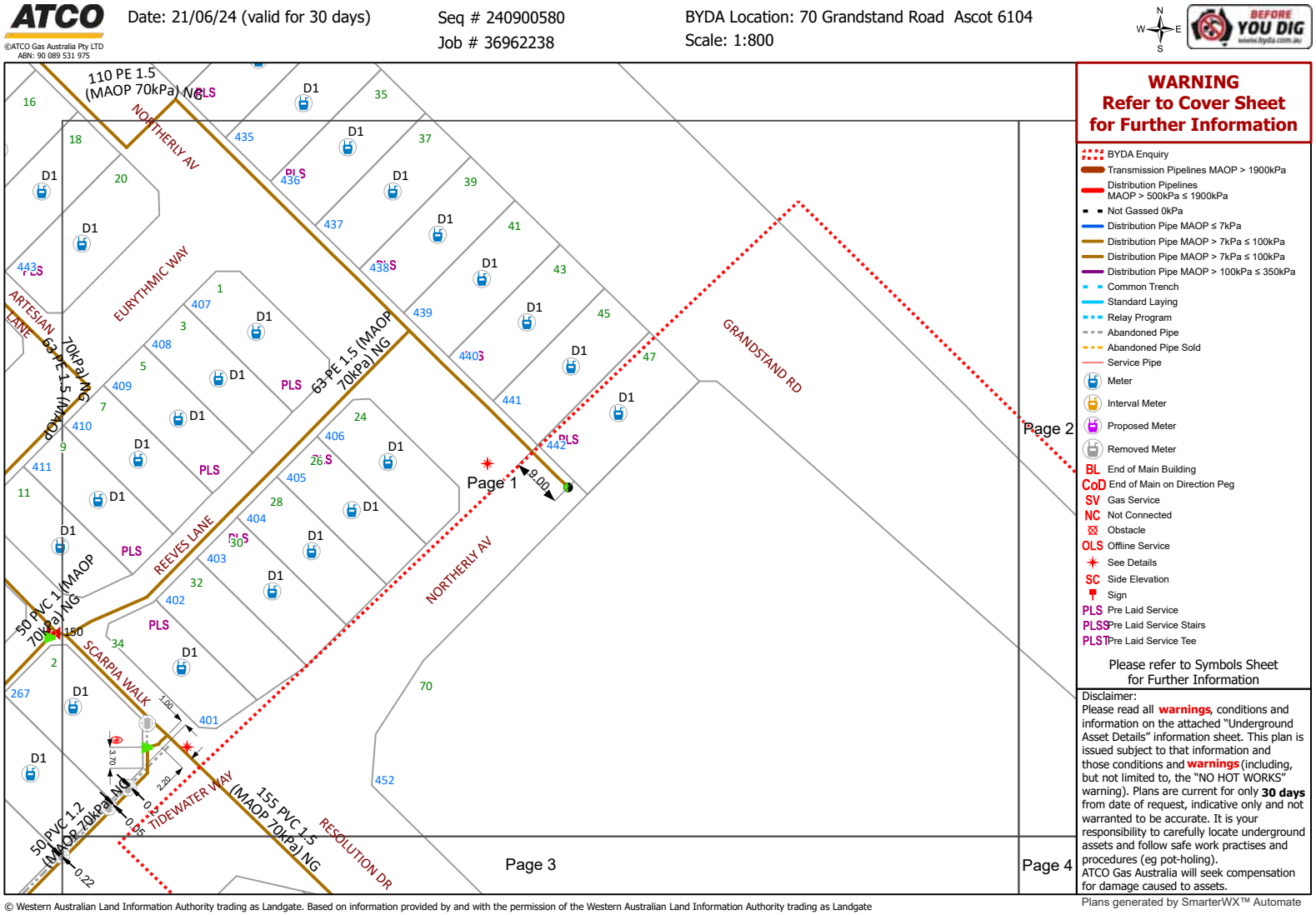
IF UNSURE, PLEASE CONTACT ATCO ON **1300 926 755**

Attachment 12.1.4 Engineering Servicing Report

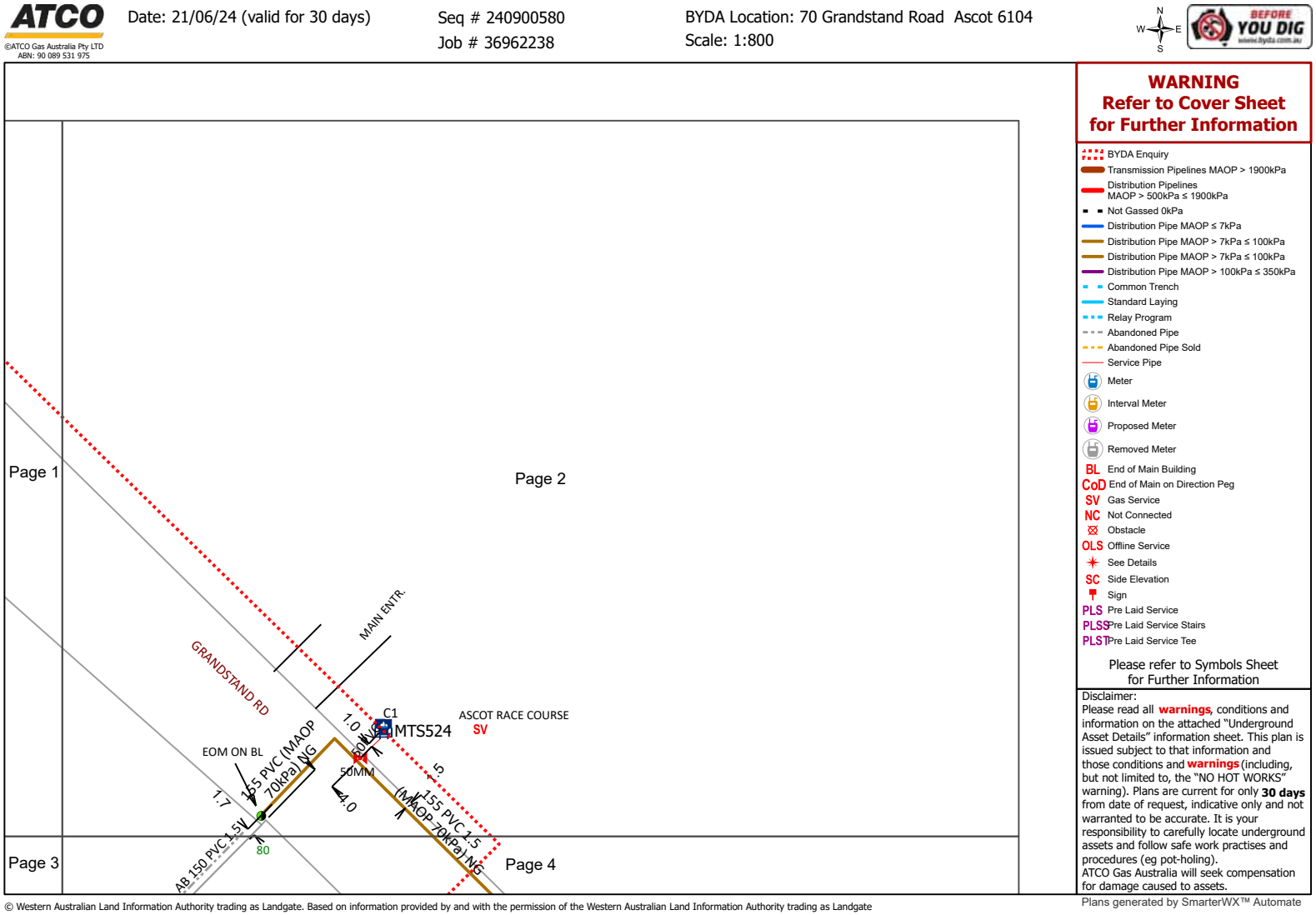


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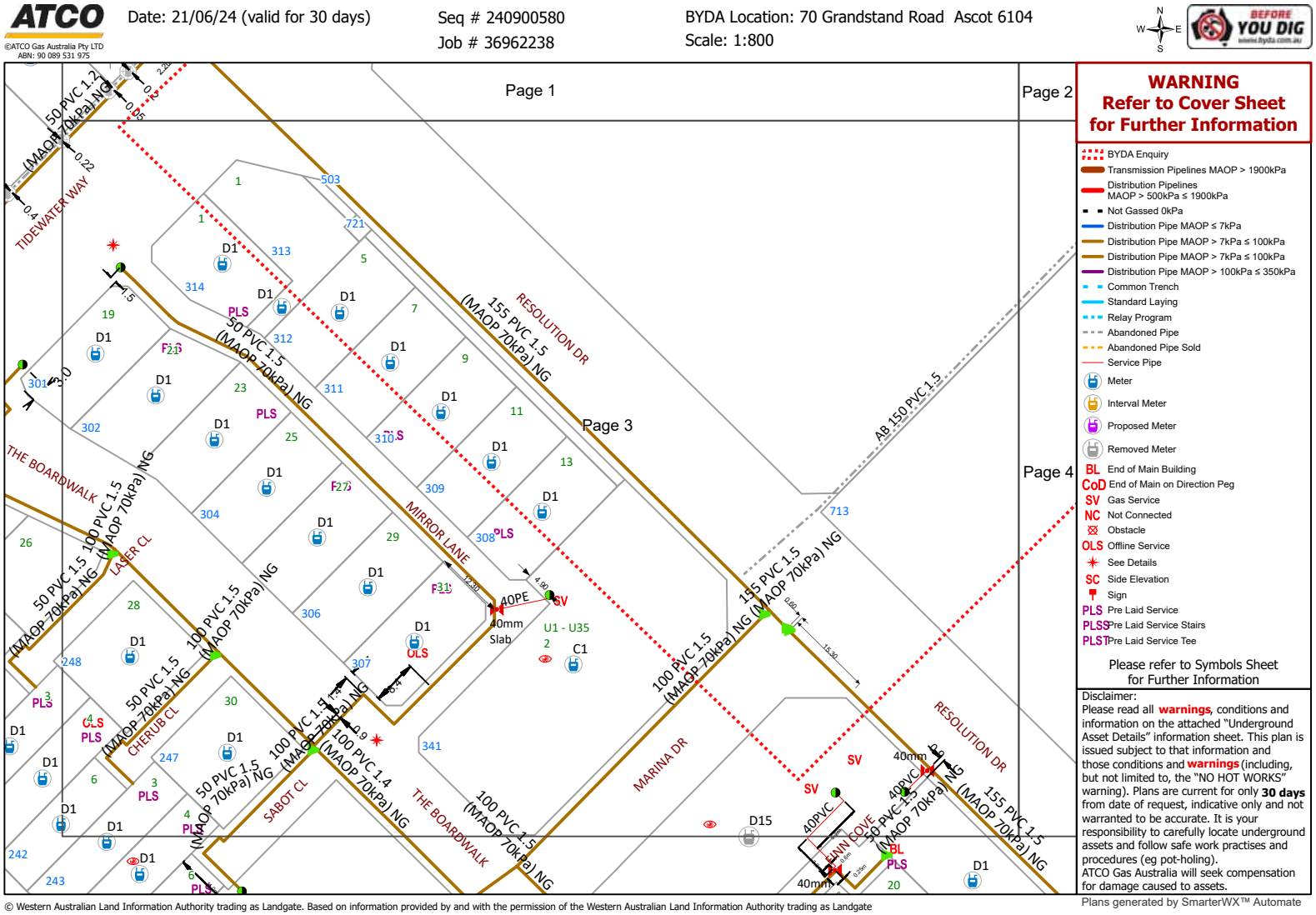
Attachment 12.1.4 Engineering Servicing Report



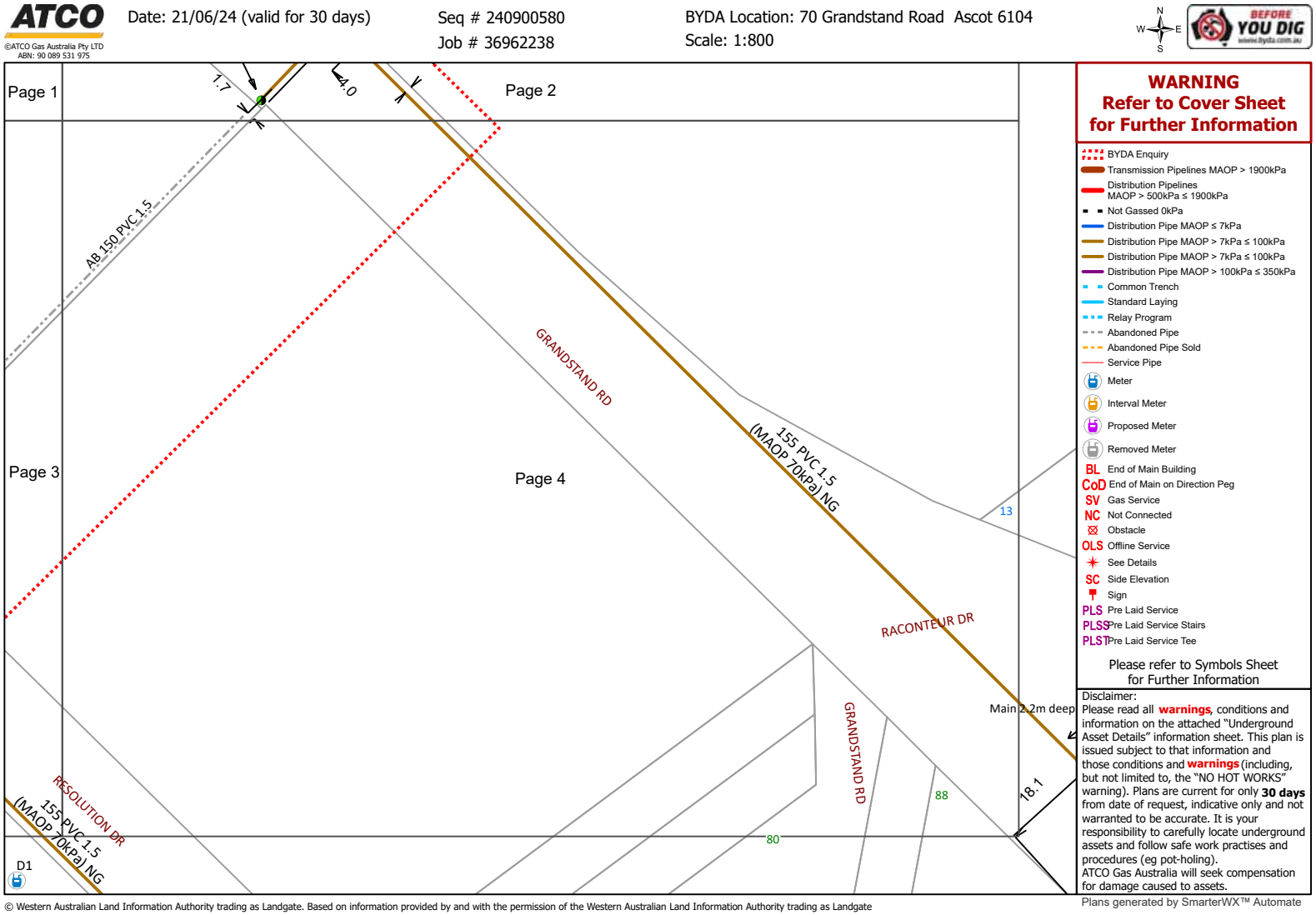
Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



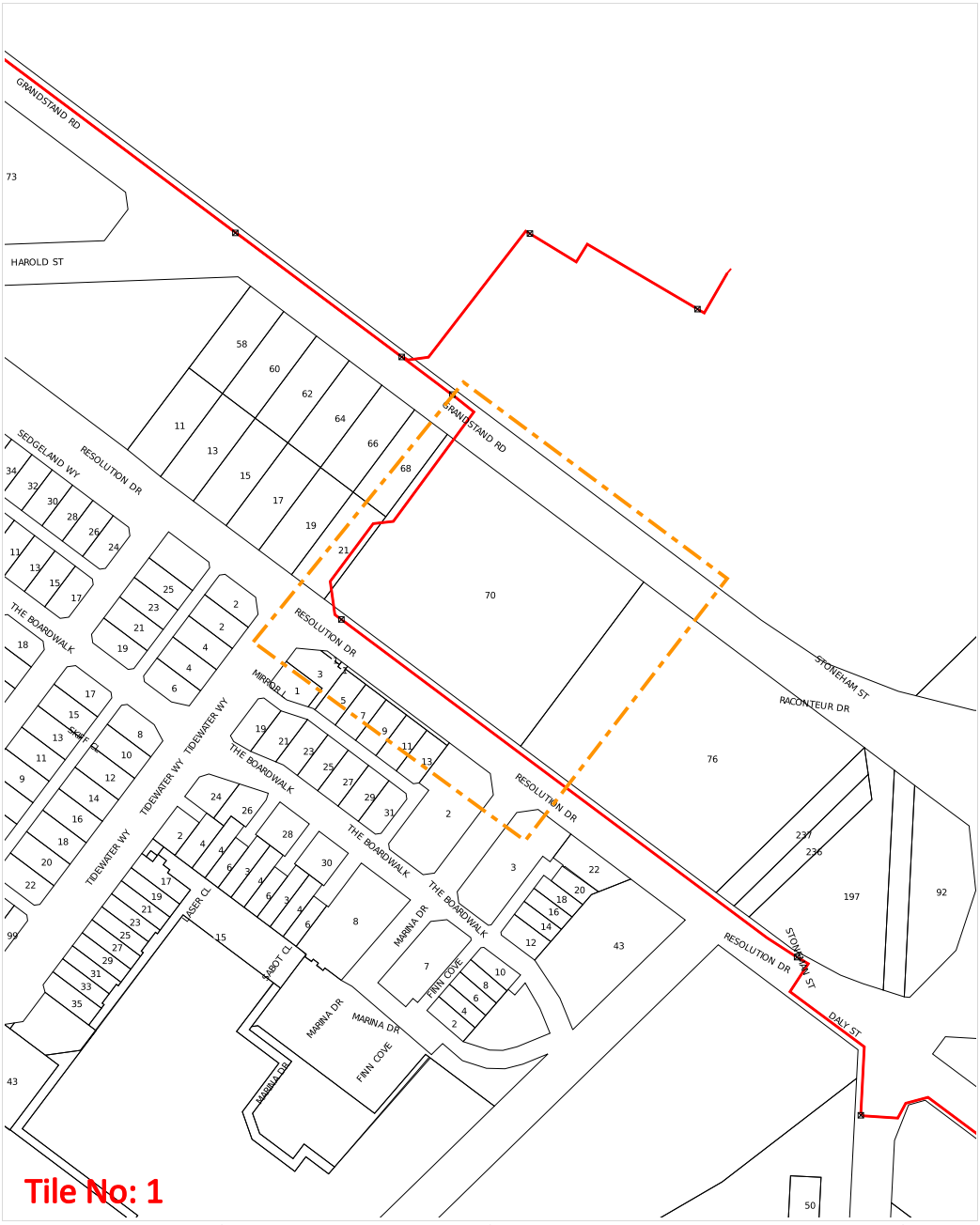
Attachment 12.1.4 Engineering Servicing Report



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

Attachment 12.1.4 Engineering Servicing Report



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Sequence Number: 240900574

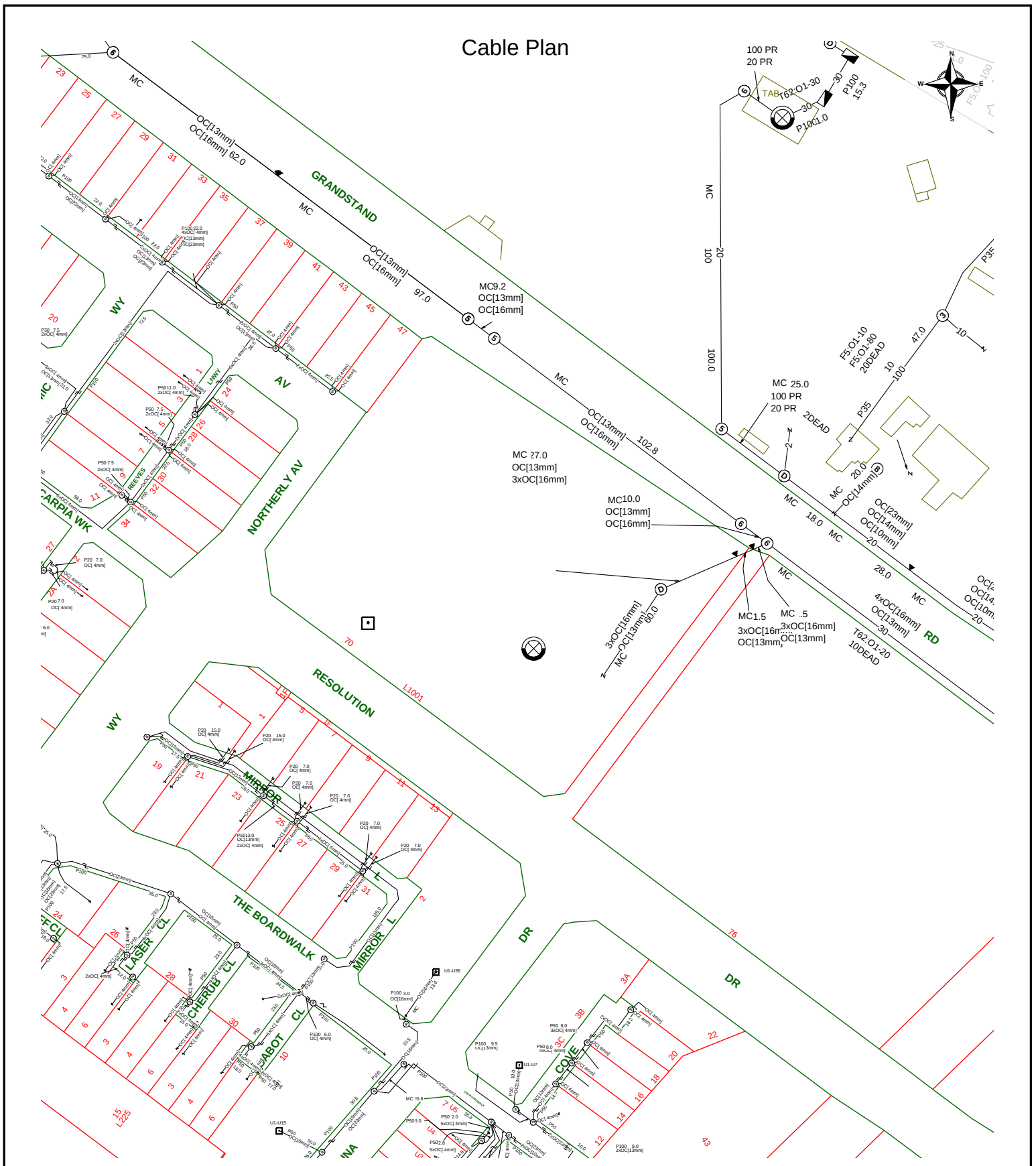
Date Generated: 21 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

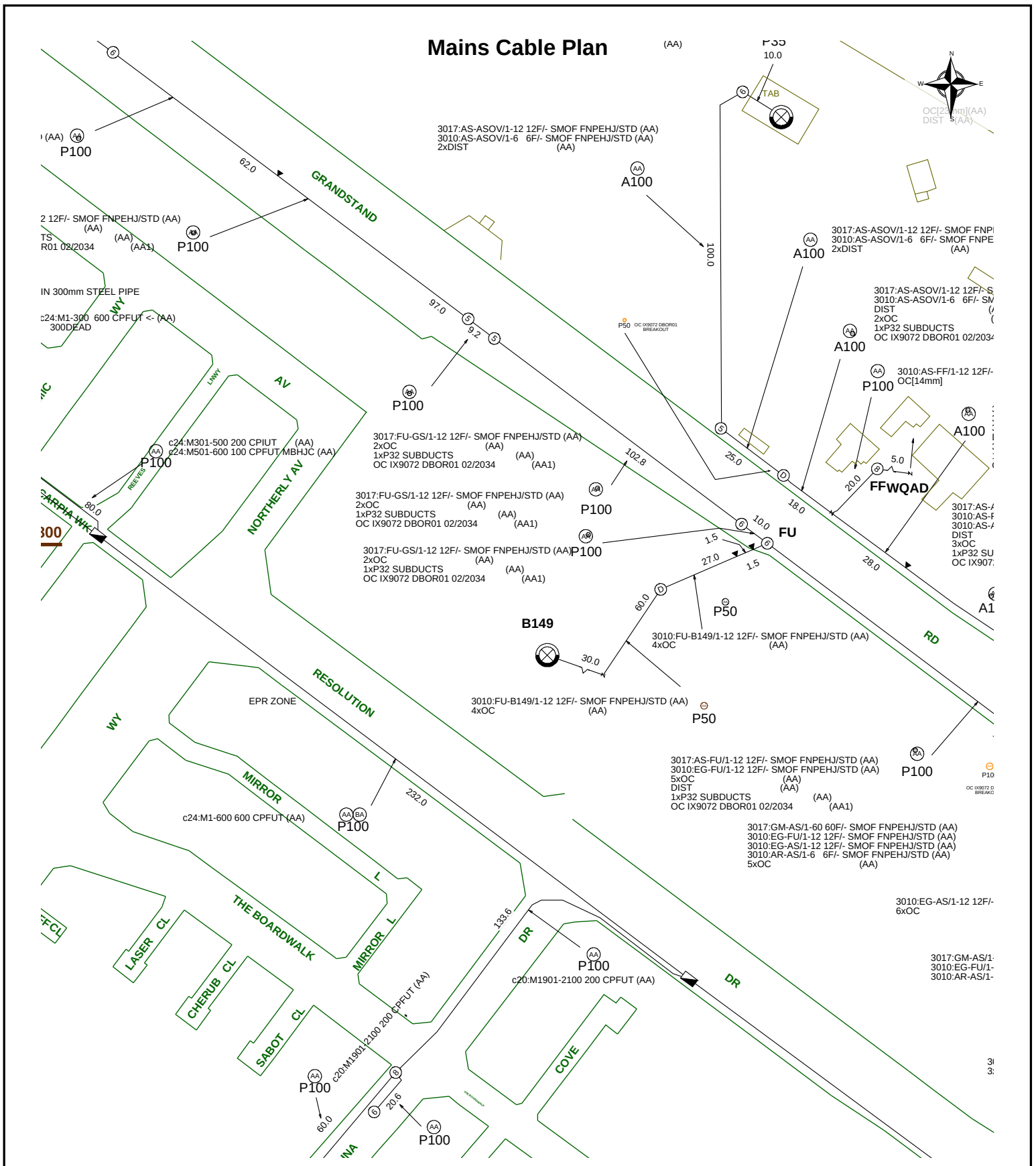
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Cable Plan



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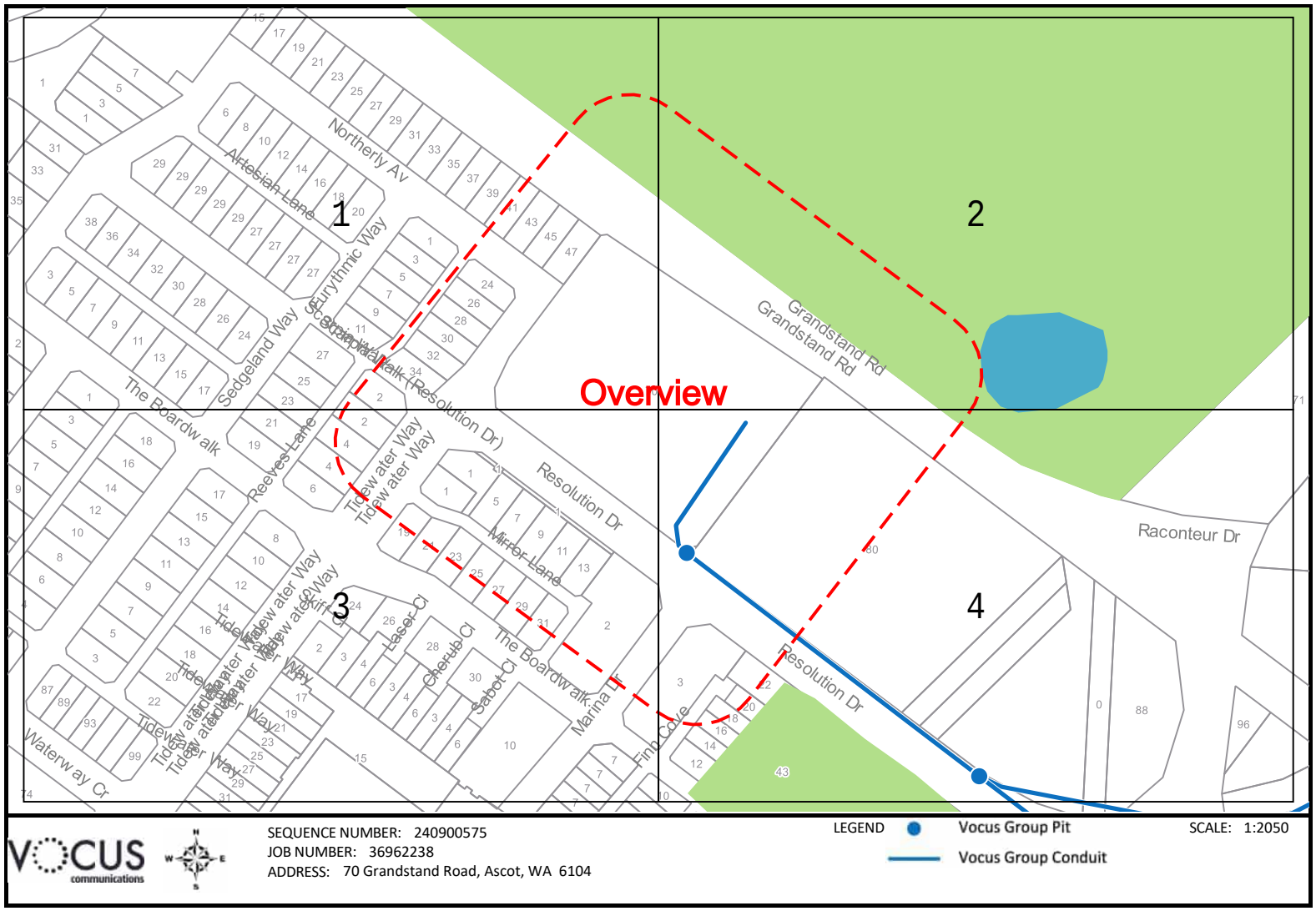
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900578
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:34	

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 2 of 2

Attachment 12.1.4 Engineering Servicing Report



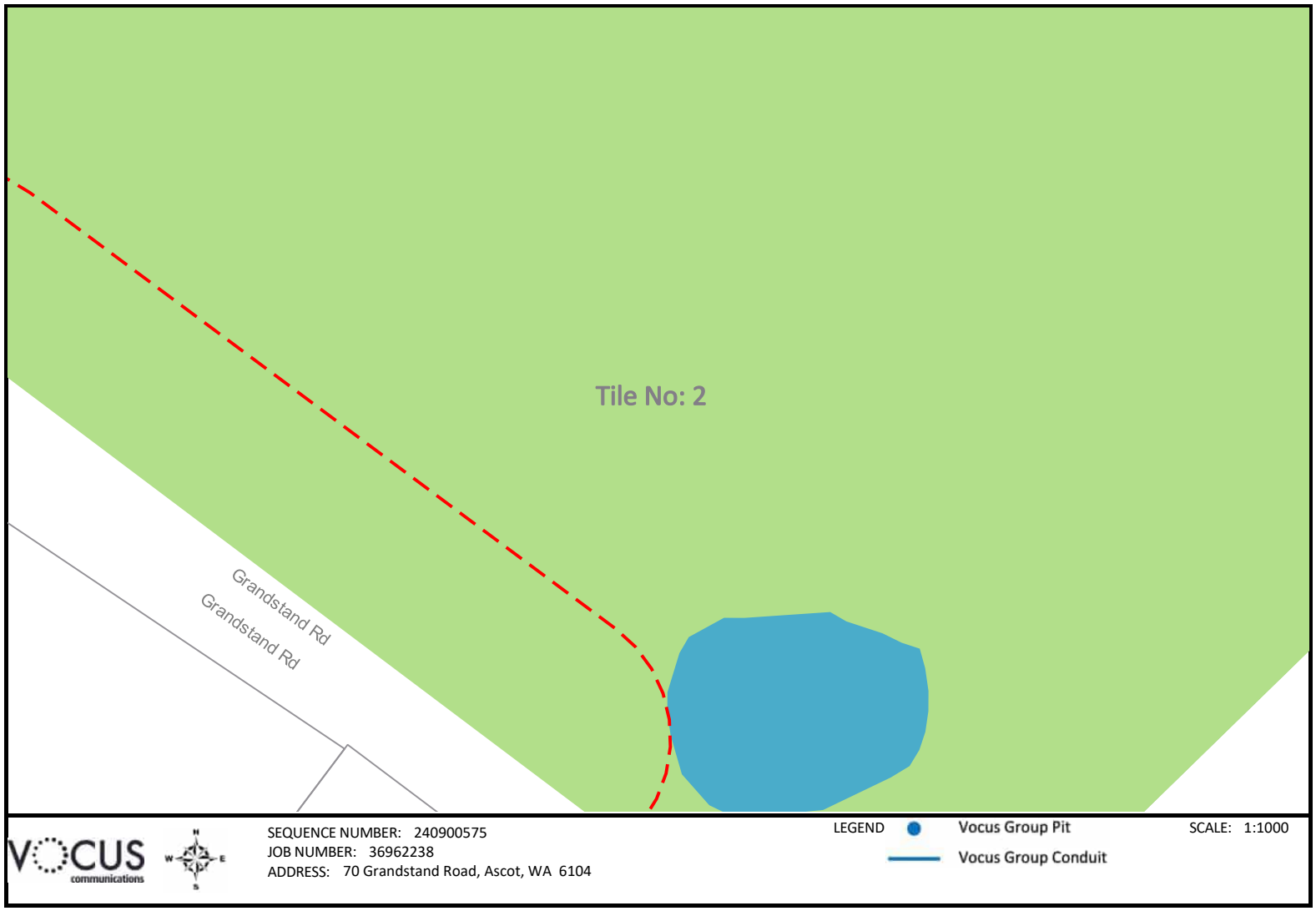
The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.

Attachment 12.1.4 Engineering Servicing Report



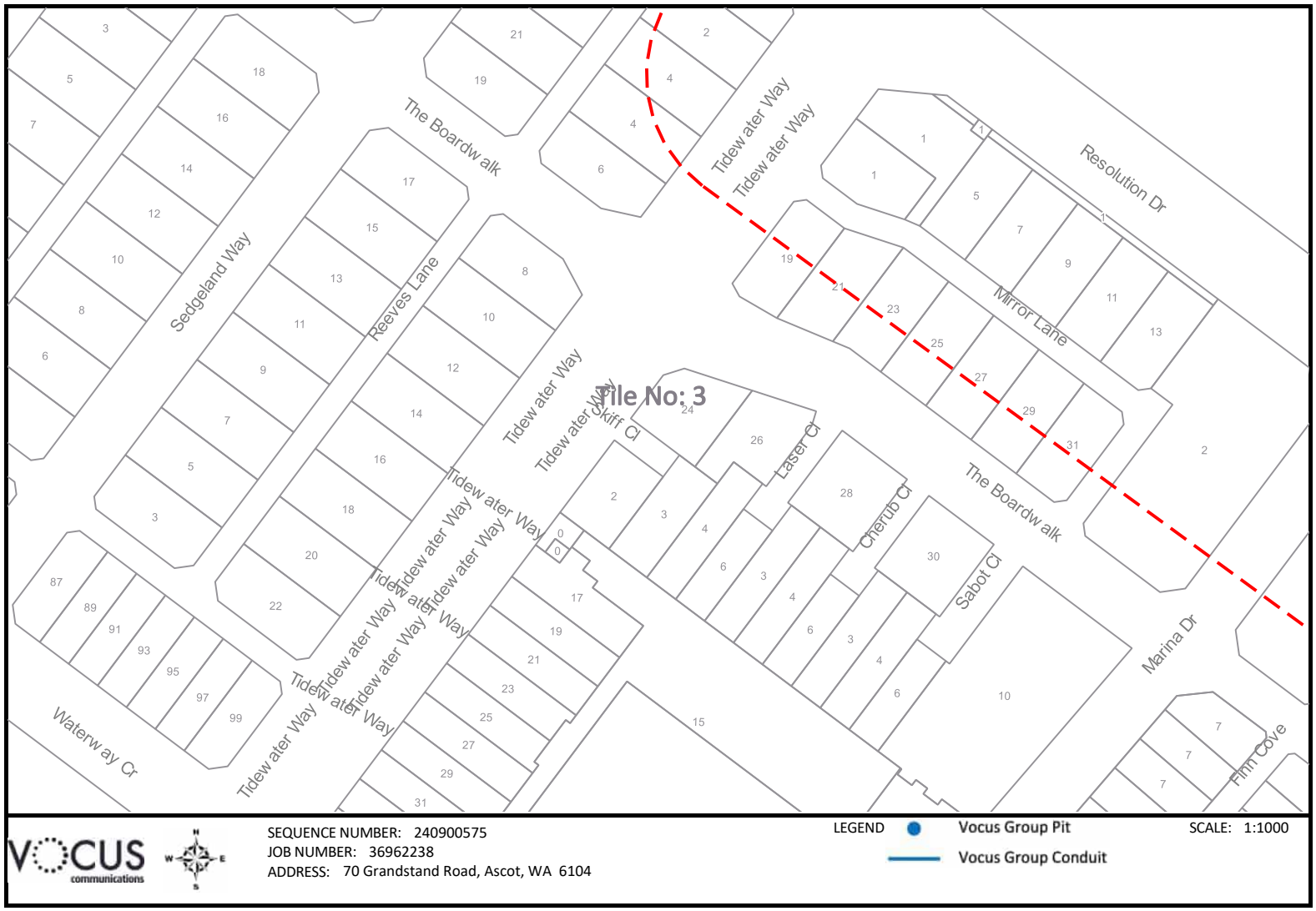
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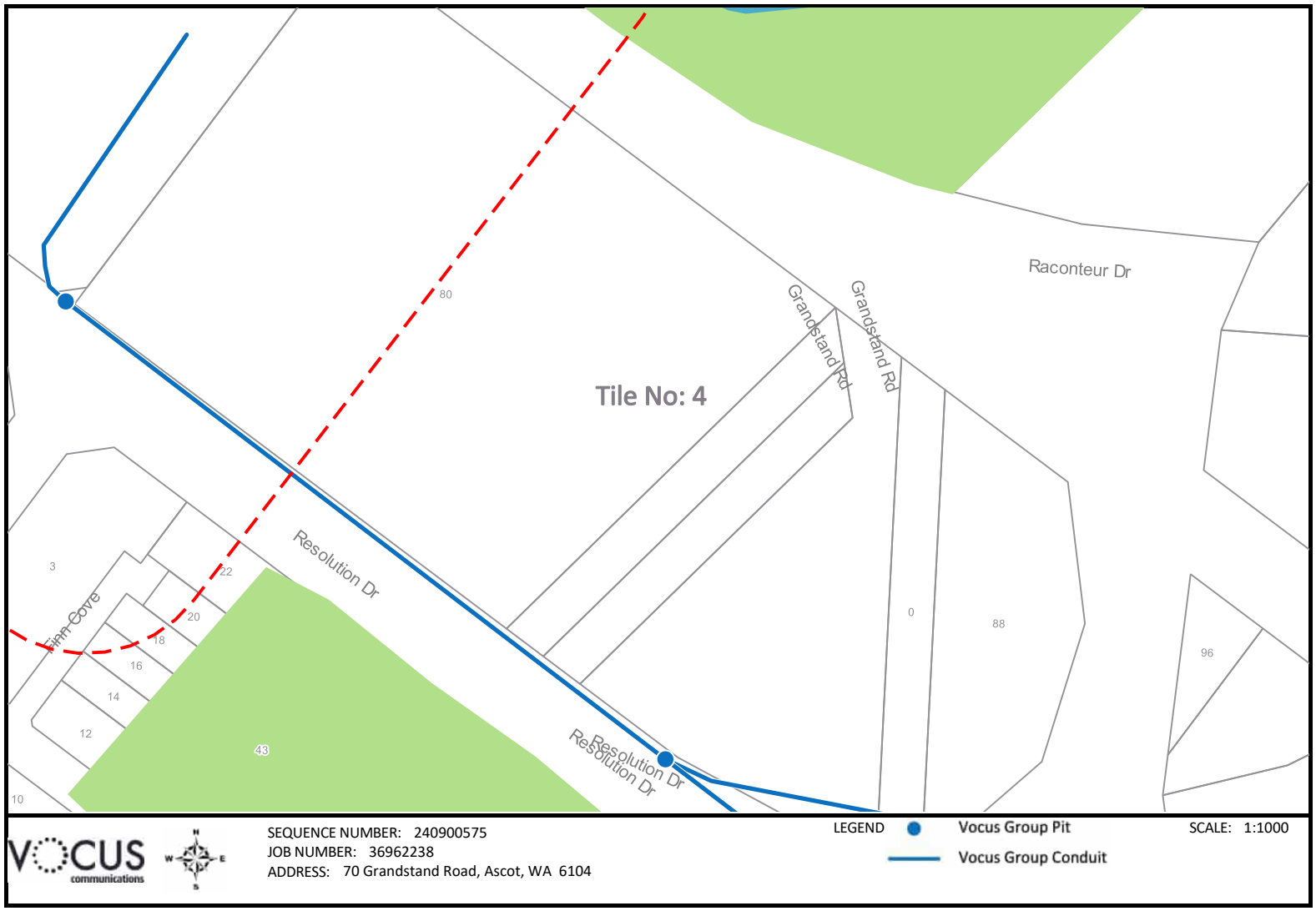
The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.

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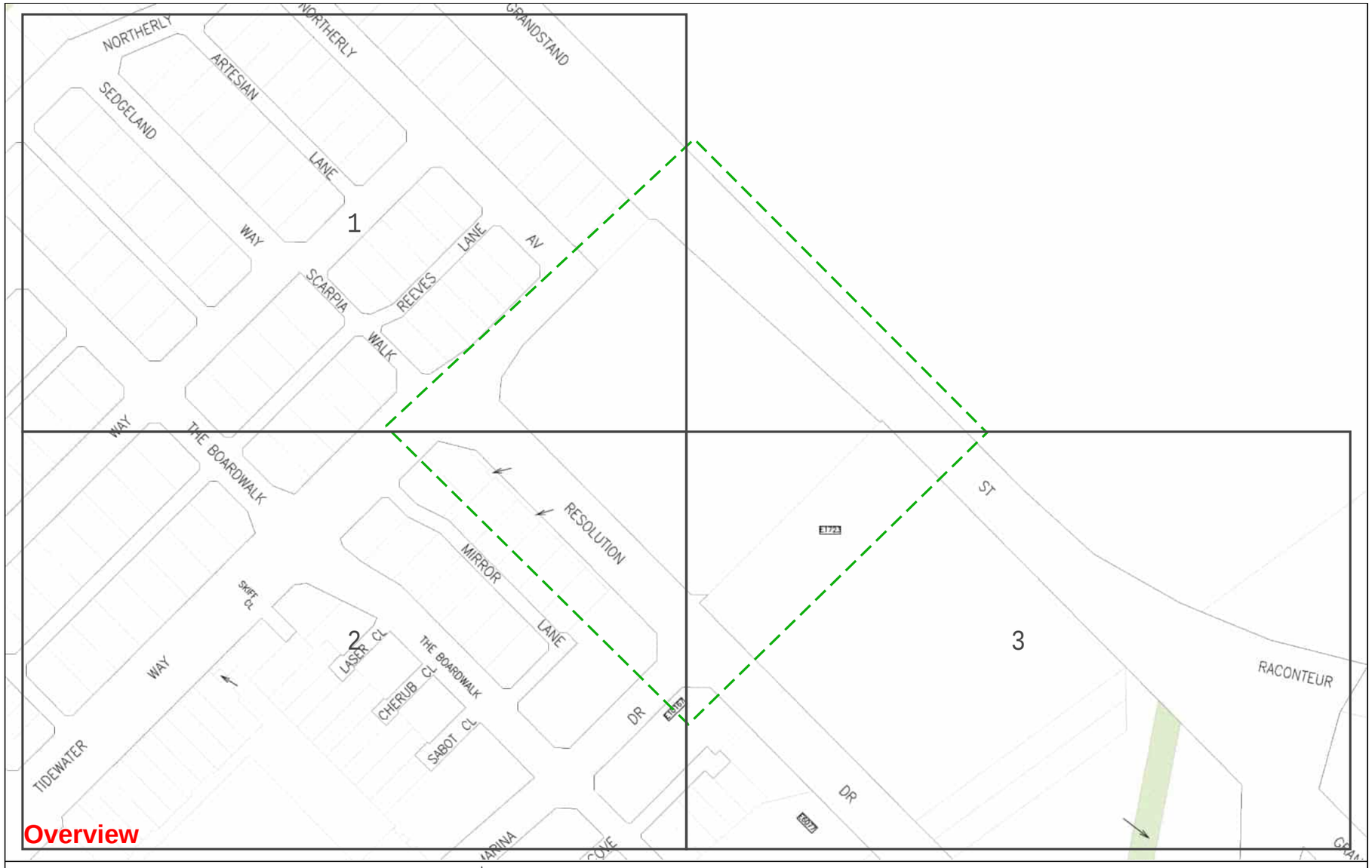
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Water Corp - Non-critical Plan.docx (21 May 2024)

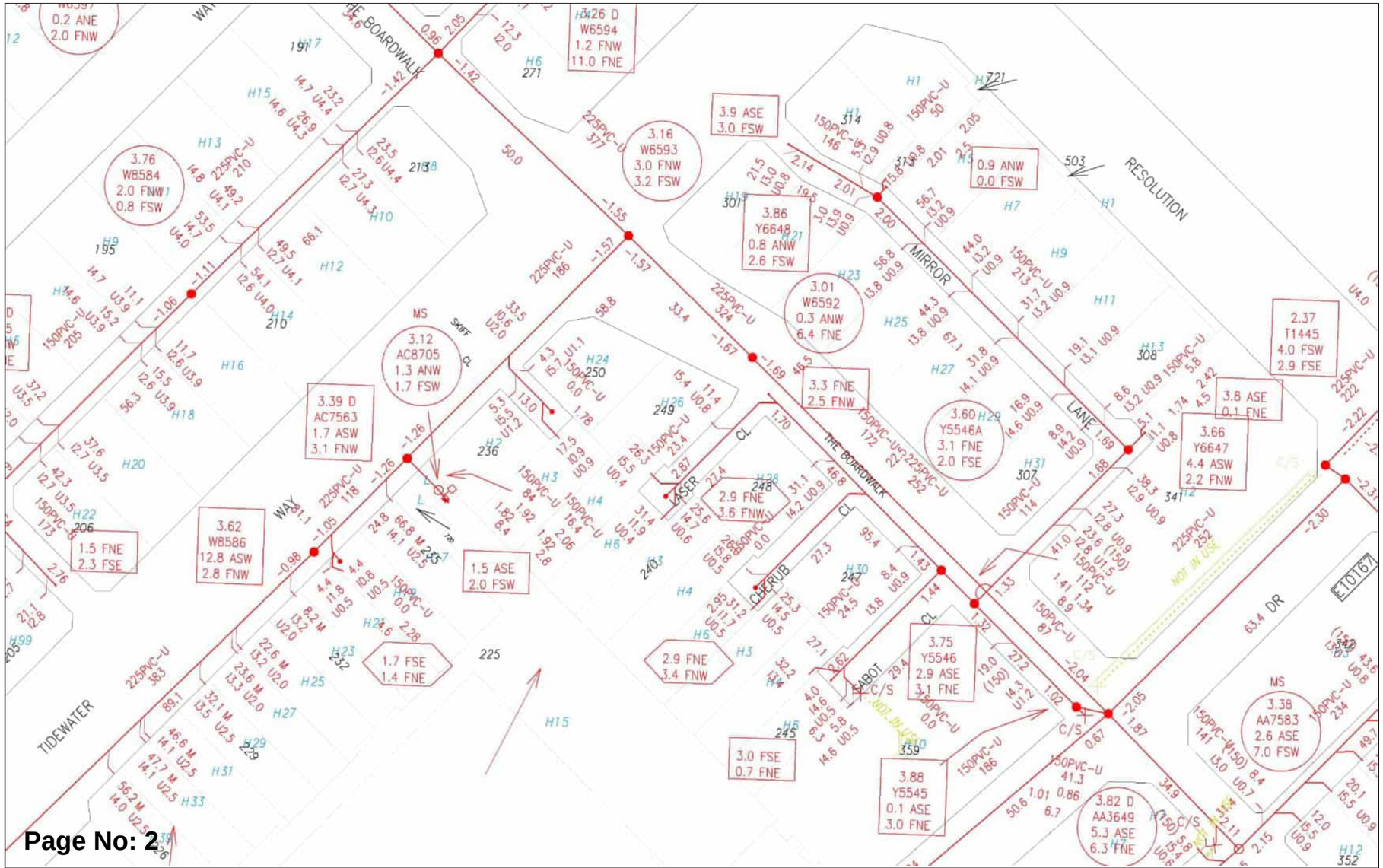
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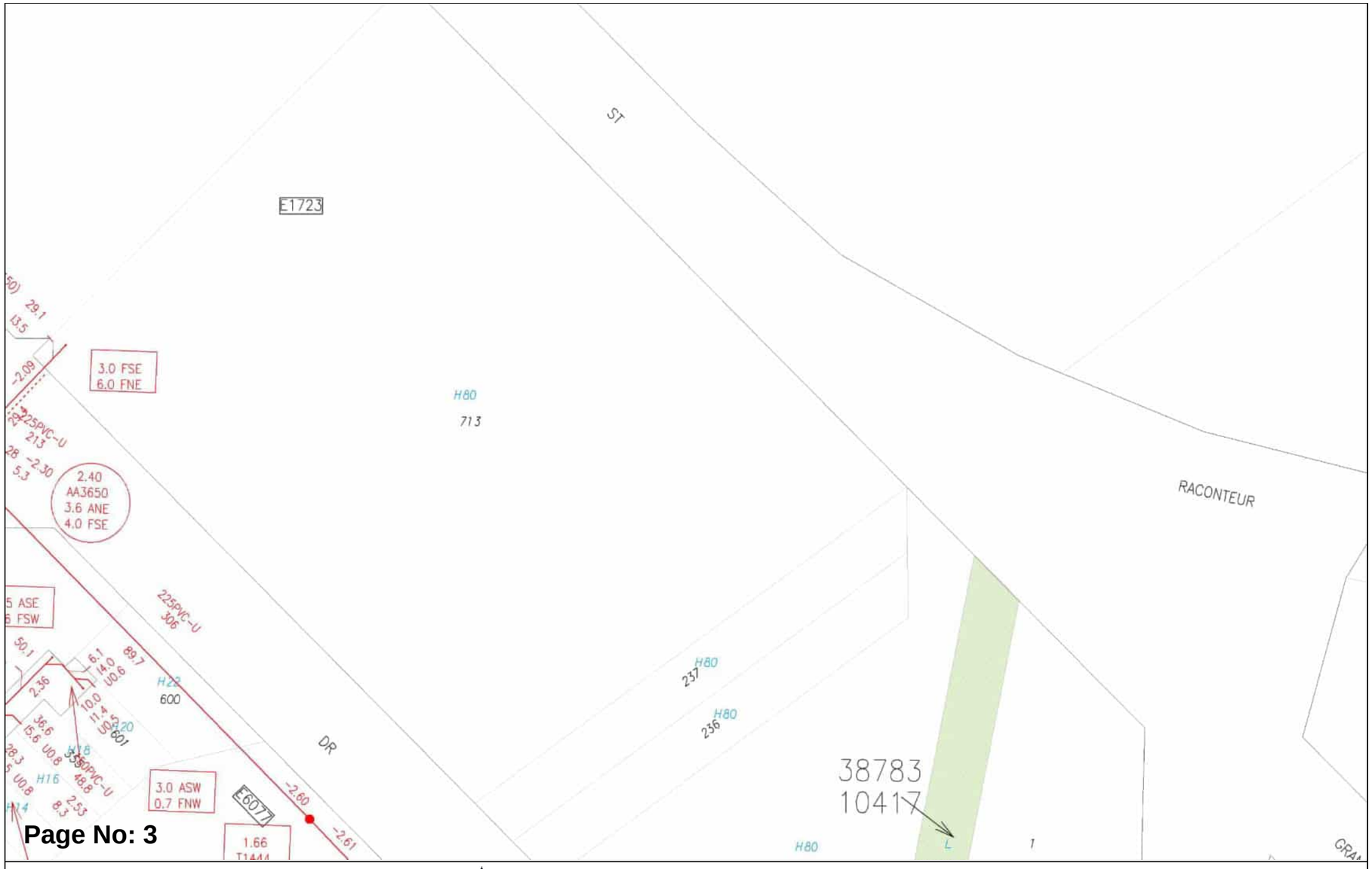
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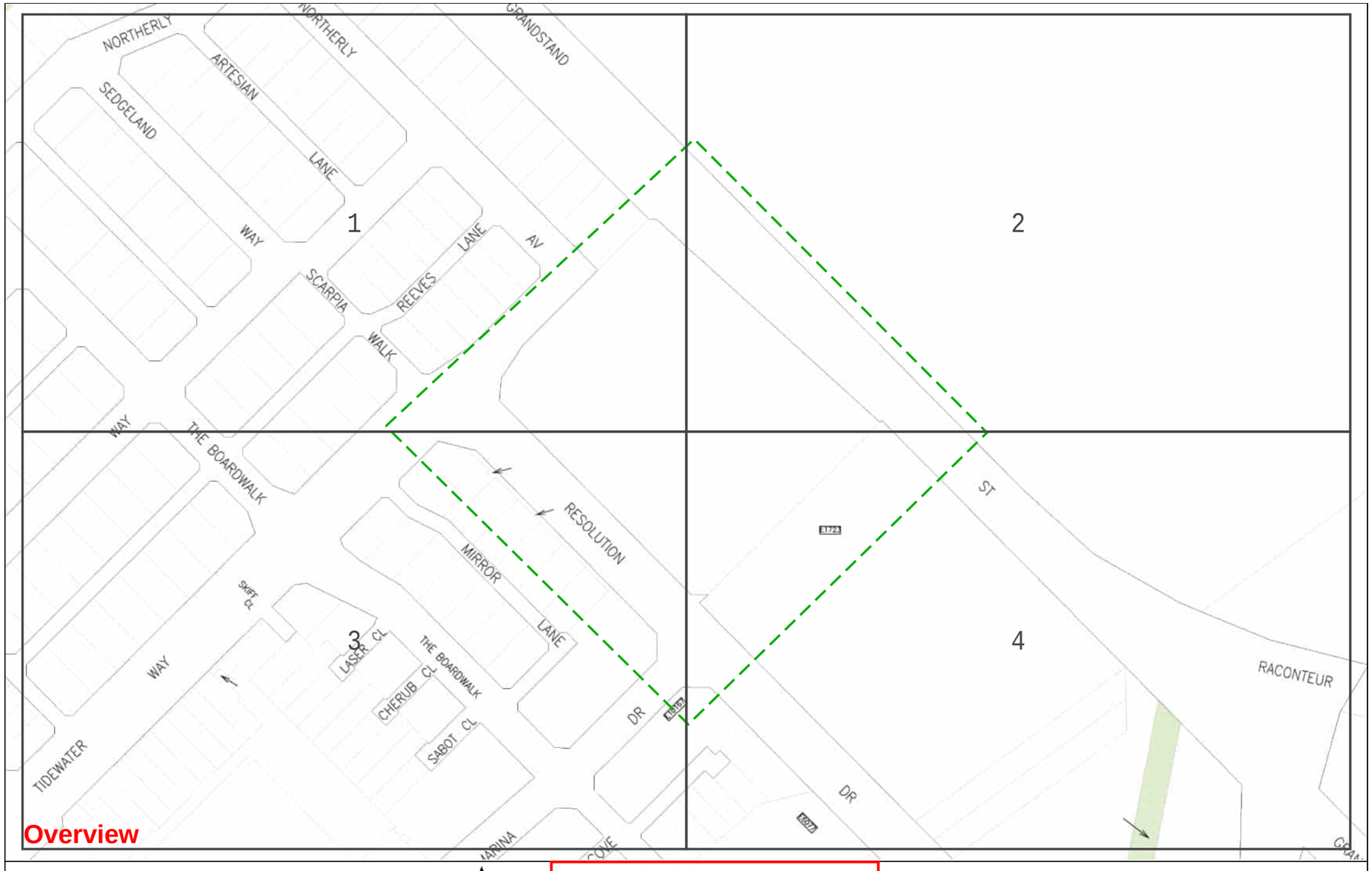
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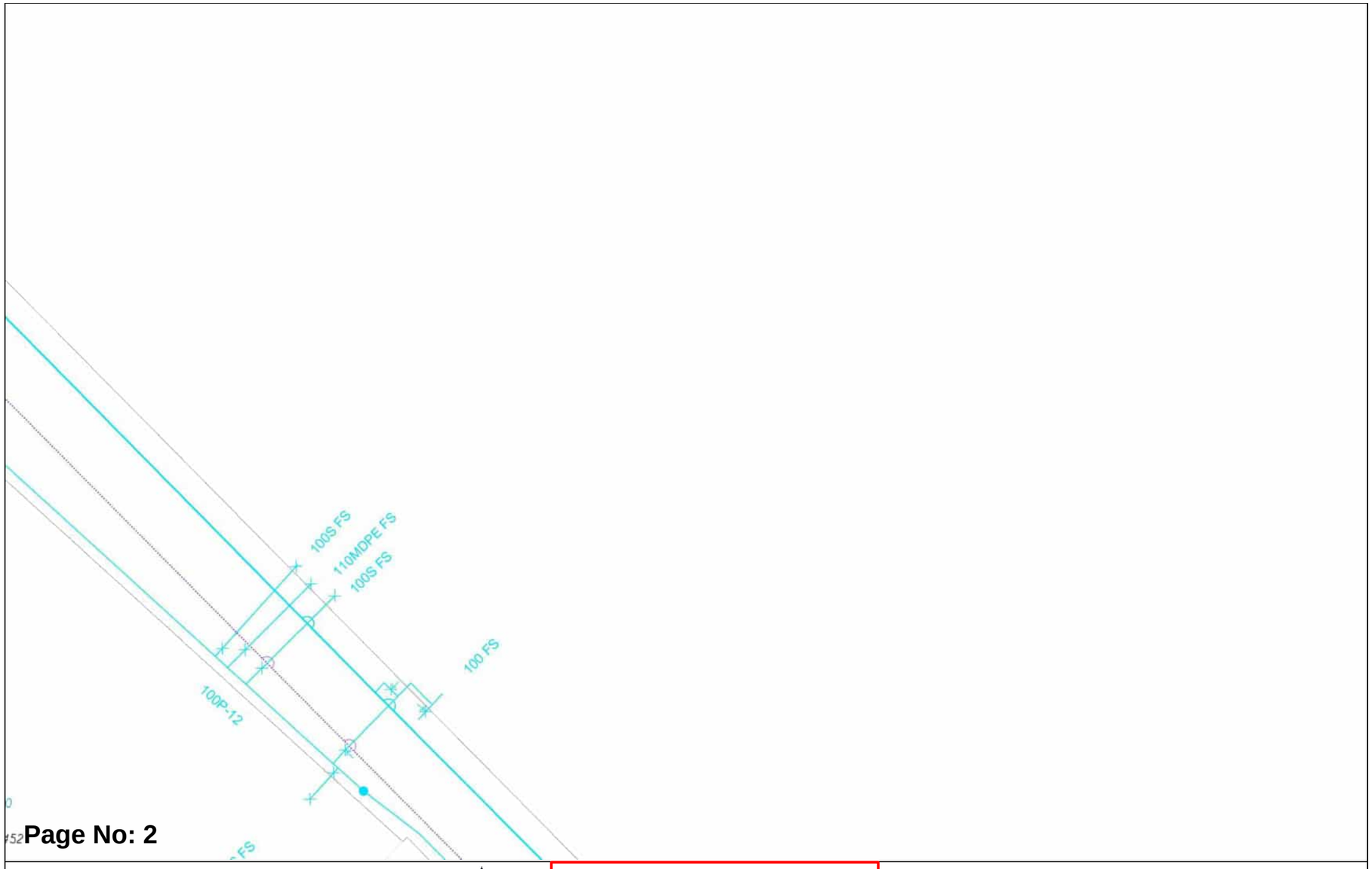
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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Page No: 2

WATER CORPORATION

Scale: 1:750
Job No.: 36962238
Sequence No.: 240900579
Print Date: 21 Jun 2024

N

Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

Apply for approval to work near our assets at:

Working near assets (watercorporation.com.au)

Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

The Water Corporation has taken due care in the preparation of this map but accepts no responsibility for any inaccuracies or inappropriate use. This plan may be reproduced in its entirety for the purpose of site work planning but shall not otherwise be altered or published in any form without the permission of the Water Corporation. The Water Corporation may need to be advised of any planned ground disturbing activities near facilities on this map. Refer to Brochure - "Protecting Buried Pipelines". Please report any inaccuracies to Asset Registration Team by email to asset.registration@watercorporation.com.au.

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Water Corp - Critical Plan.docx (21 May 2024)

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Page No: 3

WATER CORPORATION

Scale:	1:750
Job No.:	36962238
Sequence No.:	240900579
Print Date:	21 Jun 2024

N

Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

Apply for approval to work near our assets at:

Working near assets (watercorporation.com.au)

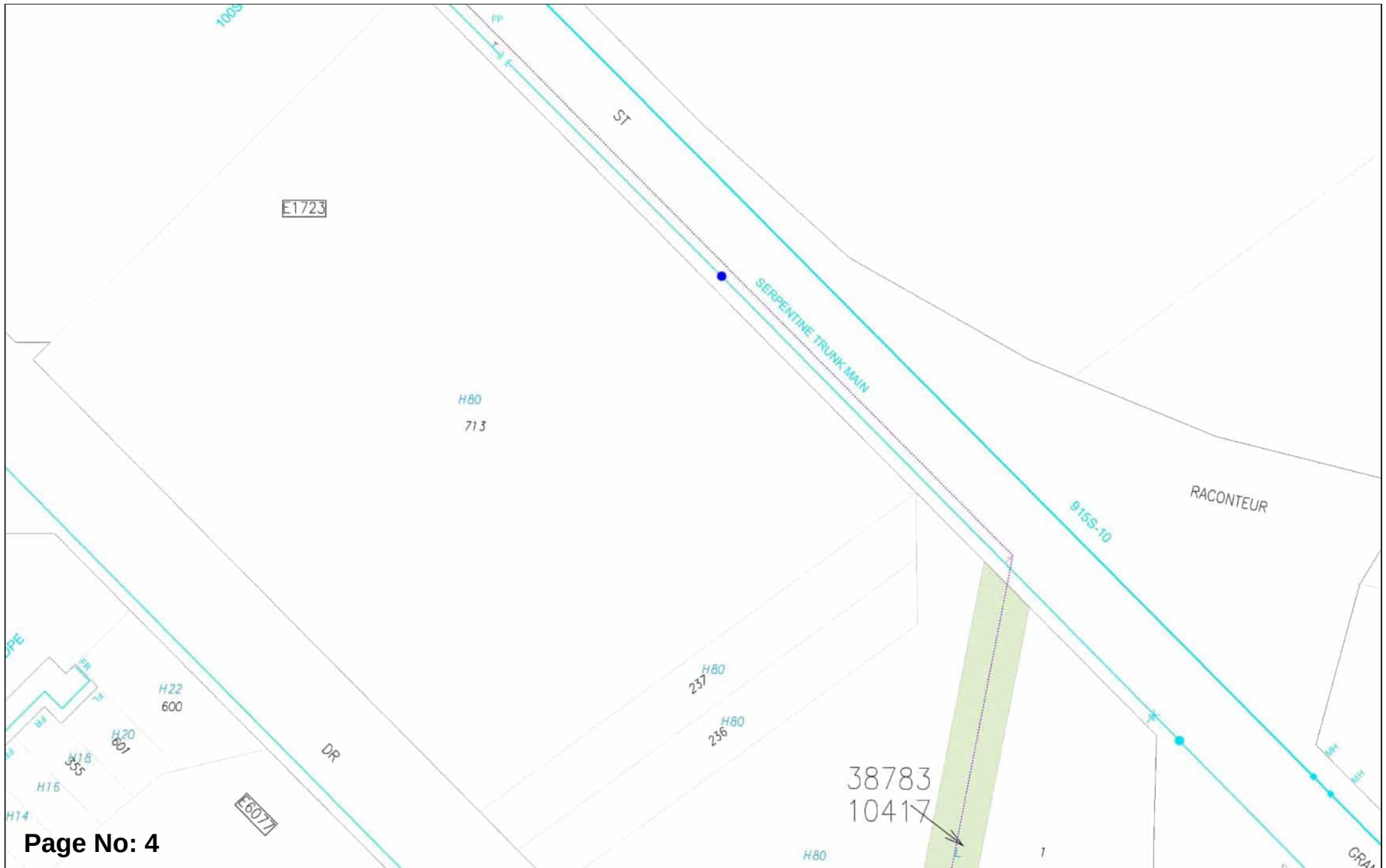
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Water Corp - Critical Plan.docx (21 May 2024)

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WATER CORPORATION

Scale: 1:750
Job No.: 36962238
Sequence No.: 240900579
Print Date: 21 Jun 2024

N

Water

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Working near assets (watercorporation.com.au)

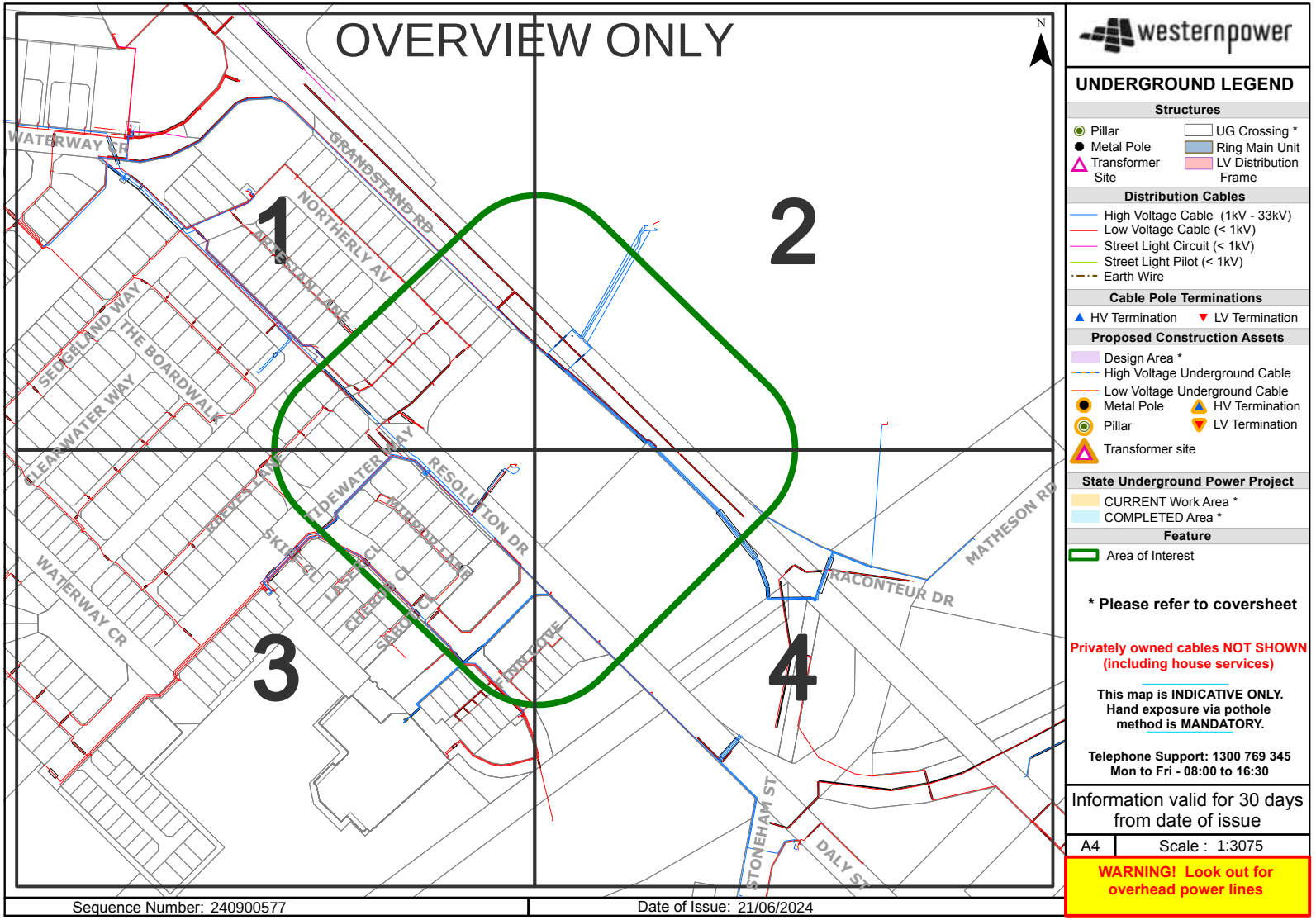
Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

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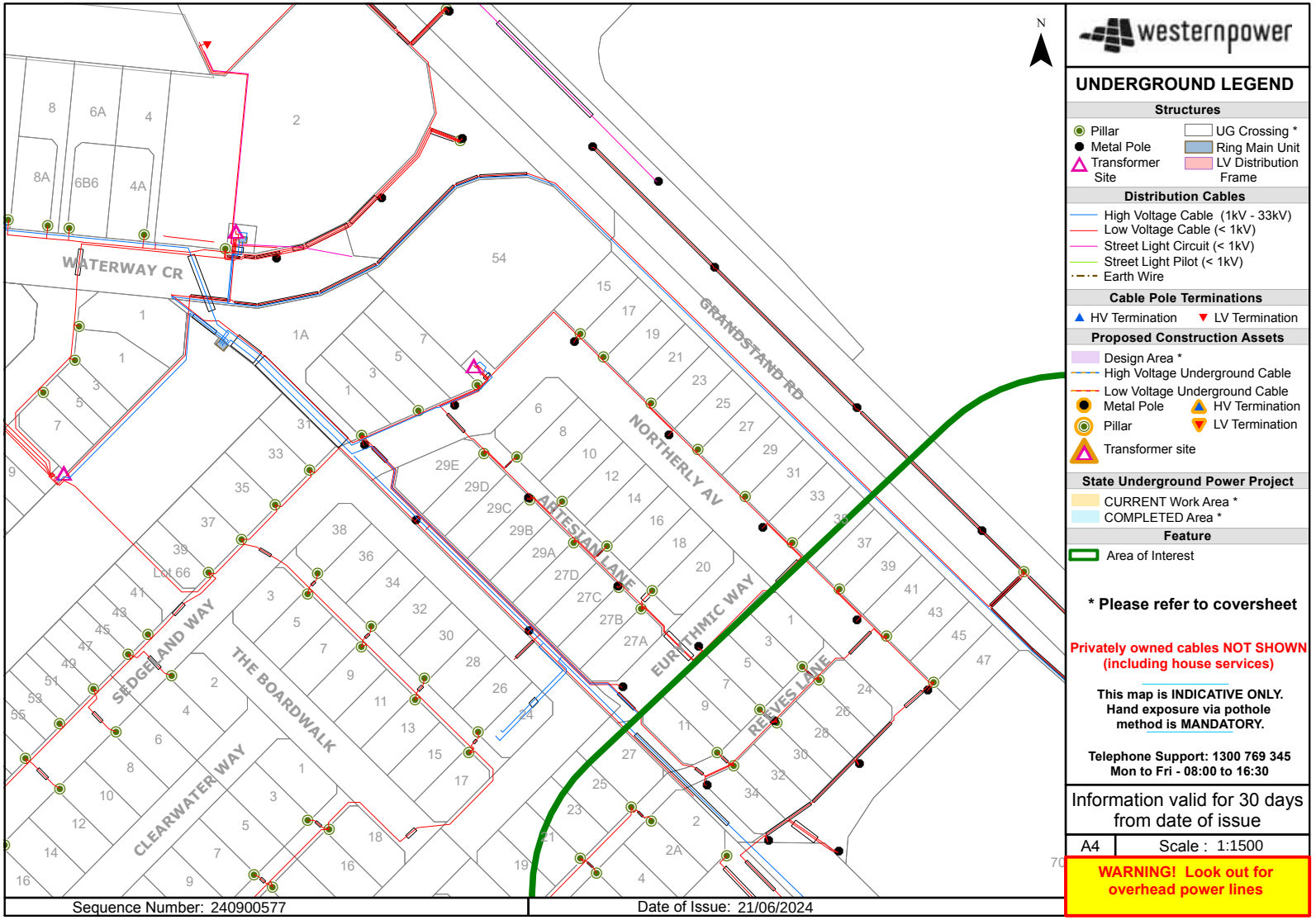
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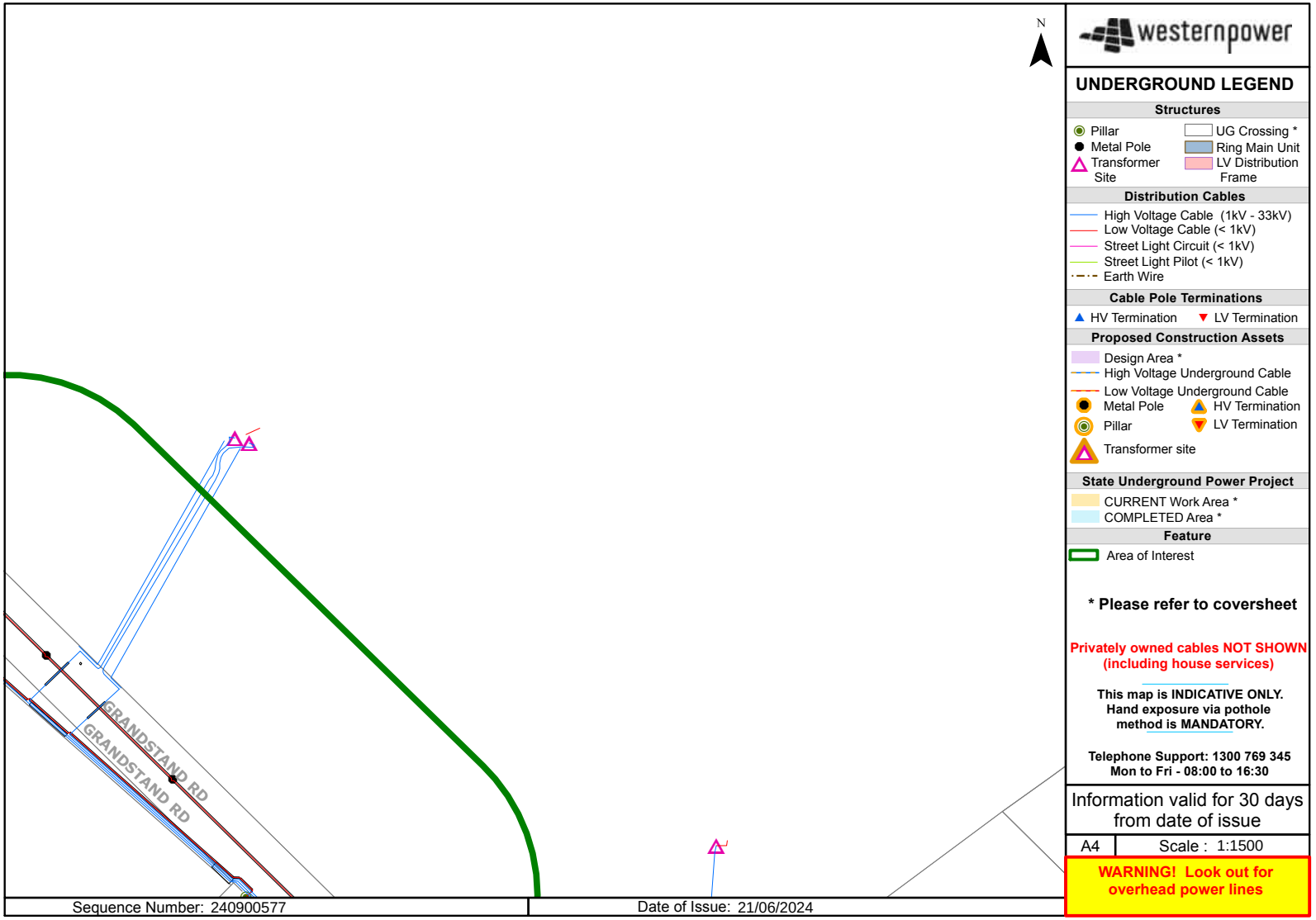
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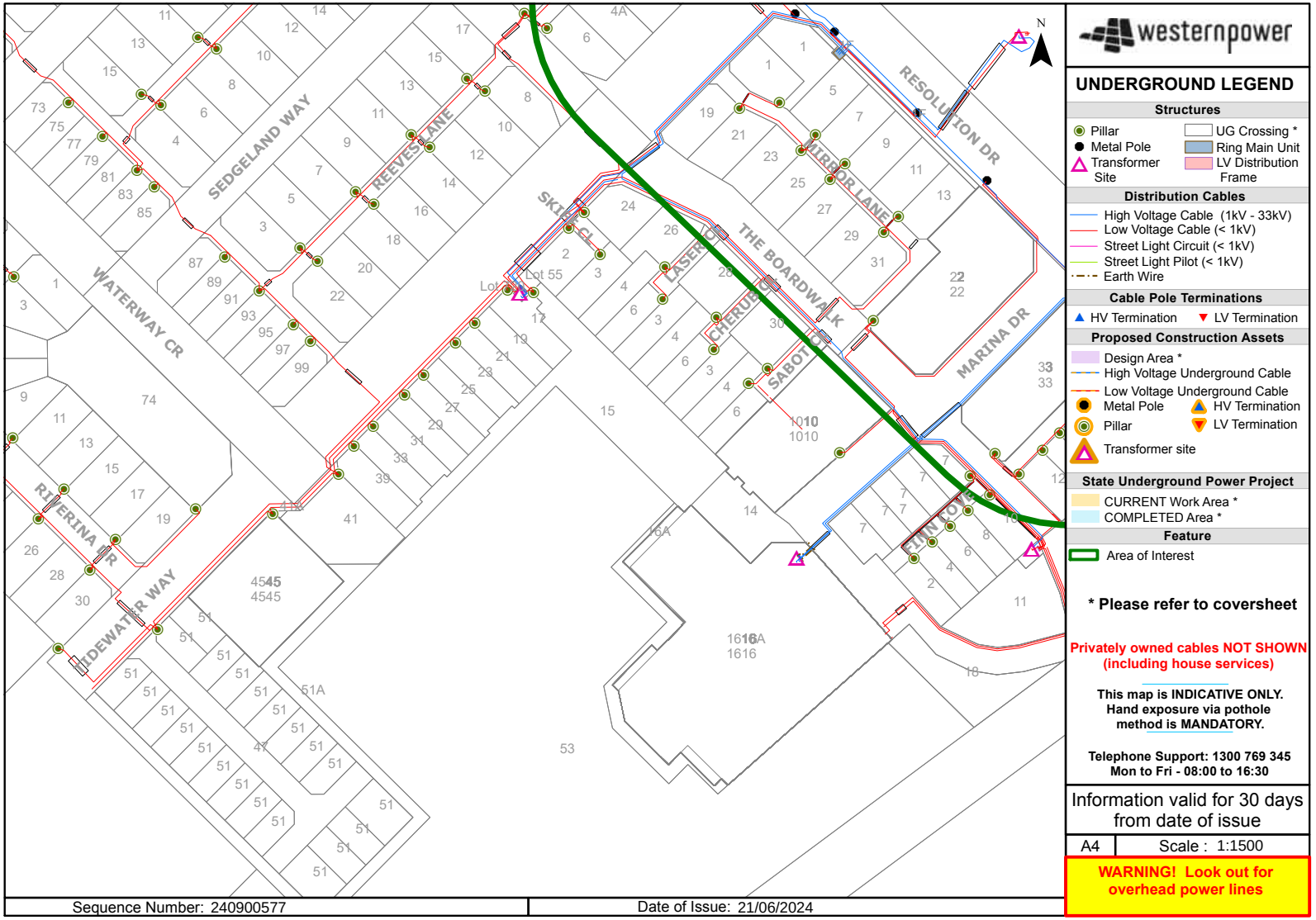
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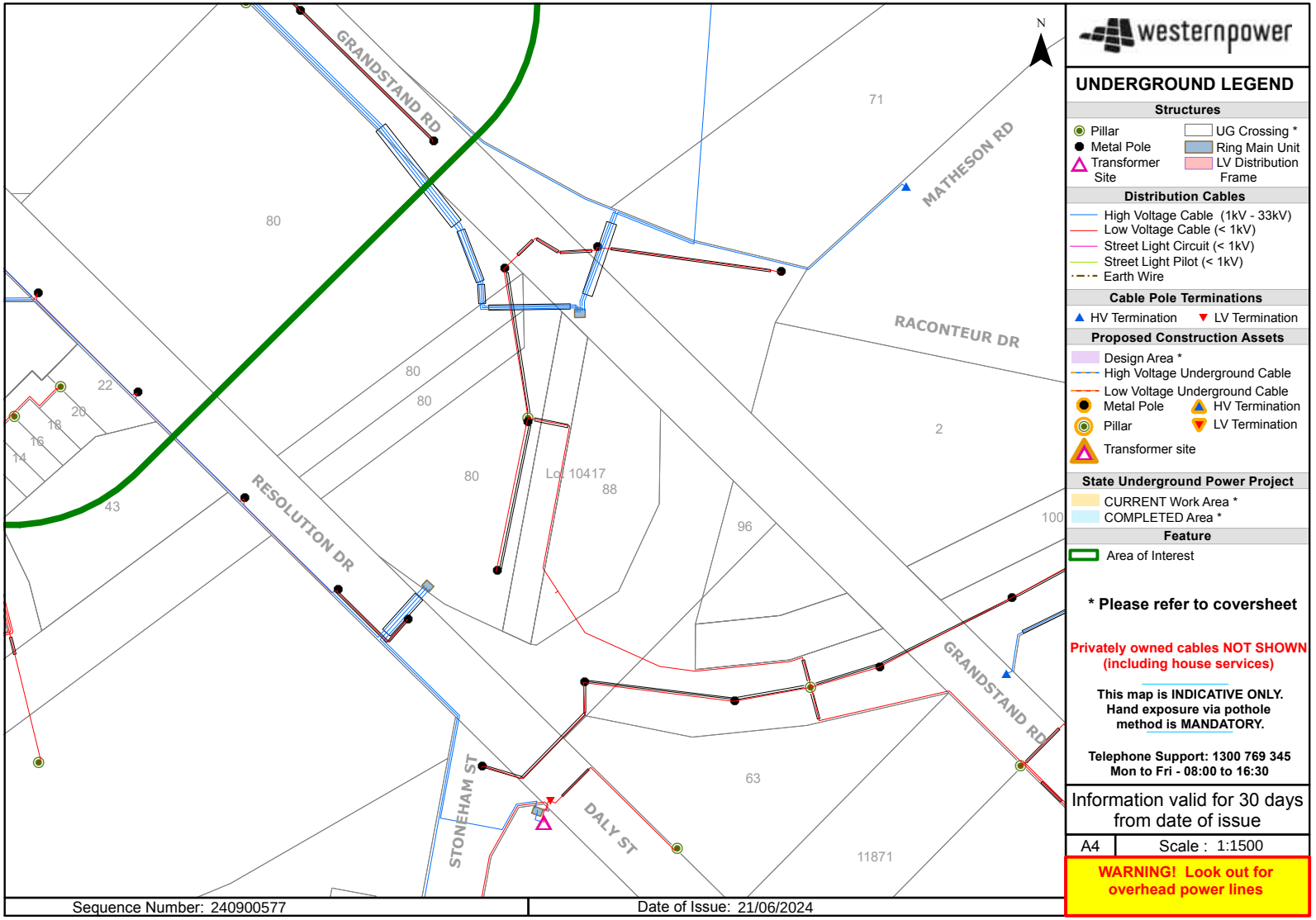
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Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report

Job ID 36962238
Preinct D

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End of document

This document may exclude some files (eg. DWF or ZIP files)

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Job No 36962250

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byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference
Precinct C - 2

Address
71 Matheson Road
Ascot WA 6104

Notes/description
-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

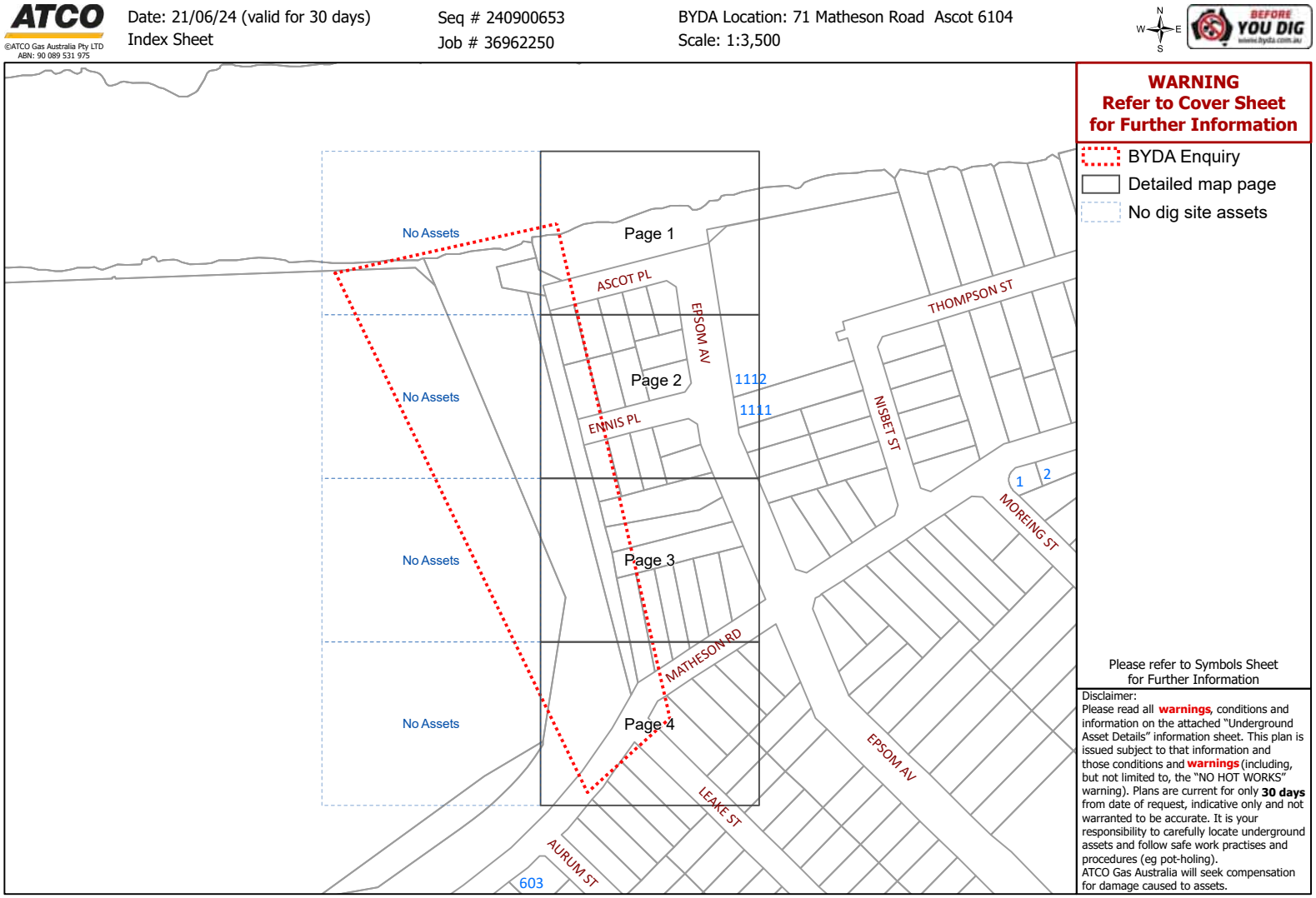
Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900653	ATCO Gas Australia	1300 926 755	NOTIFIED
240900649	NBN Co (WA)	1800 687 626	NOTIFIED
240900651	Telstra (WA)	1800 653 935	NOTIFIED
240900652	Water Corporation	13 13 95	NOTIFIED
240900650	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

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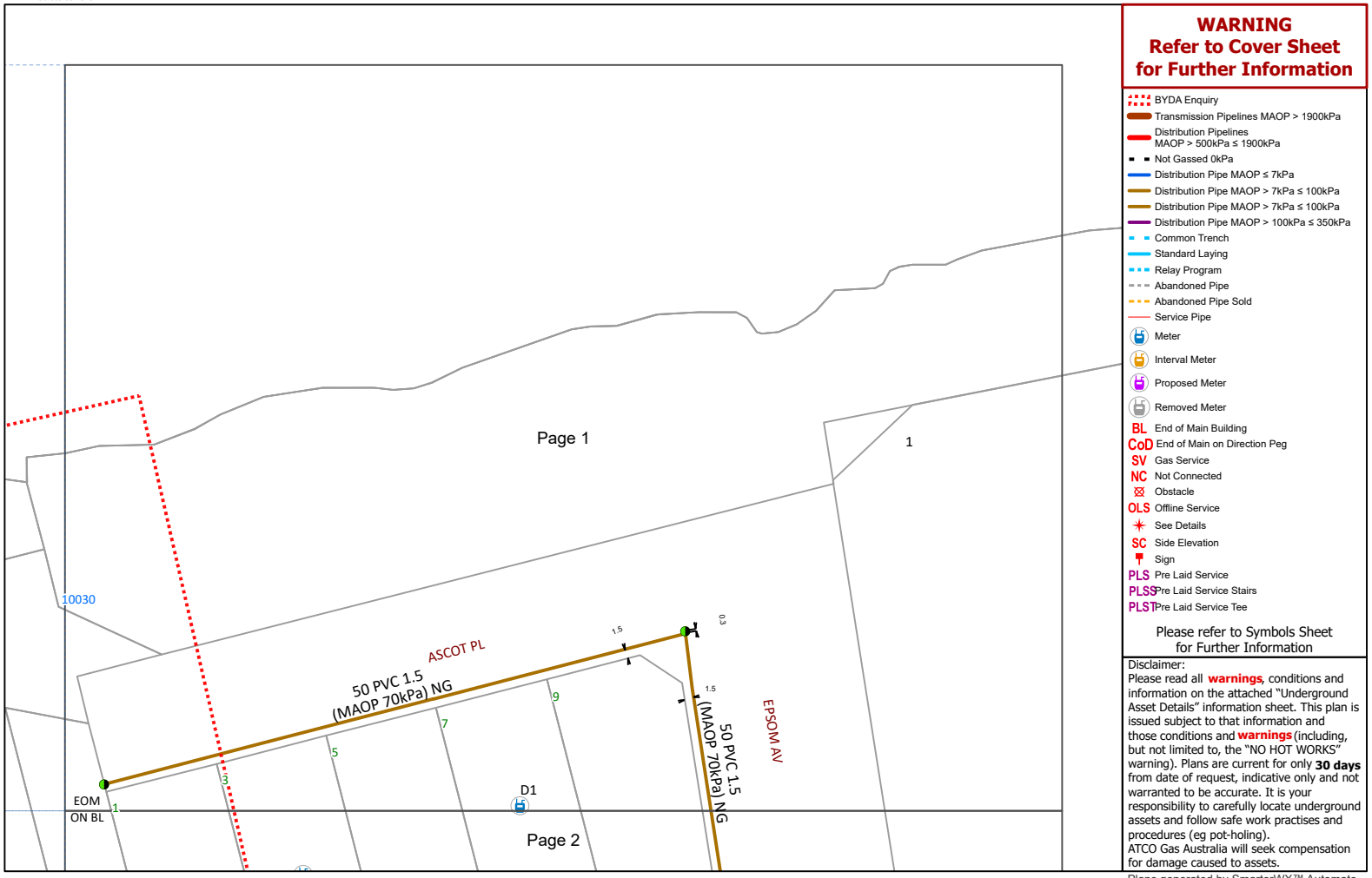
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ATCO
©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 21/06/24 (valid for 30 days)

Seq # 240900653
Job # 36962250

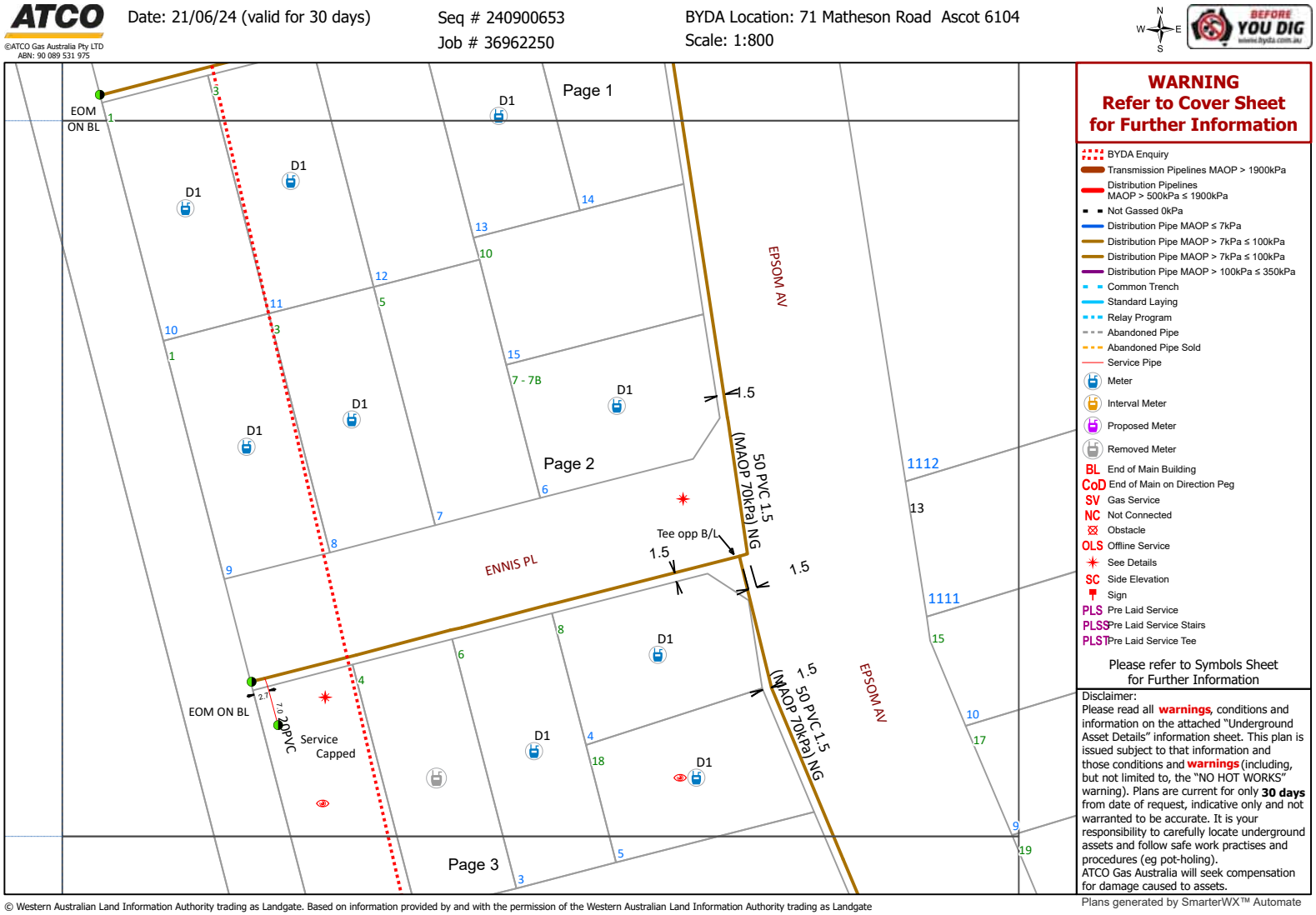
BYDA Location: 71 Matheson Road Ascot 6104
Scale: 1:800



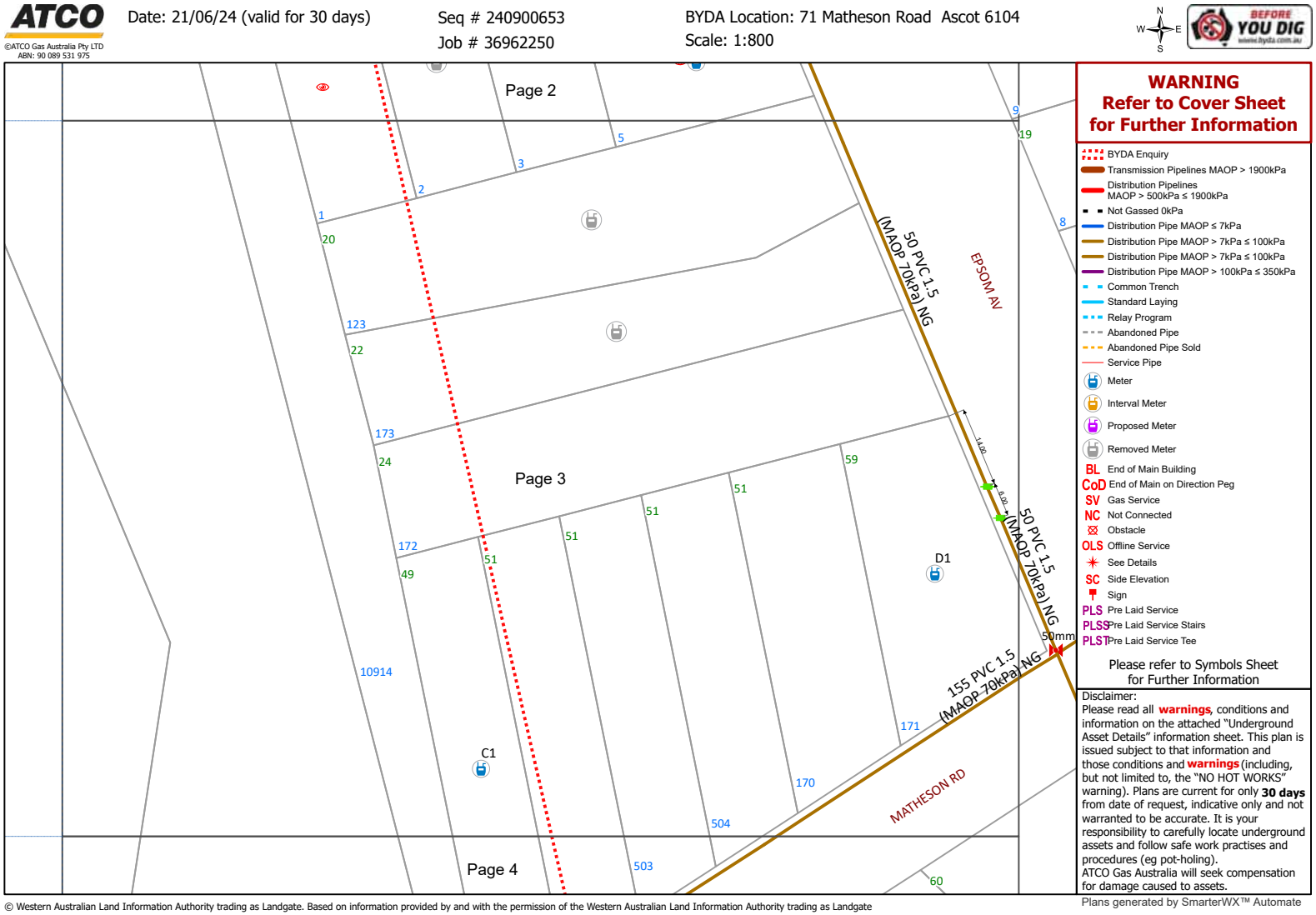
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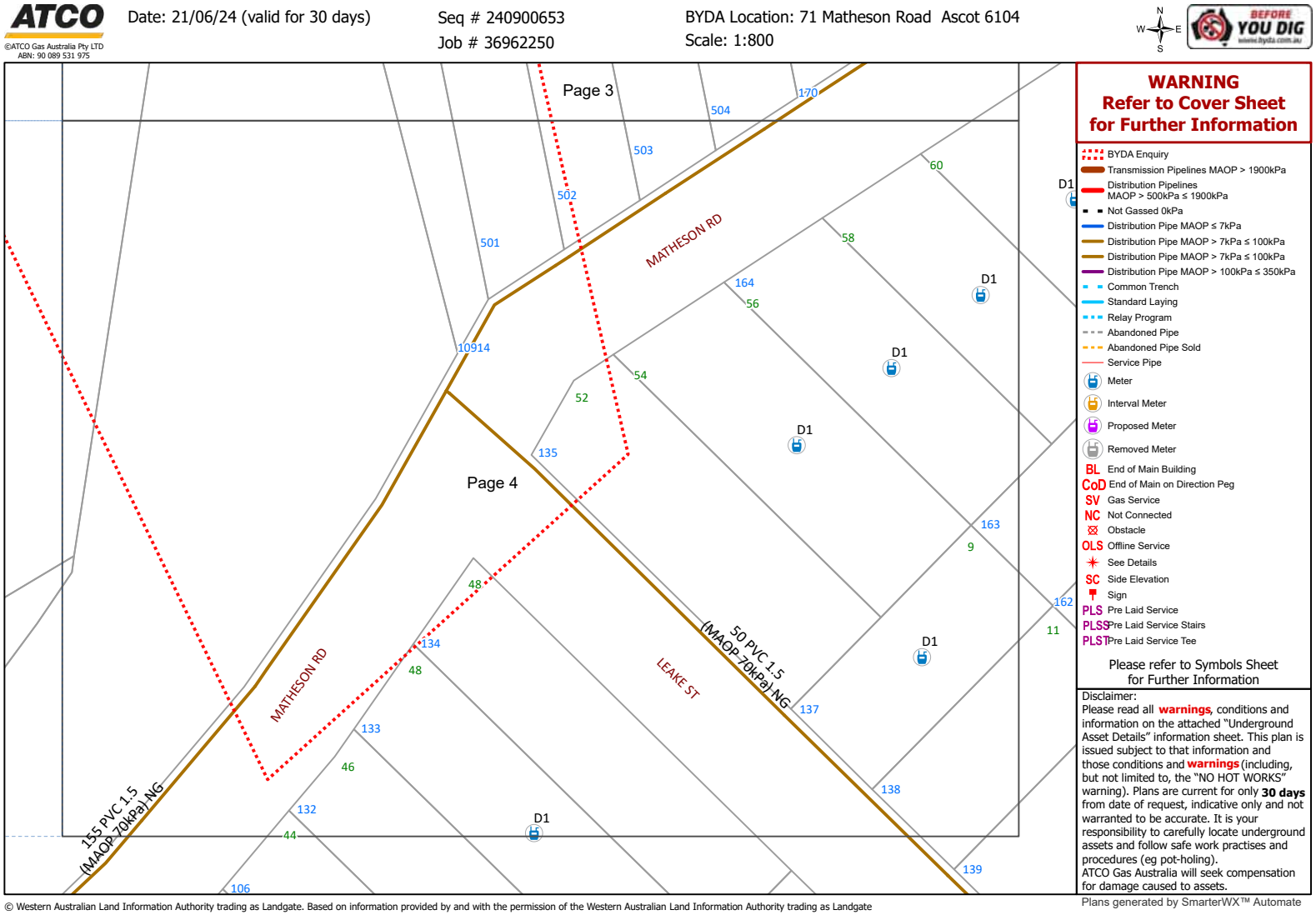
Attachment 12.1.4 Engineering Servicing Report



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Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report

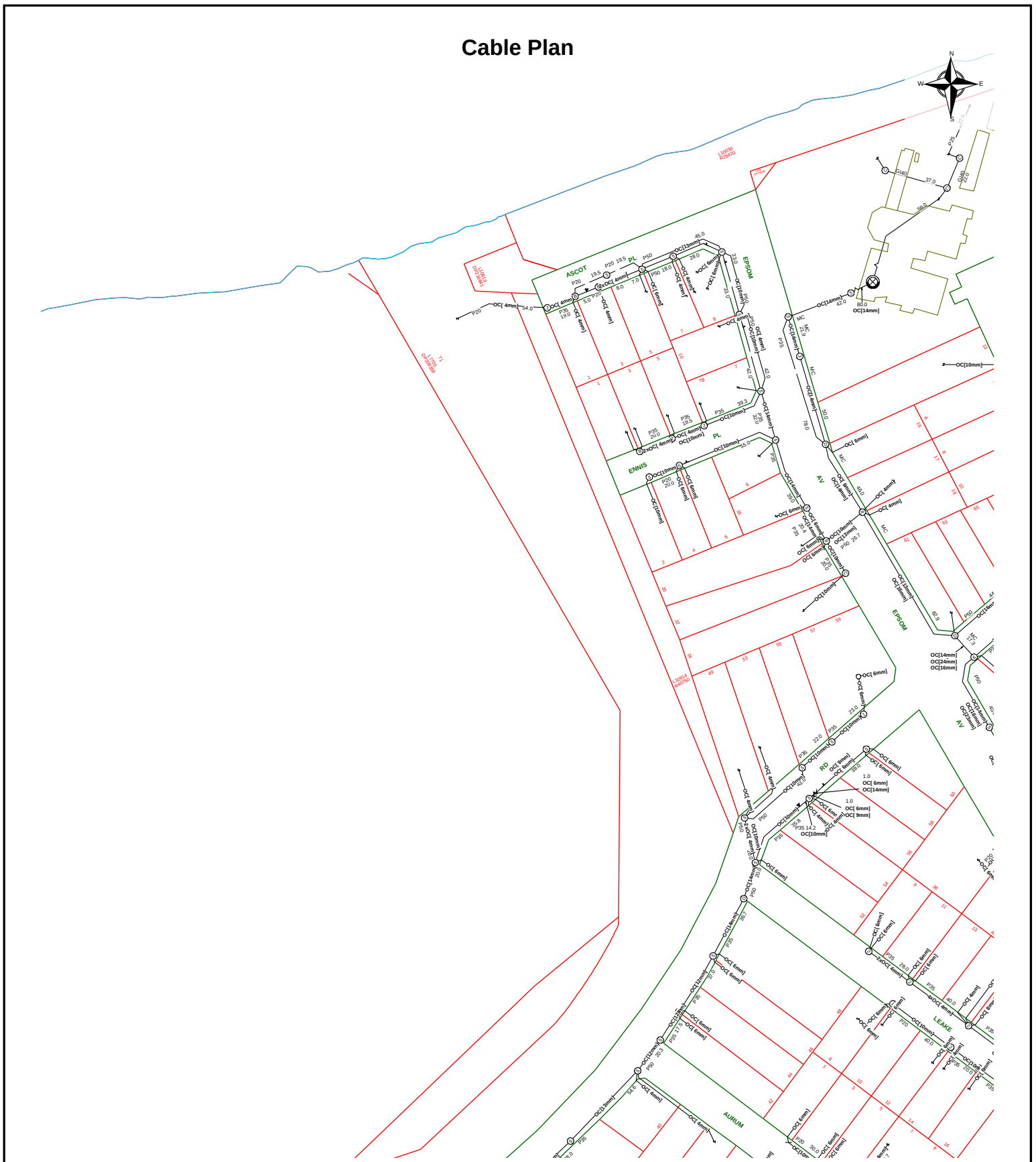


Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

Attachment 12.1.4 Engineering Servicing Report

Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900651
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:09:58	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

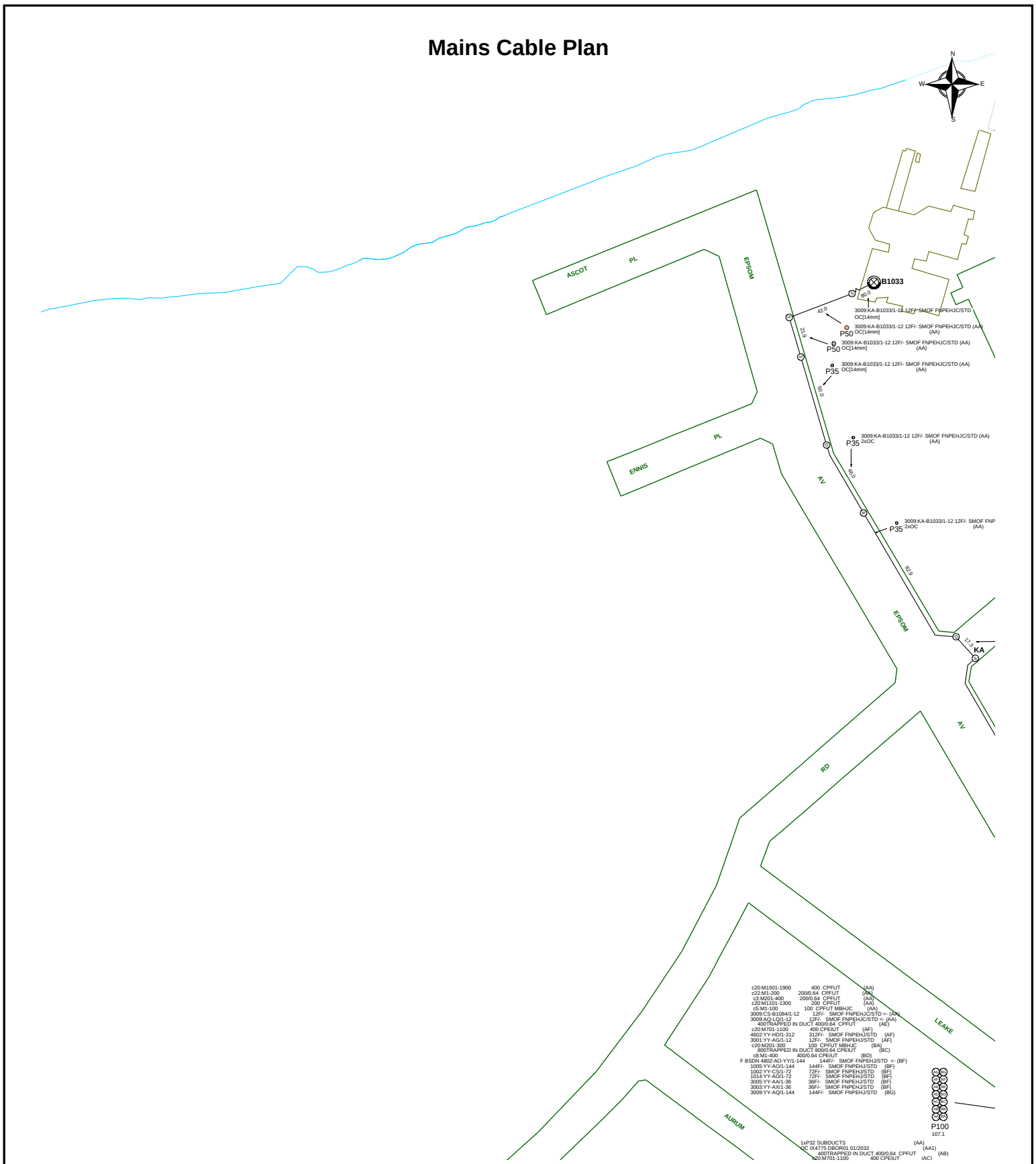
WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

Attachment 12.1.4 Engineering Servicing Report

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900651
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:09:59	

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
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See the Steps- Telstra Duty of Care that was provided in the email response.

Attachment 12.1.4 Engineering Servicing Report



Overview

WATER CORPORATION

Scale: 1:3075
Job No.: 36962250
Sequence No.: 240900652
Print Date: 21 Jun 2024

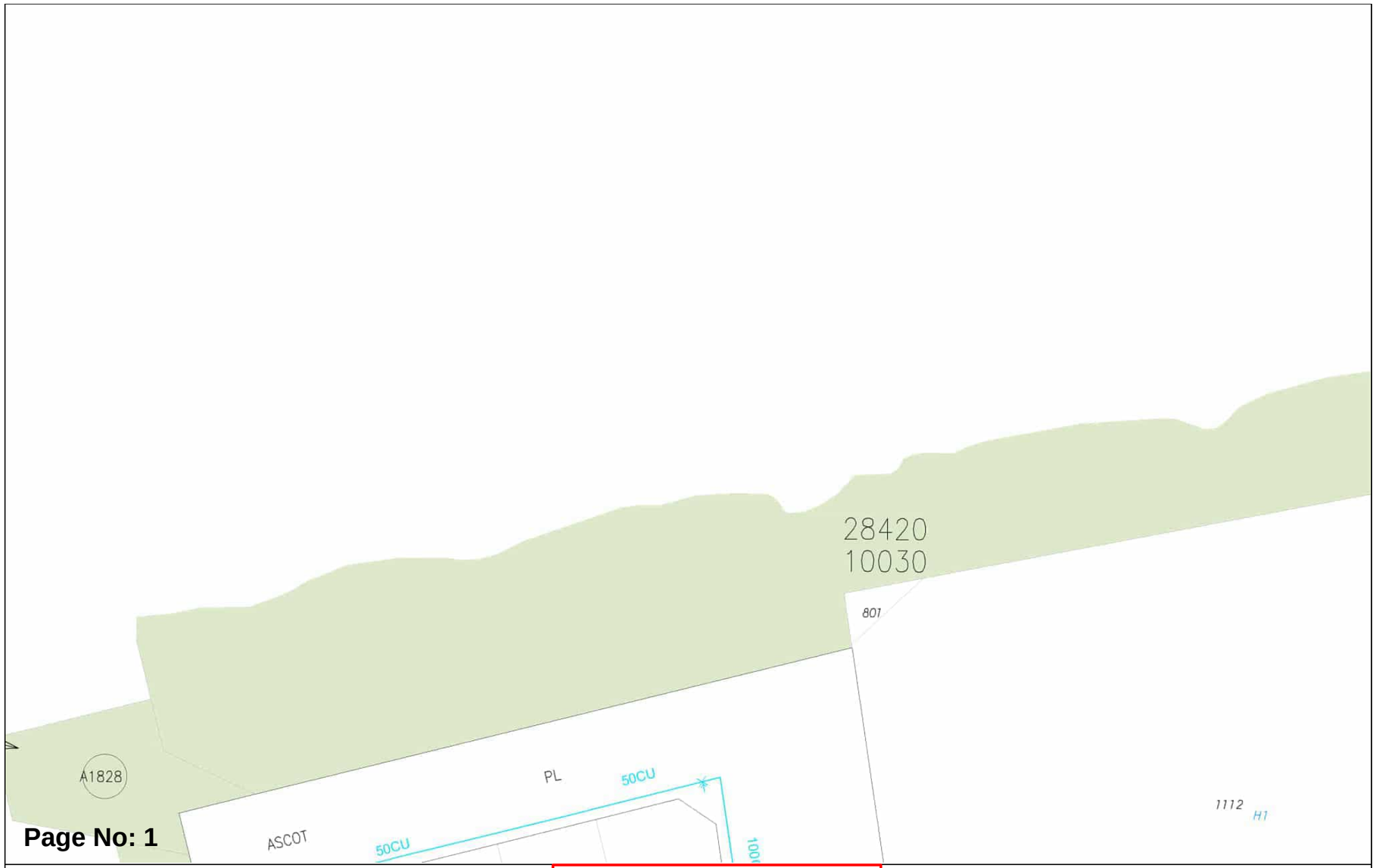
WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED
Apply for approval to work near our assets at:
Working near assets (watercorporation.com.au)
Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

The Water Corporation has taken due care in the preparation of this map but accepts no responsibility for any inaccuracies or inappropriate use. This plan may be reproduced in its entirety for the purpose of site work planning but shall not otherwise be altered or published in any form without the permission of the Water Corporation. The Water Corporation may need to be advised of any planned ground disturbing activities near facilities on this map. Refer to Brochure - "Protecting Buried Pipelines". Please report any inaccuracies to Asset Registration Team by email to asset.registration@watercorporation.com.au.

Plans generated 21 Jun 2024 by PelicanCorp TicketAccess Software | www.pelicancorp.com

Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Page No: 2

WATER CORPORATION

Scale: 1:750
Job No.: 36962250
Sequence No.: 240900652
Print Date: 21 Jun 2024

N

Water

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Page No: 3

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Water

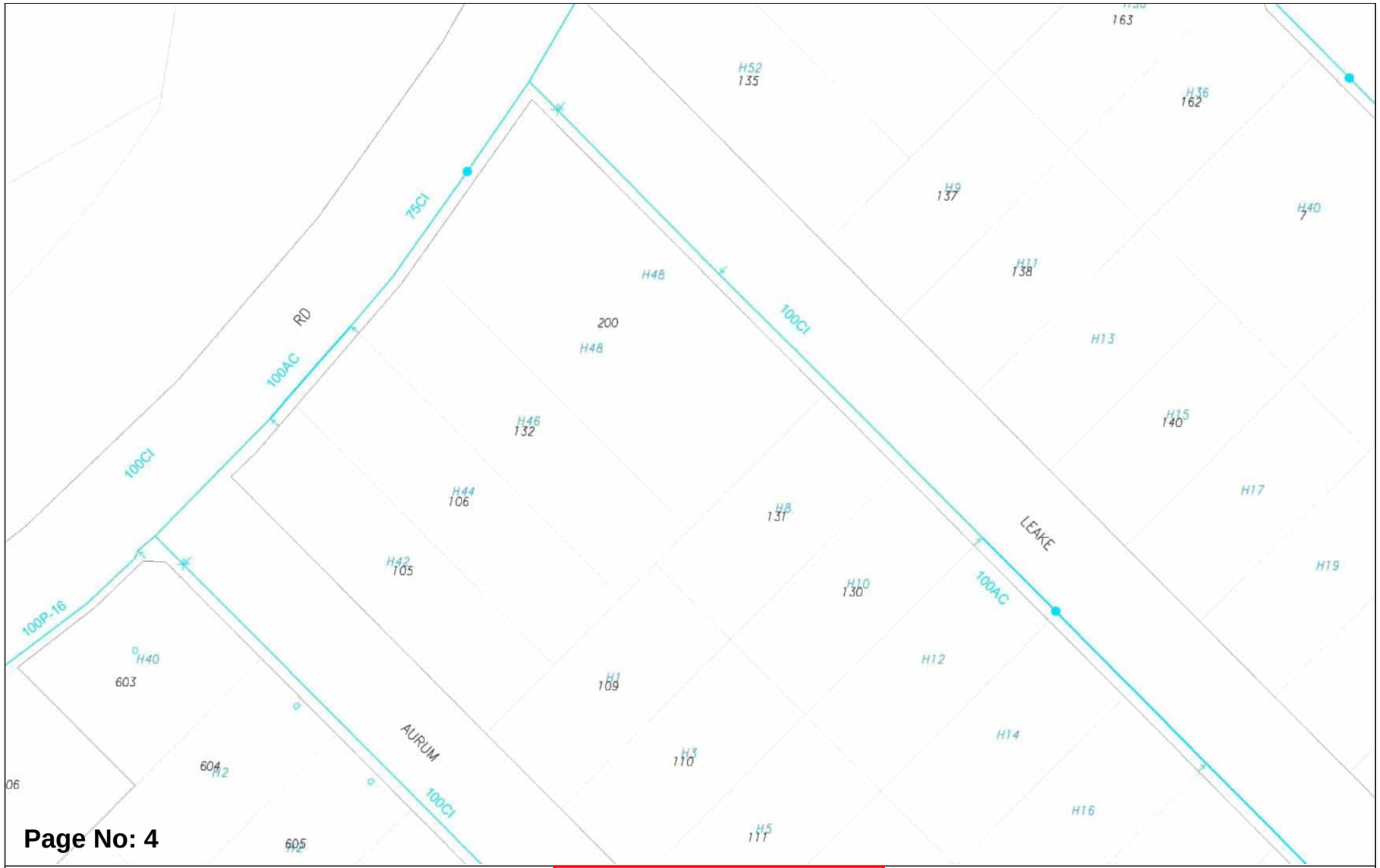
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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Overview

WATER CORPORATION

Scale: 1:3075
Job No.: 36962250
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Sewer

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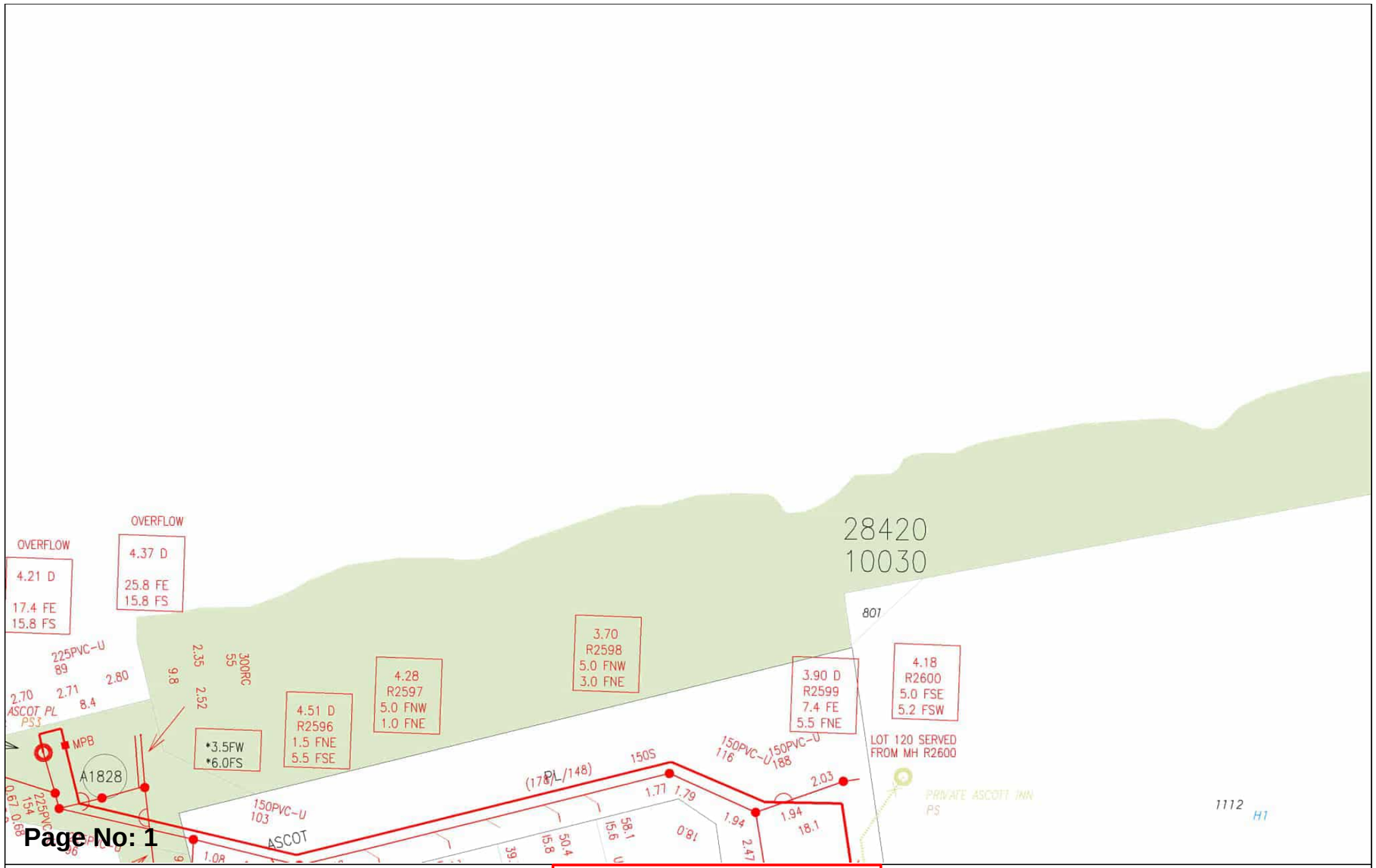
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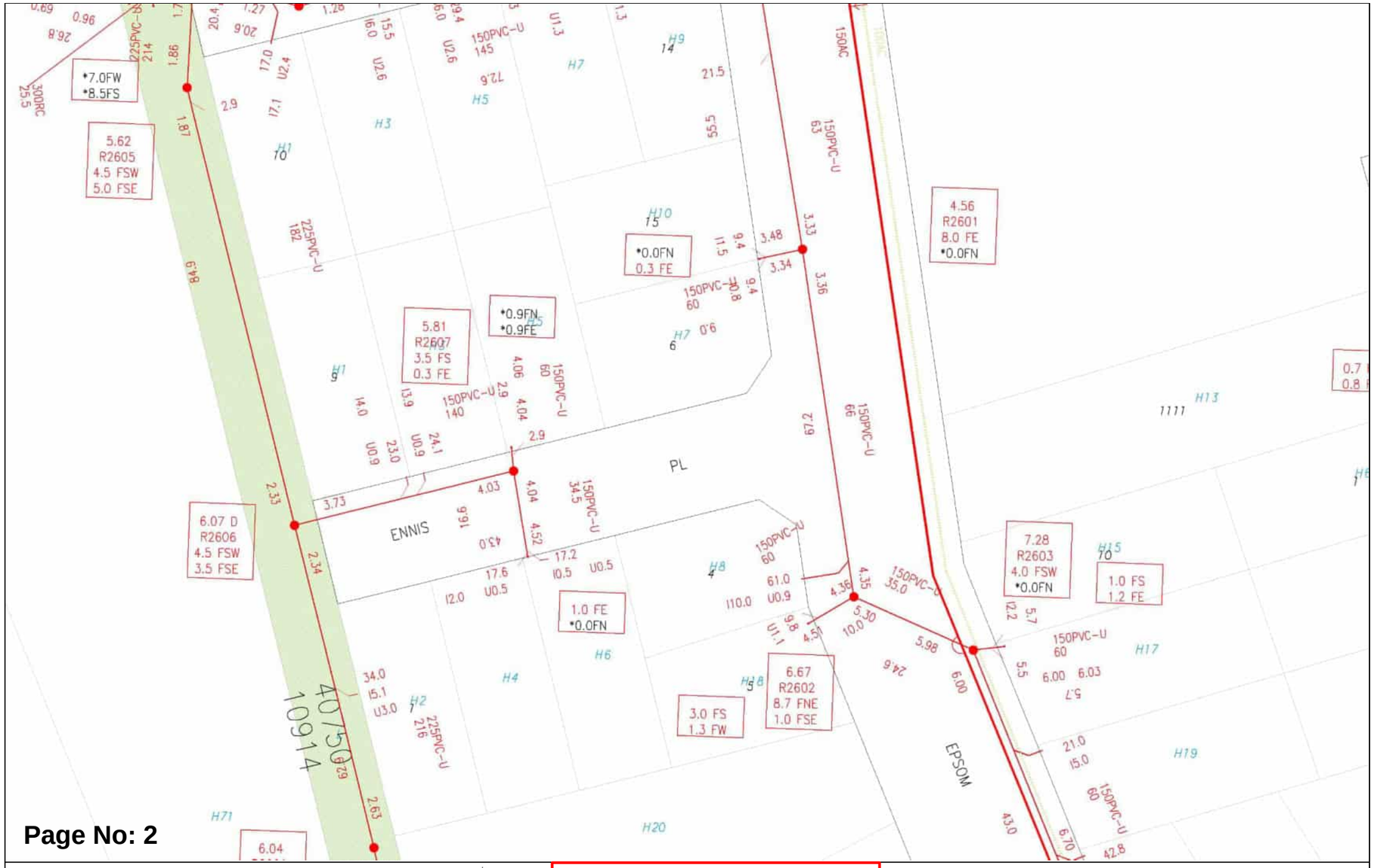
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Water Corp - Critical Plan.docx (21 May 2024)

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Page No: 2

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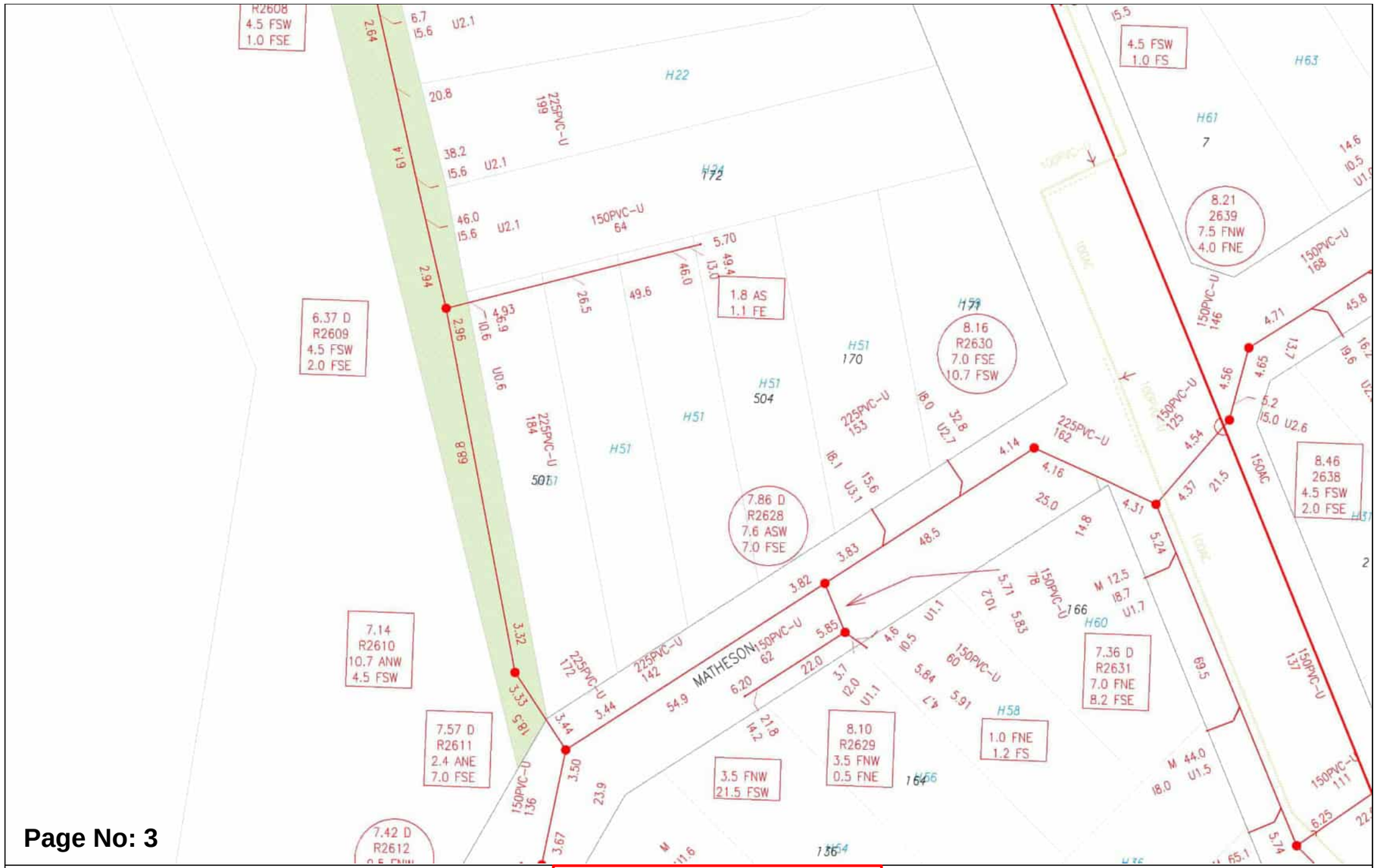
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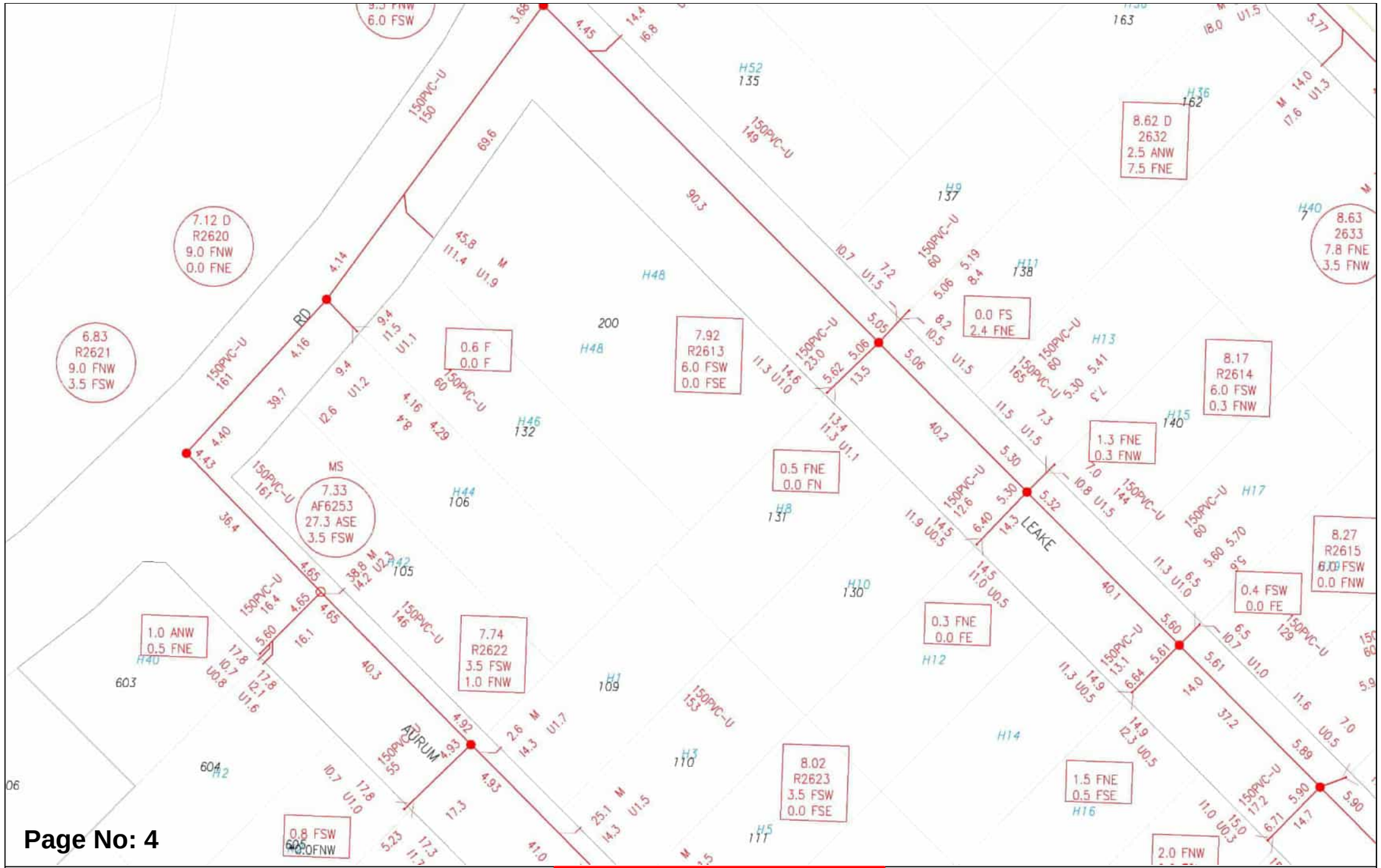


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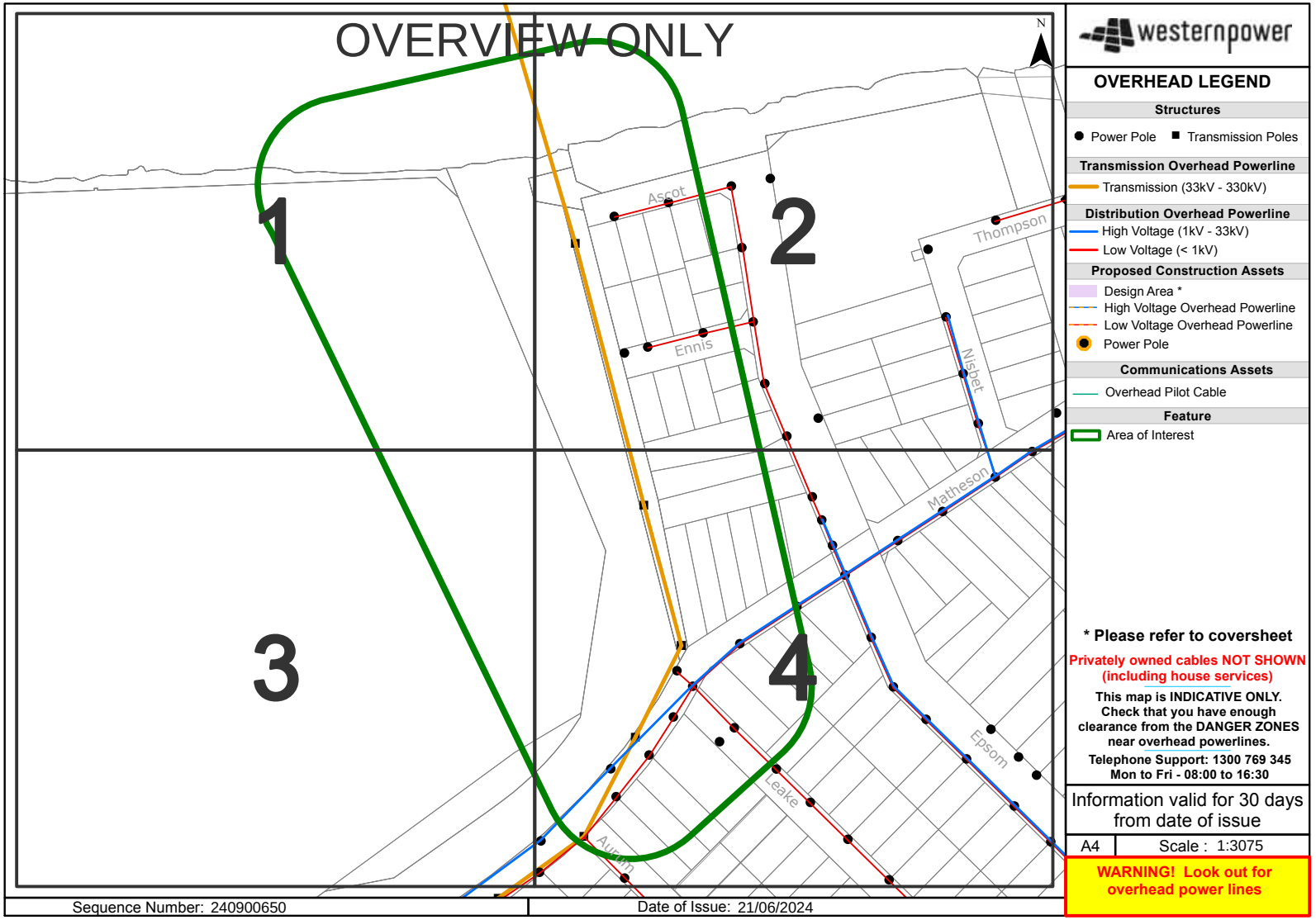
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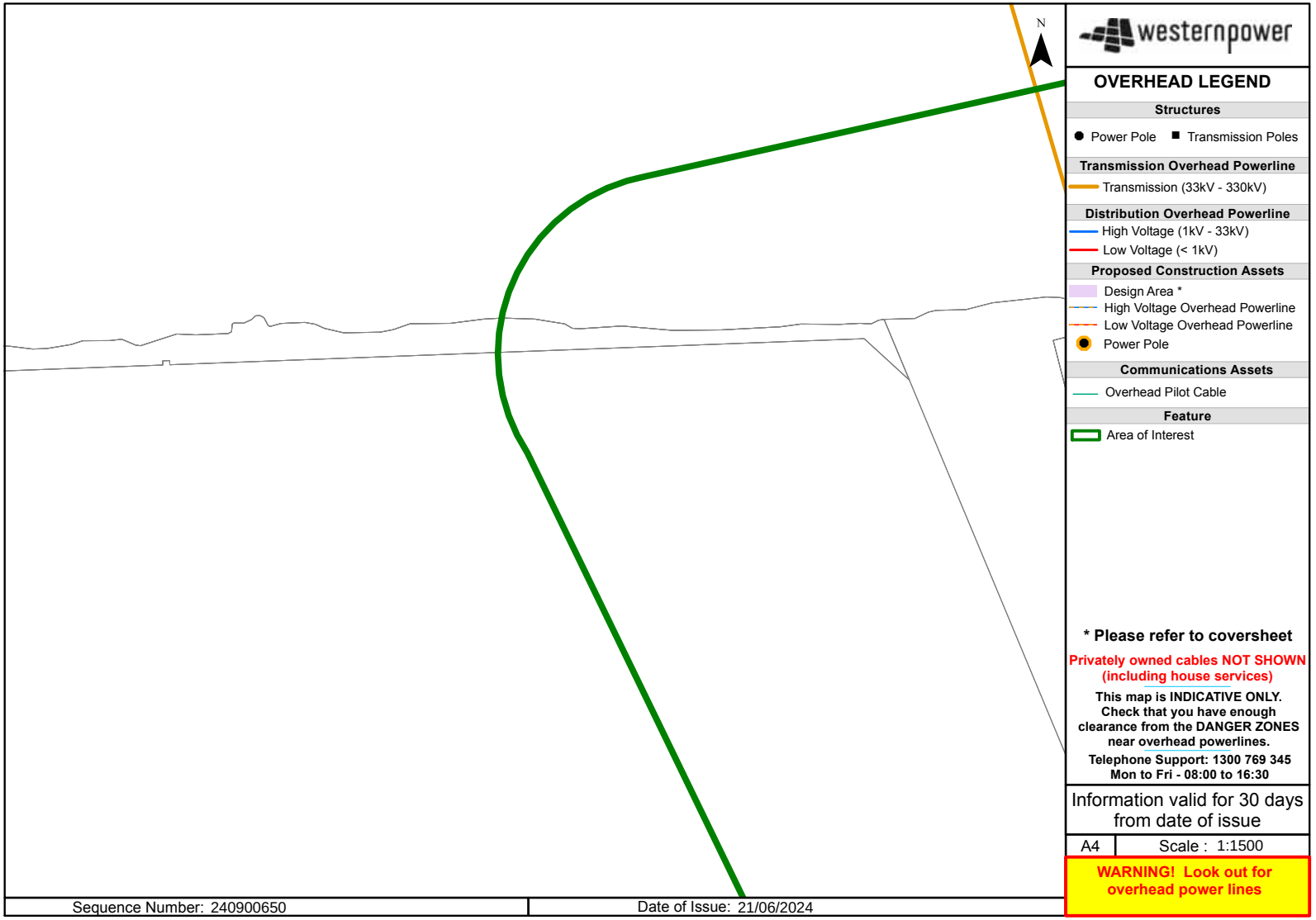
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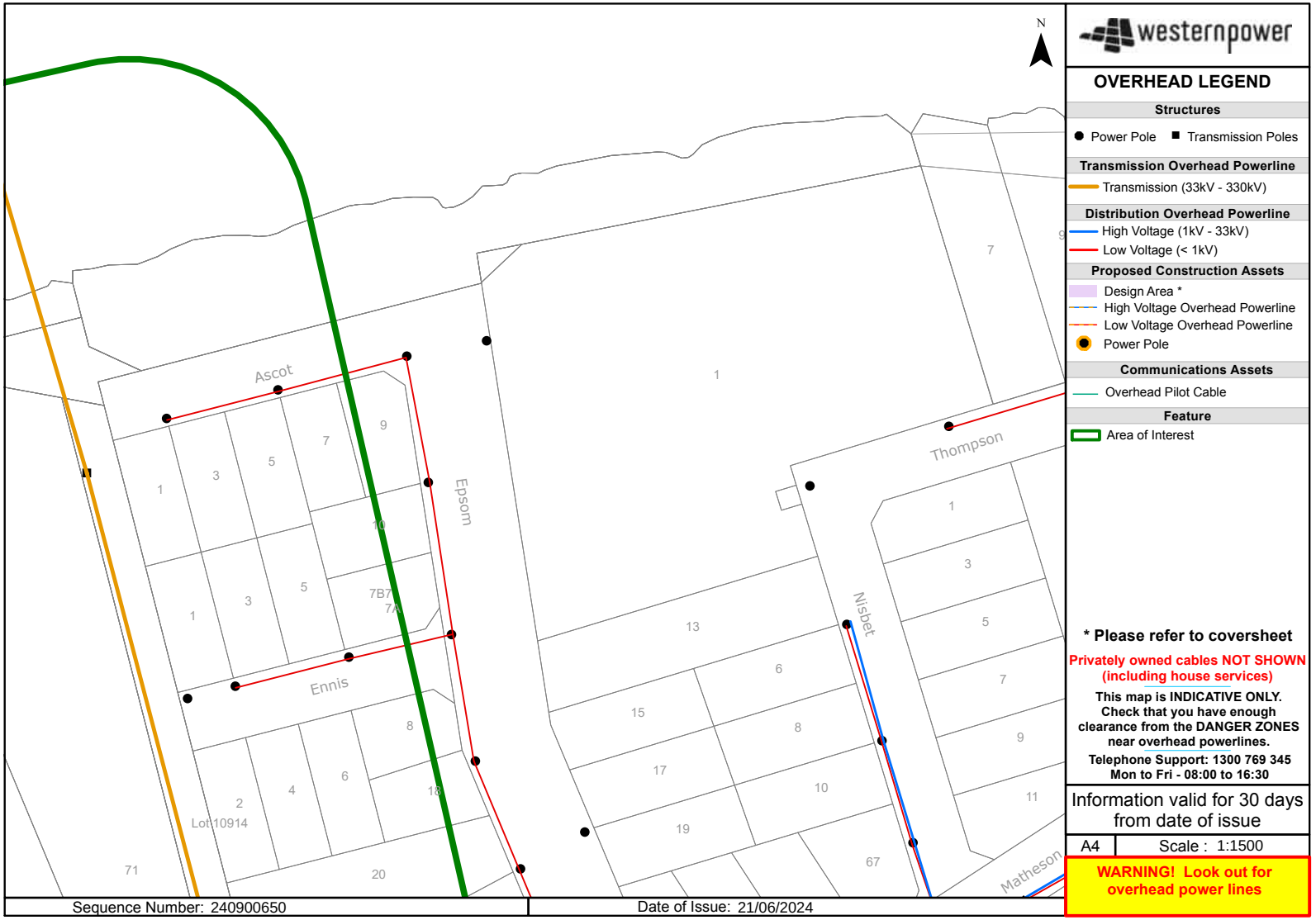
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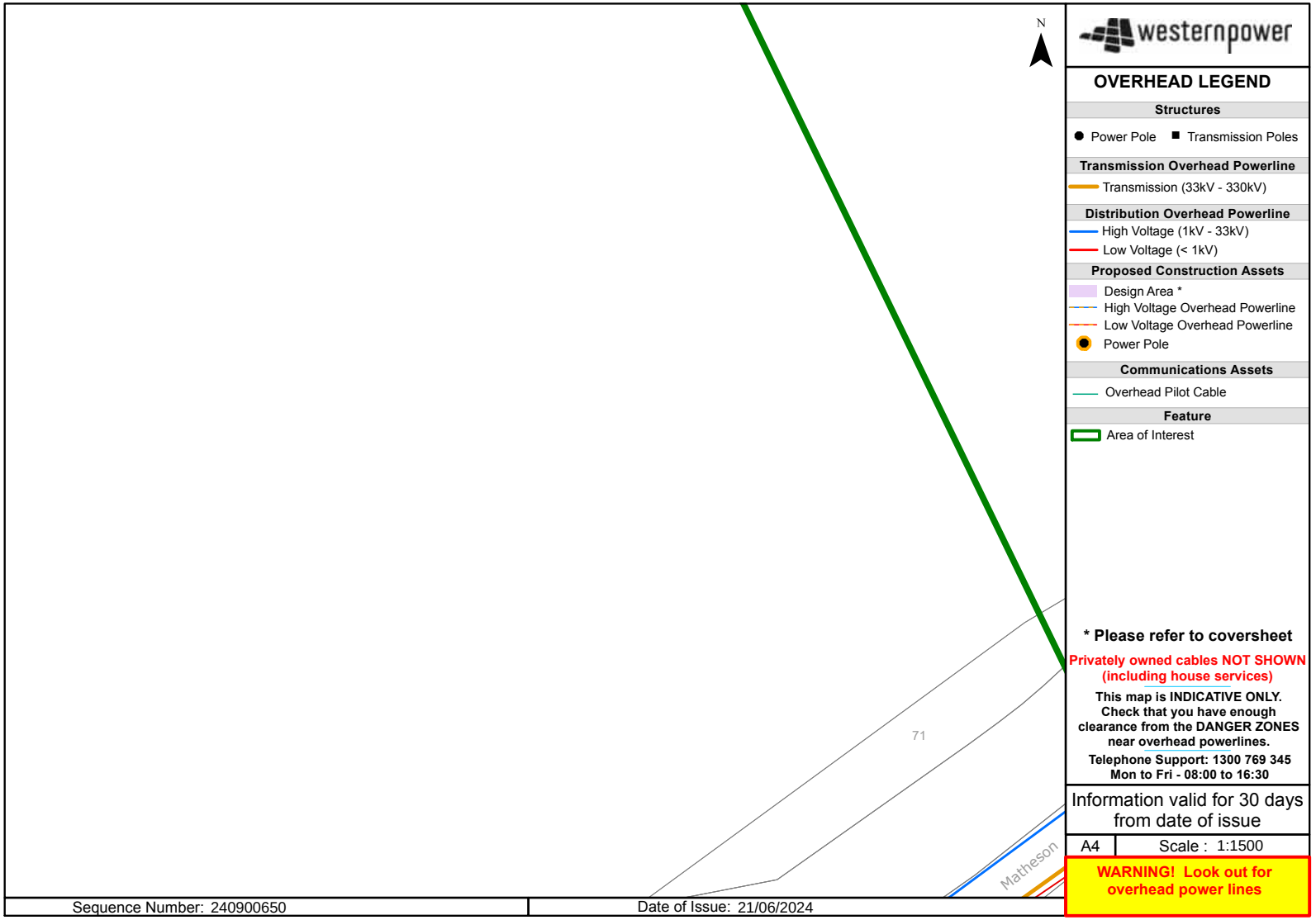
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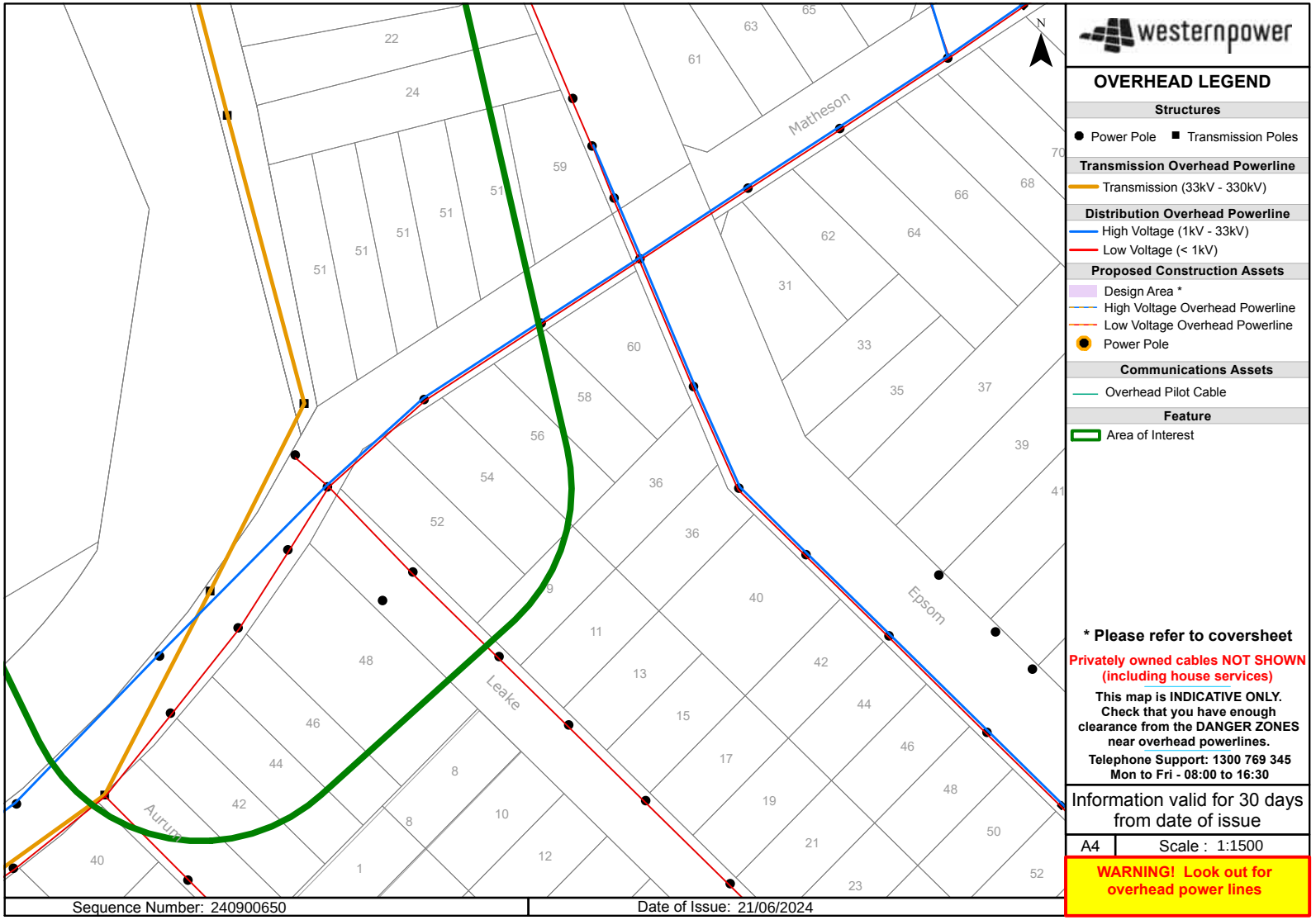
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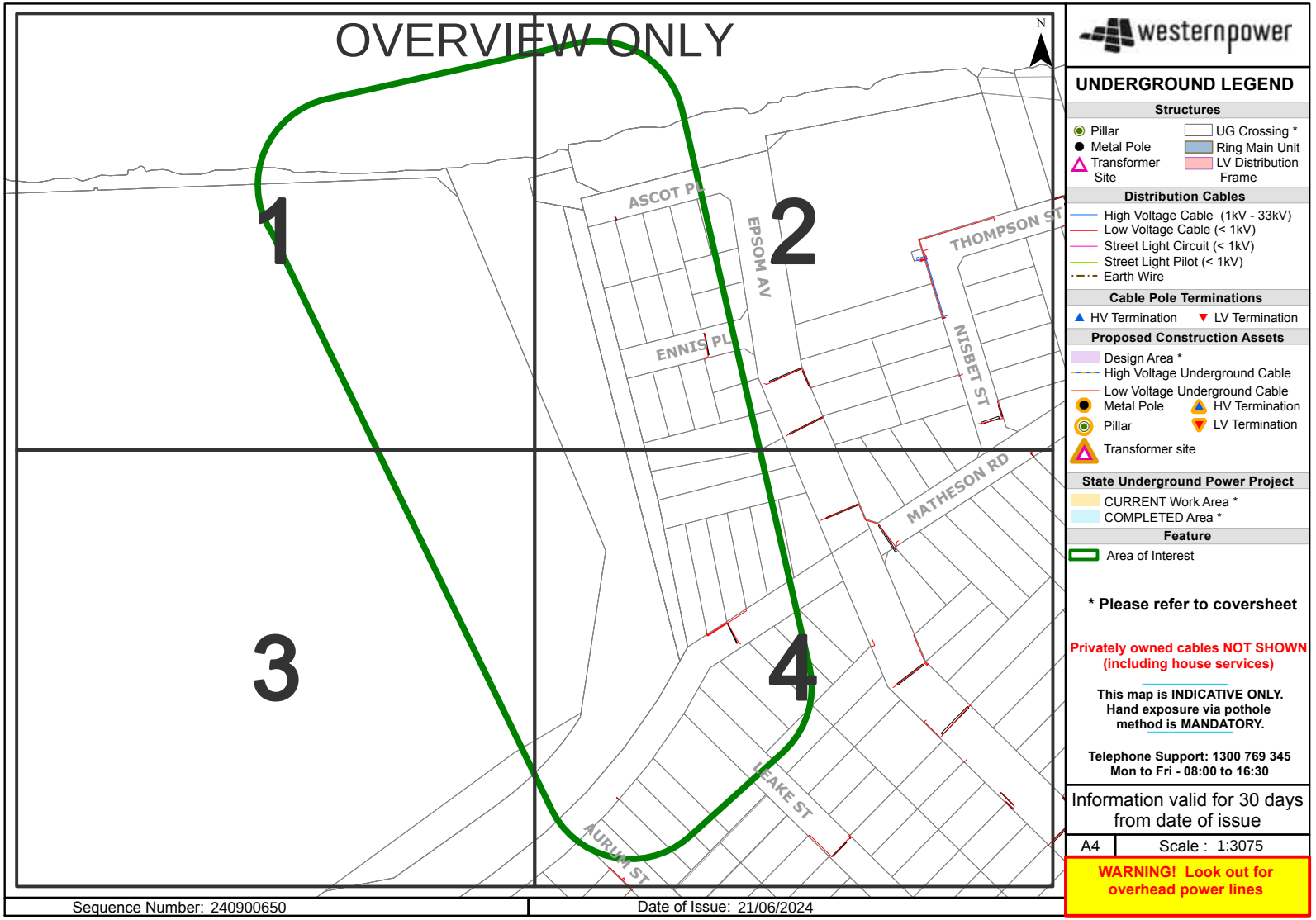
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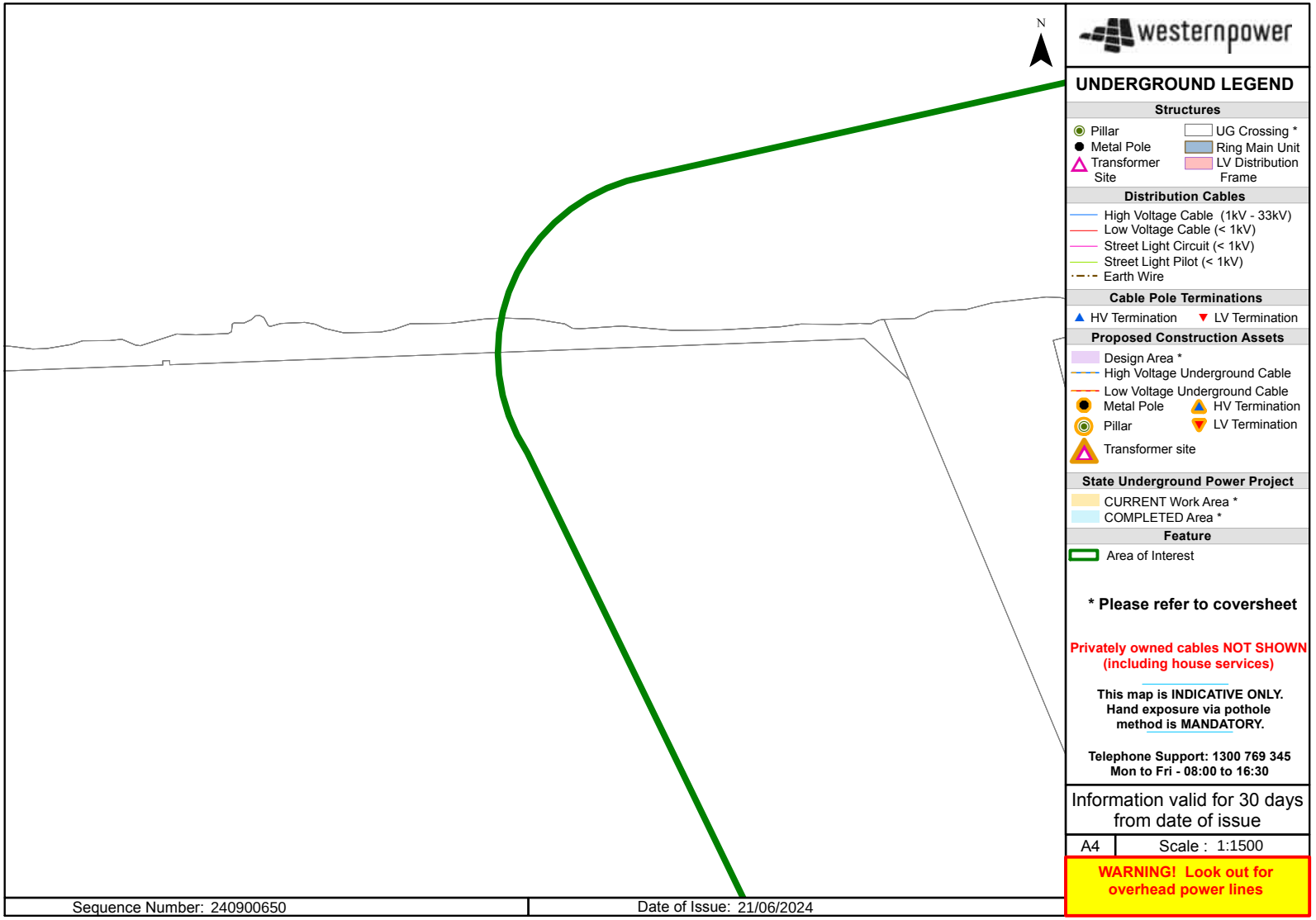
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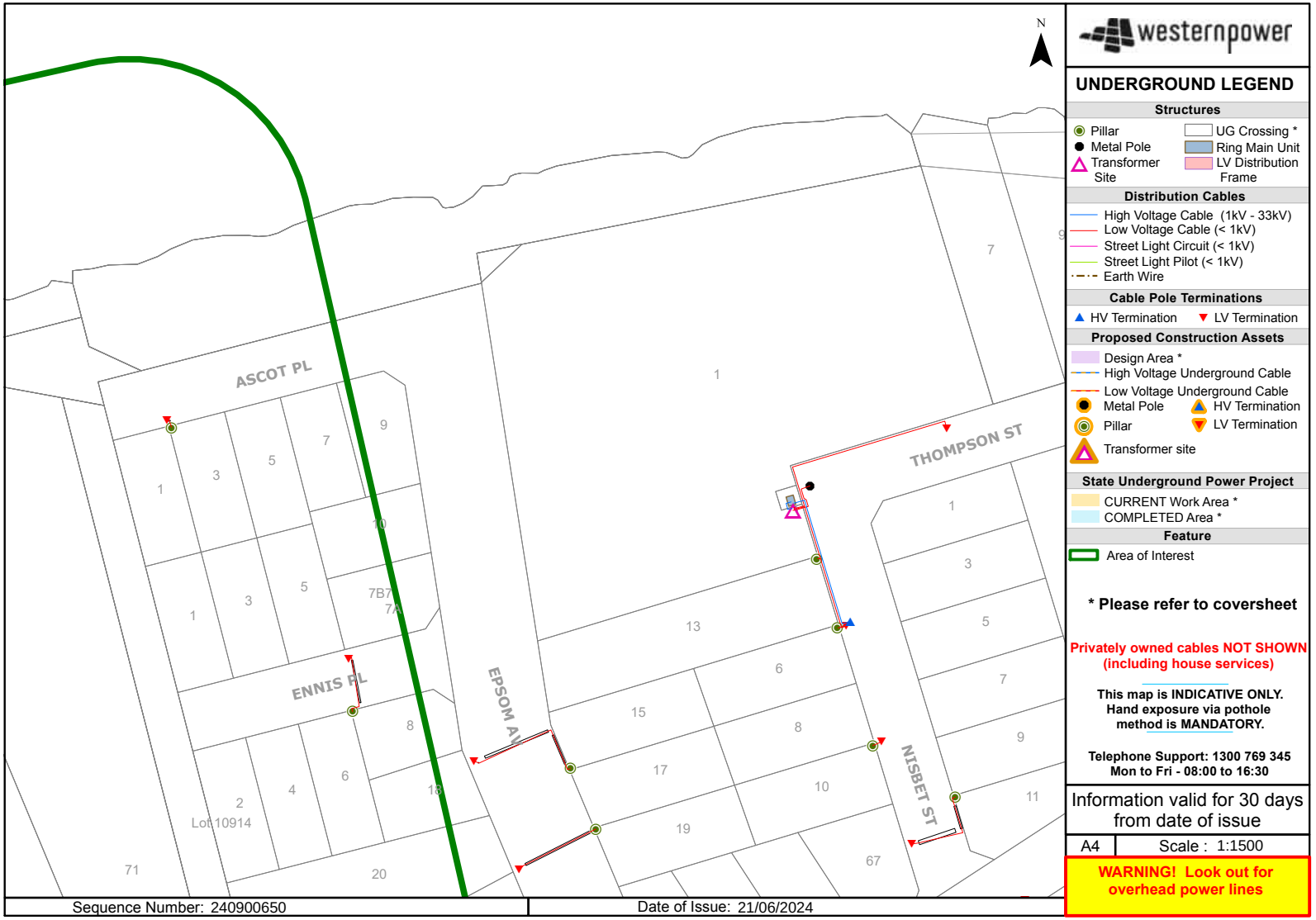
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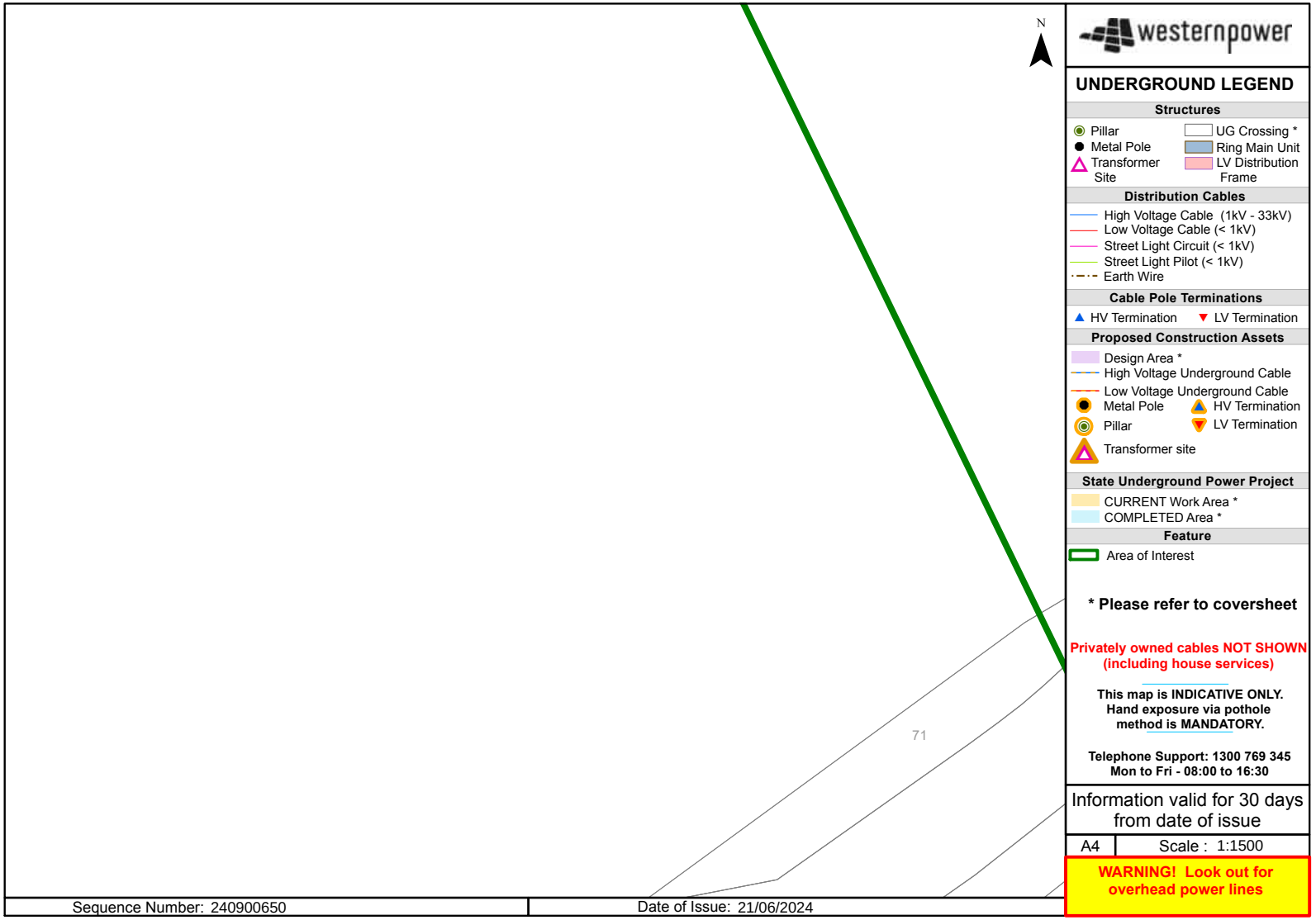
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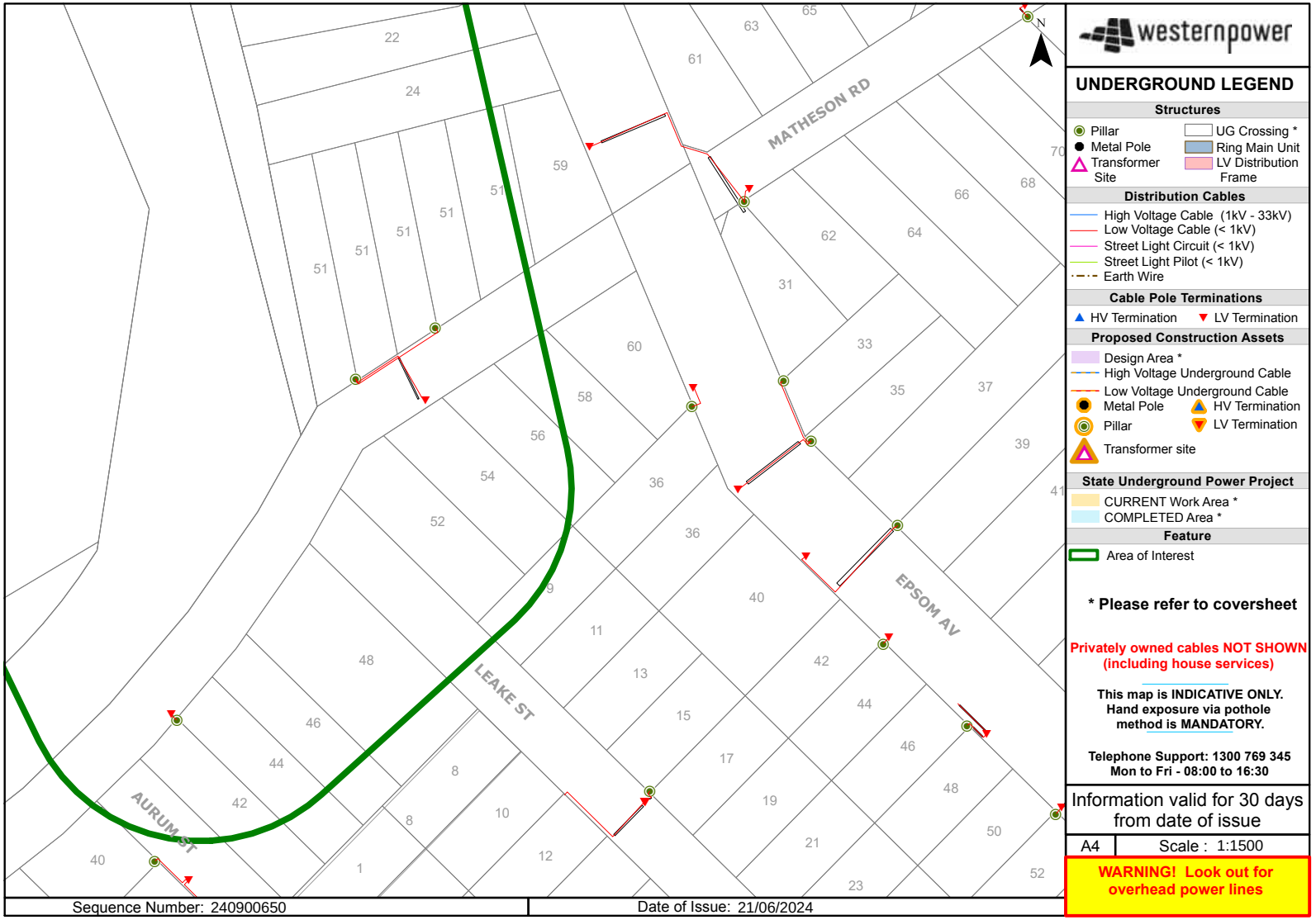
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Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report

Job No 36962248

BEFORE YOU DIG www.byda.com.au

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference
Precinct C - 1

Address
30 Matheson Road
Ascot WA 6104

Notes/description
-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

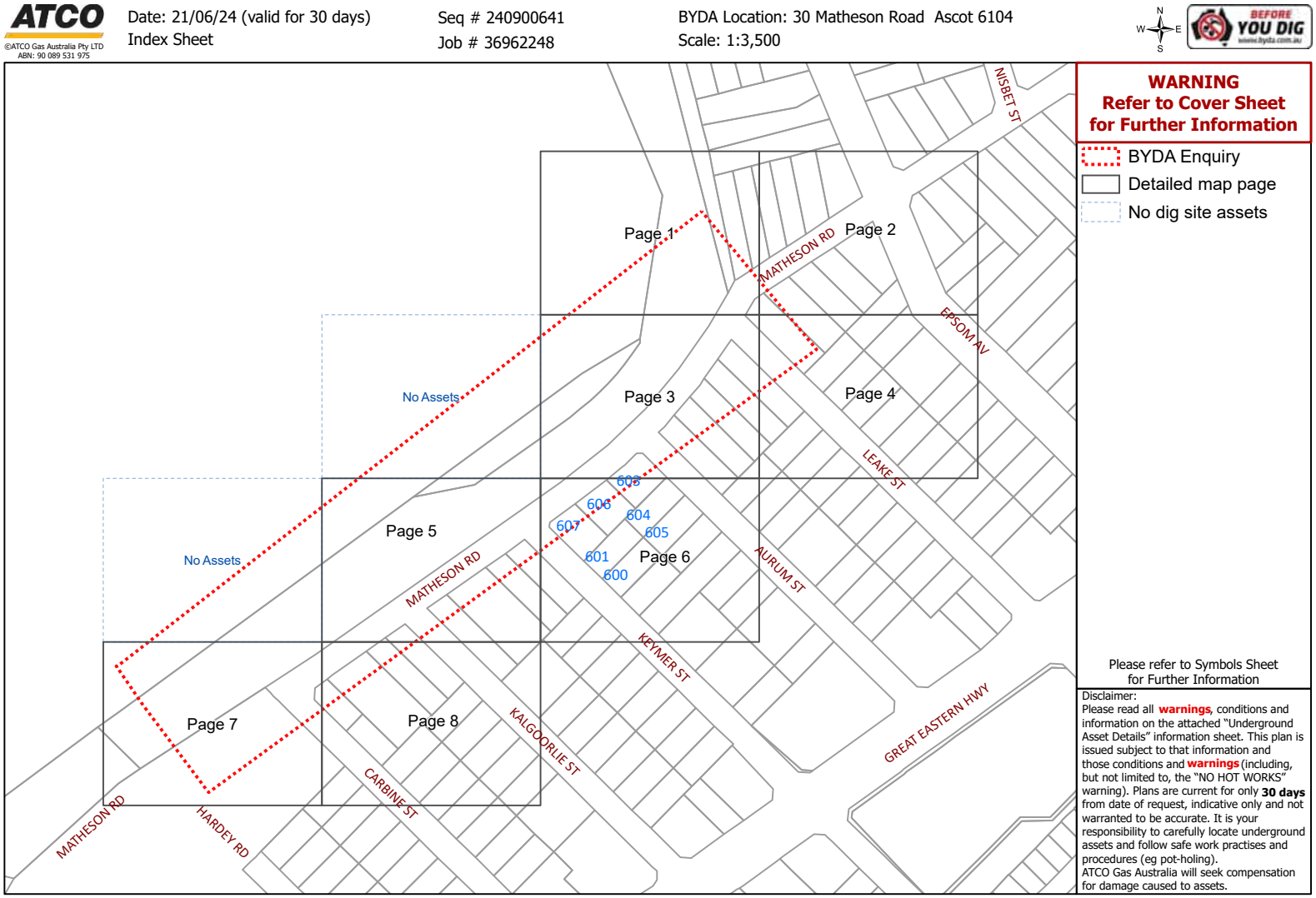
Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900641	ATCO Gas Australia	1300 926 755	NOTIFIED
240900637	NBN Co (WA)	1800 687 626	NOTIFIED
240900639	Telstra (WA)	1800 653 935	NOTIFIED
240900640	Water Corporation	13 13 95	NOTIFIED
240900638	Western Power	13 10 87	NOTIFIED

END OF UTILITIES LIST

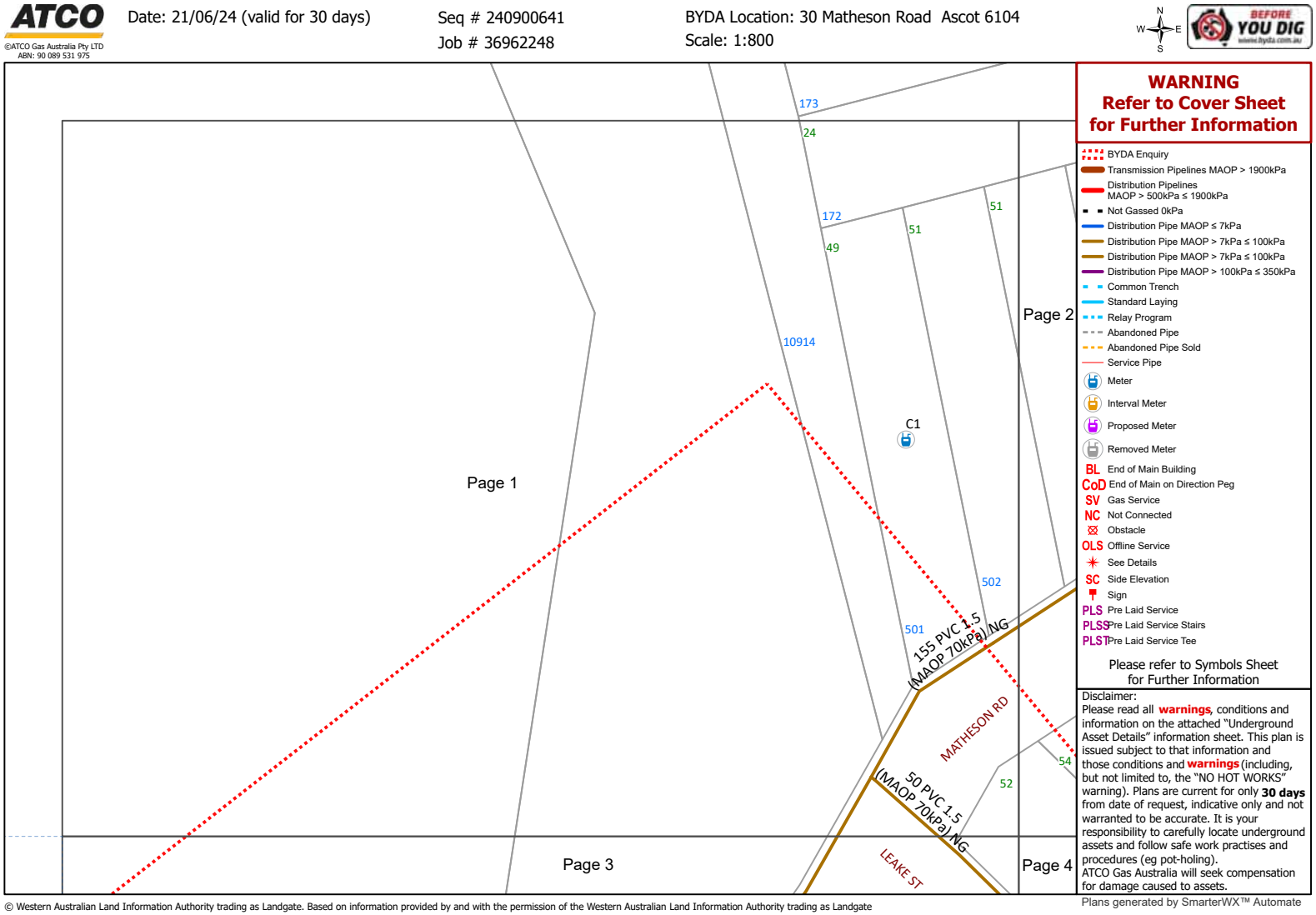
Lodge your FREE enquiry online any time at byda.com.au

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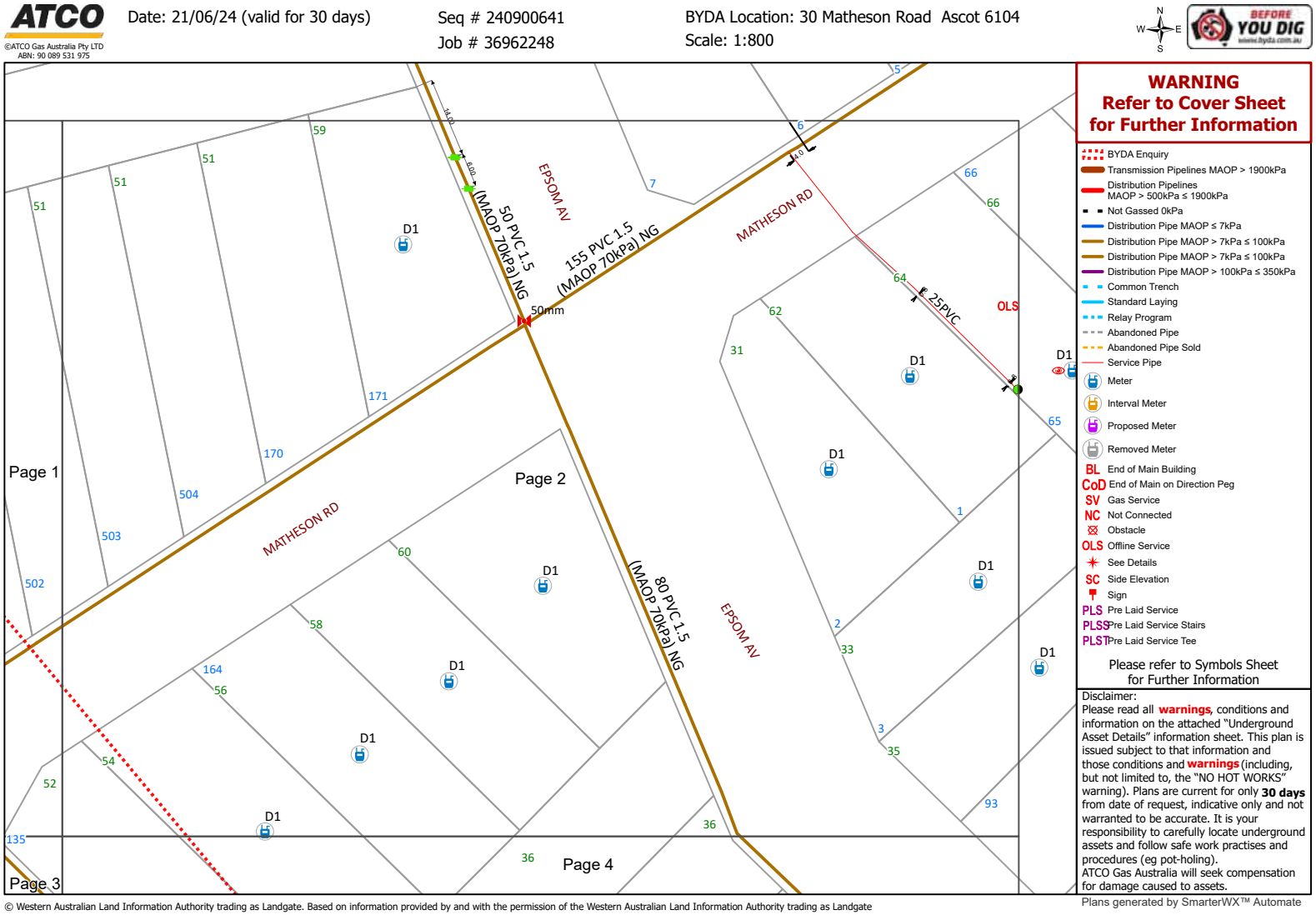


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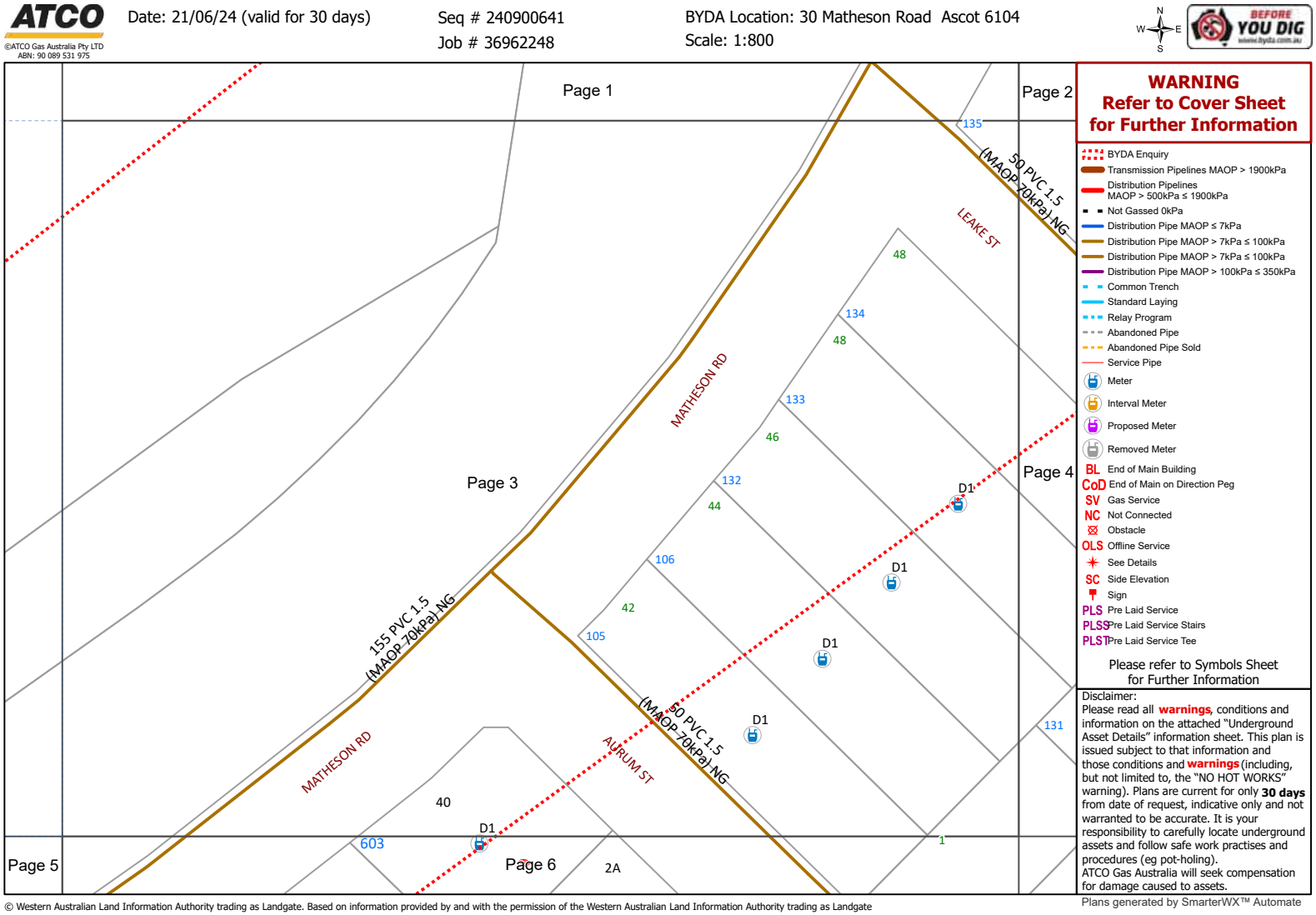
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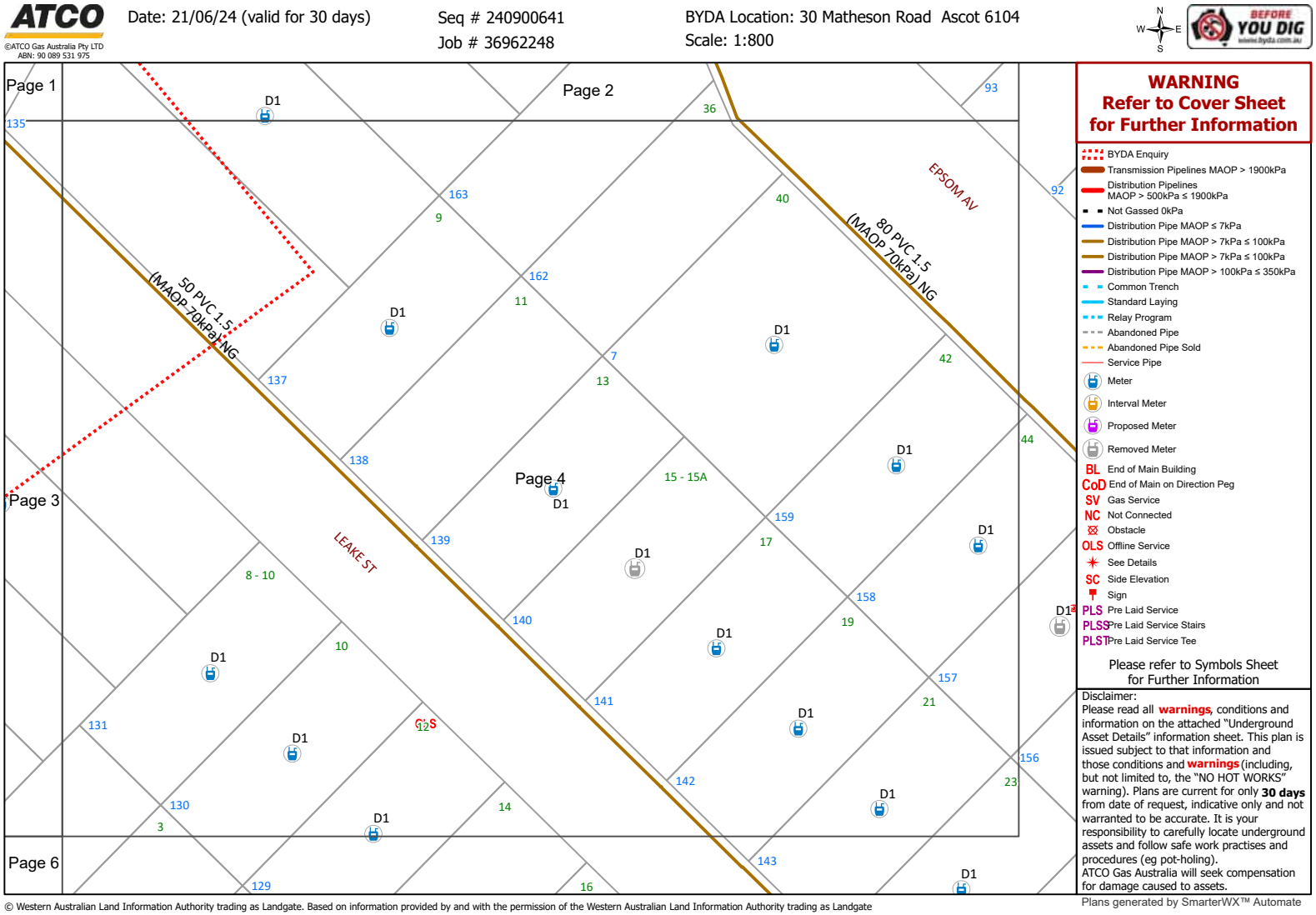
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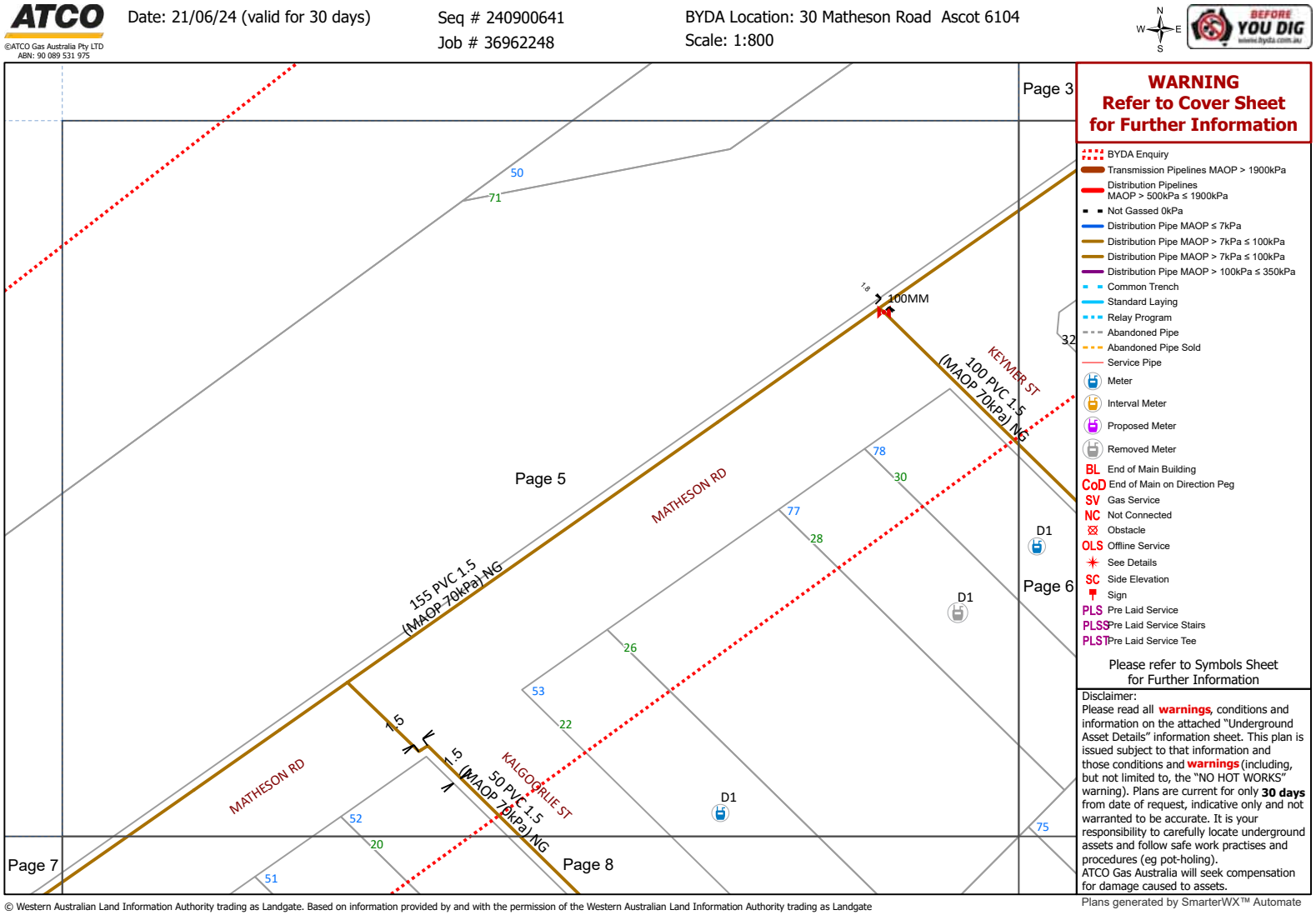
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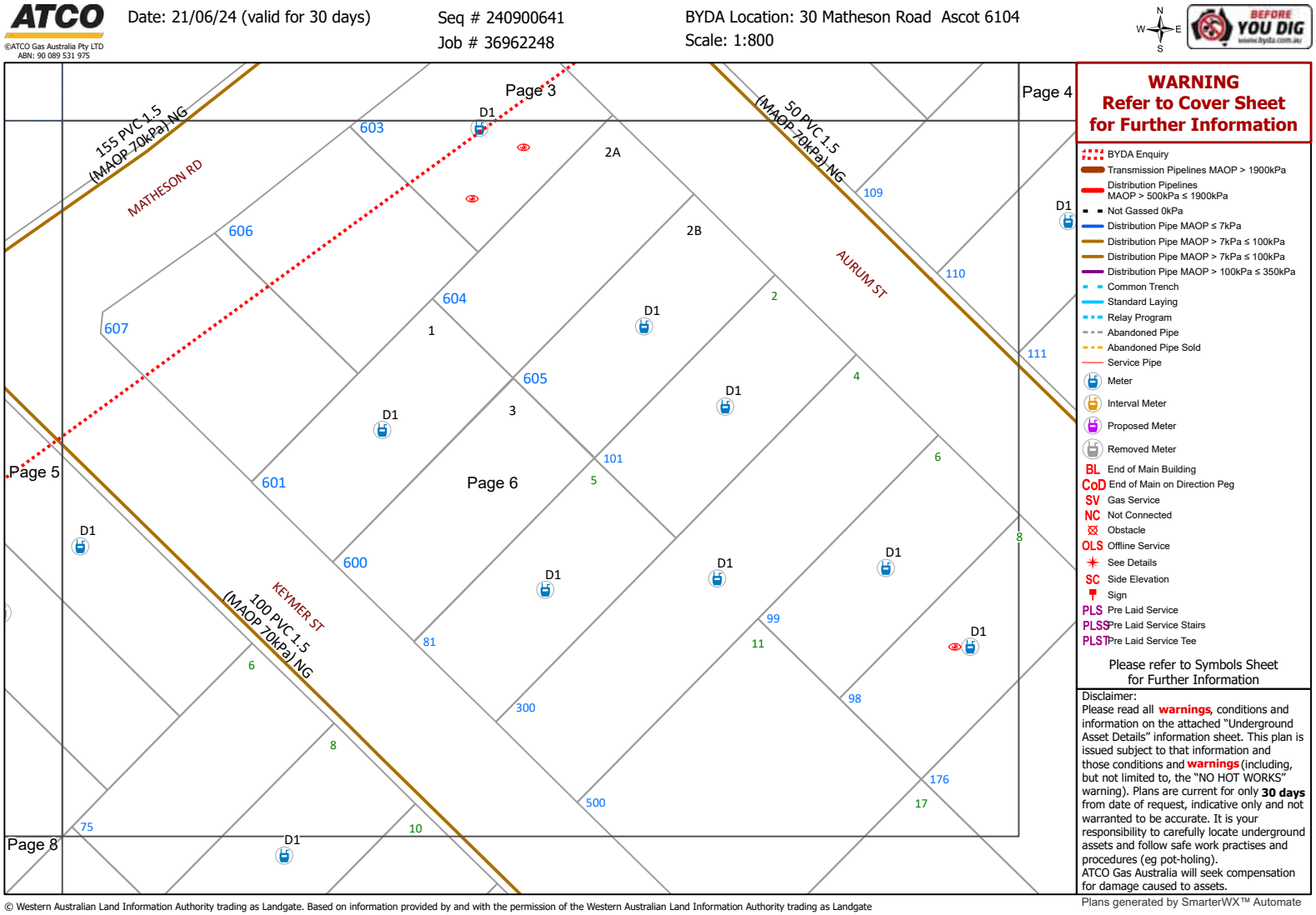
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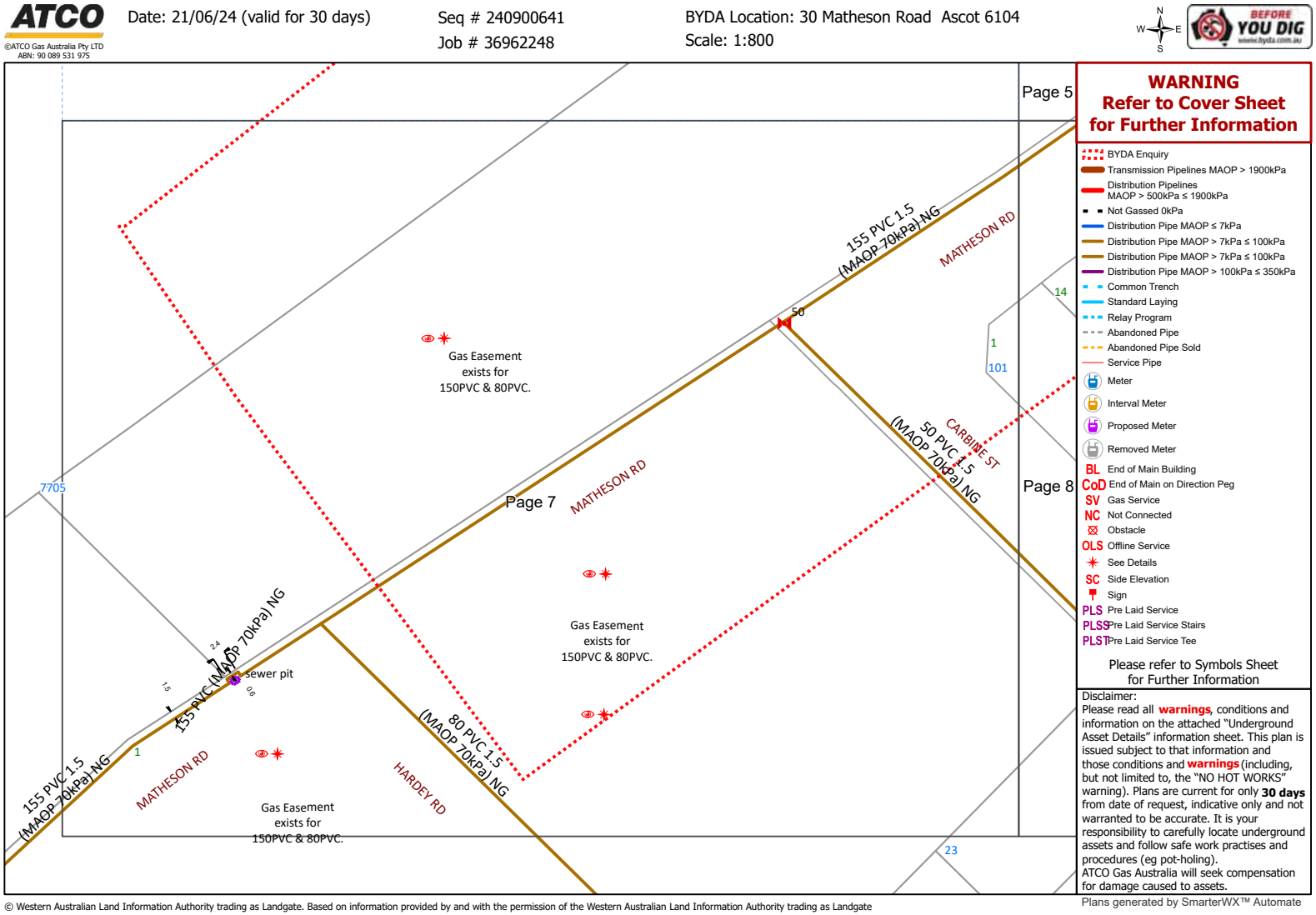
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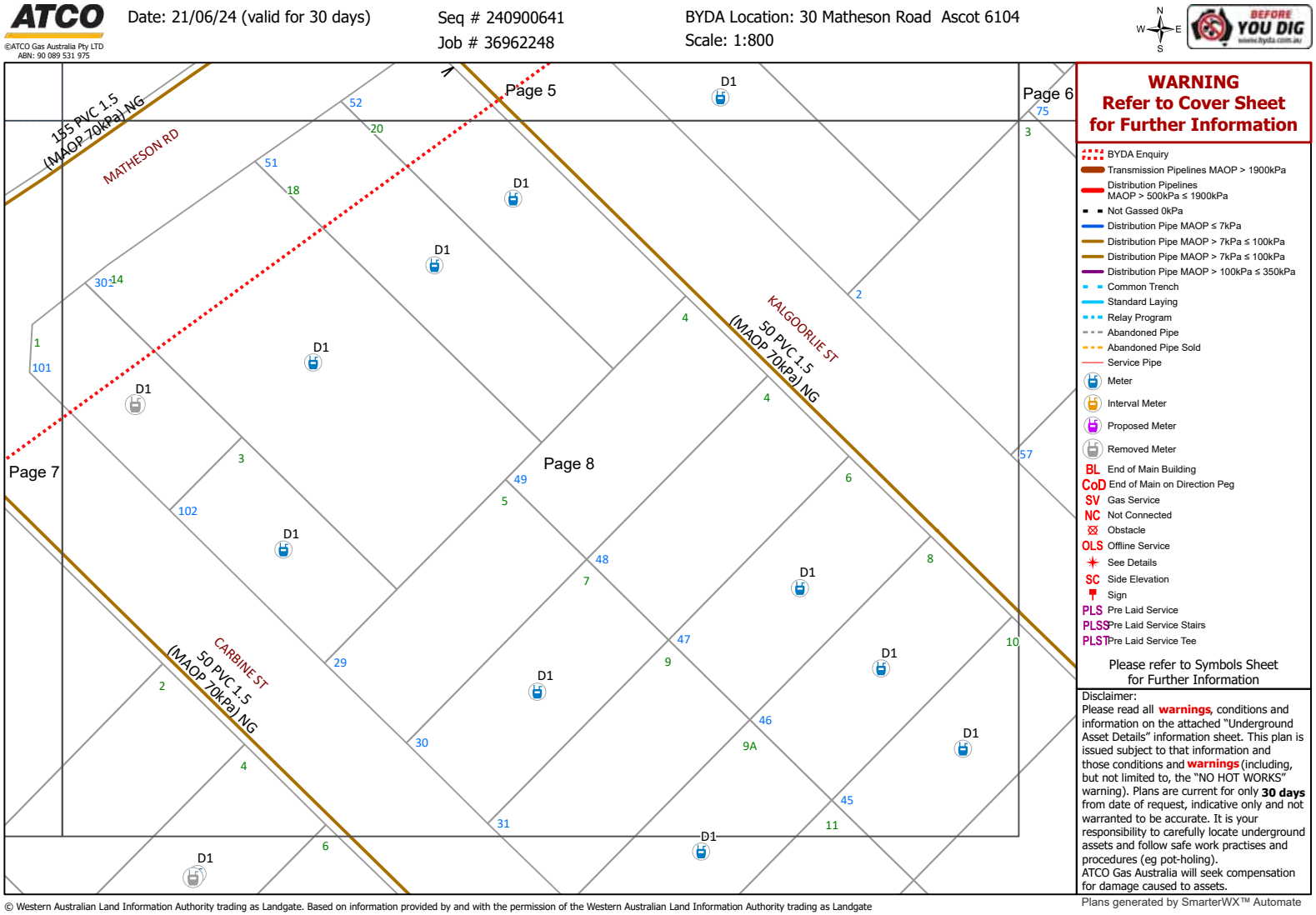
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Attachment 12.1.4 Engineering Servicing Report

ATCO UNDERGROUND ASSET DETAILS ASSETS AFFECTED

GAS DIVISION

ASSETS AFFECTED – see accompanying Plan

Justin Zielinski
ATCO Gas Australia
54 Havelock Street
West Perth
WA 6005

Job No: **36962248**
Sequence No: **240900641**
Date of Issue: 21 June 2024
Phone: **1300 926 755**

BYDA Utility Registration Name: Private
BYDA Location: **30 Matheson Road Ascot WA 6104**

ATTENTION: This response to your enquiry has been interpreted from details in your requested DBYD picture location request only (not any street address you gave). It is your duty to ensure the accompanying plan/s match your geographical area of works.

IF YOU SEE, HEAR, SMELL OR OTHERWISE DETECT GAS,
LEAVE THE IMMEDIATE AREA AND THEN CALL 13 13 52

Our records indicate that ATCO gas infrastructure ***IS PRESENT*** in the vicinity of and/or surrounding area of the above enquiry. This response relates only to ATCO assets. Your Duty of Care requires that personnel **Must** at all times comply with, and have on site, this information sheet and the accompanying plan(s). All plans are subject to this information sheet. You should refer to the ATCO Self-service Portal (Link Here) or if unsure, contact ATCO on **1300 926 755** during business hours.

All information provided is to be used as a guide only (see Disclaimer item **5**). It does not absolve you or third parties from your Duty of Care obligations, including to take additional precautions where work has the potential to impact on gas assets, public safety or the environment, or from your duties at law (including Reg 3.21 of the Occupational Safety and Health Regulations 1996).

WARNINGS

- No works of any type within 15 metres of any **CRITICAL GAS ASSET** infrastructure without prior approval from ATCO
- **NO HOT WORK** within 15 metres of any gas infrastructure except in compliance with applicable laws & *Australian Standard 1674.* **Do Not** let heat sources or hot works impact on any gas infrastructure and take into consideration that the ground or adjacent structures may also be capable of transmitting heat so as to circumvent protection afforded by a heat shield or barrier
- **DANGER** - Gas can cause asphyxiation and is flammable. Keep all ignition sources well away (e.g., flames, matches/ lighters, sparks, electrical devices, vehicles or engines, mobile phones, cameras)
- Gas pipes **Must Not** be unsupported or left without adequate cover or protection without prior approval from ATCO
- Damage to the pipe coating or pipe itself can be very dangerous if not given immediate attention. Report any damage to ATCO immediately on **13 13 52**. **Do Not** attempt to repair any damaged gas infrastructure
- No alteration or removal of live or abandoned gas infrastructure without prior written approval from ATCO
- Any abandoned or proposed gas infrastructure indicated on the gas plans **Must** be treated as live
- Never assume the location or depth of any gas infrastructure. Pipes may not follow straight lines or maintain a constant depth. Always check carefully (e.g., by careful hand digging of potholes)
- Unauthorised repairs or tampering with gas infrastructure may result in prosecution under the *Energy Operators (Powers) Act 1979*. ATCO Gas Australia reserves all rights to recover compensation for loss or damage to its gas infrastructure or other property including for indirect or consequential losses.

Attachment 12.1.4 Engineering Servicing Report

PLANS:

Plans provided are current for **30 days only** from date of request. You must use current plans at all times.

Plans do not show all gas service lines (which connect gas mains to individual meter positions). See condition **3.c)** below.

If plan shows **additional detail** symbols (*) or ( ) in the area of proposed works it is **your duty** to obtain that further detail from the number below.

Plans (including the location of pipes, services, infrastructure and boundaries) are **approximate only**. You **Must** use safe and proper procedures – including **potholing** (see condition **4** below).

Plans are not a guide as to gas availability for connection purposes.

To call ATCO: **Weekdays from 7.30am to 3.30pm, call – 1300 926 755 After hours, weekends and emergencies, call – 13 13 52**

CONDITIONS FOR WORKS IN THE VICINITY OF ATCO ASSETS

1. Compliance with Warnings

You **Must** comply with the Warnings contained in this information sheet and the accompanying plan(s).

2. Compliance with 'Working around Gas Infrastructure' Document (Link Here) **applicable laws and duty of care**

All work (including but not limited to using Excavator's Augers, Directional, drilling machines, 'Ditch Witch' type trenching machine, Loader, Dozer, Skid Steer (Bob Cat)) **Must** comply with all applicable requirements in the 'Working around Gas Infrastructure' Document and with all applicable laws and Australian Standards. All due care must be exercised to locate any gas infrastructure in the vicinity and when conducting any works near them.

3. All Gas Infrastructure

All work that may have any impact upon any gas infrastructure (see **3.a)**, **b)** and **c)** below for examples) should be carefully planned with notification to ATCO well in advance of commencement. Contact ATCO on **1300 926 755** or visit Atco's online self-service portal (Link Here). Amongst other things, this includes excavation of or near gas pipelines, boring/drilling, crossings of pipelines (including by other underground infrastructure e.g. drains, power cables, etc.), road works and structural installations. In addition:

a) Critical Asset

No works of any type are permitted within 15 meters of these pipelines without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco online Self-service portal (Link Here)

You **Must** ascertain the location of any Critical Asset, in relation to your proposed work by:

- Locating a straight line between two marker danger signs, and
- Assessing the distance from this line to your proposed work area.

ATCO may require stand-by supervision during your works and will advise of attendance requirements.

b) Non Critical Assets

These pipelines are installed in most streets throughout the Perth metro area and several country centers. Main valves, regulator sets, and test points also exist at intervals along these pipelines. Where work may impact upon these pipelines or assets then ATCO **Must** be contacted as per item **3** above.

c) Gas Services and Meters

If a gas meter is installed on a property, an underground gas service pipe will run from the meter position to the gas main in the street. Plans do not show all gas service lines (with the exception of Critical Assets), but their presence must be anticipated. Most gas meter boxes installed since 1996 will include a sticker giving approximate guidelines for the gas service line location. All due care must be exercised to locate any gas services in the vicinity and when conducting any works near them.

4. Compliance with Safe Work Practices

It is your responsibility to have and comply with adequate safe work practices and procedures. Without limiting your obligations:

PLAN The complete & current Before you Dig Australia documentation and plans must always be on site & referred to for the duration of work. Refer to regulation 3.21 of the Occupational Safety and Health Regulations 1996 and the Utility Providers "Code of Practice" for further useful information.

PREPARE Prepare by reviewing the Before you Dig Australia Documentation and contacting ATCO if you need assistance. Look for onsite ATCO asset and infrastructure clues such as pit lids, marker posts and meters. No works of any type are permitted within 15 meters of a **CRITICAL ASSET** without prior approval from ATCO. For approvals contact ATCO on **1300 926 755** or visit the Atco website Self Service portal (Link Here) and allow suitable

processing time. Atco recommends engaging a BYDA Certified Locator which includes undertaking electronic location prior to potholing.

POTHOLE Using current Before you Dig Australia plans, all gas pipes should be located (including any deviation in the direction of a gas pipe) by exposing them by careful digging using a HAND SHOVEL. Where the proposed work is parallel to a gas pipeline, pothole every 10 meters along the entire route. Damage to the pipe coating or to the pipe itself can create a very dangerous situation if not given immediate attention. If damage does occur, it **Must** be reported to ATCO immediately on Ph. **13 13 52**.

PROTECT Supervise and monitor all excavations near gas infrastructure using a dedicated spotter. Where any gas infrastructure is required to be exposed, adequate protection of the gas infrastructure is required to prevent potential damage. Also implement appropriate controls when conducting 'hot work' (in accordance with AS 1674) in the vicinity of the ATCO infrastructure such as; isolation; separation distance; the placement of an effective non-combustible barrier of sufficient size and thermal resistance for the intensity, type and duration of heat exposure; gas monitoring; monitoring the environment surrounding the ATCO infrastructure to ensure it is not being impacted by the work, and other controls as necessary.

PROCEED You should **only proceed** with your excavation work after you have planned, prepared, potholed (unless prohibited) and have protective measures in place. All locations markers/pegs are to be removed on completion of works. If you are unsure, **DO NOT** Proceed. Call ATCO on **1300 926 755**

5. Disclaimer and Further Terms

a) Nothing in this document, any accompanying plan or the 'Additional Information for Working around Gas Infrastructure' (AGA-O&M-PR24) (together called "**Documents**") purports to exclude or modify any term, condition or warranty to the extent that by law it cannot lawfully be excluded or modified by agreement or notice, including but not limited to those contained in Schedule 2 of the *Competition and Consumer Act* 2010 (Cth) and corresponding provisions of any state legislation.

b) If any of ATCO, or their respective related entities, officers, employees, agents, contractors or advisers (together called "**Associates**") is liable for a breach of a term, condition or warranty described in paragraph **5.a)** above, its liability is, to the fullest extent permitted by law, limited to any one or more of the following as it determines in its absolute discretion:

i) in relation to goods supplied by them, replacing or repairing the goods, supplying an equivalent item, paying the cost of replacing or repairing the goods or paying the cost of acquiring or hiring an equivalent item; and

ii) in relation to services supplied by them, the re-supply of the services or the payment of the cost of having the services re-supplied.

c) Subject to paragraphs **5.a)** and **b)**, but otherwise despite any other provision in the Documents, no representation or warranty is made or given (whether expressly or by implication) by any of ATCO or their respective Associates in respect of any information contained or referred to in any of the Documents or in any other communication from ATCO concerning any of the Documents or the subject matter of any of the Documents ("Information"). In particular, but without limiting the generality of the foregoing limitation, none of ATCO or their respective Associates makes any warranty or representation as to the truth, accuracy, completeness, reliability, currency, timeliness, quality or fitness for any purpose of or the standard of care taken in the preparation of any Document or Information (including, but not limited to, the accuracy of the scale of, or the location of anything or symbol shown on, any plan or diagram).

d) Subject to paragraphs **5.a)** and **b)**, to the maximum extent permitted by law, none of ATCO or their respective Associates is liable to any person or other body ("**Recipient**") who receives or otherwise obtains access to all or any part or parts of the Documents or Information, in any way (including, but not limited to, liability for negligence, breach of statutory duty or lack of care) in respect of any cost, expense, damages, loss or liability, including, but not limited to:

i) any financial or economic loss, cost, expense or damage, including but not limited to loss of production, loss of profit, loss of revenue, loss of use, loss of contract, loss of goodwill or loss of business opportunity;

ii) any new or increased costs or expenses, including but not limited to financing or operating costs;

iii) any failure to achieve any actual or anticipated saving in respect of any cost or expense;

iv) any cost, expense, damage or loss resulting from any liability of the Recipient to any other person or body howsoever and whensoever arising, suffered or incurred by the Recipient in relation to, or in connection with, the disclosure to them of, or use of, or reliance on, all or any

part or parts of the Documents or Information.

e) By using any Document or Information, each Recipient is taken to represent and warrant to ATCO that the Recipient will comply with the conditions and other terms referred to in the Documents or Information, including but not limited to conditions that:

i) the Recipient **Must** comply with the conditions in numbered paragraphs **1** to **4** above and this paragraph **5**;

ii) as between ATCO and each Recipient, ATCO owns the Information and all rights and title in and to the Information are to remain vested in ATCO;

iii) no Recipient has any right, title or interest in the Information or, except as expressly provided for in the Documents, any license or right to copy, alter, modify, publish or otherwise use or deal with the Information without prior written approval from ATCO;

iv) ATCO makes no representation and gives no warranty as to its right to disclose any Information;

v) the Recipient relies on any Information entirely at its own risk and expense;

vi) the Recipient **Must** undertake its own independent due diligence and investigations in relation to the Information;

vii) none of ATCO or their respective Associates owes the Recipient any duty of care in respect of the Information; and

viii) none of ATCO or their respective Associates is under any obligation to correct, update or revise any Documents or Information.

GAS MAIN AND SERVICE IDENTIFICATION

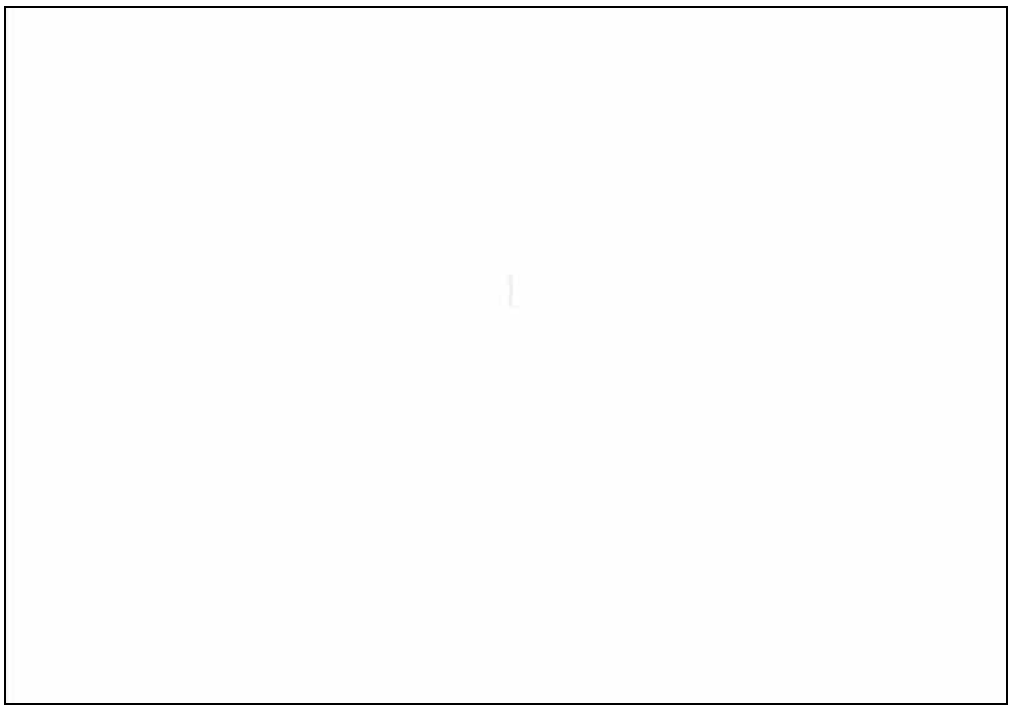
LEGEND

1. Critical Asset (See **WARNINGS** page 1)
2. Pipe Diameter (millimetres)
3. Pipe Material
   CI = Cast Iron PE = Polyethylene
   GI = Galvanised Iron PVC = PVC
   ST = Steel
4. Alignment (in metres from property line)
5. Pressure in main (MP 70 kPa = Medium Pressure and MAOP (Maximum Allowable Operating Pressure)
6. Off-line Service – service may not be straight line to meter. (**WARNING – OLS may not always be shown on plan**. See item **Error: Reference source not found** above)
7. Service Valve in the vicinity
   (**NOTE:** Service Valve may be **"BURIED"**)
8. Pre-laid Service laid in Common Trench
9. Main Status: (See **WARNINGS** page 1)
   9a. AB = Abandoned Mains
   9b. PROP = Proposed Mains
10. Customer Connection: Does not indicate actual location of Meter Position
    D2 (D = Domestic & 2 = Number of Meters)
    C1 (C = Commercial & 1 = Number of Meters)
11. **Additional detail available and Must be obtained if within area of proposed works – see page 2 above.**
12. Depth of Cover (DOC) in metres.

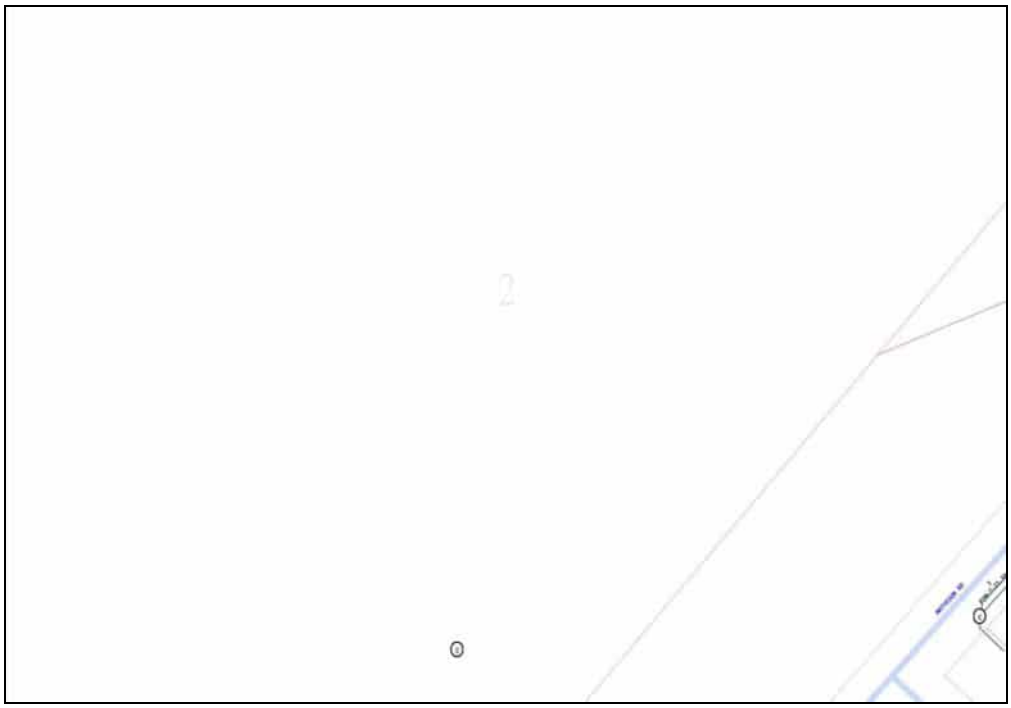


IF UNSURE, PLEASE CONTACT ATCO ON **1300 926 755**

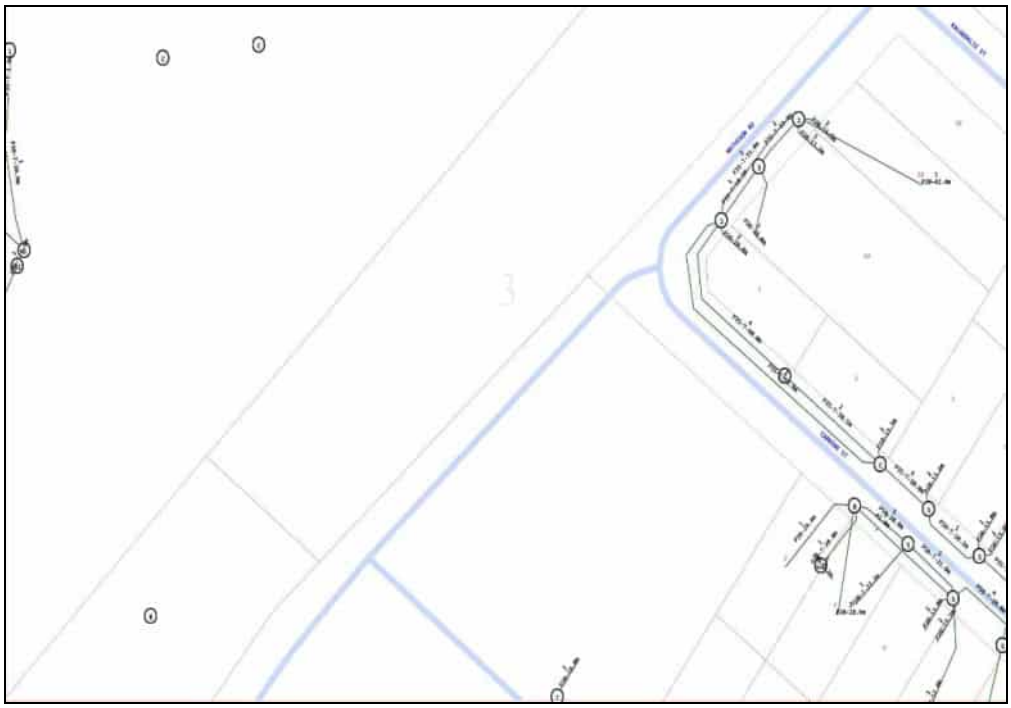
Attachment 12.1.4 Engineering Servicing Report



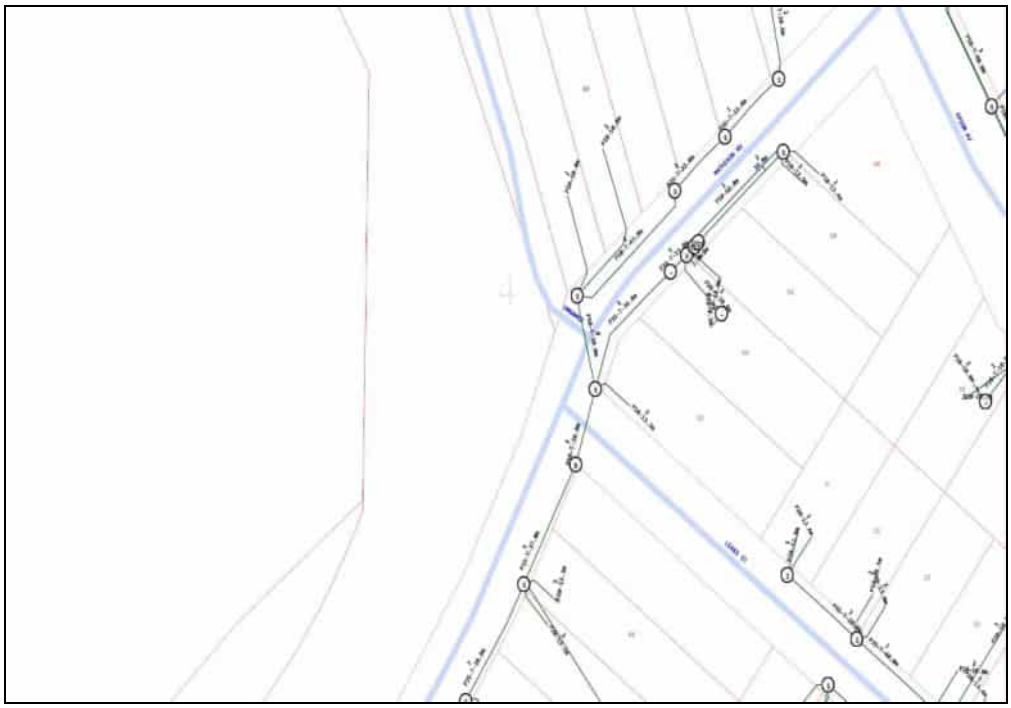
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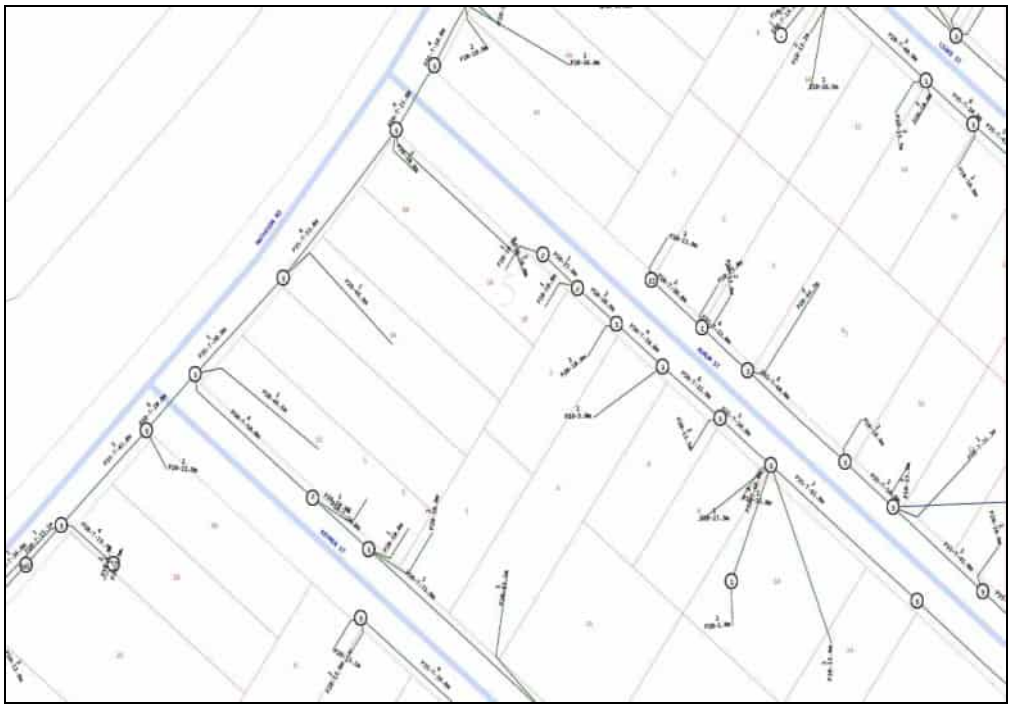
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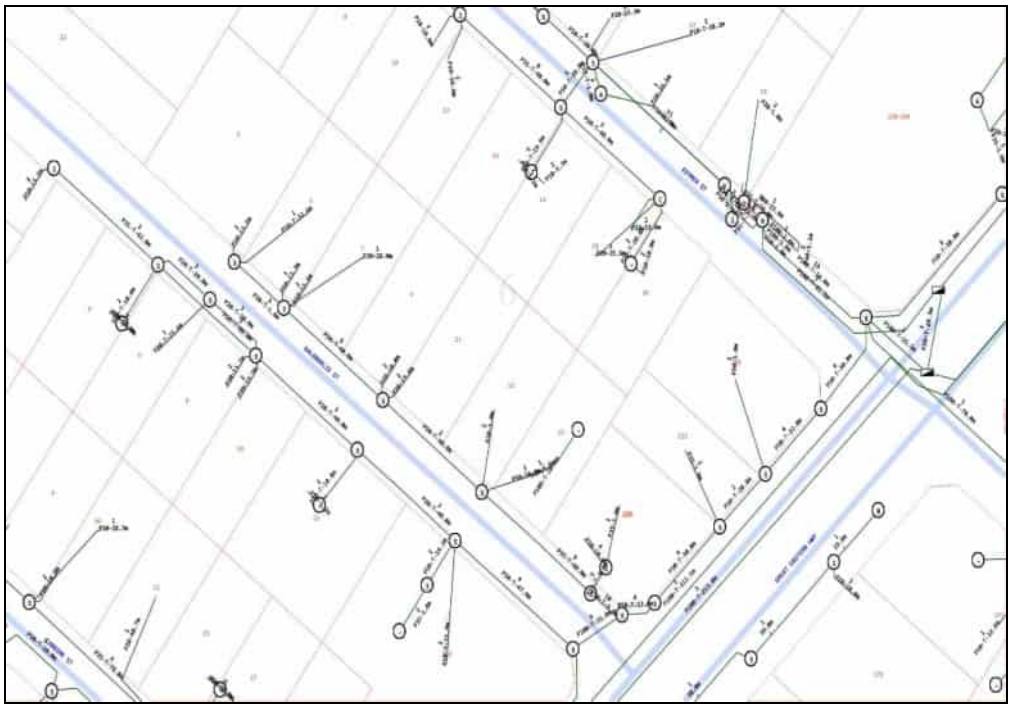
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Attachment 12.1.4 Engineering Servicing Report



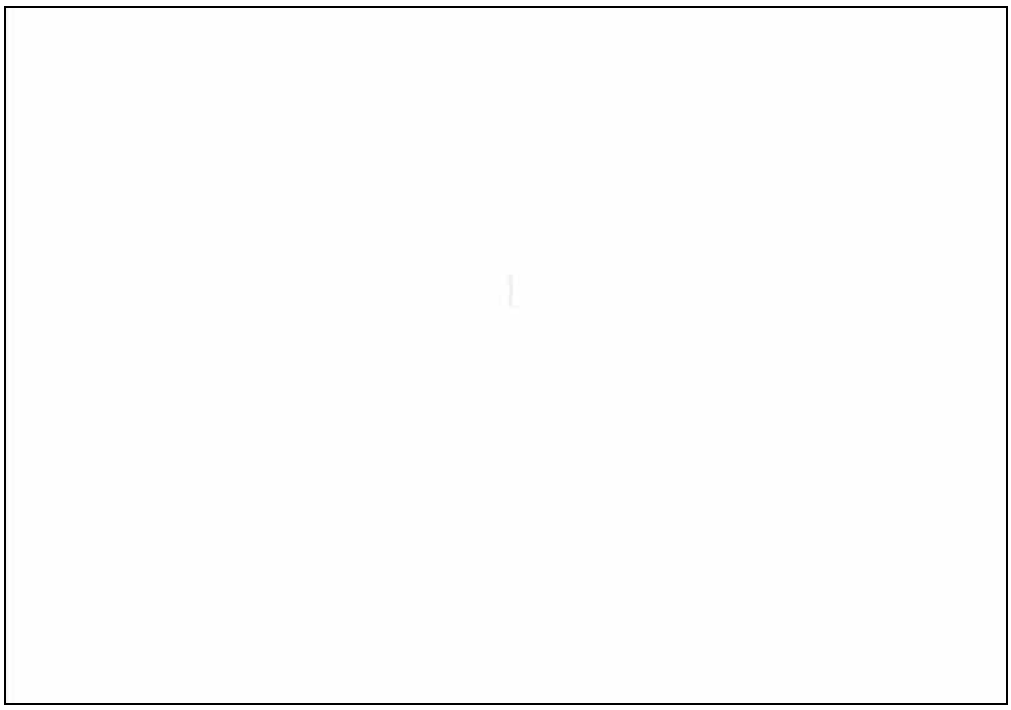
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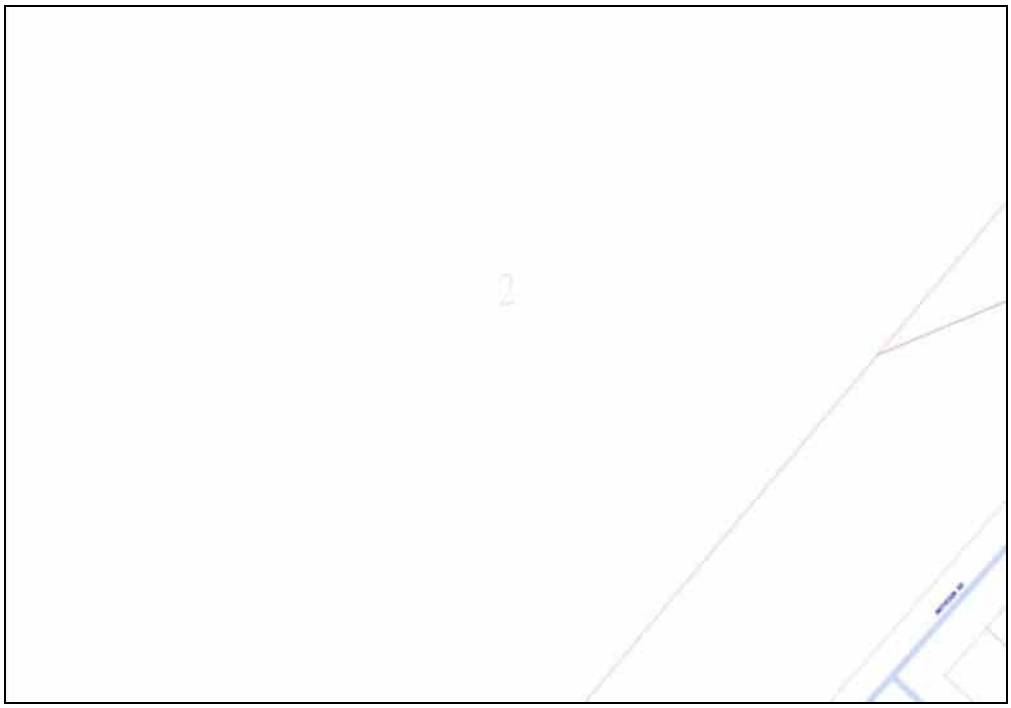
Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

Attachment 12.1.4 Engineering Servicing Report



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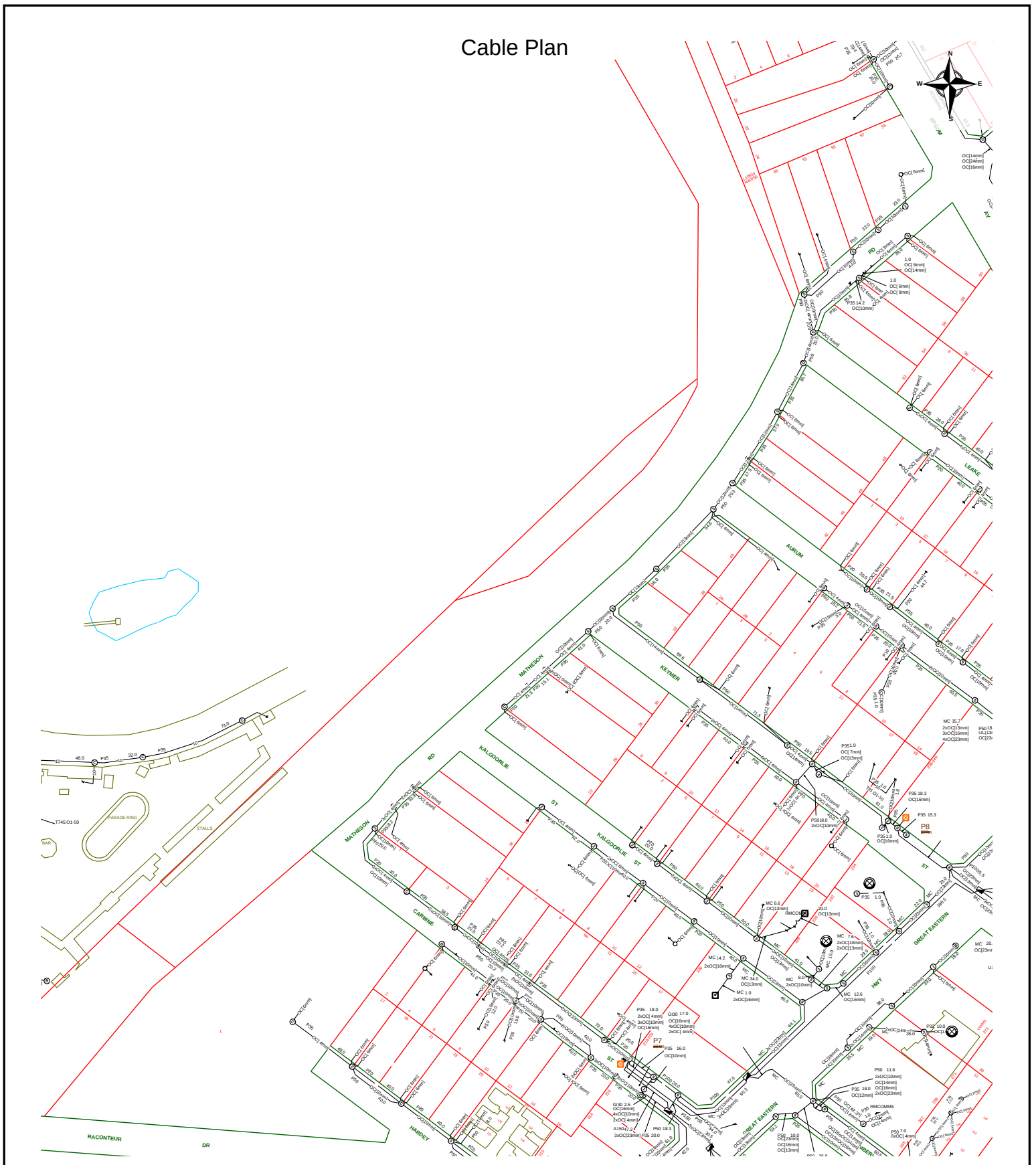


Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

Attachment 12.1.4 Engineering Servicing Report

Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900639
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:09:59	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

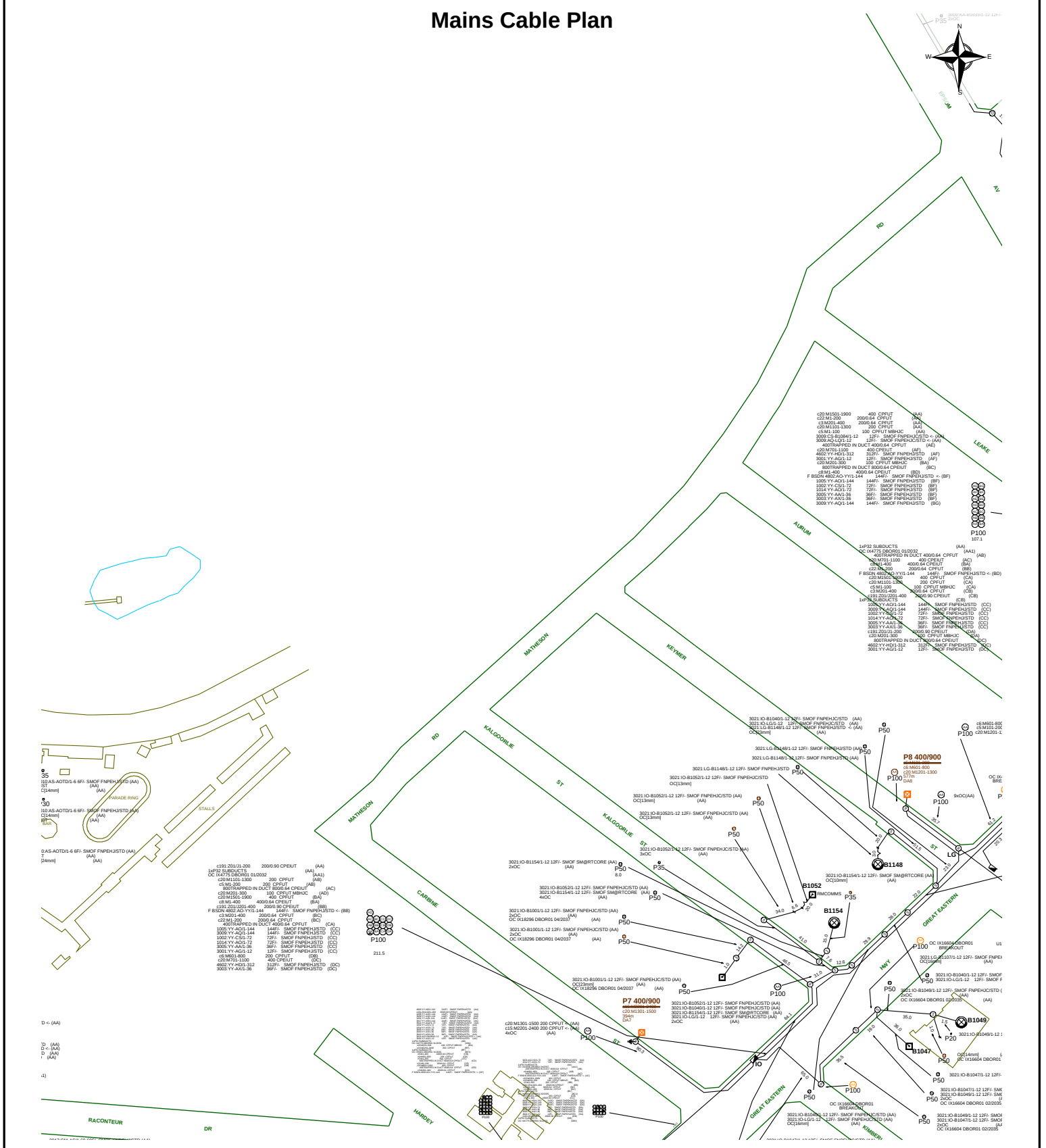
WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

Attachment 12.1.4 Engineering Servicing Report

Mains Cable Plan



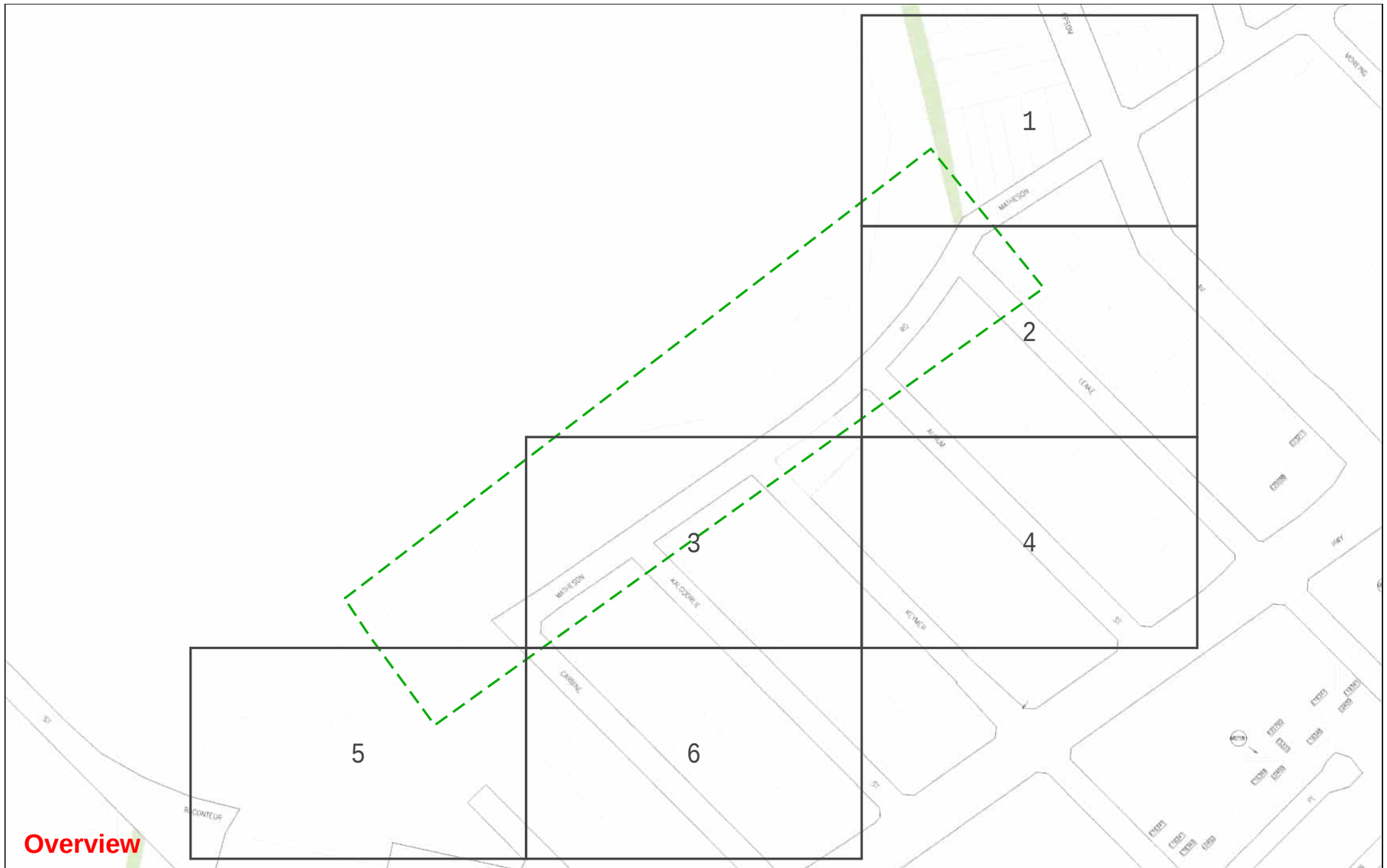
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900639
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:10:01	

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
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See the Steps- Telstra Duty of Care that was provided in the email response.

Page 2 of 2

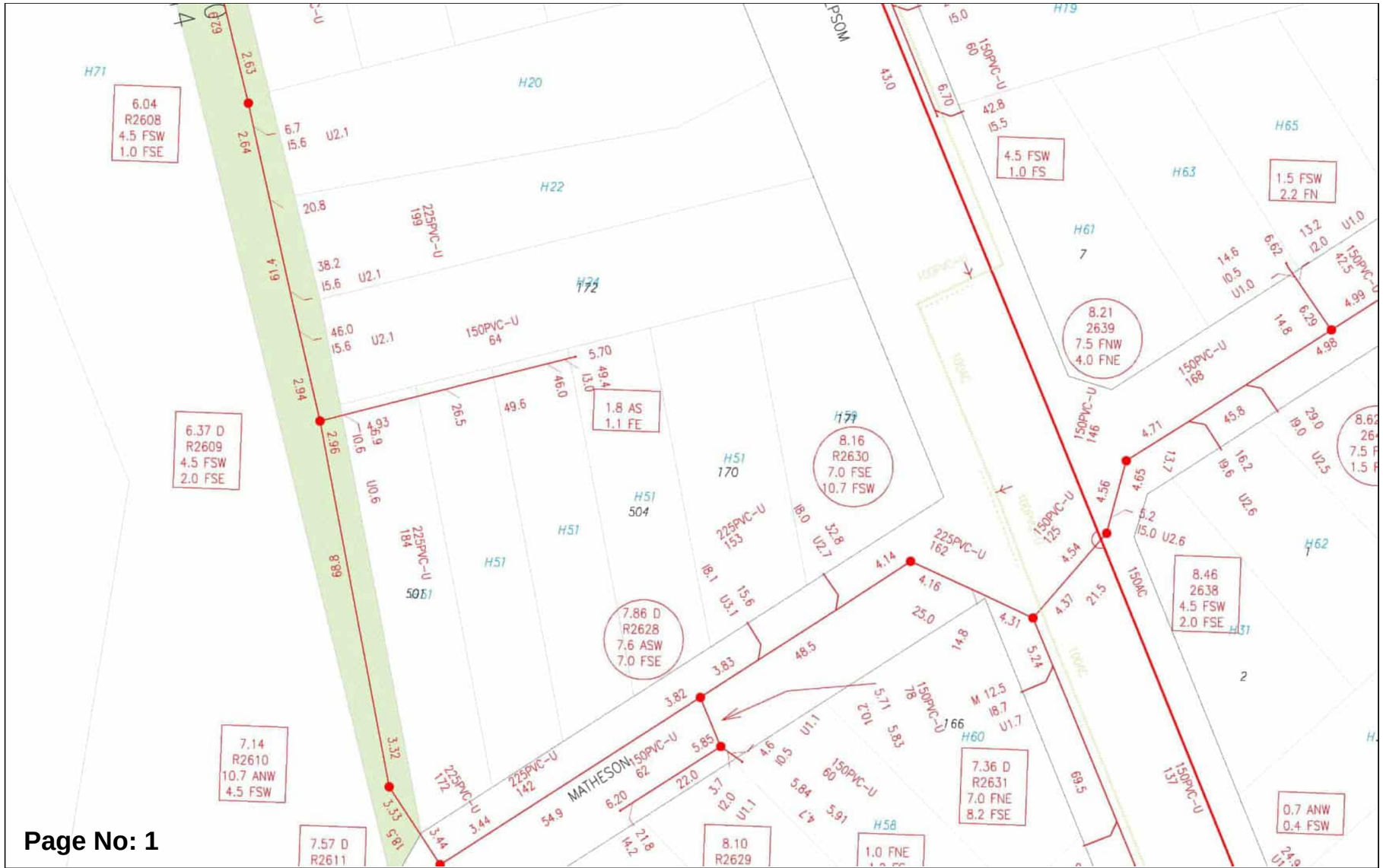
Attachment 12.1.4 Engineering Servicing Report



Plans generated 21 Jun 2024 by PelicanCorp TicketAccess Software | www.pelicancorp.com

Water Corp - Non-critical Plan.docx (21 May 2024)

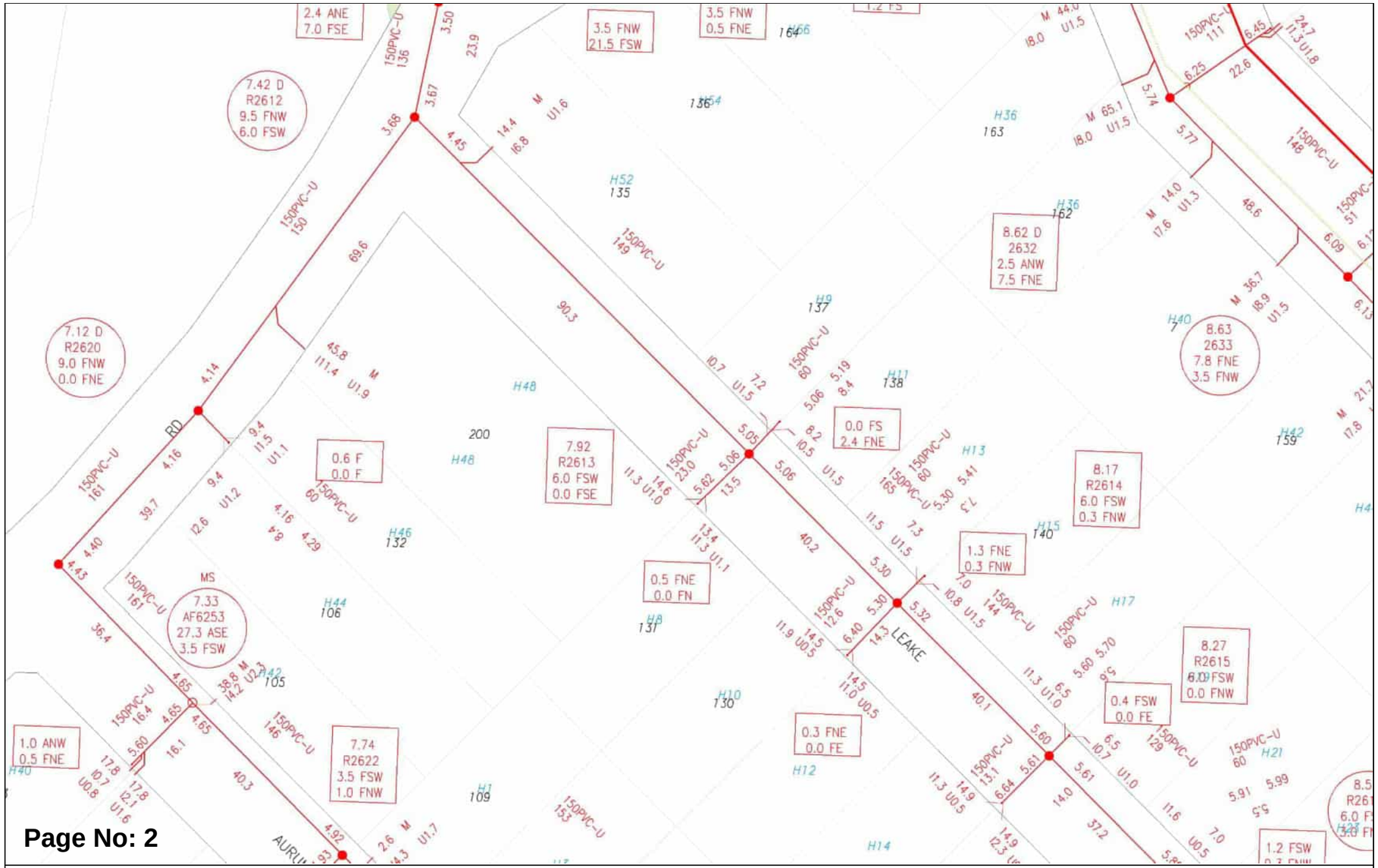
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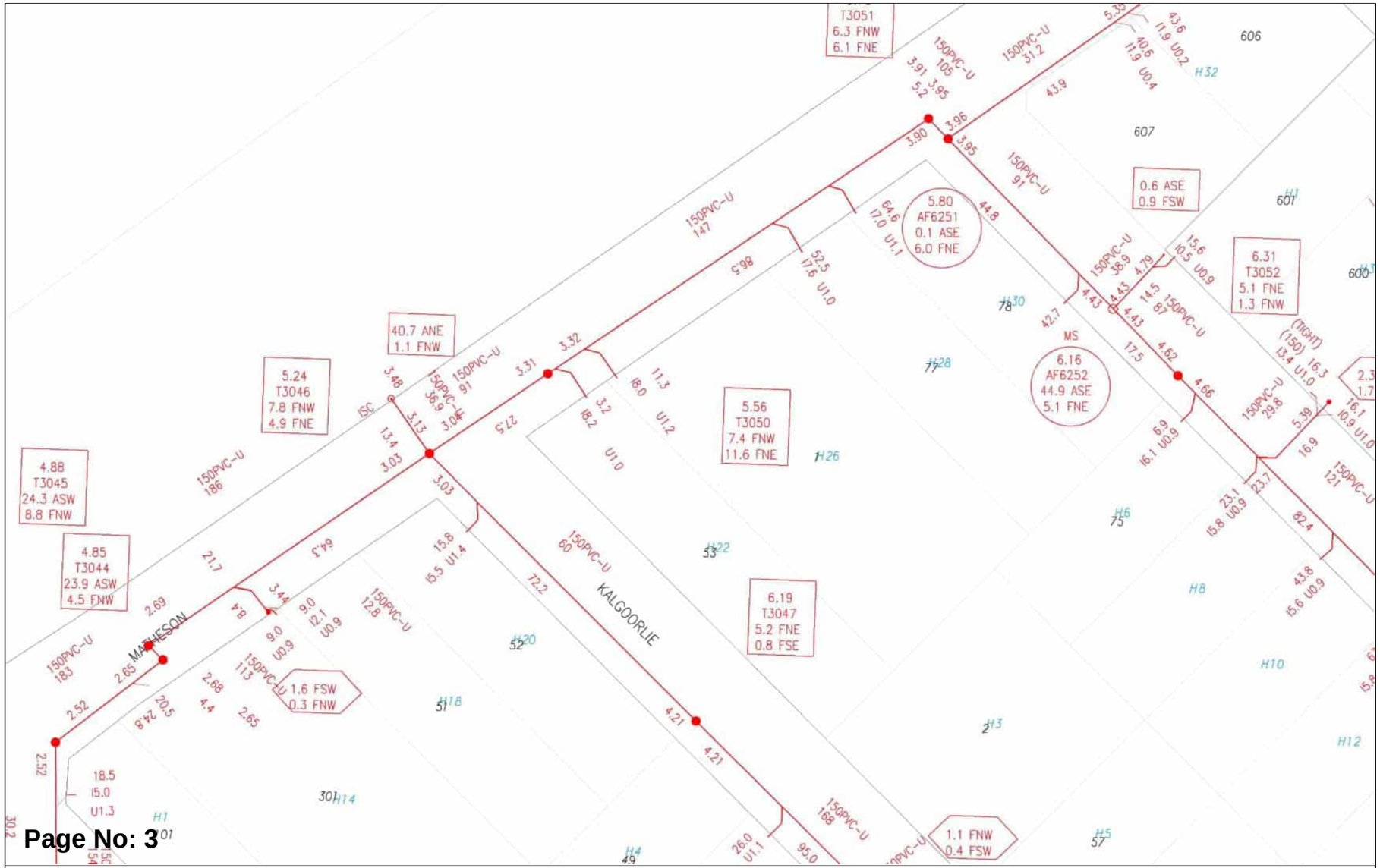
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Page No: 3

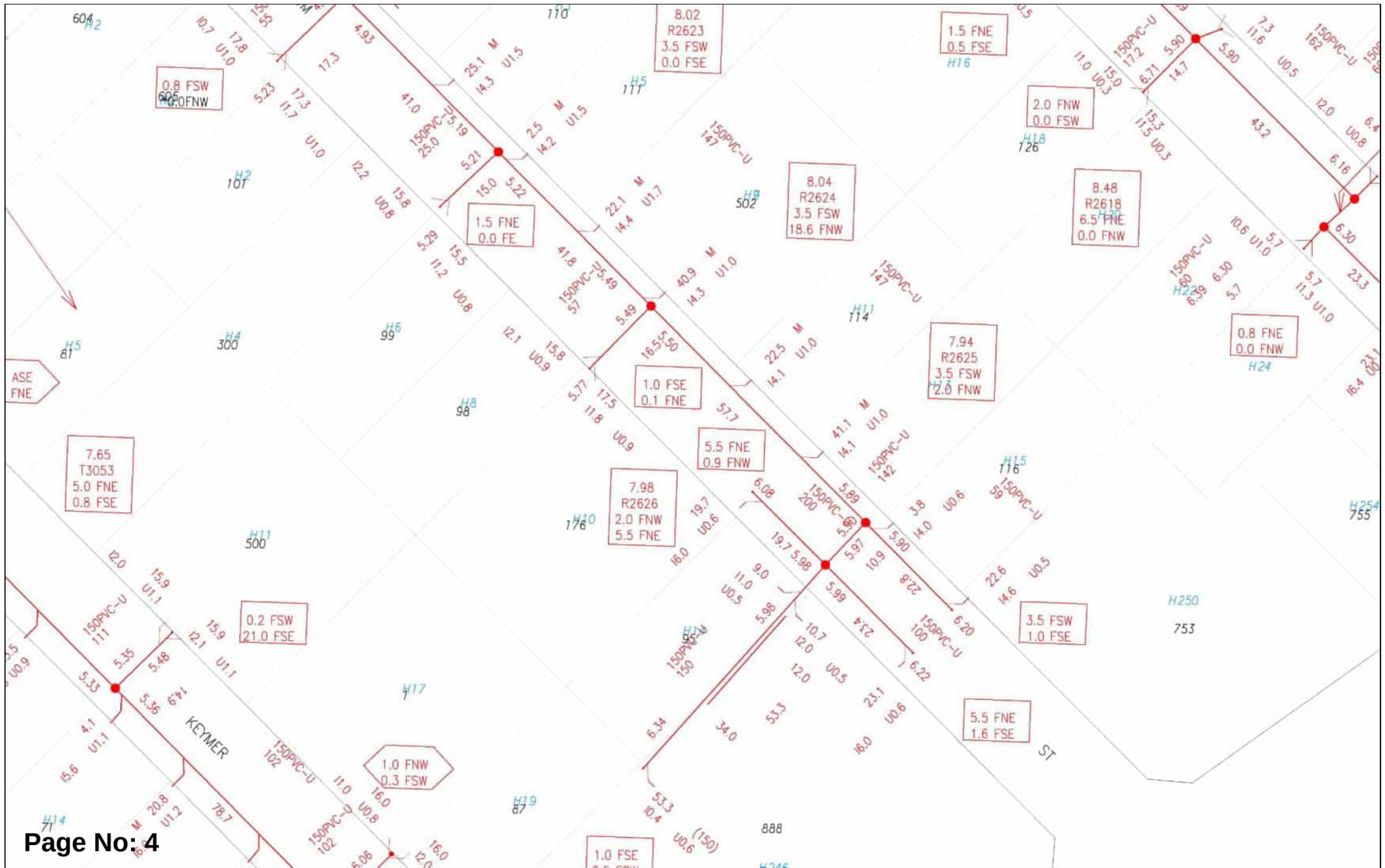
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Sequence No.: 240900640
Print Date: 21 Jun 2024

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Sewer

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Attachment 12.1.4 Engineering Servicing Report

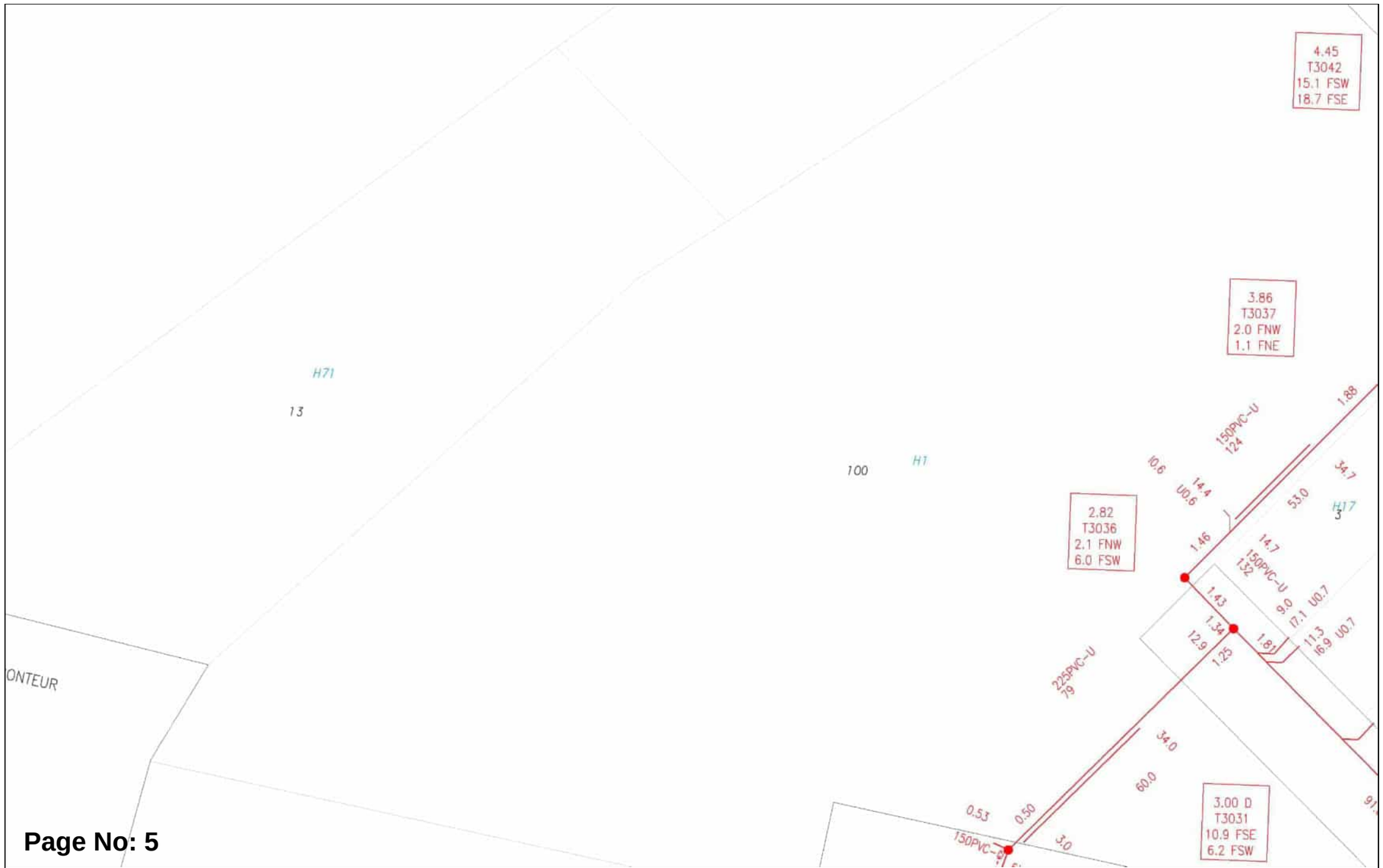


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Water Corp - Non-critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Page No: 5

WATER CORPORATION

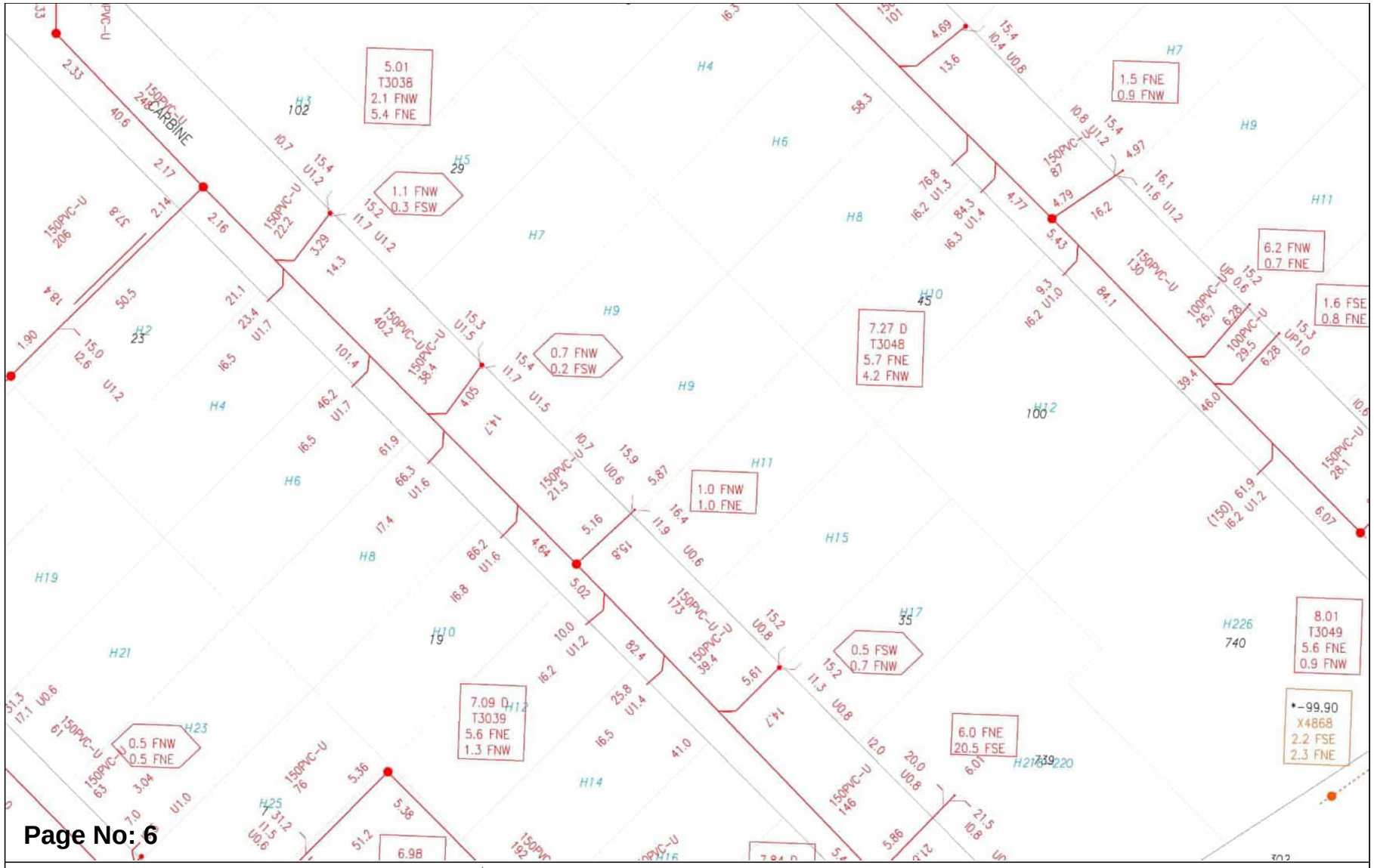
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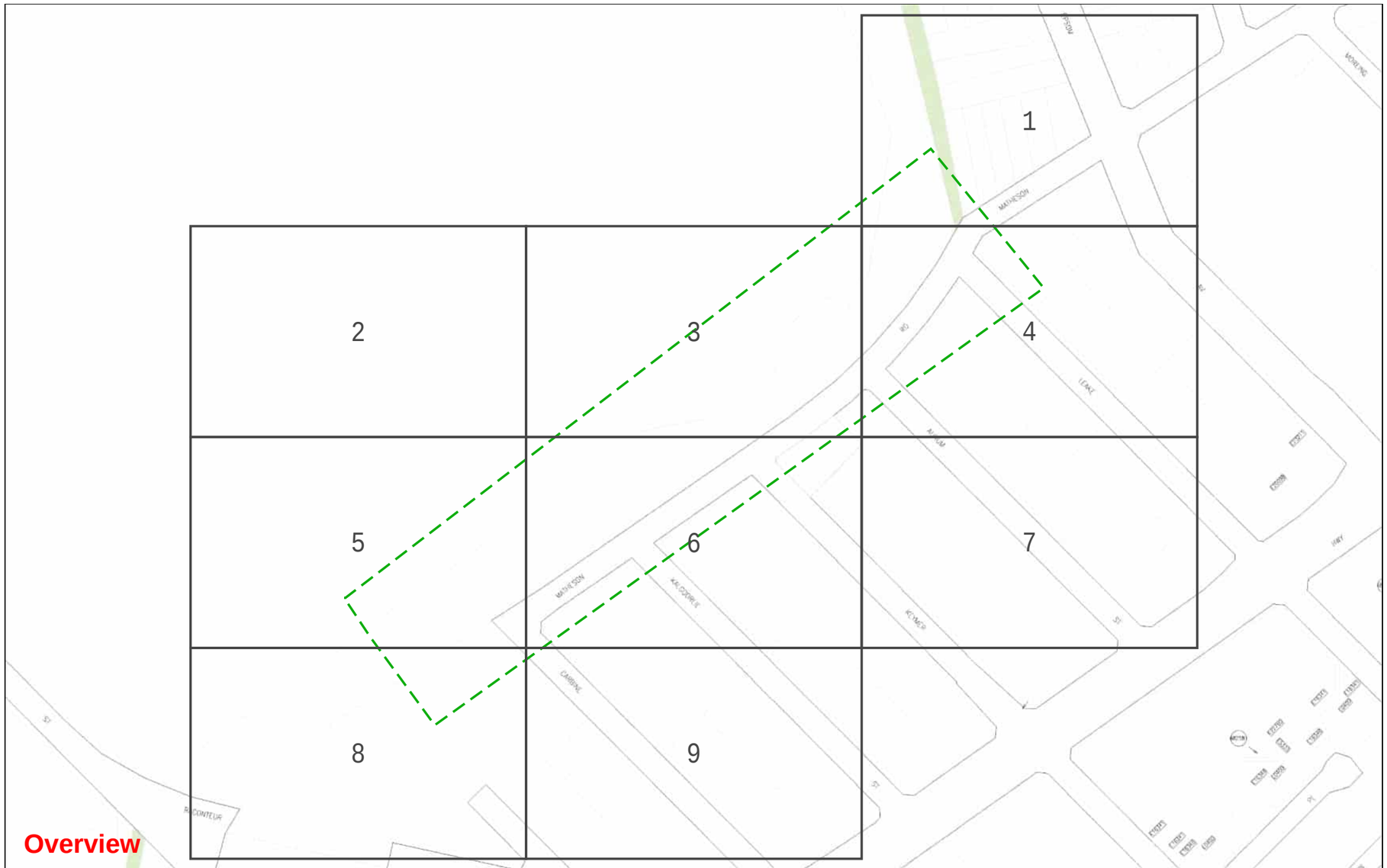
Attachment 12.1.4 Engineering Servicing Report



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Water Corp - Non-critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



WATER CORPORATION

Scale: 1:3075
Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024

Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

Apply for approval to work near our assets at:
Working near assets (watercorporation.com.au)

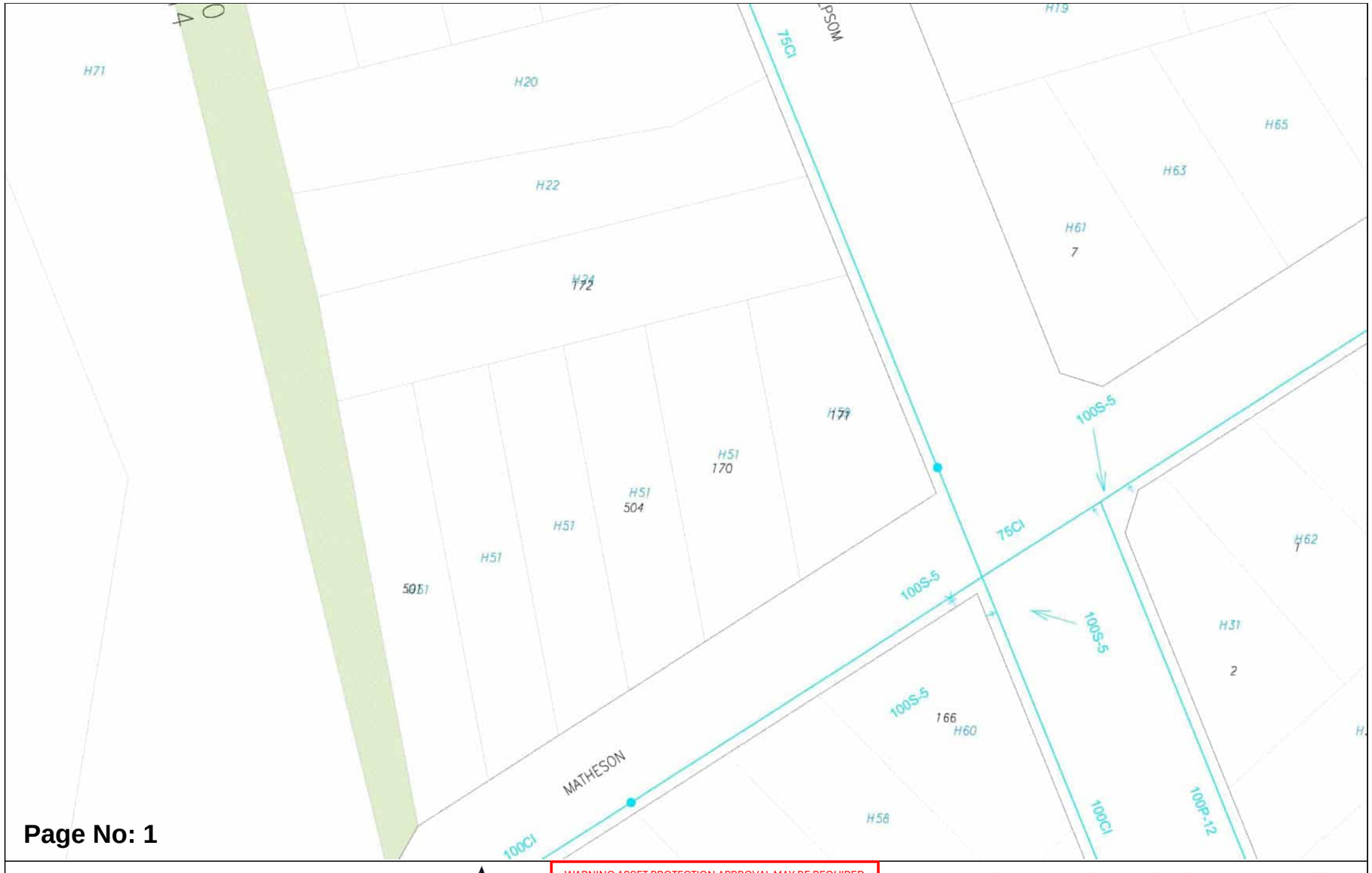
Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Page No: 1

WATER CORPORATION

Scale: 1:750
Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024

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Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

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Working near assets (watercorporation.com.au)

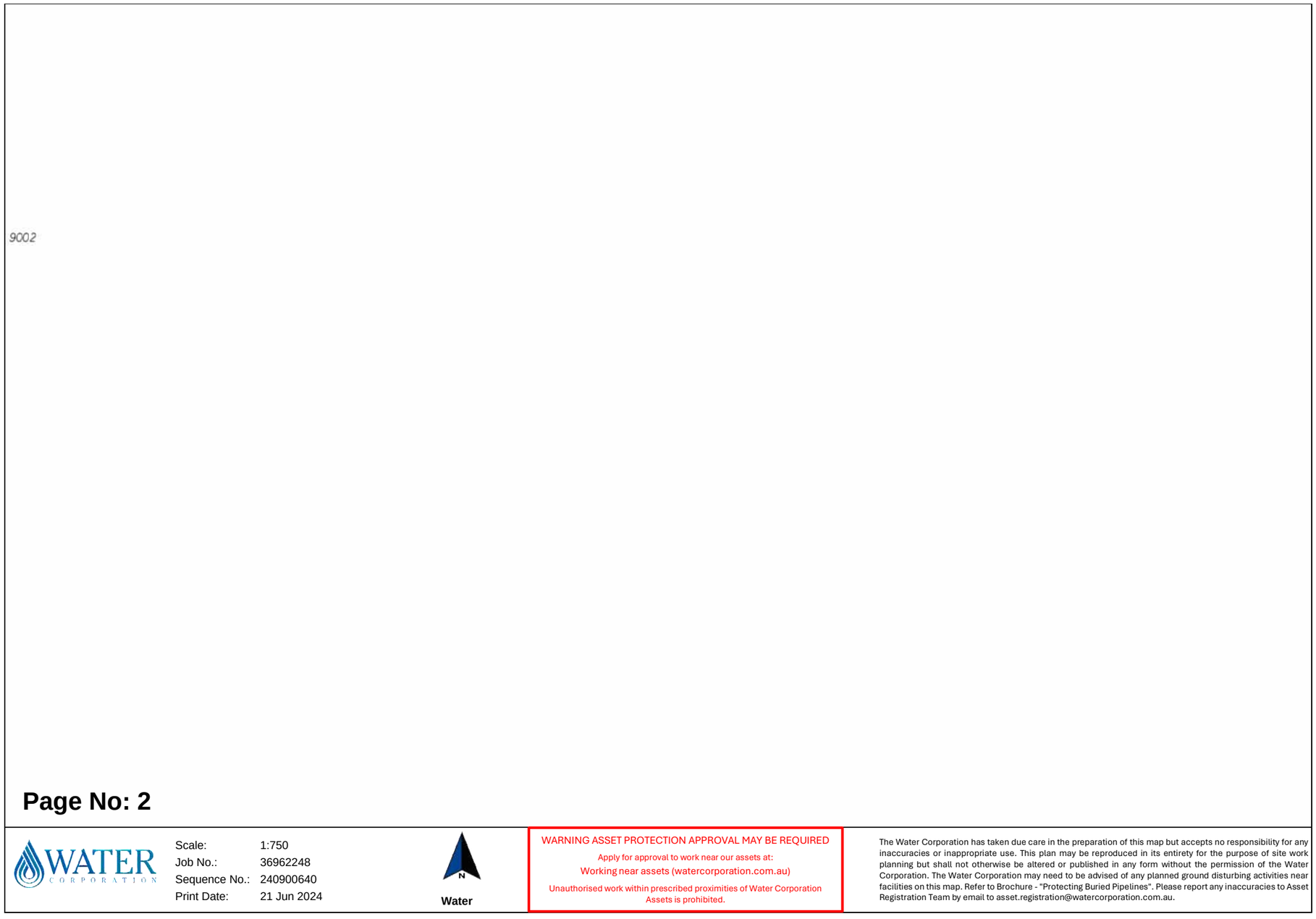
Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

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Plans generated 21 Jun 2024 by PelicanCorp TicketAccess Software | www.pelicancorp.com

Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Page No: 2

WATER CORPORATION

Scale: 1:750
Job No.: 36962248
Sequence No.: 240900640
Print Date: 21 Jun 2024

N

Water

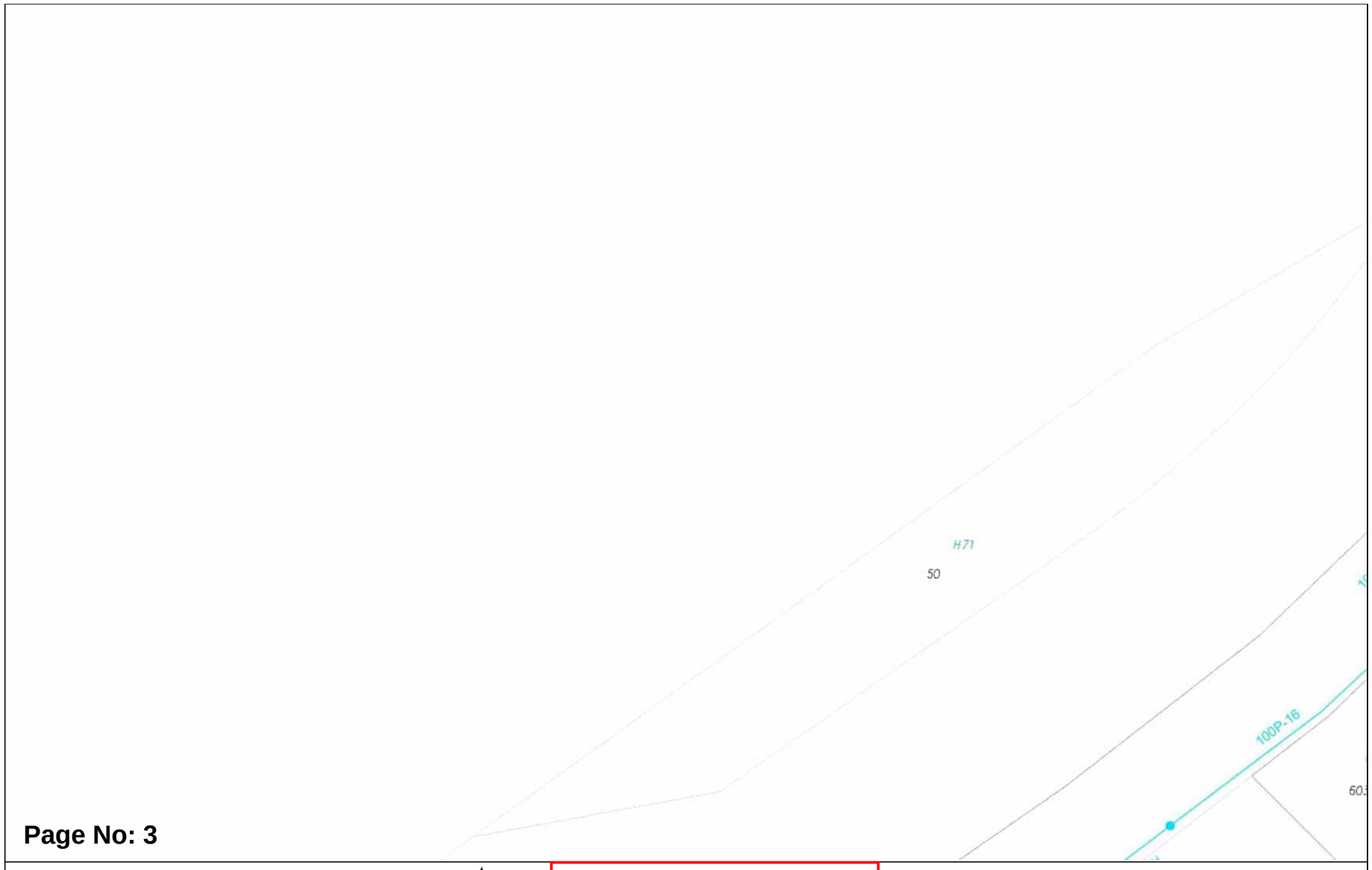
WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED
Apply for approval to work near our assets at:
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Page No: 3

Scale:	1:750	
Job No.:	36962248	
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Print Date:	21 Jun 2024	

Water

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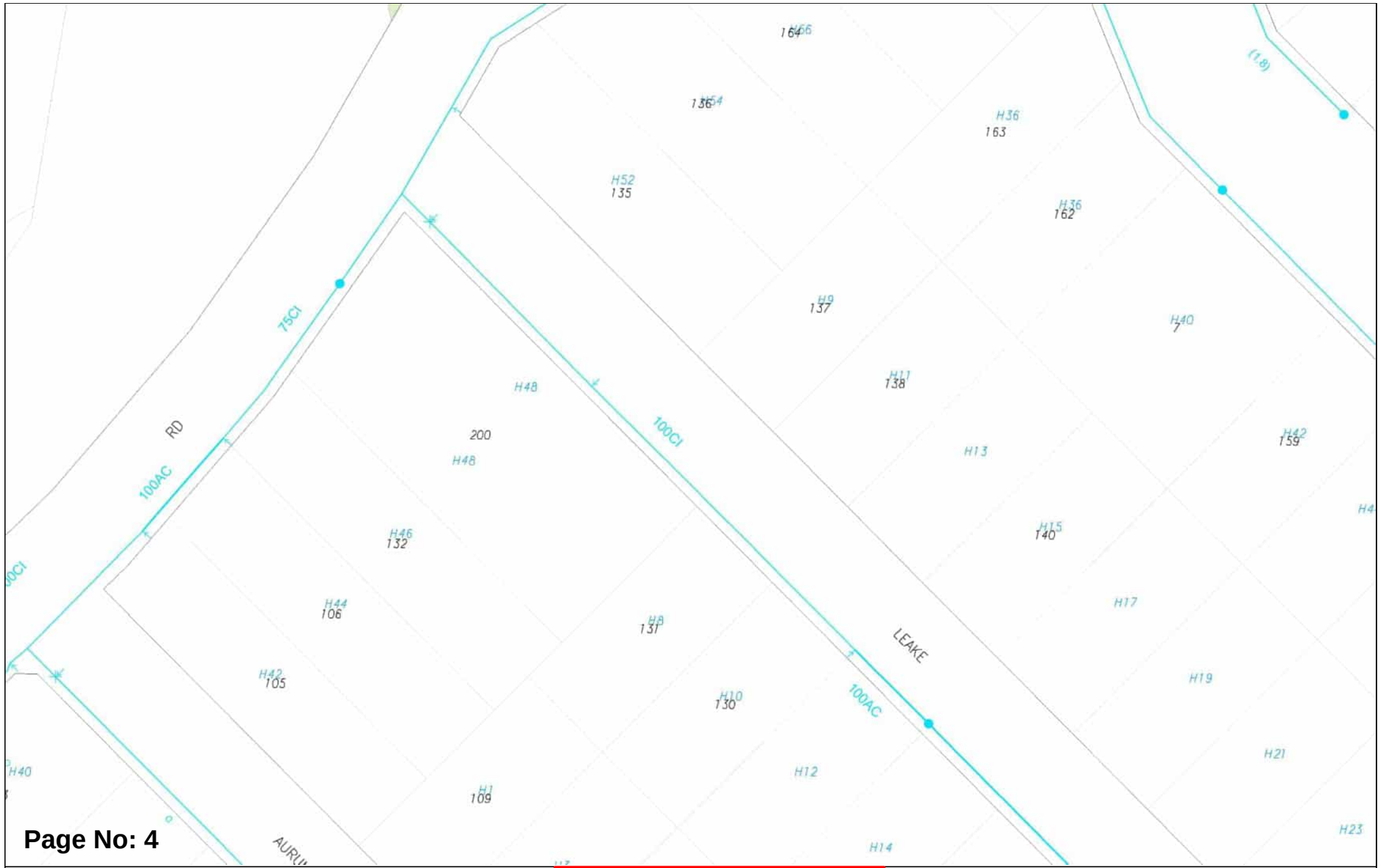
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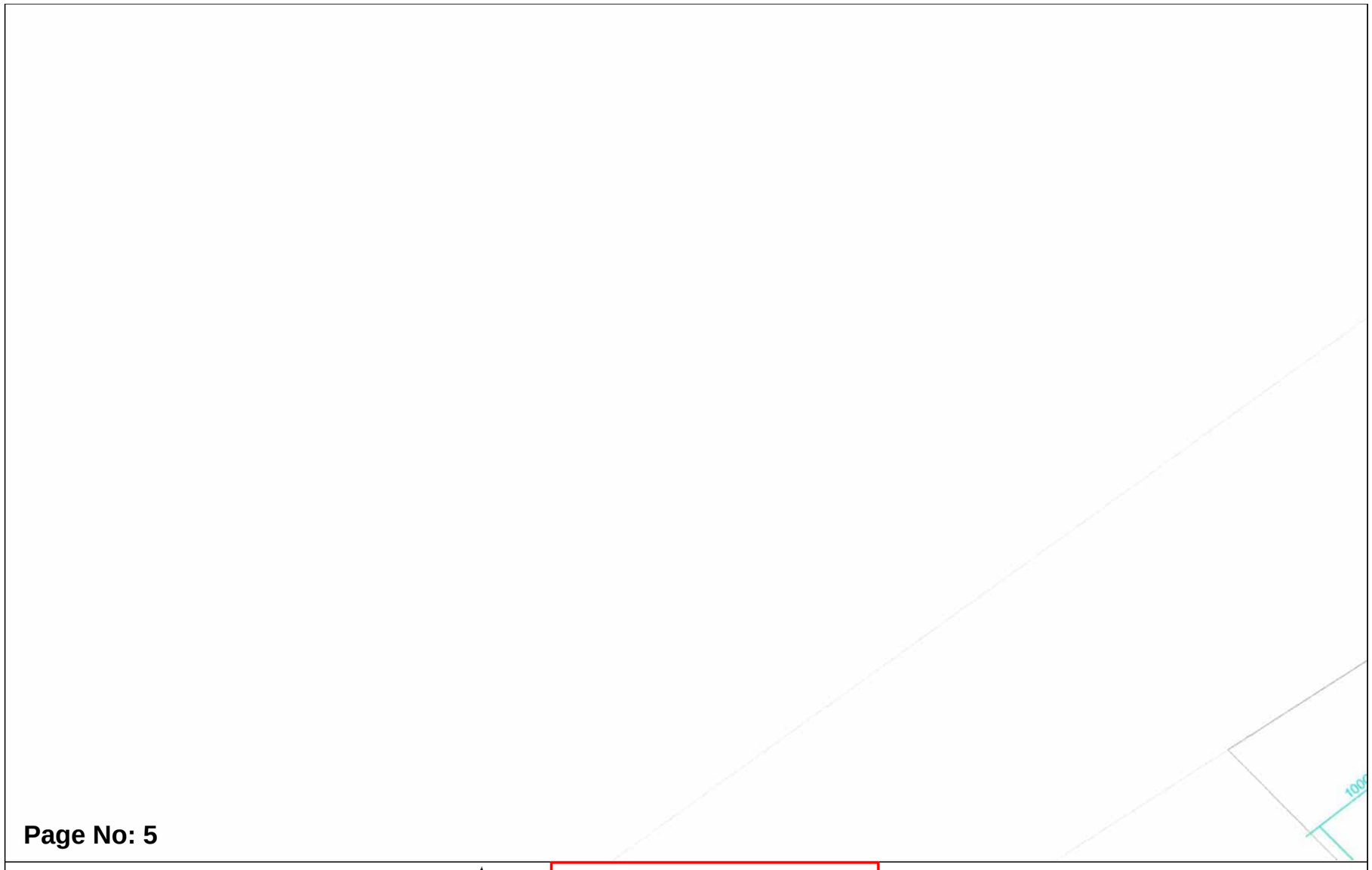
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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



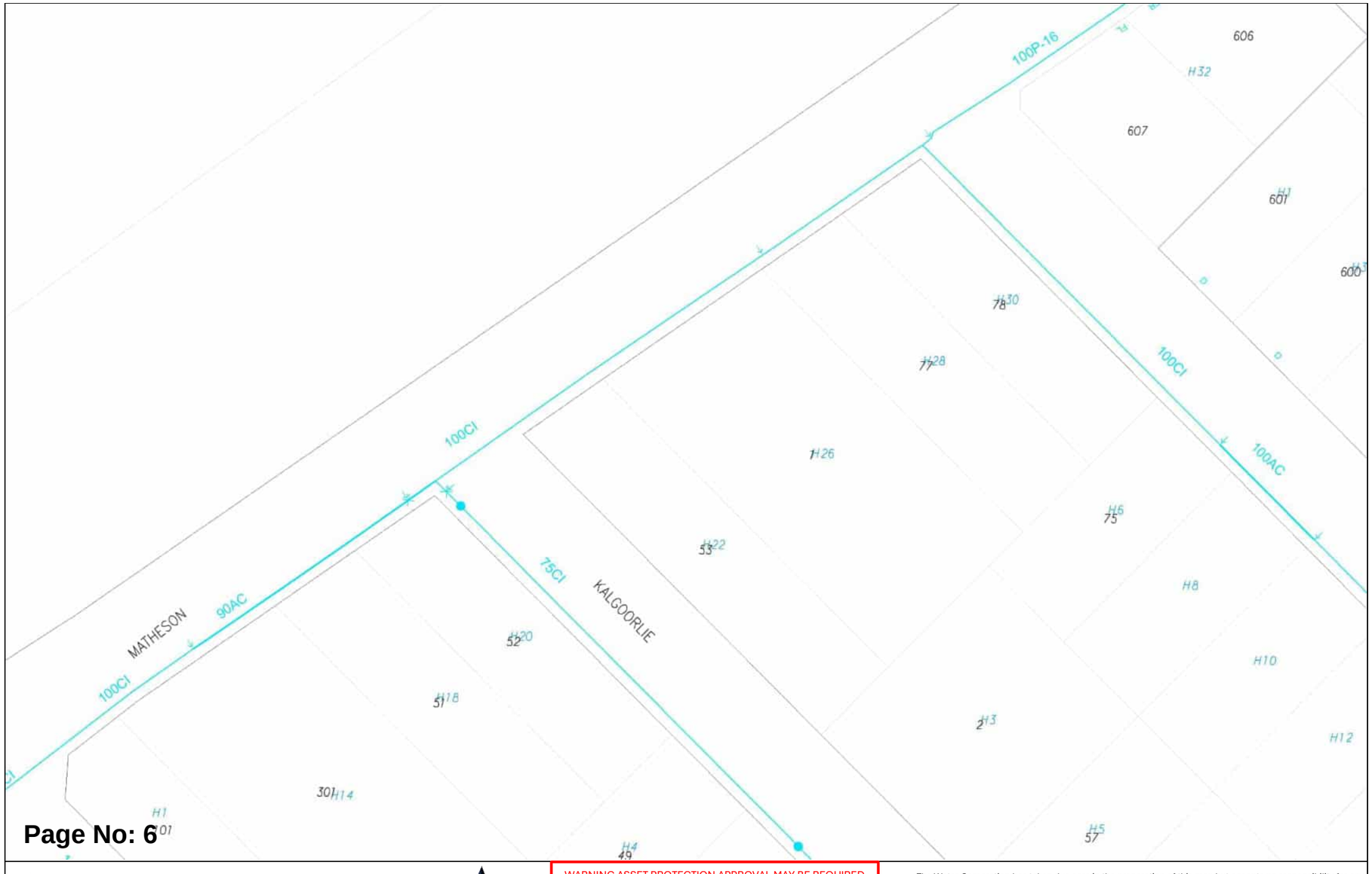
Page No: 5

WATER CORPORATION	Scale:	1:750	N	WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED Apply for approval to work near our assets at: Working near assets (watercorporation.com.au) Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.	The Water Corporation has taken due care in the preparation of this map but accepts no responsibility for any inaccuracies or inappropriate use. This plan may be reproduced in its entirety for the purpose of site work planning but shall not otherwise be altered or published in any form without the permission of the Water Corporation. The Water Corporation may need to be advised of any planned ground disturbing activities near facilities on this map. Refer to Brochure - "Protecting Buried Pipelines". Please report any inaccuracies to Asset Registration Team by email to asset.registration@watercorporation.com.au.
	Job No.:	36962248			
	Sequence No.:	240900640			
	Print Date:	21 Jun 2024	Water		

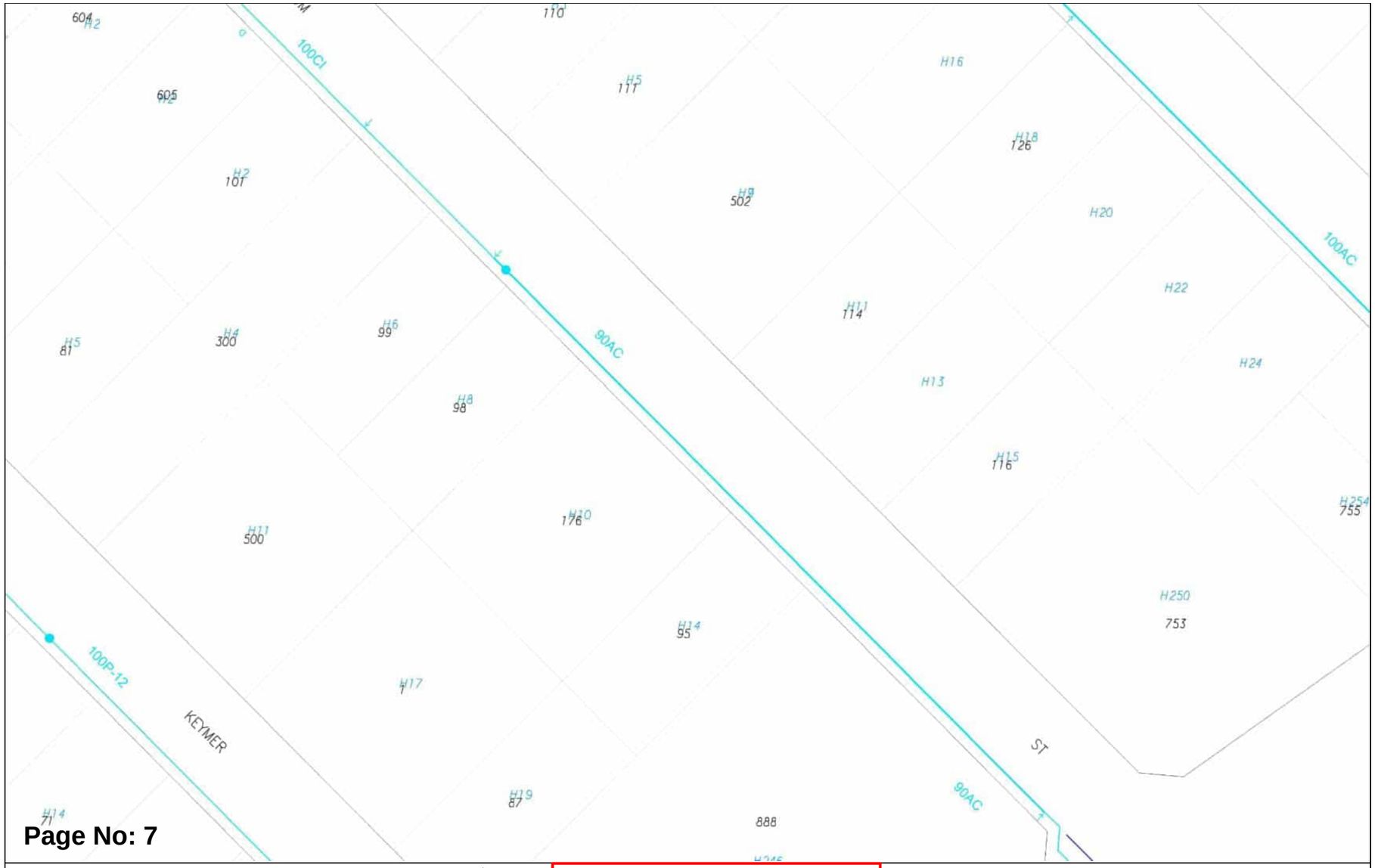
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Water Corp - Critical Plan.docx (21 May 2024)

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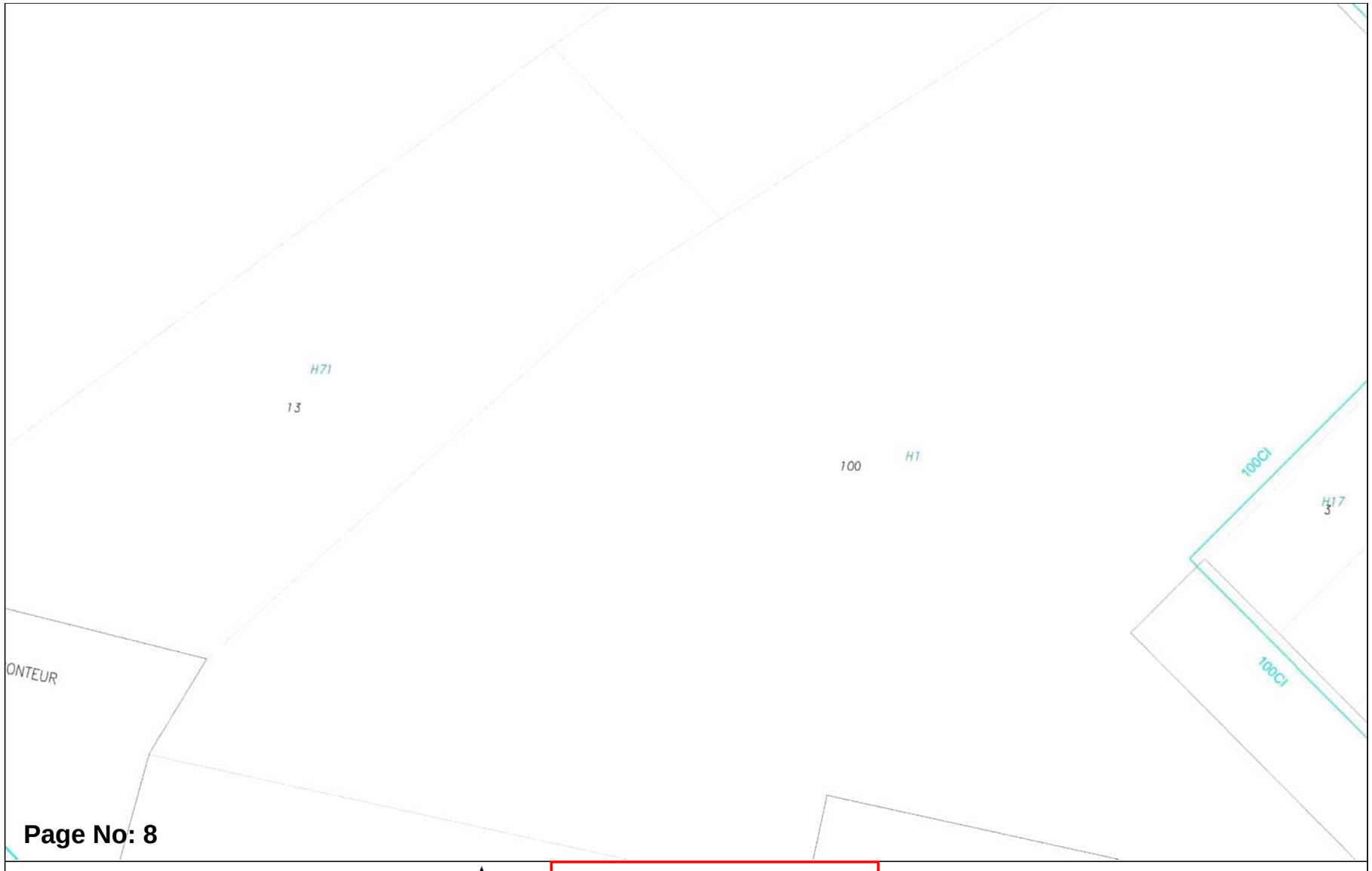
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WATER CORPORATION	Scale: 1:750 Job No.: 36962248 Sequence No.: 240900640 Print Date: 21 Jun 2024	N Water	WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED Apply for approval to work near our assets at: Working near assets (watercorporation.com.au) Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.	The Water Corporation has taken due care in the preparation of this map but accepts no responsibility for any inaccuracies or inappropriate use. This plan may be reproduced in its entirety for the purpose of site work planning but shall not otherwise be altered or published in any form without the permission of the Water Corporation. The Water Corporation may need to be advised of any planned ground disturbing activities near facilities on this map. Refer to Brochure - "Protecting Buried Pipelines". Please report any inaccuracies to Asset Registration Team by email to asset.registration@watercorporation.com.au.

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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Page No: 8

WATER CORPORATION

Scale:	1:750
Job No.:	36962248
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Print Date:	21 Jun 2024

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Water

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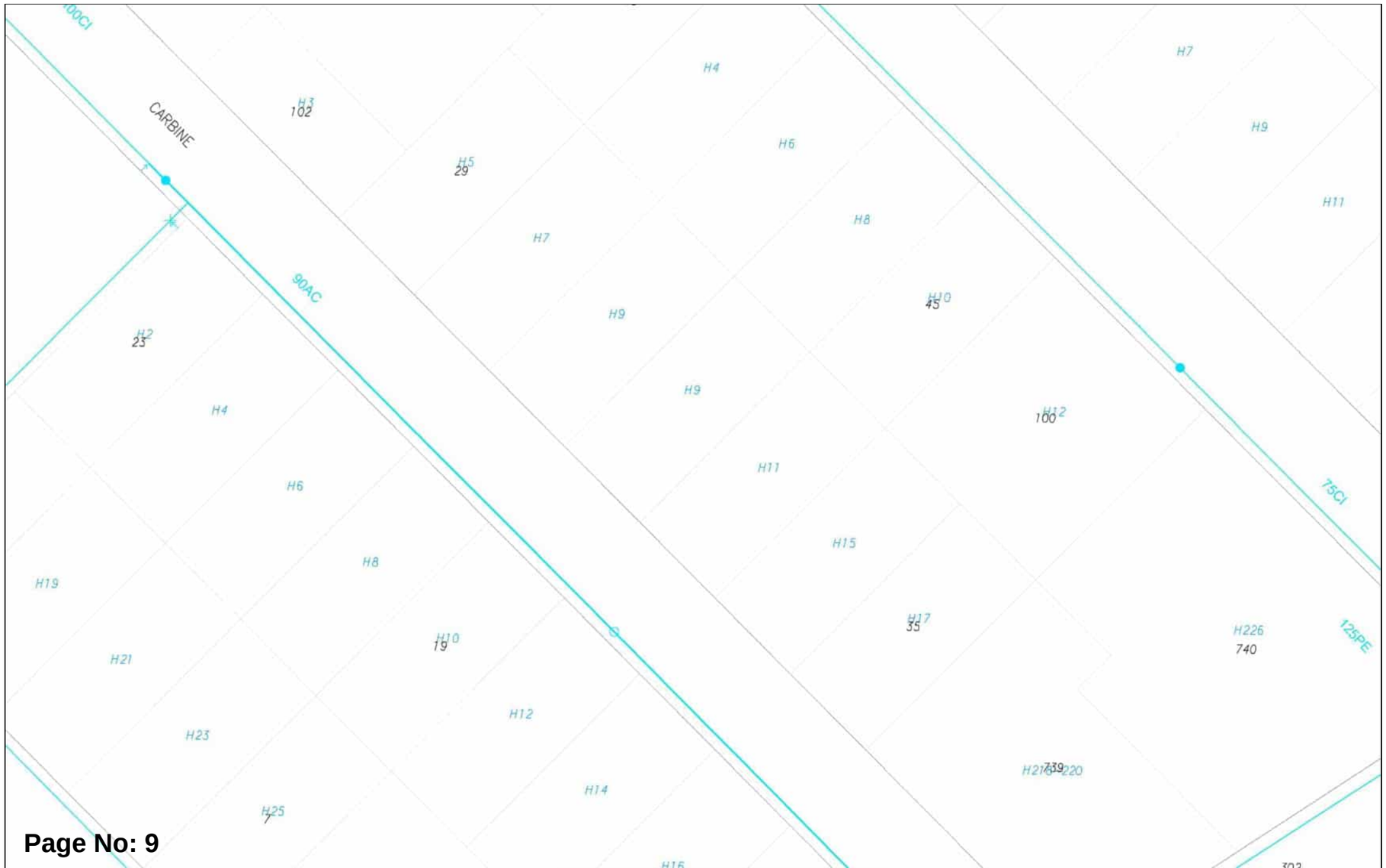
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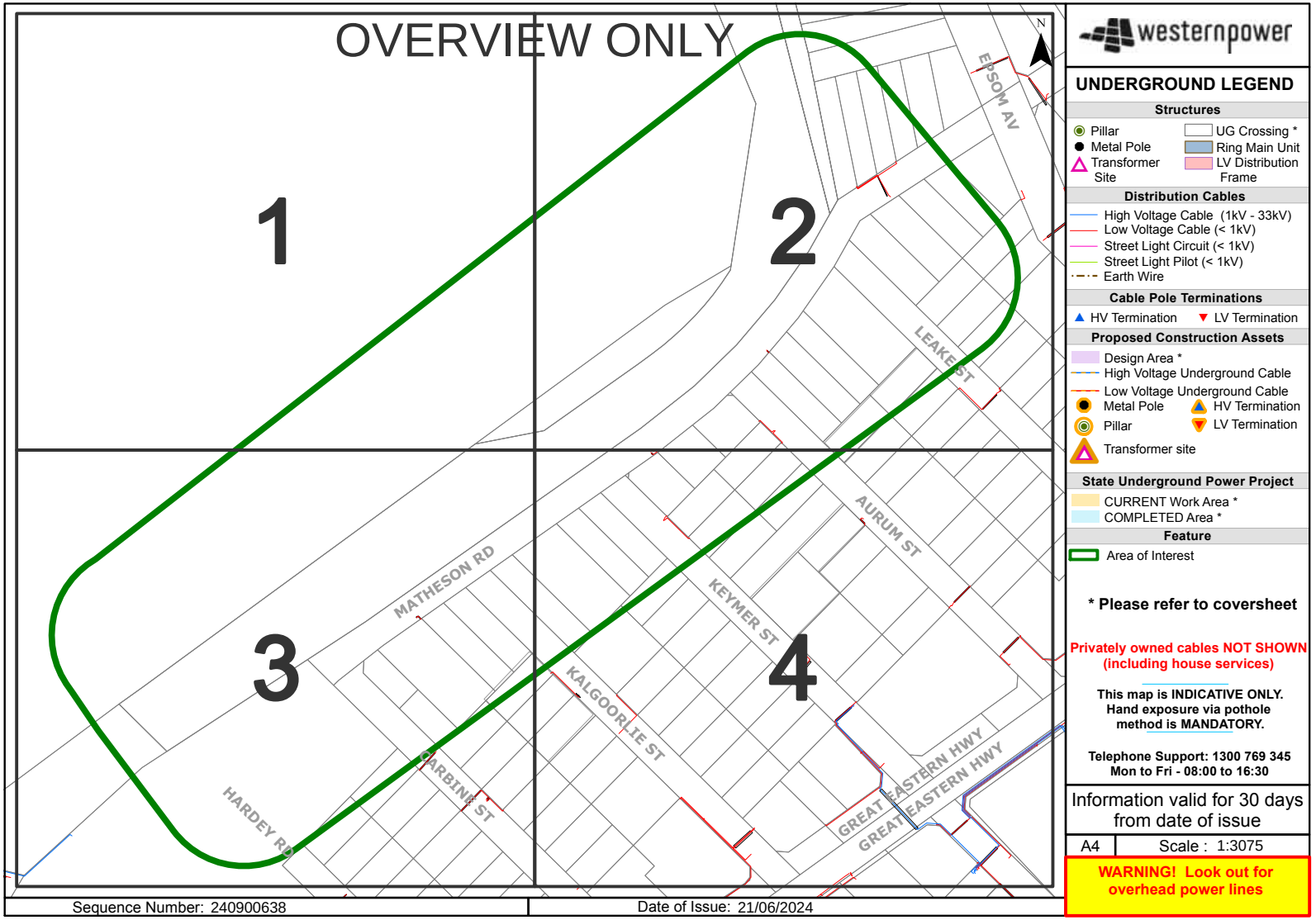
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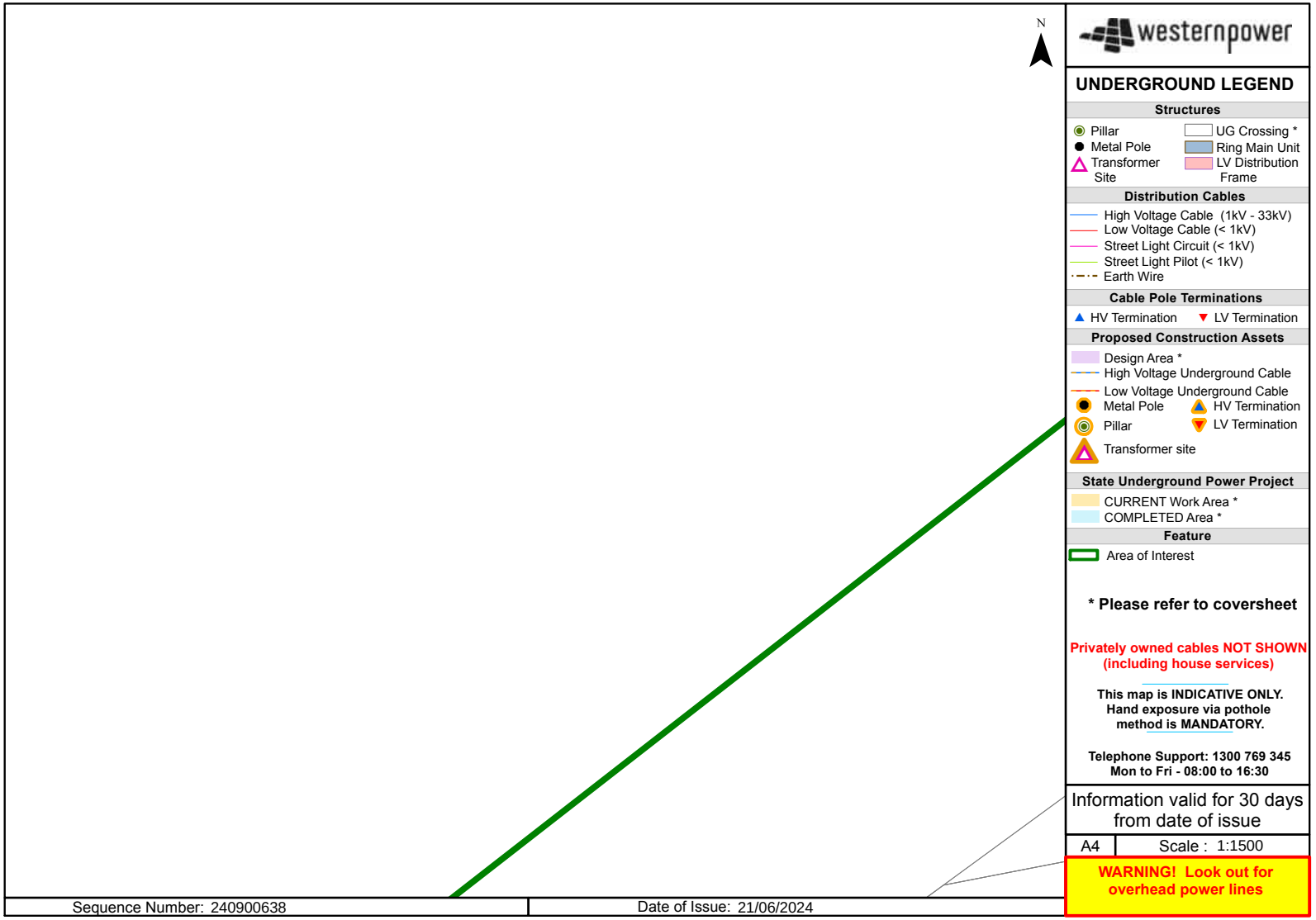
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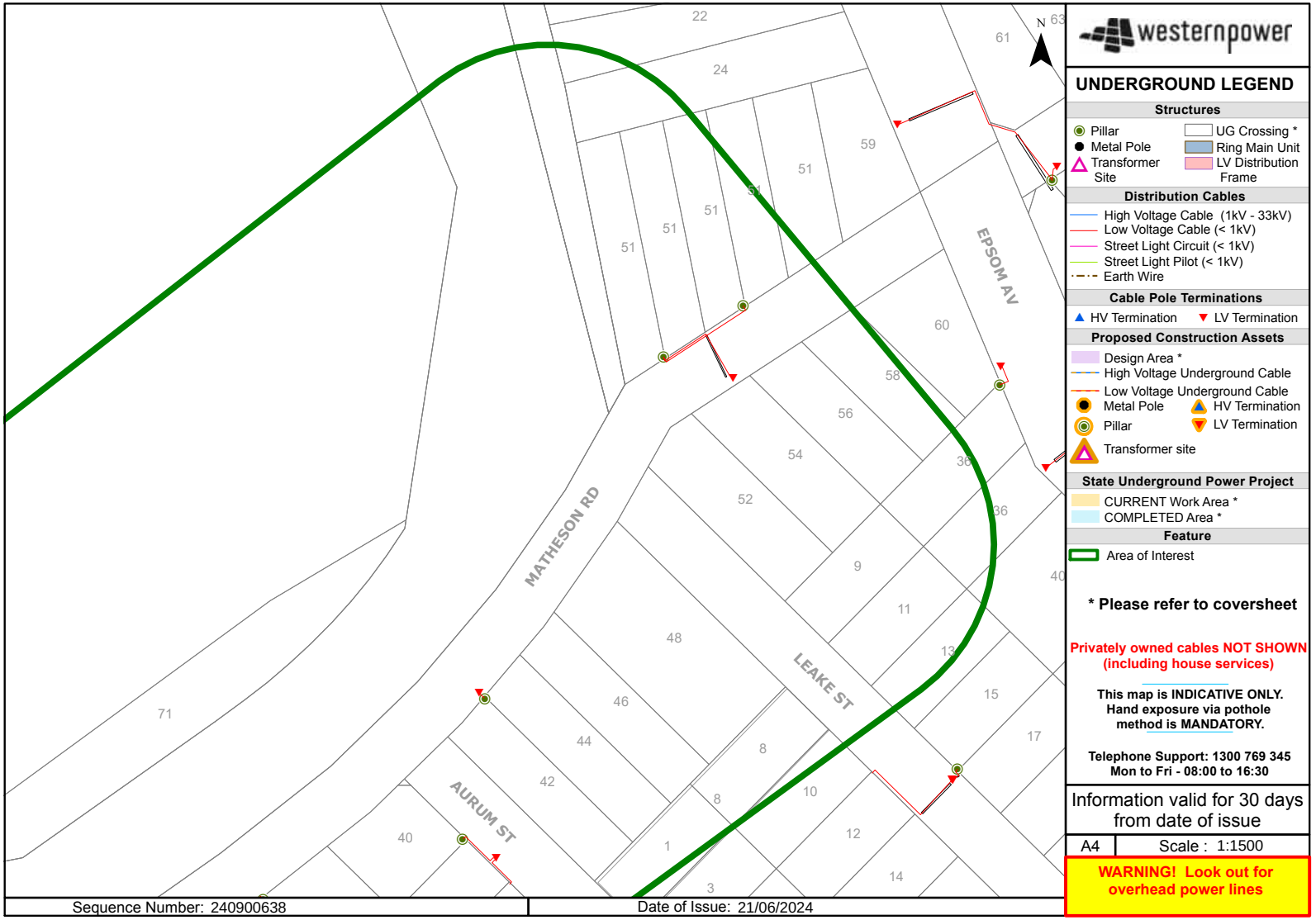
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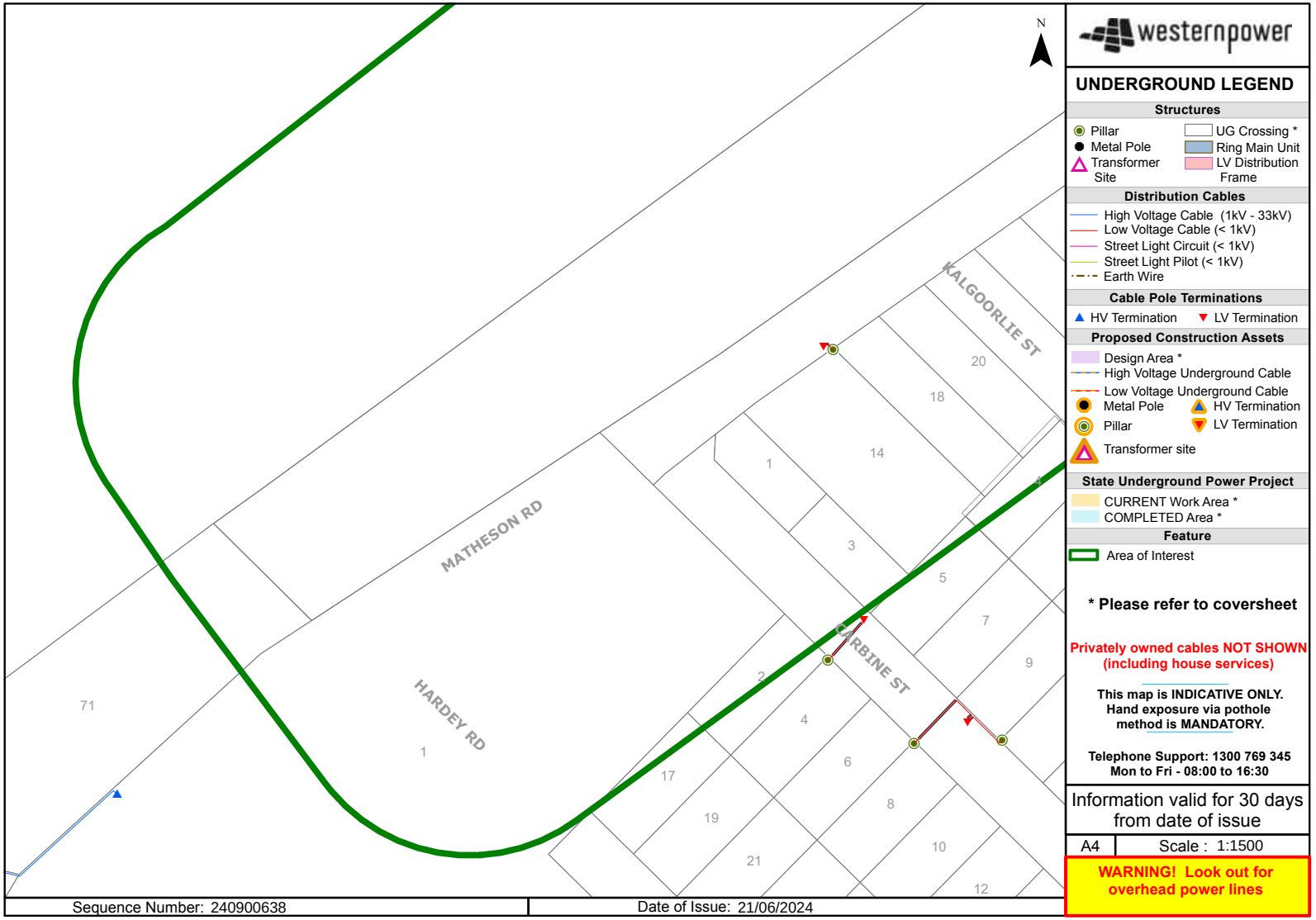
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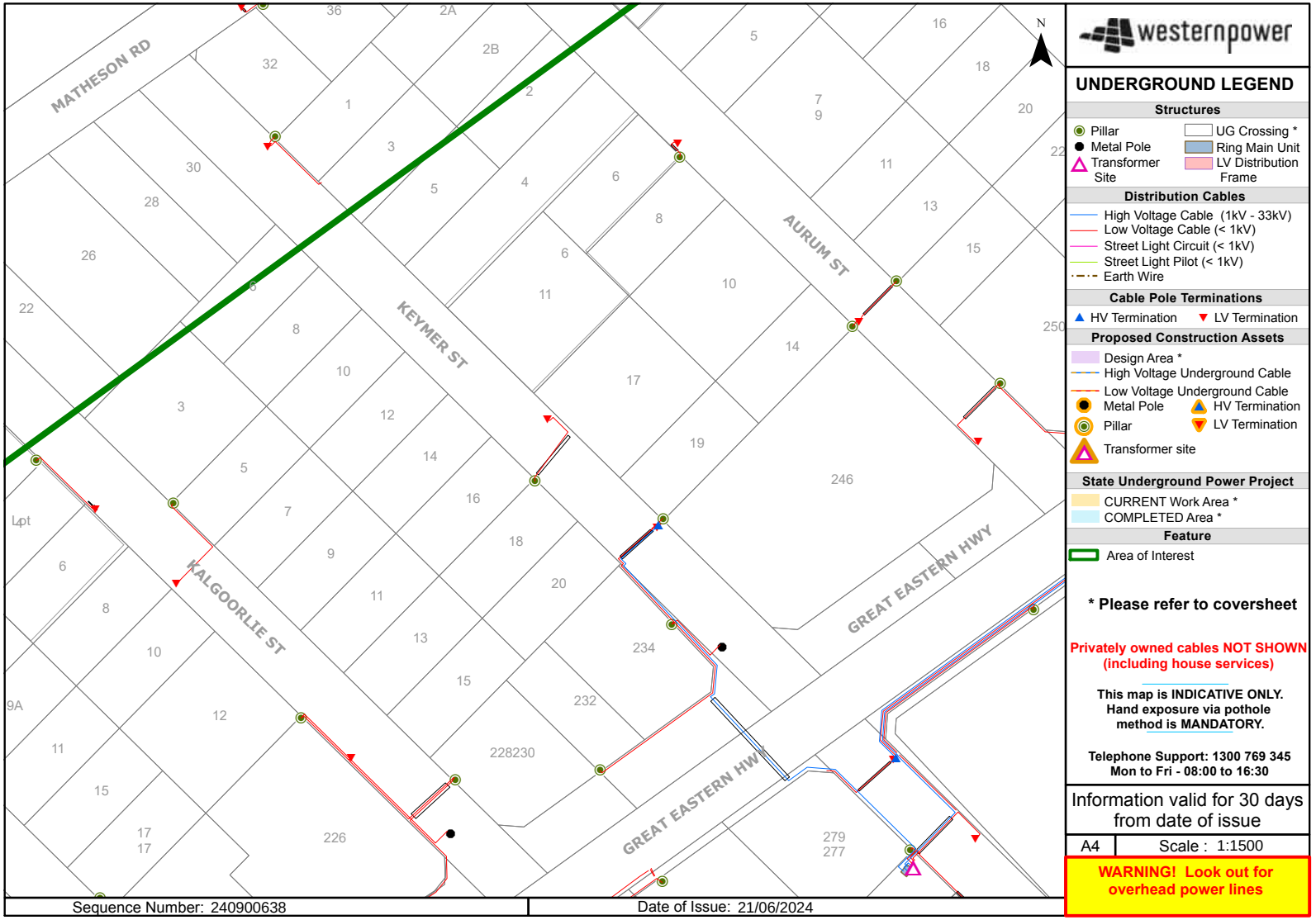
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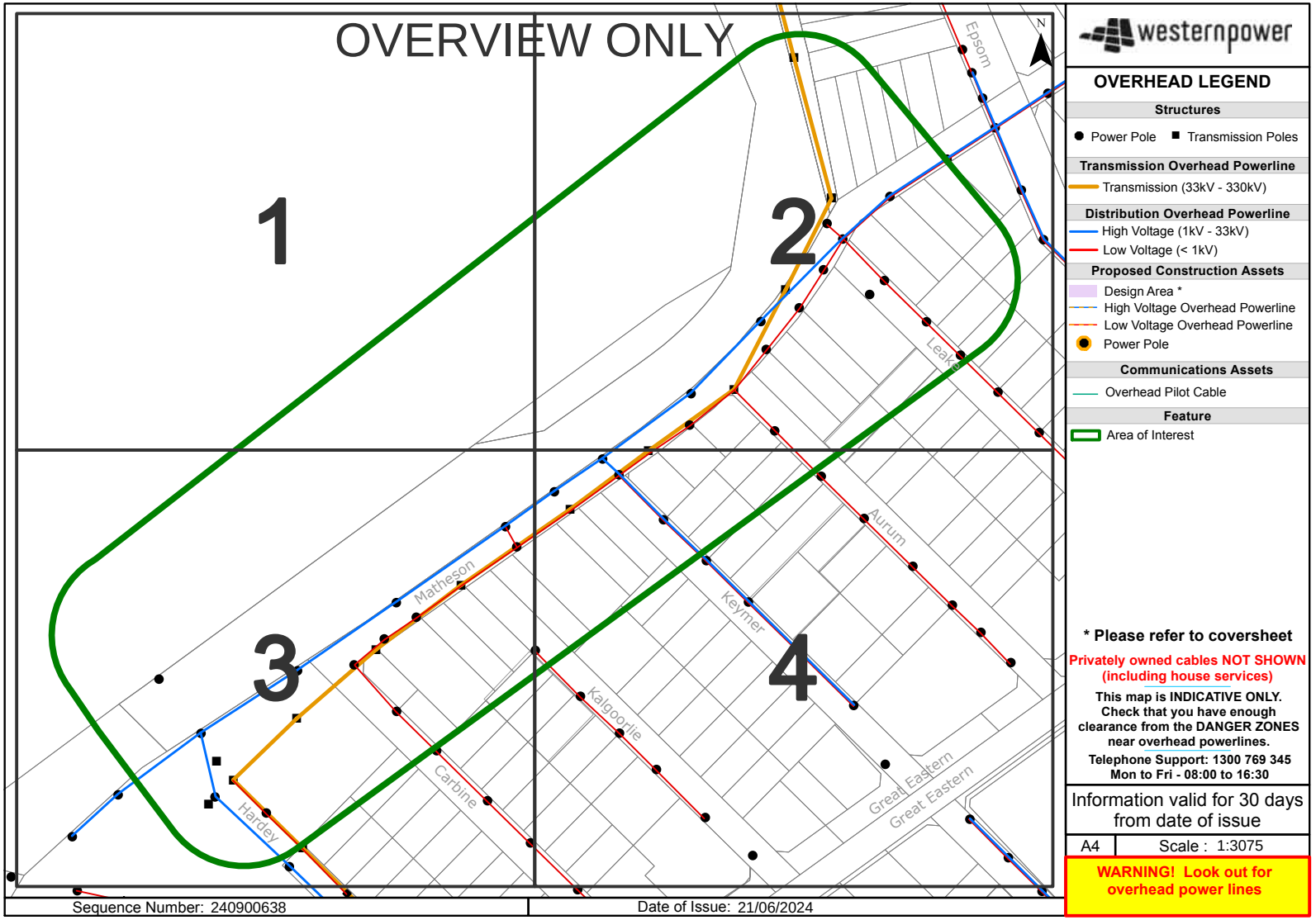
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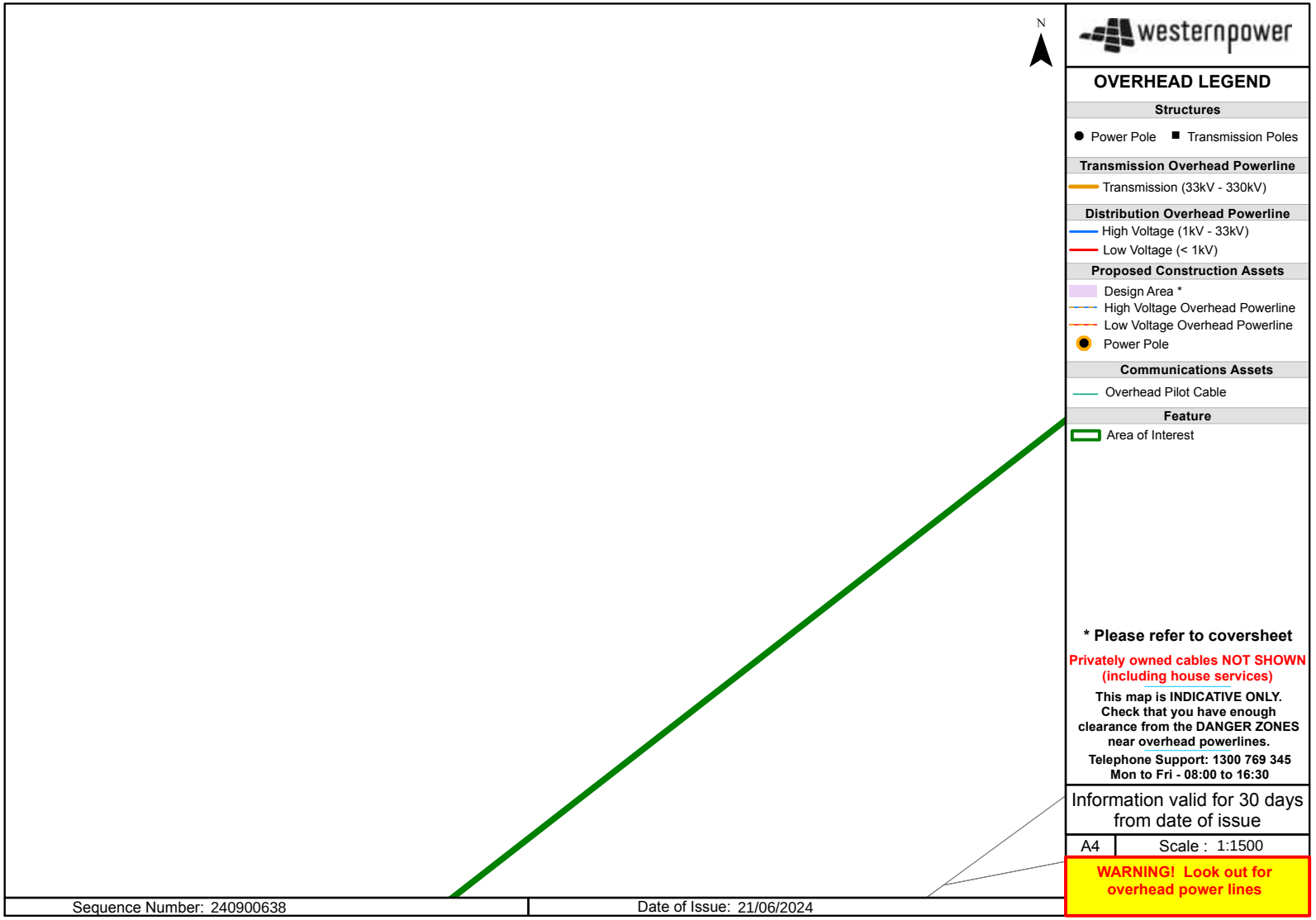
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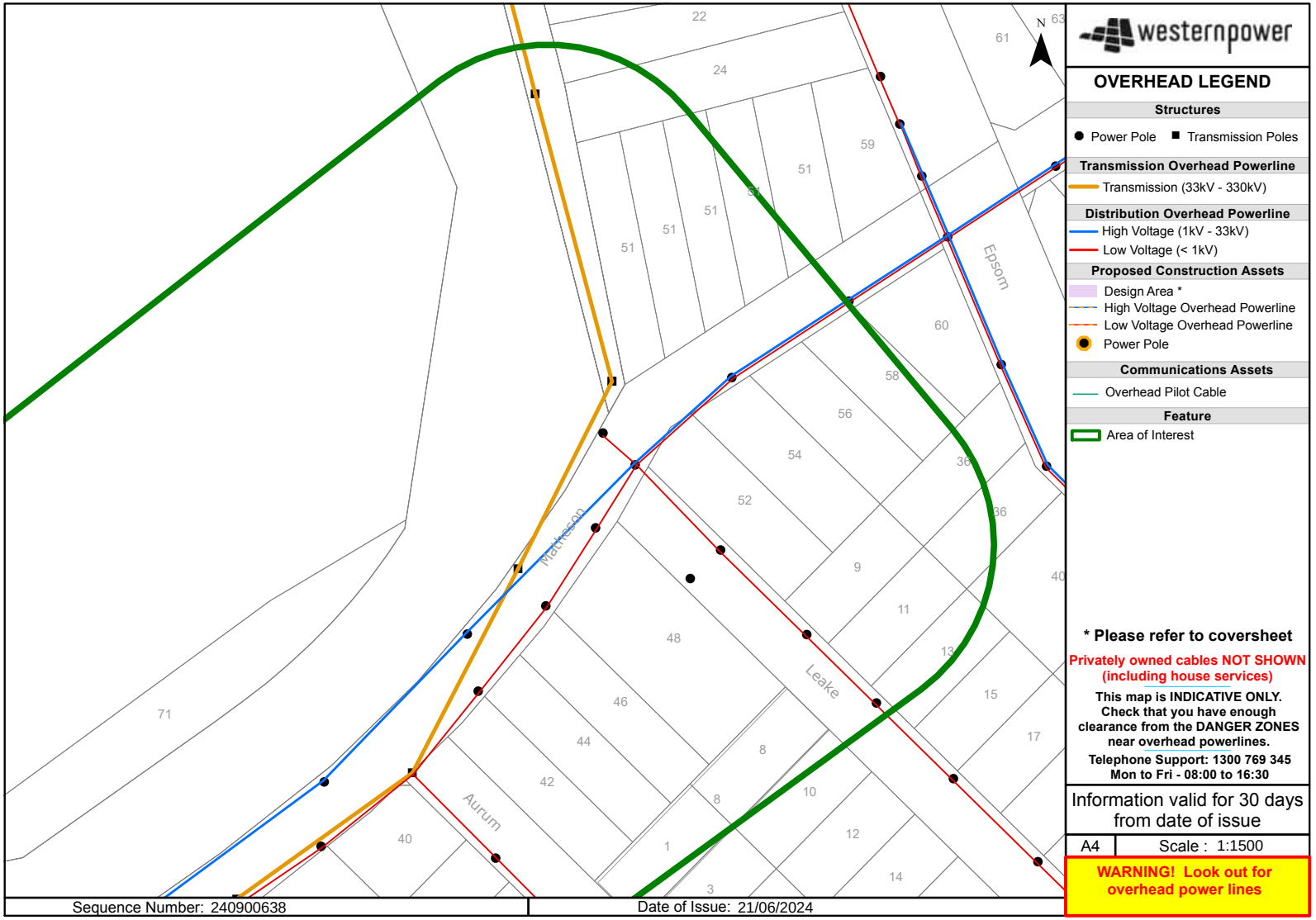
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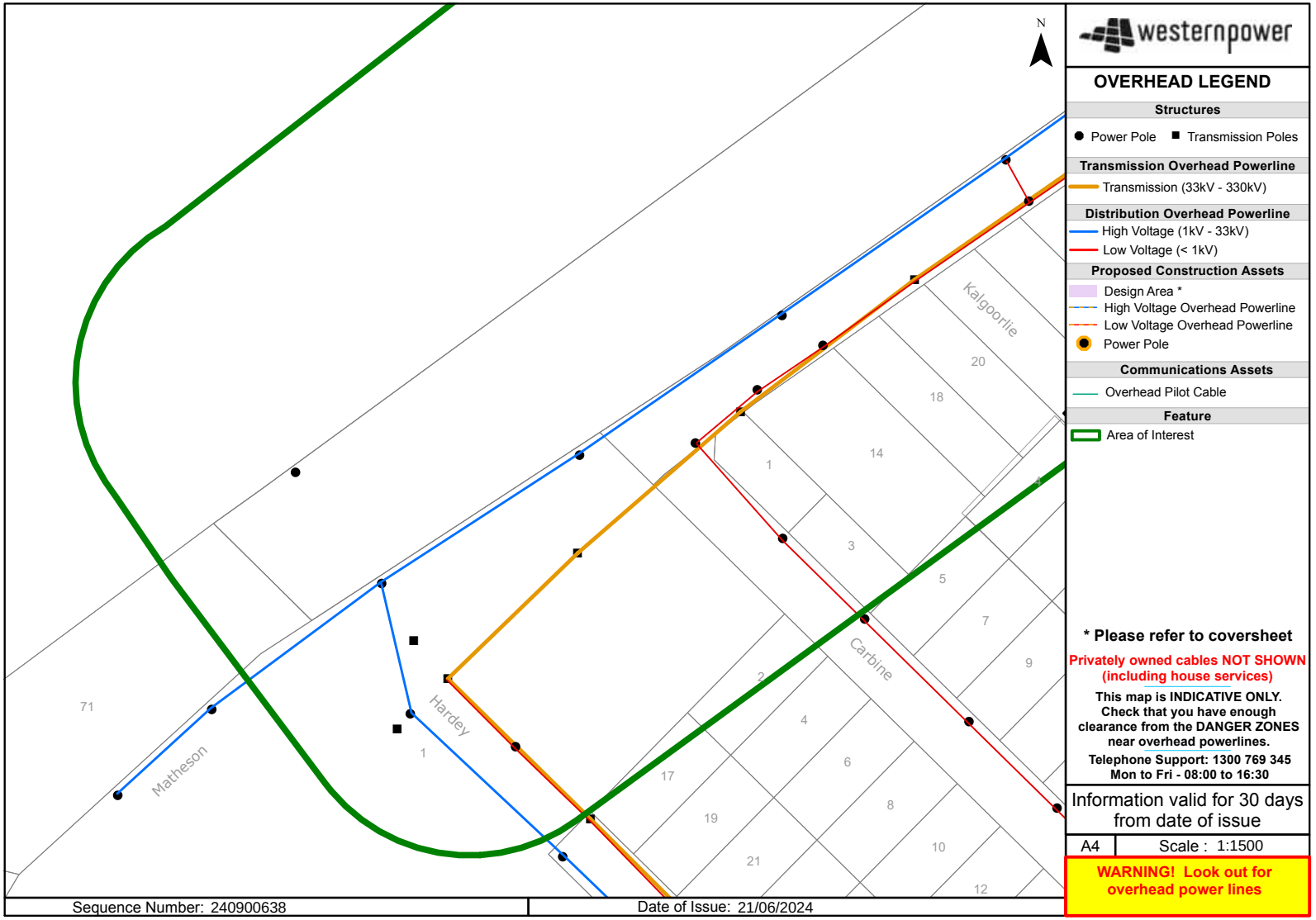
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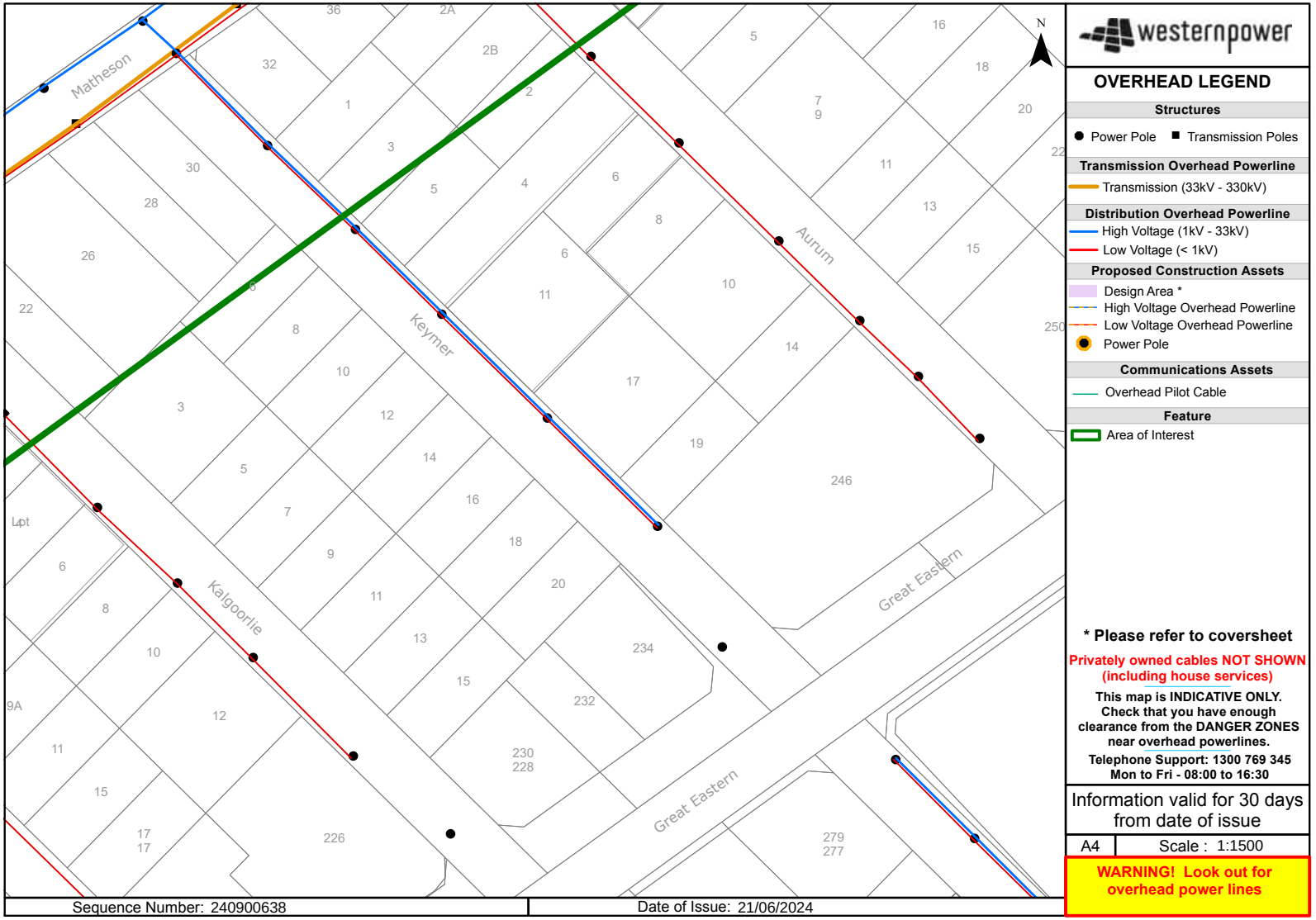
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Attachment 12.1.4 Engineering Servicing Report

Job No 36968397

BEFORE YOU DIG www.byda.com.au

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
24/06/2024	25/06/2024	25/06/2024	Private	Design	Both Road	Planning & Design



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference
Precinct B

Address
39 Northerly Avenue
Ascot WA 6104

Notes/description
-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

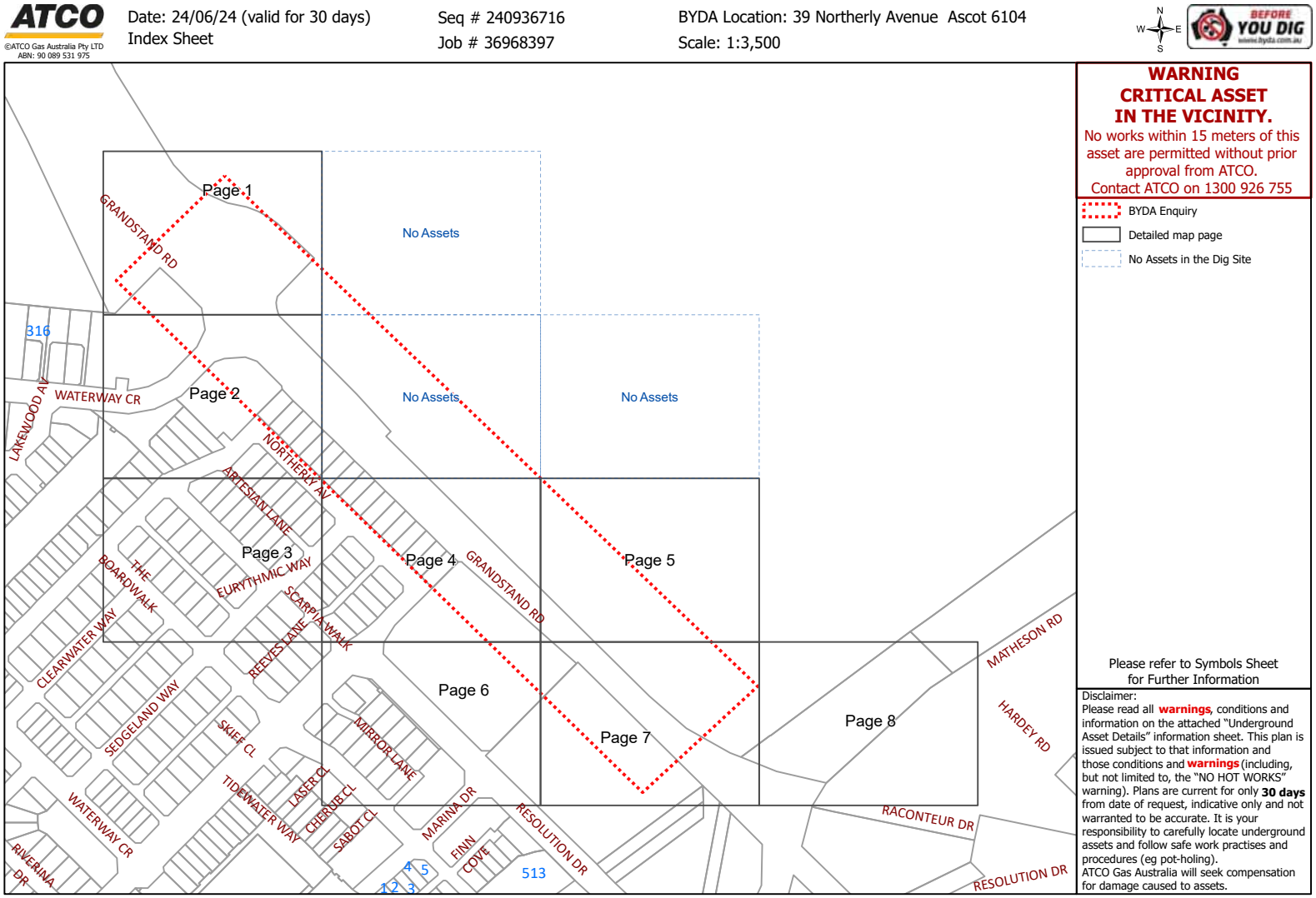
Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240936716	ATCO Gas Australia	1300 926 755	NOTIFIED
240936712	NBN Co (WA)	1800 687 626	NOTIFIED
240936708	Optus (WA)	1800 505 777	NOTIFIED
240936709	Public Transport Authority - Bus Stops	13 62 13	NOTIFIED
240936714	Telstra (WA)	1800 653 935	NOTIFIED
240936711	TPG Telecom (WA)	1800 786 306	NOTIFIED
240936710	Vocus (WA)	1800 262 663	NOTIFIED
240936715	Water Corporation	13 13 95	NOTIFIED
240936713	Western Power	13 10 87	NOTIFIED

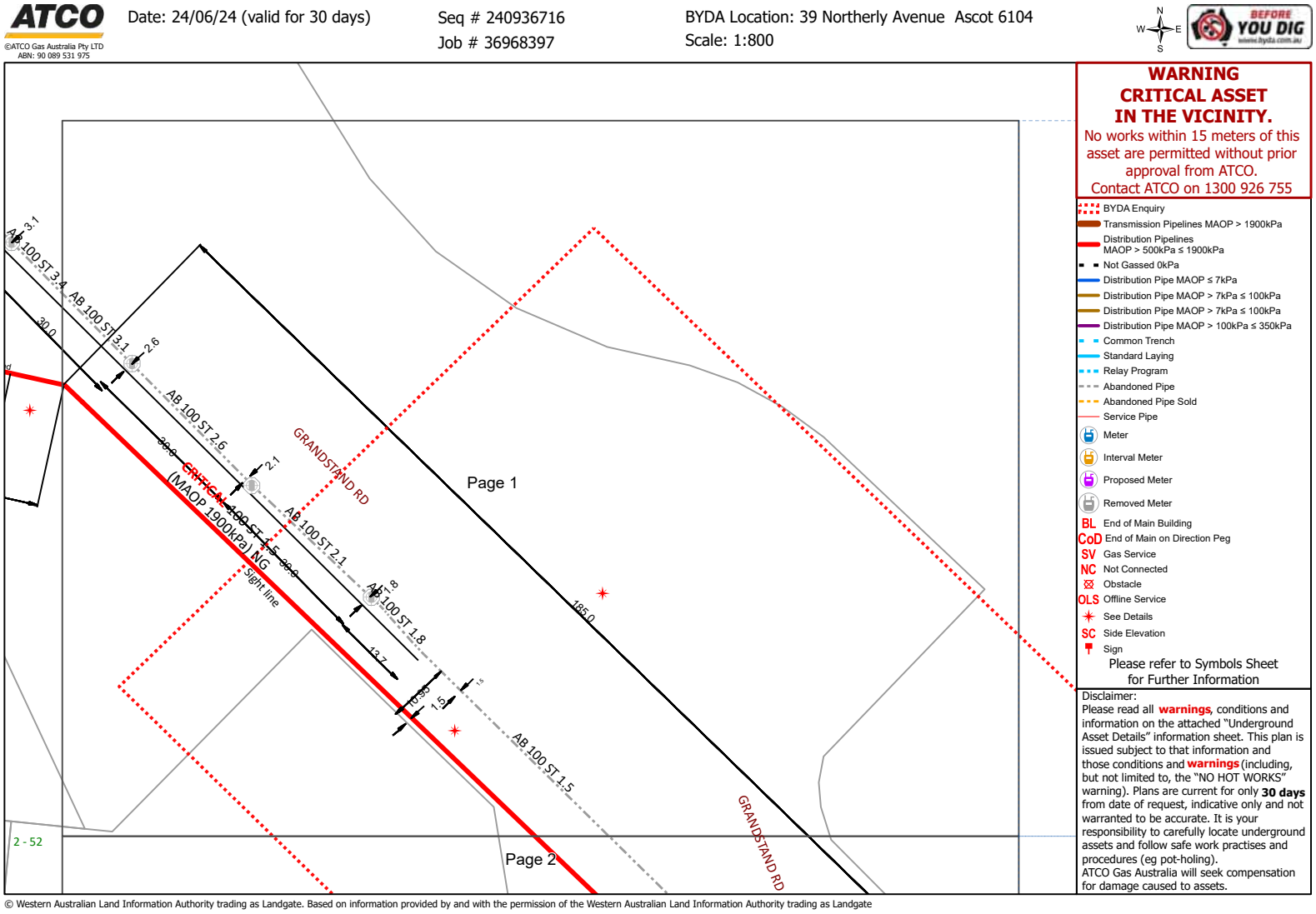
END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

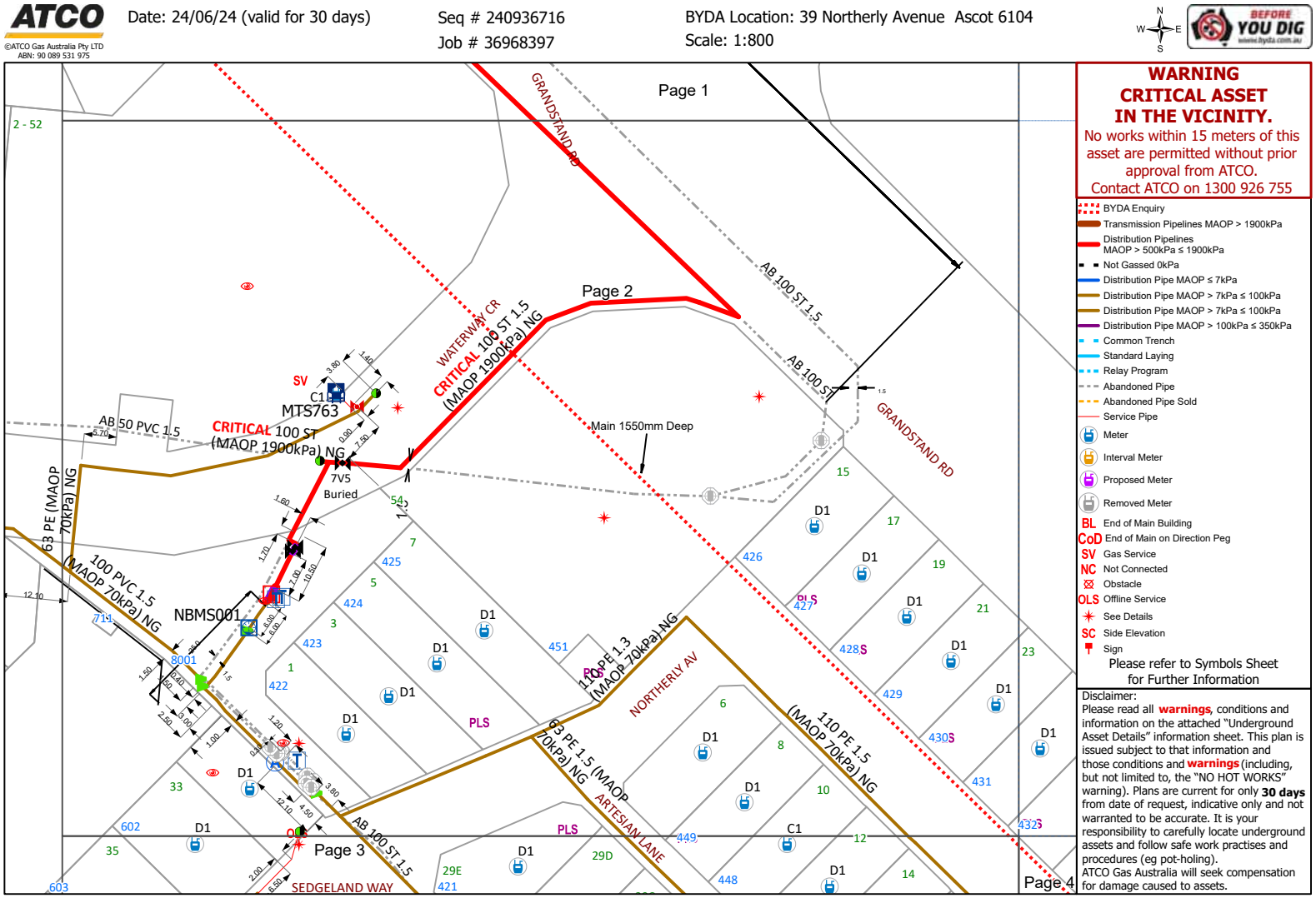
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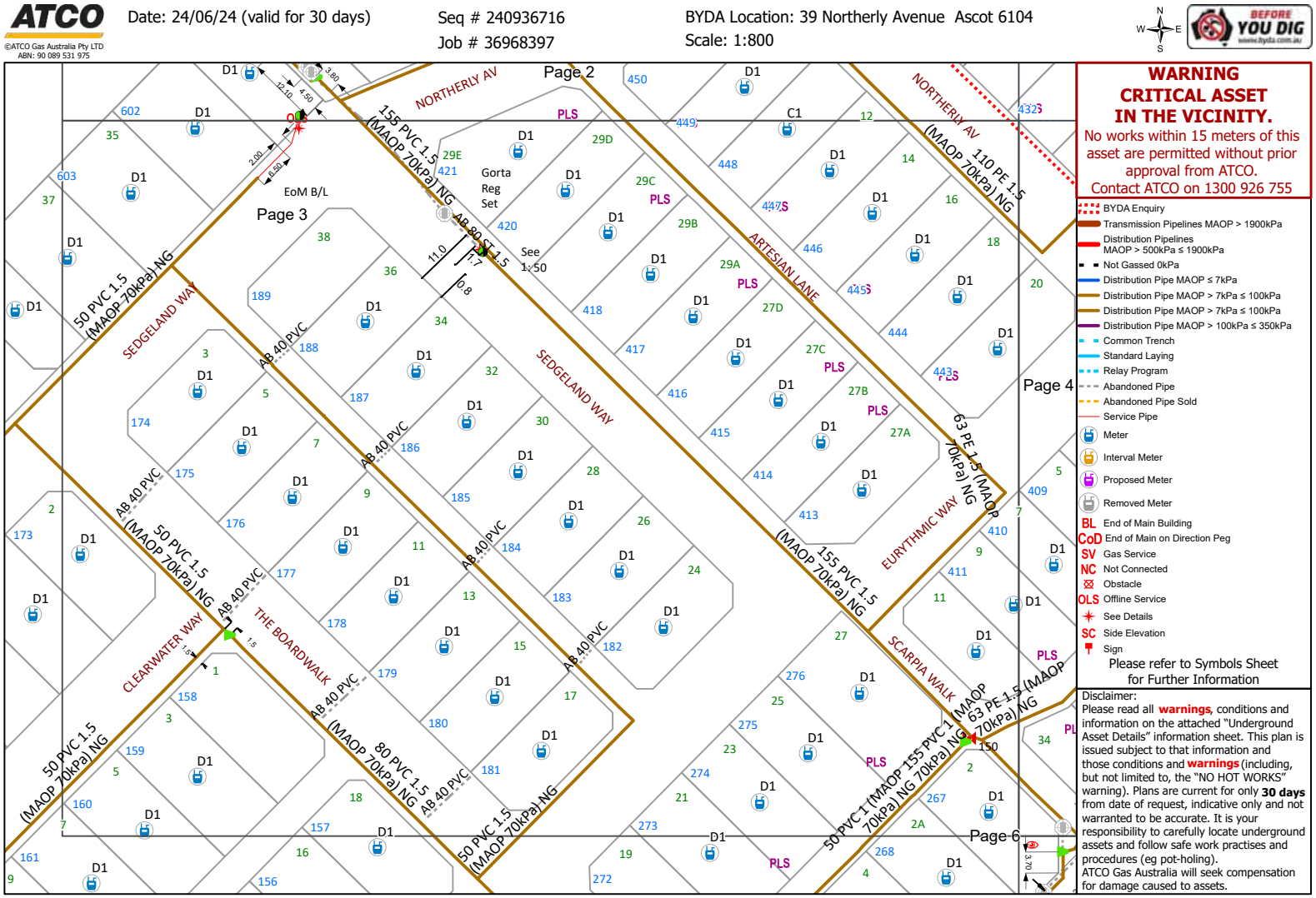


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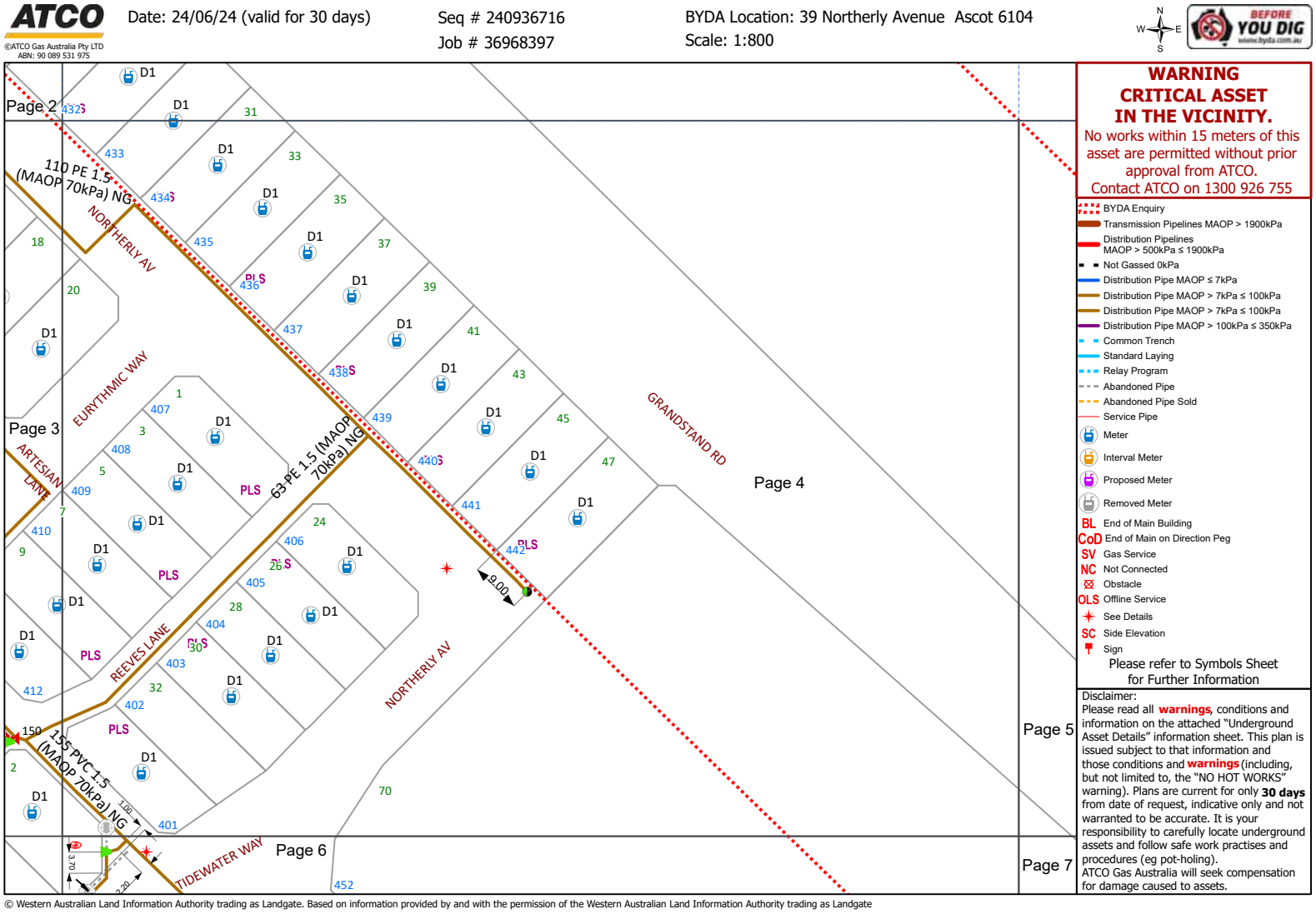
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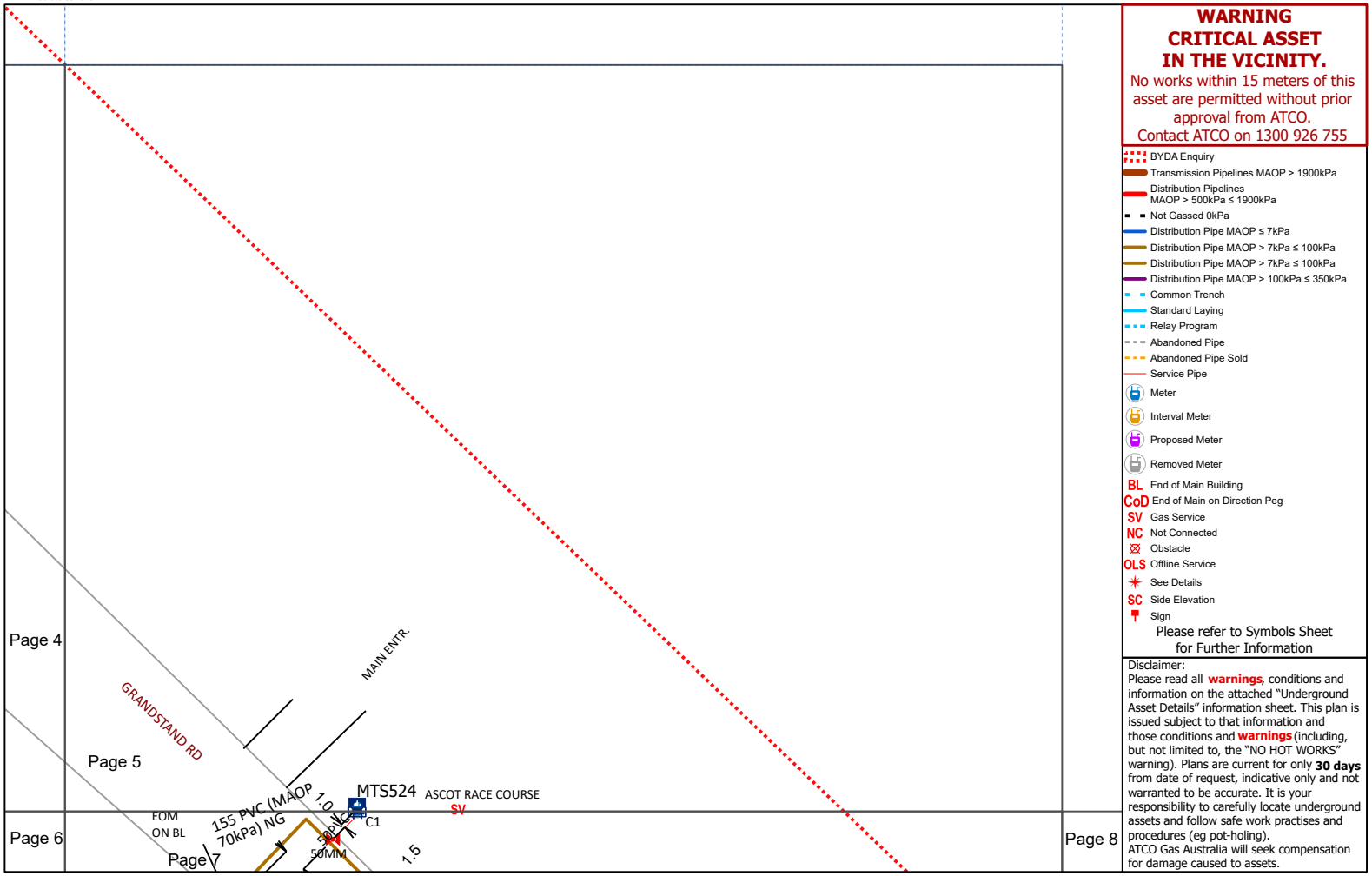
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ATCO
©ATCO Gas Australia Pty LTD
ABN: 90 089 531 975

Date: 24/06/24 (valid for 30 days)

Seq # 240936716
Job # 36968397

BYDA Location: 39 Northerly Avenue Ascot 6104
Scale: 1:800



WARNING
CRITICAL ASSET
IN THE VICINITY.
No works within 15 meters of this asset are permitted without prior approval from ATCO.
Contact ATCO on 1300 926 755

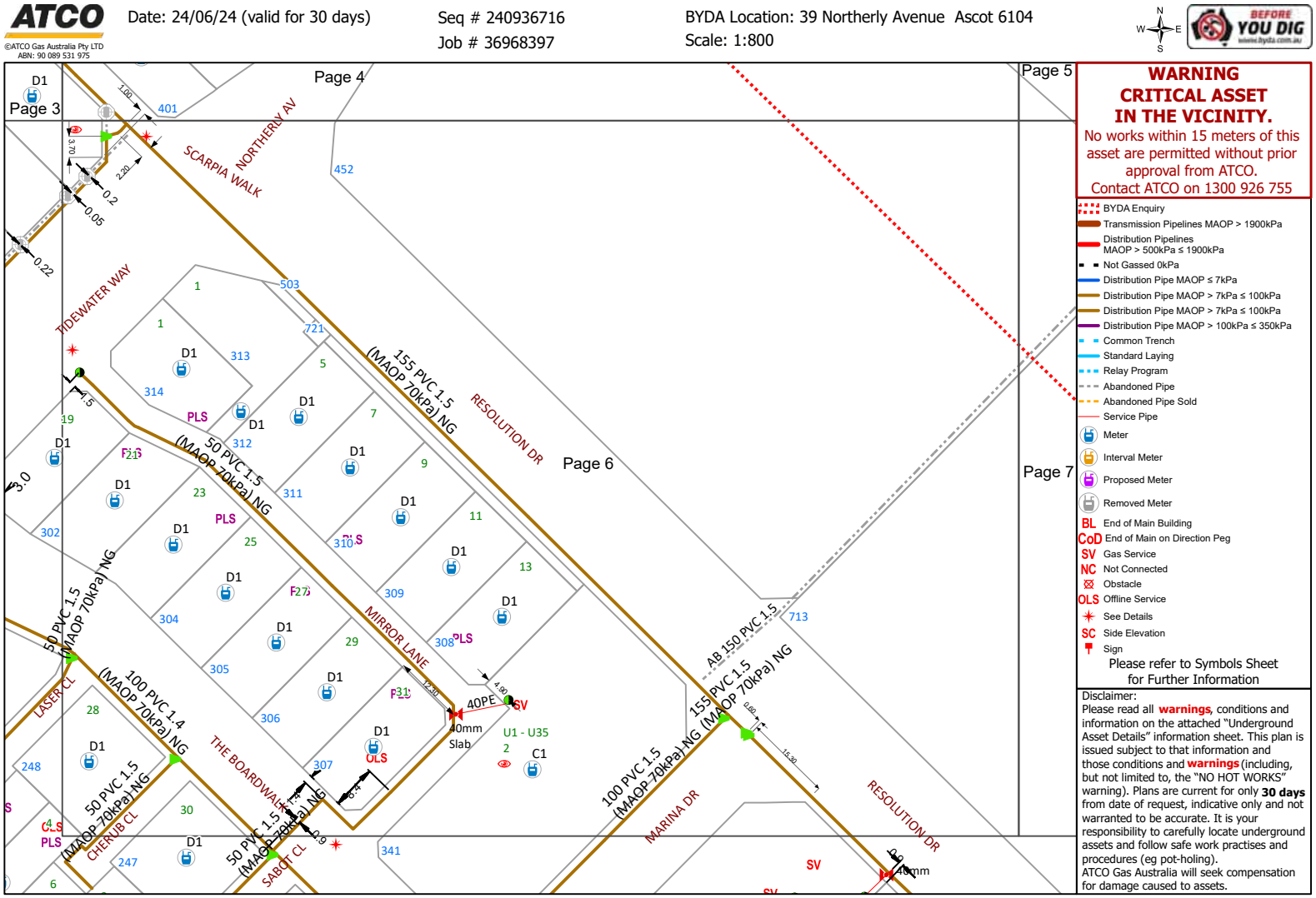
- BYDA Enquiry
- Transmission Pipelines MAOP > 1900kPa
- Distribution Pipelines MAOP > 500kPa ≤ 1900kPa
- Not Gassed 0kPa
- Distribution Pipe MAOP ≤ 7kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 7kPa ≤ 100kPa
- Distribution Pipe MAOP > 100kPa ≤ 350kPa
- Common Trench
- Standard Laying
- Relay Program
- Abandoned Pipe
- Abandoned Pipe Sold
- Service Pipe
- Meter
- Interval Meter
- Proposed Meter
- Removed Meter
- BL End of Main Building
- CoD End of Main on Direction Peg
- SV Gas Service
- NC Not Connected
- Obstacle
- OLS Offline Service
- See Details
- SC Side Elevation
- Sign

Please refer to Symbols Sheet for Further Information

Disclaimer:
Please read all **warnings**, conditions and information on the attached "Underground Asset Details" information sheet. This plan is issued subject to that information and those conditions and **warnings** (including, but not limited to, the "NO HOT WORKS" warning). Plans are current for only **30 days** from date of request, indicative only and not warranted to be accurate. It is your responsibility to carefully locate underground assets and follow safe work practises and procedures (eg pot-holing).
ATCO Gas Australia will seek compensation for damage caused to assets.

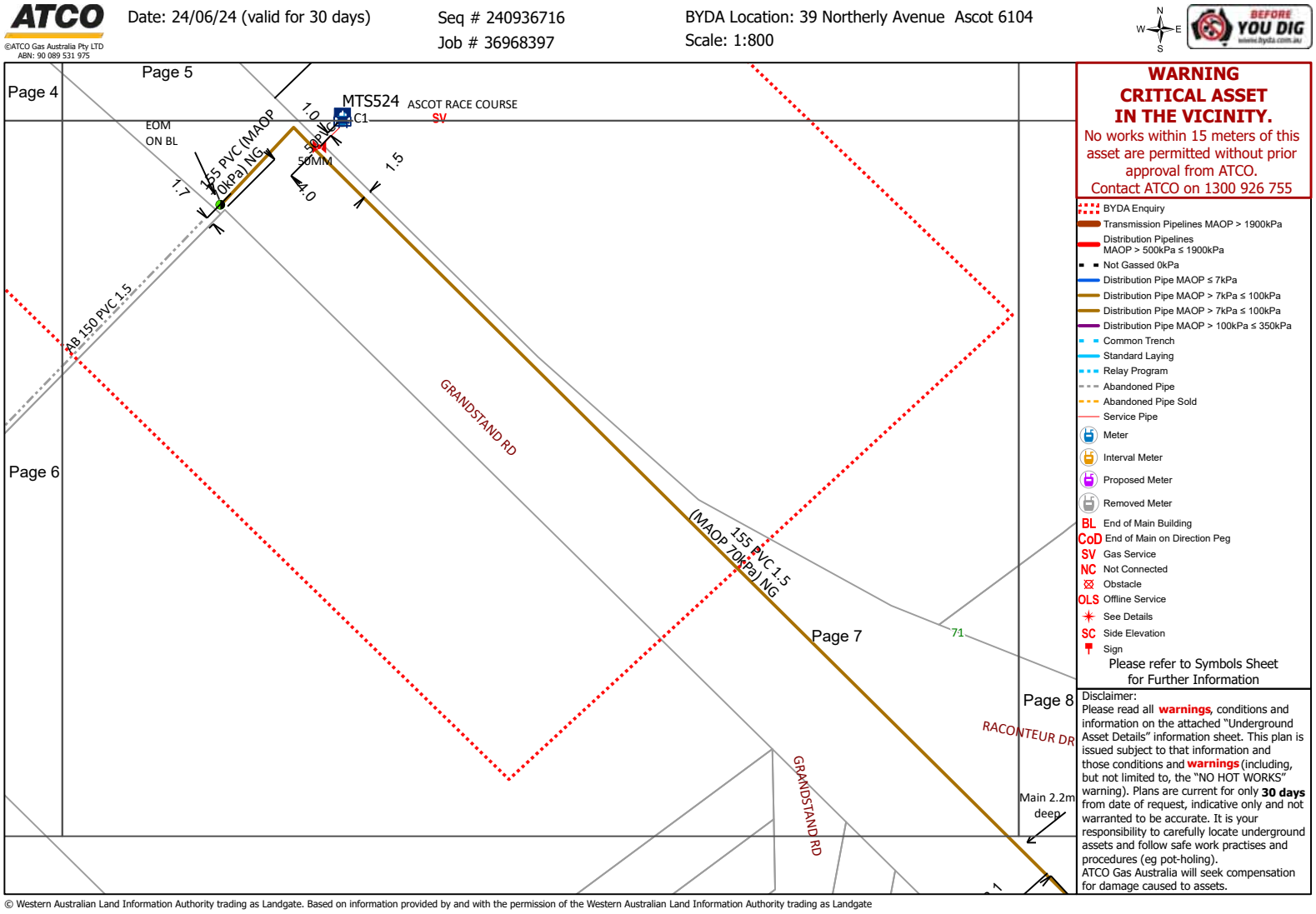
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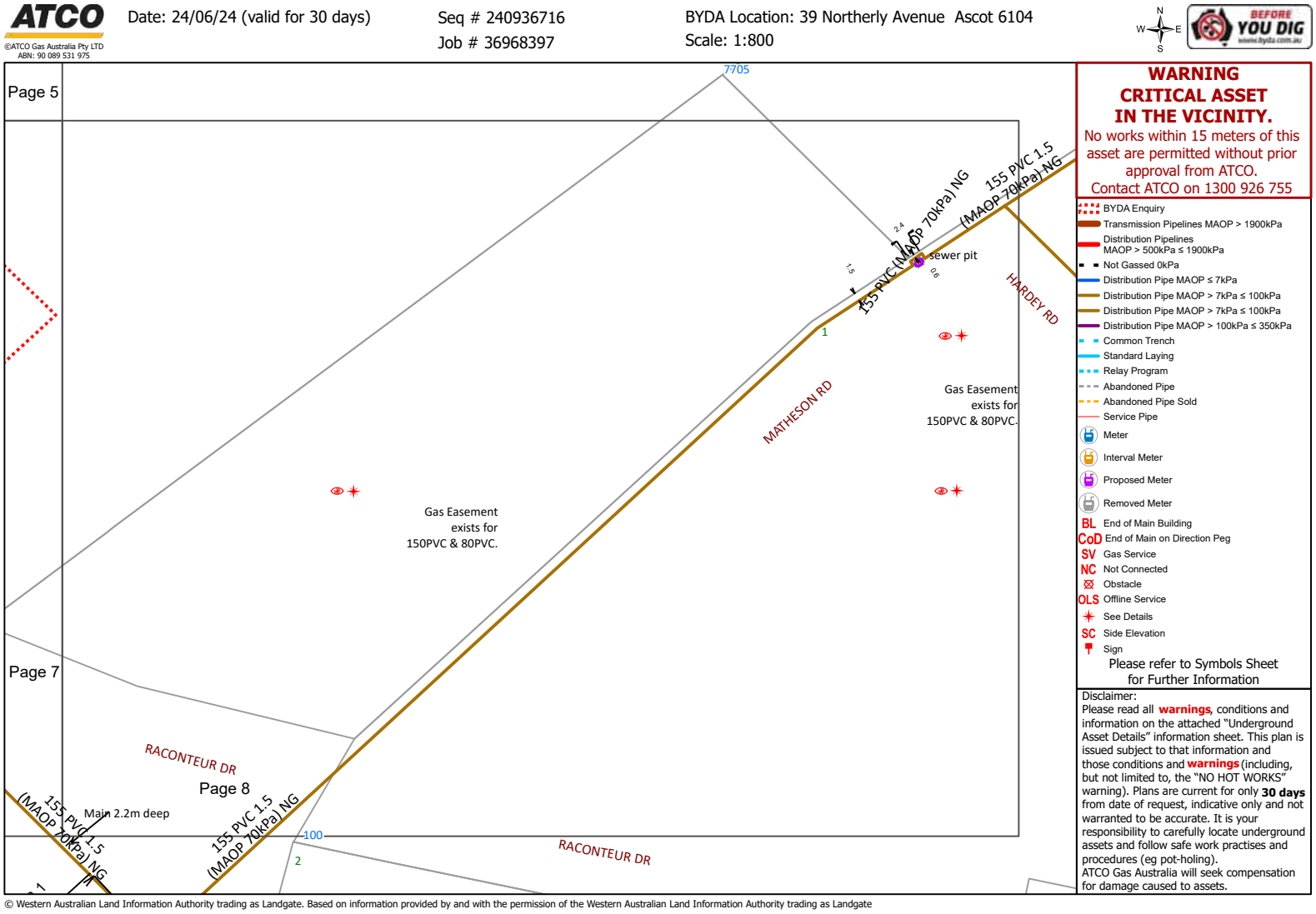


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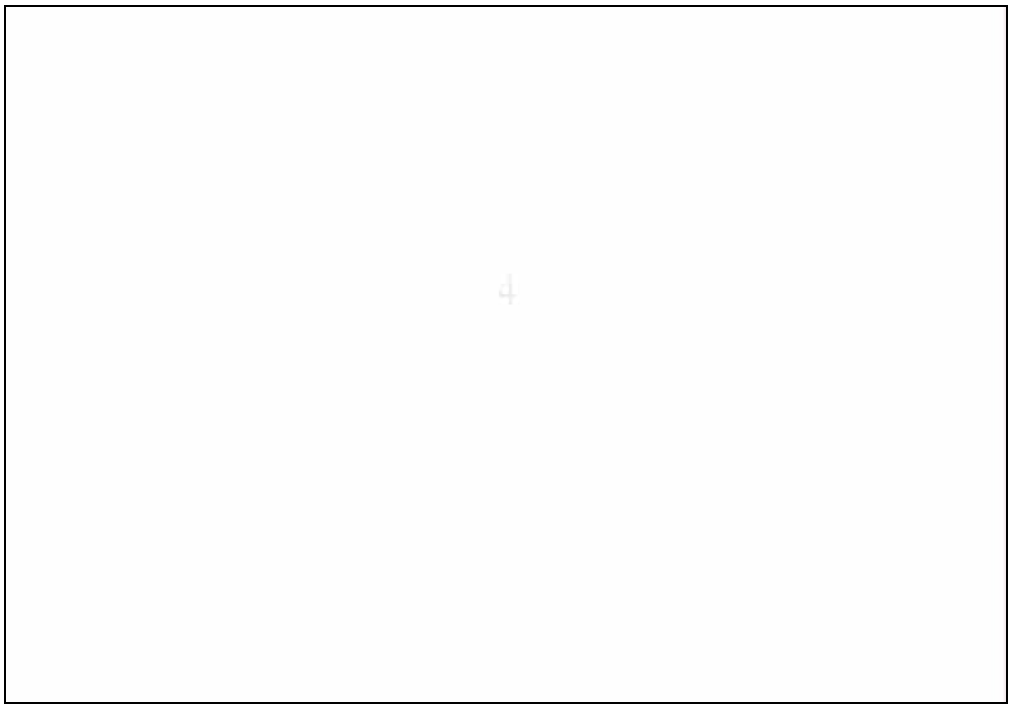
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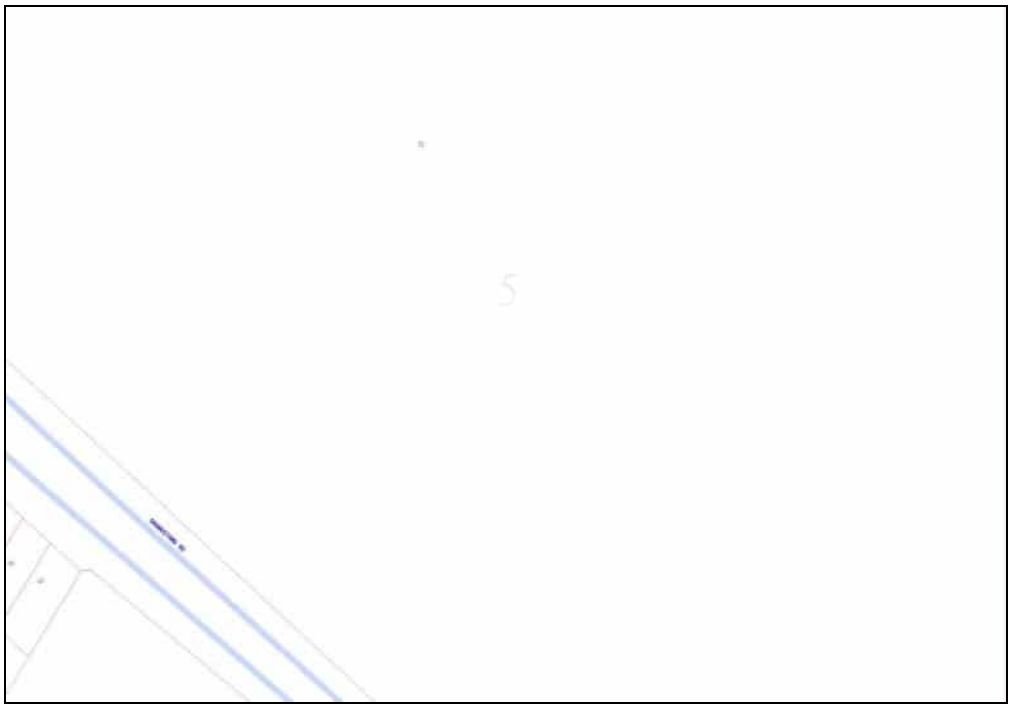
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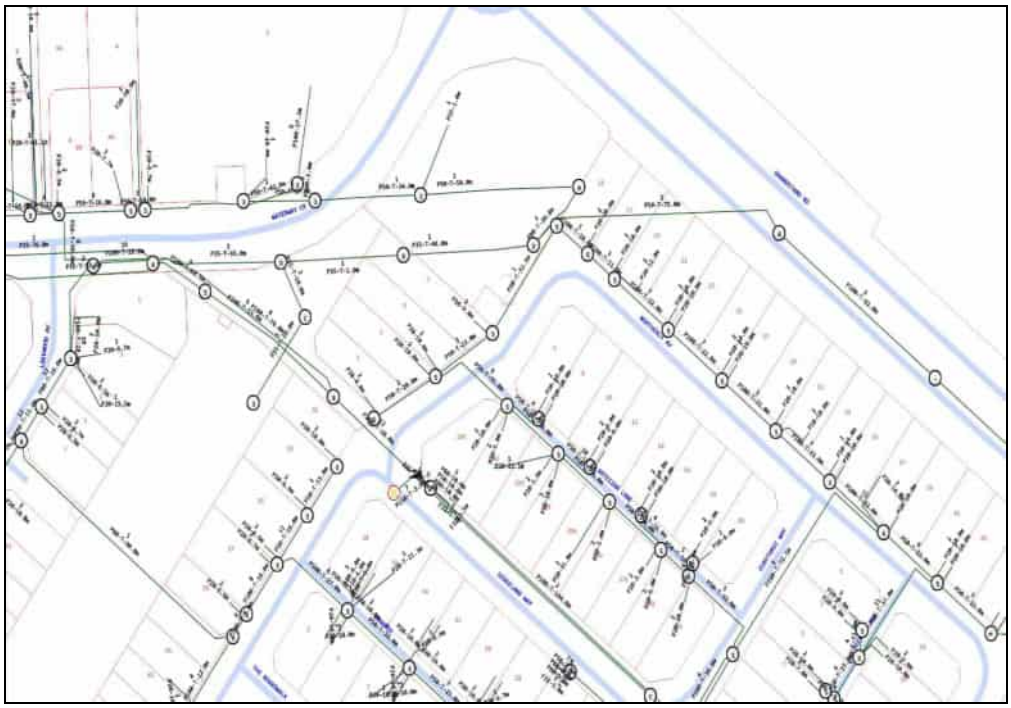
Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

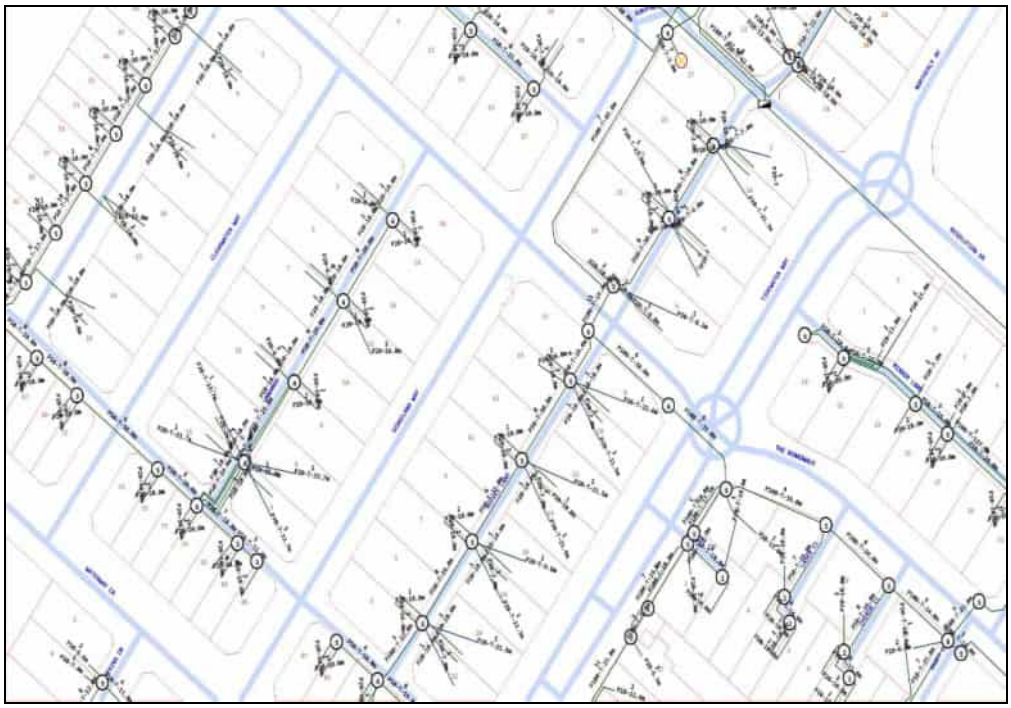
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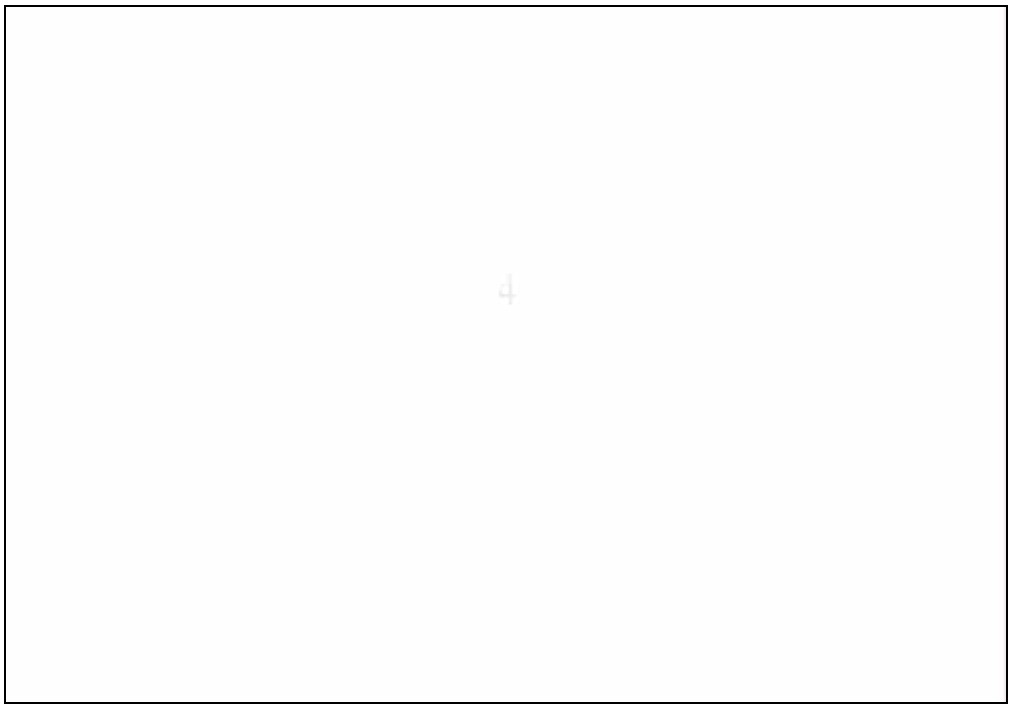
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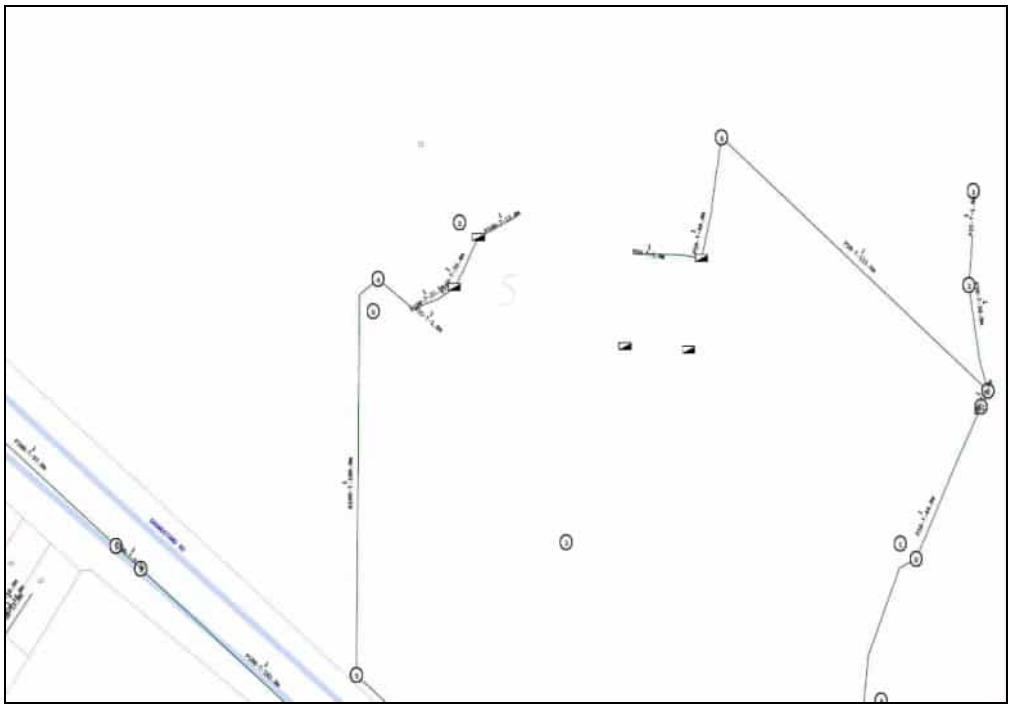
Attachment 12.1.4 Engineering Servicing Report



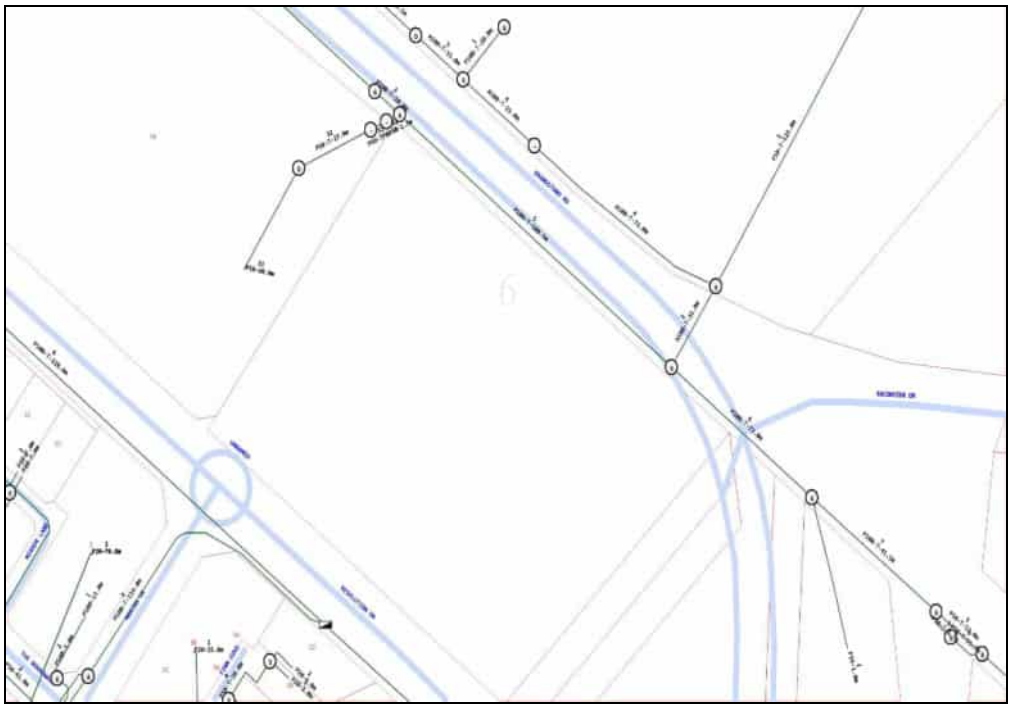
Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



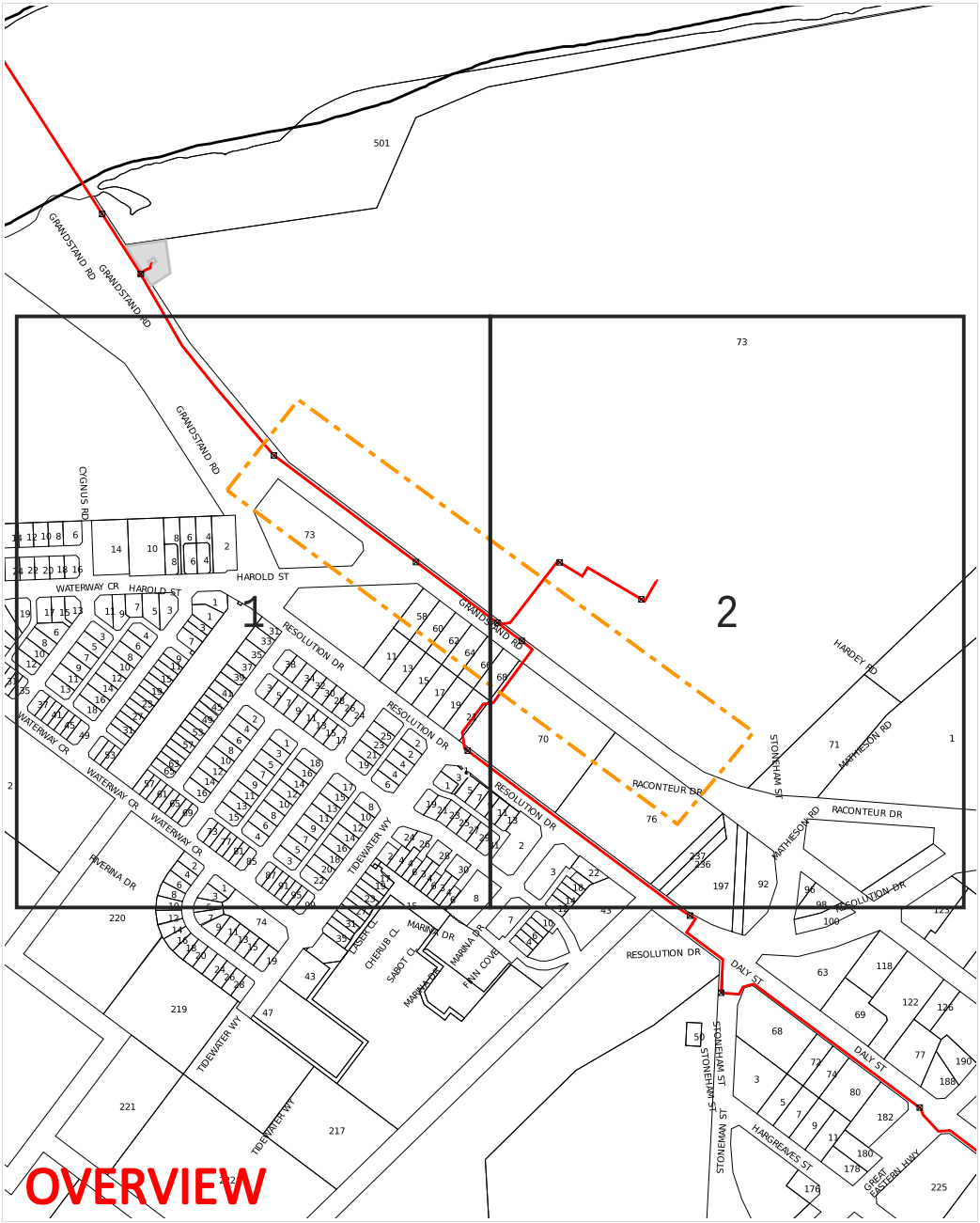
Attachment 12.1.4 Engineering Servicing Report



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

Attachment 12.1.4 Engineering Servicing Report



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Sequence Number: 240936708

Date Generated: 24 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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Attachment 12.1.4 Engineering Servicing Report



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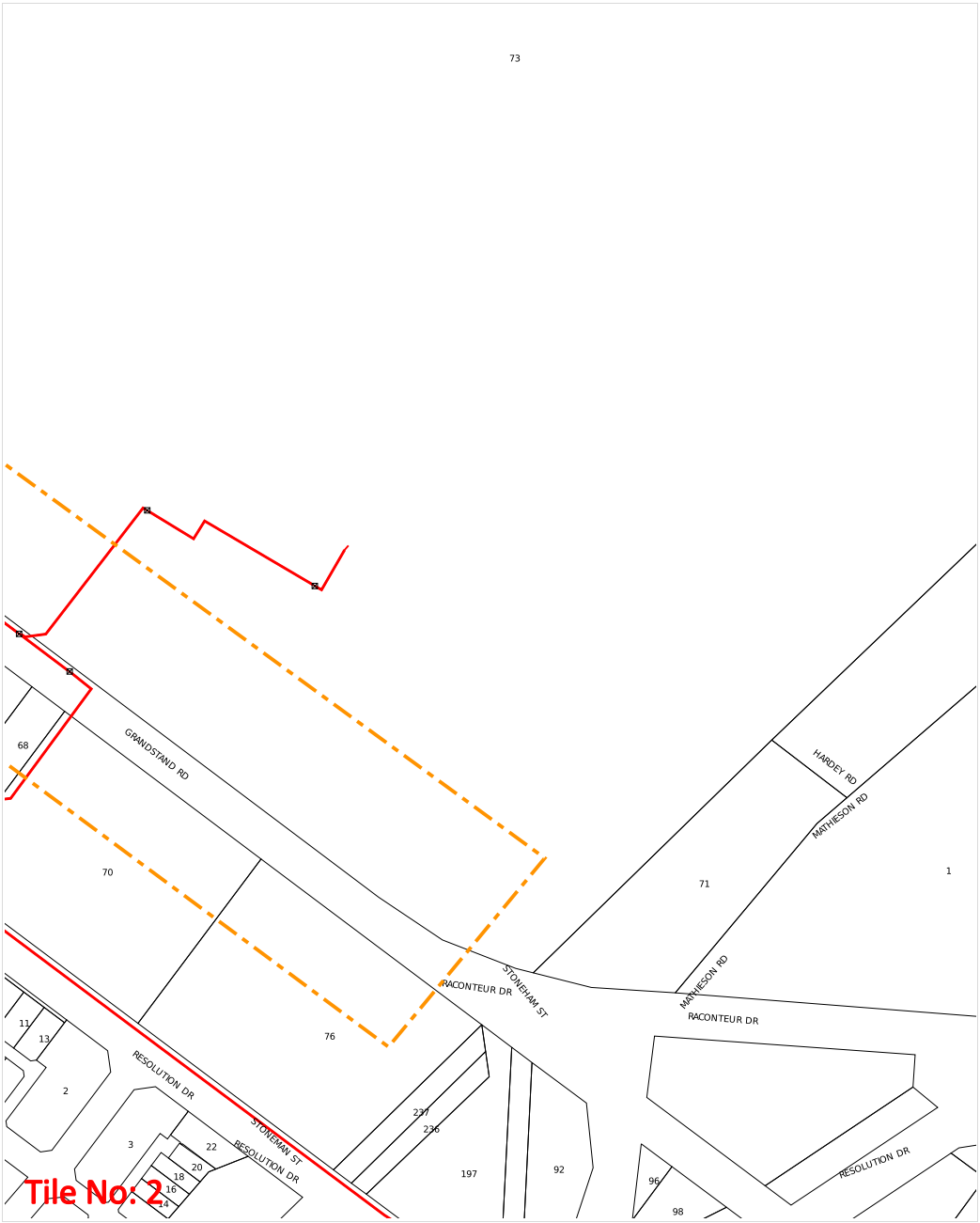
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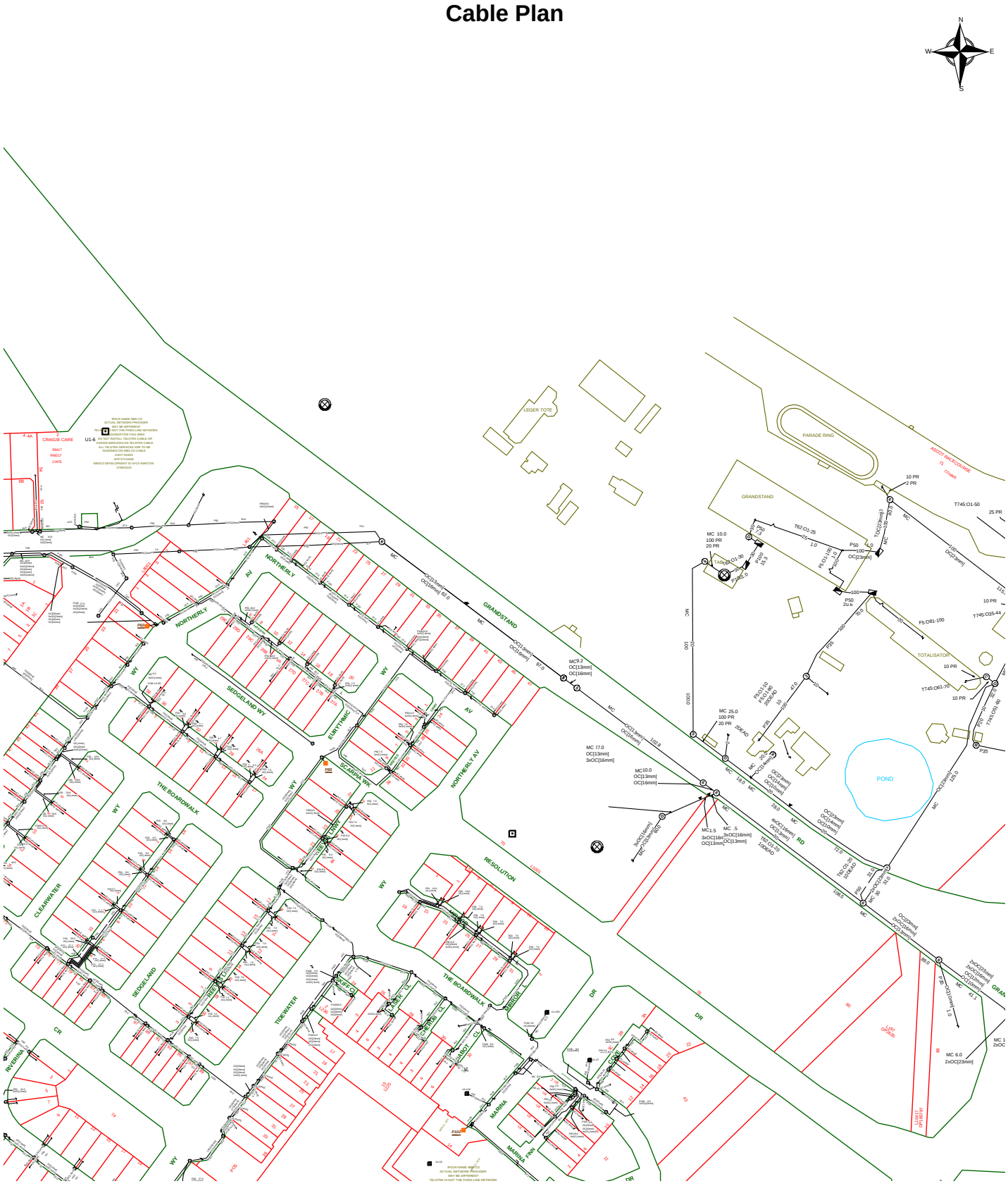
Date Generated: 24 Jun 2024

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Optus Limited ACN 052 833 208

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Attachment 12.1.4 Engineering Servicing Report

Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240936714
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 24/06/2024 09:36:36	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

Attachment 12.1.4 Engineering Servicing Report

Mains Cable Plan



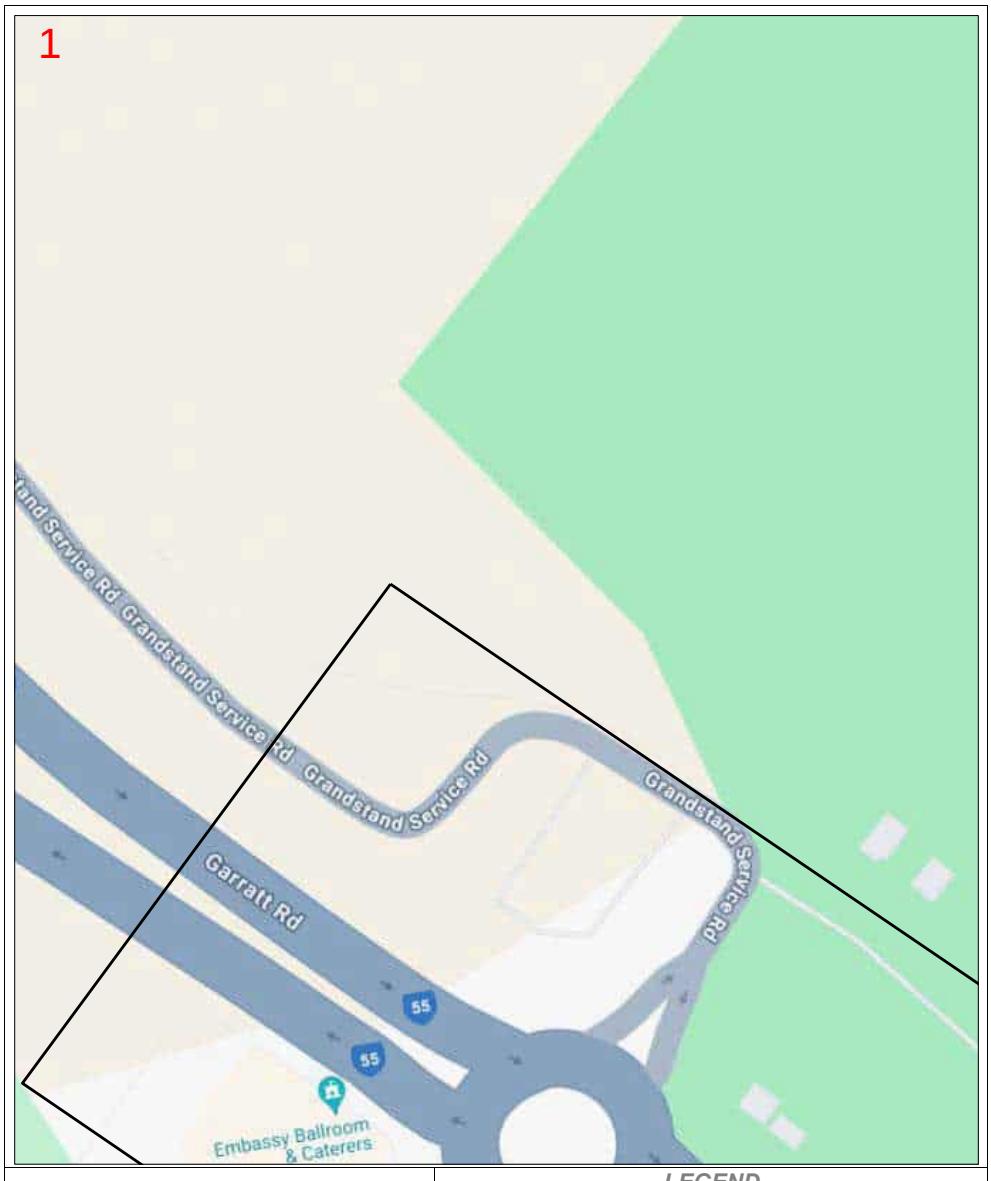
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240936714
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 24/06/2024 09:36:39	

WARNING
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Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
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See the Steps- Telstra Duty of Care that was provided in the email response.

Page 2 of 2

Attachment 12.1.4 Engineering Servicing Report



Enquiry Number: 240936711

Map Sheet: 1

Scale: 1: 750

0 0.008km

N

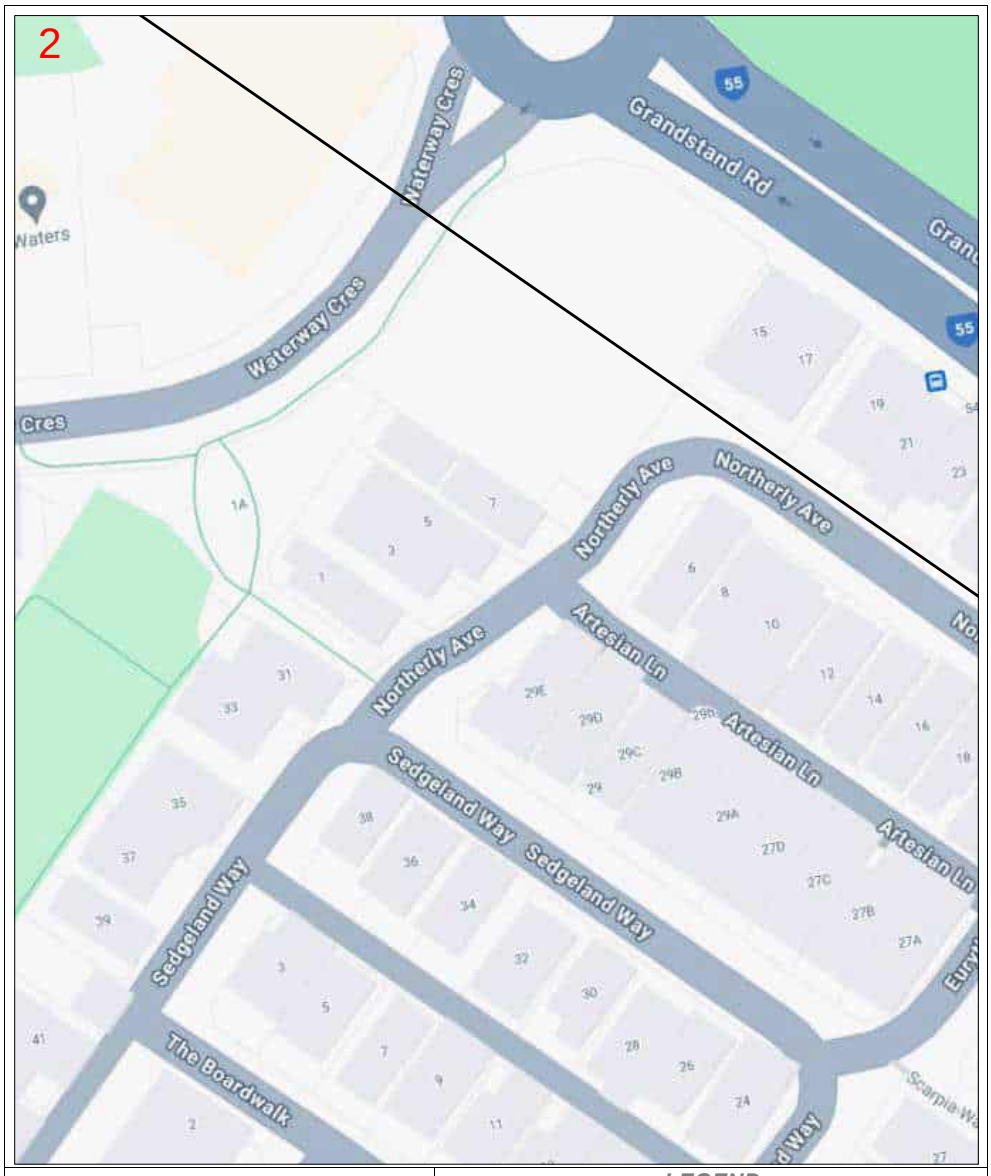
LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Attachment 12.1.4 Engineering Servicing Report



Enquiry Number: 240936711

Map Sheet: 2

Scale: 1: 750

0 0.008km

N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Attachment 12.1.4 Engineering Servicing Report



Enquiry Number: 240936711

Map Sheet: 3

Scale: 1: 750

0 0.008km

N

LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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Attachment 12.1.4 Engineering Servicing Report



Enquiry Number: 240936711

Map Sheet: 4

Scale: 1: 750

0 0.008km

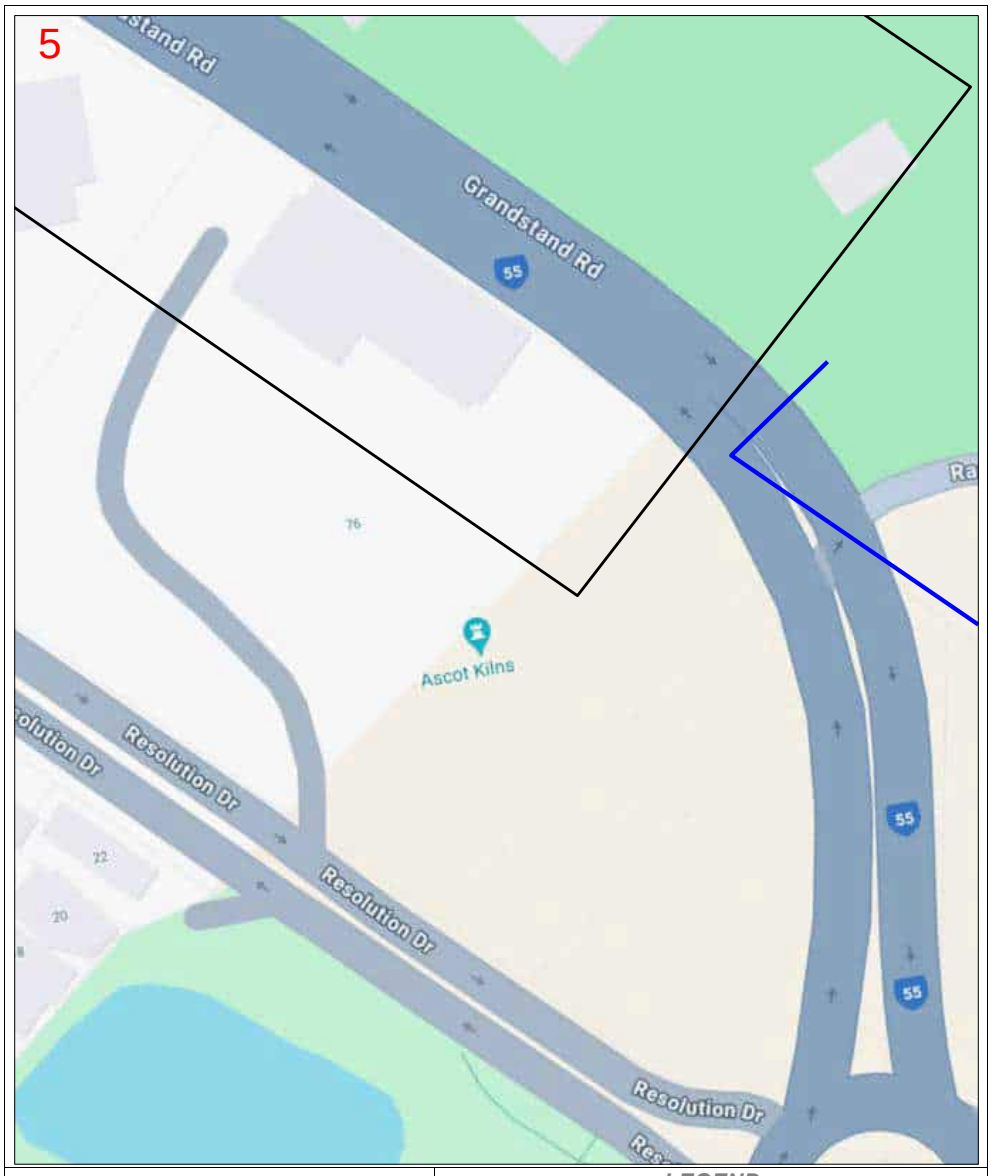
N

LEGEND

BYDA Work Area			
AAPT/PowerTel Pit		TransACT Pit	
AAPT/PowerTel Duct		TransACT Duct	
DDA Pit		SOUL Pattinson Telecoms Pit	
DDA Duct		SOUL Pattinson Telecoms Duct	
Agile/Adam Pit		PIPE Networks Pit	
Agile/Adam Duct		PIPE Networks Duct	

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Attachment 12.1.4 Engineering Servicing Report



Enquiry Number: 240936711

Map Sheet: 5

Scale: 1: 750

0 0.008km

N

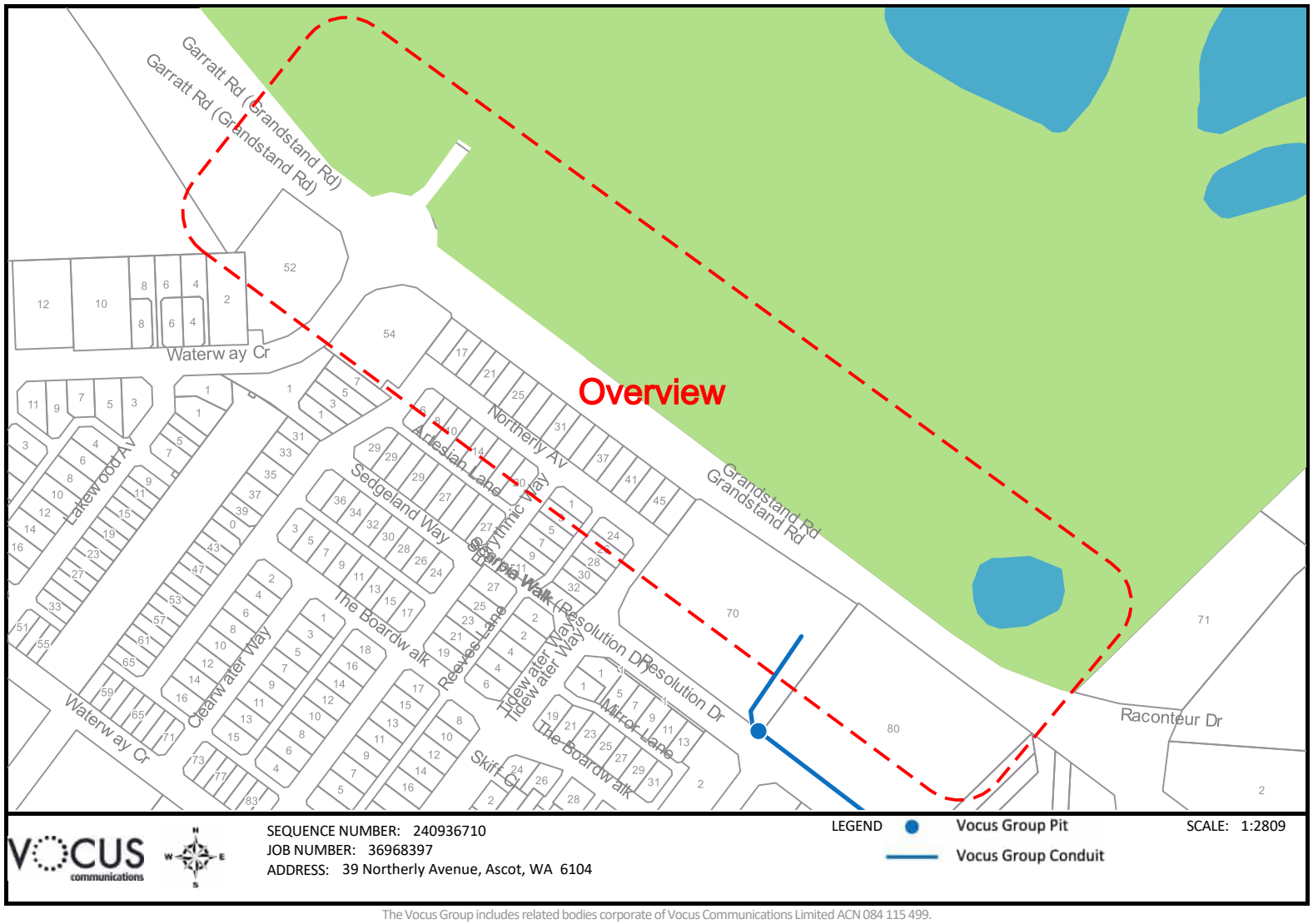
LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
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Attachment 12.1.4 Engineering Servicing Report



The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.

Attachment 12.1.4 Engineering Servicing Report



WATER CORPORATION

Scale: 1:3075
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N

Water

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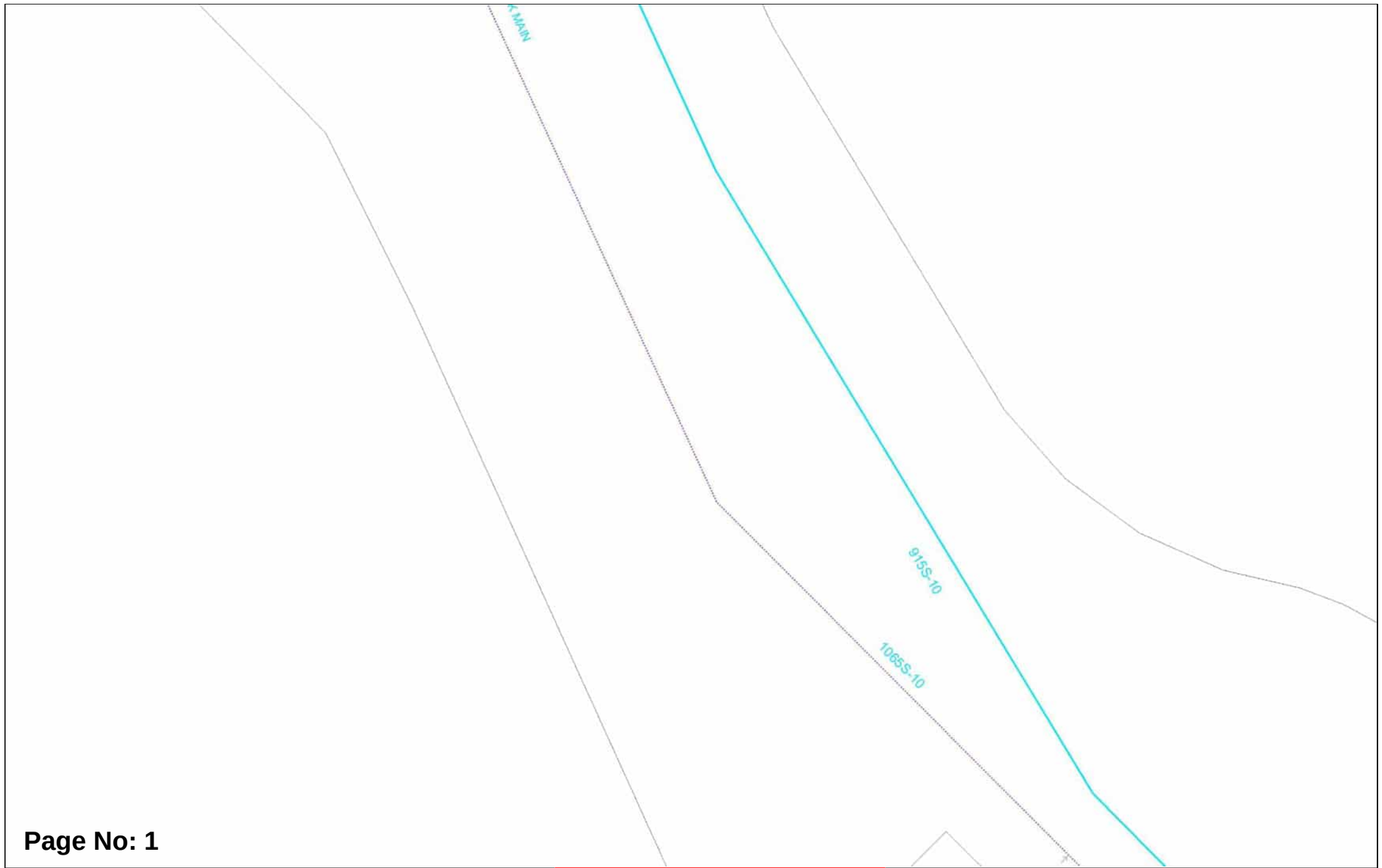
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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



Page No: 1

WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N

Water

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Attachment 12.1.4 Engineering Servicing Report



Page No: 2

WATER CORPORATION	Scale:	1:750	N
	Job No.:	36968397	
	Sequence No.:	240936715	
	Print Date:	24 Jun 2024	Water

WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED

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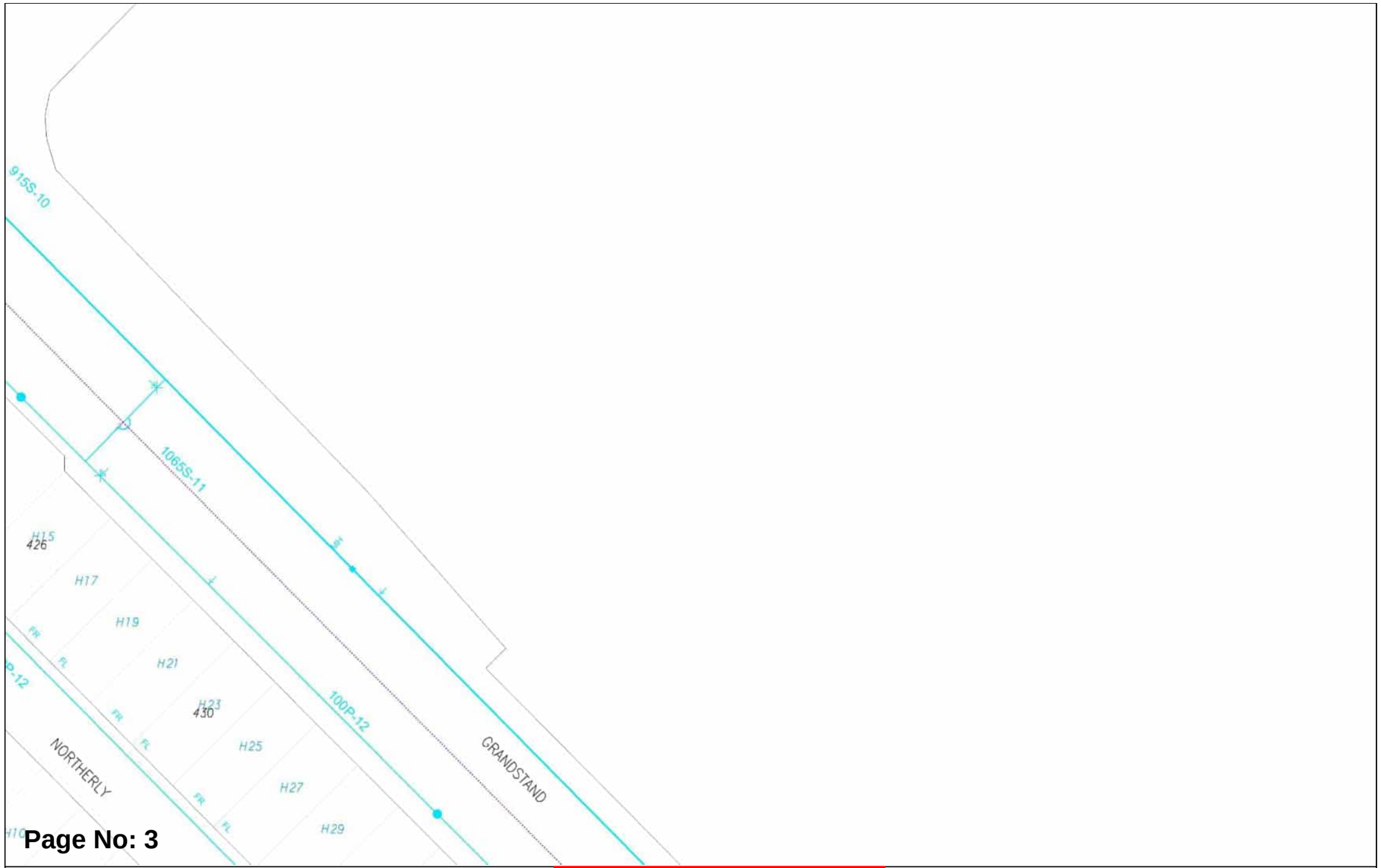
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Water Corp - Critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report



WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N
Water

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Water Corp - Critical Plan.docx (21 May 2024)

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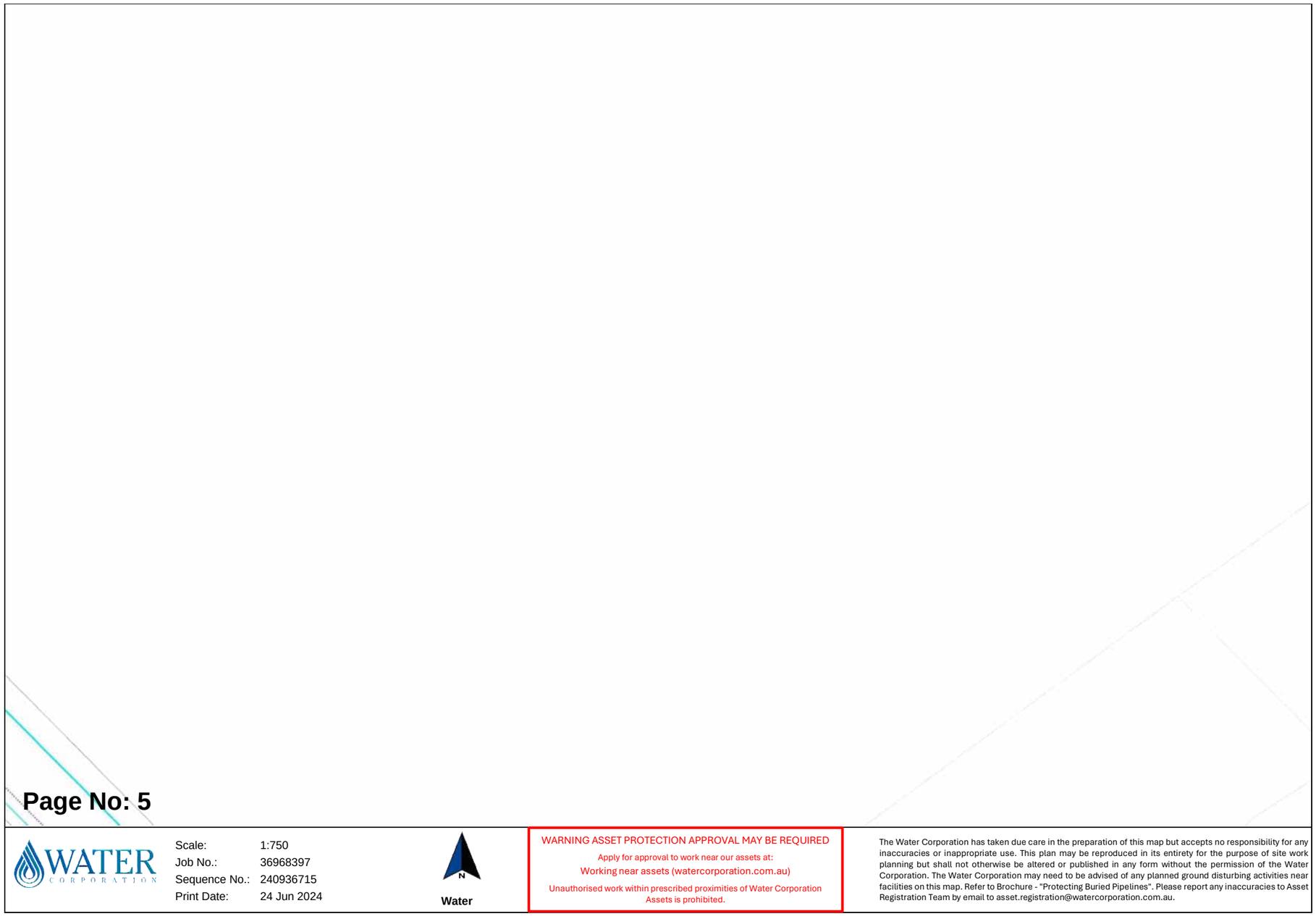


Page No: 4

WATER CORPORATION	Scale: 1:750 Job No.: 36968397 Sequence No.: 240936715 Print Date: 24 Jun 2024	N Water	WARNING ASSET PROTECTION APPROVAL MAY BE REQUIRED Apply for approval to work near our assets at: Working near assets (watercorporation.com.au) Unauthorised work within prescribed proximities of Water Corporation Assets is prohibited.

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Page No: 5

WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

N

Water

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Attachment 12.1.4 Engineering Servicing Report



Page No: 6

WATER CORPORATION

Scale:	1:750
Job No.:	36968397
Sequence No.:	240936715
Print Date:	24 Jun 2024

Water

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Attachment 12.1.4 Engineering Servicing Report



Page No: 7

WATER CORPORATION

Scale: 1:750
Job No.: 36968397
Sequence No.: 240936715
Print Date: 24 Jun 2024

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Water

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Sequence No.:	240936715
Print Date:	24 Jun 2024

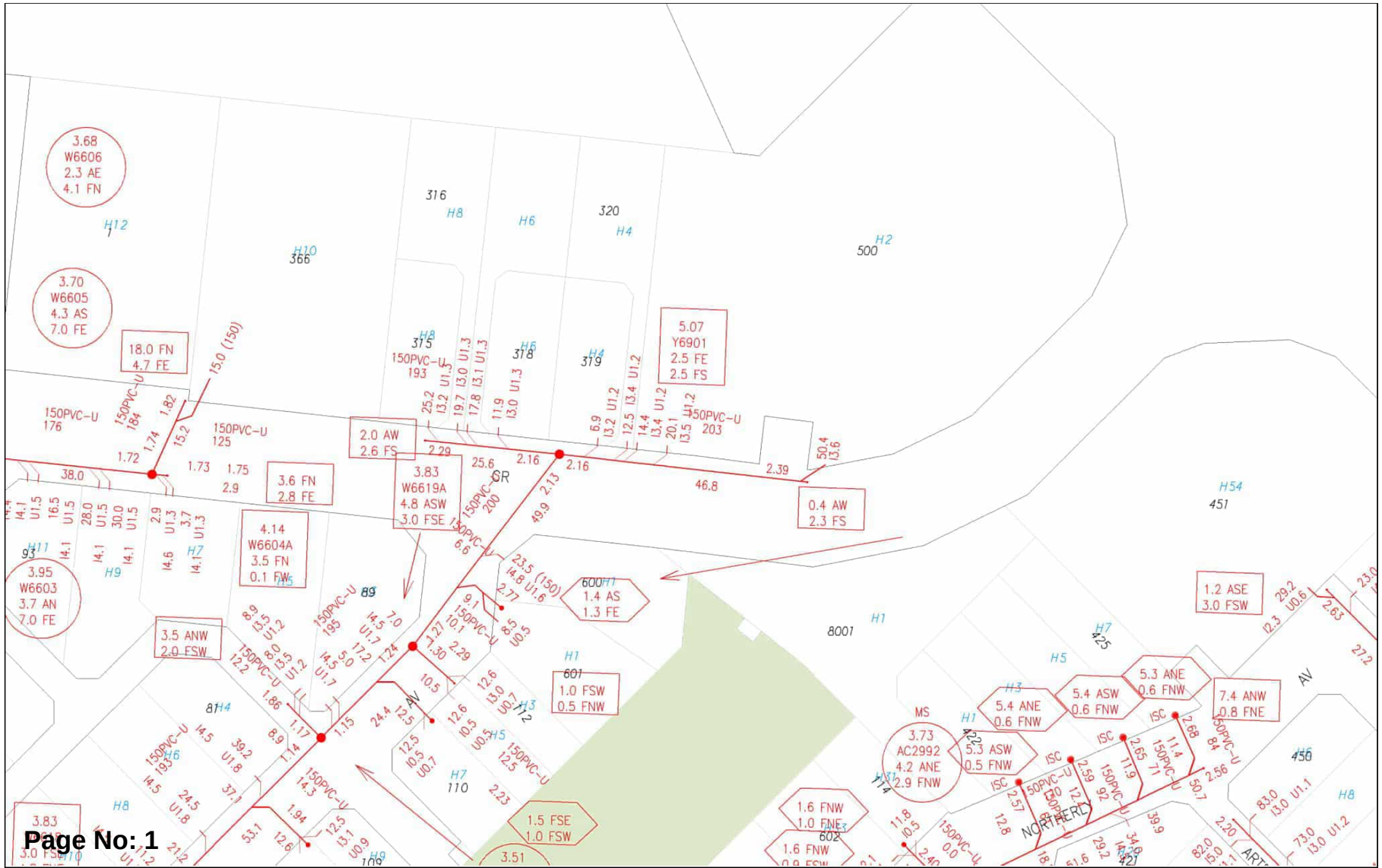
Sewer

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Water Corp - Non-critical Plan.docx (21 May 2024)

Attachment 12.1.4 Engineering Servicing Report

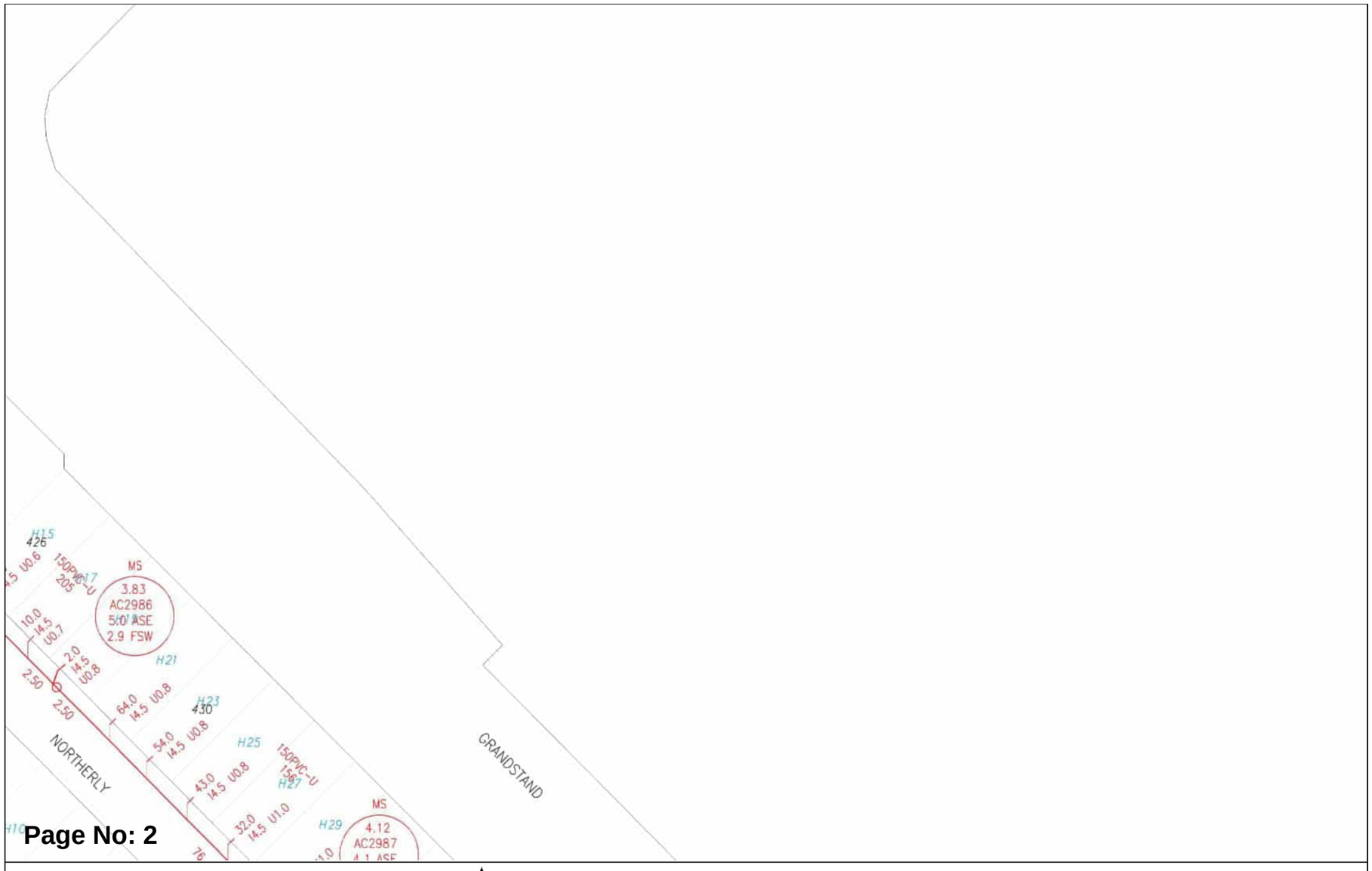


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Attachment 12.1.4 Engineering Servicing Report



Page No: 2

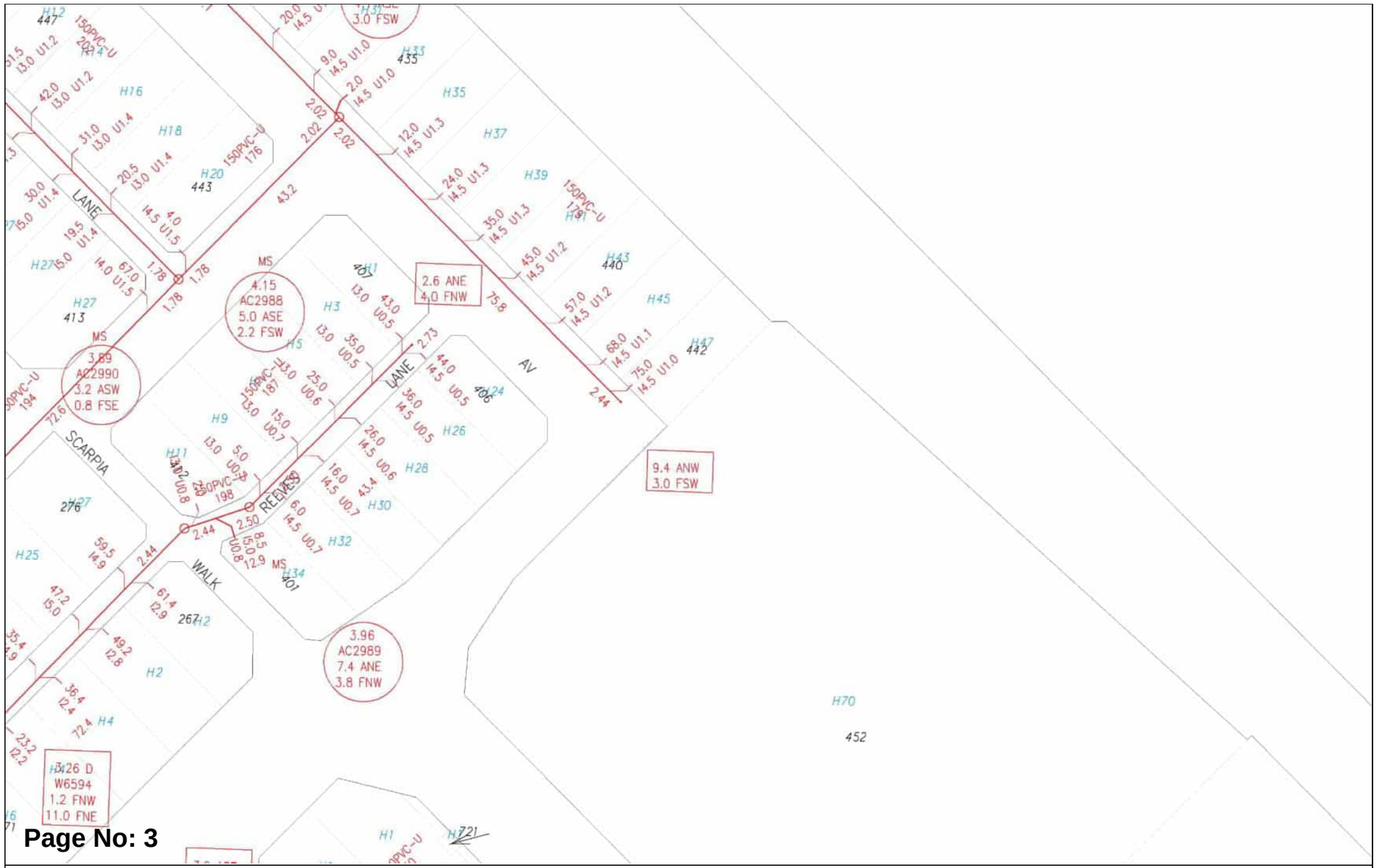
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Job No.:	36968397	
Sequence No.:	240936715	
Print Date:	24 Jun 2024	

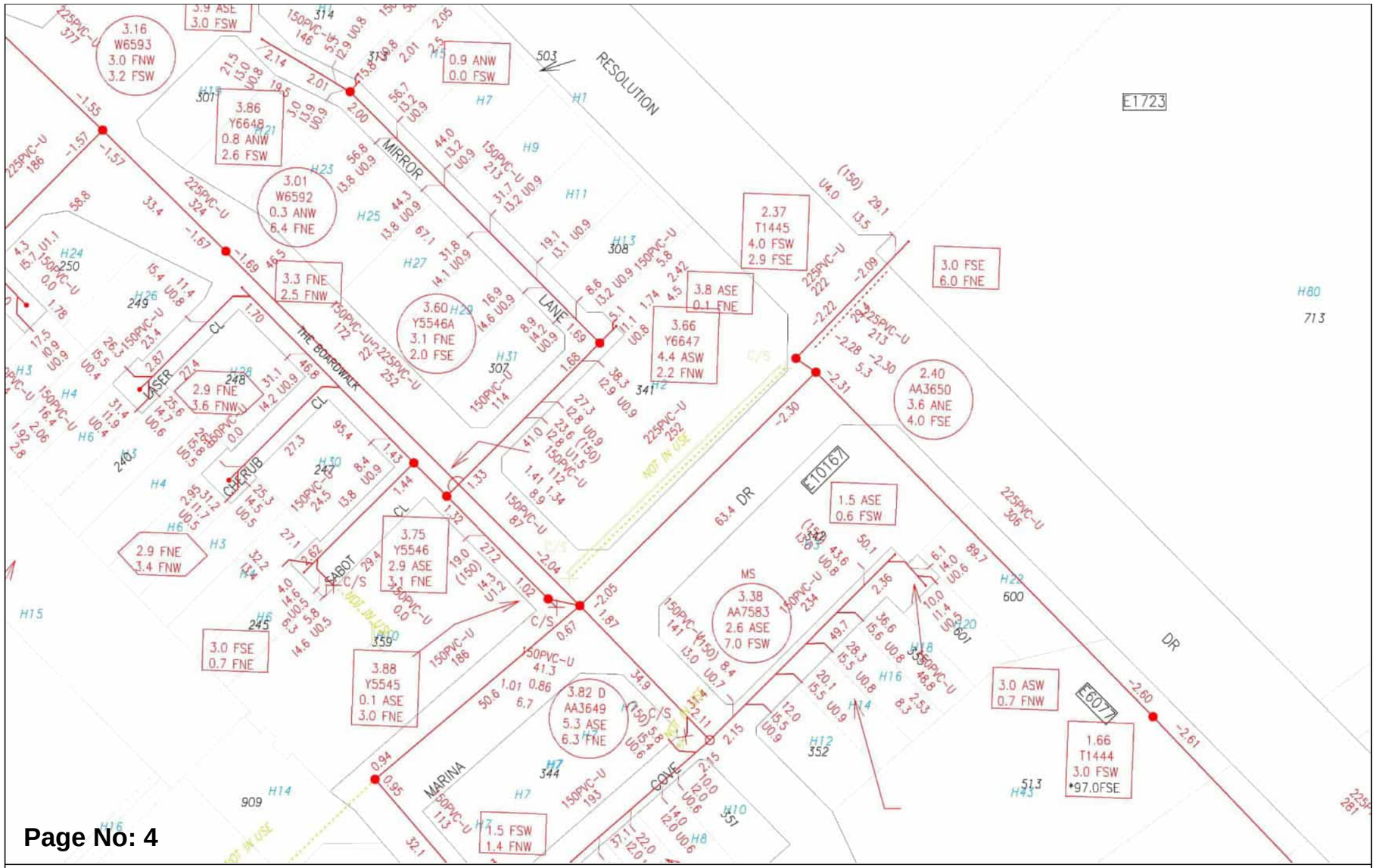
Sewer

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Page No: 4

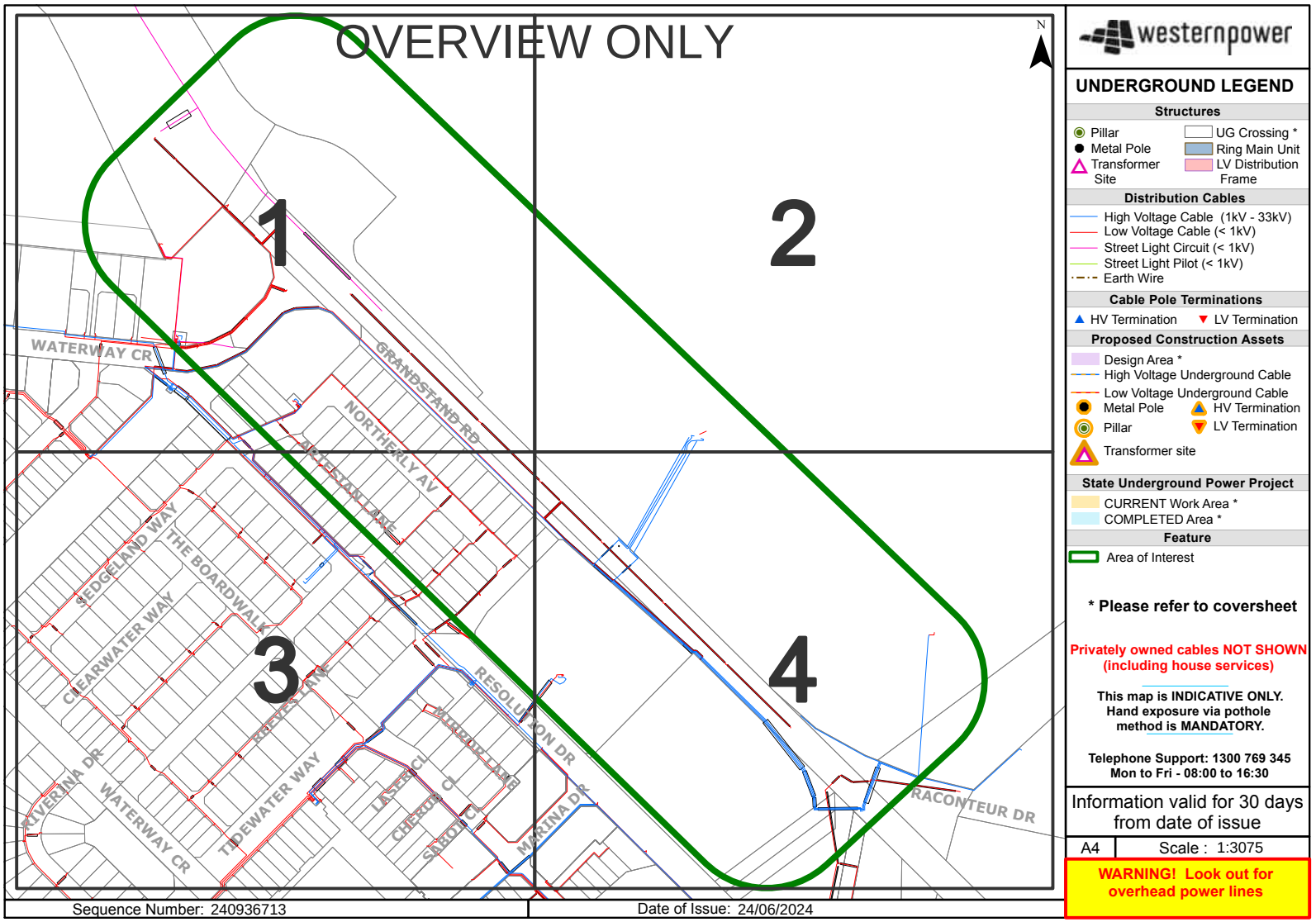
Scale:	1:750
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Print Date:	24 Jun 2024

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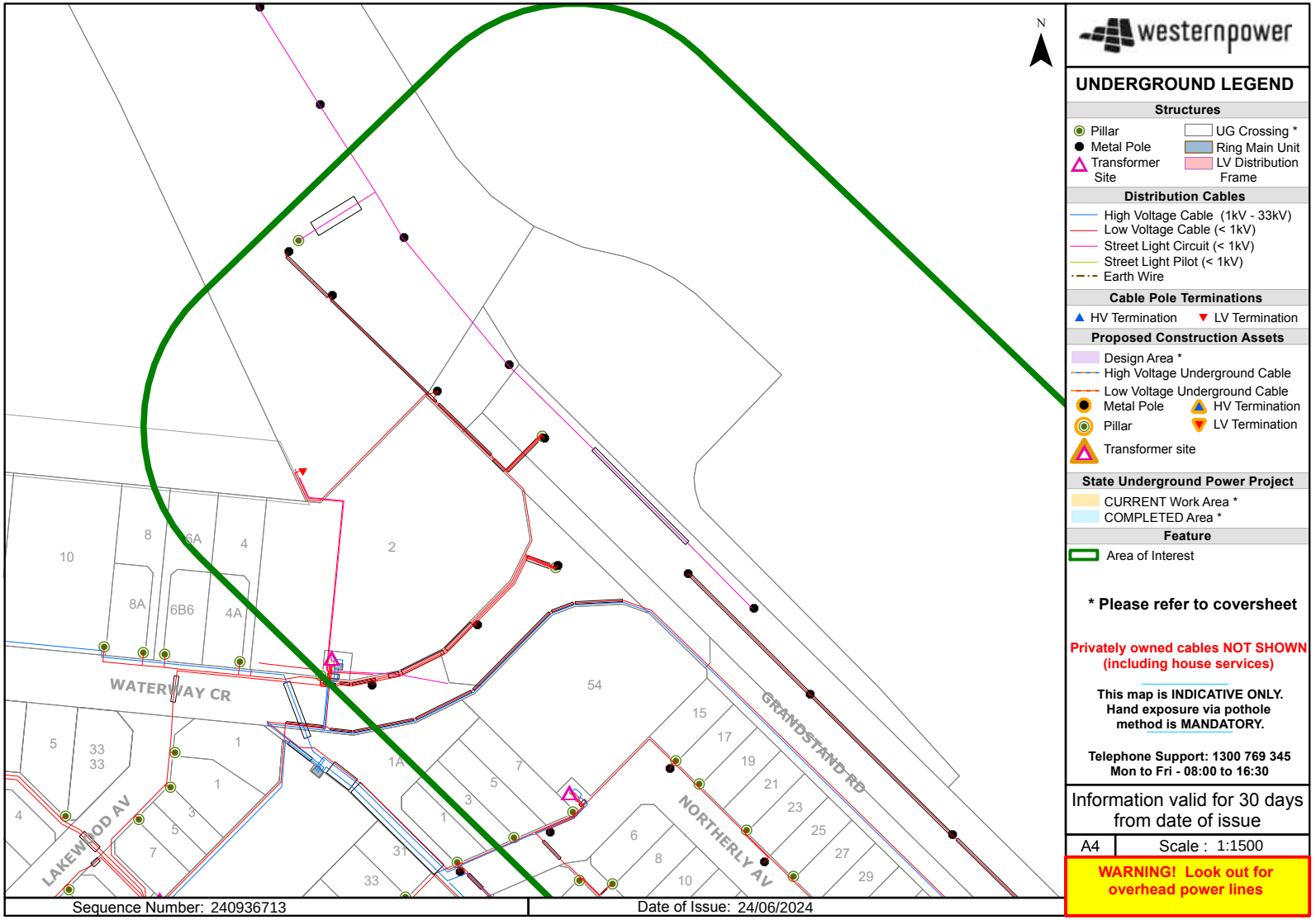
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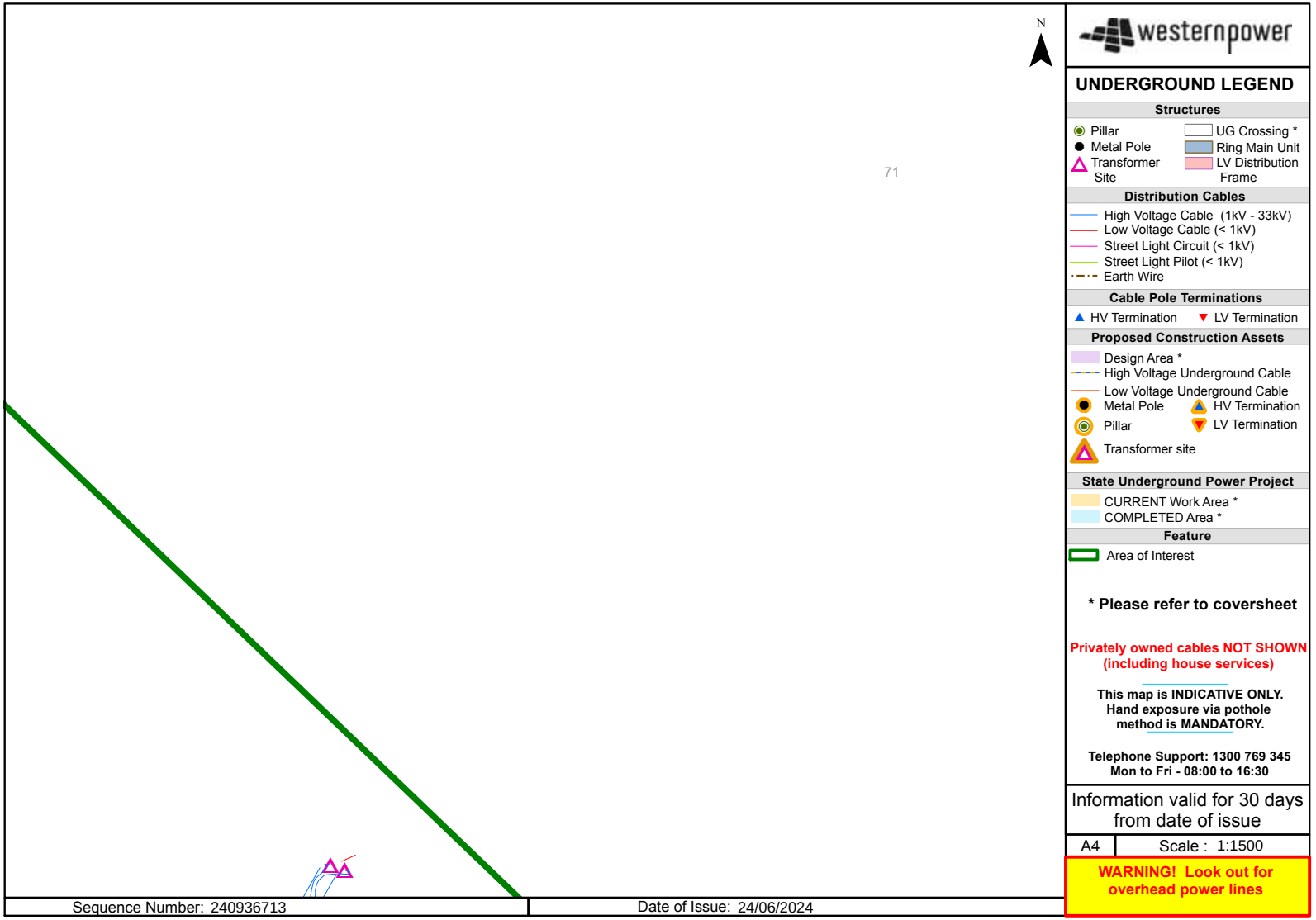
Attachment 12.1.4 Engineering Servicing Report



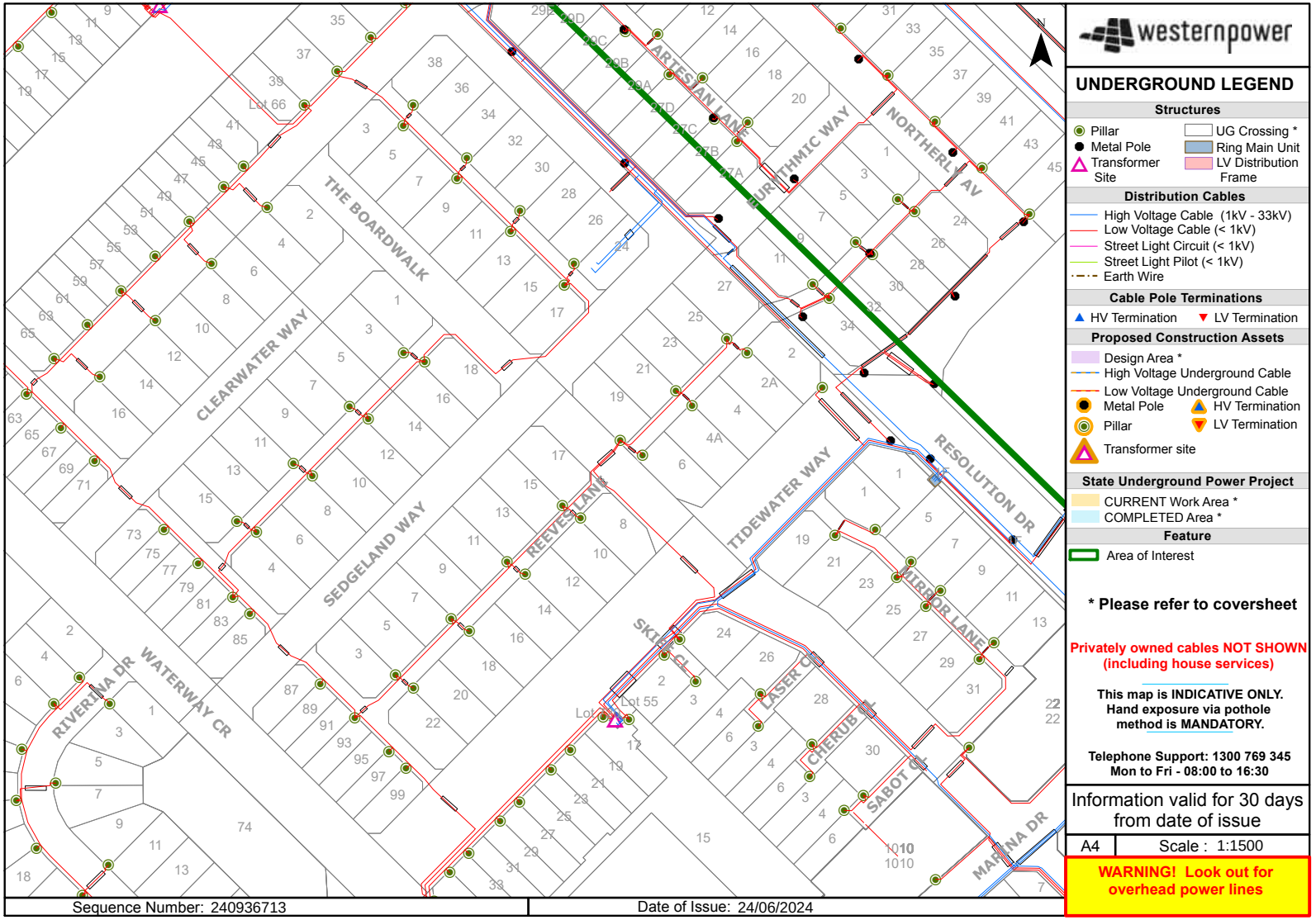
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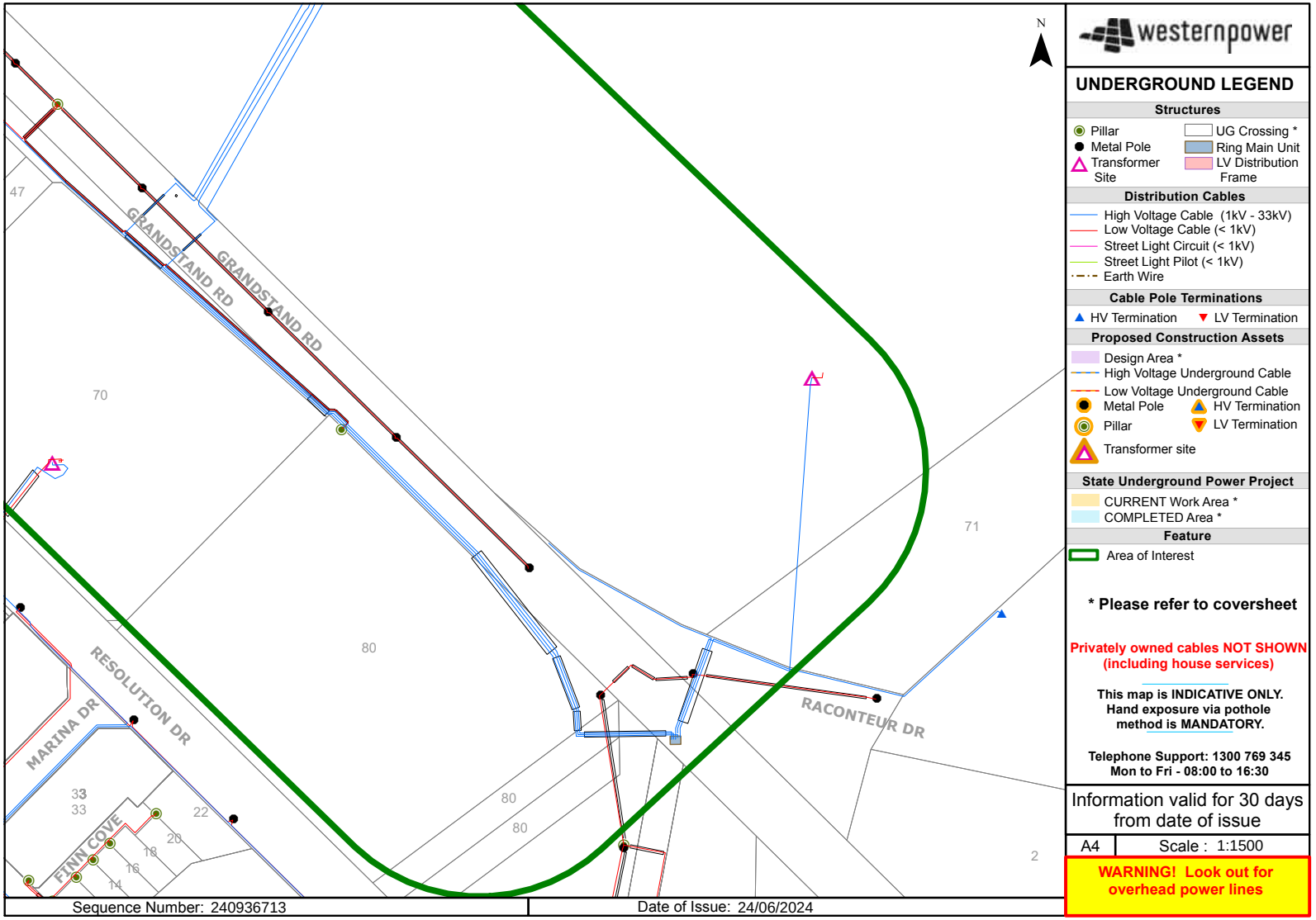
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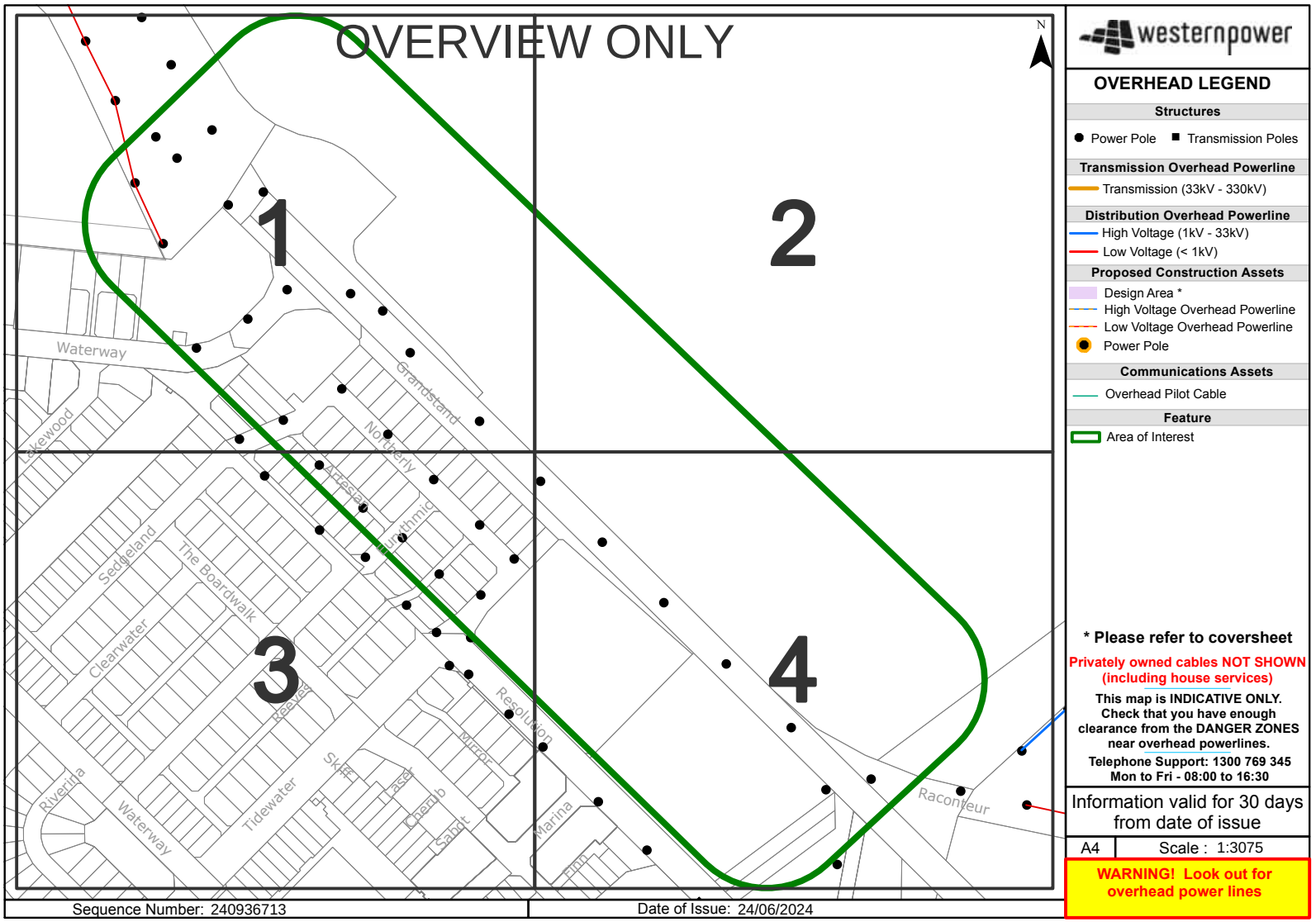
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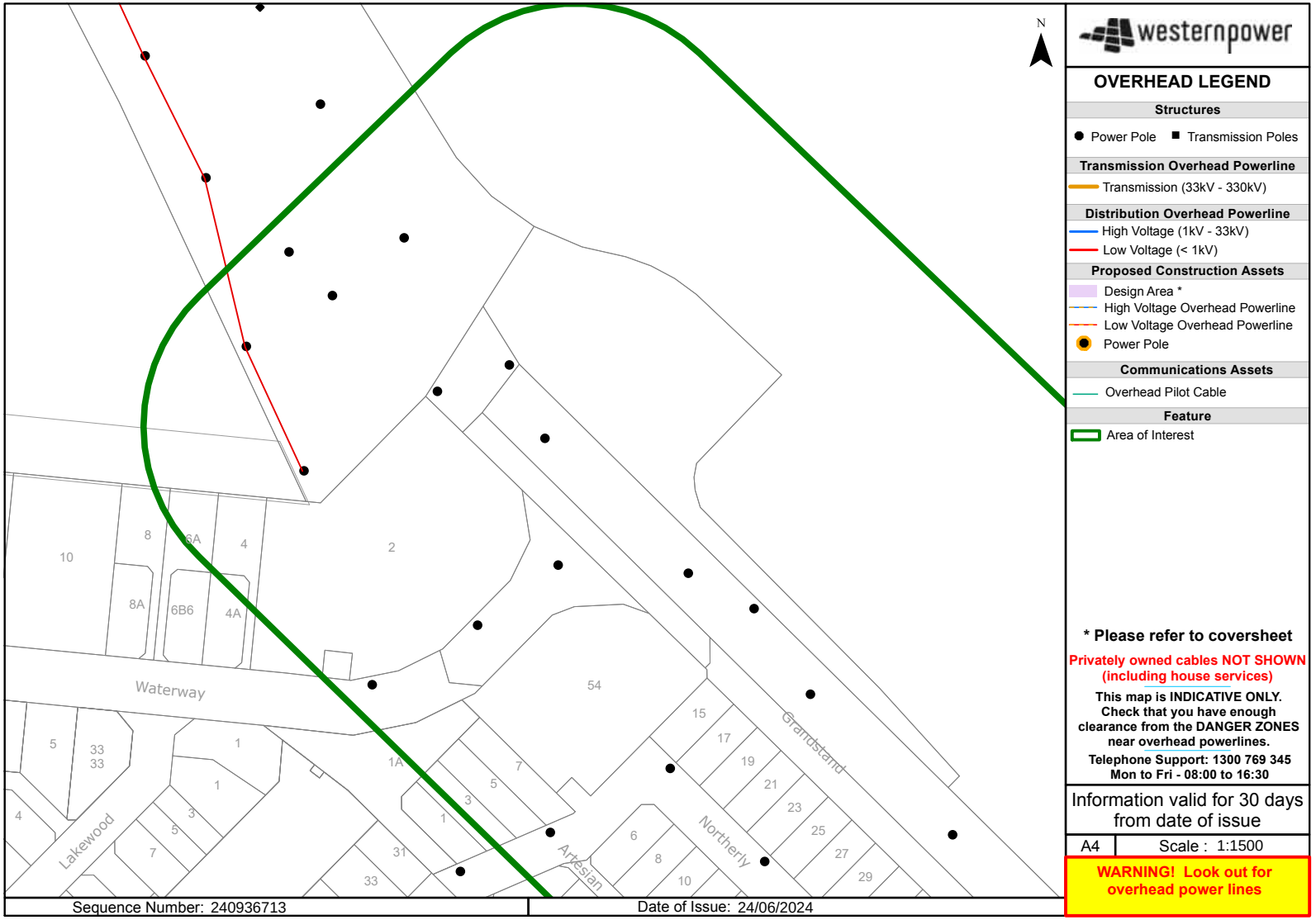
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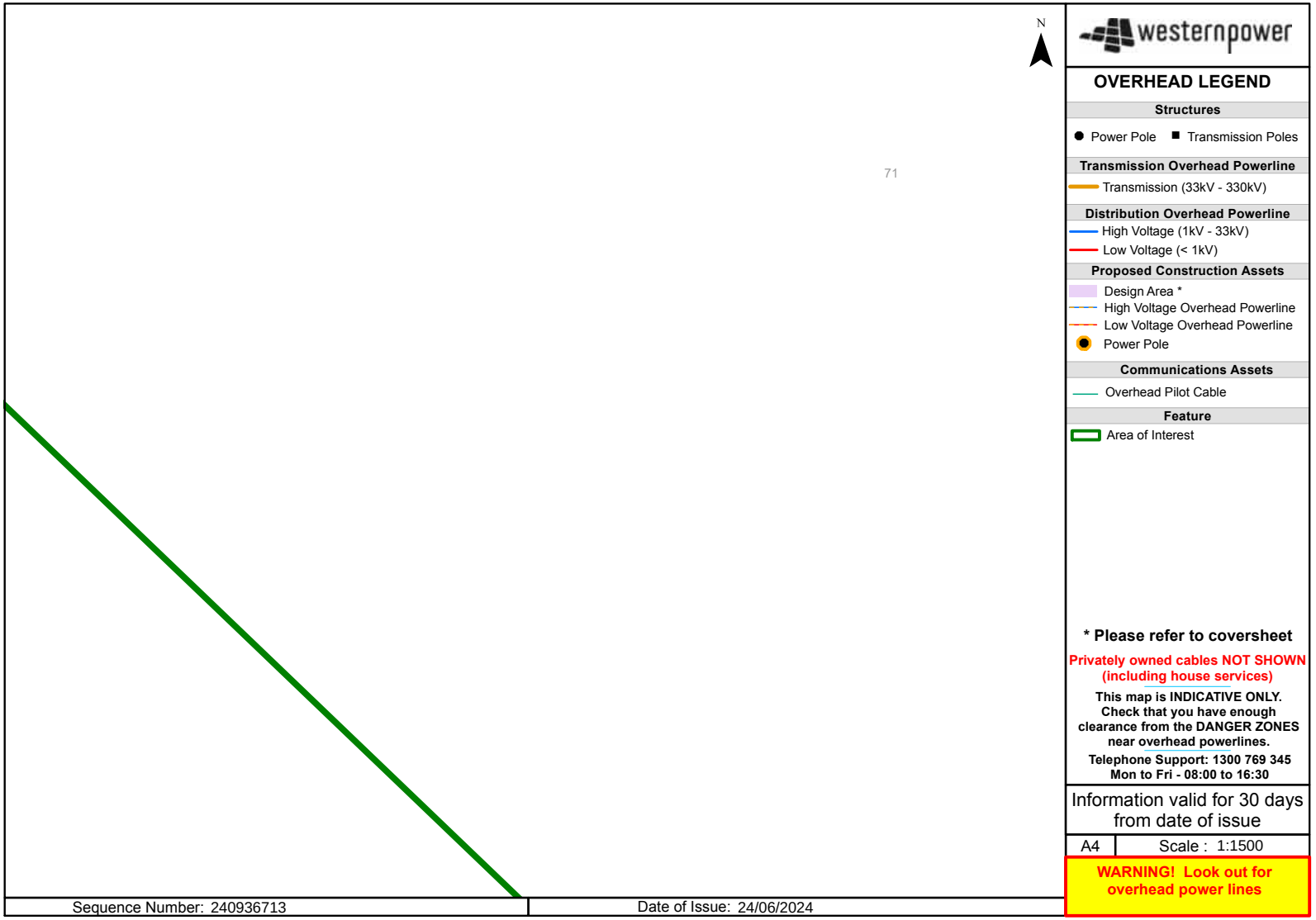
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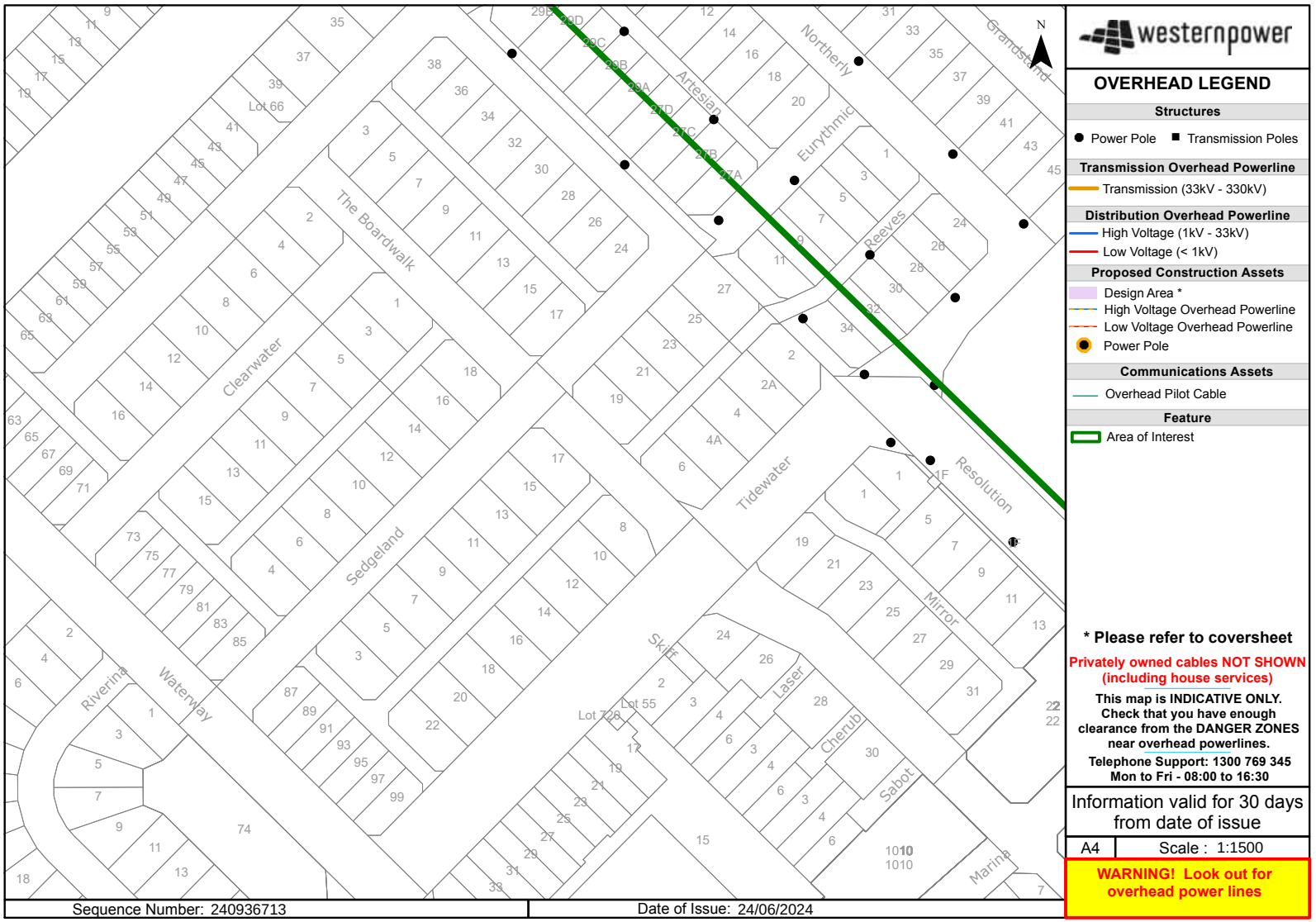
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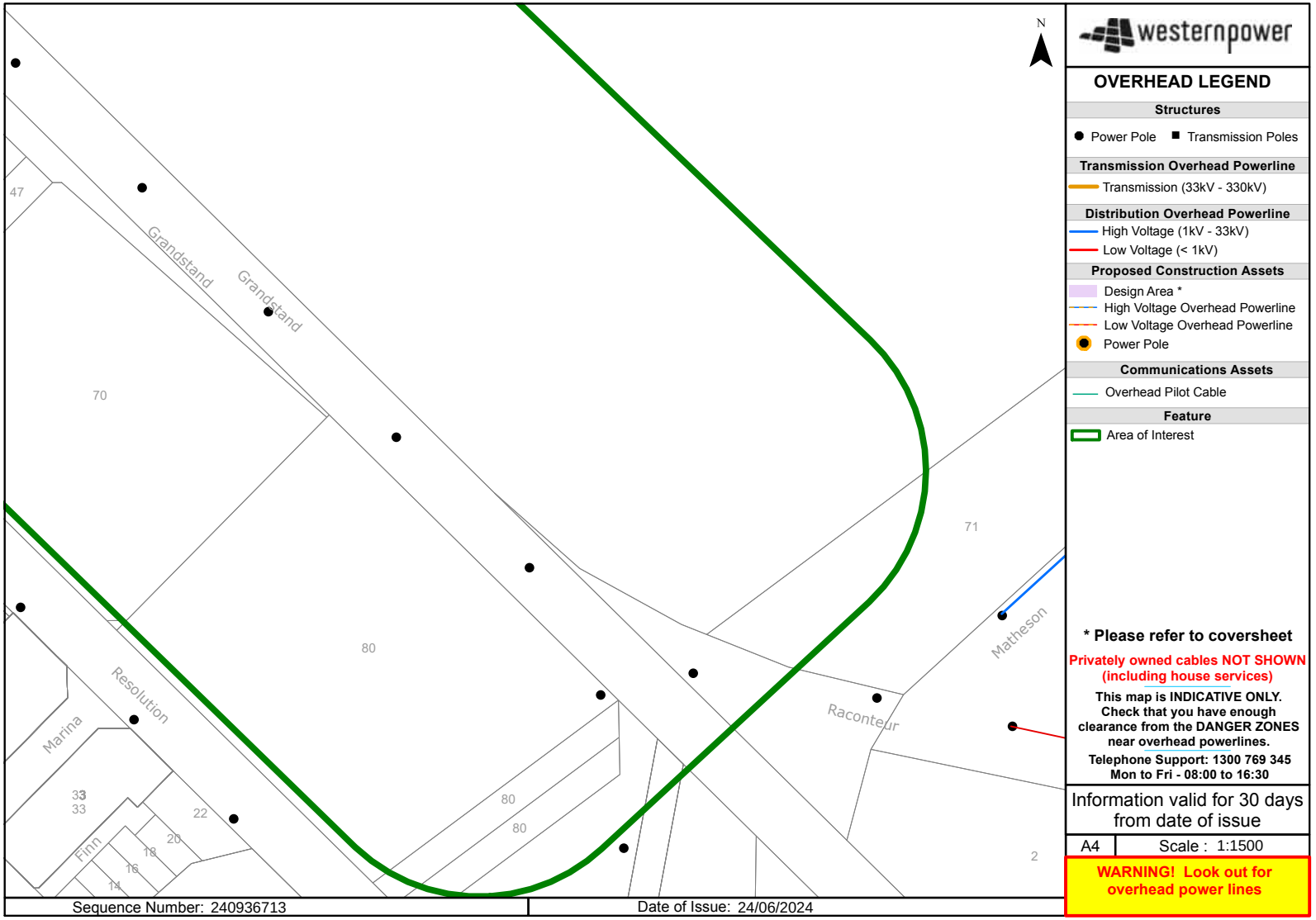
Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report



Attachment 12.1.4 Engineering Servicing Report

Job No 36962214

BEFORE YOU DIG www.byda.com.au

byda.com.au

Contact Details

Contact	Contact number	Company	Enquirer ID
Justin Zielinski	0420 304 451	-	3140642

Email
jzielinski@tabec.com.au

Address
54 Havelock Street
West Perth WA 6005

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
21/06/2024	24/06/2024	24/06/2024	Private	Design	Both Road	Subdivision



Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
Precinct A	75 Grandstand Road Ascot WA 6104	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

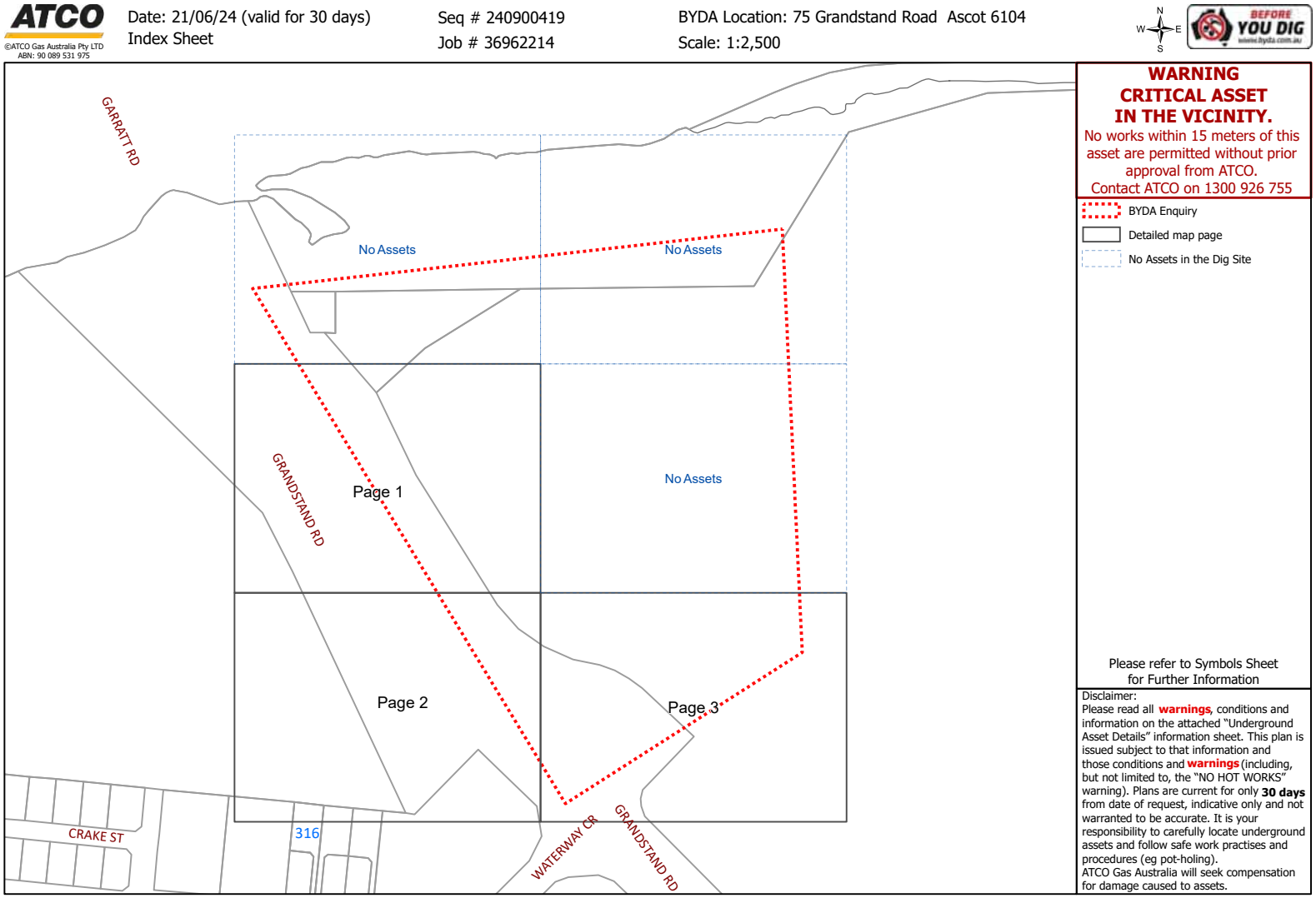
Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
240900419	ATCO Gas Australia	1300 926 755	NOTIFIED
240900415	NBN Co (WA)	1800 687 626	NOTIFIED
240900413	Optus (WA)	1800 505 777	NOTIFIED
240900417	Telstra (WA)	1800 653 935	NOTIFIED
240900414	TPG Telecom (WA)	1800 786 306	NOTIFIED
240900418	Water Corporation	13 13 95	NOTIFIED
240900416	Western Power	13 10 87	NOTIFIED

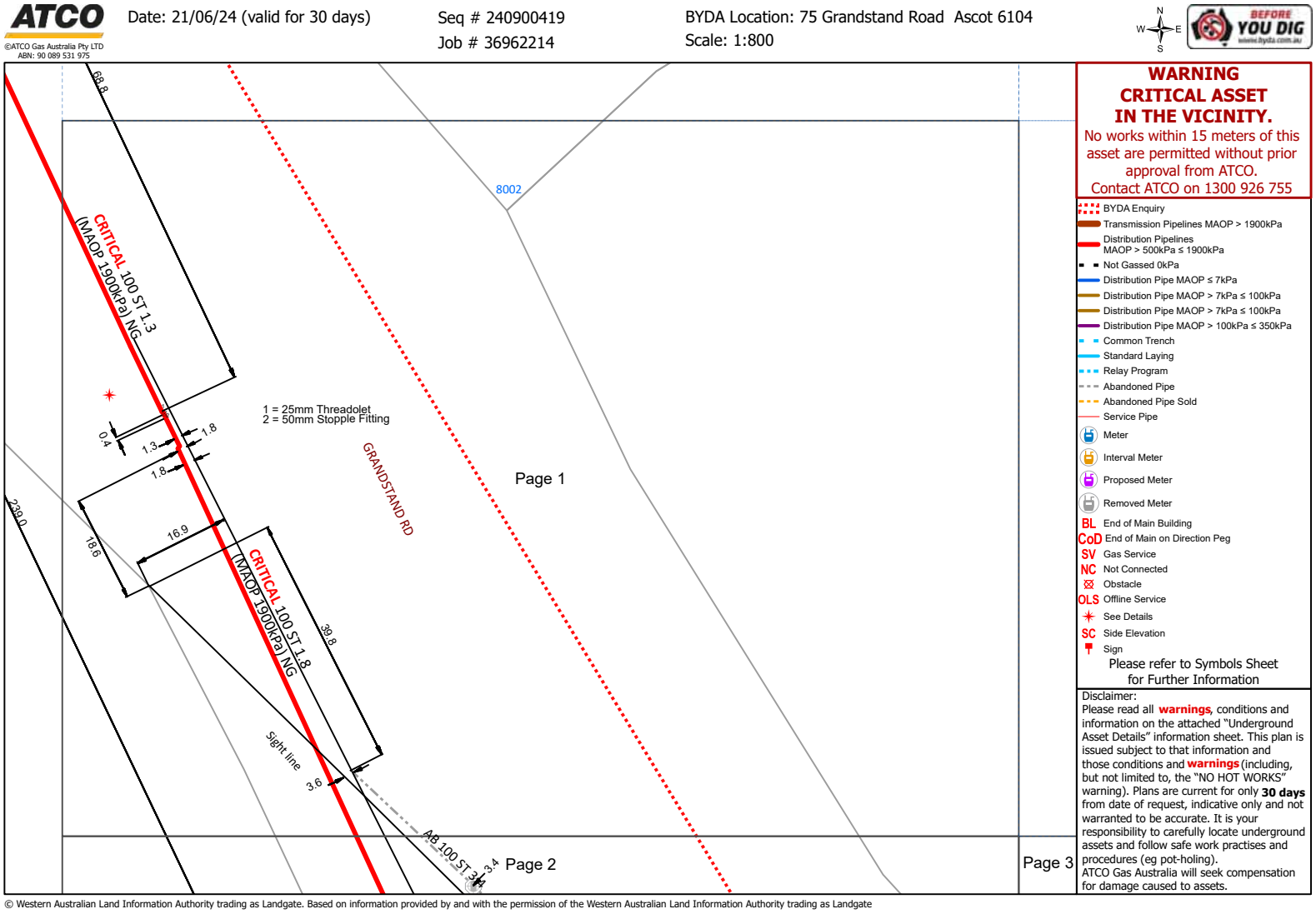
END OF UTILITIES LIST

Lodge your FREE enquiry online any time at byda.com.au

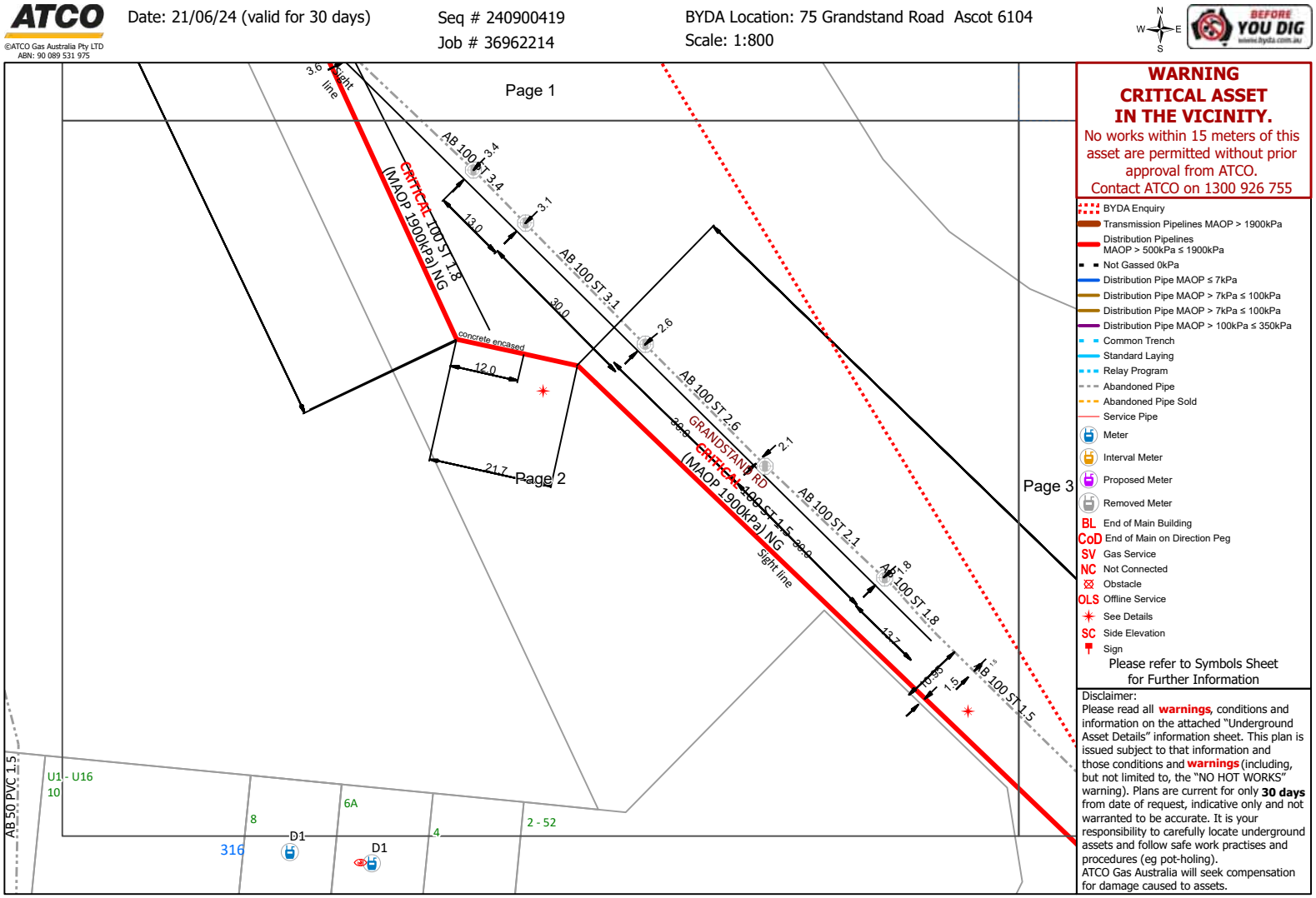
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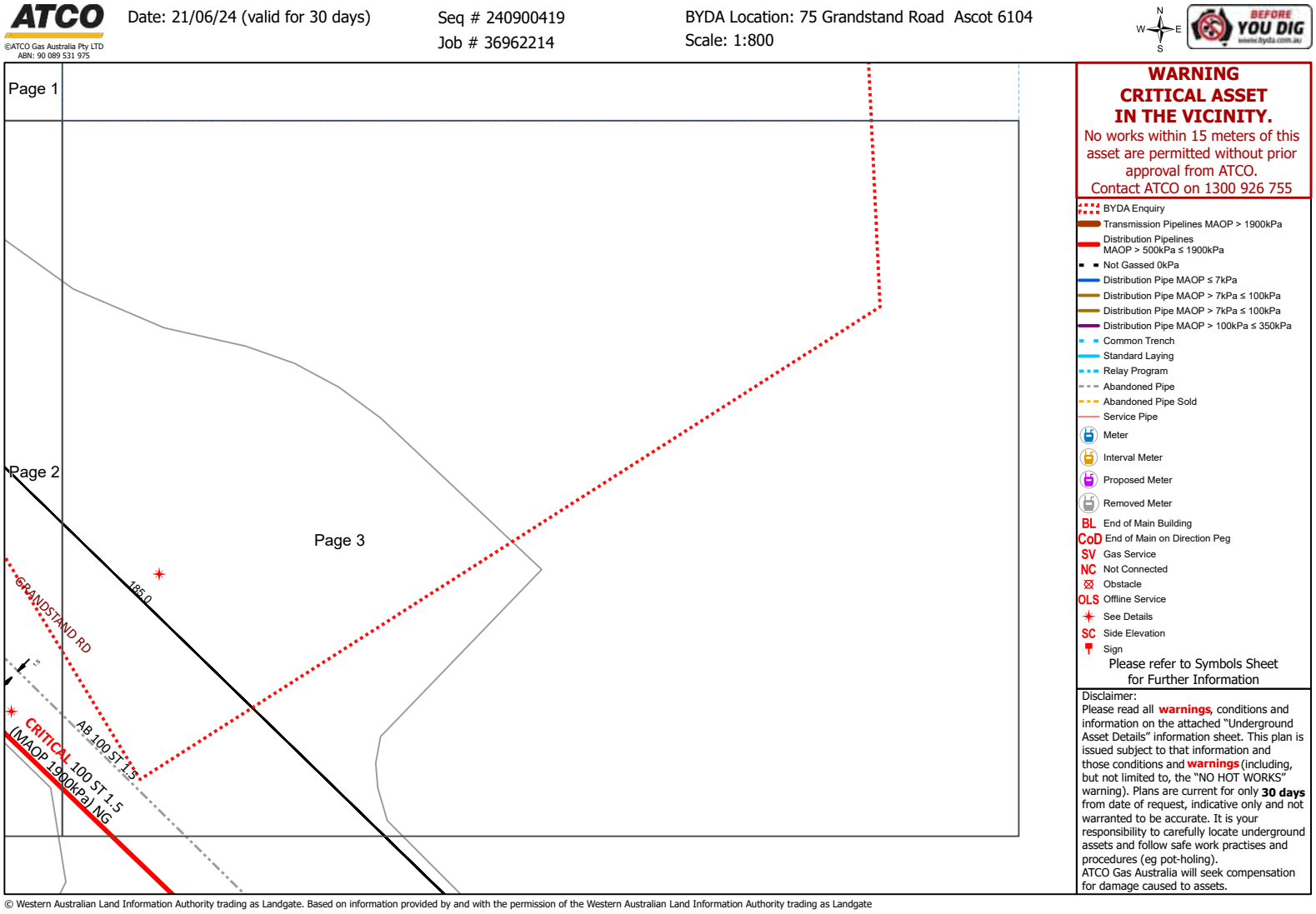


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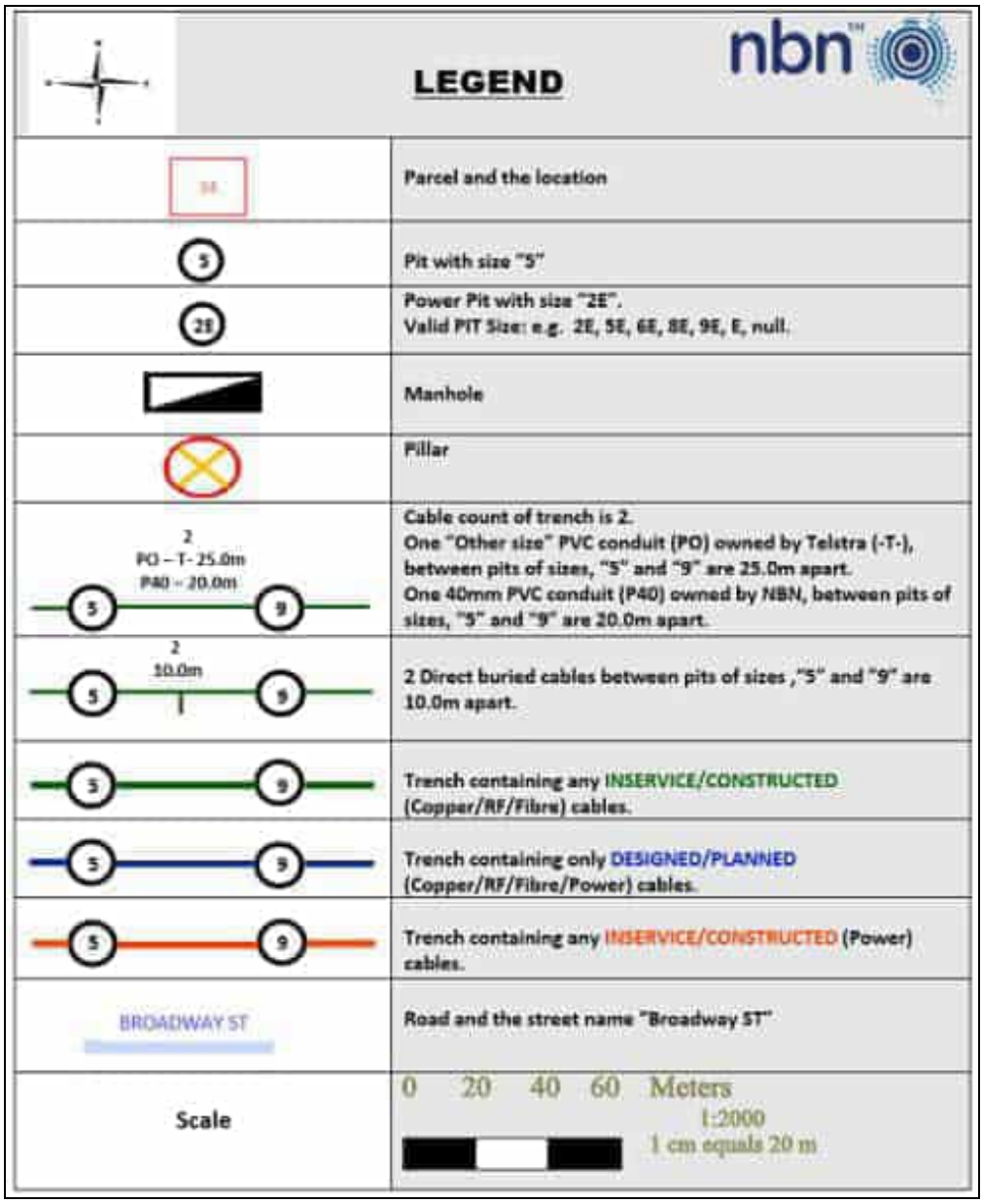
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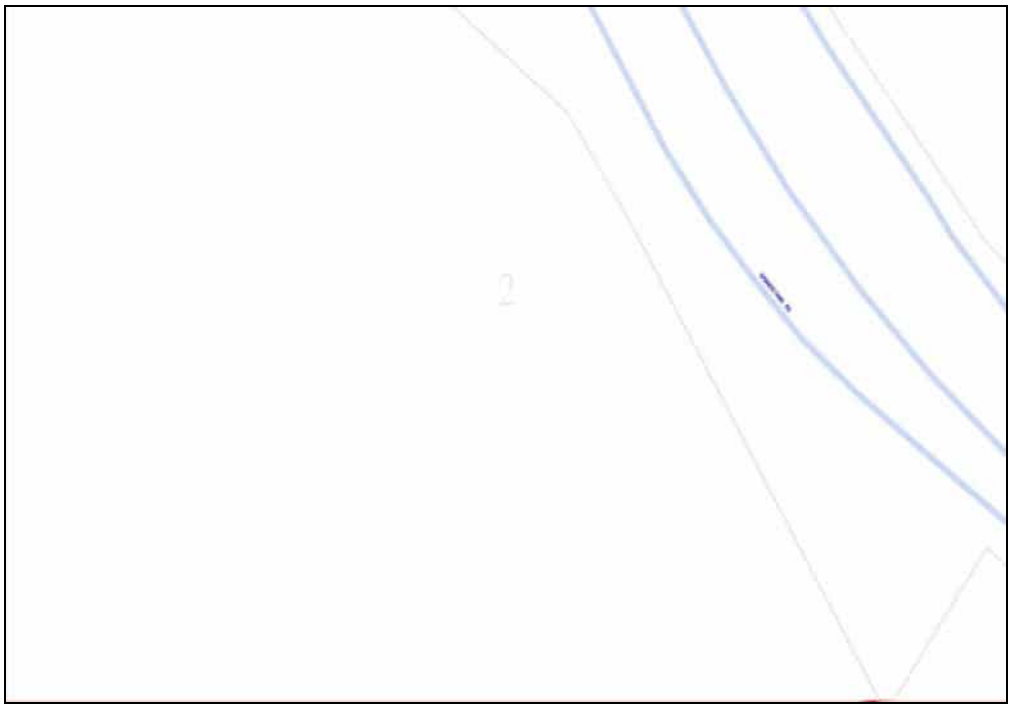


LEGEND	
14	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
2 PO – T- 25.0m P40 – 20.0m 5 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 9	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
5 9	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m

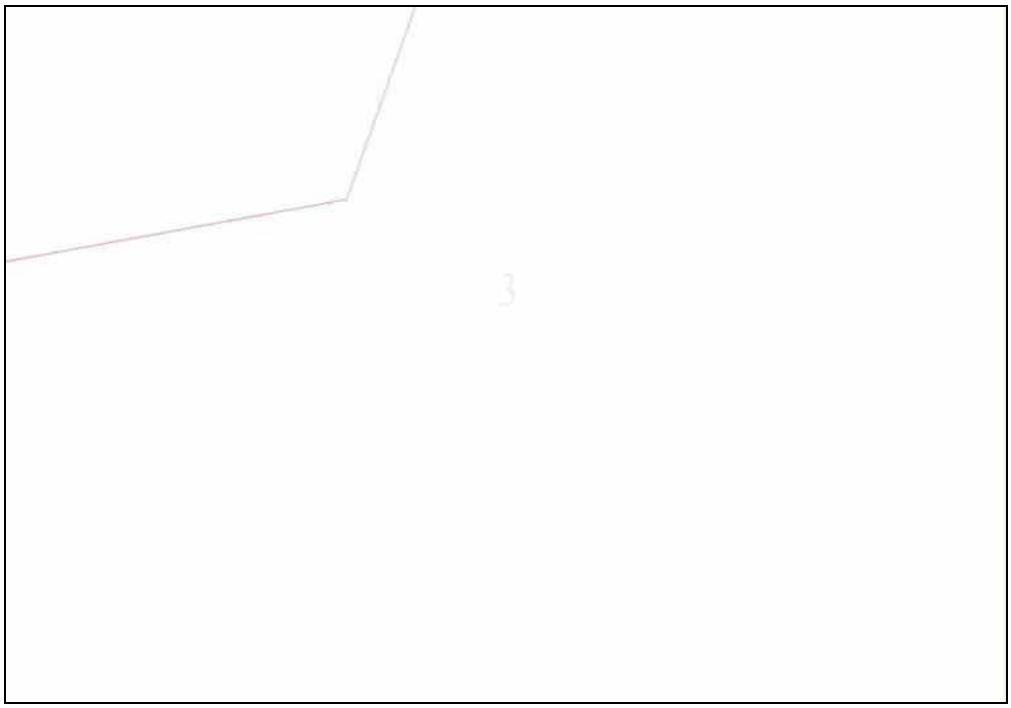
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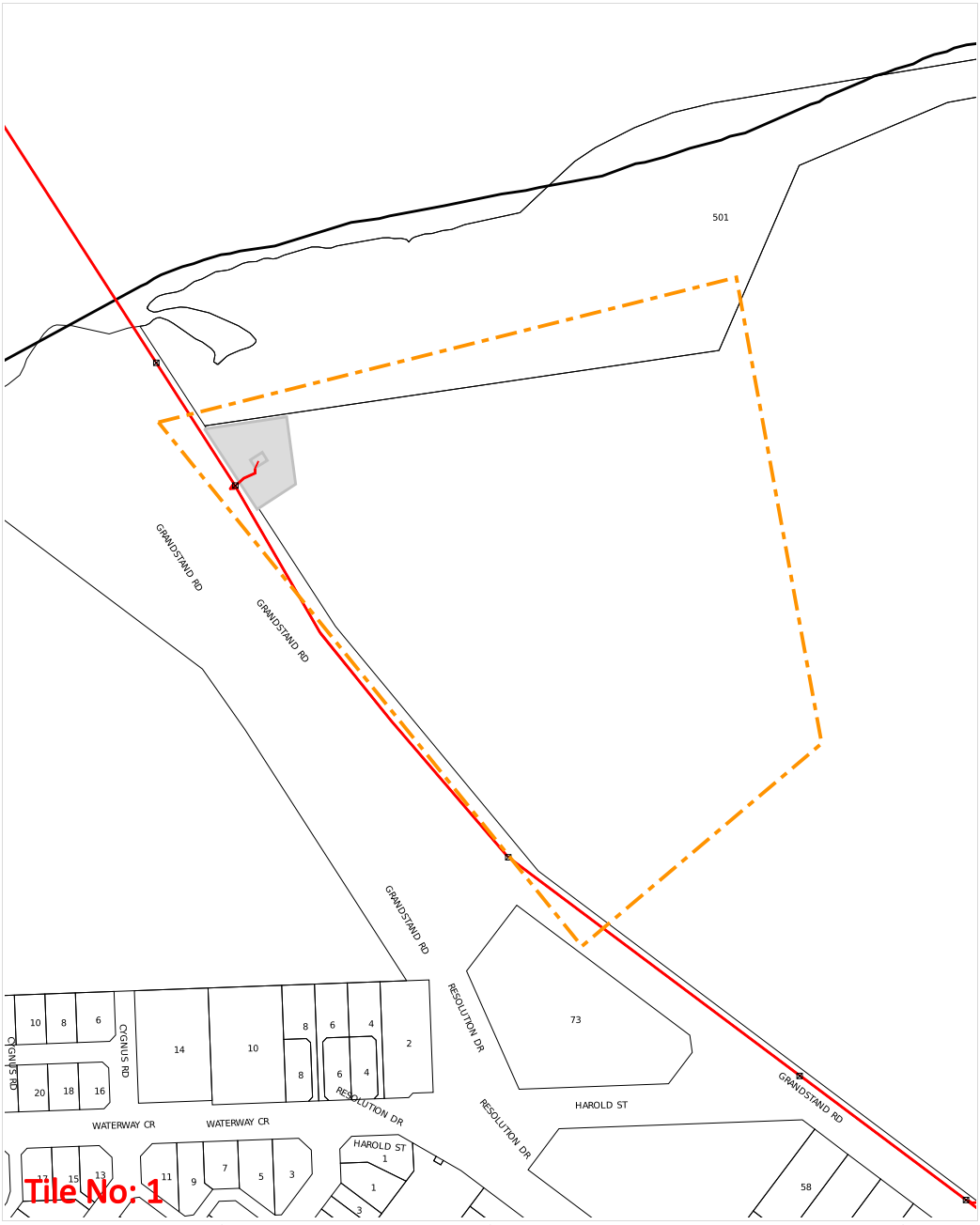
Attachment 12.1.4 Engineering Servicing Report



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of.
Notification may be by telephone - 1800 626 329.

Attachment 12.1.4 Engineering Servicing Report



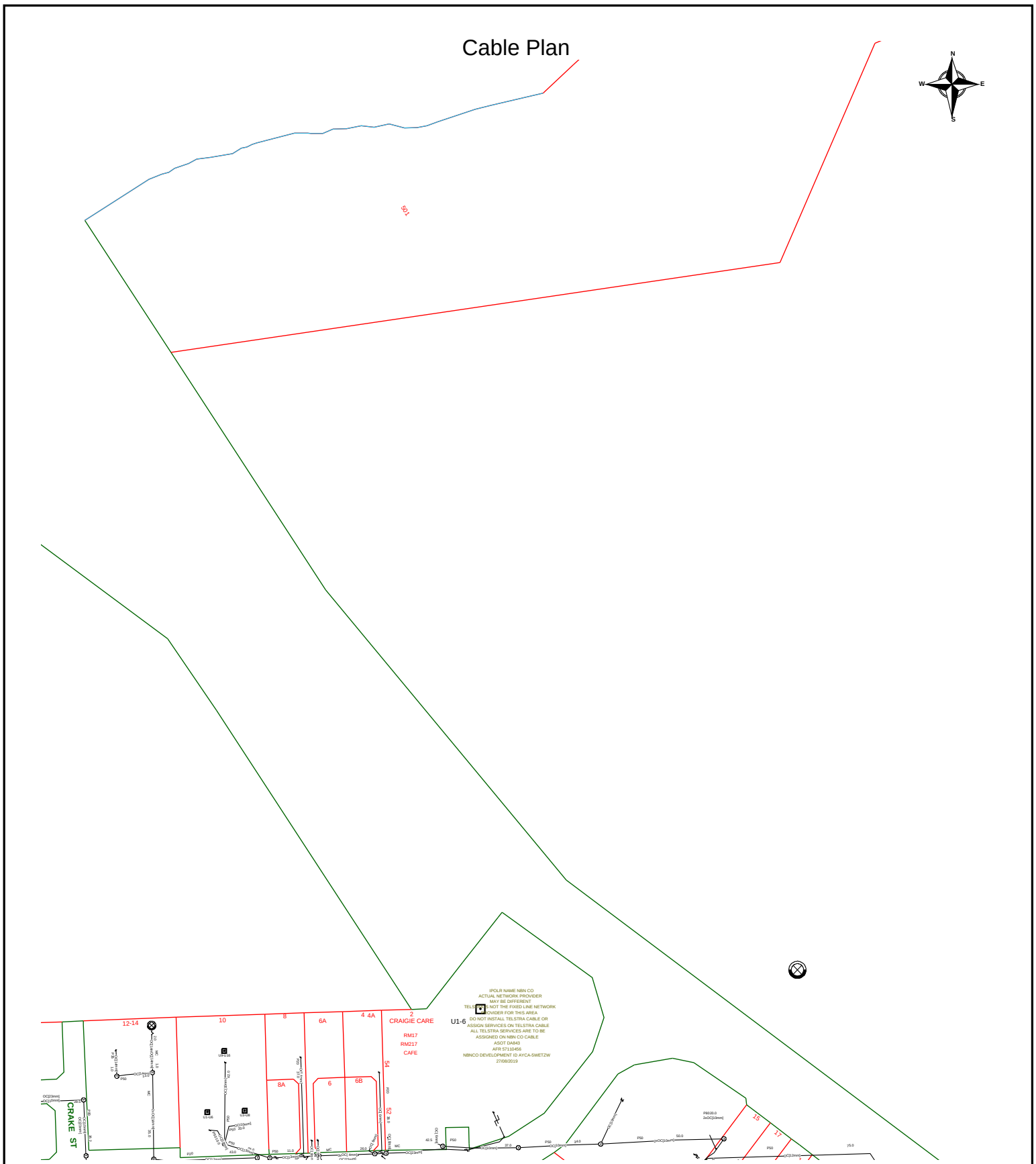
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Sequence Number: 240900413 Date Generated: 21 Jun 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

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Attachment 12.1.4 Engineering Servicing Report



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 240900417
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 21/06/2024 19:05:14	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

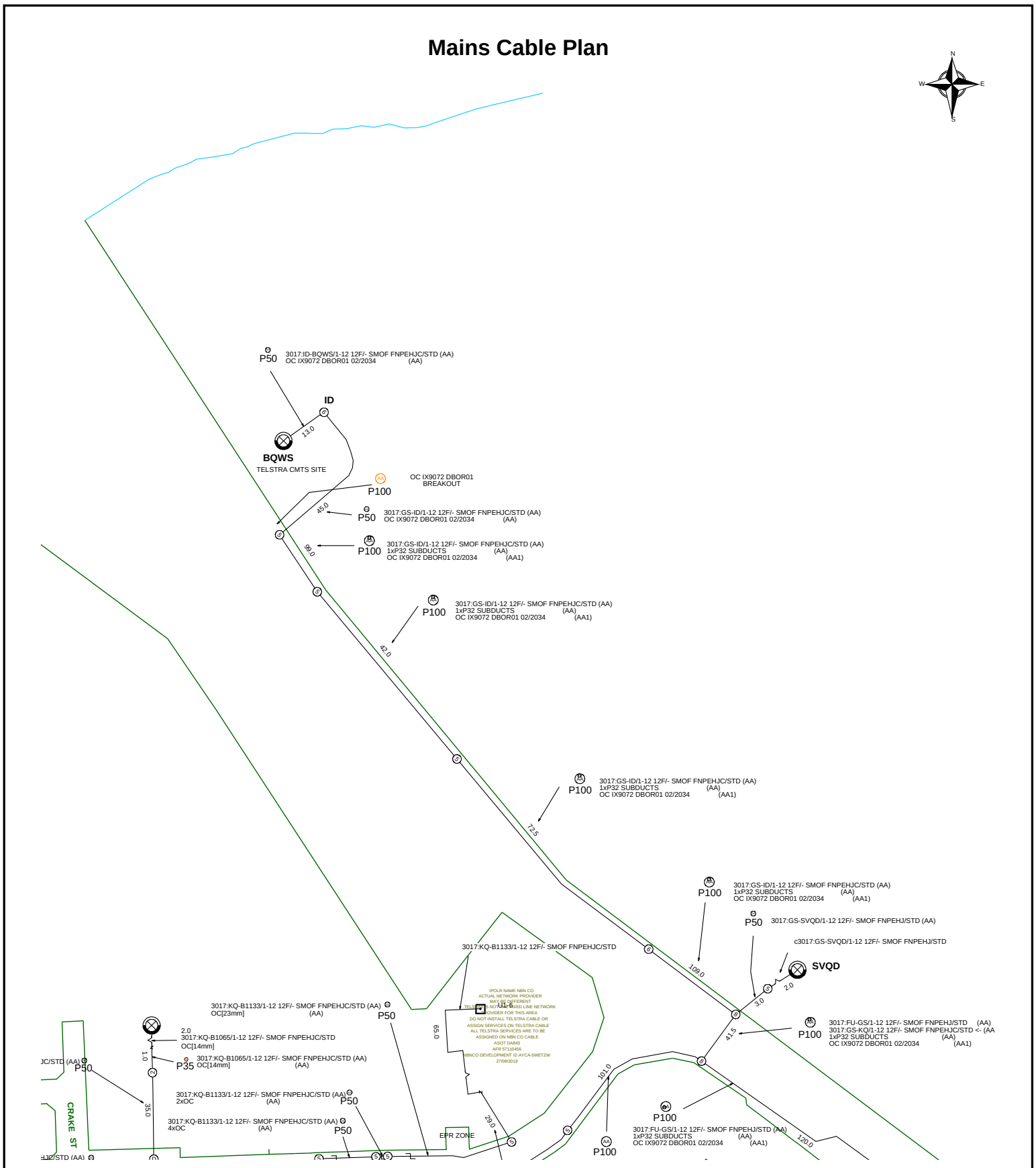
WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Page 1 of 2

Attachment 12.1.4 Engineering Servicing Report

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment
Ph - 13 22 03
Email - Telstra.Plans@team.telstra.com
Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries

TELSTRA LIMITED A.C.N. 086 174 781

Generated On 21/06/2024 19:05:16

Sequence Number: 240900417

CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
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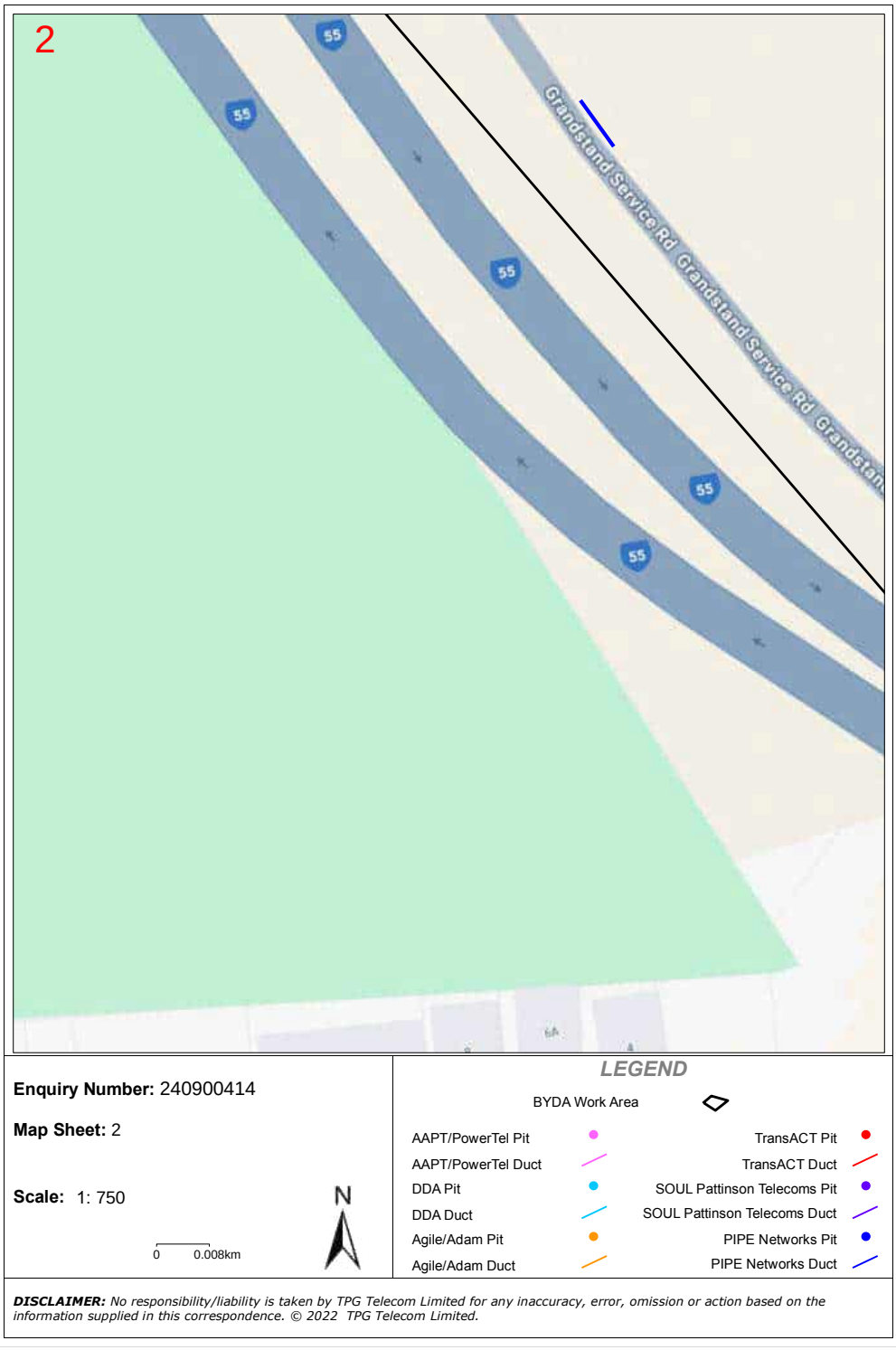
Page 2 of 2

Attachment 12.1.4 Engineering Servicing Report



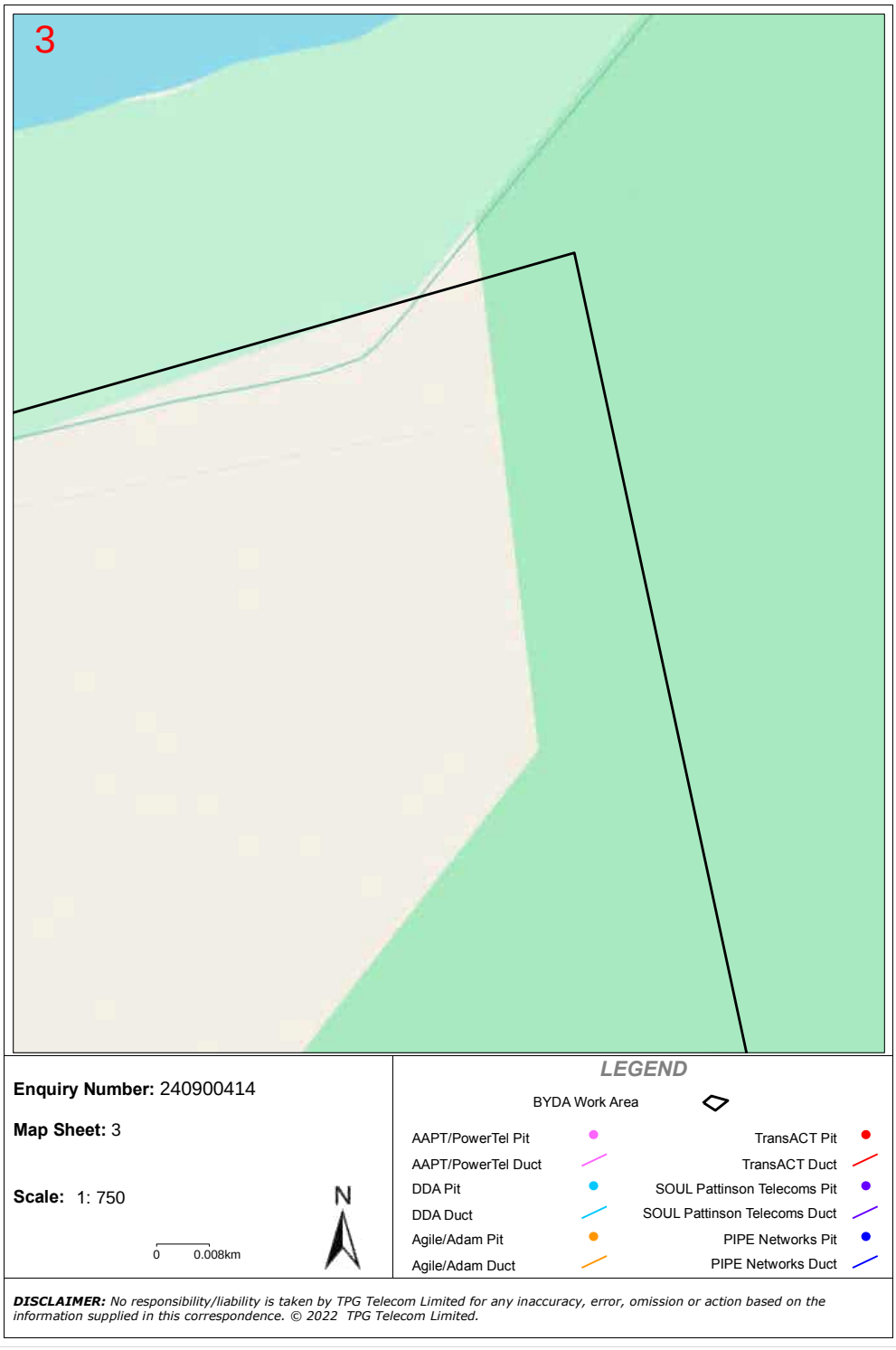
Page 3

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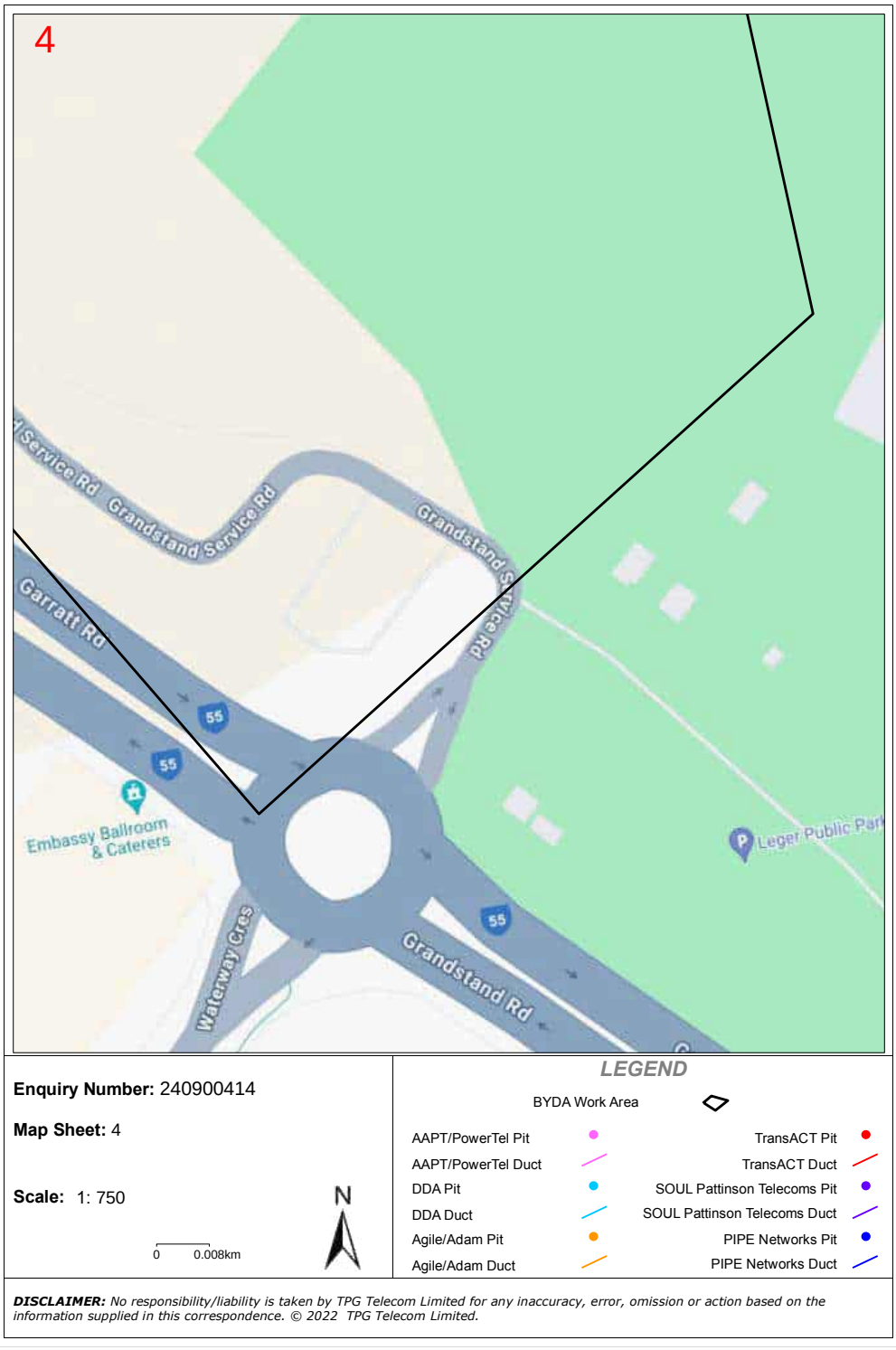
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Page 5

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Enquiry Number: 240900414

Map Sheet: 4

Scale: 1: 750

0 0.008km

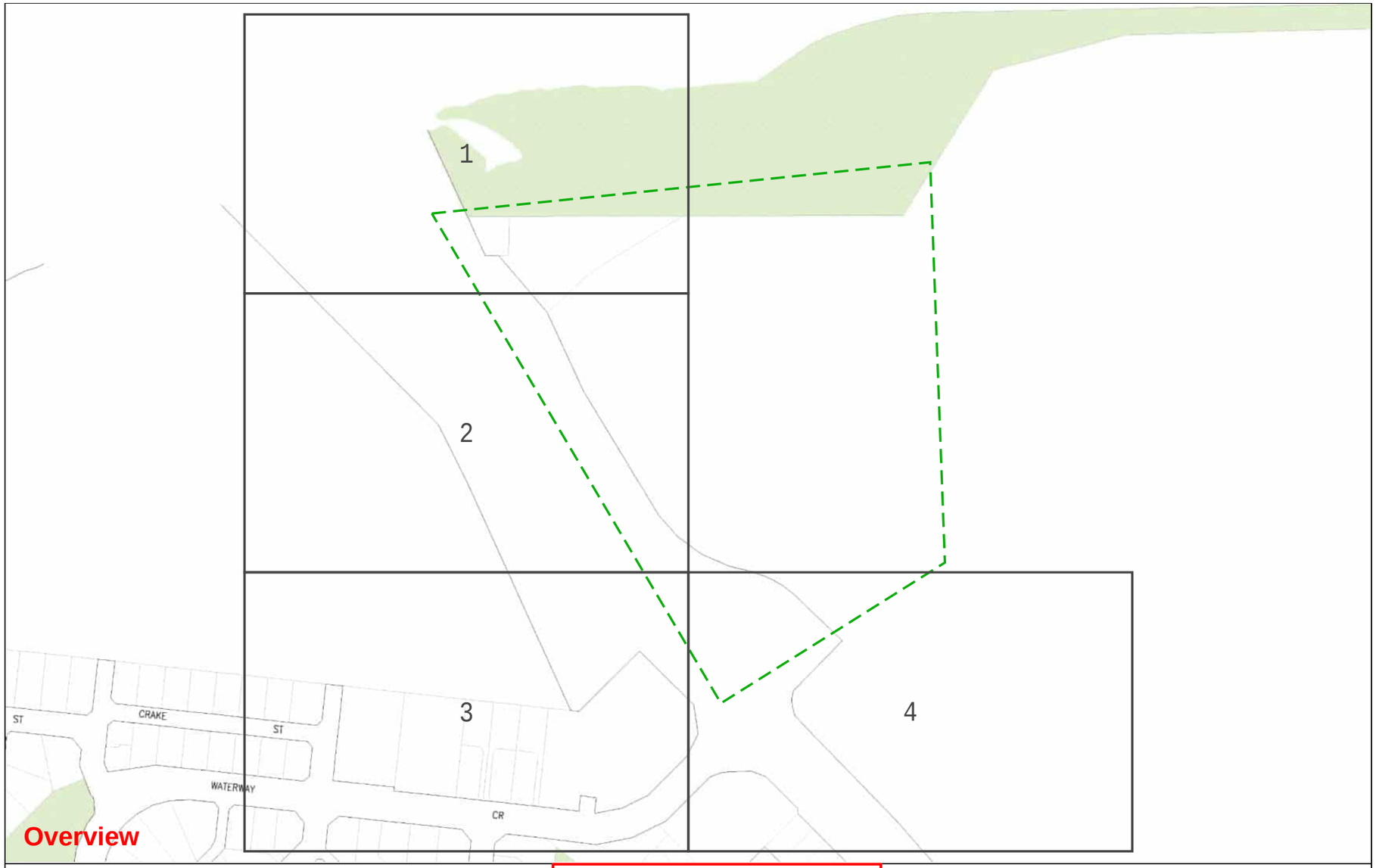
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LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

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WATER CORPORATION

Scale: 1:2306
Job No.: 36962214
Sequence No.: 240900418
Print Date: 21 Jun 2024

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Water

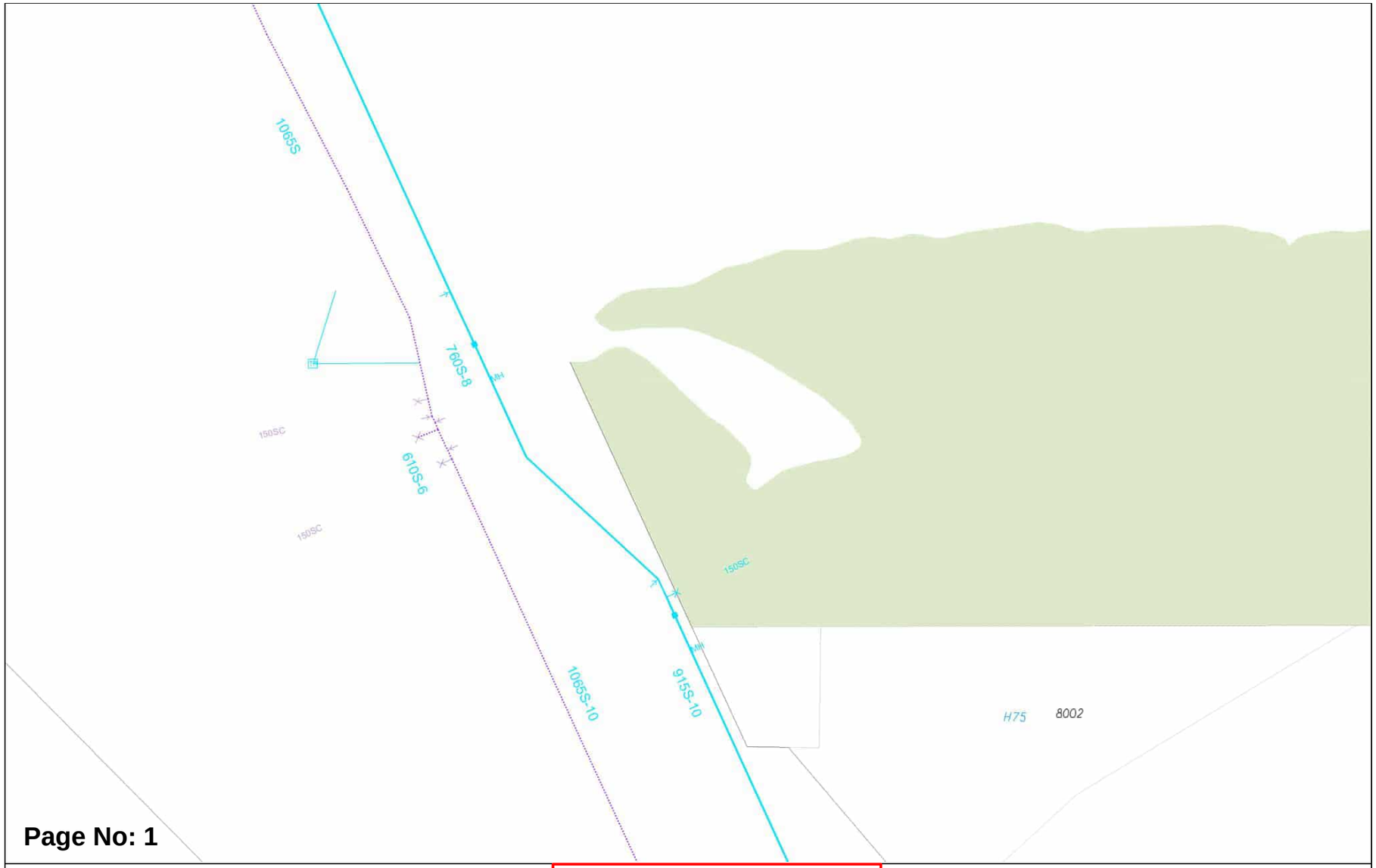
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Page No: 1

WATER CORPORATION

Scale: 1:750
Job No.: 36962214
Sequence No.: 240900418
Print Date: 21 Jun 2024

Water

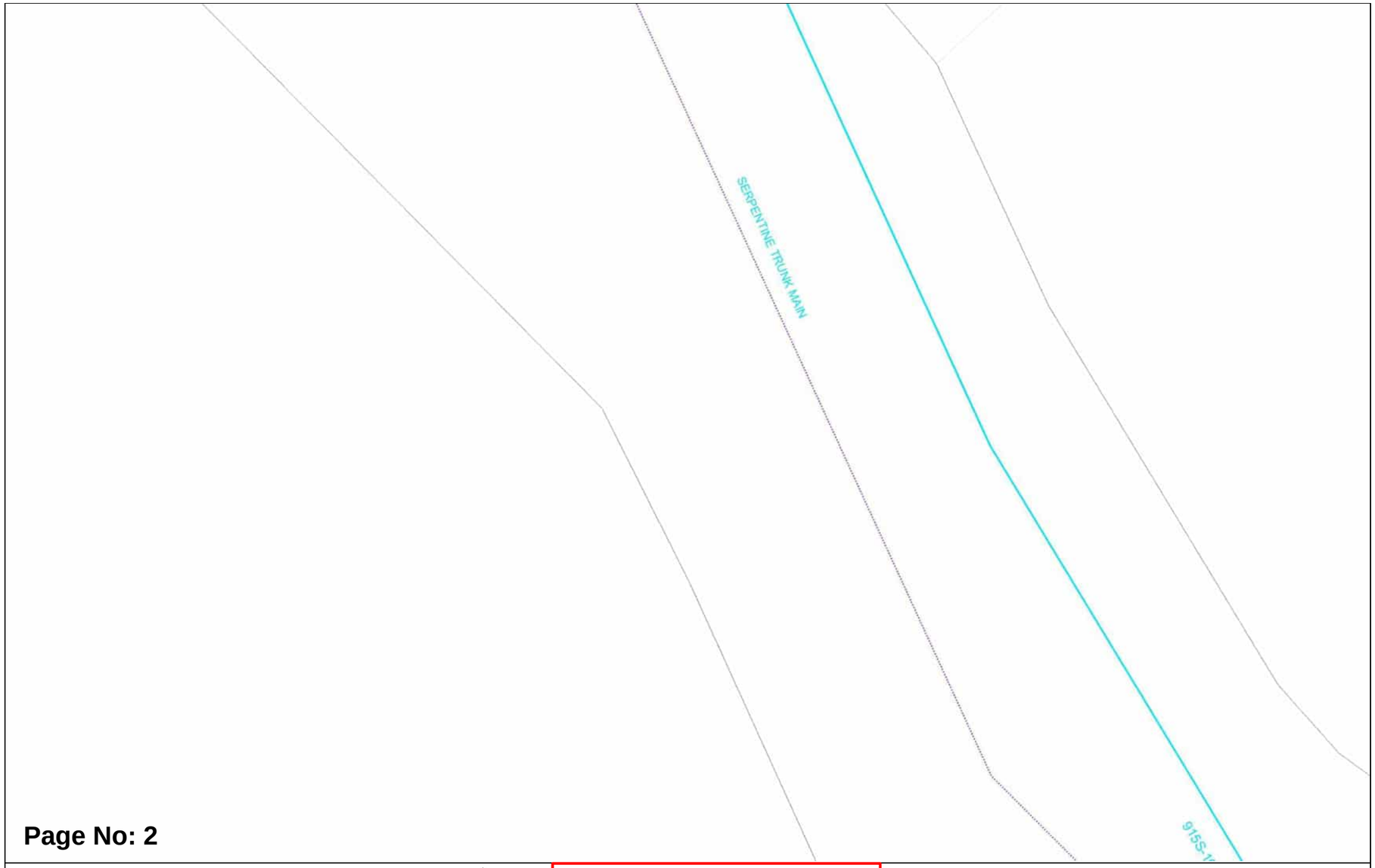
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Page No: 2

WATER CORPORATION

Scale: 1:750
Job No.: 36962214
Sequence No.: 240900418
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N

Water

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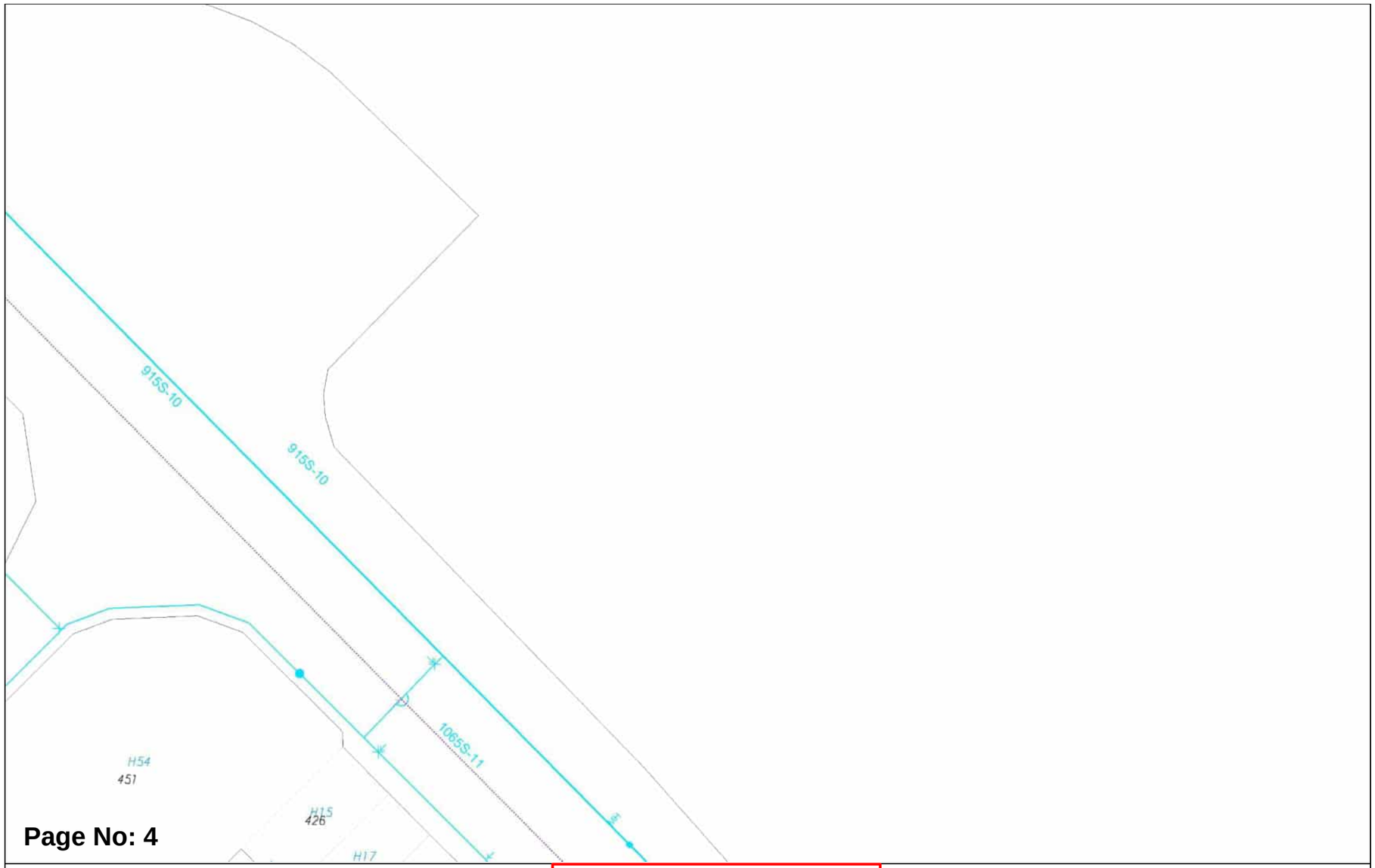
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Page No: 4

WATER CORPORATION

Scale: 1:750
Job No.: 36962214
Sequence No.: 240900418
Print Date: 21 Jun 2024

N
Water

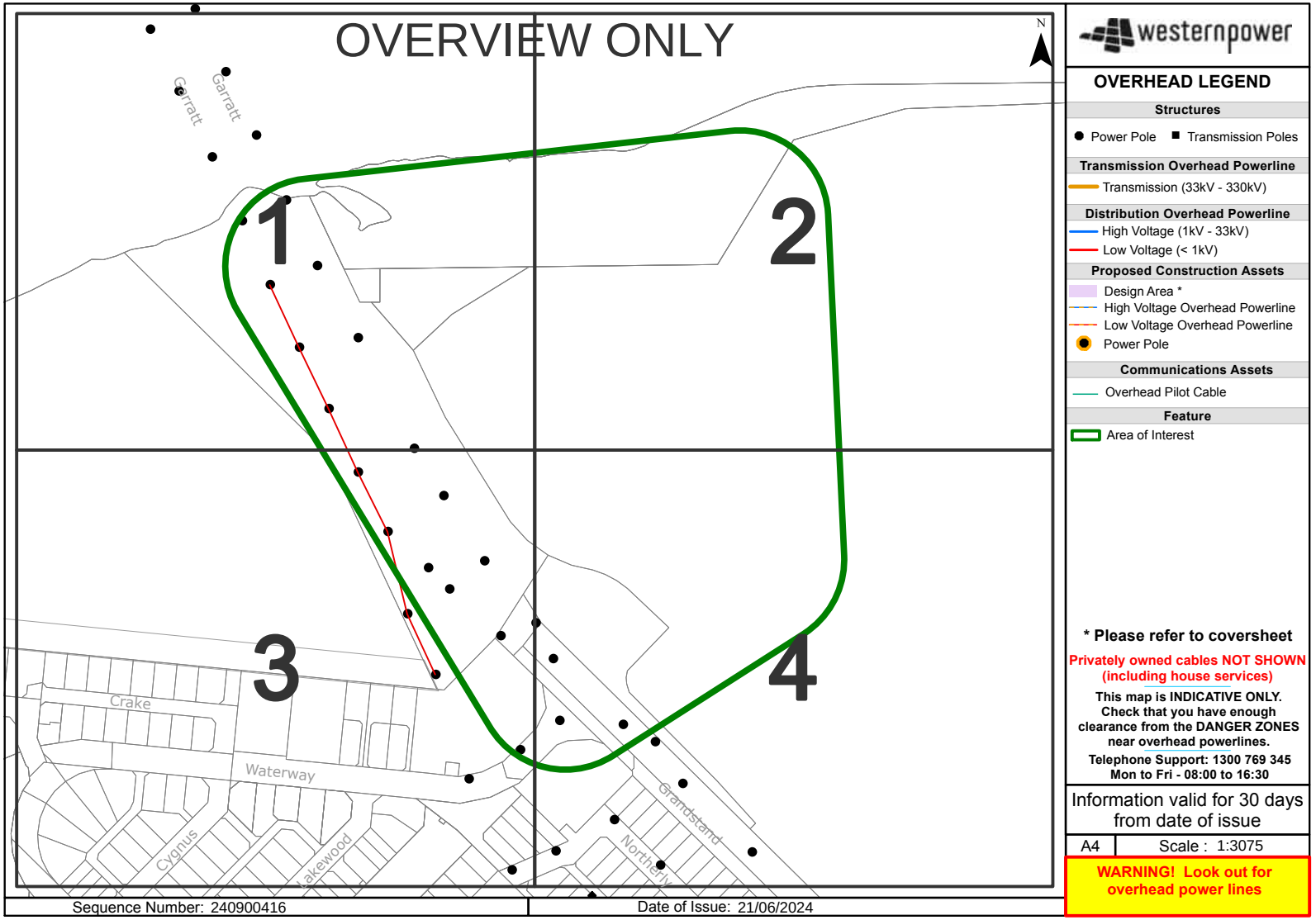
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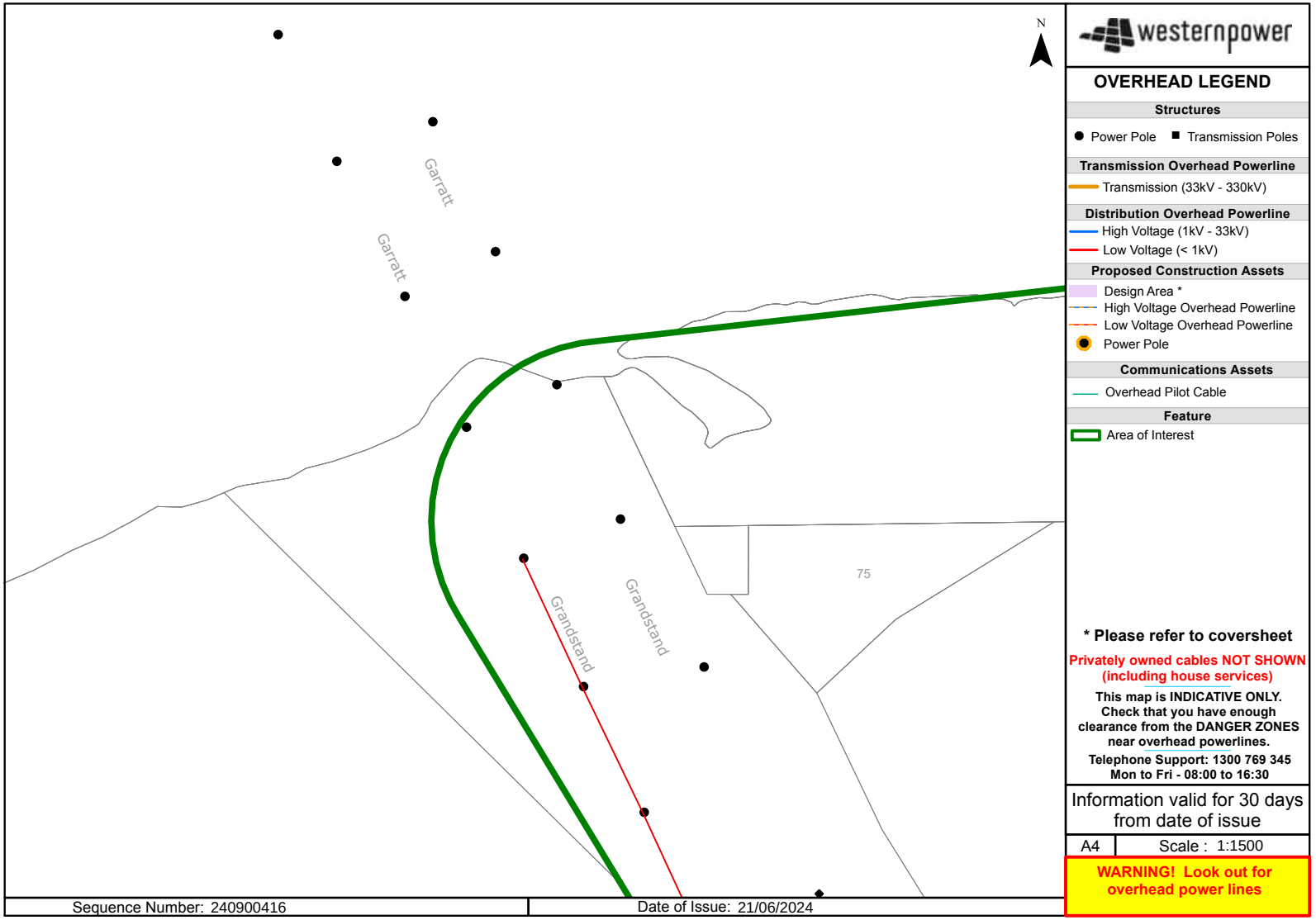
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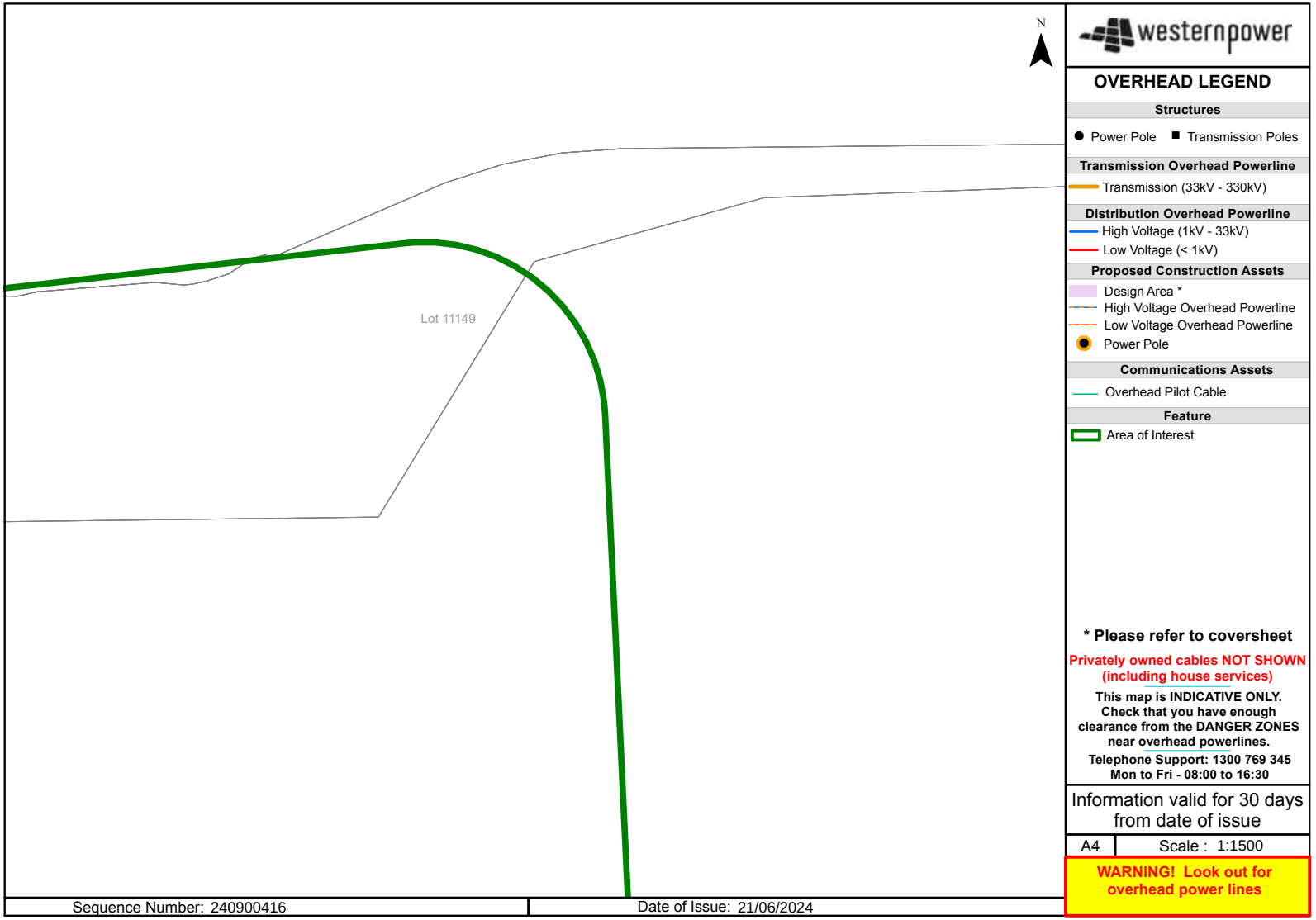
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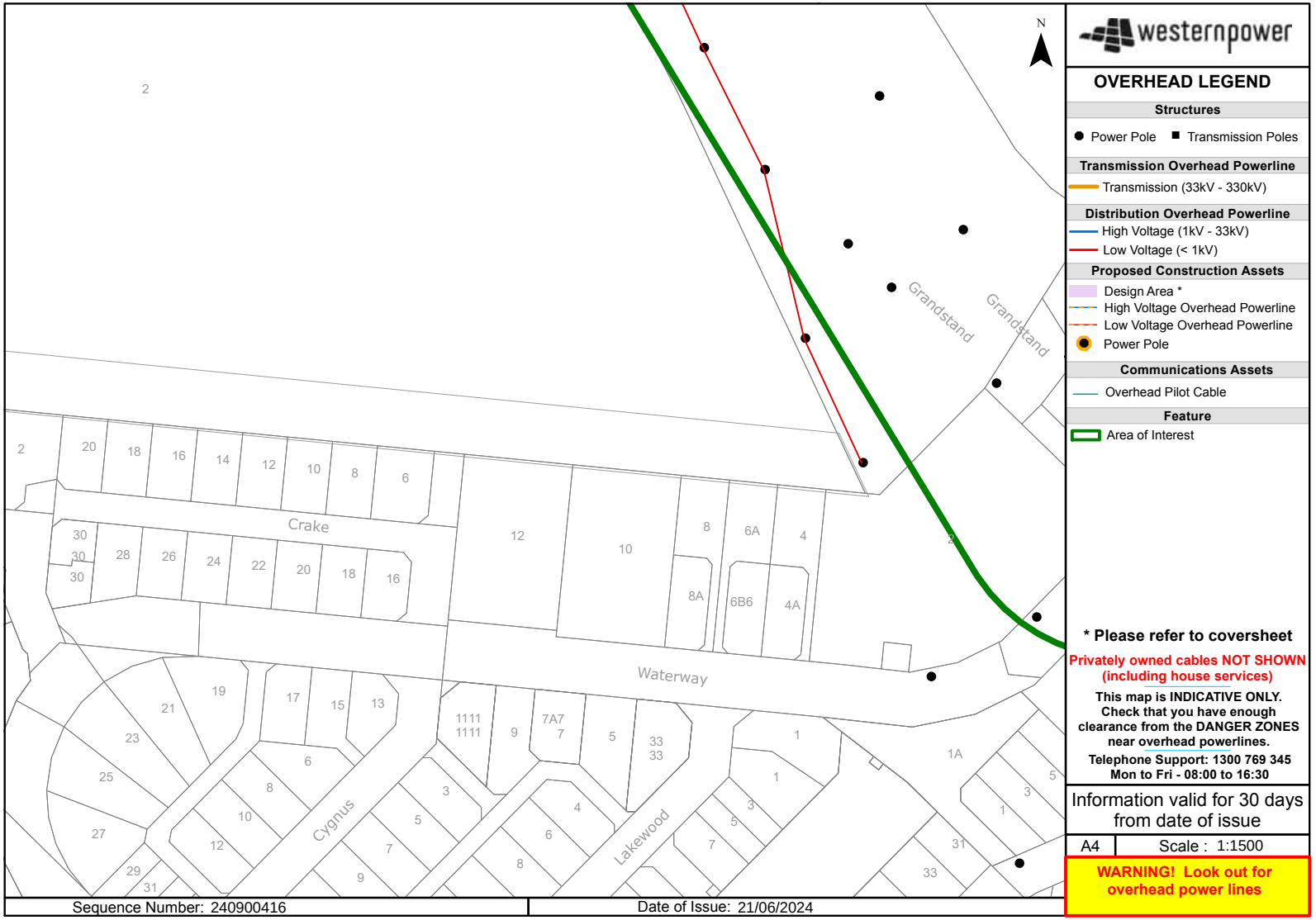
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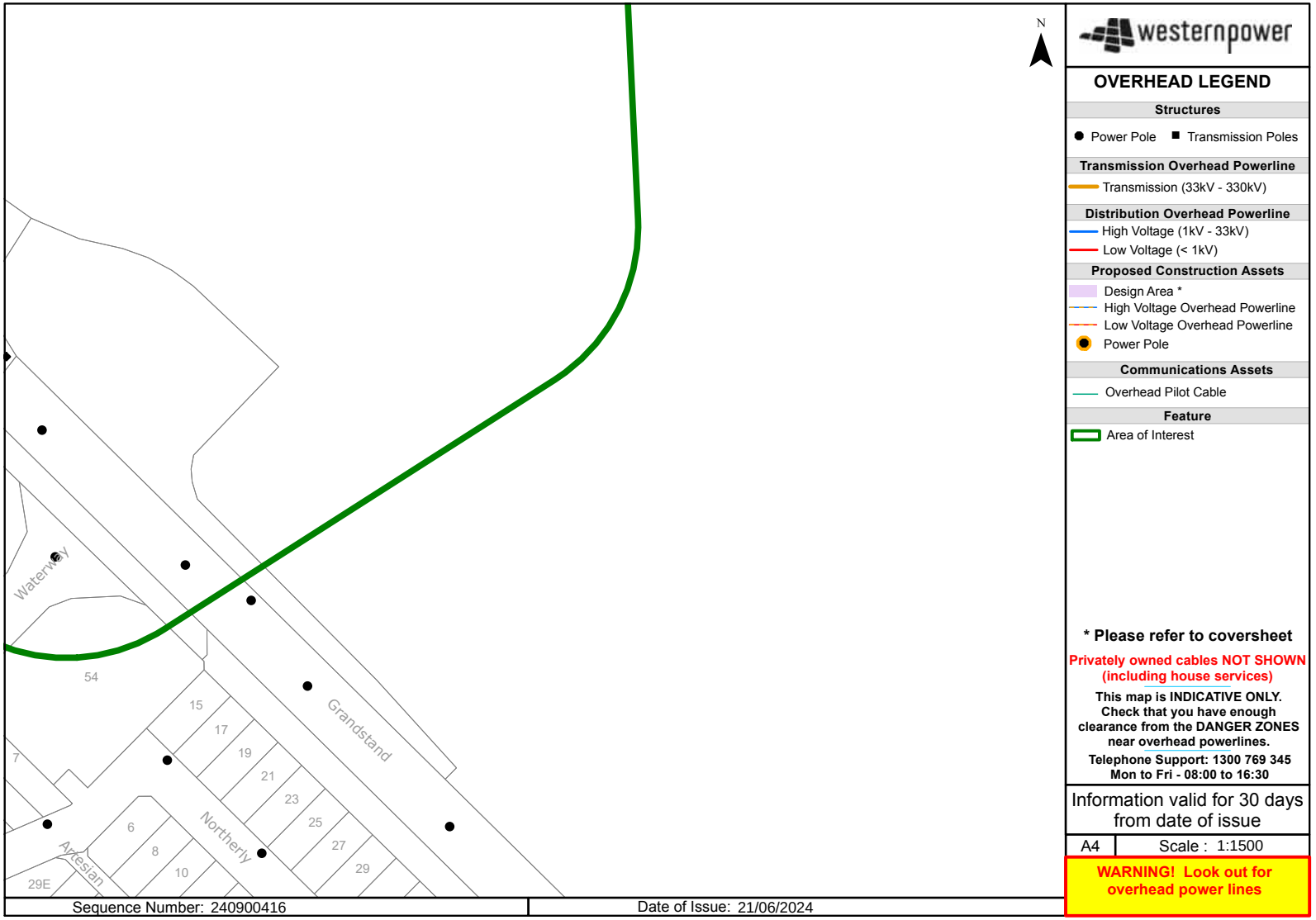
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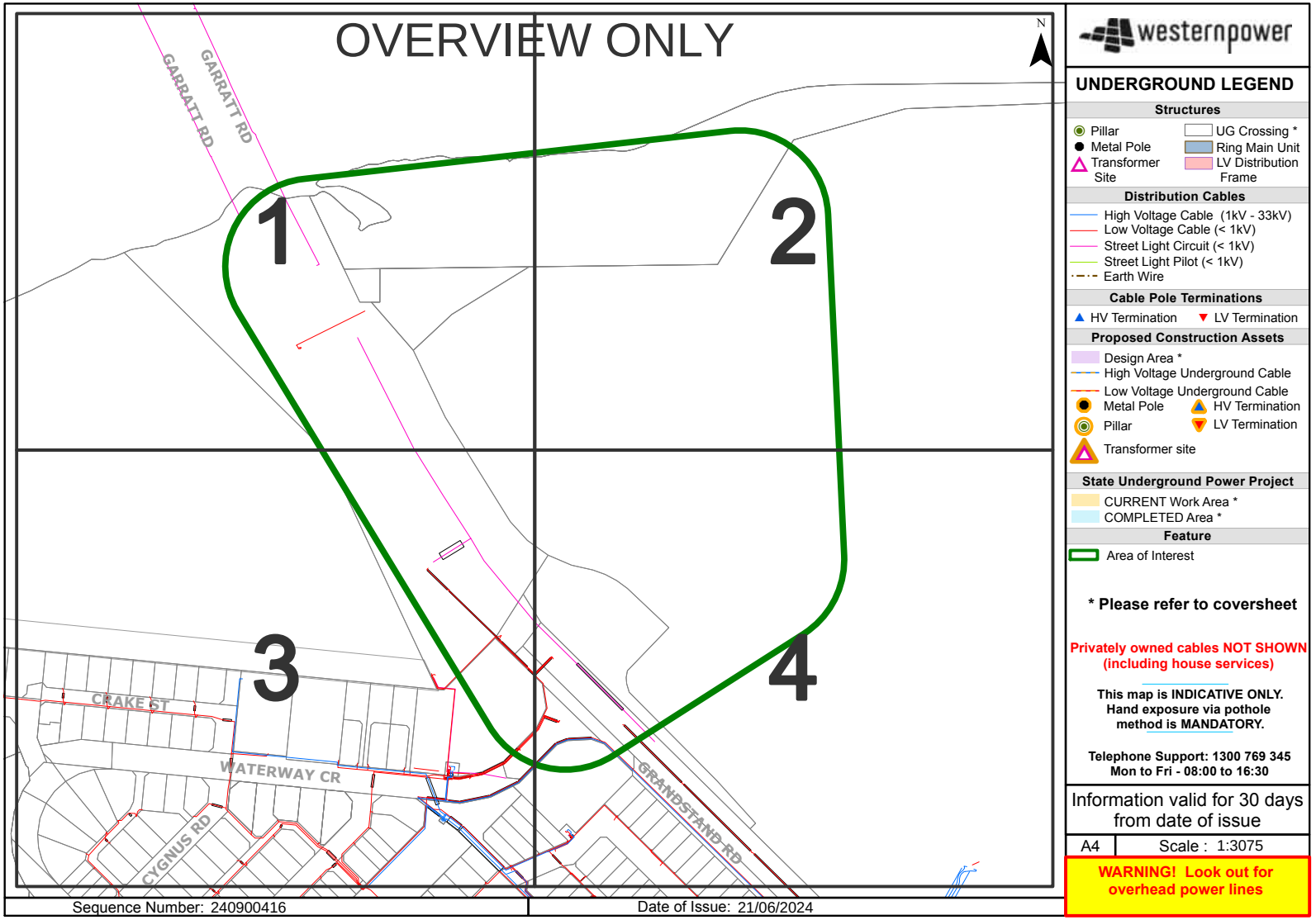
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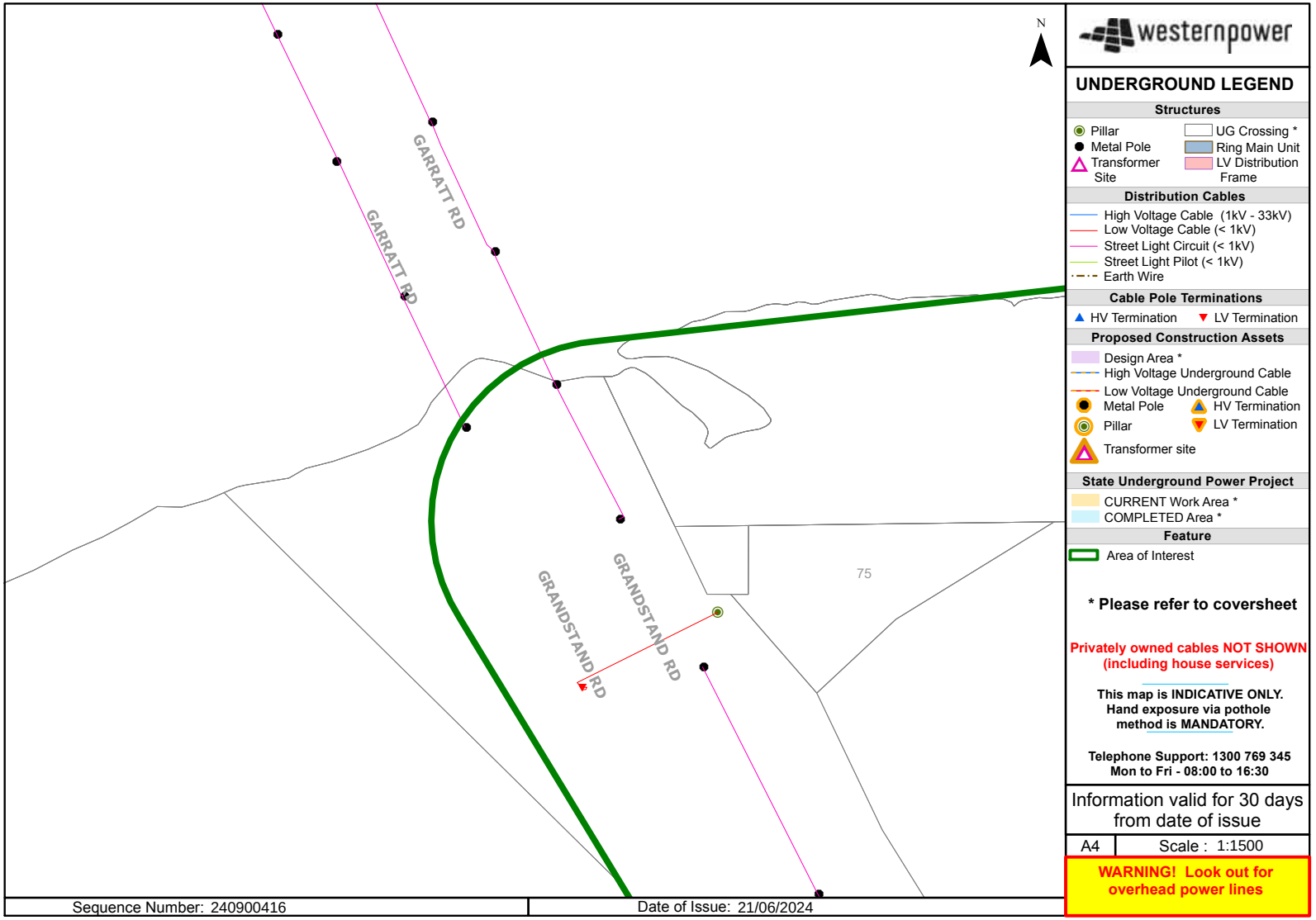
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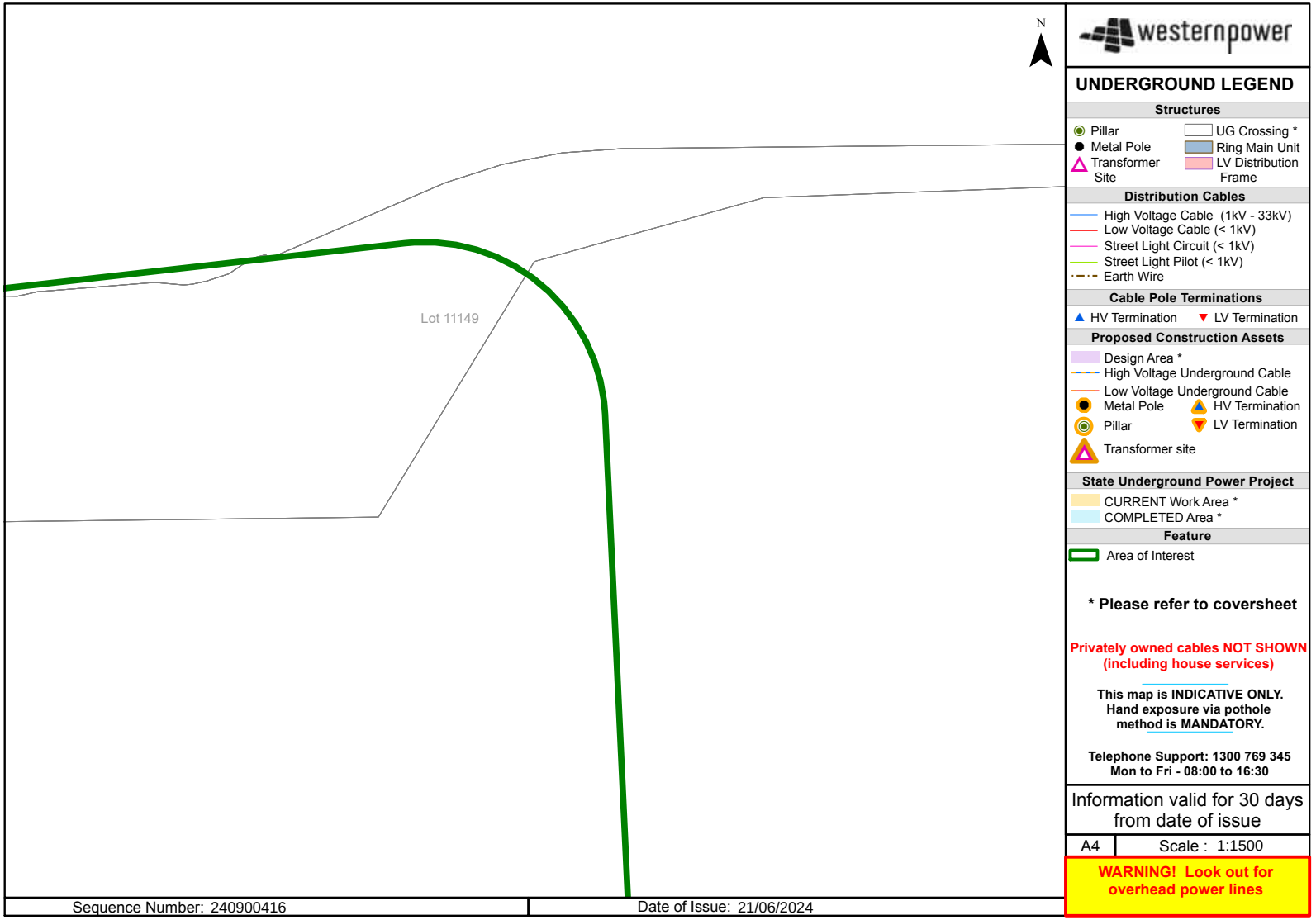
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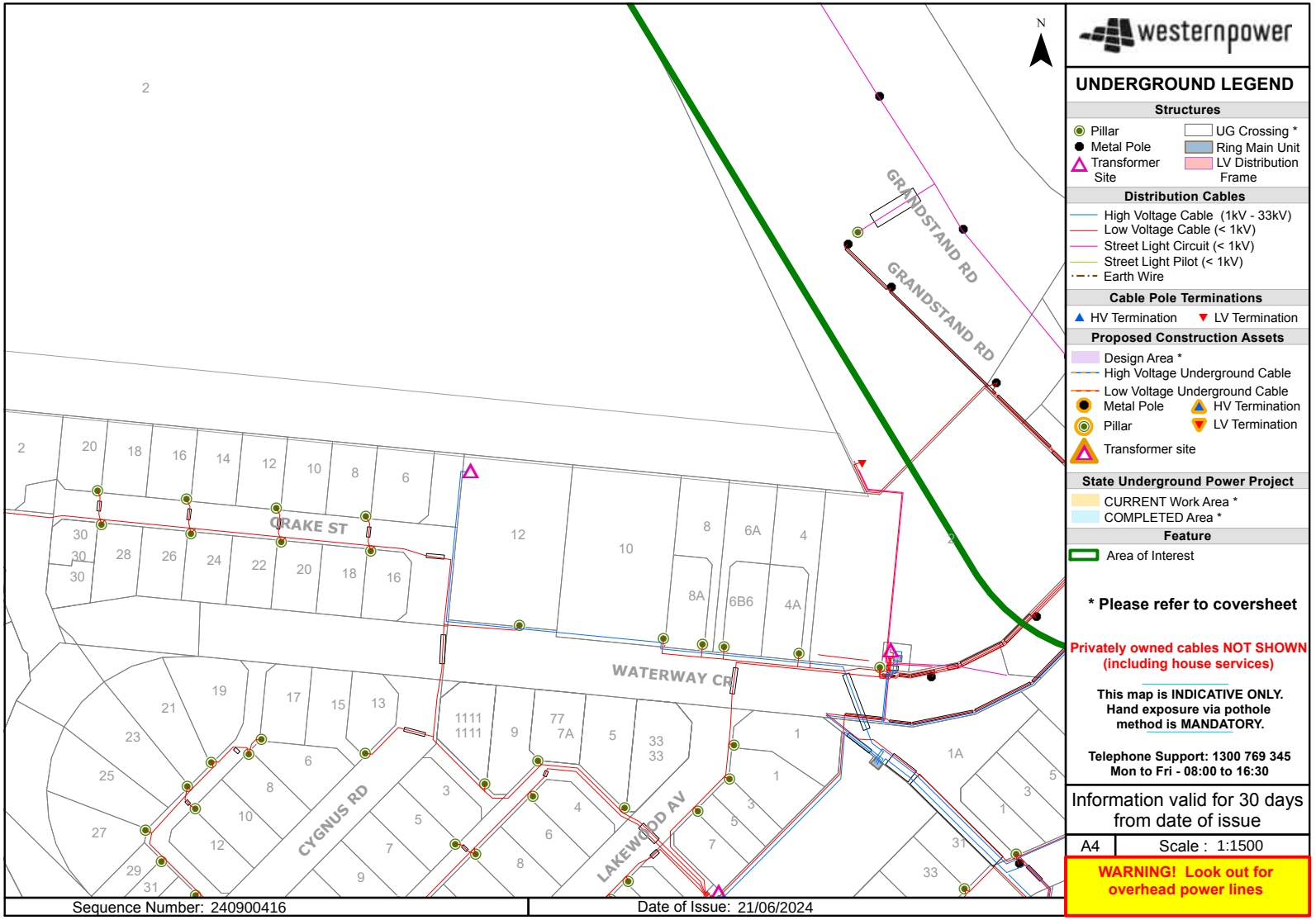
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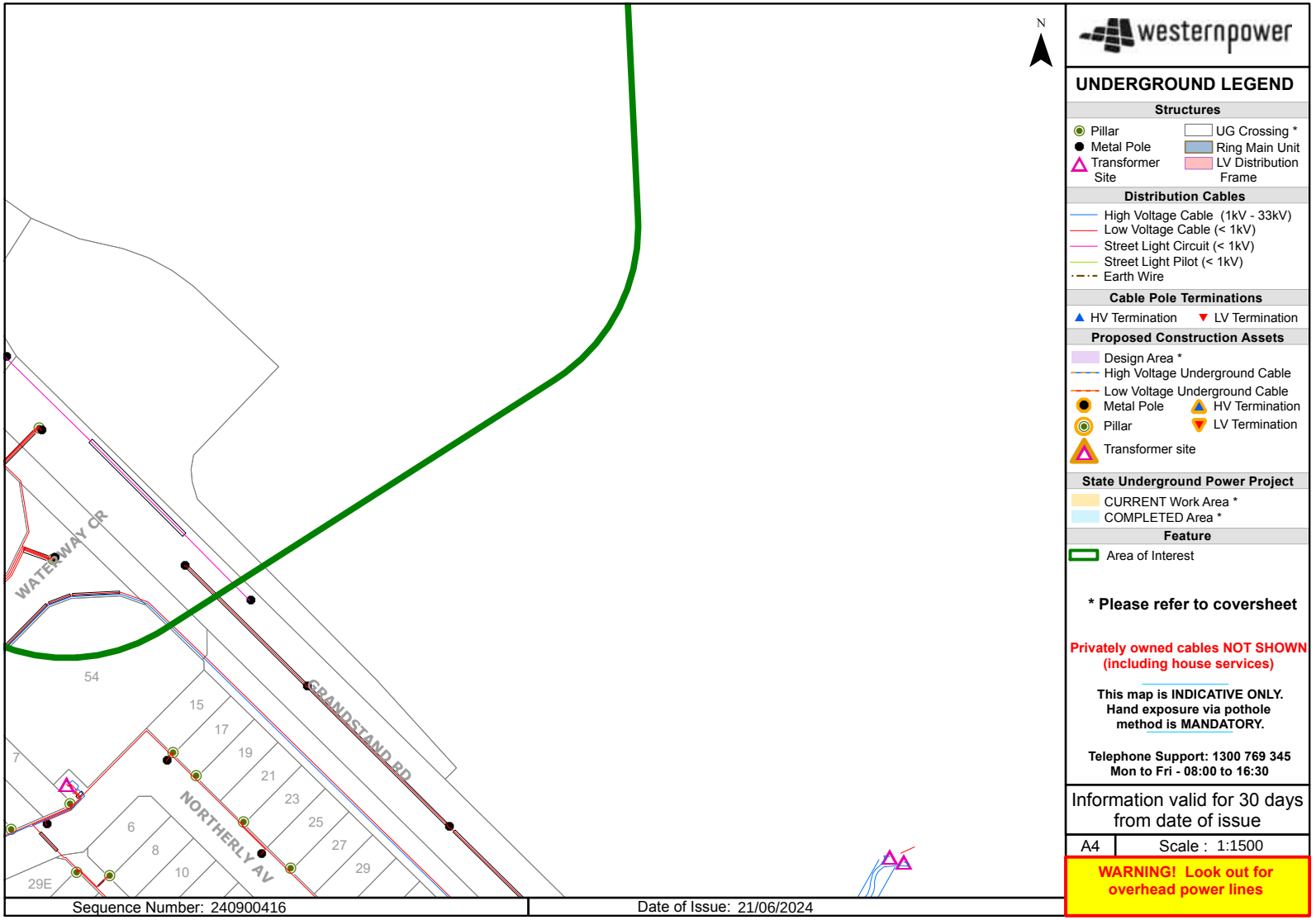
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Perth Racing

Ascot Racecourse Local Structure Plan and Scheme Amendment

Transport Impact Assessment

May 2024

Project Code: 07575

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1 Introduction

1.1 Background

On behalf of Perth Racing (Applicant), Davison Advisory Services commissioned PJA Australia Pty Ltd to prepare this Transport Impact Assessment (TIA) for the proposed Local Structure Plan and the Scheme Amendment for the Applicant's landholding, encompassing Ascot Racecourse and surrounding land in the City of Belmont, Western Australia.

This assessment has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)*. This is the most appropriate level of TIA for a proposed Local Structure Plan and Scheme Amendment submission.

1.2 Summary of TIA

In accordance with WAPC Guidelines for Transport Impact Assessments, this report sets out the details of the proposed Local Structure Plan (LSP) and Scheme Amendment in the context of the movement network, assesses the site in terms of connectivity by active and public transport, parking and vehicular access. The TIA also reviews the future traffic generation of the LSP and any potential impacts that may need to be mitigated.

Under the WAPC Guidelines for TIAs, a LSP and/or Scheme Amendment requires a 'broad brush' assessment of the impacts of the development, given structure planning is for a larger area. This report sets recommendations for more detailed traffic analysis at later stages of the planning process, subject to the LSP and Scheme Amendment being ultimately supported.

This TIA also refers to the developing City of Belmont's Golden Gateway LSP (GGLSP) which currently encompasses part of the land under the ownership of the Applicant, which has been a catalyst to complete this LSP and Scheme Amendment to guide development in this area in a considered way. In pre-submission discussions with the City of Belmont's strategic planners, the support in principle for the Applicant to undertake a LSP has been provided and it is understood that through a later iteration of the concurrent Golden Gateway LSP, the City of Belmont will look to remove the Applicant's landholdings from the GGLSP.

1.3 Regional and Local Policy Context

1.3.1 Metropolitan Region Scheme (MRS)

The Site area is currently zoned for the most part as 'Private Recreation' for the area in use as Ascot Racecourse, with the surrounding land within the site boundary zoned as 'Urban'. Some land surrounding the site boundary to the north and west is also zoned as 'Parks and Recreation-Restricted Public Access' and the Great Eastern Highway is zoned as a 'Primary Regional Road'. **Figure 1-1** illustrates the site area's MRS zoning in map 16.

Figure 1-1: MRS Zone Maps 16



Source: Metropolitan Region Scheme

1.3.2 City of Belmont Local Planning Scheme No.15

Under the provisions of *the City of Belmont Local Planning Scheme No.15* (LPS No.15) the site area is for the most part zoned as 'Place of Public Assembly' comprising the area in use as Ascot Racecourse, in the southern extent of the site a small parcel is zoned as 'Mixed Use'. The area surrounding the site boundary largely comprises of 'Mixed Use', 'Mixed Business' and 'Residential and Stables' zoning, the latter of which is bespoke to the Ascot Racecourse area and is intended "to provide for compatible and environmentally responsible use of land in proximity" to the Racecourse and Swan River to the north-west.

Part 4 of LPS No.15 sets out the general development requirements for each key zone, inclusive of the minimum car and bicycle parking requirements for largely non-residential land uses (Table 2 and Table 3), residential parking requirements are set out separately. These parking requirements will be considered as the LSP and Scheme Amendment progresses.

Figure 1-2 illustrates the LSP area zoning in the context of the site area.



Figure 1-2: City of Belmont's Local Planning Scheme 15



Source: Local Planning Scheme 15, Local Zoning, City of Belmont

1.3.3 City of Belmont's Redcliffe Station Precinct Activity Centre Plan & DA6

The Redcliffe Station Precinct Activity Centre Plan (RSPACP) is an extension of the Development Area 6 (DA6) Vision Plan and Implementation Strategy adopted by the City of Belmont in 2014. As set out on Council's website:

"Development Area 6 (DA6) is DA6) is a redevelopment area bound by Great Eastern Highway, Coolgardie Avenue, Redcliffe Road, Fauntleroy Avenue and Tonkin Highway, as well as Perth Airport's Airport West Precinct. This area can be easily distinguished into two main areas:

- *Perth Airport's Airport West Precinct*
- *A portion of the Redcliffe neighbourhood between Perth Airport and Great Eastern Highway.*

Perth Airport Pty Ltd is responsible for planning work for its Airport West Precinct through the preparation and review of the Perth Airport Masterplan.

For the remainder of the DA6 Precinct in Redcliffe, in December 2022, the WAPC wrote to advise landowners about the initiation of Improvement Plan 45 – Redcliffe Station Precinct. The Improvement Plan itself does not change the development potential of land at this point in time. Initiating the Improvement Plan is the first step of the planning pathway to establish the appropriate development potential and planning standards for future development in the precinct. The Improvement Plan sets out the broad objectives for the redevelopment of the area, after which an Improvement Scheme is prepared. The Improvement Scheme will set out the specific standards for future development.

The DPLH has been tasked to prepare the Improvement Scheme and has advised that the City will continue to play an important role in the development and delivery of this planning framework for the precinct. The Department is currently making arrangements to progress an Improvement Scheme for the Development Area 6 Precinct, which will take several months to prepare. Once drafted, there will be a minimum 90-day consultation period. The Department will subsequently review submissions and assess if any modifications to the Improvement Scheme are necessary, prior to making a recommendation to the Minister for Planning".

The City of Belmont's Vision Plan for DA6 area is shown in Figure 1-3.

Figure 1-3: DA6 Vision Plan



Source: City of Belmont

1.3.4 Recent Movement Network Upgrades in Ascot

The City of Belmont confirmed the following recent movement network upgrades in the vicinity of the subject site over the last approximate three years:

a) Network changes due to the Tonkin Gap Project: Motorists using Garratt Road bridge to access Great Eastern Highway and Guildford Road rather than the previous Tonkin Highway route increased and the City observed increased rat running over Stanton Road bridge, Abernethy Road (entire route), Hardey Road and Kooyong Road.

b) Redcliffe Train station opened 9 October 2022. This enabled bus network changes including new routes and frequency every 10 minutes. New super-buses will be established from the train station to the Perth CBD via Great Eastern Highway.

c) A 24/7 Woolworths opened near DFO late 2023.

d) Marina Drive residential development is complete and operational.

e) Belmont is slowing in rate of redeveloping the blocks of land from single site dwellings to multi-dwellings.

f) The Springs development area near Rowe Avenue & Riversdale Road, Rivervale: Increase in residential development from The Springs development. City is planning to restrict one car bay per unit, allowing all other on-street bays to be for visitors and people visiting the commercial shops and local businesses. The City has installed 'P' signs which have encouraged Fly-in/Fly-out (FIFO) workers and ALL DAY motorists heading to the Perth CBD. The City has commenced a parking strategy to review the parking. No paid parking will be involved.

Among the aforementioned projects, the Tonkin Gap project and the Marina Drive residential development are expected to directly impact the Ascot LSP area. Specifically, the Marina Drive development serves as an access point to/from Resolution Drive, via the western arm of the existing roundabout. Meanwhile, the Tonkin Gap project's construction diversions were routed via Garratt Road and subsequently Grandstand Road. However, with the recent completion of new traffic counts in 2024 as part of this Ascot LSP, both aforementioned projects (now complete) have been incorporated into the updated traffic counts, providing a basis for assessing the network's suitability and functionality.

2 Existing Situation

2.1 Existing Site Context and Land Uses

The Site is located in the Ascot suburb of Perth, immediately south of the Swan River, bound to the south-west by Grandstand Road (State Road 55) and south-east/east by Resolution Drive and largely residential land uses, with some stables.

As the site is already well established as Ascot Racecourse, vehicular access can already be achieved from several points along Grandstand Road and Matheson Road, via Raconteur Drive (from Grandstand Road) and further minor accesses via the residential streets to the south-east of the site such as Hardey Road (north), Carbine Street, Leake Street and Ascot Place. The location of the Site is illustrated in **Figure 2-1**.

Figure 2-1: Site Location



Source Mapping: NearMap 2024

2.2 Existing Road Network

The Site is located north-east of Grandstand Road and north-west of Matheson Road and Resolution Drive. Each carriageway abutting the site boundary is within the care and control of the City of Belmont, though the extent of Matheson Road and Raconteur Drive that sits within the site boundary is under the ownership of the Applicant.

Figure 2-2 shows the layout and classification of the roads surrounding the site, including the primary road network. Grandstand Road is classified under the Main Roads WA Road Hierarchy as a Distributor A, though it is worth noting that further north, the Garratt Road Bridge is classified as a Primary Distributor. This will be due to the management of the bridge sitting with Main Roads rather than the Local Government. Grandstand Road is a dual carriageway road, each side typically measuring 7.0m to 7.8m wide. No on-road cycle lane facilities are provided. A single continuous shared use path along the north-eastern side of Grandstand Road exists, with intermittent (not all continuous) provision on the south-western side. For large portions, the footpaths are separated from the carriageway by a landscaped kerbed area or colour-contrasted paving to provide separation from the road for a more pleasant walking/riding experience.

Raconteur Drive diverts east from Grandstand Road, as a one-way single-lane carriageway providing access to Matheson Road and an existing car park for Ascot Racecourse (horse float car park). Again, there are no on-road cycle lane facilities but a pedestrian footpath exists on the northern side of the carriageway connecting to Grandstand Road and another pedestrian path exists along Matheson Road (southern side) from east of Carbine Street all the way to Moreing Street. There is also a horse path along the northern side of Matheson Road that extends from the racecourse in an easterly direction. Beyond the site boundary, Matheson Road is classified as an Access Road under the Mains Road WA Road Hierarchy and no pedestrian or cycle infrastructure is noted on this route.

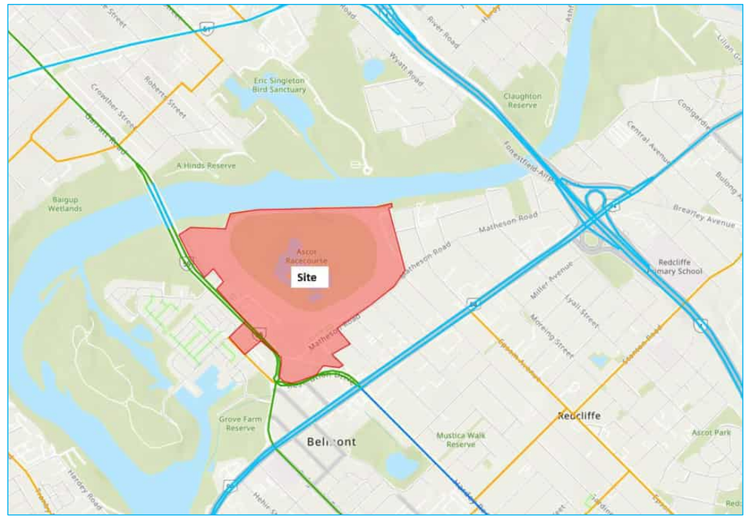
South of the site boundary, Resolution Drive continues west as a Distributor A route, from the Grandstand Road / Stoneham Street / Resolution Drive roundabout intersection. Resolution Drive is a single carriageway with shoulders of approx. 1.8m, each side of the approx. 3.5m carriageway. East of the roundabout, Resolution Drive meets the Great Eastern Highway (National Route 1 / National Highway 94) and Hardey Road via a signal-controlled intersection.

Stoneham Street continues ahead from Grandstand Road as a dual carriageway on approach to a signal-controlled intersection with the Great Eastern Highway and Belgravia Street. Great Eastern Highway is classified as a Primary Distributor while Belgravia Street continues from Stoneham Street as a Distributor A.

Figure 2-3 over page sets out the speed limits for the road network surrounding the site. Grandstand Road, Resolution Road, Stoneham Street and the Great Eastern Highway are all subject to a 60km/hr speed limit. The remaining access roads surrounding the site are subject to a 40km/h speed limit, including Matheson Road.

Existing Situation

Figure 2-2: Road Hierarchy

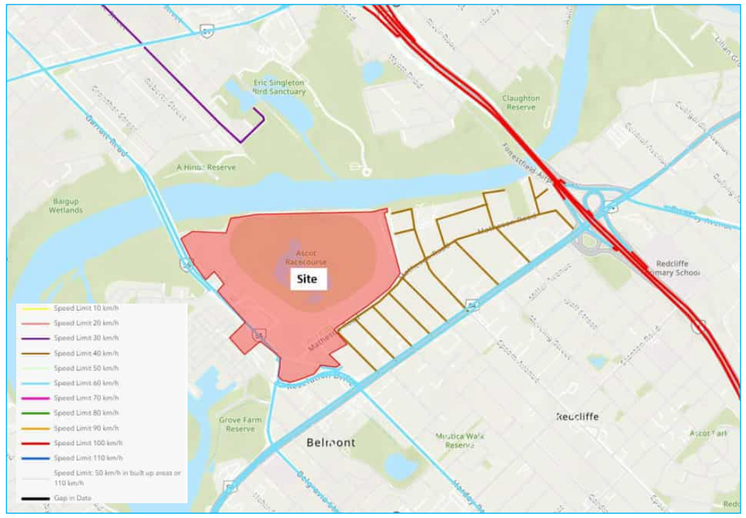


Source: MRWA Road Information Mapping System

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

- **Primary Distributors** (light blue): Form the regional and inter-regional grid of MRWA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State roads. They are managed by Main Roads.
- **Regional Distributors** (red): Roads that are not Primary Distributors but link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by Local Government.
- **District Distributor A** (green): These carry traffic between industrial, commercial, and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.
- **District Distributor B** (dark blue): Perform a similar function to "District Distributor A" but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.
- **Local Distributors** (orange): Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.
- **Access Roads** (grey): Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local Government.

Figure 2-3: Speed Classifications



Source: MRWA Road Information Mapping System

2.3 Existing RAV Network

The road network around the site does not currently form part of the Restricted Access Vehicle (RAV) Network.

2.4 Existing Key Intersections

The key intersections within the study area are as follows, with further detail and layouts shown below:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Resolution Drive / Great Eastern Highway / Hardey Road Signalised Intersection
- Stoneham Street / Great Eastern Highway / Belgravia Street Signalised Intersection
- Garratt Road / Guildford Road Signalised Intersection.

Existing Situation

All of the above intersections are modelled for traffic performance in this TIA with the exception of the Guildford Road intersection which is some 1.7km away from the LSP area.

South of Site:

Resolution Drive / Stoneham Street / Grandstand Road: The 4-way roundabout is located approx. 700m south of the site and connects Grandstand Road (providing several site accesses) with the Great Eastern Highway further south. Figure 2-4 shows the existing geometry of the intersection, Grandstand Road and Stoneham Street both have two-lane approaches to the roundabout while both approaches from Resolution Drive have a single lane approach.

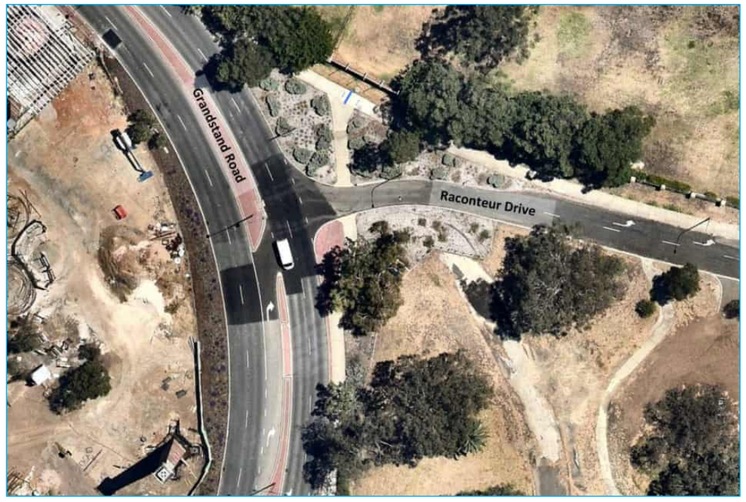
Figure 2-4: Resolution Drive / Stoneham Street / Grandstand Road – 4-way roundabout



Source Mapping: NearMap 2024

Raconteur Drive / Grandstand Road: The 3-way priority-controlled intersection is located approx. 500m south of the site and provides access to Raconteur Drive connecting to Matheson Road for one of the Ascot Racecourse car parks. As Raconteur Drive is one-way in this section, the intersection allows only left-in and right-in turning movements from each side of Grandstand Road (unless otherwise permitted under race day traffic management controls). **Figure 2-4** shows the existing geometry of the intersection.

Figure 2-5: Raconteur Drive / Grandstand Road – 3-way priority-controlled intersection (left-in / right in only)



Source Mapping: NearMap 2024

Resolution Drive / Great Eastern Highway / Hardey Road: The 4-way signalised intersection is located approx. 1km south of the site and provides access to existing residential areas to the south-east of Ascot Racecourse. **Figure 2-4** shows the existing geometry of the intersection. This includes three through lanes in each direction on the Great Eastern Highway, an intersection bus queue jump lane, a left-turn lane and a right-turn/U-turn lane.

Existing Situation

Figure 2-6: Resolution Drive / Great Eastern Highway / Hardey Road – 4-way signalised intersection



Source Mapping: NearMap 2024

Stoneham Street / Great Eastern Highway / Belgravia Street Signalised Intersection: The 4-way signalised intersection is located approx. 1km south of the site and provides access to existing residential areas to the south-east of Ascot Racecourse. **Figure 2-7** shows the existing geometry of the intersection. This includes three through lanes in each direction on the Great Eastern Highway, as well as bus queue jump lane for buses, a left-turn lane and a right-turn/U-turn lane.

Figure 2-7: Stoneham Street / Great Eastern Highway / Belgravia Street – 4-way signalised intersection



Source Mapping: NearMap 2024

North-West of the Site:

Garratt Road / Guildford Road Signalised Intersection: This 4-way signalised intersection is located approximately 1.7km north-west of the site and provides access to existing residential areas to the north-west of Ascot Racecourse. **Figure 2-8** shows the existing geometry of the intersection.

Existing Situation

Figure 2-8: Garratt Road / Guildford Road – 4-way signalised intersection



Source – NearMap 2024

2.5 Existing Traffic Volumes

PJA contacted the City of Belmont, who kindly provided their latest traffic count data for the intersection of Resolution Drive/Grandstand Road/Stoneham Street from surveys undertaken in 2017 as part of the GGLSP studies presently being undertaken by the City. In addition to this, recent traffic counts were commissioned by PJA as part of the Ascot Racecourse project in February 2024.

Complementing the existing SCATS traffic counts at the signalised intersections, traffic counts were undertaken at the intersection of Resolution Drive/Raconteur Drive priority-controlled intersection and Grandstand Road/Waterway Crescent roundabout.

Midblock traffic counts were sourced from the Main Roads TrafficMap, and these indicate that there are the following daily traffic flows on the key roads near the Ascot Racecourse:

- Grandstand Road 16,670 vehicles per day (vpd) – 2018 counts
- Resolution Drive 7,860 vpd – 2021 counts
- Stoneham Street 14,270 vpd – 2018 counts.

Review of these midblock traffic flows over an extended period[1] up to the present day, indicates that traffic flows in the Ascot area have been increasing by approximately 0.75% per annum. Advice from the City, informed from the development of the traffic model for the Golden Gateway LSP, has indicated a 0.5% growth rate.

Thus, for the derivation of equivalent 2024 traffic flows for the intersection of Resolution Drive/Grandstand Road/Stoneham Street, the traffic flows to and from the main legs of the intersection has been increased by 0.5% per annum from 2017 to 2024. This was discussed with the City as being appropriate for use for the Ascot LSP.

These actual and/or derived counted 2024 traffic flows are shown below in Figure 2-9.

Figure 2-9: Peak Hour 2024 Traffic Flows



2.6 Existing Pedestrian / Cycle Networks

Existing pedestrian / cycle networks are illustrated in **Figure 2-10.** The first part of the below figure shows the proximity of the Perth-Midland Principal Shared Path (PSP) to the site, as it links through Meltham and Bayswater north of the site. The Perth-Midland PSP is a high-quality urban dual-use pathway which runs parallel to the Midland railway line. To access the PSP from the site, shared used paths are available on the northern side of the Garratt Road Bridge to/from the site which

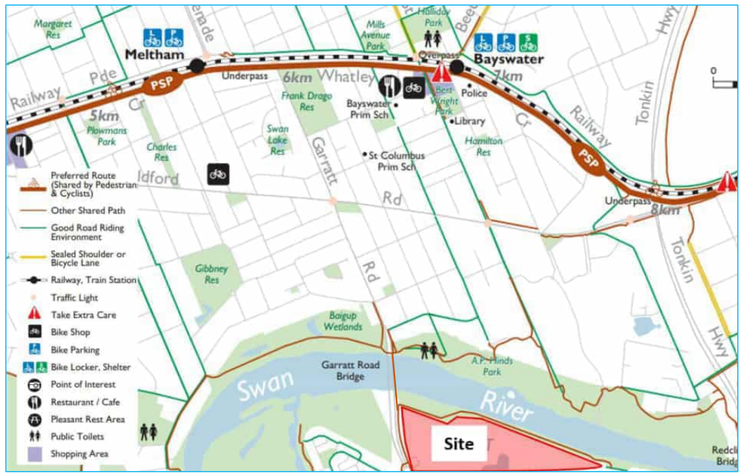
[1] Extended period over approximately 20 years (2002 – 2021).

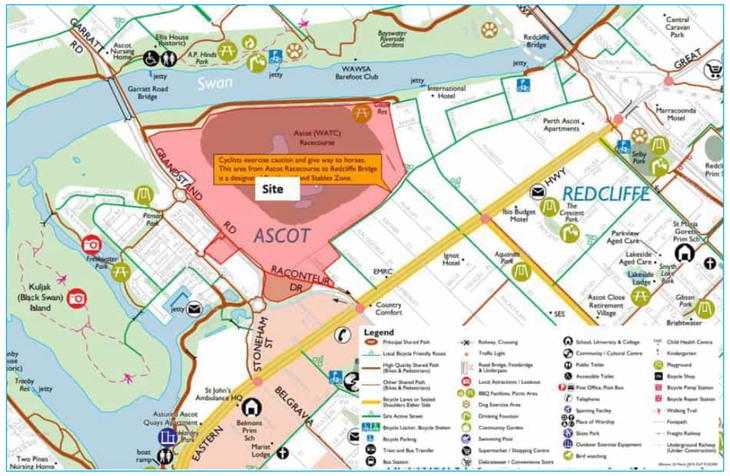
also runs parallel to the Swan River. From here, Leake Street and King William Street are two roads with good road riding environments in order to reach the PSP.

The second part of the figure below shows the existing cycle infrastructure available to the south, west and east of the site. One of the modal integration items to note is for cyclists to exercise caution and to give way to horses in the area between the racecourse and adjacent Redcliffe Bridge as a designated 'Residential and Stables' zone.

Immediately north of the site, a high-quality shared path for cyclists and pedestrians in available between the shared paths along Grandstand Road and Ascot Place. A number of local roads surrounding the site are highlighted as local cycle friendly routes including Matheson Road and Epsom Avenue. Additionally, the Great Eastern Highway is highlighted as providing cycle lanes or sealed shoulders on either side of the carriageway, though these are largely provided as on-road cycle lanes with no physical separation and are combined with, or are immediately adjacent to, bus lanes with vehicles travelling above the Safe System speeds of 30km/h for vulnerable road users.

Figure 2-10: Existing Pedestrian / Cycle Networks





Source: WA Department of Transport (2024)

2.7 Existing Public Transport

The main bus stops accessible from the site are on Grandstand Road immediately adjacent to one of the key pedestrian access points to the racecourse. Based on a desktop review, the infrastructure provided at these stops is limited as a shelter with seating is only available on the south-western side while a raised kerb to assist with reduced mobility access is only available for a short distance on the north-eastern side of Grandstand Road. It would be recommended that the City of Belmont undertake a review of these bus stops (irrespective of this development), particularly as they serve a significant destination.

These stops are served by the bus 998/999 which provided clockwise and anti-clockwise routes of the Perth CircleRoute (shown in purple in **Figure 2-11**), respectively. This circular route has limited stops and a good frequency of every 15 minutes, Monday-Saturday and every 30 minutes on Sundays, which encompasses many of Perth's suburbs encircling central Perth and locally providing connectivity to Bayswater Rail Station. Ascot Racecourse is serviced by the clockwise service at 06:03 on weekdays and a last service at 22:13. A shortened service is available on weekends and public holidays. These timings are reflected similarly in the anticlockwise service.

Additional frequent bus services are accessible from the site along the Great Eastern Highway as shown in **Figure 2-11** including services towards Redcliffe Station, central Perth and Perth Airport.

Existing Situation

Figure 2-11: Public Transport Services



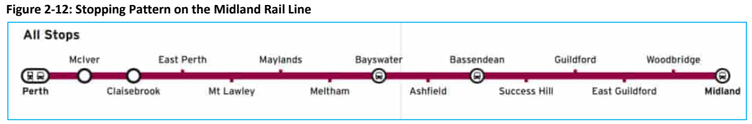
Source: WA Department of Transport (2024)

Rail Services

Bayswater Train Station is accessible via bus service 999 and provides access to both the Midland Railway Line and the Airport Line.

During the week, the Midland railway line carries passenger rail services between Perth city, and stations in between as shown in **Figure 2-12**, at intervals of approximately 10 to 15 minutes between 05:00am and 21:00pm. The frequency reduces past 9pm to every 30 minutes until 12:30am.

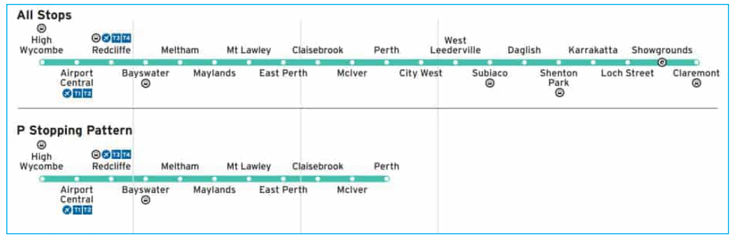
Figure 2-12: Stopping Pattern on the Midland Rail Line



Source: Transperth

The Airport Line operates from Claremont to High Wycombe via Perth Station, with some services throughout the day just terminating at Perth Station. Both variations of the route are shown in **Figure 2-13**. The service provides a fast connection to Perth Airport, operating every 12 minutes during the peak period, every 15 minutes during the day and every 30 minutes at night.

Figure 2-13: Stopping Pattern on the Airport Rail Line



Source: Transperth

Overall, the existing public transport service within the vicinity of the Site is good with moderate-to-high frequency of services operating during the network peak periods.

2.8 Crash Assessment

A search of the Main Roads WA Reporting Centre for crash data was undertaken. This search covered all recorded traffic accidents for the most recently available five-year reporting period between 1 January 2019 and 31 December 2023 for the study area shown in **Figure 2-14** and **Figure 2-15** which includes the following intersections:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Resolution Drive / Great Eastern Highway / Hardey Road Signalised Intersection
- Stoneham Street / Great Eastern Highway / Belgravia Street Signalised Intersection

Both figures highlight how the majority of recorded crashes within the study area are 'Property Damage Only' and mostly occur on the midblock carriageway itself rather than the intersections noted above. The majority of these incidents occur on the Great Eastern Highway, which is typical as a 'Primary Distributor' with higher volumes (crash exposure).

The recorded crash types for the 200 crashes recorded in the study area are shown in **Table 2-1** below. The 'Hospital' and 'Medical' crashes recorded are typically rear-end, non-collision and right-angle types of crash.

Table 2-1: Crash Data for Study Area

Type of Crash	Fatal	Hospital	Medical	Major PDO*	Minor PDO*	Total
Rear End	-	4	19	62	40	125
Sideswipe	-	-	-	8	11	19
Hit Object	-	-	-	2	3	5
Head On	-	-	-	-	-	-
Non-Collision	-	1	-	1	1	3
Right Angle	-	-	1	12	10	23
Other	-	1	-	5	6	12
Total	0	6	20	90	71	187

**Property Damage Only*

Existing Situation

Figure 2-14: Summary of All Crashes in Latest 5-Year Period

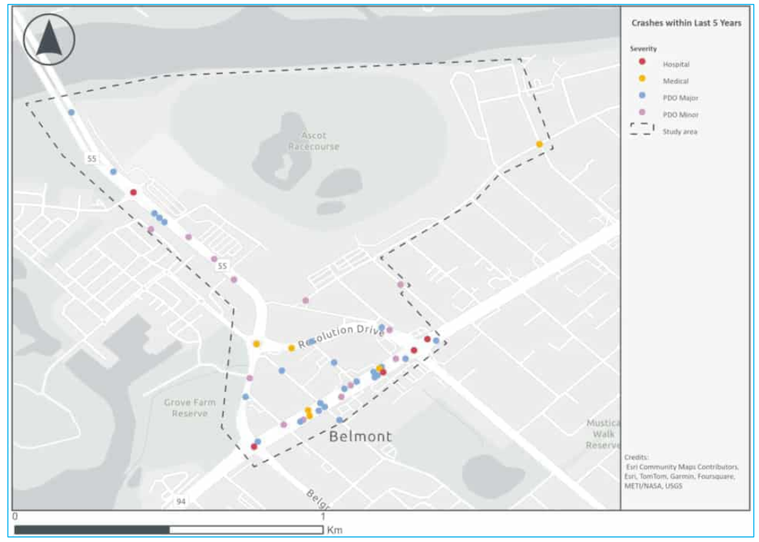
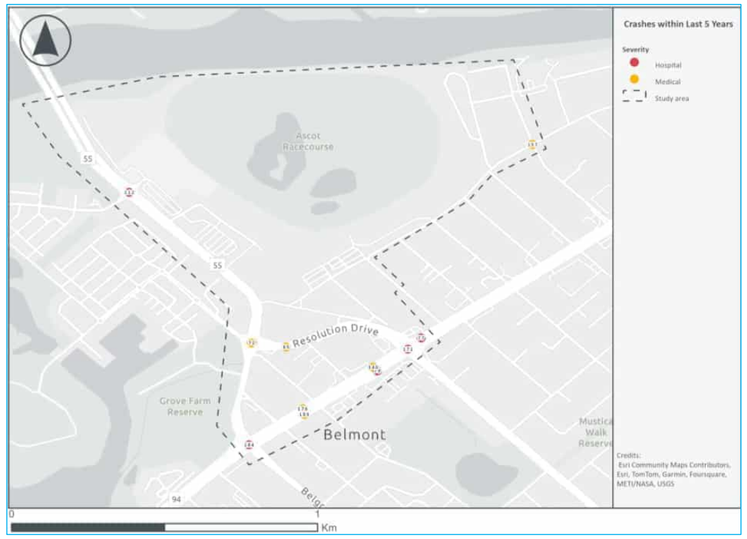


Figure 2-15: Hospital and Medical Severity Crashes in the Latest 5-Year Period



3 Proposed Local Structure Plan and Scheme Amendment

3.1 Proposed Zoning

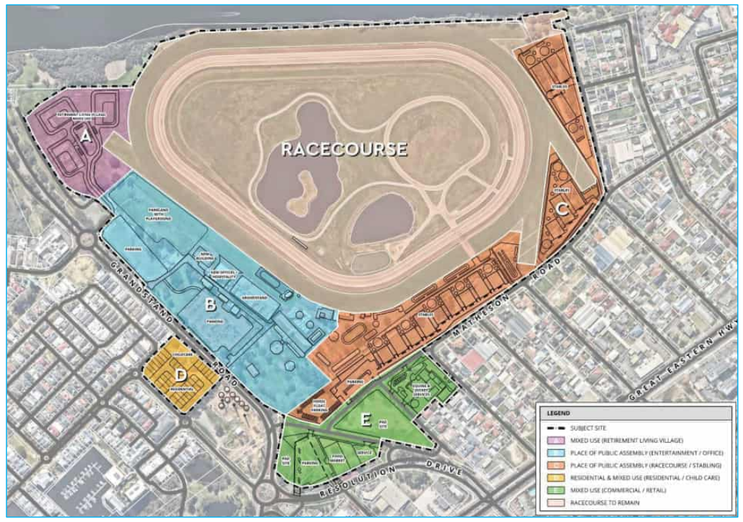
In Section 1 of this TIA, the site area was identified as largely dedicated to uses relating to Ascot Racecourse, such as 'Private Recreation' (MRS) or 'Place of Public Assembly' (LPS No.15), with some areas within the site boundary zoned as 'Urban' or 'Mixed Use'.

The Ascot LSP and Scheme Amendment proposes rezoning areas within the site boundary into five specific precincts, as summarised in **Table 3-1**, set out in **Figure 3-1** (**Appendix B**).

Table 3-1: Proposed Land Use Yield

Precinct	Proposed Zoning	Proposed Uses	Proposed Built Form/Yield
A	Mixed Use	Retirement Living Village	– 330-390 retirement apartments (across 3 buildings of up to 15 storeys, each with 110-130 apartments). – Maximum 300m^2 café.
B	Place Of Public Assembly (No Change to Existing Zone)	Entertainment / Racecourse Administration Office – (New building with replace the footprint of an existing building and existing building rebuilt adjacent to new building.)	– New building - Office on Ground Floor, approx. 61 people across 680m^2 NLA (Net Lettable Area). – New Building - Hospitality venue on Upper Floor - Total building footprint of 1,020m^2 – Parkland with a playground.
C	Place Of Public Assembly (No Change to Existing Zone)	Racecourse / Stabling	– 3 On-course stabling complexes. – Approx. 400 stables. – Parking area inc. Horse float parking.
D	Residential & Mixed Use (R60)	Residential / Child Care	– Child care centre fronting Grandstand Rd, across approx. 2,100m^2 for 70-90 children. – Residential development with a yield of approx. 41 lots.
E	Mixed Use (with additional use of 'shop')	Commercial / Retail	– Site 1: 3,400m^2 retail floorspace and 2,500m^2 commercial floorspace – Site 2: 5,200-7,100m^2 commercial floorspace. – Site 3: Equine Centre - 'Jockey Health' inc. 'consulting room' type uses.

Figure 3-1: Proposed Masterplan Concept



Source: Rowe Group Design, 2024

3.2 Vehicular Driveway Access Arrangements

While individual lot driveway access arrangements and car parking typically fall outside the scope of a general Structure Plan-level transport assessment outlined in the WAPC Guidelines, the Ascot LSP Applicant is proactively presenting several solutions upfront to enhance future lot access arrangements and network performance. These suggestions and recommendations are intended for discussion purposes only and are subject to further refinement in subsequent stages of development planning.

As highlighted in Section 2, the existing racecourse is served by a number of vehicular access points from Grandstand Road and Matheson Road.

It is acknowledged that in the draft GGLSP, a new roundabout intersection was previously proposed to replace the existing Grandstand Road / Raconteur Drive intersection, introducing an opportunity for a high capacity and controlled access to the racecourse via a new 4th arm of the roundabout. This arm would have also provided direct access for horse floats looking to travel northbound on Grandstand Road. However, it is understood that this new roundabout option was mooted based on stakeholder feedback during the City's draft GGLSP advertising period and subsequently the current intersection format will be retained.

Notwithstanding the above, for the Ascot LSP, this Grandstand Road and Resolution Drive intersection presents a major opportunity to modify the permissible movements at the restricted access point, to improve the overall access strategy for the LSP. This is further explored.

For the proposed Precinct B (Entertainment / Racecourse Administration Office) car park, vehicular access from the members carpark onto Grandstand Road, is expected to be retained as left-in/left-out (LILO). There are existing roundabouts at either end of the racecourse at Waterway Crescent and Resolution Drive that provide the same function as right turns at the crossover points. The traffic concern with allowing any right turns at the Precinct B crossovers is the added delay for patrons queuing and waiting to access the parking areas or when leaving after the races. If the LSP was to pursue direct right turn options at the Precinct B crossovers, it is recommended that the impacts would need to be assessed in finer detail, on a number of different peak weekend race days. Only the AM and PM effects of the wider development coinciding with the typical AM and PM commuter peaks has been examined for this LSP, as these would represent the highest traffic flow on a regular basis. The median island is wide enough for the northern two crossovers to potentially have two-stage right turn movements, but the southern crossover has a narrower median opposite, and therefore would not appear to have enough width to allow for two-staged median movements.

Any crossover to Precinct D (Child Care and Residential) onto Grandstand Road is recommended in the form of a LILO. A LILO is supported in balancing the needs of access to the child care centre and the amenity of residents on Northerly Avenue and Resolution Drive. There would be some non-local child care centre traffic along Resolution Drive if no LILO on Grandstand Road was permitted. As such, a LILO should be pursued to/from Grandstand Boulevard to Precinct D, which would need to be integrated safely with the operations of the crossover on the opposite side of the road to the racecourse. This can be assessed in detail in later stages, post LSP endorsement as an approval of a Scheme Amendment is not contingent on these details and available wider accessibility.

For the driveway accesses for Precinct E (commercial precinct) east of the roundabout, there is limited frontage available along Resolution Drive between Raconteur Drive and Grandstand Road. As such, full movement crossovers are unlikely to be possible due to road safety and as such likely to be in the form of LILOs.

Given the above restrictions for most access points to LILOs due to geometrical constraints, a relief valve is needed to support northbound traffic (right turning vehicle demands from the east). In this regard, the existing intersection of Grandstand Road and Resolution Drive is proposed to be open permanently to traffic with left and right turns allowed from Grandstand Road into Raconteur Drive and a left turn out from Raconteur Drive onto Grandstand Road (LILO-RI). These are the same movements currently permitted at this intersection on race days to allow racecourse patrons to park and exit. This critical left turn out to, and right turn in from Grandstand Road are both expected to operate satisfactorily with acceptable queues and delays to support the Ascot LSP (refer Section 6). Ultimate development queues are expected to be able to be contained within the current right turn pocket length on Grandstand Road.

3.3 Parking Impacts

Again, while individual lot driveway access arrangements and car parking typically fall outside the scope of a general Structure Plan-level transport assessment outlined in the WAPC Guidelines, the Ascot LSP Applicant is proactively presenting several solutions upfront to enhance future lot access arrangements.

The proposed redevelopment of Precinct E (commercial/retail) will impact the availability for parking that currently occurs on race days. The redevelopment will alter existing race patron parking and also horse-float and jockey parking in Precinct E.

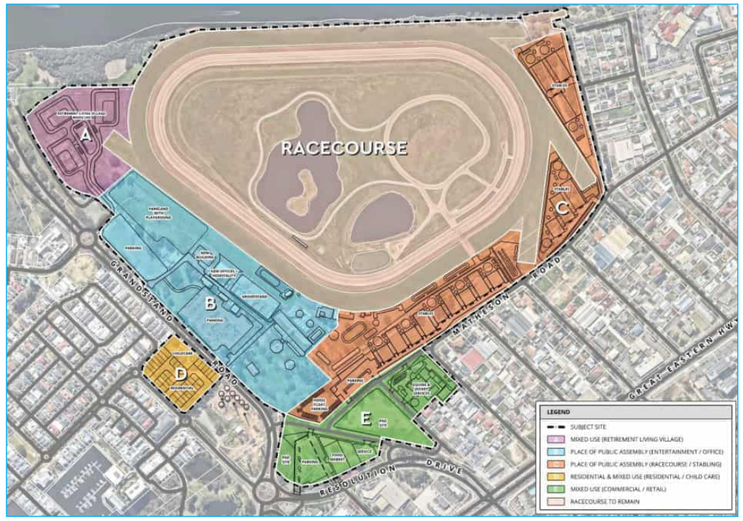
Current parking layout in **Figure 3-2** shows typical parking demand for an opening racing day on 14th October 2023. This shows paved patron parking and members parking within Precinct B (the racecourse entertainment) and patron parking within Precincts C (stabling) and E (commercial/retail). Similarly, the proposed development of Precinct C with the relocation of jockey parking and horse float parking towards the south west extremity of Precinct C will impact the ability of patrons to park within this existing area on race days. A similar impact is expected for Precinct E, where retail development will impact parking currently occurring across this land.

From **Figure 3-2** aerial imagery, there was assessed to be approximately 270 cars parked across the patron parking areas straddling the clouded area across Precincts B, C and E at the south east end of the racecourse.

Figure 3-2: Typical Parking on Race Days



Figure 3-3: Possible Future Parking Layout



The current patron parking within Precinct C (stabling) and E (commercial/retail) will be the most impacted by the LSP with these parking areas no longer available. The southern Precinct B patron parking area would still be available and could be managed to improve parking utilisation on race days. Based on observations of parking demand within the area of the grassed area in Precinct B and E, approximately 110 to 125 cars park within this area on a busy race day.

From the above aerial observations, it was found that there were approximately 40 spaces available within the patron parking in Precinct B at the north west end of the racecourse (accessed from the Waterways Crescent roundabout), approximately 70 spaces available within the member's parking area (accessed grom Grandstand Road) and the possibility to park up to 75 cars on the grassed area between the patron and member parking areas, all up approximately 185 cars could be parked.

Combined, this indicates that supply across the sites would more than meet the total demand for car parking with a **surplus of approximately 60 to 75 parking spaces** for the currently observed parking demand for a busy typical race day at Ascot. This is based on typical race days. For non-typical large events (such as the New Years Perth Cup) the traffic management plan for the racecourse would be appropriate for continued adoption.

To further manage the relocation of parking within the racecourse it is a recommendation of this TIA to implement a Travel Demand Plan for typical race days to actively discourage patrons from using their private motor vehicle to drive to and from the racecourse. This plan may include both the encouragement in the use of the currently available public transport services near the racecourse, improvement in private services, and the uptake of ride share services.

Routes 998 and 999 (CircleRoutes) stop on Grandstand Road immediately in front of the racecourse and high frequency bus service 940 stops on Great Eastern Highway. The CircleRoutes provide onward connections to Morley Bus Station via the new Bayswater Train Station (soon to be completed with Airport, Ellenbrook and Perth-Midland services and be the busiest station outside of Perth Station). Route 940 runs between Elizabeth Quay bus station (immediately next to Elizabeth Quay train station) and Redcliffe train station.

Implementing Travel Demand strategies to promote rideshare services (also known as Mobility as a Service (MaaS)) presents another option to reduce the reliance on private vehicle usage among Ascot Racecourse patrons. MaaS offers users a range of mobility options through a single platform or service provider, reducing congestion, alleviate parking demand, and promote other sustainable travel choices on race days.

Several strategies could be employed to encourage patrons to use MaaS options effectively and almost immediately:

- partnerships with MaaS providers and local transit agencies can enhance the integration of various transportation modes, ensuring seamless connectivity and ease of use for patrons.
- offering incentives such as discounted fares or priority access to race days for MaaS users (such as dedicated drop-off/pick-up areas) could further encourage patronage.
- By promoting MaaS as a viable alternative to private vehicle usage, the Ascot racecourse development could work towards addressing any perceived parking challenges.

The travel behaviours of patrons of entertainment services (hotels, taverns, restaurants, sporting venues etc) are now skewed towards using ride sharing instead of driving to these land uses. This in due to a combination of many factors but mostly the affordability, availability, attractiveness to latter generations and finally, allowing patrons to enjoy themselves without worry of driving under the influence.

3.4 Proposed Internal Transport Network

The proposed Local Structure Plan sets out the indicative future road network for the Scheme Amendment area, which is shown in **Figure 3-1**. The internal network will be detailed further as the lot submissions for each precinct are lodged for assessment. The City of Belmont places high importance on sustainable transport modes (public transport, walking and cycling) and would be seeking high-quality cycling facilities, footpaths, street trees etc to facilitate and reduce reliance on low-occupancy private car modes.

3.5 Assessment Years and Time Periods

This TIA analyses the existing base year of 2024 and the anticipated opening year of 2036 'with' and 'without' the full build-out of the Ascot LSP. Section 7 of this report discusses the assessment years and development traffic generation in more detail.

3.6 Pedestrian and Cyclist Access

Pedestrian and cyclist access has not yet been fully defined; however, it should be provided generally in accordance with the requirements of national and local guidance, the Department of Transport's Long Term Cycle Network, and areas comprising largely residential uses should be in accordance with *Liveable Neighbourhoods* and Safe System Engineering.

The proposed pedestrian and cyclist facilities should aim to provide a permeable road network within the subject site and create attractive opportunities that maximise the use of non-private vehicle transport modes. Section 5 of this report discusses access to public transport and recommended improvements.

4 Changes to External Transport Network

Part of the Ascot Racecourse development is currently within the GGLSP, with Precincts D and E falling wholly within the currently nominated GGLSP area with part of Precinct C. The draft Movement and Access Strategy report prepared by the GGLSP proposed road network changes as part of the LSP to support the LSP, noting that the proposal of a new roundabout at Resolution Drive / Grandstand Boulevard have been mooted based on advertising feedback from stakeholders. Accordingly, the GGLSP is presently in the process of being modified, to address agency concerns and comments and as such the road network is expected to remain much the same as it is presently.

The previous draft proposed road network is shown below in Figure 4-1. The proposed new roundabout, north of the current roundabout at Grandstand Road/Resolution Drive/Stoneham Street, was proposed to be a 3-way roundabout and would have provided Ascot Racecourse Precinct E an opportunity for a fourth approach entry.

The retention of the current road network does have the benefit of retaining Precinct E to be unbisected by any major roadway.

Figure 4-1: Golden Gateway Local Structure Plan



Source: Golden Gateway Public Realm Strategy

5 Integration with Surrounding Area

5.1 Surrounding Attractors / Generators

As Ascot Racecourse is already very well established in the local area, a variety of uses including retail, food, beverage and recreational uses are available in the local area primarily along the Great Eastern Highway and on the Racecourse site itself. In addition, as an attractor and a key employment location itself, the racecourse is located in close proximity to large residential areas of Redcliffe, Belmont, Rivervale and Maylands surrounding the site.

Approximately 1.2 km to the south of the Site, is Belmont Primary School.

5.2 Proposed Changes to Surrounding Land Uses

The City of Belmont's LPS No.15 details the proposed local zoning of land uses within the area surrounding the Site including DA6 to the south of Great Eastern Highway. The proposed changes to these zones are set out in full in Section 3 of this TIA, in the context of the existing zones.

5.3 Level of Overall Accessibility

As Ascot Racecourse is already very well established in the local area, the existing levels of accessibility will be maintained and built upon with the proposals to improve access for all to the site.

5.4 Pedestrian and Cyclist Accessibility

The existing shared path network on the northern side of Grandstand Road provides good active transport links to the area surrounding Ascot Racecourse. This will be further enhanced by the improvements proposed within the Ascot LSP and Scheme Amendment, as well as the Public Realm Strategy being developed as part of the GGLSP.

It is a recommendation of this TIA that, investigations be undertaken to extend the existing footpath network surrounding the racecourse, including south of Grandstand Road and improving pedestrian and cycle connections towards the local amenities on Great Eastern Highway and Belmont Primary School. If feasible, this would encourage trips on foot and wheels to local centres and help increase public transport usage to reduce the reliance on private vehicles.

6 Analysis of Transport Network

6.1 Assessment Years and Time Period

Each intersection will be assessed using the following two scenarios:

- **Scenario 1** – 2024 'current situation'.
- **Scenario 2** – 2036 'without development'.
- **Scenario 3** – 2036 'with Ascot LSP development'.

Scenario 1 sets the baseline for the area for the current traffic flows as surveyed and derived from intersection counts.

Scenario 2 without the development flows have been based on expected traffic flows in 2036 with no development of the Ascot Racecourse nor the effects of the GGLSP. In discussion with the City of Belmont, it was apparent that the previous modelling assessments undertaken for the GGLSP are presently needing to be revised by the GGLSP team. Consequently, there are too many unknowns relating to the GGLSP to assess/assume the outcomes or specific intersection turning movement traffic flows for various scenarios of the GGLSP and the adoption of the draft (now mooted) traffic flows would lead to erroneous results. Accordingly, the 2036 without development Scenario 2 assumes current traffic flows will increase to 2036 with no GGLSP influences.

Scenario 3 is with full development traffic anticipated in 2036 when all precincts are assumed to be fully developed, in line with the Ascot Racecourse anticipated rollout.

6.2 Background Traffic

The background traffic assumptions for this assessment have been based on PJA's consultation with the City of Belmont on the City's current GGLSP traffic assumptions, concluding a 0.5% growth per annum from 2021 through to 2036 is to be applied. Advice from the City of Belmont goes further to say that this growth rate is expected to be maintained through to 2041, beyond the assessment year as noted above. This growth has been applied to major traffic flows on the network but excluding traffic flows to and from:

- Waterways Crescent
- Resolution Drive west of the Grandstand Road/Resolution Drive/Stoneham Street roundabout.

The reason is that the two local Access Roads are established with the Marina Drive residential development recently completed and opened, and therefore 'ultimate' flows are captured in the 2024 base data collated.

6.3 Traffic Generation

The traffic generation rates in the AM peak trips for the Bulky Goods and Supermarket land uses are based on 20% of the expected PM peak flows.

The trip generation for Precinct A retirement village is based on a rate of 3 trips er dwelling per day and is appropriate, given that it is expected the units will have limited parking and that the demographics of the residents are expected to suggest a lower car ownership.

Table 6-1, sourced from the various sources, have been used to calculate an estimate of the traffic generated in the AM and PM peak periods. Given the location of the Site, the above is considered robust trip rates, with no reductions applied to account for linked or internal trips.

No trips were assigned to Precinct B (Racecourse) as the use of the racecourse in the AM and PM peaks during normal weekdays is comparatively negligible. The use of this precinct is expected to be at its highest on weekends and big race days, where traffic management may be utilised on Grandstand Road.

Likewise, no trips were assigned to Precinct C (the Stables). The reason for this is that activity at the stables typically occur well before the AM peak when horses are trained on the course early in the morning. After which, traffic movements from the stables will typically then occur after the typical network AM peak period.

Finally, for the retail use in Precinct E (Commercial / Retail), this was assumed to be a café of approximately 100-200m^2 in gross floor area. This development alone is not expected to generate notable trips independently, but any café patronage would be reciprocal between the proposed supermarket and commercial floorspace proposed to be located under the one roof. The café will also likely attract employees in the nearby area, who are expected to walk to and from the establishment.

The AM trips rates for the Bulky Goods and Supermarket land uses are based on 20% of the expected PM peak flows.

The trip generation for the retirement village is based on a rate of 3 trips er dwelling per day and is appropriate, given that it is expected the units will have limited parking and that the demographics of the residents are expected to suggest a lower car ownership.

Table 6-1: Trip Generation Rates

Land Use	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Retirement (Precinct A)	0.075 trips per dwelling	0.225 trips per dwelling	0.2 trips per dwelling	0.1 trips per dwelling
Racecourse (Precinct B)	NIL	NIL	NIL	NIL
Stables (Precinct C)	NIL	NIL	NIL	NIL
Residential (Precinct D)	0.2 trips per dwelling	0.6 trips per dwelling	0.5 trips per dwelling	0.3 trips per dwelling
Child Care (Precinct D)	0.25 trips per child	0.25 trips per child	0.15 trips per child	0.15 trips per child
Jockey Services (Precinct E)	1.6 trips per 100m^2	0.4 trips per 100m^2	0.4 trips per 100m^2	1.6 trips per 100m^2
Supermarket (Precinct E)	1.55 trips per 100m^2	1.55 trips per 100m^2	7.75 trips per 100m^2	7.75 trips per 100m^2
Commercial (Precinct E)	0.32 trips per 100m^2	0.08 trips per 100m^2	0.4 trips per 100m^2	1.6 trips per 100m^2
Retail (Precinct E)	NIL	NIL	NIL	NIL
Bulky Goods Retail (Precinct E)	0.2 trips per 100m^2	0.2 trips per 100m^2	1.0 trips per 100m^2	1.0 trips per 100m^2

Application of the above noted trip generation rates leads to the creation of Table 7-2 which summarises the trip volumes derived from the adopted generation rates.

Table 6-2: Estimated LSP Traffic Generation (vehicles per hour)

Land Use	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Retirement (Precinct A)	29	88	78	39
Racecourse (Precinct B)	0	0	0	0
Stables (Precinct C)	0	0	0	0
Residential (Precinct D)	8	24	21	11

Land Use	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Child Care (Precinct D)	20	20	12	12
Jockey Services (Precinct E)	21	5	5	21
Supermarket (Precinct E)	72	18	224	224
Commercial (Precinct E)	1	0	4	4
Retail (Precinct E)	0	0	0	0
Bulky Goods Retail (Precinct E)	31	8	96	96
Total	**182**	**163**	**440**	**407**

The Site is expected to generate a total of 345 two-way vehicle trips in the AM peak hour and approximately 845 in the PM peak hour. The overall development is expected to generate the highest flows in the PM and thus the PM peak has been chosen as the basis for the following intersection assessment as these higher flows would be putting the road network under the greatest stress.

Of the above generated trips, 50% of the trips associated with the supermarket have been assumed to be pass-by trips. These trips already exist on the adjacent road network, with drivers diverted from the adjacent road network onto the site and then to exit the site to continue on their journey.

6.4 Future Year Traffic Growth

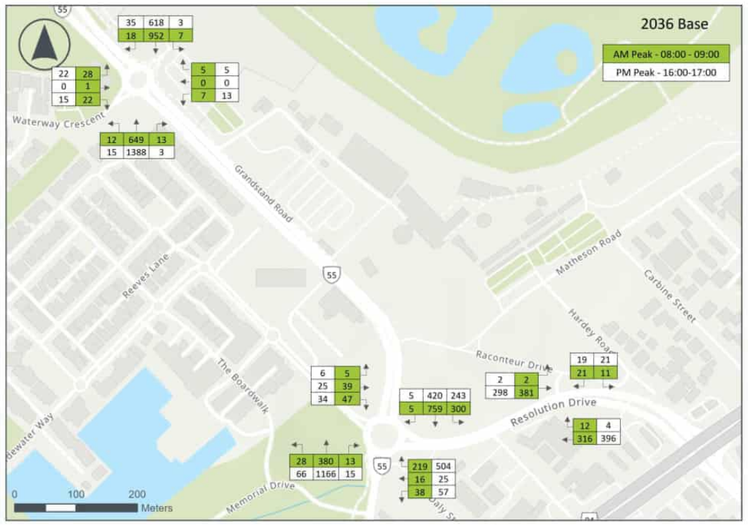
As previously discussed, the future year growth rates to 2036 (and further to 2041) were provided by the City. From 2021 to 2041 traffic flows are expected to increase by 0.5% per annum linear growth. With the Ascot Waters area being now fully developed (apart from the Precinct D component) traffic flows to and from the legs of intersections into Ascot Waters has been assumed to have zero future traffic growth.

6.5 Traffic Distribution and Assignment

The distribution of trips to and from the Site via the various site accesses have been estimated based on the existing traffic flow percentage split travelling in each direction in the AM and PM peak periods.

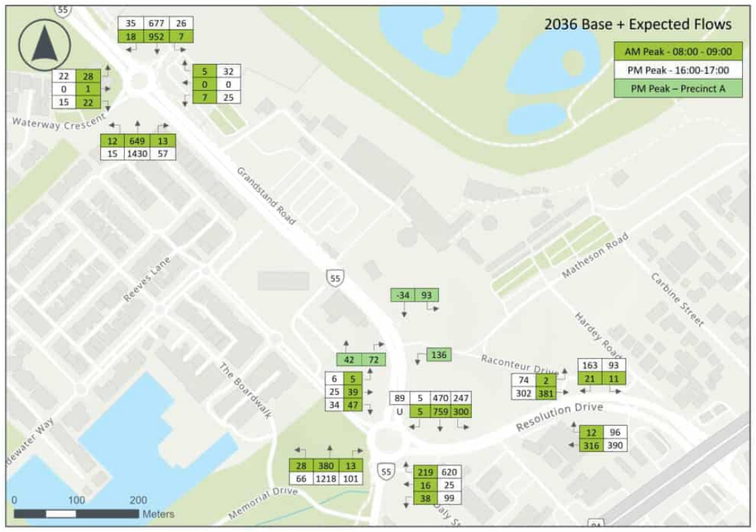
The percentage split of traffic is in keeping with the expectation that a greater proportion of trips generated by the Site will travel in same direction as the commuter peak for the residential and retirement uses. For the commercial attractions, this will be in the same direction as the commuter peak flows for the pass-by trips, but for new trips these will be attracted to the site based on the arrival flow proportions entering the Ascot Racecourse area along Grandstand Road, Resolution Drive and Stoneham Street. The estimated 2036 flows with expected distribution is presented in **Figure 6-1** to **Figure 6-3.**

Figure 6-1: Base 2036 Traffic Flows (no development; background growth only)



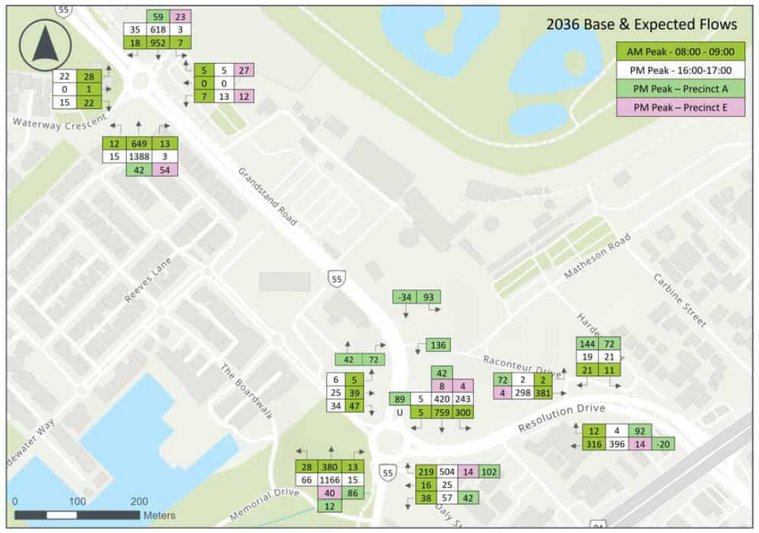
Credits: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA,

Figure 6-2: 2036 Traffic Flows (plus Precinct A Development Flows)



Credits: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA,

Figure 6-3: 2036 Traffic Flows (with Ultimate Ascot LSP Development Flows)



Credits: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA,

The above figure focuses on the distribution of traffic onto the road network for typical AM and PM peak periods. The Racecourse access has not been shown on this figure as the peak movements to and from the racecourse are expected to occur on a Saturday, when traffic flows on Grandstand Road are approximately 60% of typical PM peak values. Peak Racecourse flow is typically at approximately 12pm, prior to the start of the first race at the racecourse and the expected peak arrival time of patrons. The last race typically concludes at about 5:30pm and traffic flows at that time on Grandstand Road are approximately 50% of PM peak flows, this at a time when patrons will be leaving the racecourse at the highest rate.

To put the above into context, the peak weekend flows on Grandstand Road are approximately the same as the inter-peak weekday flows at about the same time.

6.6 Intersection Performance

SIDRA analysis was undertaken at the following intersections to estimate the impact of the development generated traffic on the surrounding transport network:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Grandstand Road and Waterways Cresent Roundabout
- Resolution Drive / Raconteur Drive intersection.

SIDRA results for each approach are presented below in the form of Degree of Saturation (DOS), Average Delay, Level of Service (LOS) and 95th Percentile Queue. These characteristics are defined as follows:

- **Degree of Saturation (DOS)**: is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded for an un-signalised intersection where DOS > 0.80;
- **95% Queue:** is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- **Average Delay:** is the average of all travel time delays for vehicles through the intersection. An unsignalised intersection is considered to be operated at capacity where the average delay exceeds 40 seconds for any movement; and
- **Level of Service (LOS)**: is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers.

6.7 Scenario 1 - Current Year 2024

The following presents the analysis of the key access points as noted above assuming current traffic flows on the road network and without the Ascot Racecourse developed.

Figure 6-4: Current Performance – Grandstand Rd/Waterways Cres

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.45	4	A	26
Precinct A	0.03	7	A	1
Grandstand Rd W	0.20	4	A	12
Waterway Cres	0.05	10	A	2
Intersection	**0.45**	**4**	**A**	**26**

Figure 6-5: Current Performance – Grandstand Rd/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.45	0	A	0
Raconteur Dr	NA	NA	NA	NA
Grandstand Rd W	0.33	0	A	0
Intersection (based on minor leg appr/mvt)	**0.45**	**0**	**A**	**0**

Figure 6-6: Current Performance – Grandstand Rd/Resolution Dr/Stoneham St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Stoneham St S	0.62	9	A	54
Resolution Dr E	0.74	15	B	47
Grandstand Rd N	0.33	4	A	21
Resolution Dr W	0.16	13	B	7
Intersection	**0.74**	**9**	**A**	**55**

Figure 6-7: Current Performance – Resolution Dr/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Resolution Dr E	0.21	0	A	0
Resolution Dr E RT	0.003	4	A	0.1/0.5
Raconteur Dr RT	0.02	6	A	0.5
Resolution Dr W	0.16	0	A	0
Intersection (based on minor leg appr/mvt)	**0.02**	**6**	**A**	**0.1/0.5**

Figure 6-8: Current Performance – Great Eastern Hwy/Resolution Dr/Hardey Rd

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Hardey Rd E	0.52	76	E	99
GEH N	0.75(T)/0.90(R)	44	D	306
Resolution Dr W	0.93	64	E	75
GEH S	0.83(T)/0.65(R)	31	C	319
Intersection	**0.93**	**42**	**D**	**319**

Figure 6-9: Current Performance – Great Eastern Hwy/Stoneham St/Belgravia St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Belgravia St E	0.81	72	E	172
GEH N	0.70(T)/0.63(R)	17	B	173
Stoneham St W	0.93	92	F	129
GEH S	0.80(T)/0.88(R)	25	C	294
Intersection	**0.93**	**34**	**C**	**294**

As summarised, apart from Great Eastern Highway, intersections all typically operate at a good level of service, with typically LoS A on all leg/movements, with some LoS B on the Resolution Drive approaches to the Resolution Drive / Stoneham Street / Grandstand Road Roundabout. The largest amount of queueing occurs at this same roundabout where it has a DoS (a

measure of how much traffic takes up the available traffic carrying capacity) of 0.74, this maximum being on the Resolution Drive eastern approach to the roundabout and considered acceptable. Intersections on Great Eastern Highway at Resolution Drive and Stoneham Street operate with DoS of approximately 0.7 to 0.85 on Great Eastern Highway with higher DoS on the western leg approaches (Resolution Drive and Stoneham Street) where DoS is approaching 0.93.

6.8 Scenario 2 – 2036 No Development, Background Traffic Growth

The following presents the analysis of the same intersections assuming a future growth horizon to 2036 with NO build out of the development. The intersections have been assessed based on the current geometries.

Ascot LSP Area Intersections: Grandstand Road and Raconteur Drive

Figure 6-10: 2036 Performance – Grandstand Rd/Waterways Cres

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.54	4	A	38
Precinct A	0.03	7	A	1
Grandstand Rd W	0.25	4	A	15
Waterway Cres	0.06	13	B	3
Intersection	**0.54**	**4**	**A**	**38**

Figure 6-11: 2036 Performance – Grandstand Rd/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.54	0	A	0
Raconteur Dr	NA	NA	NA	NA
Grandstand Rd W	0.35	0	A	0
Intersection (based on minor leg appr/mvt)	**0.54**	**0**	**A**	**0**

Figure 6-12: 2036 Performance – Grandstand Rd/Resolution Dr/Stoneham St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Stoneham St S	0.69	11	B	68
Resolution Dr E	0.81	17	B	59
Grandstand Rd N	0.35	4	A	23
Resolution Dr W	0.19	14	B	8
Intersection	**0.81**	**10**	**A**	**68**

Figure 6-13: 2036 Performance – Resolution Dr/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Resolution Dr E	0.22	0	A	0
Resolution Dr E RT	0.002	6	A	0.6
Raconteur Dr RT	0.02	7	A	0.5/0.6
Resolution Dr W	0.17	0	A	0
Intersection (based on minor leg appr/mvt)	**0.02**	**7**	**A**	**0.5/0.6**

With no development, and with continued anticipated background traffic growth on the adjacent road network, the intersections are expected to still operate satisfactorily. Noted performance changes to each intersection are:

- Grandstand Road/Waterways Crescent

  This intersection is expected to be operating well, with an overall LoS A, the same as now. There is expected to be a lengthening of vehicle queues on Grandstand Road and a slight increase in the DoS, notably for the Grandstand Road eastern approach to the roundabout.

- Grandstand Road/Raconteur Drive

  Raconteur Drive is presently closed to traffic on non-race days.

- Grandstand Road/Resolution Drive/Stoneham Street

  With the background traffic growth, this intersection is still expected to operate satisfactorily in 2036. Queues are expected to slightly lengthen with the DoS increasing from 0.74 to 0.81. Overall, the intersection is expected to operate at a LoS A.

- Resolution Drive/Raconteur Drive

  This intersection is expected to operate in almost identical manner to how it presently operates. There is still expected to be minimal delays and good corresponding LoS. The DoS for the critical right turn from Raconteur Drive onto Resolution Drive is low at 0.02, this being a measure of good operational performance for this intersection.

Great Eastern Highway Intersections

Figure 6-14: 2036 Performance – Great Eastern Hwy/Resolution Dr/Hardey Rd

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Hardey Rd E	0.54	75	E	106
GEH N	0.71(T)/1.25(R)	70	E	411
Resolution Dr W	1.24	132	F	126
GEH S	0.90(T)/0.90(R)	30	C	410
Intersection	**1.25**	**56**	**E**	**411**

Figure 6-15: 2036 Performance – Great Eastern Hwy/Stoneham St/Belgravia St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Belgravia St E	1.12	199	F	389
GEH N	0.65(T)/0.82(R)	12	B	127
Stoneham St W	1.13	237	F	232
GEH S	0.91(T)/1.13(R)	38	D	525
Intersection	**1.13**	**67**	**E**	**525**

- Great Eastern Highway/Resolution Drive/Hardey Road

  With the background traffic growth, this intersection is expected to be oversaturated in 2036. Queues are expected to slightly lengthen with the DoS increasing from 0.93 to 1.25, this high DoS as a result of the right turn lane on the northern Great Eastern Highway approach being over saturated. Overall, the intersection is expected to operate at a LoS E. Options tested to improve this intersection included the introduction of an additional right turn lane on the northern Great Eastern Highway approach, this was found to reduce the DoS to 0.99, based on the Resolution Drive approach.

- Great Eastern Highway/Stoneham Street/Belgravia Street

  Similar to the intersection above, with the background traffic growth, this intersection is expected to be oversaturated in 2036. Queues are expected to lengthen with the DoS increasing from 0.93 to 1.13, this high DoS as a result of the right turn lane on the southern Great Eastern Highway approach along with the Stoneham Street approach being over saturated. Overall, the intersection is expected to operate at a LoS E. Options tested to improve this intersection included the introduction of an additional right turn lane on the southern Great Eastern Highway approach, this was found to still have a similar overall DoS of 1.17, based on the Stoneham Street approach. But the DoS for the right turn movement on the southern approach on Great Eastern Highway reducing to 0.79.

6.9 Scenario 3 – 2036 With Ascot LSP Development

The following presents the analysis of the assessment of the road network assuming a future growth horizon to 2036 with full build out of the Ascot Racecourse LSP development for a comprehensive assessment.

<u>Ascot LSP Area Intersections: Grandstand Road and Raconteur Drive</u>

Figure 6-16: 2036 Performance with Development – Grandstand Rd/Waterways Cres

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.54	5	A	38
Precinct A	0.10	8	A	3
Grandstand Rd W	0.28	4	A	16
Waterway Cres	0.06	13	B	3
Intersection	**0.54**	**5**	**A**	**38**

Figure 6-17: 2036 Performance with Development – Grandstand Rd/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Grandstand Rd E	0.48	0	A	0
Grandstand Rd E RT	0.09	4	A	2
Raconteur Dr	0.08	6	A	2
Grandstand Rd W	0.18	0	A	0
Intersection (based on minor leg appr/mvt)	**0.48**	**0.5**	**A**	**2**

Figure 6-18: 2036 Performance with Development – Grandstand Rd/Resolution Dr/Stoneham St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Stoneham St S	0.85	23	C	136
Resolution Dr E	0.86	17	B	79
Grandstand Rd N	0.28	5	A	16
Resolution Dr W	0.28	18	B	13
Intersection	**0.86**	**17**	**B**	**136**

Figure 6-19: 2036 Performance with Development – Resolution Dr/Raconteur Dr

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Resolution Dr E	0.22	0	A	0
Resolution Dr E RT	0.09	2.2	A	2
Raconteur Dr RT	0.19	8	A	3.9/4.9
Resolution Dr W	0.17	0	A	0
Intersection (based on minor leg appr/mvt)	**0.19**	**8**	**A**	**3.9/4.9**

With full development of the Ascot Racecourse LSP area, and with continued background traffic growth on the adjacent road network, the intersections are expected to still operate satisfactorily in Scenario 3 and only minor changes to performance results to each intersection as compared to the previous Scenario 2:

- Grandstand Road/Waterways Crescent

  This intersection is expected to continue to operate well, with an overall LoS A, the same as for the no-development Scenario 2. Other metrics for this intersection are expected to be similar to the 2036 scenario and thus there is expected to be no detrimental impact issues caused by the LSP development.

- Grandstand Road/Raconteur Drive

  This intersection is proposed to be open permanently to traffic with left and right turns allowed from Grandstand Road into Raconteur Drive and only a left turn out from Raconteur Drive onto Grandstand Road. These are the same

movements currently permitted at this intersection when the intersection is open on race days to allow racecourse patrons to park. It is noted that the critical right turn from Grandstand Road onto Raconteur Drive and the left turn from Raconteur Drive onto Grandstand Road are both expected to operate at LoS A with DoS of 0.8 to 0.9, acceptable queues and delays. Queues are expected to be able to be contained within the current right turn pocket length on Grandstand Road.

- Grandstand Road/Resolution Drive/Stoneham Street

  With the background traffic growth and the Ascot LSP development traffic, this intersection is still expected to operate satisfactorily in 2036. Queues are expected to lengthen to 136m (68m) on Stoneham Street and 79m (from 59m) on Resolution Drive eastern approach. Overall, the DoS for the intersection is expected to be 0.86, this again acceptable with a total average delay of 17s and overall LoS B. Across all measures, this intersection is expected to operate satisfactorily.

- Resolution Drive/Raconteur Drive

  This intersection is expected to still operate similar to 2024 as in 2036 without any development. The DoS for the right turn from Raconteur Drive onto Resolution Drive is expected to be 0.19 with slightly longer queues, but no more than a single vehicle queued either at Raconteur Drive prior to entering Resolution Drive, or within the median waiting to entering the western traffic flow back towards the roundabout at the intersection of Grandstand Road/Resolution Drive/Stoneham Street.

Great Eastern Highway Intersections

Figure 6-20: 2036 Performance with Development – Great Eastern Hwy/Resolution Dr/Hardey Rd

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Hardey Rd E	0.60	81	F	116
GEH N	0.72(T)/1.53(R)	126	F	634
Resolution Dr W	1.51	204	F	195
GEH S	0.91(T)/0.90(R)	30	C	417
Intersection	**1.53**	**86**	**F**	**634**

Figure 6-21: 2036 Performance with Development – Great Eastern Hwy/Stoneham St/Belgravia St

Lane	PM Peak			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
Belgravia St E	1.20	252	F	461
GEH N	0.63(T)/1.10(R)	15	B	98
Stoneham St W	1.40	480	F	354
GEH S	0.88(T)/1.38(R)	40	D	468
Intersection	**1.40**	**103**	**F**	**468**

- Great Eastern Highway/Resolution Drive/Hardey Road

  The addition of the LSP development traffic is expected to exacerbate the performance of this intersection, which is expected to be over capacity in 2036 without the development. The intersection is expected to be oversaturated with 2036 queues expected to lengthen and the DoS increasing from 1.25 to 1.53. This high DoS is a result of the right turn lane on the northern (or north-east orientated) Great Eastern Highway approach being oversaturated (demand exceeds capacity). Overall, the intersection is expected to operate at a LoS F, slightly worse than the expected E without the LSP development.

- Great Eastern Highway/Stoneham Street/Belgravia Street

  Similar to the highway intersection above, with the background traffic growth and the addition of the LSP development traffic, this intersection is expected to also be oversaturated in 2036. Queues are expected to lengthen with the DoS increasing from 1.13 to 1.40, this high DoS as a result of the right turn lane on the southern (or south-west orientated) Great Eastern Highway approach along with the Stoneham Street approach being oversaturated. Overall, the intersection is expected to operate at a LoS F, slightly worse than the expected E without the LSP development.

6.10 SIDRA Intersection Results

Analysis of the intersections in the Ascot LSP area at the 2024 (base) and 2036 (full development) design horizons shows that there is predicted to be no detrimental issues with respect to traffic queuing and delays for any movement in the PM peak period where the highest traffic flows are expected. This is on the basis that the existing intersection of Grandstand Road and Resolution Drive is able to be opened permanently to traffic as a LILO-RI as currently occurs on race days.

The Great Eastern Highway signalised intersections at Resolution Drive and Stoneham Street were also checked for performance in 2036. Unsurprisingly, these highway intersections are expected to be oversaturated in 2036, even without the Ascot LSP development, primarily due to increasing demands on Great Eastern Highway.

In summary, outside of the highway intersections, all parameters of this capacity assessment are within recognised thresholds for acceptable intersection operation.

7 Conclusions & Recommendations

This Transport Impact Assessment (TIA) for Ascot Racecourse has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)*, which is the most appropriate level of TIA for a proposed Scheme Amendment and Local Structure Plan submission.

The Site, which is the subject of this assessment, is currently zoned as Place of Public Assembly across the proposed five development Precinct. This zoning is proposed be changed to mixed use, place of public assembly, and residential across the five precincts to allow development in keeping with the Applicant's intention for this Site as a multi-use development and complements the intention for the proposed Golden Gateway LSP.

The following conclusions and recommendations have been made regarding the proposed development with respect to this TIA:

7.1 Overall Integration with Surrounding Attractors / Generators

As Ascot Racecourse is already very well established in the local area, a variety of uses including retail, food, beverage and recreational uses are available in the local area primarily along the route of the Great Eastern Highway and on the Racecourse site itself. In addition, as an attractor and employment location itself, the racecourse is located in close proximity to large residential areas of Redcliffe, Belmont, Rivervale and Maylands surrounding the site.

Approximately 1.2 km to the south of the Site, is situated Belmont Primary School.

7.2 Road Network Accessibility and Parking

The site is well located in relation to the existing road network with access available from the major road network through Ascot via current intersections.

The following key intersections are located on the main road network within the Ascot area and will be immediately affected by traffic flows to and from the development site:

- Resolution Drive / Stoneham Street / Grandstand Road Roundabout
- Raconteur Drive / Grandstand Road Intersection
- Grandstand Road and Waterways Cresent Roundabout
- Resolution Drive / Raconteur Drive intersection.

Under the WAPC Guidelines for TIAs, a Scheme Amendment requires a 'broad brush' assessment of the impacts of the development. While individual lot driveway access arrangements and car parking typically fall outside the scope of a general Structure Plan-level transport assessment outlined in the WAPC Guidelines, the Ascot LSP Applicant is proactively presenting discussions/solutions to enhance future lot access arrangements and network performance. These suggestions are subject to further refinement in subsequent stages of development planning.

Given the Ascot LSP restrictions for most access points will be LILOs due to geometrical constraints, a relief valve is needed to support northbound traffic (right turning vehicular demands from the east). In this regard, the existing intersection of Grandstand Road and Raconteur Drive is proposed to be opened permanently to traffic with left and right turns allowed from Grandstand Road into Raconteur Drive and a left turn out from Raconteur Drive onto Grandstand Road (LILO-RI). These are the same movements currently permitted at this intersection on race days to allow racecourse patrons to park and exit. This critical left turn out to, and right turn in from Grandstand Road are both expected to operate satisfactorily with acceptable queues and delays to support the Ascot LSP. Ultimate development queues are expected to be able to be contained within the current right turn pocket length on Grandstand Road.

Additionally, the Applicant has undertaken a high-level parking appraisal for the Ascot LSP, even though this is not a standard requirement of a Structure Plan assessment under the WAPC Guidelines. The exiting net parking availability of Ascot on a race day and the proposed new development areas combined, is estimated to be able to adequately meet the currently observed parking demand for a busy typical race day at Ascot. For non-typical large events (such as the New Years Perth Cup) the traffic management plan for the racecourse would be appropriate for continued adoption. To further ensure that racecourse patrons are well informed of parking distribution and pick up / set down areas, it is a recommendation of this TIA to implement a Travel Demand Plan to assist traffic management and actively discourage patrons from using their private motor vehicle to drive to and from the racecourse. This plan may include both the encouragement in the use of the currently available public transport services near the racecourse, improvement in private high occupancy services, and the uptake of ride share services (MaaS).

7.3 Pedestrian and Cycle Accessibility

The existing footpath network on the northern side of Grandstand Road provides good links to the area surrounding Ascot Racecourse. This will be further enhanced by the improvements proposed through the LSP and Scheme Amendment, as well as the Public Realm Strategy being developed as part of the Golden Gateway LSP.

It is a recommendation of this report that, investigations be undertaken to extend the existing footpath network surrounding the racecourse, including south of Grandstand Road and improving pedestrian and cycle connections towards the local amenities on Great Eastern Highway. If feasible, this would encourage trips on foot to local centres and help increase public transport usage to reduce the reliance on private vehicle modes.

7.4 Public Transport Accessibility

The main bus stops accessible from the site are on Grandstand Road immediately adjacent to one of the key pedestrian access points to the racecourse. Based on a desktop review, the infrastructure provided at these stops is limited as a shelter with seating is only available on the south-western side while a raised kerb to assist with reduced mobility access is only available for a short distance on the north-eastern side of Grandstand Road. It would be recommended that a review of these bus stops is undertaken irrespective of any development, particularly as they serve a significant destination, it could also be considered that the proposed development provides a contribution to these improvements.

Additional frequent bus services are accessible from the site along the Great Eastern Highway towards the new Bayswater Railway Sation, Redcliffe Station, central Perth and Perth Airport.

7.5 Analysis of the Transport Network

Analysis of the intersections in the Ascot area with and without the Ascot LSP has been assessed at the 2024 (current) and 2036 (ultimate) design horizons. The comparison of results show that there is predicted to be no detrimental issues with respect to traffic queuing and delays for any movement in the PM peak period (PM peak is when the highest traffic flows are expected). All parameters of this capacity assessment are within recognised thresholds for acceptable intersection operation.

The downstream Great Eastern Highway intersections were also assessed for completeness and were shown to operate above their capacity in 2036, this without the addition of the Ascot LSP development.

It is important to note that at the time of preparing this report, the details of the Golden Gateway Local Structure Plan were still under revision. Whilst every endeavour was made to interrogate the previous traffic modelling and road network proposals in the draft reports and liaise with key project members for updates, the details were still unfinished and presented too many unknowns to be adequately and accurately incorporated into this traffic modelling intersection analyses.

7.6 Recommendations

It is the recommendation of this TIA that:

- the existing intersection of Grandstand Road and Raconteur Drive be opened permanently to traffic as a LILO-RI as currently occurs on race days.
- Travel Demand Plan be undertaken to assist Ascot Racecourse patrons better utilise the parking available around the racecourse on race days and/or address this within the Ascot Event Traffic Management Plan.
- When GGLSP details are finalised, the external highway intersections be re-assessed in terms of their capacity to accommodate future development-generated traffic of the wider network and their anticipated background growth:
    - Great Eastern Highway/Resolution Drive/Hardey Road
    - Great Eastern Highway/Stoneham Street/Belgravia Street.

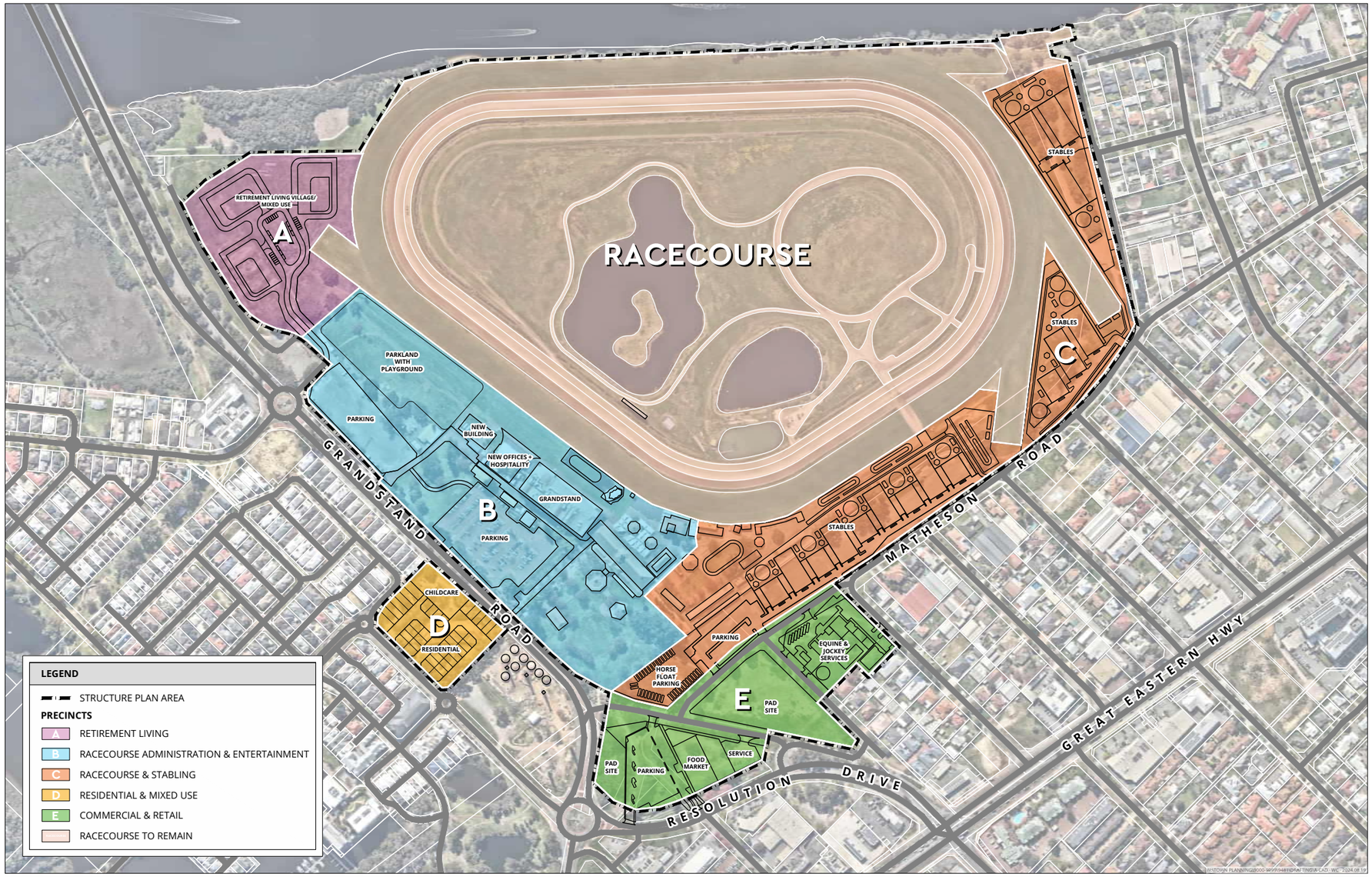
Attachment 12.1.5 Transport Impact Assessment

Appendix A TIA Checklist

Item	Provided	Comments/Proposals
Summary	Y	
Introduction / Background	Y	
Structure Plan Proposal		
Regional context	Y	
Proposed land uses	Y	
Table of land uses and quantities	Y	
Major attractors / generators	Y	
Specific issues	Y	
Existing Situation		
Existing land uses within structure plan	Y	
Existing land uses within 800m of structure plan area	Y	
Existing road network within structure plan area	Y	
Existing pedestrian / cycle network within structure plan area	Y	
Existing public transport services within structure plan area	Y	
Existing road network within 2 (or 5) km of the structure plan area	Y	
Traffic flows on roads within the structure plan area (PM and/or AM peak hours)	Y	
Existing pedestrian / cycle networks within 800m of the structure plan area.	Y	
Existing public transport services within 800m of the structure plan area.	Y	
Proposed Internal Transport Networks		
Changes / additions to existing road network or proposed new road network	Y	
Road reservation widths	Y	
Road cross-sections & speed limits	Y	
Intersection controls	Y	
Pedestrian / cycle networks and crossing facilities	Y	
Changes to External Transport Networks		
Road network	Y	
Intersection controls	Y	
Pedestrian/cycle networks and crossing facilities	Y	
Public transport services	Y	
Integration with the surrounding area		
Trip attractors / generators within 800 metres	Y	
proposed changes to land uses within 800 metres	Y	
travel desire lines from development to these attractors/ generators	Y	
adequacy of external transport networks	Y	
deficiencies in external transport networks	Y	
remedial measures to address deficiencies	Y	
Analysis of internal transport networks		
assessment years	Y	
time periods	Y	
Structure plan generated traffic	Y	
Extraneous (through) traffic	Y	
Design traffic flows (that is, total traffic)	Y	
Road cross-sections	Y	
Intersection controls	Y	
Access strategy	Y	
Pedestrian / cycle networks	Y	
Safe routes to schools	Y	
Pedestrian permeability & efficiency	Y	
Access to public transport	Y	
Analysis of external transport networks		
Extent of analysis	Y	
Base flows for assessment year(s)	Y	
Total traffic flows	Y	
Road cross-sections	Y	
Intersection layouts and controls	Y	
Pedestrian / cycle networks	Y	
Conclusions	Y	

Appendix B Proposed Masterplan Precincts

Attachment 12.1.5 Transport Impact Assessment



DRAFT MASTER PLAN CONCEPT
VARIOUS LOTS - ASCOT RACECOURSE
ASCOT

N
0 100 m
SCALE @ A3: 1:4000
9481-CON-01-D

DRAWN: WC
DATE CREATED: 2024.08.19
PROJECTION: MGA50 GDA94
CADASTRE: LANDGATE
AERIAL: NEARMAP 20230831
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ROWE GROUP DESIGN

Appendix C SIDRA Modelling Outputs

LANE SUMMARY

Site: 103a [Leg 1 PM (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	101	0.0	101	0.0	1149	0.088	100	2.2	LOS A	0.3	2.5	Full	6	0.0	0.0
Approach	101	0.0	101	0.0		0.088		2.2	LOS A	0.3	2.5				
North: Racecourse															
Lane 1	172	0.0	172	0.0	1298	0.132	100	5.7	LOS A	0.6	4.5	Short	50	0.0	NA
Lane 2	150	0.0	150	0.0	1122	0.133	100	4.6	LOS A	0.5	3.9	Full	500	0.0	0.0
Approach	322	0.0	322	0.0		0.133		5.2	LOS A	0.6	4.5				
West: Raconteur Dr															
Lane 1	78	0.0	78	0.0	1772	0.044	100	5.6	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	314	2.5	314	2.5	1883	0.167	100	0.0	LOS A	0.0	0.0	Full	550	0.0	0.0
Approach	392	2.0	392	2.0		0.167		1.1	NA	0.0	0.0				
All Vehicles	815	1.0	815	1.0		0.167		2.9	NA	0.6	4.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	101	101	0.0	1149	0.088	100	NA	NA
Approach	101	101	0.0		0.088			

North: Racecourse

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	172	-	172	0.0	1298	0.132	100	0.0	2
Lane 2	-	150	150	0.0	1122	0.133	100	NA	NA

Approach	172	150	322	0.0		0.133			
West: Raconteur Dr									
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	78	-	78	0.0	1772	0.044	100	0.0	2
Lane 2	-	314	314	2.5	1883	0.167	100	NA	NA
Approach	78	314	392	2.0		0.167			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	815	1.0	0.167						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
North: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103b [Leg 2 PM (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Raconteur Dr															
Lane 1	417	3.8	417	3.8	1860	0.224	100	0.1	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 2	101	0.0	101	0.0	1773	0.057	100	5.7	LOS A	0.0	0.0	Short	85	0.0	NA
Approach	518	3.0	518	3.0		0.224		1.2	NA	0.0	0.0				
North: Median															
Lane 1	150	0.0	150	0.0	781	0.192	100	3.4	LOS A	0.7	4.9	Full	6	0.0	0.0
Approach	150	0.0	150	0.0		0.192		3.4	LOS A	0.7	4.9				
All Vehicles	668	2.3	668	2.3		0.224		1.7	NA	0.7	4.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

East: Raconteur Dr

Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	417	-	417	3.8	1860	0.224	100	NA	NA
Lane 2	-	101	101	0.0	1773	0.057	100	0.0	1
Approach	417	101	518	3.0		0.224			

North: Median

Mov. From N To Exit:	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	150	150	0.0	781	0.192	100	NA	NA
Approach	150	150	0.0		0.192			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	668	2.3	0.224

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
East: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103a [Leg 1 PM (Site Folder: Grandstand/Raconteur)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Grandstand PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
NorthEast: Raconteur Dr															
Lane 1	100	0.0	100	0.0	1237	0.081	100	5.7	LOS A	0.3	2.4	Short	50	0.0	NA
Lane 2	1	0.0	1	0.0	871	0.001	100	5.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	101	0.0	101	0.0		0.081		5.7	LOS A	0.3	2.4				
NorthWest: Grandstand Rd															
Lane 1	98	0.0	98	0.0	1548	0.063	100	5.8	LOS A	0.3	1.9	Short	75	0.0	NA
Lane 2	345	3.5	345	3.5	1864	0.185	100	0.1	LOS A	0.0	0.0	Full	550	0.0	0.0
Lane 3	345	3.5	345	3.5	1864	0.185	100	0.1	LOS A	0.0	0.0	Full	550	0.0	0.0
Approach	788	3.1	788	3.1		0.185		0.8	LOS A	0.3	1.9				
SouthWest: Median															
Lane 1	76	0.0	76	0.0	869	0.087	100	3.7	LOS A	0.3	2.2	Full	6	0.0	0.0
Approach	76	0.0	76	0.0		0.087		3.7	LOS A	0.3	2.2				
All Vehicles	964	2.5	964	2.5		0.185		1.5	NA	0.3	2.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

NorthEast: Raconteur Dr

Mov. From NE To Exit:	L2 SE	T1 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	100	-	100	0.0	1237	0.081	100	0.0	2
Lane 2	-	1	1	0.0	871	0.001	100	NA	NA
Approach	100	1	101	0.0		0.081			

NorthWest: Grandstand Rd

Mov. From NW To Exit:	L2 NE	T1 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	98	-	98	0.0	1548	0.063	100	0.0	2

Lane 2	-	345	345	3.5	1864	0.185	100	NA	NA
Lane 3	-	345	345	3.5	1864	0.185	100	NA	NA
Approach	98	690	788	3.1		0.185			
SouthWest: Median									
Mov. From SW To Exit:	T1 NE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	76	0.0		869	0.087	100	NA	NA
Approach	76	76	0.0			0.087			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	964	2.5	0.185						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
NorthEast: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: Grandstand Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
SouthWest: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103b [Leg 2 PM (Site Folder: Grandstand/Raconteur)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Grandstand PM with Dev (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandtand Rd															
Lane 1	912	2.2	912	2.2	1888	0.483	100	0.3	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 2	912	2.2	912	2.2	1888	0.483	100	0.3	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 3	76	0.0	76	0.0	1770	0.043	100	5.7	LOS A	0.0	0.0	Short	50	0.0	NA
Approach	1900	2.1	1900	2.1		0.483		0.5	NA	0.0	0.0				
NorthEast: Median															
Lane 1	1	0.0	1	0.0	115	0.009	100	30.2	LOS D	0.0	0.2	Full	6	0.0	0.0
Approach	1	0.0	1	0.0		0.009		30.2	LOS D	0.0	0.2				
All Vehicles	1901	2.1	1901	2.1		0.483		0.5	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

SouthEast: Grandtand Rd

Mov. From SE To Exit:	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	912	-	912	2.2	1888	0.483	100	NA	NA
Lane 2	912	-	912	2.2	1888	0.483	100	NA	NA
Lane 3	-	76	76	0.0	1770	0.043	100	0.0	2
Approach	1824	76	1900	2.1		0.483			

NorthEast: Median

Mov. From NE To Exit:	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	0.0	115	0.009	100	NA	NA
Approach	1	1	0.0		0.009			

	Total	%HV	Deg.Satn (v/c)

All Vehicles	1901	2.1	0.483

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandtand Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103a [Leg 1 PM - No Dev (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur Current PM (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	4	0.0	4	0.0	1200	0.004	100	1.8	LOS A	0.0	0.1	Full	6	0.0	0.0
Approach	4	0.0	4	0.0		0.004		1.8	LOS A	0.0	0.1				
North: Racecourse															
Lane 1	23	0.0	23	0.0	1298	0.018	100	5.5	LOS A	0.1	0.6	Short	50	0.0	NA
Lane 2	21	0.0	21	0.0	1202	0.018	100	4.1	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	45	0.0	45	0.0		0.018		4.9	LOS A	0.1	0.6				
West: Raconteur Dr															
Lane 1	2	0.0	2	0.0	1838	0.001	100	5.5	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	314	2.5	314	2.5	1883	0.167	100	0.0	LOS A	0.0	0.0	Full	550	0.0	0.0
Approach	316	2.5	316	2.5		0.167		0.1	NA	0.0	0.0				
All Vehicles	365	2.1	365	2.1		0.167		0.7	NA	0.1	0.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	4	0.0	1200	0.004	100	NA	NA
Approach	4	4	0.0		0.004			

North: Racecourse

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	23	-	23	0.0	1298	0.018	100	0.0	2
Lane 2	-	21	21	0.0	1202	0.018	100	NA	NA

Approach	23	21	45	0.0		0.018			
West: Raconteur Dr									
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	-	2	0.0	1838	0.001	100	0.0	2
Lane 2	-	314	314	2.5	1883	0.167	100	NA	NA
Approach	2	314	316	2.5		0.167			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	365	2.1		0.167					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
North: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103b [Leg 2 PM - No Dev (Site Folder: Raconteur T)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Raconteur Current PM (Network Folder: AM)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Raconteur Dr															
Lane 1	417	3.8	417	3.8	1860	0.224	100	0.1	LOS A	0.0	0.0	Full	780	0.0	0.0
Lane 2	4	0.0	4	0.0	1838	0.002	100	5.7	LOS A	0.0	0.0	Short	85	0.0	NA
Approach	421	3.7	421	3.7		0.224		0.2	NA	0.0	0.0				
North: Median															
Lane 1	21	0.0	21	0.0	850	0.025	100	2.5	LOS A	0.1	0.6	Full	6	0.0	0.0
Approach	21	0.0	21	0.0		0.025		2.5	LOS A	0.1	0.6				
All Vehicles	443	3.5	443	3.5		0.224		0.3	NA	0.1	0.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

East: Raconteur Dr

Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	417	-	417	3.8	1860	0.224	100	NA	NA
Lane 2	-	4	4	0.0	1838	0.002	100	0.0	1
Approach	417	4	421	3.7		0.224			

North: Median

Mov. From N To Exit:	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	21	21	0.0	850	0.025	100	NA	NA
Approach	21	21	0.0		0.025			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	443	3.5	0.224

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
East: Raconteur Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 PM - with GG/ Dev (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	917	0.9	917	0.9	1695	0.541	100	4.3	LOS A	5.1	38.1	Full	300	0.0	0.0
Lane 2	772	0.9	772	0.9	1427	0.541	100	4.8	LOS A	5.0	36.9	Full	300	0.0	0.0
Approach	1689	0.9	1689	0.9		0.541		4.6	LOS A	5.1	38.1				
NorthEast: Racecourse															
Lane 1[d]	74	1.4	74	1.4	710	0.104	100	8.0	LOS A	0.4	3.3	Full	500	0.0	0.0
Approach	74	1.4	74	1.4		0.104		8.0	LOS A	0.4	3.3				
NorthWest: Garratt Road															
Lane 1[d]	472	1.3	472	1.3	1686	0.280	100	4.2	LOS A	2.2	16.1	Full	500	0.0	0.0
Lane 2	400	1.3	400	1.3	1429	0.280	100	4.7	LOS A	2.1	15.8	Full	500	0.0	0.0
Approach	872	1.3	872	1.3		0.280		4.4	LOS A	2.2	16.1				
SouthWest: Waterway Cres															
Lane 1[d]	35	0.0	35	0.0	588	0.059	100	11.7	LOS B	0.4	2.8	Full	500	0.0	0.0
Approach	35	0.0	35	0.0		0.059		11.7	LOS B	0.4	2.8				
All Vehicles	2669	1.0	2669	1.0		0.541		4.7	LOS A	5.1	38.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	15	902	-	-	917	0.9	1695	0.541	100	NA	NA
Lane 2	-	722	48	1	772	0.9	1427	0.541	100	NA	NA
Approach	15	1624	48	1	1689	0.9		0.541			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	41	1	32	74	1.4		710	0.104	100	NA	NA
Approach	41	1	32	74	1.4			0.104			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	47	424	-	-	472	1.3	1686	0.280	100	NA	NA
Lane 2	-	365	32	3	400	1.3	1429	0.280	100	NA	NA
Approach	47	789	32	3	872	1.3		0.280			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	15	35	0.0		588	0.059	100	NA	NA
Approach	19	1	15	35	0.0			0.059			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2669	1.0	0.541								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway Current AM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	342	2.8	342	2.8	1747	0.196	100	4.0	LOS A	1.1	8.4	Full	300	0.0	0.0
Lane 2	290	2.9	290	2.9	1483	0.196	100	4.2	LOS A	1.1	8.3	Full	300	0.0	0.0
Approach	633	2.8	633	2.8		0.196		4.1	LOS A	1.1	8.4				
NorthEast: Racecourse															
Lane 1[d]	18	29.1	18	29.1	455	0.039	100	11.0	LOS B	0.1	1.5	Full	500	0.0	0.0
Approach	18	29.1	18	29.1		0.039		11.0	LOS B	0.1	1.5				
NorthWest: Garratt Road															
Lane 1[d]	589	1.4	589	1.4	1747	0.337	100	4.1	LOS A	2.8	20.9	Full	500	0.0	0.0
Lane 2	498	1.4	498	1.4	1476	0.337	100	4.3	LOS A	2.8	20.6	Full	500	0.0	0.0
Approach	1086	1.4	1086	1.4		0.337		4.2	LOS A	2.8	20.9				
SouthWest: Waterway Cres															
Lane 1[d]	53	4.0	53	4.0	866	0.061	100	7.4	LOS A	0.3	2.2	Full	500	0.0	0.0
Approach	53	4.0	53	4.0		0.061		7.4	LOS A	0.3	2.2				
All Vehicles	1789	2.2	1789	2.2		0.337		4.3	LOS A	2.8	20.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	328	-	-	342	2.8	1747	0.196	100	NA	NA
Lane 2	-	280	9	1	290	2.9	1483	0.196	100	NA	NA
Approach	14	608	9	1	633	2.8		0.196			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	1	7	18	29.1	455	0.039	100	NA	NA

Approach	9	1	7	18	29.1			0.039			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	8	580	-	-	589	1.4	1747	0.337	100	NA	NA
Lane 2	-	481	16	1	498	1.4	1476	0.337	100	NA	NA
Approach	8	1061	16	1	1086	1.4		0.337			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	26	53	4.0		866	0.061	100	NA	NA
Approach	25	1	26	53	4.0			0.061			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1789	2.2	0.337

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway Current PM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 12

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	956	1.0	956	1.0	1758	0.544	100	4.2	LOS A	5.1	37.6	Full	300	0.0	0.0
Lane 2	804	1.0	804	1.0	1480	0.544	100	4.3	LOS A	5.0	36.9	Full	300	0.0	0.0
Approach	1760	1.0	1760	1.0		0.544		4.2	LOS A	5.1	37.6				
NorthEast: Racecourse															
Lane 1[d]	21	5.0	21	5.0	706	0.030	100	7.1	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	21	5.0	21	5.0		0.030		7.1	LOS A	0.1	0.9				
NorthWest: Garratt Road															
Lane 1[d]	438	1.7	438	1.7	1781	0.246	100	4.0	LOS A	2.0	15.1	Full	500	0.0	0.0
Lane 2	370	1.5	370	1.5	1506	0.246	100	4.5	LOS A	2.0	14.6	Full	500	0.0	0.0
Approach	808	1.6	808	1.6		0.246		4.2	LOS A	2.0	15.1				
SouthWest: Waterway Cres															
Lane 1[d]	35	0.0	35	0.0	610	0.057	100	12.7	LOS B	0.4	3.1	Full	500	0.0	0.0
Approach	35	0.0	35	0.0		0.057		12.7	LOS B	0.4	3.1				
All Vehicles	2624	1.2	2624	1.2		0.544		4.4	LOS A	5.1	37.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	15	941	-	-	956	1.0	1758	0.544	100	NA	NA
Lane 2	-	799	4	1	804	1.0	1480	0.544	100	NA	NA
Approach	15	1740	4	1	1760	1.0		0.544			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	15	1	5	21	5.0		706	0.030	100	NA	NA
Approach	15	1	5	21	5.0			0.030			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	435	-	-	438	1.7	1781	0.246	100	NA	NA
Lane 2	-	335	32	4	370	1.5	1506	0.246	100	NA	NA
Approach	3	769	32	4	808	1.6		0.246			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	15	35	0.0		610	0.057	100	NA	NA
Approach	19	1	15	35	0.0			0.057			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2624	1.2	0.544

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 AM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	384	2.8	384	2.8	1751	0.220	100	4.0	LOS A	1.3	9.8	Full	300	0.0	0.0
Lane 2	326	2.8	326	2.8	1484	0.220	100	4.2	LOS A	1.3	9.6	Full	300	0.0	0.0
Approach	710	2.8	710	2.8		0.220		4.1	LOS A	1.3	9.8				
NorthEast: Racecourse															
Lane 1[d]	18	29.1	18	29.1	421	0.042	100	11.7	LOS B	0.2	1.6	Full	500	0.0	0.0
Approach	18	29.1	18	29.1		0.042		11.7	LOS B	0.2	1.6				
NorthWest: Garratt Road															
Lane 1[d]	662	1.4	662	1.4	1750	0.379	100	4.1	LOS A	3.3	24.8	Full	500	0.0	0.0
Lane 2	559	1.4	559	1.4	1477	0.379	100	4.3	LOS A	3.3	24.5	Full	500	0.0	0.0
Approach	1221	1.4	1221	1.4		0.379		4.2	LOS A	3.3	24.8				
SouthWest: Waterway Cres															
Lane 1[d]	53	4.0	53	4.0	839	0.063	100	7.6	LOS A	0.3	2.2	Full	500	0.0	0.0
Approach	53	4.0	53	4.0		0.063		7.6	LOS A	0.3	2.2				
All Vehicles	2002	2.2	2002	2.2		0.379		4.3	LOS A	3.3	24.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	14	371	-	-	384	2.8	1751	0.220	100	NA	NA
Lane 2	-	315	9	1	326	2.8	1484	0.220	100	NA	NA
Approach	14	686	9	1	710	2.8		0.220			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	9	1	7	18	29.1		421	0.042	100	NA	NA
Approach	9	1	7	18	29.1			0.042			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	8	654	-	-	662	1.4	1750	0.379	100	NA	NA
Lane 2	-	542	16	1	559	1.4	1477	0.379	100	NA	NA
Approach	8	1196	16	1	1221	1.4		0.379			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	26	53	4.0		839	0.063	100	NA	NA
Approach	25	1	26	53	4.0			0.063			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2002	2.2	0.379

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 PM (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	880	1.0	880	1.0	1756	0.501	100	4.1	LOS A	4.3	31.9	Full	300	0.0	0.0
Lane 2	742	1.0	742	1.0	1479	0.501	100	4.3	LOS A	4.2	31.4	Full	300	0.0	0.0
Approach	1622	1.0	1622	1.0		0.501		4.2	LOS A	4.3	31.9				
NorthEast: Racecourse															
Lane 1[d]	21	5.0	21	5.0	729	0.029	100	6.9	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	21	5.0	21	5.0		0.029		6.9	LOS A	0.1	0.9				
NorthWest: Garratt Road															
Lane 1[d]	404	1.7	404	1.7	1779	0.227	100	4.0	LOS A	1.8	13.5	Full	500	0.0	0.0
Lane 2	342	1.5	342	1.5	1506	0.227	100	4.5	LOS A	1.8	13.1	Full	500	0.0	0.0
Approach	747	1.6	747	1.6		0.227		4.2	LOS A	1.8	13.5				
SouthWest: Waterway Cres															
Lane 1[d]	35	0.0	35	0.0	643	0.054	100	11.3	LOS B	0.4	2.6	Full	500	0.0	0.0
Approach	35	0.0	35	0.0		0.054		11.3	LOS B	0.4	2.6				
All Vehicles	2424	1.2	2424	1.2		0.501		4.3	LOS A	4.3	31.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	15	866	-	-	880	1.0	1756	0.501	100	NA	NA
Lane 2	-	736	4	1	742	1.0	1479	0.501	100	NA	NA
Approach	15	1602	4	1	1622	1.0		0.501			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	15	1	5	21	5.0		729	0.029	100	NA	NA
Approach	15	1	5	21	5.0			0.029			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	401	-	-	404	1.7	1779	0.227	100	NA	NA
Lane 2	-	307	32	4	342	1.5	1506	0.227	100	NA	NA
Approach	3	708	32	4	747	1.6		0.227			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	15	35	0.0		643	0.054	100	NA	NA
Approach	19	1	15	35	0.0			0.054			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2424	1.2	0.501								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Garratt/Waterway 2041 AM - with GG/ Dev (Site Folder: Grandstand/Garratt/Waterway)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Grandstand Road															
Lane 1[d]	479	2.3	479	2.3	1626	0.295	100	4.3	LOS A	2.0	15.4	Full	300	0.0	0.0
Lane 2	407	2.2	407	2.2	1379	0.295	100	4.8	LOS A	2.0	14.9	Full	300	0.0	0.0
Approach	886	2.2	886	2.2		0.295		4.5	LOS A	2.0	15.4				
NorthEast: Racecourse															
Lane 1[d]	125	4.2	125	4.2	556	0.225	100	10.5	LOS B	1.0	7.6	Full	500	0.0	0.0
Approach	125	4.2	125	4.2		0.225		10.5	LOS B	1.0	7.6				
NorthWest: Garratt Road															
Lane 1[d]	683	1.3	683	1.3	1713	0.399	100	4.2	LOS A	3.5	26.4	Full	500	0.0	0.0
Lane 2	577	1.3	577	1.3	1446	0.399	100	4.4	LOS A	3.5	26.0	Full	500	0.0	0.0
Approach	1260	1.3	1260	1.3		0.399		4.3	LOS A	3.5	26.4				
SouthWest: Waterway Cres															
Lane 1[d]	53	4.0	53	4.0	741	0.071	100	8.4	LOS A	0.3	2.6	Full	500	0.0	0.0
Approach	53	4.0	53	4.0		0.071		8.4	LOS A	0.3	2.6				
All Vehicles	2324	1.9	2324	1.9		0.399		4.8	LOS A	3.5	26.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

SouthEast: Grandstand Road

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	U SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	14	466	-	-	479	2.3	1626	0.295	100	NA	NA
Lane 2	-	378	27	1	407	2.2	1379	0.295	100	NA	NA
Approach	14	844	27	1	886	2.2		0.295			

NorthEast: Racecourse

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	63	1	61	125	4.2		556	0.225	100	NA	NA
Approach	63	1	61	125	4.2			0.225			
NorthWest: Garratt Road											
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	U NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	26	657	-	-	683	1.3	1713	0.399	100	NA	NA
Lane 2	-	560	16	1	577	1.3	1446	0.399	100	NA	NA
Approach	26	1217	16	1	1260	1.3		0.399			
SouthWest: Waterway Cres											
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	26	53	4.0		741	0.071	100	NA	NA
Approach	25	1	26	53	4.0			0.071			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2324	1.9	0.399								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Racecourse				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: Garratt Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Waterway Cres				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham Current AM (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 7

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	234	2.8	234	2.8	1458	0.160	100	4.3	LOS A	1.0	7.3	Full	300	0.0	0.0
Lane 2	187	3.0	187	3.0	1167	0.160	100	5.2	LOS A	0.9	6.9	Full	300	0.0	0.0
Approach	421	2.9	421	2.9		0.160		4.7	LOS A	1.0	7.3				
East: Resolution Dr															
Lane 1[d]	271	2.9	271	2.9	773	0.351	100	10.2	LOS B	1.8	14.0	Full	500	0.0	0.0
Approach	271	2.9	271	2.9		0.351		10.2	LOS B	1.8	14.0				
North: Grandstand Road															
Lane 1[d]	580	3.0	580	3.0	1649	0.352	100	4.0	LOS A	2.9	22.1	Full	500	0.0	0.0
Lane 2	479	3.0	479	3.0	1361	0.352	100	4.2	LOS A	2.8	21.5	Full	500	0.0	0.0
Approach	1059	3.0	1059	3.0		0.352		4.1	LOS A	2.9	22.1				
West: Resolution Dr															
Lane 1[d]	99	1.0	99	1.0	864	0.115	100	7.3	LOS A	0.6	4.1	Full	500	0.0	0.0
Approach	99	1.0	99	1.0		0.115		7.3	LOS A	0.6	4.1				
All Vehicles	1850	2.8	1850	2.8		0.352		5.3	LOS A	2.9	22.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	28	205	-	-	234	2.8	1458	0.160	100	NA	NA
Lane 2	-	172	13	2	187	3.0	1167	0.160	100	NA	NA
Approach	28	377	13	2	421	2.9		0.160			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	38	16	217	271	2.9		773	0.351	100	NA	NA
Approach	38	16	217	271	2.9			0.351			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	297	283	-	-	580	3.0	1649	0.352	100	NA	NA
Lane 2	-	469	5	4	479	3.0	1361	0.352	100	NA	NA
Approach	297	752	5	4	1059	3.0		0.352			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	42	51	99	1.0		864	0.115	100	NA	NA
Approach	5	42	51	99	1.0			0.115			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1850	2.8	0.352								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham Current PM (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	751	2.8	751	2.8	1084	0.693	100	9.7	LOS A	9.0	68.1	Full	300	0.0	0.0
Lane 2	561	3.0	561	3.0	810	0.693	100	12.2	LOS B	8.0	60.7	Full	300	0.0	0.0
Approach	1312	2.9	1312	2.9		0.693		10.8	LOS B	9.0	68.1				
East: Resolution Dr															
Lane 1[d]	618	2.9	618	2.9	763	0.810	100	17.2	LOS B	7.7	58.7	Full	500	0.0	0.0
Approach	618	2.9	618	2.9		0.810		17.2	LOS B	7.7	58.7				
North: Grandstand Road															
Lane 1[d]	581	3.0	581	3.0	1677	0.346	100	3.8	LOS A	3.0	23.1	Full	500	0.0	0.0
Lane 2	481	3.0	481	3.0	1388	0.346	100	4.1	LOS A	2.9	22.3	Full	500	0.0	0.0
Approach	1062	3.0	1062	3.0		0.346		3.9	LOS A	3.0	23.1				
West: Resolution Dr															
Lane 1[d]	75	1.0	75	1.0	404	0.186	100	13.9	LOS B	1.1	8.3	Full	500	0.0	0.0
Approach	75	1.0	75	1.0		0.186		13.9	LOS B	1.1	8.3				
All Vehicles	3066	2.9	3066	2.9		0.810		9.8	LOS A	9.0	68.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	71	680	-	-	751	2.8	1084	0.693	100	NA	NA
Lane 2	-	543	16	1	561	3.0	810	0.693	100	NA	NA
Approach	71	1223	16	1	1312	2.9		0.693			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	60	28	530	618	2.9		763	0.810	100	NA	NA
Approach	60	28	530	618	2.9			0.810			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	255	326	-	-	581	3.0	1677	0.346	100	NA	NA
Lane 2	-	469	6	6	481	3.0	1388	0.346	100	NA	NA
Approach	255	795	6	6	1062	3.0		0.346			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	29	39	75	1.0		404	0.186	100	NA	NA
Approach	7	29	39	75	1.0			0.186			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3066	2.9	0.810

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham 2036 AM - No Change (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	247	2.8	247	2.8	1440	0.172	100	4.4	LOS A	1.1	8.0	Full	300	0.0	0.0
Lane 2	197	3.0	197	3.0	1149	0.172	100	5.3	LOS A	1.0	7.5	Full	300	0.0	0.0
Approach	445	2.9	445	2.9		0.172		4.8	LOS A	1.1	8.0				
East: Resolution Dr															
Lane 1[d]	287	2.9	287	2.9	751	0.382	100	10.7	LOS B	2.1	16.1	Full	500	0.0	0.0
Approach	287	2.9	287	2.9		0.382		10.7	LOS B	2.1	16.1				
North: Grandstand Road															
Lane 1[d]	614	3.0	614	3.0	1640	0.375	100	4.0	LOS A	3.2	24.2	Full	500	0.0	0.0
Lane 2	506	3.0	506	3.0	1351	0.375	100	4.3	LOS A	3.1	23.4	Full	500	0.0	0.0
Approach	1120	3.0	1120	3.0		0.375		4.1	LOS A	3.2	24.2				
West: Resolution Dr															
Lane 1[d]	105	1.0	105	1.0	846	0.124	100	7.5	LOS A	0.6	4.5	Full	500	0.0	0.0
Approach	105	1.0	105	1.0		0.124		7.5	LOS A	0.6	4.5				
All Vehicles	1957	2.8	1957	2.8		0.382		5.4	LOS A	3.2	24.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	30	218	-	-	247	2.8	1440	0.172	100	NA	NA
Lane 2	-	181	14	2	197	3.0	1149	0.172	100	NA	NA
Approach	30	399	14	2	445	2.9		0.172			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	40	17	229	287	2.9		751	0.382	100	NA	NA
Approach	40	17	229	287	2.9			0.382			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	315	300	-	-	614	3.0	1640	0.375	100	NA	NA
Lane 2	-	496	6	5	506	3.0	1351	0.375	100	NA	NA
Approach	315	795	6	5	1120	3.0		0.375			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	6	45	54	105	1.0		846	0.124	100	NA	NA
Approach	6	45	54	105	1.0			0.124			
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1957	2.8	0.382								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham 2036 PM - No Change (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 24

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	776	2.8	776	2.8	1037	0.749	100	11.2	LOS B	10.5	79.9	Full	300	0.0	0.0
Lane 2	574	3.0	574	3.0	767	0.749	100	14.1	LOS B	9.2	70.1	Full	300	0.0	0.0
Approach	1350	2.9	1350	2.9		0.749		12.4	LOS B	10.5	79.9				
East: Resolution Dr															
Lane 1[d]	636	2.9	636	2.9	752	0.846	100	20.7	LOS C	10.5	79.7	Full	500	0.0	0.0
Approach	636	2.9	636	2.9		0.846		20.7	LOS C	10.5	79.7				
North: Grandstand Road															
Lane 1[d]	598	3.0	598	3.0	1673	0.358	100	3.8	LOS A	3.2	24.1	Full	500	0.0	0.0
Lane 2	495	3.0	495	3.0	1384	0.358	100	4.1	LOS A	3.1	23.2	Full	500	0.0	0.0
Approach	1093	3.0	1093	3.0		0.358		4.0	LOS A	3.2	24.1				
West: Resolution Dr															
Lane 1[d]	77	1.0	77	1.0	371	0.208	100	14.3	LOS B	1.2	8.9	Full	500	0.0	0.0
Approach	77	1.0	77	1.0		0.208		14.3	LOS B	1.2	8.9				
All Vehicles	3156	2.9	3156	2.9		0.846		11.2	LOS B	10.5	79.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	74	703	-	-	776	2.8	1037	0.749	100	NA	NA
Lane 2	-	556	17	1	574	3.0	767	0.749	100	NA	NA
Approach	74	1259	17	1	1350	2.9		0.749			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	62	28	546	636	2.9		752	0.846	100	NA	NA
Approach	62	28	546	636	2.9			0.846			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	262	336	-	-	598	3.0	1673	0.358	100	NA	NA
Lane 2	-	483	6	6	495	3.0	1384	0.358	100	NA	NA
Approach	262	819	6	6	1093	3.0		0.358			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	30	40	77	1.0		371	0.208	100	NA	NA
Approach	7	30	40	77	1.0			0.208			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3156	2.9	0.846

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [Grandstand/Resolution/Stoneham 2036 PM - NO GG & Ascott (Site Folder: Grandstand/Raconteur/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Roundabout
Design Life Analysis: Constant Number of Years = 19

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stoneham St															
Lane 1[d]	821	2.7	821	2.7	963	0.852	100	20.8	LOS C	17.9	135.6	Full	300	0.0	0.0
Lane 2	590	2.7	590	2.7	692	0.852	100	26.1	LOS C	14.9	112.5	Full	300	0.0	0.0
Approach	1411	2.7	1411	2.7		0.852		23.0	LOS C	17.9	135.6				
East: Resolution Dr															
Lane 1[d]	741	2.4	741	2.4	866	0.855	100	17.2	LOS B	10.5	79.1	Full	500	0.0	0.0
Approach	741	2.4	741	2.4		0.855		17.2	LOS B	10.5	79.1				
North: Grandstand Road															
Lane 1[d]	444	3.0	444	3.0	1615	0.275	100	3.9	LOS A	2.1	15.9	Full	500	0.0	0.0
Lane 2	363	2.3	363	2.3	1321	0.275	100	5.9	LOS A	2.0	15.2	Full	500	0.0	0.0
Approach	807	2.7	807	2.7		0.275		4.8	LOS A	2.1	15.9				
West: Resolution Dr															
Lane 1[d]	85	0.9	85	0.9	306	0.277	100	18.2	LOS B	1.7	12.7	Full	500	0.0	0.0
Approach	85	0.9	85	0.9		0.277		18.2	LOS B	1.7	12.7				
All Vehicles	3043	2.6	3043	2.6		0.855		16.6	LOS B	17.9	135.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Stoneham St

Mov. From S To Exit:	L2 W	T1 N	R2 E	U S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	72	749	-	-	821	2.7	963	0.852	100	NA	NA
Lane 2	-	524	65	1	590	2.7	692	0.852	100	NA	NA
Approach	72	1273	65	1	1411	2.7		0.852			

East: Resolution Dr

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.

Lane 1	95	28	618	741	2.4		866	0.855	100	NA	NA
Approach	95	28	618	741	2.4			0.855			
North: Grandstand Road											
Mov. From N To Exit:	L2 E	T1 S	R2 W	U N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	251	193	-	-	444	3.0	1615	0.275	100	NA	NA
Lane 2	-	282	6	75	363	2.3	1321	0.275	100	NA	NA
Approach	251	474	6	75	807	2.7		0.275			
West: Resolution Dr											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	29	49	85	0.9		306	0.277	100	NA	NA
Approach	7	29	49	85	0.9			0.277			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3043	2.6	0.855

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
North: Grandstand Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0

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Project: C:\PJA\Phil Jones Associates\SharedData - 07575 Ascot Racecourse Local Structure Plan & Scheme Amendment\4. Technical\4.3 Analysis\4.3.1 Transport\07575_M_01_A_Ascot Racecourse LSP&SA.sip9

LANE SUMMARY

Site: 103av [TCS PM - Current (Site Folder: GEH/Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	121	5.8	121	5.8	307	0.393	87[6]	75.6	LOS E	9.4	73.9	Short	60	0.0	NA
Lane 2	144	5.8	144	5.8	319	0.452	100	72.1	LOS E	11.4	89.1	Full	500	0.0	0.0
Lane 3	158	5.8	158	5.8	303	0.522	100	78.9	LOS E	12.7	99.1	Short	60	0.0	NA
Approach	423	5.8	423	5.8		0.522		75.6	LOS E	12.7	99.1				
NorthEast: GEH															
Lane 1	117	5.8	117	5.8	1329	0.088	12[5]	18.9	LOS B	2.3	17.7	Short	120	0.0	NA
Lane 2	579	6.3	579	6.3	771[1]	0.750	100	39.1	LOS D	36.0	283.5	Full	500	0.0	0.0
Lane 3	614	6.3	614	6.3	818	0.750	100	31.0	LOS C	38.8	305.7	Full	500	0.0	0.0
Lane 4	561	6.3	561	6.3	748[1]	0.750	100	36.3	LOS D	34.6	272.4	Full	500	0.0	0.0
Lane 5	308	5.8	308	5.8	342	0.903	100	101.5	LOS F	29.6	231.4	Short	125	0.0	NA
Approach	2179	6.2	2179	6.2		0.903		43.8	LOS D	38.8	305.7				
NorthWest: Resolution Dr															
Lane 1	157	5.8	157	5.8	742	0.211	100	23.7	LOS C	6.4	50.1	Short	90	0.0	NA
Lane 2	37	5.8	37	5.8	103	0.362	39[6]	92.4	LOS F	3.3	25.7	Full	430	0.0	0.0
Lane 3	95	5.8	95	5.8	103	0.926	100	109.3	LOS F	9.5	74.6	Short	140	0.0	NA
Lane 4	32	5.8	32	5.8	98	0.323	100	97.3	LOS F	2.8	21.7	Short	58	0.0	NA
Approach	321	5.8	321	5.8		0.926		64.4	LOS E	9.5	74.6				
SouthWest: GEH															
Lane 1	57	5.8	57	5.8	781	0.073	9[5]	52.7	LOS D	2.8	21.8	Short	75	0.0	NA
Lane 2	610	11.7	610	11.7	731[1]	0.834	100	36.4	LOS D	34.4	291.3	Full	500	0.0	0.0
Lane 3	641	11.7	641	11.7	768	0.834	100	20.1	LOS C	37.6	319.0	Full	500	0.0	0.0
Lane 4	641	11.7	641	11.7	768	0.834	100	20.1	LOS C	37.6	319.0	Full	500	0.0	0.0
Lane 5	221	5.8	221	5.8	342	0.647	100	77.8	LOS E	17.9	140.2	Short	240	0.0	NA
Approach	2169	10.9	2169	10.9		0.834		31.4	LOS C	37.6	319.0				
All Vehicles	5093	8.2	5093	8.2		0.926		42.5	LOS D	38.8	319.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd										
Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	85	36	-	121	5.8	307	0.393	87[6]	23.9	2
Lane 2	-	144	-	144	5.8	319	0.452	100	NA	NA
Lane 3	-	-	158	158	5.8	303	0.522	100	51.1	2
Approach	85	180	158	423	5.8		0.522			
NorthEast: GEH										
Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	117	-	-	117	5.8	1329	0.088	12[5]	0.0	2
Lane 2	-	579	-	579	6.3	771[1]	0.750	100	NA	NA
Lane 3	-	614	-	614	6.3	818	0.750	100	NA	NA
Lane 4	-	561	-	561	6.3	748[1]	0.750	100	NA	NA
Lane 5	-	-	308	308	5.8	342	0.903	100	61.9	4
Approach	117	1754	308	2179	6.2		0.903			
NorthWest: Resolution Dr										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	157	-	-	157	5.8	742	0.211	100	0.0	2
Lane 2	-	37	-	37	5.8	103	0.362	39[6]	NA	NA
Lane 3	-	95	-	95	5.8	103	0.926	100	0.0	2
Lane 4	-	-	32	32	5.8	98	0.323	100	0.0	3
Approach	157	133	32	321	5.8		0.926			
SouthWest: GEH										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	57	-	-	57	5.8	781	0.073	9[5]	0.0	2
Lane 2	-	610	-	610	11.7	731[1]	0.834	100	NA	NA
Lane 3	-	641	-	641	11.7	768	0.834	100	NA	NA
Lane 4	-	641	-	641	11.7	768	0.834	100	NA	NA
Lane 5	-	-	221	221	5.8	342	0.647	100	0.0	4
Approach	57	1892	221	2169	10.9		0.834			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5093	8.2	0.926

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd Merge Type: **Priority**												
Exit Short Lane	1	45	0.0	316	326	3.09	2.06	154	1413	0.109	0.5	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				316	1800	0.176	0.0	0.0
NorthEast Exit: GEH												

Merge Type: **Priority**											
Exit Short Lane	1	120	0.0	610	642	3.09	2.06	157	1076	0.146	1.3	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				610	1800	0.339	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**											
Exit Short Lane	1	140	0.0	453	466	3.09	2.06	92	1265	0.073	0.8	1.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				453	1800	0.252	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 (Site Folder: GEH/Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	141	5.8	141	5.8	318	0.442	87[6]	75.2	LOS E[11]	11.0	86.3	Short	60	0.0	NA
Lane 2	167	5.8	167	5.8	329	0.508	100	72.2	LOS E[11]	13.3	104.1	Full	500	0.0	0.0
Lane 3	169	5.8	169	5.8	312[1]	0.542	100	78.5	LOS E[11]	13.5	106.0	Short	60	0.0	NA
Approach	477	5.8	477	5.8		0.542		75.3	LOS E[11]	13.5	106.0				
NorthEast: GEH															
Lane 1	125	5.8	125	5.8	1341	0.093	13[5]	16.1	LOS B	2.6	20.0	Short	120	0.0	NA
Lane 2	619	6.3	619	6.3	866[1]	0.714	100	28.6	LOS C	33.7	265.4	Full	500	0.0	0.0
Lane 3	650	6.3	650	6.3	910	0.714	100	23.7	LOS C	36.0	283.4	Full	500	0.0	0.0
Lane 4	608	6.3	608	6.3	852[1]	0.714	100	29.4	LOS C	32.9	259.6	Full	500	0.0	0.0
Lane 5	330	5.8	330	5.8	264	1.252	100	333.4	LOS F[11]	52.6	411.1	Short	125	0.0	NA
Approach	2331	6.2	2331	6.2		1.252		69.9	LOS E[11]	52.6	411.1				
NorthWest: Resolution Dr															
Lane 1	168	5.8	168	5.8	628	0.267	100	31.7	LOS C	8.4	65.5	Short	90	0.0	NA
Lane 2	40	5.8	40	5.8	82	0.485	39[6]	96.0	LOS F[11]	3.6	28.2	Full	430	0.0	0.0
Lane 3	102	5.8	102	5.8	82	1.239	100	320.5	LOS F[11]	16.0	125.5	Short	140	0.0	NA
Lane 4	34	5.8	34	5.8	78	0.433	100	100.9	LOS F[11]	3.1	23.9	Short	58	0.0	NA
Approach	344	5.8	344	5.8		1.239		131.7	LOS F[11]	16.0	125.5				
SouthWest: GEH															
Lane 1	61	5.8	61	5.8	869	0.070	8[5]	44.9	LOS D	2.7	21.2	Short	75	0.0	NA
Lane 2	735	11.7	735	11.7	813[1]	0.903	100	31.6	LOS C	42.6	360.7	Full	500	0.0	0.0
Lane 3	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 4	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 5	237	5.8	237	5.8	264	0.897	100	100.4	LOS F[11]	22.8	178.1	Short	240	0.0	NA
Approach	2576	11.0	2576	11.0		0.903		30.0	LOS C	48.4	410.3				
All Vehicles	5728	8.3	5728	8.3		1.252		56.1	LOS E[11]	52.6	411.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Attachment 12.1.5 Transport Impact Assessment

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	91	49	-	141	5.8	318	0.442	87[6]	38.2	2
Lane 2	-	167	-	167	5.8	329	0.508	100	NA	NA
Lane 3	-	-	169	169	5.8	312[1]	0.542	100	57.5	2
Approach	91	217	169	477	5.8		0.542			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	125	-	-	125	5.8	1341	0.093	13[5]	0.0	2
Lane 2	-	619	-	619	6.3	866[1]	0.714	100	NA	NA
Lane 3	-	650	-	650	6.3	910	0.714	100	NA	NA
Lane 4	-	608	-	608	6.3	852[1]	0.714	100	NA	NA
Lane 5	-	-	330	330	5.8	264	1.252	100	100.0	4
Approach	125	1876	330	2331	6.2		1.252			

NorthWest: Resolution Dr

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	168	-	-	168	5.8	628	0.267	100	0.0	2
Lane 2	-	40	-	40	5.8	82	0.485	39[6]	NA	NA
Lane 3	-	102	-	102	5.8	82	1.239	100	0.0	2
Lane 4	-	-	34	34	5.8	78	0.433	100	0.0	3
Approach	168	142	34	344	5.8		1.239			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	-	-	61	5.8	869	0.070	8[5]	0.0	2
Lane 2	-	735	-	735	11.7	813[1]	0.903	100	NA	NA
Lane 3	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 4	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 5	-	-	237	237	5.8	264	0.897	100	0.0	4
Approach	61	2278	237	2576	11.0		0.903			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5728	8.3	1.252

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd Merge Type: **Priority**												
Exit Short Lane	1	45	0.0	319	328	3.09	2.06	165	1411	0.117	0.5	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				319	1800	0.177	0.0	0.0

Attachment 12.1.5 Transport Impact Assessment

NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	120	0.0	735	773	3.09	2.06	168	935	0.179	1.8	2.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				735	1800	0.408	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**												
Exit Short Lane	1	140	0.0	431	443	3.09	2.06	110	1289	0.086	0.8	1.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				431	1800	0.239	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	33.2	453.8	NA
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	9.8	429.8	NA
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 - mod (Site Folder: GEH/ Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	148	5.8	148	5.8	351	0.422	87[6]	54.2	LOS D	9.6	75.3	Short	60	0.0	NA
Lane 2	160	5.8	160	5.8	329	0.486	100	71.9	LOS E[11]	12.7	99.0	Full	500	0.0	0.0
Lane 3	169	5.8	169	5.8	312[1]	0.542	100	78.5	LOS E[11]	13.5	106.0	Short	60	0.0	NA
Approach	477	5.8	477	5.8		0.542		68.8	LOS E[11]	13.5	106.0				
NorthEast: GEH															
Lane 1	125	5.8	125	5.8	1326	0.094	13[5]	16.6	LOS B	2.7	21.5	Short	120	0.0	NA
Lane 2	614	6.3	614	6.3	868[1]	0.707	100	28.2	LOS C	33.2	261.5	Full	500	0.0	0.0
Lane 3	644	6.3	644	6.3	910	0.707	100	23.6	LOS C	35.3	278.3	Full	500	0.0	0.0
Lane 4	619	6.3	619	6.3	875[1]	0.707	100	27.6	LOS C	33.5	264.2	Full	500	0.0	0.0
Lane 5	149	5.8	149	5.8	239	0.624	83[6]	90.3	LOS F[11]	12.5	98.0	Short	125	0.0	NA
Lane 6	181	5.8	181	5.8	239	0.756	100	89.4	LOS F[11]	15.8	124.0	Short	125	0.0	NA
Approach	2331	6.2	2331	6.2		0.756		34.8	LOS C	35.3	278.3				
NorthWest: Resolution Dr															
Lane 1	168	5.8	168	5.8	628	0.267	100	31.7	LOS C	8.4	65.5	Short	90	0.0	NA
Lane 2	40	5.8	40	5.8	103	0.387	39[6]	92.6	LOS F[11]	3.5	27.5	Full	430	0.0	0.0
Lane 3	102	5.8	102	5.8	103	0.991	100	128.6	LOS F[11]	11.1	87.1	Short	140	0.0	NA
Lane 4	34	5.8	34	5.8	98	0.346	100	97.5	LOS F[11]	3.0	23.3	Short	58	0.0	NA
Approach	344	5.8	344	5.8		0.991		74.0	LOS E[11]	11.1	87.1				
SouthWest: GEH															
Lane 1	61	5.8	61	5.8	869	0.070	8[5]	44.7	LOS D	2.7	21.2	Short	75	0.0	NA
Lane 2	735	11.7	735	11.7	813[1]	0.903	100	31.6	LOS C	42.6	360.7	Full	500	0.0	0.0
Lane 3	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 4	772	11.7	772	11.7	855	0.903	100	17.9	LOS B	48.4	410.3	Full	500	0.0	0.0
Lane 5	237	5.8	237	5.8	244	0.969	100	120.5	LOS F[11]	25.2	197.2	Short	240	0.0	NA
Approach	2576	11.0	2576	11.0		0.969		31.9	LOS C	48.4	410.3				
All Vehicles	5728	8.3	5728	8.3		0.991		38.7	LOS D	48.4	410.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	91	57	-	148	5.8	351	0.422	87[6]	25.6	2
Lane 2	-	160	-	160	5.8	329	0.486	100	NA	NA
Lane 3	-	-	169	169	5.8	312[1]	0.542	100	57.5	2
Approach	91	217	169	477	5.8		0.542			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	125	-	-	125	5.8	1326	0.094	13[5]	0.0	2
Lane 2	-	614	-	614	6.3	868[1]	0.707	100	NA	NA
Lane 3	-	644	-	644	6.3	910	0.707	100	NA	NA
Lane 4	-	619	-	619	6.3	875[1]	0.707	100	NA	NA
Lane 5	-	-	149	149	5.8	239	0.624	83[6]	4.2	4
Lane 6	-	-	181	181	5.8	239	0.756	100	4.2	5
Approach	125	1876	330	2331	6.2		0.756			

NorthWest: Resolution Dr

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	168	-	-	168	5.8	628	0.267	100	0.0	2
Lane 2	-	40	-	40	5.8	103	0.387	39[6]	NA	NA
Lane 3	-	102	-	102	5.8	103	0.991	100	0.0	2
Lane 4	-	-	34	34	5.8	98	0.346	100	0.0	3
Approach	168	142	34	344	5.8		0.991			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	-	-	61	5.8	869	0.070	8[5]	0.0	2
Lane 2	-	735	-	735	11.7	813[1]	0.903	100	NA	NA
Lane 3	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 4	-	772	-	772	11.7	855	0.903	100	NA	NA
Lane 5	-	-	237	237	5.8	244	0.969	100	0.0	4
Approach	61	2278	237	2576	11.0		0.969			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5728	8.3	0.991

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd												

Merge Type: **Priority**												
Exit Short Lane	1	45	0.0	339	348	3.09	2.06	165	1389	0.119	0.6	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				339	1800	0.188	0.0	0.0
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	120	0.0	735	773	3.09	2.06	168	935	0.179	1.8	2.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				735	1800	0.408	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**												
Exit Short Lane	1	140	0.0	341	351	3.09	2.06	267	1387	0.192	0.6	0.8
Merge Lane	2	-	100.0	Merge Lane is not Opposed				341	1800	0.189	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
Lane 6	0.0	0.0	0.0	0.0
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 - with LSP (Site Folder: GEH/ Resolution)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hardey Rd															
Lane 1	168	5.4	168	5.4	321	0.522	87[6]	81.3	LOS F[11]	13.4	104.2	Short	60	0.0	NA
Lane 2	184	4.8	184	4.8	307[1]	0.600	100	78.8	LOS E[11]	14.9	115.6	Full	500	0.0	0.0
Lane 3	169	5.8	169	5.8	312[1]	0.542	100	83.8	LOS F[11]	13.5	106.0	Short	60	0.0	NA
Approach	521	5.3	521	5.3		0.600		81.2	LOS F[11]	14.9	115.6				
NorthEast: GEH															
Lane 1	125	5.8	125	5.8	1341	0.093	13[5]	16.2	LOS B	2.6	20.0	Short	120	0.0	NA
Lane 2	620	6.3	620	6.3	866[1]	0.716	100	28.8	LOS C	33.9	266.7	Full	500	0.0	0.0
Lane 3	652	6.3	652	6.3	910	0.716	100	23.7	LOS C	36.2	285.0	Full	500	0.0	0.0
Lane 4	605	6.3	605	6.3	844[1]	0.716	100	44.8	LOS D	32.7	257.9	Full	500	0.0	26.6[8]
Lane 5	405	4.7	405	4.7	265	1.529	100	593.6	LOS F[11]	81.9	633.9	Short	125	0.0	NA
Approach	2406	6.0	2406	6.0		1.529		125.8	LOS F[11]	81.9	633.9				
NorthWest: Resolution Dr															
Lane 1	207	4.7	207	4.7	631	0.328	100	33.4	LOS C	11.1	85.8	Short	90	0.0	NA
Lane 2	49	4.7	49	4.7	83	0.590	39[6]	96.8	LOS F[11]	4.5	34.6	Full	430	0.0	0.0
Lane 3	125	4.7	125	4.7	83	1.508	100	559.7	LOS F[11]	25.2	194.9	Short	140	0.0	NA
Lane 4	41	4.8	41	4.8	78	0.525	100	101.5	LOS F[11]	3.7	29.0	Short	58	0.0	NA
Approach	422	4.7	422	4.7		1.508		203.7	LOS F[11]	25.2	194.9				
SouthWest: GEH															
Lane 1	75	4.7	75	4.7	872	0.085	9[5]	44.8	LOS D	3.4	25.9	Short	75	0.0	NA
Lane 2	729	11.7	729	11.7	805[1]	0.906	100	31.8	LOS C	42.2	357.5	Full	500	0.0	0.0
Lane 3	774	11.7	774	11.7	855	0.906	100	18.3	LOS B	49.3	417.3	Full	500	0.0	0.0
Lane 4	774	11.7	774	11.7	855	0.906	100	18.3	LOS B	49.3	417.3	Full	500	0.0	0.0
Lane 5	237	5.8	237	5.8	264	0.897	100	100.4	LOS F[11]	22.8	178.1	Short	240	0.0	NA
Approach	2589	11.0	2589	11.0		0.906		30.4	LOS C	49.3	417.3				
All Vehicles	5939	8.0	5939	8.0		1.529		85.8	LOS F[11]	81.9	633.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
8 Probability of Blockage has been set on the basis of a queue that overflows from a short lane.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Approach Lane Flows (veh/h)

SouthEast: Hardey Rd

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	91	77	-	168	5.4	321	0.522	87[6]	55.9	2
Lane 2	-	184	-	184	4.8	307[1]	0.600	100	NA	NA
Lane 3	-	-	169	169	5.8	312[1]	0.542	100	57.5	2
Approach	91	261	169	521	5.3		0.600			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	125	-	-	125	5.8	1341	0.093	13[5]	0.0	2
Lane 2	-	620	-	620	6.3	866[1]	0.716	100	NA	NA
Lane 3	-	652	-	652	6.3	910	0.716	100	NA	NA
Lane 4	-	605	-	605	6.3	844[1]	0.716	100	NA	NA
Lane 5	-	-	405	405	4.7	265	1.529	100	100.0	4
Approach	125	1876	405	2406	6.0		1.529			

NorthWest: Resolution Dr

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	207	-	-	207	4.7	631	0.328	100	0.7	2
Lane 2	-	49	-	49	4.7	83	0.590	39[6]	NA	NA
Lane 3	-	125	-	125	4.7	83	1.508	100	35.2	2
Lane 4	-	-	41	41	4.8	78	0.525	100	0.0	3
Approach	207	175	41	422	4.7		1.508			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	75	-	-	75	4.7	872	0.085	9[5]	0.0	2
Lane 2	-	729	-	729	11.7	805[1]	0.906	100	NA	NA
Lane 3	-	774	-	774	11.7	855	0.906	100	NA	NA
Lane 4	-	774	-	774	11.7	855	0.906	100	NA	NA
Lane 5	-	-	237	237	5.8	264	0.897	100	0.0	4
Approach	75	2278	237	2589	11.0		0.906			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	5939	8.0	1.529

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Hardey Rd Merge Type: **Priority**												

Exit Short Lane	1	45	0.0	320	329	3.08	2.05	174	1413	0.123	0.5	0.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				320	1800	0.178	0.0	0.0
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	120	0.0	729	768	3.07	2.05	207	952	0.217	1.7	2.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				729	1800	0.405	0.0	0.0
NorthWest Exit: Resolution Dr Merge Type: **Priority**												
Exit Short Lane	1	140	0.0	449	460	3.07	2.05	151	1281	0.118	0.8	1.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				449	1800	0.250	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Hardey Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	70.0	952.5	NA
NorthWest: Resolution Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	21.1	914.4	NA
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - Current (Site Folder: GEH/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	268	13.0	268	13.0	332	0.806	100	69.0	LOS E	19.9	172.3	Full	500	0.0	0.0
Lane 2	247	13.0	247	13.0	306[1]	0.806	100	74.3	LOS E	18.4	159.3	Full	500	0.0	0.0
Lane 3	173	13.0	173	13.0	320	0.540	67[5]	71.6	LOS E	11.5	99.3	Short	73	0.0	NA
Approach	687	13.0	687	13.0		0.806		71.5	LOS E	19.9	172.3				
NorthEast: GEH															
Lane 1	136	4.6	136	4.6	1226	0.111	16[5]	13.6	LOS B	3.2	24.9	Full	500	0.0	0.0
Lane 2	587	6.2	587	6.2	835	0.702	100	13.8	LOS B	22.0	173.4	Full	500	0.0	0.0
Lane 3	587	6.2	587	6.2	835	0.702	100	13.8	LOS B	22.0	173.4	Full	500	0.0	0.0
Lane 4	587	6.2	587	6.2	835	0.702	100	13.8	LOS B	22.0	173.4	Full	500	0.0	0.0
Lane 5	82	5.8	82	5.8	129	0.637	100	82.4	LOS F	6.2	48.2	Short	180	0.0	NA
Approach	1978	6.1	1978	6.1		0.702		16.7	LOS B	22.0	173.4				
NorthWest: Stoneham St															
Lane 1	11	5.8	11	5.8	199	0.053	100	71.4	LOS E	0.7	5.4	Short	75	0.0	NA
Lane 2	194	5.8	194	5.8	210	0.926	100	88.9	LOS F	16.5	128.7	Full	300	0.0	0.0
Lane 3	188	5.8	188	5.8	203[1]	0.926	100	92.5	LOS F	15.9	124.6	Full	300	0.0	0.0
Lane 4	184	5.8	184	5.8	199	0.926	100	95.8	LOS F	15.7	122.6	Short	60	0.0	NA
Approach	577	5.8	577	5.8		0.926		91.9	LOS F	16.5	128.7				
SouthWest: GEH															
Lane 1	712	5.8	712	5.8	1261	0.564	70[5]	13.5	LOS B	21.0	164.6	Short	145	0.0	NA
Lane 2	646	6.8	646	6.8	804	0.803	100	25.6	LOS C	34.9	277.3	Full	500	0.0	0.0
Lane 3	665	6.8	665	6.8	828	0.803	100	26.0	LOS C	36.9	293.5	Full	500	0.0	0.0
Lane 4	665	6.8	665	6.8	828	0.803	100	26.0	LOS C	36.9	293.5	Full	500	0.0	0.0
Lane 5	114	4.6	114	4.6	130	0.877	100	91.6	LOS F	9.3	72.0	Short	210	0.0	NA
Approach	2802	6.5	2802	6.5		0.877		25.4	LOS C	36.9	293.5				
All Vehicles	6044	7.0	6044	7.0		0.926		34.1	LOS C	36.9	293.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program

Approach Lane Flows (veh/h)

SouthEast: Belgravia St

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	84	184	-	268	13.0	332	0.806	100	NA	NA
Lane 2	-	247	-	247	13.0	306[1]	0.806	100	NA	NA
Lane 3	-	-	173	173	13.0	320	0.540	67[5]	33.0	2
Approach	84	431	173	687	13.0		0.806			
NorthEast: GEH										
Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	136	-	-	136	4.6	1226	0.111	16[5]	NA	NA
Lane 2	-	587	-	587	6.2	835	0.702	100	NA	NA
Lane 3	-	587	-	587	6.2	835	0.702	100	NA	NA
Lane 4	-	587	-	587	6.2	835	0.702	100	NA	NA
Lane 5	-	-	82	82	5.8	129	0.637	100	0.0	4
Approach	136	1760	82	1978	6.1		0.702			
NorthWest: Stoneham St										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	-	-	11	5.8	199	0.053	100	0.0	2
Lane 2	-	194	-	194	5.8	210	0.926	100	NA	NA
Lane 3	-	100	87	188	5.8	203[1]	0.926	100	NA	NA
Lane 4	-	-	184	184	5.8	199	0.926	100	71.4	3
Approach	11	295	272	577	5.8		0.926			
SouthWest: GEH										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	712	-	-	712	5.8	1261	0.564	70[5]	16.5	2
Lane 2	-	646	-	646	6.8	804	0.803	100	NA	NA
Lane 3	-	665	-	665	6.8	828	0.803	100	NA	NA
Lane 4	-	665	-	665	6.8	828	0.803	100	NA	NA
Lane 5	-	-	114	114	4.6	130	0.877	100	0.0	4
Approach	712	1977	114	2802	6.5		0.877			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	6044	7.0	0.926

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow veh/h	Opposing Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	646	667	3.09	2.06	11	1049	0.010	1.4	1.5
Merge Lane	2	-	100.0	Merge Lane is not Opposed				646	1800	0.359	0.0	0.0
SouthWest Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	587	604	3.16	2.11	84	1069	0.079	1.3	1.6

Merge Lane	2	-	100.0	Merge Lane is not Opposed	587	1800	0.326	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 (Site Folder: GEH/Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	333	13.0	333	13.0	296	1.123	100	213.6	LOS F[11]	44.9	389.1	Full	500	0.0	0.0
Lane 2	276	13.0	276	13.0	246[1]	1.123	100	241.7	LOS F[11]	37.5	324.9	Full	500	0.0	0.0
Lane 3	185	13.0	185	13.0	275[1]	0.672	60[5]	108.9	LOS F[11]	15.3	132.5	Short	73	0.0	NA
Approach	793	13.0	793	13.0		1.123		199.0	LOS F[11]	44.9	389.1				
NorthEast: GEH															
Lane 1	145	4.6	145	4.6	1296	0.112	17[5]	12.9	LOS B	3.6	27.8	Full	500	0.0	0.0
Lane 2	628	6.2	628	6.2	962	0.652	100	7.1	LOS A	16.1	127.1	Full	500	0.0	0.0
Lane 3	628	6.2	628	6.2	962	0.652	100	7.1	LOS A	16.1	127.1	Full	500	0.0	0.0
Lane 4	628	6.2	628	6.2	962	0.652	100	7.1	LOS A	16.1	127.1	Full	500	0.0	0.0
Lane 5	88	5.8	88	5.8	107	0.818	100	104.3	LOS F[11]	8.3	64.6	Short	180	0.0	NA
Approach	2116	6.1	2116	6.1		0.818		11.5	LOS B	16.1	127.1				
NorthWest: Stoneham St															
Lane 1	11	5.8	11	5.8	185	0.061	100	97.0	LOS F[11]	0.9	7.0	Short	75	0.0	NA
Lane 2	221	5.8	221	5.8	195[1]	1.129	100	232.6	LOS F[11]	29.7	232.7	Full	300	0.0	0.0
Lane 3	194	5.8	194	5.8	172[1]	1.129	100	241.9	LOS F[11]	26.2	205.2	Full	300	0.0	0.0
Lane 4	191	5.8	191	5.8	170[1]	1.129	100	245.0	LOS F[11]	25.9	202.8	Short	60	0.0	NA
Approach	617	5.8	617	5.8		1.129		236.9	LOS F[11]	29.7	232.7				
SouthWest: GEH															
Lane 1	761	5.8	761	5.8	1254	0.607	67[5]	18.4	LOS B	30.1	235.3	Short	145	0.0	NA
Lane 2	665	6.8	665	6.8	729[1]	0.912	100	36.5	LOS D	46.1	366.3	Full	500	0.0	0.0
Lane 3	870	6.8	870	6.8	954	0.912	100	30.8	LOS C	66.1	525.0	Full	500	0.0	9.4
Lane 4	846	6.8	846	6.8	928[1]	0.912	100	36.9	LOS D	63.4	503.5	Full	500	0.0	5.6
Lane 5	122	4.6	122	4.6	108	1.126	100	233.7	LOS F[11]	16.3	127.0	Short	210	0.0	NA
Approach	3264	6.5	3264	6.5		1.126		38.2	LOS D	66.1	525.0				
All Vehicles	6791	7.1	6791	7.1		1.129		66.7	LOS E[11]	66.1	525.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Attachment 12.1.5 Transport Impact Assessment

Approach Lane Flows (veh/h)

SouthEast: Belgravia St

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	90	242	-	333	13.0	296	1.123	100	NA	NA
Lane 2	-	276	-	276	13.0	246[1]	1.123	100	NA	NA
Lane 3	-	-	185	185	13.0	275[1]	0.672	60[5]	60.0	2
Approach	90	519	185	793	13.0		1.123			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	145	-	-	145	4.6	1296	0.112	17[5]	NA	NA
Lane 2	-	628	-	628	6.2	962	0.652	100	NA	NA
Lane 3	-	628	-	628	6.2	962	0.652	100	NA	NA
Lane 4	-	628	-	628	6.2	962	0.652	100	NA	NA
Lane 5	-	-	88	88	5.8	107	0.818	100	0.0	4
Approach	145	1883	88	2116	6.1		0.818			

NorthWest: Stoneham St

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	-	-	11	5.8	185	0.061	100	0.0	2
Lane 2	-	221	-	221	5.8	195[1]	1.129	100	NA	NA
Lane 3	-	95	99	194	5.8	172[1]	1.129	100	NA	NA
Lane 4	-	-	191	191	5.8	170[1]	1.129	100	100.0	3
Approach	11	315	291	617	5.8		1.129			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	761	-	-	761	5.8	1254	0.607	67[5]	49.5	2
Lane 2	-	665	-	665	6.8	729[1]	0.912	100	NA	NA
Lane 3	-	870	-	870	6.8	954	0.912	100	NA	NA
Lane 4	-	846	-	846	6.8	928[1]	0.912	100	NA	NA
Lane 5	-	-	122	122	4.6	108	1.126	100	0.0	4
Approach	761	2381	122	3264	6.5		1.126			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	6791	7.1	1.129

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	665	686	3.09	2.06	11	1029	0.011	1.4	1.6
Merge Lane	2	-	100.0	Merge Lane is not Opposed				665	1800	0.369	0.0	0.0
SouthWest Exit: GEH												

Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	628	647	3.16	2.11	80	1024	0.078	1.4	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				628	1800	0.349	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	18.2	221.7	NA
Lane 2	0.0	15.1	221.7	NA
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	12.6	232.6	NA
Lane 3	0.0	11.1	232.6	NA
Lane 4	0.0	11.0	232.6	NA
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	6.8	226.7	NA

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LANE SUMMARY

Site: 103av [TCS PM - 2036 - mod (Site Folder: GEH/ Stoneham)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	336	13.0	336	13.0	303	1.109	100	184.7	LOS F[11]	43.9	380.6	Full	500	0.0	0.0
Lane 2	272	13.0	272	13.0	245[1]	1.109	100	229.8	LOS F[11]	36.2	313.9	Full	500	0.0	0.0
Lane 3	185	13.0	185	13.0	275[1]	0.671	61[5]	108.1	LOS F[11]	15.3	132.5	Short	73	0.0	NA
Approach	793	13.0	793	13.0		1.109		182.4	LOS F[11]	43.9	380.6				
NorthEast: GEH															
Lane 1	145	4.6	145	4.6	1336	0.109	17[5]	11.7	LOS B	3.3	25.5	Full	500	0.0	0.0
Lane 2	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 3	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 4	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 5	88	5.8	88	5.8	78	1.125	100	228.7	LOS F[11]	11.8	92.3	Short	180	0.0	NA
Approach	2116	6.1	2116	6.1		1.125		14.4	LOS B	11.8	92.3				
NorthWest: Stoneham St															
Lane 1	11	5.8	11	5.8	312	0.036	100	83.0	LOS F[11]	0.8	6.3	Short	75	0.0	NA
Lane 2	217	5.8	217	5.8	185	1.173	100	268.7	LOS F[11]	31.2	244.1	Full	300	0.0	0.0
Lane 3	196	5.8	196	5.8	167[1]	1.173	100	279.5	LOS F[11]	28.2	220.2	Full	300	0.0	0.0
Lane 4	193	5.8	193	5.8	165[1]	1.173	100	282.6	LOS F[11]	27.8	217.6	Short	60	0.0	NA
Approach	617	5.8	617	5.8		1.173		273.1	LOS F[11]	31.2	244.1				
SouthWest: GEH															
Lane 1	761	5.8	761	5.8	1276	0.597	68[5]	20.2	LOS C	28.6	224.0	Short	145	0.0	NA
Lane 2	635	6.8	635	6.8	722[1]	0.880	100	32.6	LOS C	41.0	325.4	Full	500	0.0	0.0
Lane 3	875	6.8	875	6.8	995	0.880	100	21.9	LOS C	57.4	456.4	Full	500	0.0	0.0
Lane 4	870	6.8	870	6.8	990[1]	0.880	100	22.9	LOS C	56.9	452.1	Full	500	0.0	0.0
Lane 5	61	4.6	61	4.6	77	0.790	100	107.4	LOS F[11]	5.8	44.8	Short	210	0.0	NA
Lane 6	61	4.6	61	4.6	77	0.790	100	106.3	LOS F[11]	5.8	44.8	Short	210	0.0	NA
Approach	3264	6.5	3264	6.5		0.880		27.0	LOS C	57.4	456.4				
All Vehicles	6791	7.1	6791	7.1		1.173		63.6	LOS E[11]	57.4	456.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Attachment 12.1.5 Transport Impact Assessment

Approach Lane Flows (veh/h)

SouthEast: Belgravia St

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	90	246	-	336	13.0	303	1.109	100	NA	NA
Lane 2	-	272	-	272	13.0	245[1]	1.109	100	NA	NA
Lane 3	-	-	185	185	13.0	275[1]	0.671	61[5]	60.0	2
Approach	90	519	185	793	13.0		1.109			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	145	-	-	145	4.6	1336	0.109	17[5]	NA	NA
Lane 2	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 3	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 4	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 5	-	-	88	88	5.8	78	1.125	100	0.0	4
Approach	145	1883	88	2116	6.1		1.125			

NorthWest: Stoneham St

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	-	-	11	5.8	312	0.036	100	0.0	2
Lane 2	-	217	-	217	5.8	185	1.173	100	NA	NA
Lane 3	-	98	98	196	5.8	167[1]	1.173	100	NA	NA
Lane 4	-	-	193	193	5.8	165[1]	1.173	100	100.0	3
Approach	11	315	291	617	5.8		1.173			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	761	-	-	761	5.8	1276	0.597	68[5]	44.9	2
Lane 2	-	635	-	635	6.8	722[1]	0.880	100	NA	NA
Lane 3	-	875	-	875	6.8	995	0.880	100	NA	NA
Lane 4	-	870	-	870	6.8	990[1]	0.880	100	NA	NA
Lane 5	-	-	61	61	4.6	77	0.790	100	0.0	4
Lane 6	-	-	61	61	4.6	77	0.790	100	0.0	5
Approach	761	2381	122	3264	6.5		0.880			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	6791	7.1	1.173

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	635	656	3.09	2.06	11	1061	0.011	1.3	1.5

Merge Lane	2	-	100.0	Merge Lane is not Opposed				635	1800	0.353	0.0	0.0
SouthWest Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	628	647	3.16	2.11	81	1024	0.079	1.4	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				628	1800	0.349	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	16.6	196.5	NA
Lane 2	0.0	13.4	196.5	NA
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	4.9	224.9	NA
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	16.0	311.0	NA
Lane 3	0.0	14.4	311.0	NA
Lane 4	0.0	14.2	311.0	NA
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	0.0	0.0	0.0
Lane 6	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 103av [TCS PM - 2036 - with LSP (Site Folder: GEH/ Stoneham)]

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New Site
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 180 seconds (Site Optimum Cycle Time - Minimum Delay)
Design Life Analysis: Constant Number of Years = 14

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St															
Lane 1	359	12.1	359	12.1	299	1.199	100	276.3	LOS F[11]	53.7	460.6	Full	500	0.0	0.0
Lane 2	302	11.8	302	11.8	251[1]	1.199	100	307.9	LOS F[11]	45.3	387.2	Full	500	0.0	0.0
Lane 3	185	13.0	185	13.0	274[1]	0.674	56[5]	112.9	LOS F[11]	15.3	132.5	Short	73	0.0	NA
Approach	845	12.2	845	12.2		1.199		251.8	LOS F[11]	53.7	460.6				
NorthEast: GEH															
Lane 1	145	4.6	145	4.6	1336	0.109	17[5]	11.7	LOS B	3.3	25.5	Full	500	0.0	0.0
Lane 2	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 3	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 4	628	6.2	628	6.2	1003	0.626	100	4.6	LOS A	11.5	90.6	Full	500	0.0	0.0
Lane 5	97	5.2	97	5.2	88	1.105	100	212.0	LOS F[11]	12.7	98.4	Short	180	0.0	NA
Approach	2126	6.0	2126	6.0		1.105		14.6	LOS B	12.7	98.4				
NorthWest: Stoneham St															
Lane 1	13	4.9	13	4.9	167	0.080	100	108.2	LOS F[11]	1.1	8.4	Short	75	0.0	NA
Lane 2	247	5.0	247	5.0	176	1.402	100	479.2	LOS F[11]	45.6	353.6	Full	300	0.0	19.9
Lane 3	228	5.0	228	5.0	163[1]	1.402	100	490.1	LOS F[11]	42.2	327.1	Full	300	0.0	12.8
Lane 4	225	5.0	225	5.0	161[1]	1.402	100	493.2	LOS F[11]	41.6	322.6	Short	60	0.0	NA
Approach	714	5.0	714	5.0		1.402		480.2	LOS F[11]	45.6	353.6				
SouthWest: GEH															
Lane 1	846	5.2	846	5.2	1264	0.669	76[5]	22.6	LOS C	31.9	247.9	Short	145	0.0	NA
Lane 2	627	6.8	627	6.8	709[1]	0.885	100	34.1	LOS C	41.4	328.6	Full	500	0.0	0.0
Lane 3	881	6.8	881	6.8	995	0.885	100	22.6	LOS C	58.9	468.1	Full	500	0.0	0.0
Lane 4	873	6.8	873	6.8	986[1]	0.885	100	23.6	LOS C	58.0	460.5	Full	500	0.0	0.0
Lane 5	122	4.6	122	4.6	88	1.376	100	448.3	LOS F[11]	22.1	171.7	Short	210	0.0	NA
Approach	3348	6.3	3348	6.3		1.376		40.5	LOS D	58.9	468.1				
All Vehicles	7033	6.8	7033	6.8		1.402		102.7	LOS F[11]	58.9	468.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
5 Lane under-utilisation found by the program
11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Attachment 12.1.5 Transport Impact Assessment

Approach Lane Flows (veh/h)

SouthEast: Belgravia St

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	90	269	-	359	12.1	299	1.199	100	NA	NA
Lane 2	-	302	-	302	11.8	251[1]	1.199	100	NA	NA
Lane 3	-	-	185	185	13.0	274[1]	0.674	56[5]	60.1	2
Approach	90	570	185	845	12.2		1.199			

NorthEast: GEH

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	145	-	-	145	4.6	1336	0.109	17[5]	NA	NA
Lane 2	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 3	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 4	-	628	-	628	6.2	1003	0.626	100	NA	NA
Lane 5	-	-	97	97	5.2	88	1.105	100	0.0	4
Approach	145	1883	97	2126	6.0		1.105			

NorthWest: Stoneham St

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	-	-	13	4.9	167	0.080	100	0.0	2
Lane 2	-	247	-	247	5.0	176	1.402	100	NA	NA
Lane 3	-	118	111	228	5.0	163[1]	1.402	100	NA	NA
Lane 4	-	-	225	225	5.0	161[1]	1.402	100	100.0	3
Approach	13	365	336	714	5.0		1.402			

SouthWest: GEH

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	846	-	-	846	5.2	1264	0.669	76[5]	54.4	2
Lane 2	-	627	-	627	6.8	709[1]	0.885	100	NA	NA
Lane 3	-	881	-	881	6.8	995	0.885	100	NA	NA
Lane 4	-	873	-	873	6.8	986[1]	0.885	100	NA	NA
Lane 5	-	-	122	122	4.6	88	1.376	100	0.0	4
Approach	846	2381	122	3348	6.3		1.376			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	7033	6.8	1.402

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
NorthEast Exit: GEH Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	627	648	3.07	2.05	13	1079	0.012	1.3	1.5
Merge Lane	2	-	100.0	Merge Lane is not Opposed				627	1800	0.349	0.0	0.0
SouthWest Exit: GEH												

Merge Type: **Priority**												
Exit Short Lane	1	100	0.0	628	647	3.16	2.11	75	1024	0.073	1.4	1.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				628	1800	0.349	0.0	0.0

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
SouthEast: Belgravia St				
Lane 1	0.0	29.8	358.4	NA
Lane 2	0.0	25.0	358.4	NA
Lane 3	0.0	0.0	0.0	0.0
NorthEast: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	4.6	189.6	NA
NorthWest: Stoneham St				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	35.4	723.2	NA
Lane 3	0.0	32.7	723.2	NA
Lane 4	0.0	32.3	723.2	NA
SouthWest: GEH				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
Lane 5	0.0	16.6	677.1	NA

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Attachment 12.1.6 Retail Assessment

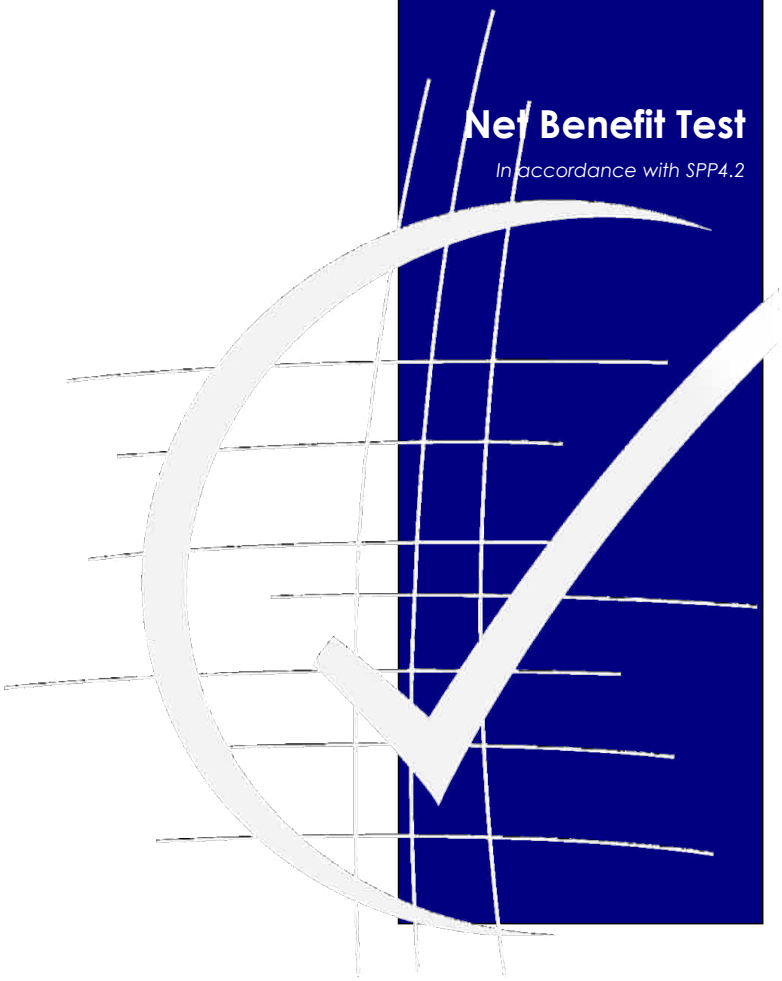
Taktics4

Proposed Activity

Ascot, City of Belmont

Net Benefit Test

In accordance with SPP4.2



Attachment 12.1.6 Retail Assessment

Project

Project name	**Ascot Centre**
Project number	**2360**
Prepared for	**Perth Racing / Rowe Group**

Contact

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Acknowledgement of Country

Taktics4 acknowledges the First Nations people as the custodians of the land which is the subject of this assessment. Taktics4 recognise and respect their continuing culture, and Elders past, present, and emerging.

Attachment 12.1.6 Retail Assessment

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Attachment 12.1.6 Retail Assessment

1. EXECUTIVE SUMMARY

This assessment considers the net benefit of two proposed activity categories proposed in Ascot, in the City of Belmont. The assessment has been prepared in response to the policy requirements established by State Planning Policy 4.2. This Net Benefit Test assesses:

1. Proposed local centre of 3,400 sqm NLA (PLUC 5 – 'SHOP')
2. Proposed bulky goods precinct of 9,600 sqm (PLUC 6 – 'OTHER RETAIL')

Proposed Local Centre

The assessment reveals that the proposed local centre activity will generate a Net Benefit by:

- being sustainable from 2026 – satisfying an existing resident trade area and filling an existing demand/gap/need in the market
- having low – insignificant impacts on surrounding activity network – with any impacts likely to be offset by potential sales growth generated by additional resident population and spending over the next 15 years.
- creating up to 85 full time equivalent jobs,
- reducing the number of vehicle km required to be travelled by residents in the immediate trade area.

Residents in Ascot and Belmont:

- are the communities most likely to experience the benefit from the proposed activity.
- are estimated to account for 40% of total sales / trips at the proposed activity.
- do not currently have access to a full line supermarket-based centre within 2.5 km.
- travel up to 2.5 km each way (5 km round trip) every time they access their full line supermarket needs.

Proposed Bulky Goods

The assessment reveals that the proposed activity will generate a Net Benefit by:

- complementing the existing offer in the vicinity
- being accessible through strong north south and east west connections.
- creating up to 120 jobs.
- having low/insignificant impacts on existing and planned activity precincts – which will subsequently be offset by planned population and retail spending growth in the trade area.

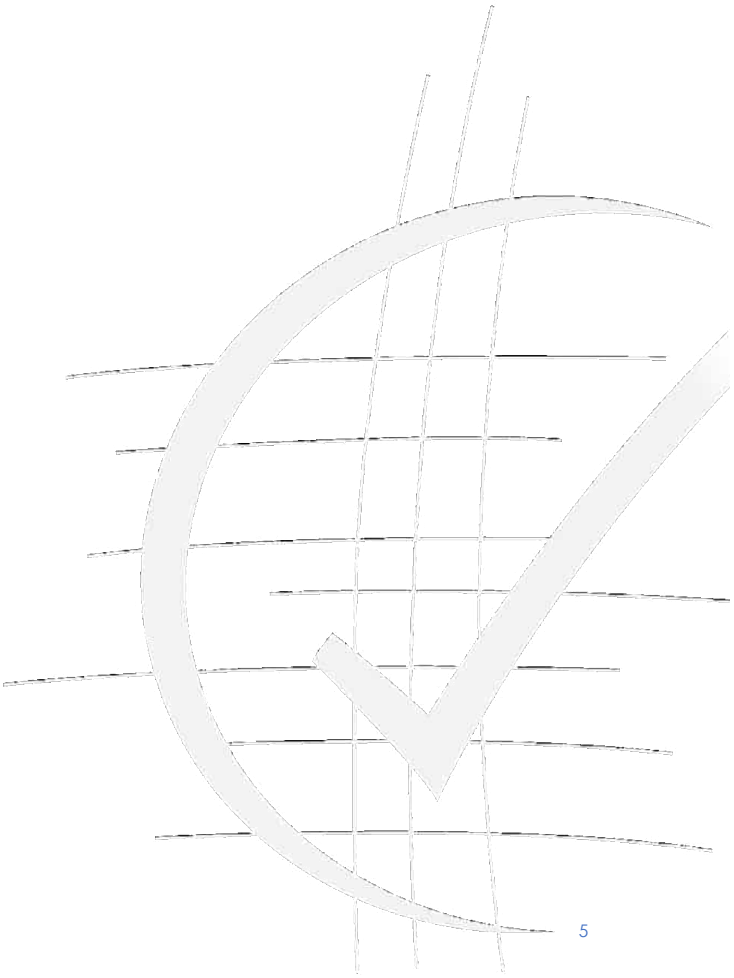
Net Benefit

Subsequently, the proposed activity:

- will not impact the integrity of the surrounding activity centre network – and as such will not have any negative impact on existing or planned public or private investment in the trade area.
- will reduce the amount of trip kilometres that Ascot and Belmont residents must travel each year to satisfy their daily/weekly and bulky goods shopping needs.
- will save over 530,000 to 700,000 trips p.a. to centres outside their trade area
- will save between 40 and 50 trips per person per annum.

Attachment 12.1.6 Retail Assessment

- will save between 2.7 M km p.a. and 3.5 M km p.a. of vehicular travel per annum
- is consistent with the objectives and outcomes of SPP 4.2.
- is aligned with local planning strategies.



Attachment 12.1.6 Retail Assessment

2. INTRODUCTION

This assessment represents a 'Net Benefit Test' for two activity categories proposed in Ascot, City of Belmont. The Net Benefit Test has been prepared in response to the policy requirements established by State Planning Policy 4.2 – Activity Centres. The Net Benefit Test assesses:

1. a proposed local centre of 3,400 sqm NLA (PLUC 5 – 'SHOP')
2. a proposed bulky goods precinct of 9,600 sqm (PLUC 6 – 'OTHER RETAIL')

This assessment has been prepared in three distinct parts and should be read in conjunction with the proposed Local Structure Plan and Scheme Amendment documents.

Part 1	Relevant market variables appropriate to the assessment of both activity types	Activity Centre Network Trade Area Definition Population Retail Spending Profile Retail Spending capacity
Part 2	Proposed Local Centre (PLUC 5)	Market Demand/Need Impact Test Net Benefit Test
Part 3	Proposed Bulky Goods (PLUC 6)	Market Demand/Need Impact Test Net Benefit Test

2.1 Purpose

A net benefit occurs when the benefits (pros) to the community arising from a proposal outweigh any identified impacts (cons) to the community arising from a proposal. The Net Benefit Test assesses the potential impacts and benefits of a proposal to the community and on existing and planned activity centres and is expected to answer the following questions.

- Is there a demand for additional floorspace, and if so, how does the proposal meet this demand?
- How will the proposed development impact on the role of the activity centre?
- How will the proposal impact the viability and vibrancy of other activity centres in the hierarchy?
- Are any potential impacts reduced or mitigated over the longer term?
- What is the anticipated loss and/or gain of services to the community?
- What is the anticipated impact on access (distance, time, mode of travel) to services by the community?
- Will the proposal contribute to a net increase in employment?
- Does the proposal align with the objectives and outcomes of this policy and the planning framework?

Attachment 12.1.6 Retail Assessment

A Net Benefit Test is to be prepared when:

- A proposal introduces floorspace in an existing or planned activity centre which exceeds the floorspace identified for that centre in a current 'Needs Assessment'.
- A proposal introduces new land or rezones land to facilitate major development or out-of-centre development.

2.2 Out-of-Centre Development

An Out of Centre Development is defined by SPP4.2 as a proposal which introduces:

- Category A or B activity centre (see table) uses outside of an existing or planned activity centre as identified by a Needs Assessment (regardless of land size).
- More than 500 sqm NLA of Category A uses outside an existing or planned activity centre as identified by a Needs Assessment.

Exemptions to Out of Centre Development includes:

- Development applications for Category B activity centre uses where the existing zoning contemplates (P, D, A) land uses.
- Development applications for Category A activity centre uses up to 1,500 sqm NLA where they are located substantially within the 400m walkable catchment of a rail station.

Out of Centre Development may only be appropriate where a proposal:

- is sufficiently separated from nearby activity centres to minimise negative impacts to those activity centres (as demonstrated through the Net Benefit Test).
- is in proximity to existing housing at an average dwelling density of at least 25 dwellings per gross Urban Zone (Region Schemes) hectare within a 400 m walkable catchment of the development; and
- accessible to its catchment community by walking and cycling, minimising the need for additional private vehicle trips.

2.3 Major Development

A major development is defined by SPP4.2 as a proposal which introduces additional Category A activity floor space which exceeds the threshold for the activity centre hierarchy in the table below.

FIGURE 1 - MAJOR DEVELOPMENT FLOORSPACE THRESHOLDS by CENTRE TYPE

Existing Activity Centre Hierarchy	Additional Floor space threshold (sqm NLA)
Strategic	10,000
Specialised	3,000
Secondary	10,000
District	5,000
Neighbourhood	3,000
Local	1,500
Proposed Activity Centre Hierarchy	any development in a proposed / planned centre is a major development regardless of floor space amount

Attachment 12.1.6 Retail Assessment

2.4 Activity Centre Uses

Assessments are only required to be undertaken for the following activity types.

FIGURE 2 – PLANNING CATEGORY

Planning Land Use Code (PLUC)	Category A Activity Centre Uses	Category B Activity Centre Uses
5 – 'SHOP'	Shop Liquor Store - Large Fast Food Outlet Lunch Bar Restaurant & Café	Convenience store Liquor store - small Restricted premises Service station
6 – 'OTHER RETAIL'		Bulky goods showroom Motor vehicle, boat, or caravan sales

2.5 Scope and Methodology

The Net Benefit Test is to be based on:

- The contextual description of the proposal and location with supporting maps, identifying if out-of-centre, within-centre or new activity centre.
- The change in net lettable area (NLA) of the shop/ retail (PLUC 5 - SHP) and/or other retail (PLUC 6 - RET) floor space.
- The defined trade area (including primary trade area and any secondary and tertiary trade areas).
- The estimated existing and forecast population of the trade area.
- The trade area resident attributes and implications for floorspace need and spending estimates.
- The estimated existing and forecast expenditure of the trade area using latest ABS Household Expenditure Survey or other reliable source.
- The estimated average annual sales (aggregate and per sqm NLA) for the proposed development and/or activity centre pre-and post-development proposal.

2.6 Modelling Method

The retail model is designed to assess the likely propensity for a resident in a particular area to visit/spend at each centre in the network. Based on the proximity of the resident to each centre, the role and function of each centre, the size of the retail offer at each centre, relative to other centres. The sales potential for the proposed centre will be based on the extent to which it may capture retail sales from each trade area. The results of the retail modelling shows:

- The expected market share that each centre may expect to capture from each trade area.
- The retail sales that may therefore be expected to be captured by each centre in the network from the designated trade areas.
- The relative contribution of each trade area to the overall sales at each centre.

The model results are focused primarily on the centres which can be expected to generate most of their sales from within the modelled trade areas. Centres located on the fringe of, or outside the trade areas will only show that proportion of sales captured from the trade areas. Subsequently, centres on the fringe of, or outside will not show a true sales figure, but rather

that part of the sales captured solely from within the trade area modelled. The impact assessment typically focuses primarily on the existing and planned centres closest to the proposed centre.

2.7 Measuring Impact

The potential sales generated by the development of the proposed centre will be drawn from centres in the network that would have reasonably expected to capture those sales had the proposed centre not been developed. The impact of the proposal on existing and planned activity centres is defined as an estimate of the retail turnover for each relevant activity centre identified for the following scenarios:

- without the proposed activity centre and
- with the new activity centre(s) assumed to be developed (or expanded).
- The differences between the 'without' and 'with' scenario is the potential turnover impact for each activity centre.

Competition between businesses in and of itself is not considered a relevant planning consideration. The impact of a proposal on an activity centre is defined as the potential loss of services and any associated detriment to the community caused by the proposed development. The following impact percentage and risk level for retail turnover is provided as a general guide and should not be used as the only indicator of acceptability of a proposal.

FIGURE 3 - SPP4.2 IMPACT and RISK GUIDE

Impact Percentage	Potential Impact	Risk Level	Description
0-5%	Insignificant	Low	Any impacts are likely to be temporary and have no long-term effects on the viability of individual activity centres.
5-10%	Moderate	Medium	Impacts are likely to be more significant for individual centres, but overall network sustainability is unlikely to be undermined in the long term.
10% +	Significant	High	Impacts are likely to be very significant for individual centres and are likely to undermine the long-term network sustainability.

Where the short-term impact is initially high before falling to a medium or low level in the long term, consideration should be given to how the development can be staged or if there needs to be any additional short-term benefits to ensure that level of service is always maintained. However, the overall impact of the proposal may be lessened or offset by the potential growth in sales each activity centre may generate from the introduction of additional residents and spending in the trade area over time.

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3. ACTIVITY CENTRE NETWORK

The existing and planned activity centres in the immediate network of a proposed activity centre represents a key determinant for assessing the demand for a proposed activity centre. The following activity centres are considered most likely to influence and be influenced by the proposed activity.

3.1 Strategic / Secondary Activity Centres

A Strategic Centre and two Secondary Centres are estimated to influence the potential demand and sustainability of the proposed activity.

Morley Strategic Centre

Designated / Classified	Strategic Centre	SPP4.2
Performs the role of a	Strategic Centre	
Location from proposed activity	4.5 km north	
Estimated current 'Shop' floor space (PLUC 5)	99,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, W, A, S, K, T	
Estimated current 'Other Retail' floor space (PLUC 6)	22,500 sqm NLA	(LUS 2015/17)
Development potential	Medium	

Belmont

Designated / Classified	Secondary Centre	SPP4.2
Performs the role of a	Secondary Centre	
Location from proposed activity	3.0 km south	
Estimated current 'Shop' floor space (PLUC 5)	63,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, W, A, K, BW	
Estimated current 'Other Retail' floor space (PLUC 6)	30,000 sqm NLA	(LUS 2015/17)
Development potential	Medium	

Victoria Park

Designated / Classified	Secondary Centre	SPP4.2
Performs the role of a	Neighbourhood	
Location from proposed activity	4.5 km southwest	
Estimated current 'Shop' floor space (PLUC 5)	22,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	W	
Estimated current 'Other Retail' floor space (PLUC 6)	25,000 sqm NLA	(LUS 2015/17)
Development potential	Low	

3.2 District Centres

Four district centres are estimated to influence the potential demand and sustainability of proposed the activity.

Inglewood

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Neighbourhood	
Location from proposed activity	4 km north	
Estimated current 'Shop' floor space (PLUC 5)	10,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, W, A	
Estimated current 'Other Retail' floor space (PLUC 6)	2,700 sqm NLA	(LUS 2015/17)
Development potential	Low	

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Bayswater

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Local	
Location from proposed activity	2.5 km north	
Estimated current 'Shop' floor space (PLUC 5)	3,800 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Maylands

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Neighbourhood	
Location from proposed activity	3 km northwest	
Estimated current 'Shop' floor space (PLUC 5)	12,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	C, 2 x IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Ashfield

Designated / Classified	District Centre	SPP4.2
Performs the role of a	Local	
Location from proposed activity	3 km northeast	
Estimated current 'Shop' floor space (PLUC 5)	750 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Medium	

3.3 Neighbourhood/Local

Four neighbourhood/local centres are estimated to influence the potential demand and sustainability of the proposed activity.

Rivervale

Designated / Classified	Neighbourhood Centre	
Performs the role of a	Local	
Location from proposed activity	2.5 km southwest	
Estimated current 'Shop' floor space (PLUC 5)	3,000 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Kooyong

Designated / Classified	Neighbourhood Centre	
Performs the role of a	Local	
Location from proposed activity	3 km southwest	
Estimated current 'Shop' floor space (PLUC 5)	2,250 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

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Belvidere

Designated / Classified	Neighbourhood Centre	
Performs the role of a	Local	
Location from proposed activity	1.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	6,200 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

Epsom

Designated / Classified	Local Centre	
Performs the role of a	Local	
Location from proposed activity	1.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	6,200 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	IGA	
Estimated current 'Other Retail' floor space (PLUC 6)	0 sqm NLA	(LUS 2015/17)
Development potential	Low	

3.4 Service Commercial Precincts / Other Centres

Airport

Designated / Classified	Specialised Centre	
Performs the role of a	Neighbourhood	
Location from proposed activity	2.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	5,000 sqm NLA	
Majors / Anchor Tenants	W	
Estimated current 'Other Retail' floor space (PLUC 6)	25,000 sqm NLA	
Development potential	High	

Great Eastern Highway

Designated / Classified	N/a	
Performs the role of a	Service Commercial	
Location from proposed activity	1.5 km east	
Estimated current 'Shop' floor space (PLUC 5)	8,600 sqm NLA	(LUS 2015/17)
Majors / Anchor Tenants	-	
Estimated current 'Other Retail' floor space (PLUC 6)	4,700 sqm NLA	(LUS 2015/17)
Development potential	Medium	

3.5 Summary

Analysis of the activity centre network reveals that:

- Residents in the trade area have access to approximately 70,500 sqm NLA of total convenience-based retail floor space.
- There are no full line supermarkets within 1.5 km of the proposed activity.
- There are only two full line supermarkets (Coles at Maylands and Woolworths at Airport) within 3km of the proposed activity.
- There are four small, limited line IGA supermarkets located between 1.5 km and 3 km of the proposed activity.
- The closest 'clusters' of multiple supermarket operators are located at Belmont (3 km) and Inglewood (4 km)

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- There are three classified district activity centres north of the proposed activity (Maylands, Bayswater, Ashfield), yet none of these activity centres perform the role of a district centre and function more as neighbourhood or local centres due to their limited retail offer.
- Residents in the trade area have access to nearly 105,000 sqm NLA of bulky goods retail activity across six precincts.

FIGURE 4
EXISTING & PLANNED ACTIVITY CENTRES FRAMEWORK
By Centre Name, by Centre Type, by Floorspace /Year

Total Convenience		Estimated NLA Floorspace (sqm) by Year				
Centre Name	**Centre Type**	**2023**	**2026**	**2031**	**2036**	**2041**
Morley	Strategic	13,100	13,100	13,100	13,100	13,100
Belmont	Secondary	11,250	11,250	11,250	11,250	11,250
East Vic Park	District	5,400	5,400	5,400	5,400	5,400
Victoria Park	Secondary	3,750	3,750	3,750	3,750	3,750
Inglewood	District	8,750	8,750	8,750	8,750	8,750
Bassendean	District	4,400	4,400	4,400	4,400	4,400
Maylands	District	4,600	4,600	4,600	4,600	4,600
GEH (west)	Local	1,500	1,500	1,500	1,500	1,500
Airport	Special	4,400	4,400	4,400	4,400	4,400
Bayswater	District	500	500	500	500	500
Belvidere	Local	3,000	3,000	3,000	3,000	3,000
Rivervale (Kooyong)	Local	1,250	1,250	1,250	1,250	1,250
Ashfield	District	550	550	550	550	550
GEH (east)	District	6,900	6,900	6,900	6,900	6,900
Epsom	Local	1,200	1,200	1,200	1,200	1,200
All Existing and Planned Centres		**70,550**	**70,550**	**70,550**	**70,550**	**70,550**
Ascot		-	3,400	3,400	3,400	3,400
All Centres		**70,550**	**73,950**	**73,950**	**73,950**	**73,950**

Land Use Employment Survey (WAPC 2015) / Taktics4

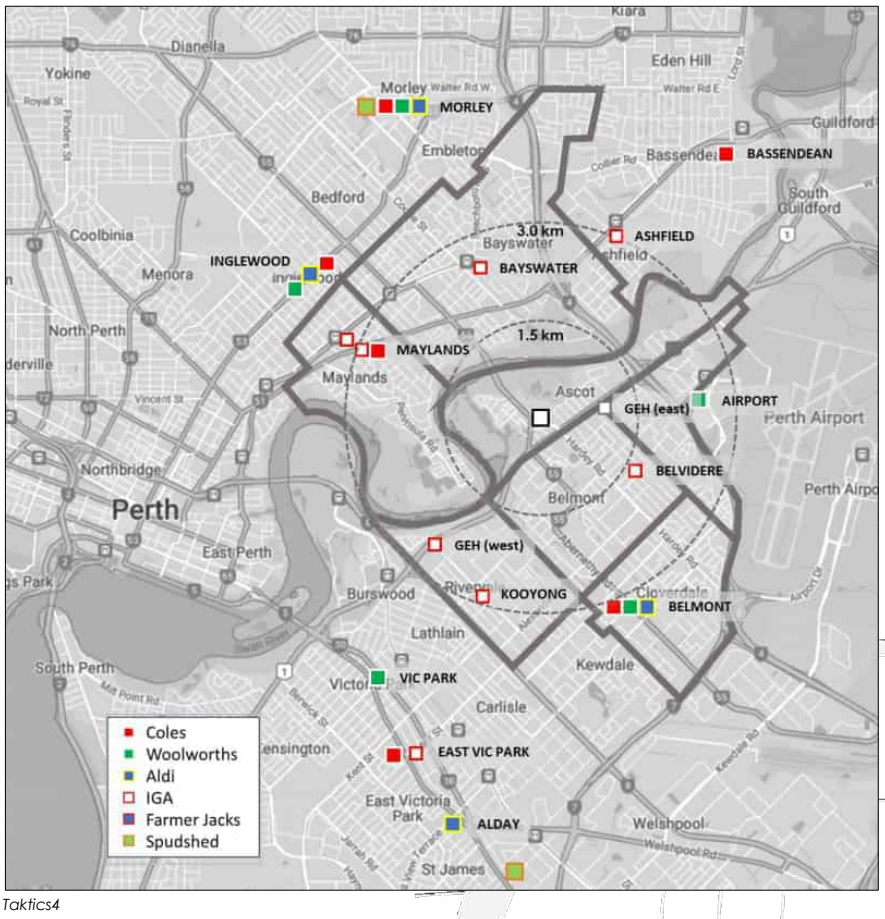
FIGURE 5
EXISTING & PLANNED ACTIVITY CENTRES FRAMEWORK
By Centre Name, by Centre Type, by Floorspace /Year

Bulky Goods/LFR		Estimated NLA Floorspace (sqm) by Year				
Centre Name	**Centre Type**	**2023**	**2026**	**2031**	**2036**	**2041**
Morley	Strategic	22,500	22,500	22,500	22,500	22,500
Belmont	Secondary	30,000	30,000	30,000	30,000	30,000
East Vic Park	District	0	0	0	0	0
Victoria Park	Secondary	25,000	25,000	25,000	25,000	25,000
Inglewood	District	2,700	2,700	2,700	2,700	2,700
Bassendean	District	0	0	0	0	0
Maylands	District	0	0	0	0	0
GEH (west)	Local	0	0	0	0	0
Airport	Special	20,000	20,000	20,000	20,000	20,000
Bayswater	District	0	0	0	0	0
Belvidere	Local	0	0	0	0	0
Rivervale (Kooyong)	Local	0	0	0	0	0
Ashfield	District	0	0	0	0	0
Eastgate/GE Hwy	District	4,700	4,700	4,700	4,700	4,700
Epsom	District	0	0	0	0	0
All Existing and Planned Centres		**104,900**	**104,900**	**104,900**	**104,900**	**104,900**
Ascot			9,600	9,600	9,600	9,600
All Centres		**104,900**	**114,500**	**114,500**	**114,500**	**114,500**

Land Use Employment Survey (WAPC 2015) / Taktics4

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FIGURE 6 - SUPERMARKET BASED ACTIVITY CENTRES



Taktics4

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4. TRADE AREA

The trade area for retail activity is largely determined by a range of industry, market and consumer-based principles. Consumer dynamics vary significantly between different retail categories and is influenced by the frequency in which consumers require access to certain retail goods and services. Retailers, shopping centre developers, and urban planners acknowledge this variation in dynamics through the establishment of a clearly defined hierarchy of activity centres which reflect different shopping trips and expectations for consumers/residents.

4.1 Market Behaviour

Convenience retail

Convenience retail trips include visits to supermarkets, other food and grocery stores, newsagencies, and cafes/takeaway stores. These trips are typically daily or weekly trips and are generally made to activity centres closest to the resident/consumer. Activity centres serving this category are typically anchored by a supermarket, or small grocery store and classified as Neighbourhood and/or Local Centres.

Comparative retail

Comparative retail trips include visits to department stores, discount department stores, fashion, and household goods stores. These are typically less frequent trips than convenience-based trips and consumers are more likely to target specific items, brands, products, and prices on these trips. They are therefore more likely to travel further to access these goods and services. Centres serving this category are typically anchored by a Department Store or DDS and classified as Strategic, Secondary, or District Centres. These centres invariably also serve a convenience-based role.

Large Format/Bulky Goods

Homewares, furnishing, and recreation goods are more likely to reflect infrequent trips for targeted goods/purchases. Consumers are prepared to travel further for these goods and services. These centres are less likely to include a convenience-based role beyond access to cafes/takeaway facilities as part of the shopping experience.

Behaviour Philosophy

The fundamental retail consumer principles adopted by modelling techniques in this assessment are that residents are generally:

- Less likely to travel beyond the nearest Strategic Centre and or Secondary Centre to visit another centre with the same role/function/offer.
- Less likely to travel beyond the nearest District Centre to visit another District Centre with the same role/function/offer.
- Just as likely to travel beyond one supermarket-based neighbourhood centre to visit another supermarket-based centre with another operator (i.e., to shop at a Coles instead of a Woolworths or vice versa).
- Less likely to travel beyond the nearest local centre to visit another local centre with the same role/function/offer (i.e., to drive past one IGA to shop at another IGA).

That is not to say that residents will not visit other centres, but that they will not visit these centres frequently enough to establish a pattern of behaviour.

4.2 Delineation of Trade Area

The trade area for proposed activity represents the area likely to generate most of the sales for a proposed activity centre. A trade area can be defined by applying these market behaviour principles, collating proximity of existing and planned urban areas with their accessibility to existing and planned centres, based on road networks, and physical barriers.

The trade area for the proposed activity may be delineated by residents in**:**

Ascot, Belmont	Mainly within 1.5 km of the proposed activity.
Redcliffe, Rivervale, Bayswater, Maylands, Cloverdale	All or partly within 1.5 km-3.0 km of the proposed activity.

This trade area comprises residents which are likely to generate most of the sales for the proposed activity. The trade area is divided north and south by the Swan River. However, the proposed activity is located on a road with access across the river, which therefore creates direct access to residents in the trade areas to the north and the south. The trade area incorporates residents across three Local Government Areas – City of Belmont, City of Bayswater, and Town of Victoria Park.

4.3 Population

The existing and forecast resident population in the trade area represents the first variable for determining the demand for retail activity in a trade area. According to adopted population forecasts for the three local government areas the total trade area is:

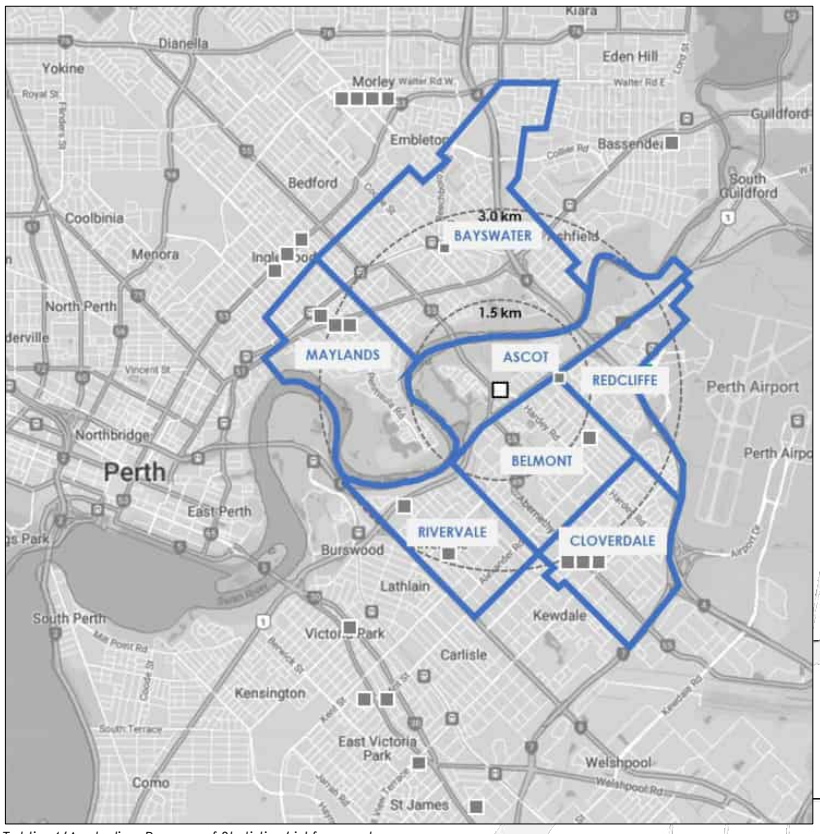
- Estimated to contain nearly 78,000 residents in 2026.
- Forecast to increase to 93,500 residents by 2041.
- Therefore, estimated to grow by 15,800 additional residents over the 15-year period at an average of over 1,050 additional residents p.a.

Ascot and Belmont trade areas are:

- Estimated to contain a resident population of 11,000 residents in 2026.
- Forecast to increase to 16,400 residents by 2041.
- Therefore, estimated to grow by an additional 5,400 over a 15-year period at an average of 300 additional residents per annum.
- Expected to be the trade areas with the largest proportional growth over the next 15 years.

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FIGURE 7 - TRADE AREA MAP



Taktics4/Australian Bureau of Statistics/ id forecast

FIGURE 8

CURRENT and FORECAST POPULATION
By Trade Area by Year

Catchment	2023	2026	2031	2036	2041	2023-2041	%
Bayswater	25,050	25,600	26,800	28,000	29,200	4,150	17%
Maylands	13,350	13,400	13,900	14,400	14,900	1,550	12%
Ascot	3,300	3,400	3,700	4,600	5,200	1,900	58%
Belmont	7,400	7,600	9,000	10,300	11,200	3,800	51%
Rivervale	11,850	12,400	13,400	14,200	15,000	3,150	27%
Redcliffe	5,400	5,500	5,700	5,800	7,000	1,600	30%
Cloverdale	9,500	9,800	10,200	10,500	11,000	1,500	16%
Total Trade Area	**75,850**	**77,700**	**82,700**	**87,800**	**93,500**	17,650	23%
Average growth per census		1,850	5,000	5,100	5,700		
Average growth p.a.	-	617	1,000	1,020	1,140		
Average growth p.a. (%)		0.8%	1.3%	1.2%	1.3%		

id forecast - LGA Bayswater, Belmont Victoria Park

Taktics4/Australian Bureau of Statistics/ id forecast

Attachment 12.1.6 Retail Assessment

4.4 Resident Demographic Profiles

The demographic profile of the resident population in a trade area represents a second level of demand for retail activity in a trade area. Consumer spending surveys confirm that residents with different personal, household and economic characteristics are likely to exhibit different spending behaviour regarding the amount they buy and the type of goods they buy. The demographic characteristics of the resident population in the trade area will determine the retail spending profile and retail spending capacity available to retailers/centres in the trade areas. Key demographic characteristics include household composition, dwelling tenure, and income potential. Relevant socio-economic characteristics for residents in the trade area are highlighted below.

Person and Household Profile

The resident population in the Ascot, Belmont, Bayswater trade area is characterised by:

- an average age of 40 years which is 3.8% above the Perth average.
- an average household size of 2.3 persons per dwelling which is 9% smaller than the Perth average.
- a higher representation of one person households.
- a predominantly Australian born population.
- an ethnic/cultural balance consistent with Perth averages.
- a stable resident base with longevity in the trade area.

Employment, Income, Economic Profile

The resident labour force in the Ascot, Belmont, Bayswater trade area is characterised by:

- a labour force participation rate consistent with Perth averages.
- a higher representation of professionals.
- a higher representation of labour force employed in the retail, accommodation, and F&B sector and professional services sector.
- an average personal income that is 6% above Perth averages.
- an average of 2 incomes per dwelling which is 5% below Perth averages.
- an average household income that is 1% higher than Perth averages.
- an average mortgage that is 1% higher than Perth averages.
- an average rent that is 6% lower than Perth averages.
- a higher representation of rental dwellings.
- a slightly lower representation of dwellings with a mortgage.

Dwelling Profile

The dwelling stock in the Ascot, Belmont, Bayswater trade area is characterised by:

- slightly higher representation of townhouses and semi-detached dwellings.
- an average of 3 bedrooms per dwellings which is 9% smaller than the average Perth dwelling.

4.5 Resident Retail Spending Profile

Resident retail spending profiles for the trade area are derived by extrapolating data from a range of sources including:

- Household Expenditure Survey by socio economic characteristics (ABS 2015)
- Population and Household Census by socio economic characteristics (ABS 2021)
- Retail Sales by store categories (ABS 2024)

Correlation of data from these sources relative to the demographic profiles of an area produces an estimate of the average retail spending potential of residents within that area. Some of the trade areas may not currently have sufficient population bases to extract valid demographic profiles. Where trade areas do not have sufficient population base the retail spending profiles have been adopted from neighbouring/adjoining trade areas. Correlation of demographic profiles to retail spending profiles for residents in the trade area reveal that:

- Ascot and Bayswater residents are estimated to have an average total retail spending profile of between $19,550 and $21,900 per resident p.a. which is higher than Perth averages.
- Maylands, Belmont, Rivervale, Redcliffe, and Cloverdale residents have an average total retail spending profile of between $15,200 and $16,600 per resident p.a. which is lower than Perth averages.

FIGURE 9

ESTIMATED AVERAGE RETAIL SPENDING PER CAPITA
By Retail Category by Trade Area
Dec-23

Retail Store Category	Total Convenience Retail	Total Comparison Retail	Total Shop	Bulky Goods/LFR	Total 'Shop' & 'Other Retail'
Bayswater	$11,143	$5,367	$16,510	$3,046	$19,556
Maylands	$9,464	$4,446	$13,910	$2,605	$16,515
Ascot	$12,289	$6,240	$18,529	$3,363	$21,891
Belmont	$8,933	$4,198	$13,130	$2,468	$15,598
Rivervale	$9,495	$4,461	$13,956	$2,613	$16,568
Redcliffe	$8,829	$4,149	$12,977	$2,441	$15,418
Cloverdale	$8,741	$4,108	$12,848	$2,418	$15,267
Perth Average	***$10,374***	***$4,872***	***$15,246***	***$2,839***	***$18,086***

8501.0 Retail Trade, Australia
Retail Turnover, State by Industry Subgroup

4.6 Resident Retail Spending Capacity

The resident retail spending capacity represents the total retail spending that is generated by residents in a trade area that is available to be capture by existing and planned centres in the trade area (and beyond). It is measured by multiplying the average potential resident retail spending profile for each area by the forecast resident population in each area to determine the forecast resident retail spending capacity of each trade area over time. Based on the average potential resident retail spending profiles for supermarkets, residents in the trade area are estimated to generate:

FIGURE 10

ESTIMATED ANNUAL RESIDENT RETAIL SPENDING CAPACITY in TRADE AREA ($M p.a.)
By Retail Category by Year

	2023	2026	2031	2036	2041
Total Convenience Retail	$755	$774	$823	$875	$931
Total Comparison Retail	$360	$368	$392	$417	$444
Total Shop	$1,115	$1,142	$1,215	$1,291	$1,374
Bulky Goods/LFR	$208	$213	$226	$240	$256
Total 'Shop & Other' Retail	$1,323	$1,355	$1,441	$1,532	$1,630

8501.0 Retail Trade, Australia
Retail Turnover, State by industry Subgroup

Convenience based retail spending

Residents across the total trade area are estimated to spend:

- $774 M p.a. in convenience-based shops/centres in 2026.
- $931 M p.a. in convenience-based shops/centres by 2041.

Residents in Ascot and Belmont trade areas are estimated to:

- spend $106 M p.a. in convenience-based shops/centres in 2026.
- spend $164 M p.a. in convenience-based shops/centres by 2041.

Other Retail (Bulky Goods/Showroom)

Residents across the total trade area are estimated to spend:

- spend $213 M p.a. in total bulky goods/LFR outlets in 2026.
- spend $256 M p.a. in total bulky goods/LFR outlets by 2041.

Attachment 12.1.6 Retail Assessment

5. PART A – LOCAL CENTRE

This section assesses the potential market demand for, and potential sustainability of a proposed local centre at Ascot. This assessment subsequently informs the assessment of potential impacts at existing and planned activity centres. The proposed local centre is:

- Included as part of the planning for the City of Belmont Golden Gateway Precinct.
- Located 3 km from the nearest supermarket-based activity centre.
- Classified as a planned activity centre.
- Not classified as an out of centre development.
- Considered a major development because it proposes 3,400 sqm NLA of PLUC 5 activity.

Eligibility for Exemption from a Net Benefit Test

The proposed local centre activity:

- is accessible to an existing walkable trade area.
- includes more than 1,500 sqm NLA of PLUC 5 activity
- is not located within 400 metres of a railway station.
- is therefore not eligible for exemption from a Net Benefit Test under the provisions of SPP4.2.

5.1 Market Share

Market share represents the proportion of resident spending generated from a trade area to a proposed activity centre. Market share is a measure of influence that a centre will have over customers in an area.

Example:

Total annual retail spending generated by residents in a trade area is $100M p.a.

A centre is capturing a market share of 20% of that retail spending

The centre therefore captures $20M p.a. in sales from the trade area

The proposed local centre if developed by 2026, is estimated to capture:

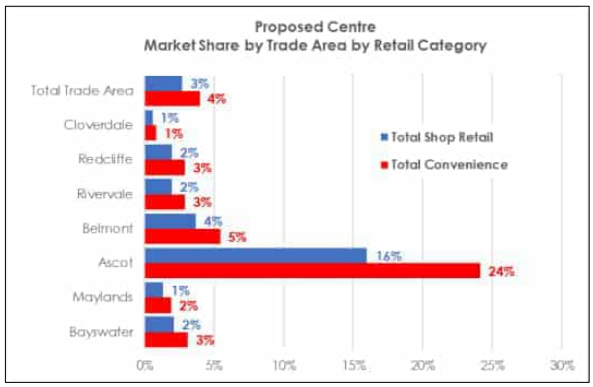
Convenience Spending

- 24% of all convenience/food/grocery/local spending generated by residents in Ascot.
- 5% of all convenience/food/grocery/local spending generated by residents in Belmont.
- A combined total of 4% of all convenience/food/grocery/local spending generated by residents across the total trade area.

Total Retail Spending

- 16% of all retail spending generated by residents in Ascot.
- 4% of all retail spending generated by residents in Belmont.
- A combined total of 3% of all retail spending generated by residents in the total trade area.

FIGURE 11



Taktics4 Retail Model

5.2 Sales Contribution

Sales contribution represents the proportion of a centres annual sales that is captured from a trade area. Sales contribution is a measure of the reliance / exposure that an activity centre has to a trade area.

Example:

A centre is capturing total retail sales of $20M p.a.

$15M p.a. of those sales are being captured from one trade area.

Therefore 75% of the centre sales are being contributed from that trade area.

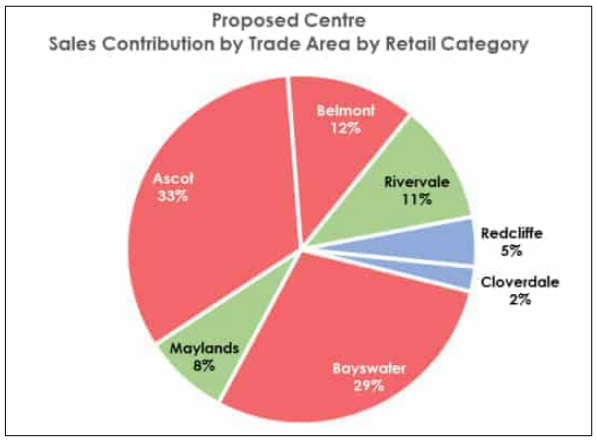
The proposed local centre is ultimately estimated to generate:

- 62% of its forecast annual retail sales from residents in the immediate suburbs of Ascot (33%), and Bayswater (29%).
- 31% of its forecast annual retail sales from residents in Maylands, Belmont, and Rivervale.
- A combined total of 74% of its forecast annual retail sales will be derived from residents in the immediate local catchment it is intended to serve.

This sales contribution level is consistent with industry expectations.

Attachment 12.1.6 Retail Assessment

FIGURE 12



Taktics4 Retail Model

5.3 Sales Potential

The Sales Potential represents the total sales that a centre may be expected to capture based on achieving the estimated market share from each trade area. It is a measure of a centre's viability and sustainability. Sales potential is measured by either annual sales and/or by sales productivity. Sales productivity is the total annual sales of centre divided by the total retail floor space NLA of the centre.

Example:

A centre captures total annual retail sales of $20M p.a.

The centre has a retail floor space of 4,000 sqm NLA.

The centre has a sales productivity of $20M p.a. divided by 4,000 sqm NLA = $5,000/sqm p.a.

The proposed local centre if developed in 2026 is estimated to have the potential to generate:

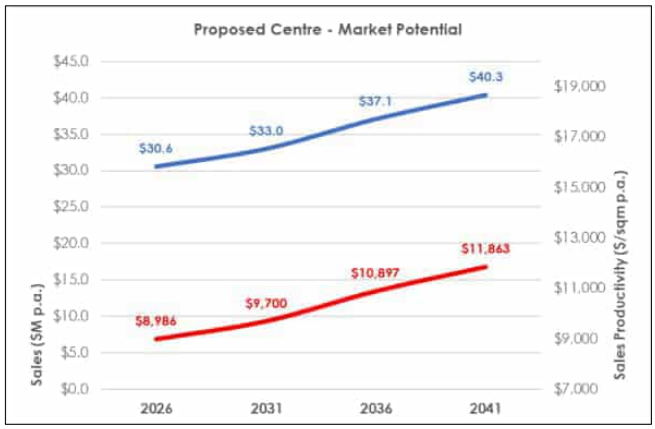
- $30.6M p.a. at $9,000/sqm p.a. by 2026
- $33.0M p.a. at $9,700/sqm p.a. by 2031
- $37.1M p.a. at $10,900/sqm p.a. by 2036
- $40.3M p.a. at $11800/sqm p.a. by 2041

The proposed local centre at Ascot:

- Has the potential to generate sufficient sales to be sustainable by 2026, satisfying industry measures conducive to a sustainable supermarket based local centre.
- Serve an immediate role in meeting the day-to-day convenience needs of residents in the immediate walkable catchment of the proposed local centre.
- Rely predominantly on sales being captured from the immediate suburbs of Ascot, Maylands and Belmont.
- Be sustainable despite a potential market capture of only 16% of total retail sales from resident spending in Ascot, leaving 84% of retail spending to be captured by existing and planned centres.

Attachment 12.1.6 Retail Assessment

FIGURE 13



Taktics4 Retail Model

5.4 Sales Impact

Sales impact represents the potential loss of sales at a centre due to the development of another centre. Sales impact is measured by comparing the potential sales of a centre at a particular year/period with the other centre included and excluded from the equation/modelling. Sales impact may be measured by potential actual annual sales or a percentage of potential annual sales.

Example

A centre is forecast to generate annual sales of $20M p.a. in 2026 without the proposed centre being developed by 2026.

The centre is forecast to generate annual sales of $18M p.a. in 2026 if the proposed centre is developed by 2026.

The centre is therefore estimated to experience a potential sales impact of $2M p.a. in 2026.

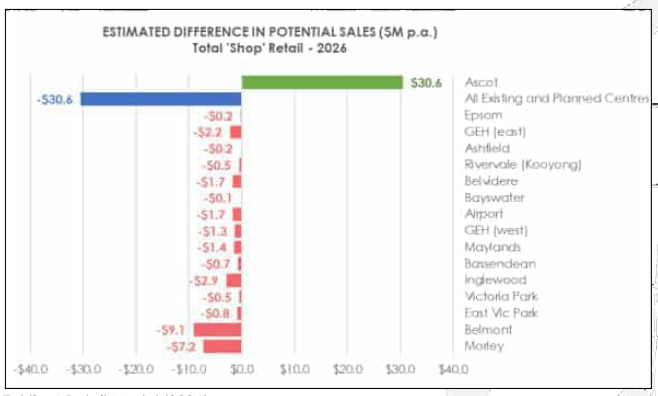
The centre is estimated to subsequently experience a potential sales impact of 10% of its sales ($2M p.a. loss from its $20M p.a.)

Actual Sales

Modelling the activity centres network with and without the proposed activity reveals that the development of the proposed activity by 2026 would have the potential to capture $30.6M p.a. in retail sales that might otherwise be captured from existing or planned centres.

Over 68% of all retail sales generated by the proposed local centre would be captured from four centres including Belmont Centre (-$9.1M p.a.), Morley Centre (-$7.2M p.a.), Inglewood (-$2.9M p.a.), and Maylands ($1.4M p.a.). This is because these centres currently contain the retail offer that a proposed local centre is likely to provide at Ascot.

FIGURE 14
ESTIMATED ACTUAL ANNUAL SALES CAPTURED from OTHER ACTIVITY CENTRES by SHOP SALES by FIRST YEAR TRADE of PROPOSED ACTIVITY (2026)



Taktics4 Retail Model (2024)

Attachment 12.1.6 Retail Assessment

Percentage of Sales

The modelling shows that upon trading in 2026, the retail sales captured by a proposed local centre has the potential to impact the overall retail sales generated by residents in the trade area at:

Belmont

The public and private investment at Belmont Centre will not be impacted by the proposed local centre. The potential sales impact is forecast to be less than 3.0% which is classified as insignificant impact/risk. The potential sales impact at Belmont is in effect considerably less than 3.0% as the model only shows the potential loss in sales at Belmont from residents in the modelled trade area. The Belmont Centre generates sales from a more extensive trade area than the trade area for the proposed local centre.

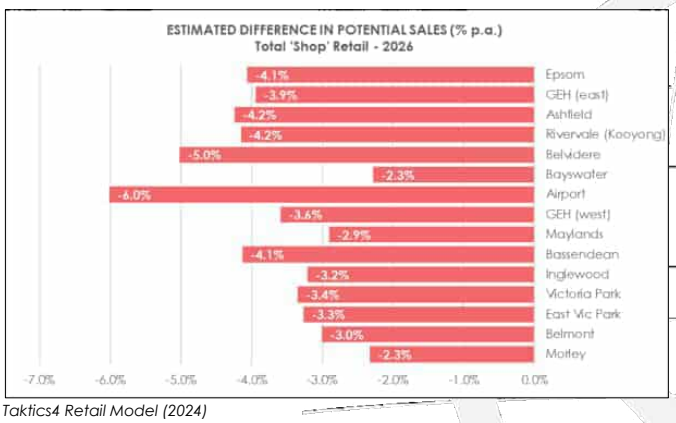
Morley

The public and private investment at Morley Centre will not be impacted by the proposed local centre. The potential sales impact is forecast to be less than 2.3% which is classified as insignificant impact/risk. The potential sales impact is in effect considerably less than 2.3% as the model only shows the potential loss in sales at Morley from residents in the modelled trade area. The Morley Centre generates sales from a more extensive trade area than the trade area for the proposed local centre.

Bayswater

The public and private investment at Bayswater will not be impacted by the proposed local centre. The potential sales impact at Bayswater is less than 2.3% which is classified as low impact/low risk. The low impact is because the Bayswater Centre does not provide the offer intended at the proposed local centre. Therefore, the Bayswater Centre is not capturing the sales that will be captured by the proposed local centre.

FIGURE 15
ESTIMATED IMPACT of PROPOSED ACTIVITY on ANNUAL SALES at OTHER ACTIVITY CENTRES by SHOP SALES by FIRST YEAR TRADE of PROPOSED ACTIVITY (2026)



Taktics4 Retail Model (2024)

Local Centres

Centres at Epsom (4.1%), Ashfield (4.2%), Rivervale/Kooyong (4.2%) and Belvidere (5.0%) are all estimated to be impacted by between 4% and 5%. These impacts are classified as insignificant impact65/ low risk. There is not expected to be an impact to private or public investment. This is because these centres do not currently offer the extent of the retail offer intended to be provided by the proposed local centre.

Attachment 12.1.6 Retail Assessment

Airport

The convenience-based centre anchored by Woolworths at the Airport, is the only centre which is estimated to experience a moderate impact (6%). The potential sales impact is in effect considerably less than 6.0% as the model only shows the potential loss in sales at the Airport from resident spending generated from within the modelled trade area. The Airport Centre generates sales from a far more extensive trade area than the trade area for the proposed local centre.

5.5 Sales Growth

Sales Growth represents the increase in retail sales that may be expected from a centre because of an increase in population growth in the trade area.

For example:

A centre is currently capturing total retail sales of $20M p.a.

It achieves these sales by capturing 20% market share of all resident spending in the trade area.

Therefore, the trade area has a current resident retail spending capacity of $100M p.a.

Residential development occurs in the trade area at 10% growth over a five-year period.

In five years, the resident retail spending capacity in the trade area has increased to $110M p.a.

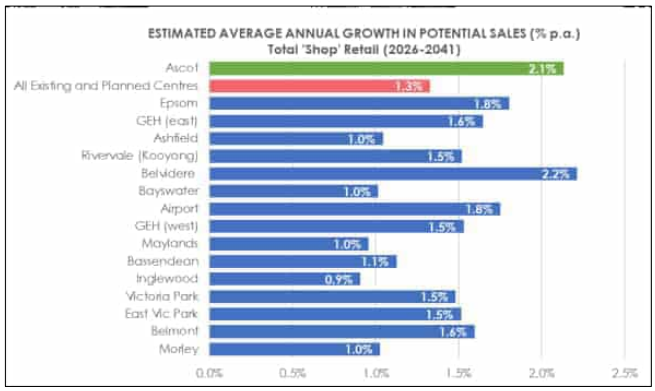
The sales potential for the centre is forecast to increase to $22M p.a. (in constant dollars) despite maintain the same market share within the trade area.

This potential sales growth across centres has the potential to offset any initial sales impact generated by the development of a proposed local centre.

The population in the total trade area is expected to increase from 77,700 in 2026 to 93,500 in 2041. This population growth will result in an increase in resident retail spending capacity in the total trade area from $1,142M p.a. in 2026 to $1,374M p.a. in 2041. That represents an additional $232M p.a. in the total trade area for all centres to capture.

The graph shows that beyond the development of the proposed local centre in 2026, all centres in the trade area, or area of influence by the proposed local centre is forecast to have the potential to experience an average annual growth in sales of between 1% and 2.0% p.a. over the subsequent 15 years.

FIGURE 16
ESTIMATED AVERAGE ANNUAL SALES GROWTH at ACTIVITY CENTRES SHOP SALES Between 2026 and 2041



Taktics4 Retail Model (2024)

5.6 Summary

The findings in this Net Benefit Test confirm that a proposed local centre at Ascot will result in insignificant/low risk impacts on the surrounding existing and planned activity centres network. With any potential sales impact offset by the potential for substantial average sales growth in the trade area over the next 15 years.

Overall, the development of the proposed local centre at Ascot is not expected to generate significant impacts for the surrounding centres network. The centres network is currently bereft of full line supermarket-based centres. This means that residents in the trade area are already bypassing the smaller local centres to access their convenience retail needs at centres further afield than they should have to travel.

Attachment 12.1.6 Retail Assessment

6. PART B - BULKY GOODS

This section assesses the potential market demand for, and potential sustainability of proposed 'Other' Retail Bulky Goods Precinct at Ascot. This assessment is necessary to subsequently inform the assessment of potential impacts at existing and planned activity centres. The proposed bulky goods activity is considered an 'out of centre' development.

6.1 Market Share

Market share represents the proportion of resident spending generated from a trade area to the proposed centre. Market share is a measure of influence that a centre will have over customers in an area.

Example:

Total annual retail spending generated by residents in a trade area is $100M p.a.

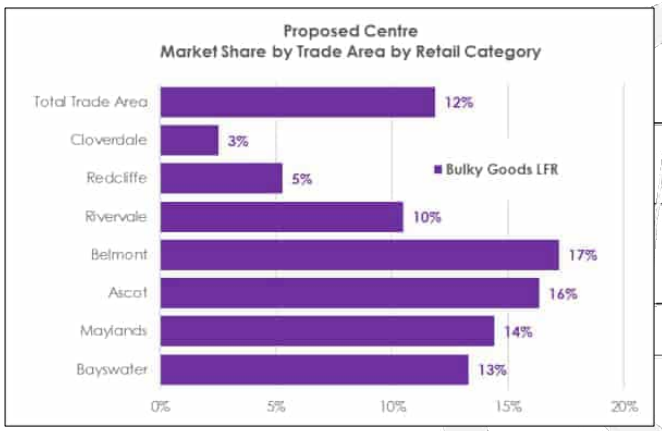
A centre is capturing a market share of 20% of that retail spending

The centre therefore captures $20M p.a. in sales from the trade area

The proposed bulky goods activity if developed by 2026, is estimated to capture:

- 12% of all bulky goods spending generated by residents across the total trade area.
- relatively consistent market capture between 13%-17% of all bulky goods retail spending from residents in Ascot, Belmont, Maylands, Bayswater and Rivervale.5% of all convenience/food/grocery/local spending generated by residents in Belmont, reflecting the propensity for residents to travel further to access this type of retail category.

FIGURE 17



Taktics4 Retail Model

6.2 Sales Potential

The Sales potential represents the total sales that a centre may be expected to capture based on achieving the estimated market share from each trade area. It is a measure of a centre's viability and sustainability. Sales potential is measured by either annual sales and/or by sales productivity. Sales productivity is the total annual sales of centre divided by the total retail floor space NLA of the centre.

Example:

A centre captures total annual retail sales of $20M p.a.

The centre has a retail floor space of 4,000 sqm NLA.

The centre has a sales productivity of $20M p.a. divided by 4,000 sqm NLA = $5,000/sqm p.a.

The proposed local centre if developed in 2026 is estimated to have the potential to generate:

$25.2M p.a. at $2,600/sqm p.a. by 2026

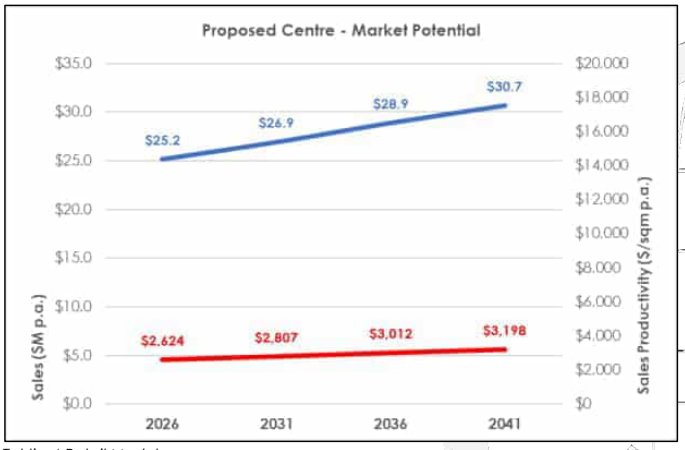
$26.9M p.a. at $2,800/m p.a. by 2031

$28.9M p.a. at $3,000/sqm p.a. by 2036

$30.7M p.a. at $3,200/sqm p.a. by 2041

The proposed bulky goods activity at Ascot has the potential to generate sufficient sales to be sustainable by 2026, satisfying industry measures conducive to a sustainable bulky goods activity. Be sustainable despite a potential market capture of only 12% of total bulky goods sales from resident spending in the total trade area, leaving 88% of bulky goods retail spending to be captured by existing and planned centres.

FIGURE 18



Taktics4 Retail Model

6.3 Sales Impact

Sales impact represents the potential loss of sales at a centre due to the development of another centre. Sales impact is measured by comparing the potential sales of a centre at a particular year/period with the other centre included and excluded from the equation/modelling. Sales impact may be measured by potential actual annual sales or a percentage of potential annual sales.

Example

A centre is forecast to generate annual sales of $20M p.a. in 2026 without the proposed centre being developed by 2026.

The centre is forecast to generate annual sales of $18M p.a. in 2026 if the proposed centre is developed by 2026.

The centre is therefore estimated to experience a potential sales impact of $2M p.a. in 2026.

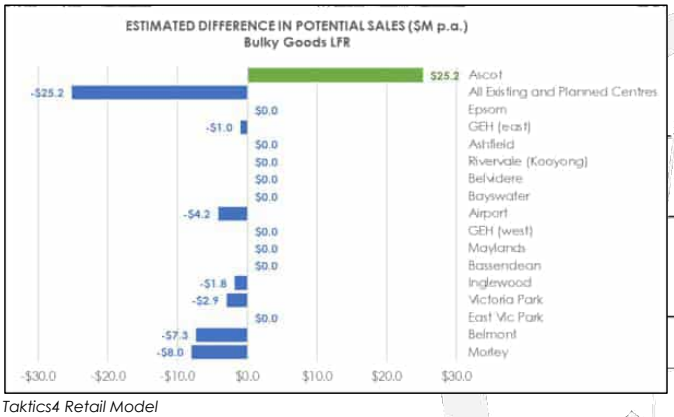
The centre is estimated to subsequently experience a potential sales impact of 10% of its sales ($2M p.a. loss from its $20M p.a.)

Actual Sales

The development/introduction of the proposed bulky goods activity in Ascot by 2026 will have the potential to capture $25.2M p.a. in retail sales that might otherwise be captured from existing or planned centres.

Over 81% of all retail sales generated by the proposed bulky goods activity to be captured from four centres including Belmont Centre (-$7.3M p.a.), Morley Centre (-$8.0M p.a.), Airport (-$-4.2M p.a.), and Victoria Park ($-2.9M p.a.).

FIGURE 19



Taktics4 Retail Model

Attachment 12.1.6 Retail Assessment

Percentage of Sales

The modelling shows that upon trading in 2026, the retail sales captured by proposed bulky goods activity centre has the potential to impact the overall retail sales generated by residents in the trade area at:

Belmont

The public and private investment at Belmont Centre will not be impacted by the proposed local centre. The potential sales impact is forecast to be less than 4.2% which is classified as insignificant impact/risk. The potential sales impact at Belmont is in effect considerably less than 4.2% as the model only shows the potential loss in sales at Belmont from residents in the modelled trade area. The Belmont Centre generates sales from a more extensive trade area than the trade area for the proposed bulky goods activity at Ascot.

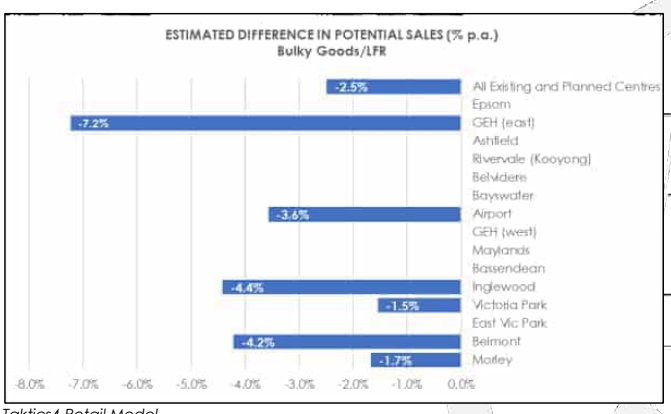
Morley

The public and private investment at Morley Centre will not be impacted by the proposed bulky goods activity. The potential sales impact is forecast to be less than 1.7% which is classified as insignificant impact/risk. The potential sales impact is in effect considerably less than 1.7% as the model only shows the potential loss in sales at Morley from residents in the modelled trade area. The Morley Centre generates sales from a more extensive trade area than the trade area for the proposed bulky goods activity at Ascot.

Airport

The public and private investment at the Airport will not be impacted by the proposed bulky goods activity. The potential sales impact is forecast to be less than 3.6% which is classified as insignificant impact/risk. The potential sales impact is in effect considerably less than 3.6% as the model only shows the potential loss in sales at the Airport from residents in the modelled trade area. The Airport generates sales from a more extensive trade area than the trade area for the proposed bulky goods activity at Ascot.

FIGURE 20



Taktics4 Retail Model

6.4 Sales Growth

Sales Growth represents the increase in retail sales that may be expected from a centre because of an increase in population growth in the trade area.

For example:

A centre is currently capturing total retail sales of $20M p.a.

It achieves these sales by capturing 20% market share of all resident spending in the trade area.

Therefore, the trade area has a current resident retail spending capacity of $100M p.a.

Residential development occurs in the trade area at 10% growth over a five-year period.

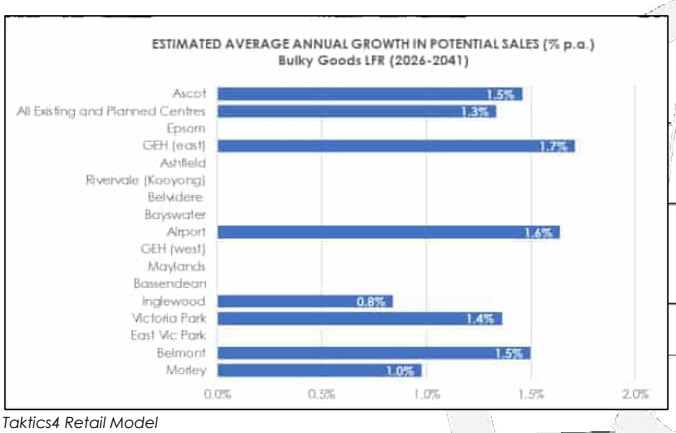
In five years, the resident retail spending capacity in the trade area has increased to $110M p.a.

The sales potential for the centre is forecast to increase to $22M p.a. (in constant dollars) despite maintain the same market share within the trade area.

This potential sales growth across centres has the potential to offset any initial sales impact generated by the development of a proposed local centre.

The population in the total trade area is expected to increase from 77,700 in 2026 to 93,500 in 2041. This population growth will result in an increase in resident retail spending capacity in the total trade area from $1,142M p.a. in 2026 to $1,374M p.a. in 2041. That represents an additional $232M p.a. in the total trade area for all centres to capture. The graph shows that beyond the development of the proposed bulky goods in 2026, all relevant centres in the trade area, or area of influence by the proposed bulky goods activity at Ascot is forecast to have the potential to experience an average annual growth in sales of between 1.0% and 2.0% p.a. over the subsequent 15 years.

FIGURE 21



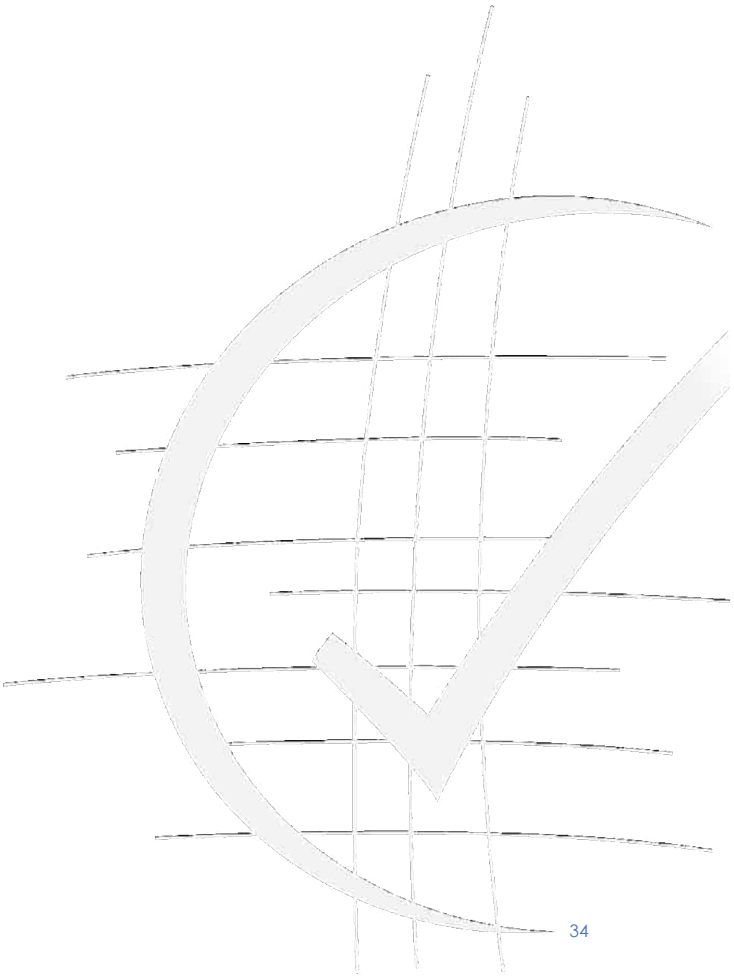
Taktics4 Retail Model

Attachment 12.1.6 Retail Assessment

6.5 Summary

The findings in this Net Benefit Test confirm that proposed bulky goods activity at Ascot will.

- Result in insignificant/low risk impacts on the surrounding existing and planned activity centres network. With any potential sales impact offset by the potential for substantial average sales growth in the trade area over the next 15 years.
- Subsequently not have an unreasonable impact on the delivery and sustainability of private and public infrastructure at other activity centres.



Attachment 12.1.6 Retail Assessment

7. NET BENEFIT TEST

When estimating benefits to the community, the Net Benefit Test should:

- Detail what benefit will occur due to the proposed development.
- Use existing data and standards to measure the size of the benefit and how important it will be to the community.
- Identify those in the community who will be likely to experience the benefit.
- Estimate how many individuals are expected to experience the benefit.
- Describe the degree of change expected due to the benefit.
- Determine the expected duration for which stakeholders are expected to experience the benefit.

SPP4.2 provides a guide to estimating/measuring the net benefit to the community including:

7.1 Employment

Will the proposal provide new jobs in addition to any that may be lost elsewhere – net additional jobs?

The proposed activity has the potential to create up to 205 Full Time Equivalent jobs including 85 in the shopping precinct and 120 in the bulky goods showroom precinct.

FIGURE 22

TOTAL EMPLOYMENT OPPORTUNITIES

PLUC	Activity Type	Floor space (sqm NLA)	Ratio (FTE jobs/sqm)	FTE Jobs
PLUC 5	Shops	3,400	40	85
PLUC 6	Bulky Goods/Showroom	9,600	80	120
Combined		**13,000**	**63**	**205**

Land Use and Employment Survey (WAPC 2017)

Will the proposed activity contribute to diversifying local jobs – creating more strategic employment versus population-driven employment?

Will the proposal have the potential to improve access to economic opportunity for minority and vulnerable groups?

Employment in shop and bulky goods activity typically attracts residents which fit the following:

- Female labour force
- Part time labour force
- Young adult labour force
- Local labour force
- Labour force without access to a motor vehicle

Attachment 12.1.6 Retail Assessment

Gender	Employment Sector	
	Total Retailing	All Sectors
Male Employees	34%	43%
Female Employees	66%	57%
All Employees	100%	100%

The proposed activity is conducive to the female employment labour force. Females on average represent 66% of all retail related jobs compared to 57% for all job sectors.

Employment Status	Employment Sector	
	Total Retailing	All Sectors
Full Time Employment	38%	54%
Part time Employment	62%	46%
All Employment	100%	100%

The proposed activity is conducive to the part time employment labour force. Part time employees represent 62% of all retail related jobs compared to 46% for all job sectors.

Age of Employee	Employment Sector	
	Total Retailing	All Sectors
15-19 years	19%	9%
All Ages	100%	100%

The proposed activity is conducive to young adults in the labour force. Young adults represent 19% of all retail related jobs compared to 9% for all job sectors.

Distance Travelled	Employment Sector	
	Total Retailing	All Sectors
less than 2.5 km	15%	10%
2.5 km - 10 km	42%	32%
All Distances	100%	100%

The proposed activity is conducive to residents who live within 2.5 km of the proposed activity. 15% of all residents in retail related jobs on average travel up to 2.5km from their home compared to 10% for all job sectors.

Travel Mode	Employment Sector	
	Total Retailing	All Sectors
Car, as passenger	9%	6%
Bicycle	1%	0%
Walked only	2%	2%
Walked, Cycled, Passenger	11%	8%
All Modes	100%	100%

The proposed activity is conducive to residents who do not have ready access to motor vehicle for travel to work. 11% of residents working in the retail sector cycle, walk or travel by passenger to work compared to 8% for all job sectors.

The impact assessment shows that all activity centres in the network have the potential to increase sales and subsequently not need to reduce employment levels. The proposed local centre is therefore expected to provide new local jobs for residents.

Attachment 12.1.6 Retail Assessment

7.2 Impact

How is the proposal expected to impact upon the current and expected turnover and role of relevant activity centres?

The proposed activity is estimated to have an initial low / insignificant risk to activity centres in the network. Any impacts on these activity centres are likely to be temporary and have no long-term effects on the viability of individual activity centres. The initial impacts to activity centres are expected to be offset by future growth in sales from resident and spending growth.

Will the proposal increase the choice and availability of goods and services in the area?

Retail modelling confirms that the residents in Ascot and Belmont are the communities most likely to experience the benefit from the proposed activity. Residents in Ascot and Belmont are estimated to account for 60% of total sales / trips at the proposed activity confirming the importance of the proposed activity to these residents.

Ascot and Belmont trade area currently comprise 11,000 residents. Ascot and Belmont trade area resident population base will grow to 16,400 residents by 2041. Despite this population profile, residents in Ascot do not currently have access to a full line supermarket-based centre within 2.5 km. Ascot residents must therefore travel up to 2.5 km each way (5 km round trip) every time they access their full line supermarket needs.

The introduction of the proposed activity will fill an identified gap in the supply and demand of convenience-based activity in the Ascot and Belmont area.

7.3 Impact on Activity Centre Hierarchy

Retail modelling confirm that the proposed activity centre is sufficiently sized, located and configured to satisfy the local trade area needs without impinging on the trading potential of other centres. And that the proposed centre will not have a significant or long-term impact on any of the individual activity centres modelled as part of the centres network.

It therefore follows that the proposed activity centre will not create any unreasonable or detrimental impact on the role and function of the activity centre hierarchy and framework in the trade area.

All centres will have the opportunity to compete for the additional retails sales available through the increased retail spending capacity planned in the trade area. It will be up to each of the centres and their respective operators in the existing and planned network to establish plans and strategies to target that additional retail spending capacity.

The forecast population growth in the trade area will ultimately create the potential for all centres in the network to achieve an average increase in sales of between 1% and 3% per annum over the period between 2026 and 2041. This average sales growth will further offset the immediate impact experienced from the introduction of the proposed activity.

7.4 Compatibility

Is the proposal compatible with surrounding land uses?

The proposed activity will introduce proposed activity in the middle of a trade area which contains 11,000 – 16,400 residents within a 1.5 km radius of the proposed activity. This resident population is a significant base for a supermarket-based centre.

7.5 Environment

Will there be an improvement in the level of amenity and vibrancy that benefits the wider community? Will the proposal include land uses such as healthcare, education, and community facilities? Will the proposal have an impact on overall vehicle trips? Will car-based net trips (by distance) increase or reduce because of the proposal?

The proposed activity has the potential to create a community hub for the Ascot and Belmont communities. increasing a sense of place for residents. The proposed activity does not in itself create these facilities. However, some of these facilities will likely be attracted to the area because of the introduction of the proposed activity.

The proposed activity has the potential to reduce the amount of trip kilometres that Ascot and Belmont residents must travel each year to satisfy their daily/weekly shopping needs. As stated, the Ascot and Belmont resident population base represents 11,000 growing to 16,400 residents who will benefit directly from the proposed activity. Ascot and Belmont residents therefore have the potential to:

- reduce the amount of trip kilometres that Ascot and Belmont residents must travel each year to satisfy their daily/weekly shopping needs.
- save over 530,000 to 700,000 trips p.a. to centres outside their trade area
- save between 40 and 50 trips per person per annum.
- save between 2.7 M km p.a. and 3.5 M km p.a. of vehicular travel per annum

7.6 Infrastructure

Is there significant government investment in services, infrastructure or development in the area or nearby centres that may be affected by the proposal? Will the proposal impact patronage/viability of the investment and what is the expected impact? Will the proposal include new, or improvements to existing transport infrastructure, particularly walking, cycling and public transport, that increases access and helps manage congestion? Will the proposal include enhancements to utilities that benefit the local area?

As previously stated, the proposed activity has the potential to significantly reduce the number of trips/trip km by residents especially for residents in Ascot and Belmont. Residents in these areas will be far more likely to walk to the proposed activity than their current trip patterns to supermarket-based centres over 2 km from the proposed activity. The proposed activity has the potential to generate demand for enhancements to community and non-retail related to services in the local area.

7.7 Strategic Alignment

Is the proposal consistent with the strategic planning for the area? Is it aligned with the relevant regional strategy and approved local planning strategy? Is the size and scale of the proposal consistent with the level of the hierarchy? What are the potential impacts on the activity centre hierarchy? Is the proposal consistent with the objectives and outcomes of SPP 4.2?

The proposed activity is classified as a planned centre in an adopted planning instrument. The proposed activity is a size, scale, function, and role that is consistent with and complements the overall activity centre hierarchy. The proposed local centre activity is consistent with the City of Belmont's Activity Centre Planning strategy.

The proposed activity will not have a significant impact on any of the activity centres in the network. The proposed activity does not have the potential to result in the loss of or change the role and function of any activity centre in the network. As such the proposed activity is not have the potential to have any impact or change to the activity centre hierarchy.

The Net Benefit Test confirms that the proposed activity satisfies the criteria for assessing the benefits to the community and is therefore consistent with the objectives and outcomes of SPP4.2.

Attachment 12.1.7 Transportation Noise Assessment

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Transportation Noise Assessment

Ascot Racecourse Structure Plan

Reference: 23118540-01

Prepared for:
Perth Racing C/- Davison Advisory Services

Attachment 12.1.7 Transportation Noise Assessment

Reference: 23118540-01

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This report has been prepared in accordance with the scope of services described in the contract or agreement between Lloyd George Acoustics Pty Ltd and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client, and Lloyd George Acoustics Pty Ltd accepts no responsibility for its use by other parties.

Date	Rev	Description	Author	Verified
16-Nov-23	0	Issued to Client	Terry George	-

Attachment 12.1.7 Transportation Noise Assessment

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Attachment 12.1.7 Transportation Noise Assessment

1. INTRODUCTION

A Local Structure Plan (LSP) and Scheme Amendment are being prepared for landholdings in Ascot, referred to as the Ascot Racecourse Structure Plan (refer *Figure 1-1*). Parts of the site will be potentially impacted by road traffic noise, being the subject of this report, with consideration given to *State Planning Policy No. 5.4 Road and Rail Noise*, being the subject of this report.

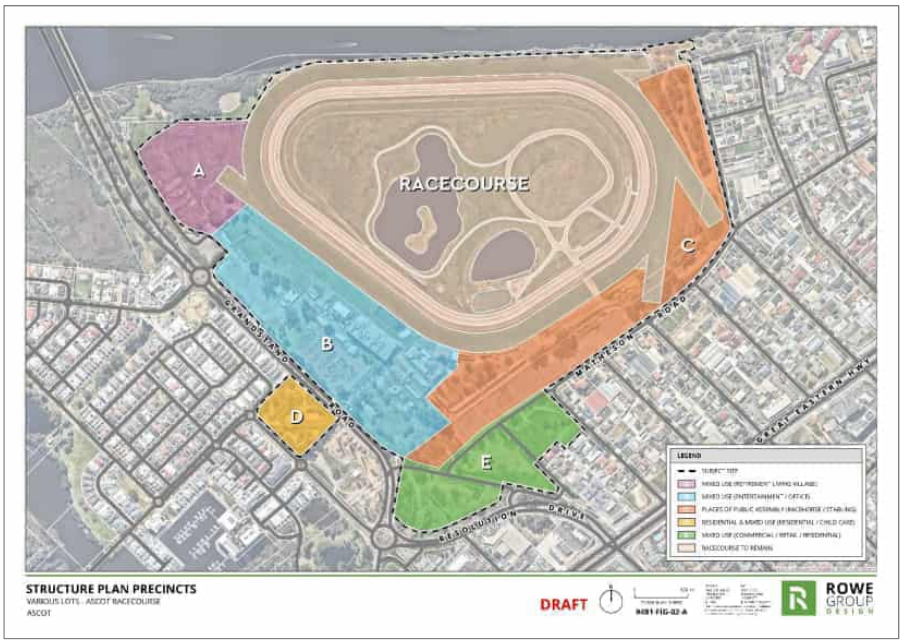


Figure 1-1: Structure Plan Precincts

Appendix B contains a description of some of the terminology used throughout this report.

2. CRITERIA

The criteria relevant to this project is provided in *State Planning Policy No. 5.4 Road and Rail Noise* (hereafter referred to as SPP 5.4) produced by the Western Australian Planning Commission (WAPC). SPP 5.4 is supported by the *Road and Rail Noise Guidelines* (the Guidelines) and the Department of Planning, Lands and Heritage mapping. The objectives of SPP 5.4 are to:

- Protect the community from unreasonable levels of transport noise;
- Protect strategic and other significant freight transport corridors from incompatible urban encroachment;
- Ensure transport infrastructure and land-use can mutually exist within urban corridors;
- Ensure that noise impacts are addressed as early as possible in the planning process; and
- Encourage best practice noise mitigation design and construction standards.

Table 2-1 sets out noise targets that are to be achieved by proposals under which SPP 5.4 applies. Where the targets are exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

Table 2-1: Noise Targets for Noise Sensitive Land-Use

Scenario	Outdoor Noise Target		Indoor Noise Target	
Noise-sensitive land-use and/or development	55 dB $L_{Aeq(Day)}$	50 dB $L_{Aeq(Night)}$	40 dB $L_{Aeq(Day)}$ (Living and Work Areas)	35 dB $L_{Aeq(Night)}$ (Bedrooms)

Notes:

- Day period is from 6am to 10pm and night period from 10pm to 6am.
- The outdoor noise target is to be measured at 1-metre from the most exposed, habitable[1] facade of a noise sensitive building.
- For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 *Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* (as amended) for each relevant time period.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practicable to do so using the various noise mitigation measures outlined in the Guidelines.

The application of SPP 5.4 is to consider anticipated traffic volumes for the next 20 years from when the noise assessment has been undertaken.

[1] *A habitable room is defined in State Planning Policy 3.1 as a room used for normal domestic activities that includes a bedroom, living room, lounge room, music room, sitting room, television room, kitchen, dining room, sewing room, study, playroom, sunroom, gymnasium, fully enclosed swimming pool or patio.*

3. METHODOLOGY

The site is within the trigger distance of Great Eastern Highway, considered to be a 'Strategic Freight/Major Traffic Route' as shown on the PlanWA Maps (refer *Table 1-1* and *Figure 3-1*).

Table 3-1: Transport Corridor Classification and Trigger Distances

Transport Road Classification	Trigger Distance	Distance Measured From
Strategic Freight and Major Traffic Routes Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume	300 metres	Road carriageway edge
Other Significant Freight/Traffic Routes These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meets the criteria of either ≥ 100 Class 7 to 12 Austroads vehicles daily or ≥ 23,000 daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)	200 metres	Road carriageway edge



Figure 3-1: Subject Site Locality in Relation to Road (Source: DPLH PlanWA)

The methodology used in this assessment is to follow the screening assessment procedure provided in the Guidelines. From *Table* 2 of the Guidelines (refer *Figure 3-2*), noise levels at the proposed site are up to 58 dB $L_{Aeq(Day)}$, with Great Eastern Highway being a total of 6 lanes and at its closest point at a distance of 130 metres.

The forecast levels provided in the Guidelines assume open and level ground. The Guidelines allow a 4 dB reduction in noise level where:

- an existing building or structure screens more than 50% of the most exposed part of the noise-sensitive land-use; or
- where a solid continuous minimum 1.8 metre noise wall/fence exists or is proposed; or
- through a combination of permanent structures and terrain so there is no direct line of sight.

In this project, the 4 dB reduction is applicable to the ground floor due to other buildings located between the subject site and road corridor.

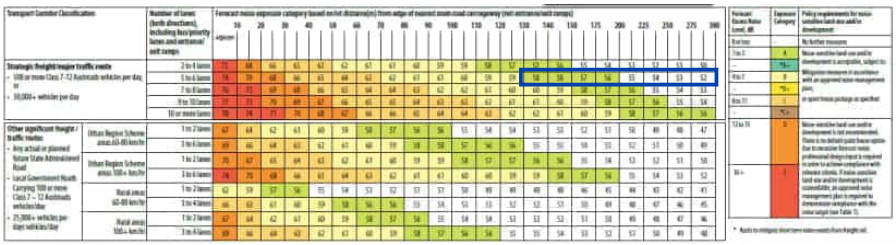


Figure 3-2: Noise Exposure Forecast Table from Guidelines

4. RESULTS

The results of the screening assessment are summarised as follows:

- Zone E is within 200 metres of Great Eastern Highway;
- Zone E is mixed use and therefore may have some noise sensitive (residential) uses subject to compliance with SPP 5.4;
- Zone E is no closer than 130 metres to Great Eastern Highway placing parts within Exposure A:
  - Due to the screening effect of existing buildings, any ground floor noise sensitive uses would be compliant with the outdoor noise target; and
  - Noise sensitive uses above ground floor and within 200 metres of Great Eastern Highway would be subject to Package A (refer *Appendix A*), including a notification on title. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available.



Figure 4-1: Exposure Levels to Upper Floors of Noise Sensitive Buildings

5. CONCLUSION

The objectives of SPP 5.4 are to achieve:

- Indoor noise levels specified in *Table 2-1* in noise-sensitive areas (e.g. bedrooms and living rooms of houses); and
- A reasonable degree of acoustic amenity for outdoor living areas on each residential lot.

Where the outdoor noise targets of *Table 2-1* are achieved, no further noise controls are necessary. Based on the SPP 5.4 screening assessment procedure, any part of the development outside of 200 metres is compliant. Any ground floor noise sensitive development within 200 metres is also compliant.

The only area of potential exceedance, based on the screening assessment procedure of SPP 5.4 are upper residential floors within Zone E where a small area is shown to be in Exposure A. As the Structure Plan develops further, measurements could be undertaken to quantify actual noise levels from Great Eastern Highway, rather than using the screening assessment procedure. Alternatively given the relatively low impact, the screening assessment procedure can be adopted, applying Quiet House Package A to upper floors of noise sensitive dwellings within the marked area on *Figure 4-1*. Alternatives to the Deemed to Comply Package A can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific plans are available

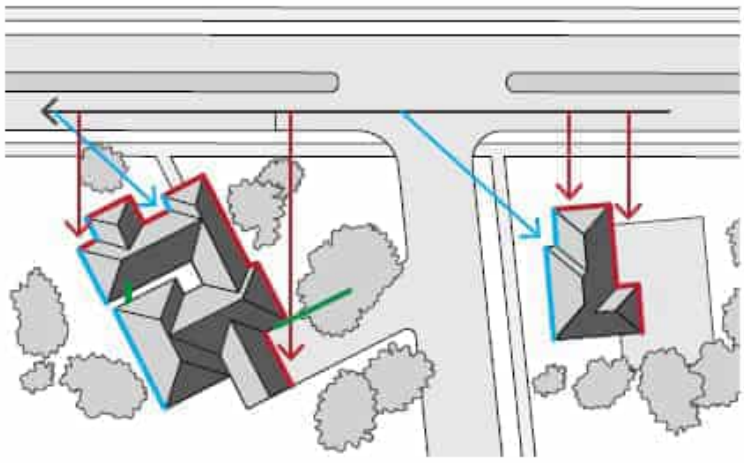
Appendix A – Quiet House Packages

The packages and information provided on the following pages are taken from *Road and Rail Noise Guidelines* (September 2019).

Where outdoor and indoor noise levels received by a noise-sensitive land-use and/or development exceed the policy's noise target, implementation of quiet house requirements is an acceptable solution.

With regards to the packages, the following definitions are provided:

- **Facing** the transport corridor (red): Any part of a building façade is 'facing' the transport corridor if any straight line drawn perpendicular (at a 90 degree angle) to its nearest road lane or railway line intersects that part of the façade without obstruction (ignoring any fence).
- **Side-on** to transport corridor (blue): Any part of a building façade that is not 'facing' is 'side-on' to the transport corridor if any straight line, at any angle, can be drawn from it to intersect the nearest road lane or railway line without obstruction (ignoring any fence).
- **Opposite** to transport corridor (green): Neither 'side on' nor 'facing', as defined above.



Quiet House Package A

56-58 dB $L_{Aeq(Day)}$ & 51-53 dB $L_{Aeq(Night)}$

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	• Up to 40% floor area ($R_w + C_{tr} \geq 28$): – Sliding or double hung with minimum 10mm single or 6mm-12mm-10mm double insulated glazing; – Sealed awning or casement windows with minimum 6mm glass. • Up to 60% floor area ($R_w + C_{tr} \geq 31$): – Sealed awning or casement windows with minimum 6mm glass.	• Up to 40% floor area ($R_w + C_{tr} \geq 25$): – Sliding or double hung with minimum 6mm single or 6mm-12mm-6mm double insulated glazing; • Up to 60% floor area ($R_w + C_{tr} \geq 28$); • Up to 80% floor area ($R_w + C_{tr} \geq 31$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	No specific requirements	
External Doors	Facing	• Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.	• Doors to achieve $R_w + C_{tr} \geq 25$: – 35mm Solid timber core hinged door and frame system certified to R_w 28 including seals; – Glazed sliding door with 10mm glass and weather seals.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less.	
	Opposite	No specific requirements	
External Walls	All	• $R_w + C_{tr} \geq 45$: – Two leaves of 90mm thick clay brick masonry with minimum 20mm cavity; or – Single leaf of 150mm brick masonry with 13mm cement render on each face; or – One row of 92mm studs at 600mm centres with: ▪ Resilient steel channels fixed to the outside of the studs; and ▪ 9.5mm hardboard or fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside; ▪ 75mm thick mineral wool insulation with a density of at least 11kg/m³; and ▪ 2 x 16mm fire-rated plasterboard to inside.	
Roofs and Ceilings	All	• $R_w + C_{tr} \geq 35$: • Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard.	
Outdoor Living Areas		At least one outdoor living area located on the opposite side of the building from the transport corridor or at least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum 2 metres height above ground level.	

Mechanical Ventilation requirements

In implementing the acceptable treatment packages, fresh air requirements of the National Construction Code must be satisfied on the basis of windows closed. Whilst not the only solution, the most common is mechanical ventilation / air-conditioning is installed with the following considerations:

- Acoustically rated openings and ductwork to provide a minimum sound reduction performance of R_w 40 dB into sensitive spaces;
- Evaporative systems require attenuated ceiling air vents to allow closed windows;
- Refrigerant based systems need to be designed to achieve National Construction Code fresh air ventilation requirements;
- Openings such as eaves, vents and air inlets must be acoustically treated, closed or relocated to building sides facing away from the corridor where practicable.

Notification

Notifications on title advise prospective purchasers of the potential for noise impacts from major transport corridors and help with managing expectations.

The Notification is to state as follows:

This lot is in the vicinity of a transport corridor and is affected, or may in the future be affected, by road and rail transport noise. Road and rail transport noise levels may rise or fall over time depending on the type and volume of traffic.

Appendix B – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A, dB.

- **L_{eq}**

The L_{eq} level represents the average noise energy during a measurement period.

- **L_1**

The L_1 level represents the noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{10}**

The L_{10} level represents the noise level exceeded for 10 percent of the measurement period and is considered to represent the "intrusive" noise level.

- **L_{90}**

The L_{90} level represents the noise level exceeded for 90 percent of the measurement period and is considered to represent the "background" noise level.

- **$L_{Aeq(Day)}$**

The $L_{Aeq(Day)}$ level is the logarithmic average of the L_{Aeq} levels from 6.00am to 10.00pm.

- **$L_{Aeq(Night)}$**

The $L_{Aeq(Night)}$ level is the logarithmic average of the L_{Aeq} levels from 10.00pm to 6.00am.

- **$L_{A10,18hour}$**

The $L_{A10,18hour}$ level is the arithmetic average of the hourly L_{A10} levels between 6.00am and midnight.

- **$L_{Aeq,24hour}$**

The $L_{Aeq,24hour}$ level is the logarithmic average of the L_{Aeq} levels from over an entire day.

- **Noise-sensitive land use and/or development**

Land-uses or development occupied or designed for occupation or use for residential purposes (including dwellings, residential buildings or short-stay accommodation), caravan park, camping ground, educational establishment, child care premises, hospital, nursing home, corrective institution or place of worship.

- **R_w**

This is the weighted sound reduction index. It is a single number rating determined by moving a grading curve in integral steps against the laboratory measured transmission loss until the sum of the deficiencies at each one-third-octave band, between 100 Hz and 3.15 kHz, does not exceed 32 dB. The higher the R_w value, the better the acoustic performance.

- **C_{tr}**

This is a spectrum adaptation term for airborne noise and provides a correction to the R_w value to suit source sounds with significant low frequency content such as road traffic or home theatre systems. A wall that provides a relatively high level of low frequency attenuation (i.e. masonry) may have a value in the order of – 4 dB, whilst a wall with relatively poor attenuation at low frequencies (i.e. stud wall) may have a value in the order of -12 dB.

- **About the Term 'Reasonable'**

An assessment of reasonableness should demonstrate that efforts have been made to resolve conflicts without comprising on the need to protect noise-sensitive land-use activities. For example, have reasonable efforts been made to design, relocate or vegetate a proposed noise barrier to address community concerns about the noise barrier height? Whether a noise mitigation measure is reasonable might include consideration of:

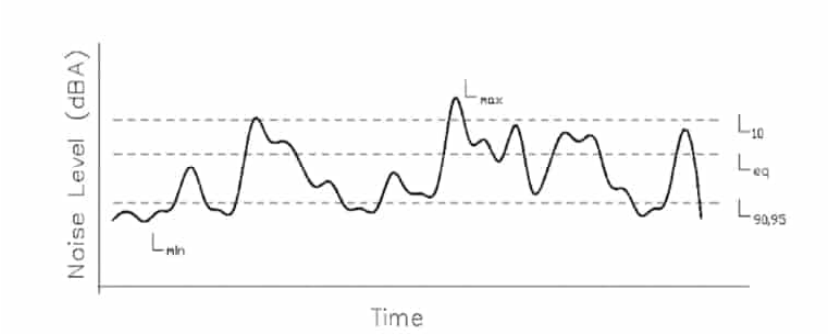
- The noise reduction benefit provided;
- The number of people protected;
- The relative cost vs benefit of mitigation;
- Road conditions (speed and road surface) significantly differ from noise forecast table assumptions;
- Existing and future noise levels, including changes in noise levels;
- Aesthetic amenity and visual impacts;
- Compatibility with other planning policies;
- Differences between metropolitan and regional situations and whether noise modelling requirements reflect the true nature of transport movements;
- Ability and cost for mobilisation and retrieval of noise monitoring equipment in regional areas;
- Differences between Greenfield and infill development;
- Differences between freight routes and public transport routes and urban corridors;
- The impact on the operational capacity of freight routes;
- The benefits arising from the proposed development;
- Existing or planned strategies to mitigate the noise at source.

- **About the Term 'Practicable'**

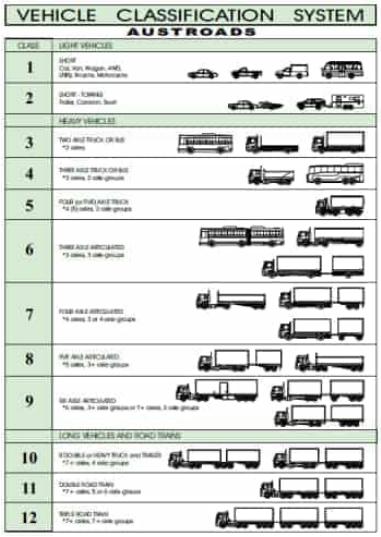
'Practicable' considerations for the purposes of the policy normally relate to the engineering aspects of the noise mitigation measures under evaluation. It is defined as "reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge" (*Environmental Protection Act 1986*). These may include:

- Limitations of the different mitigation measures to reduce transport noise;
- Competing planning policies and strategies;
- Safety issues (such as impact on crash zones or restrictions on road vision);
- Topography and site constraints (such as space limitations);
- Engineering and drainage requirements;
- Access requirements (for driveways, pedestrian access and the like);
- Maintenance requirements;
- Bushfire resistance or BAL ratings;
- Suitability of the building for acoustic treatments.

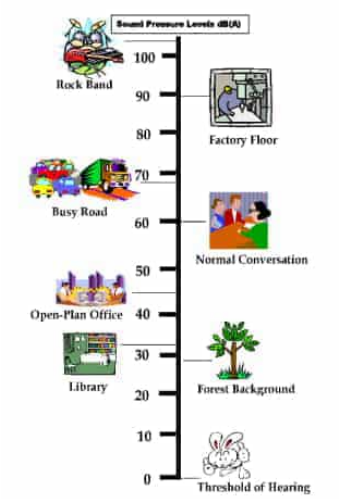
- **Chart of Noise Level Descriptors**



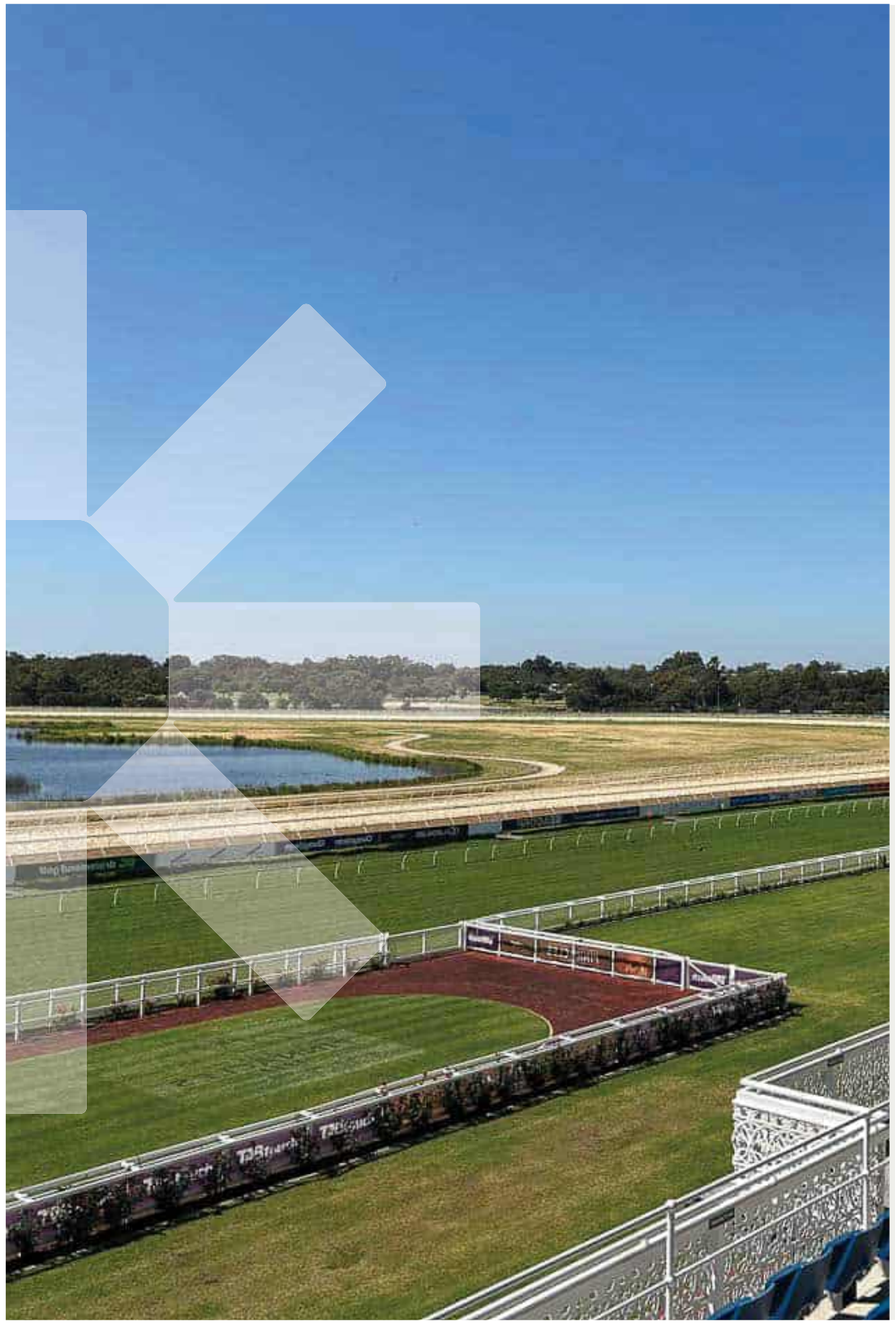
- **Austroads Vehicle Class**



- **Typical Noise Levels**



Attachment 12.1.8 Landscape Master Plan



Ascot Racecourse Local Structure Plan

Landscape Master Plan

FOR: Davison Advisory Services

SLR PROJECT No: 675.072227.00001

ISSUE 0.2 7th August 2024

SLR

Attachment 12.1.8 Landscape Master Plan

Document No.

675.072227.00001 Ascot Racecourse Structure Plan

Revision History

Revision	Revision Date	Details	Drawn By	Authorised by
0.1	June 2024	Draft for Review	Dallas Ellis	Dean Butcher
0.2	August 2024	Submission	Dallas Ellis	Dean Butcher



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Front Cover Image: © SLR Consulting

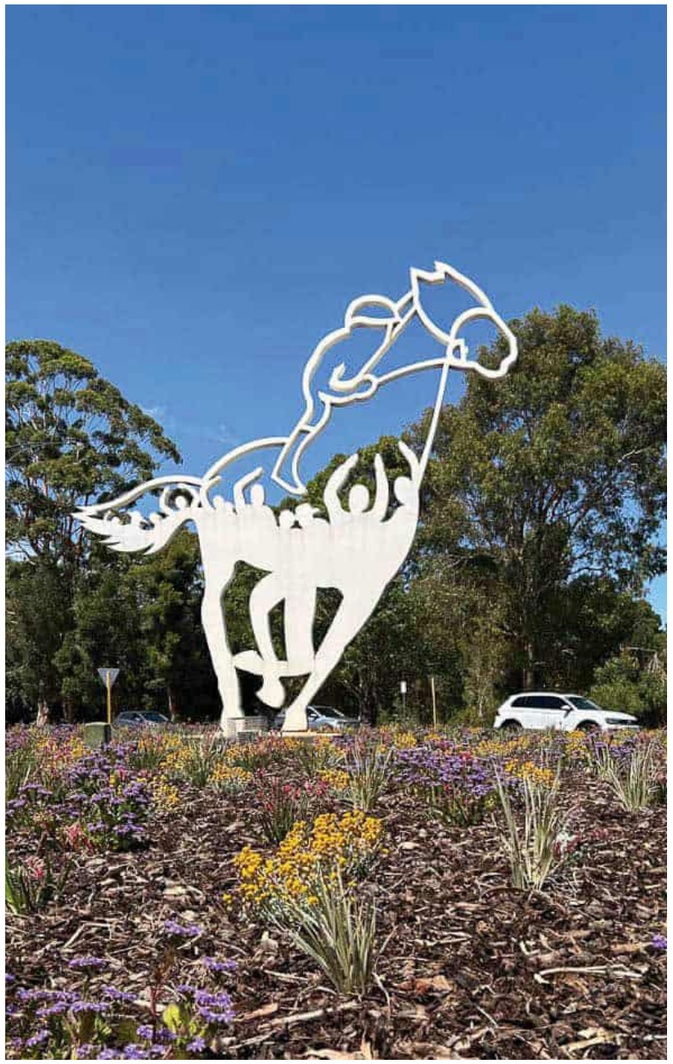


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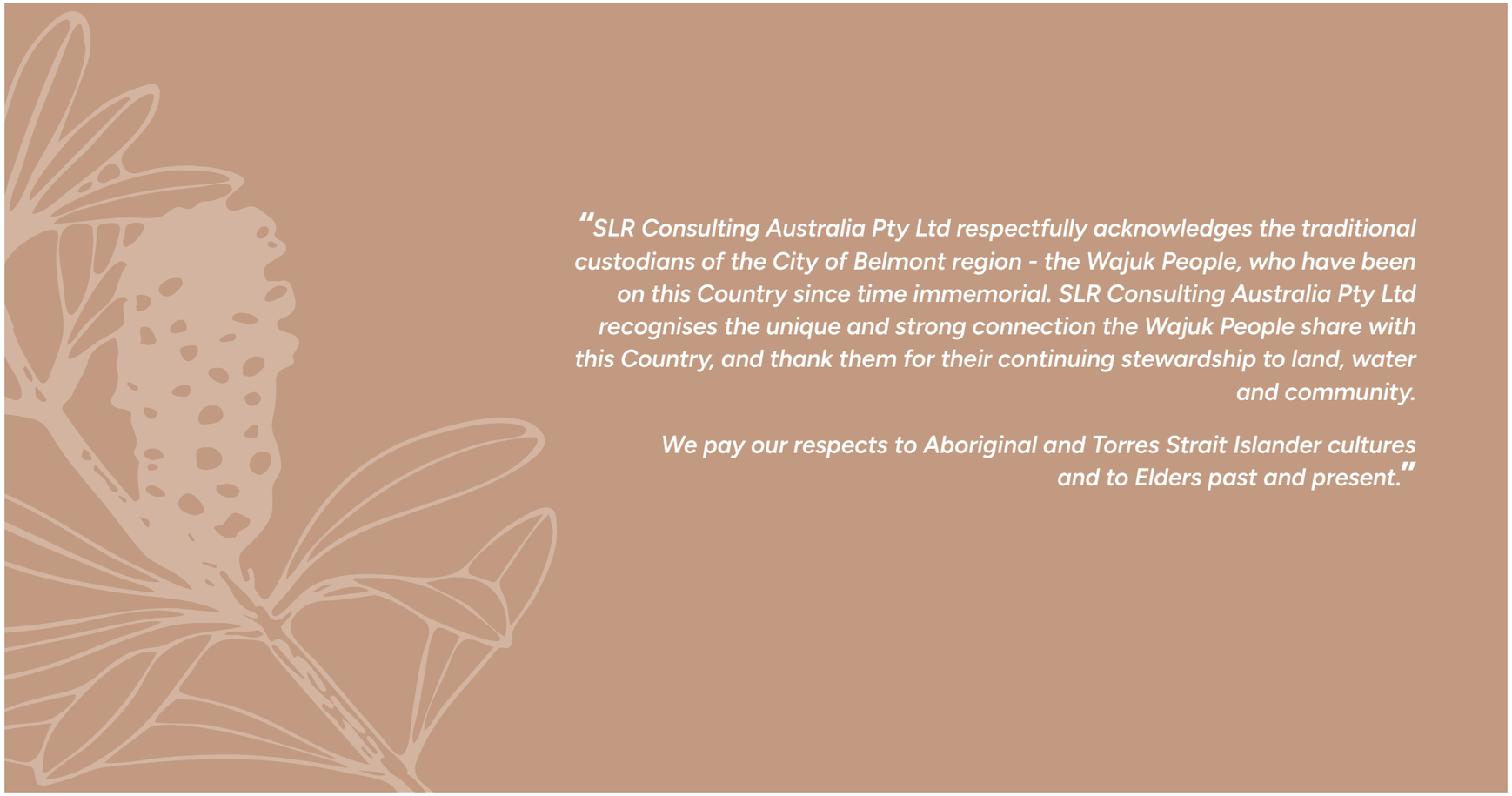
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Acknowledgment of Country



"SLR Consulting Australia Pty Ltd respectfully acknowledges the traditional custodians of the City of Belmont region - the Wajuk People, who have been on this Country since time immemorial. SLR Consulting Australia Pty Ltd recognises the unique and strong connection the Wajuk People share with this Country, and thank them for their continuing stewardship to land, water and community.

We pay our respects to Aboriginal and Torres Strait Islander cultures and to Elders past and present."

1. Background

SLR Consulting Australia Pty Ltd (SLR) has been commissioned on behalf of Perth Racing to prepare a Landscape Master Plan for Perth Racing's landholdings in Ascot, including and surrounding the existing Ascot Racecourse.

Perth Racing's landholdings encompass the area bound by the Swan River to the north, the Ascot Stables area and Matheson Road to the east and south-east, Resolution Drive to the south and south-west, and Grandstand Road to the west.

The Landscape Master Plan supports the Ascot Racecourse Structure Plan prepared to guide the future use and development of Perth Racing's landholdings. The plan establishes a vision and objectives for the Precinct, and identifies design response opportunities to achieve the intended landscape outcomes for the site.



LEGEND

1. Riverside Gardens
2. Garratt Road Bridge park
3. Garratt Road Bridge
4. Ascot Racecourse Entry
5. Heritage Listed Ascot Brickworks
6. Ascot Waters Park, Memorial Drive
7. Member's Carpark Entry

2. Process



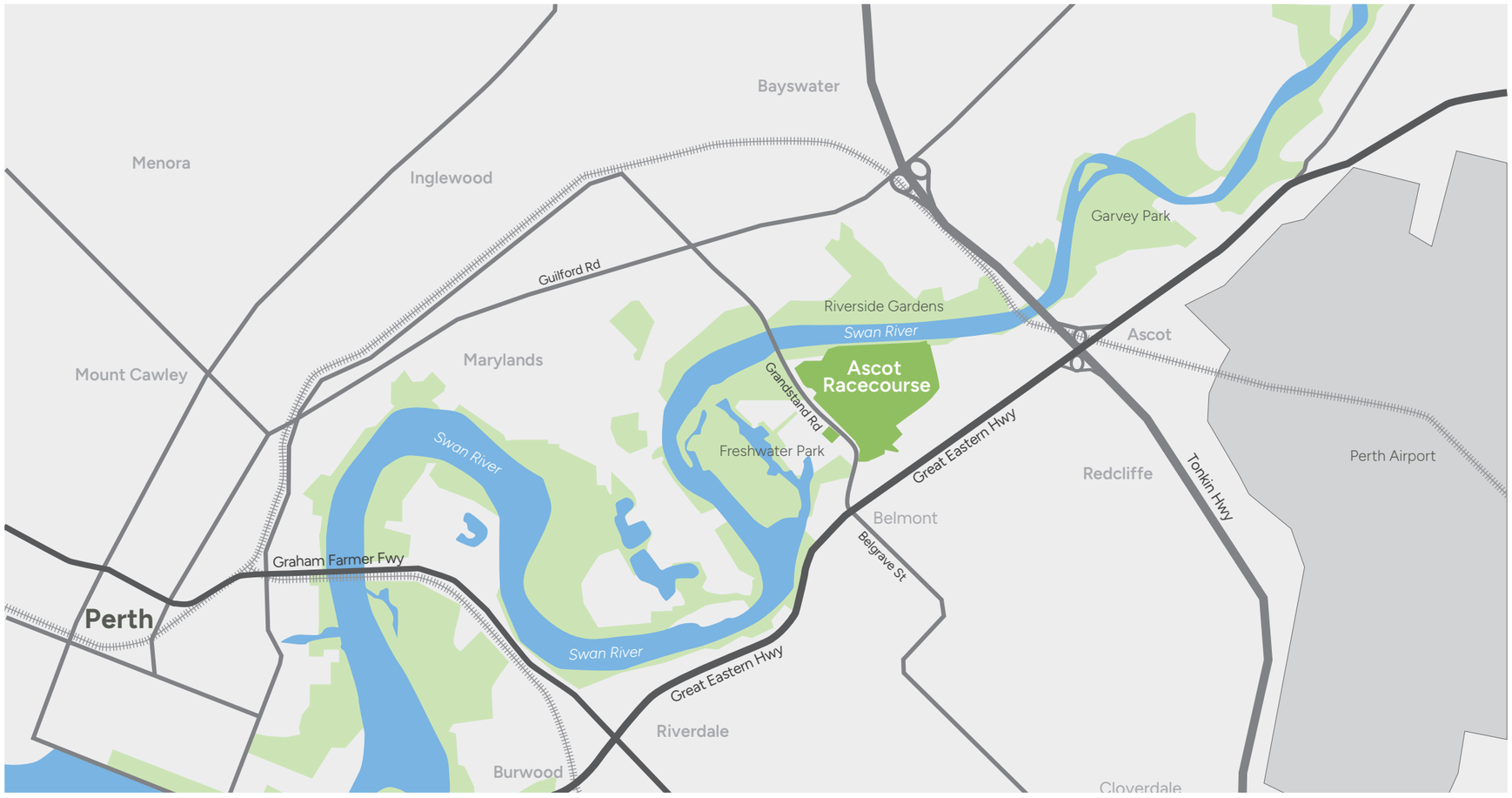
Image: © SLR Consulting

Attachment 12.1.8 Landscape Master Plan



Image: © SLR Consulting

3. Location & Context



4. Existing Situation

The existing elements within the site and its immediate surrounds define the local Visual Environment. This includes natural elements such as vegetation, built form elements including:

Legibility

- Prominent areas of the site feel detached from its surrounds both visually and physically as a result of fencing and vegetation
- Entry points generally have a low level of visibility and legibility
- 'Ascot Racecourse' sign and views into the site are not clearly visible from the roundabout on Grandstand Road which results in reduced legibility
- Broader racecourse land especially to the east feel detached from the site
- Entry points are marked by piers and structures, reflecting traditional elements and materials used through the site in built form
- The well-defined vegetated edge along Grandstand Road enhances the site's legibility and character
- A variety of fencing styles and hoarding along Grandstand Road detract from the character of the racecourse

Visibility

- Views into the Racecourse and the open areas are obscured by low-level hedging and hoarding signs.
- Views and visibility of main corner from the roundabout is poor
- The corner 'Ascot Racecourse' sign is obscured by shrubs









Images: © SLR Consulting

Character

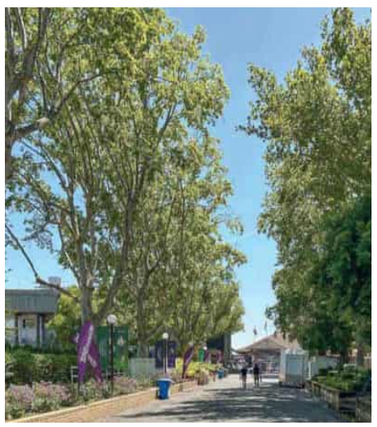
- General
  - Natural forms such as the existing vegetation is juxtaposed against the 'historical racecourse design'
  - Mix of built form styles and materials
  - High quality features such as open space areas, feature trees and historical structures create a strong identity within the racecourse however this character is less evident around it's edges and at entry points.
  - The racecourse has a 'village' feel around the open bar areas created by the shade and laneways
  - Large areas of open pavement car parks visible from Grandstand Road and Matheson Road are hot and uninteresting
  - The combination of 'equine' character elements such as post and rail fencing, grass areas and formal planting promote a racecourse feel within the site
- Materials
  - The red bricks and brickwork used throughout the site is a prominent element used within the site and which is reinforced by the materiality across Granstand Road at the Ascot Kilns site
  - Terra cotta tiles gable roofs complement the brick elements around the site
  - Brick piers with stone capping are traditional elements used along boundaries and within the site
  - Brick patterning in pavements – checker board pattern
  - Entry structures/ admission points utilise traditional built form theming
  - Open/ permeable fencing varies in materiality around the site
  - Timber lattice work and wrought iron balustrading are detailed features elements used on the entry structures and within the built form
  - Broader areas of pavement can vary in appearance, quality and finish such as larger areas of bitumen outside of feature paving
  - Steel and brickwork reminiscent of historical periods in history

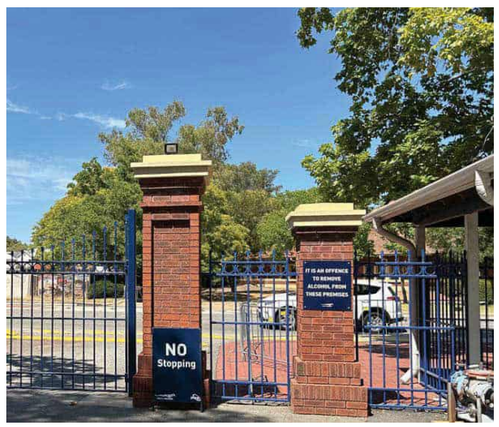












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Attachment 12.1.8 Landscape Master Plan

- Structures
  - Red brick with cream coloured plinths, lintels and capping
  - Pitched terra cotta tiled roofing
  - Detailing, façade colours and treatments, arches and architectural features are of high quality
- Vegetation
  - Large feature trees both native and exotic are scattered throughout the site
  - Large shade trees provide shade in public areas to complement the structures especially around the open grassed areas
  - Detailed low-level shrub and groundcover planting is a feature around key congregation areas and at entry points and which include a combination of native and exotic species







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ASCOT RACECOURSE 9

5. Key Character Elements

Key character elements are those elements that typically characterise the identity of the Ascot Racecourse and strengthen its sense of place.

Key character elements can be materials, patterns, vegetation, built form or symbols and should be and their use should be encouraged where appropriate to further reinforce the identity and character of the racecourse.

- Red Bricks used for pedestrian pavements, walls, piers and building elements
- Checkerboard patterning used in feature pedestrian areas
- Large feature trees planted in avenues at entry points
- Large shade and feature trees used in open park areas and open equine display areas
- Open fencing that reflects an rural-style or equine character, usually painted white









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6. Ascot Racecourse Identity

All future works within the Ascot Racecourse should reflect character elements as outlined in section 5 to strengthen its identity and character.

Whilst development will occur on the racecourse the ability to reflect the key character elements within the context of its equine and racing use and history, will act to positively reinforce its character and setting.

The identity of Ascot Racecourse is reflected in both spatial, physical and thematic elements.

Spatial

Open grassed areas - these primarily reflect the character of the racetrack and key outdoor function areas. Open function areas are further improved by feature specimen trees that provide shade and established character within the context of its open character.

Views and Visibility

Views of the feature open areas and significant structures from internal areas and areas external to the site.

Views of the racetrack along key pedestrian and vehicular axis.

Materiality

Materials characteristic of the racetrack are embodied in the red bricks of the area. The red bricks are a key element in the built form, pedestrian paved areas, landscaped walls and other external elements. The red bricks/ pavers and the distinct checkerboard patterning is evident at entry points and key external spaces.

Colours

Whilst the red colouration of the bricks stands out as the key colour element at and near ground level, this is also offset by the cream bricks and finishes. This light colour is a counterpoint to the red finish that is also reflected in the brick piers and capping along the perimeter and internal walls as well as on the colouration of the built form.

Planting

Planting takes a number of forms within the racecourse, but that which helps to define its identity is mainly around the feature specimens. This takes the forms of native Eucalypt species reflecting the native/ endemic character of the area, large non endemic feature trees and palms that reference the history of the use. Whilst the informality of planting within open spaces and plazas has a defined character, formal avenue planting with large specimens along entry paths, entrances and concourse areas also helps to define its character.

At a detailed level, formal shrubs, feature plants and annual gardens reflect the European history of the racecourse mainly around entry points.

7. Opportunities & Challenges

Opportunities

- Use the materials and patterning in the wider open space and landscape areas
- Create greater visibility or visual permeability into the site at key locations such as entry points
- Screen or reduce visibility into the site to areas such as car parks where visibility is currently very high
- Create a greater degree of legibility around entry points
- Strengthen feature vegetation at entry points
- Improve internal pedestrian legality throughout the site
- Use key character elements through all areas of the broader site to strengthen the identity and character instead of limiting it to around the main racing and grandstand area

Challenges

- Screening and limiting access to service areas and facilities
- Large areas of parking highly visible from Grandstand Road
- Creating visible linkages to racecourse from Grandstand Road
- Integrating future service and back-of-house uses









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Attachment 12.1.8 Landscape Master Plan



Image: © SLR Consulting

8. Landscape & Open Space Vision Statement



Image: © SLR Consulting

9. Landscape & Open Space Principles

The following Landscape Principles provide high level guidance around future development of Landscape and Open Space elements at the Ascot Racecourse. These are grouped under key topics relevant to the site, its uses and landscape outcomes.

Community

Create a safe and welcoming place where the comminty can use a range of facilities focused around the equine uses of the racecourse.

History and Culture

Recognise, and utilise the key historical, cultural and character elements within the design to strengthen its meaning and sense of place.

Sustainability

Utilise sustainable principles in the planning, design and implemetation of landscapes and open spaces.

Environment

Recognise inherent environmental and ecological values of the broader context of the site in strengthening the linkages and relationship of the racecourse to its surrounds.

Context and Linkages

Improve the legibility of the site by providing safe and functional connectivity to the site and within the site.

Open Space

Provide a range of open spaces within the site that cater for a diverse range of users and activities with a focus around the equine uses of the racecourse.

Economics

A place that provides a wide range of open spaces and outdoor uses in attracting the local community.

10. Landscape & Open Space Objectives

Landscape and Open Space Objectives provide further direction on how the Landscape Principles can be achieved through incorporating identified landscape elements into future works on site.

Community

- Incorporate programmable open spaces and recreational uses within the development to attract community users and to complement the existing racecourse uses.

Environment

- Utilise riparian plant species endemic to the Swan River within the Precincts, to reinforce the visual and landscape linkages to between the racecourse and the river.
- Where possible integrate sustainable practices into the racecourse planning and design of landscapes and open spaces.

Open Space

- Provide a feature recreation and open space area adjoining the racecourse that incorporates a range of recreational, play and community facilities.
- Provide programmable open space areas that integrate with the formal play and recreational elements and respond to annual/ season events.
- Utilise natural shade in open spaces and recreation areas to improve the amenity of the open spaces.

History and Culture

- Make reference within open spaces to historical and cultural values of the site and broader locality through the use of artwork and sculpture, plant species, and materials and finishes.
- Reinforce historical and cultural values of the site and its uses through signage and wayfinding that informs the community and provides a finer layer of detail and interest within the landscapes and open spaces.

Context and Linkages

- Provide safe and efficient linkages between the racecourse site and open space areas along the Swan River.
- Provide safe and legible pedestrian paths and vehicular access through the site that reinforces the pedestrian dual use areas.
- Provide shaded pathways throughout the site that reinforce the vegetated character of the site.

Economics

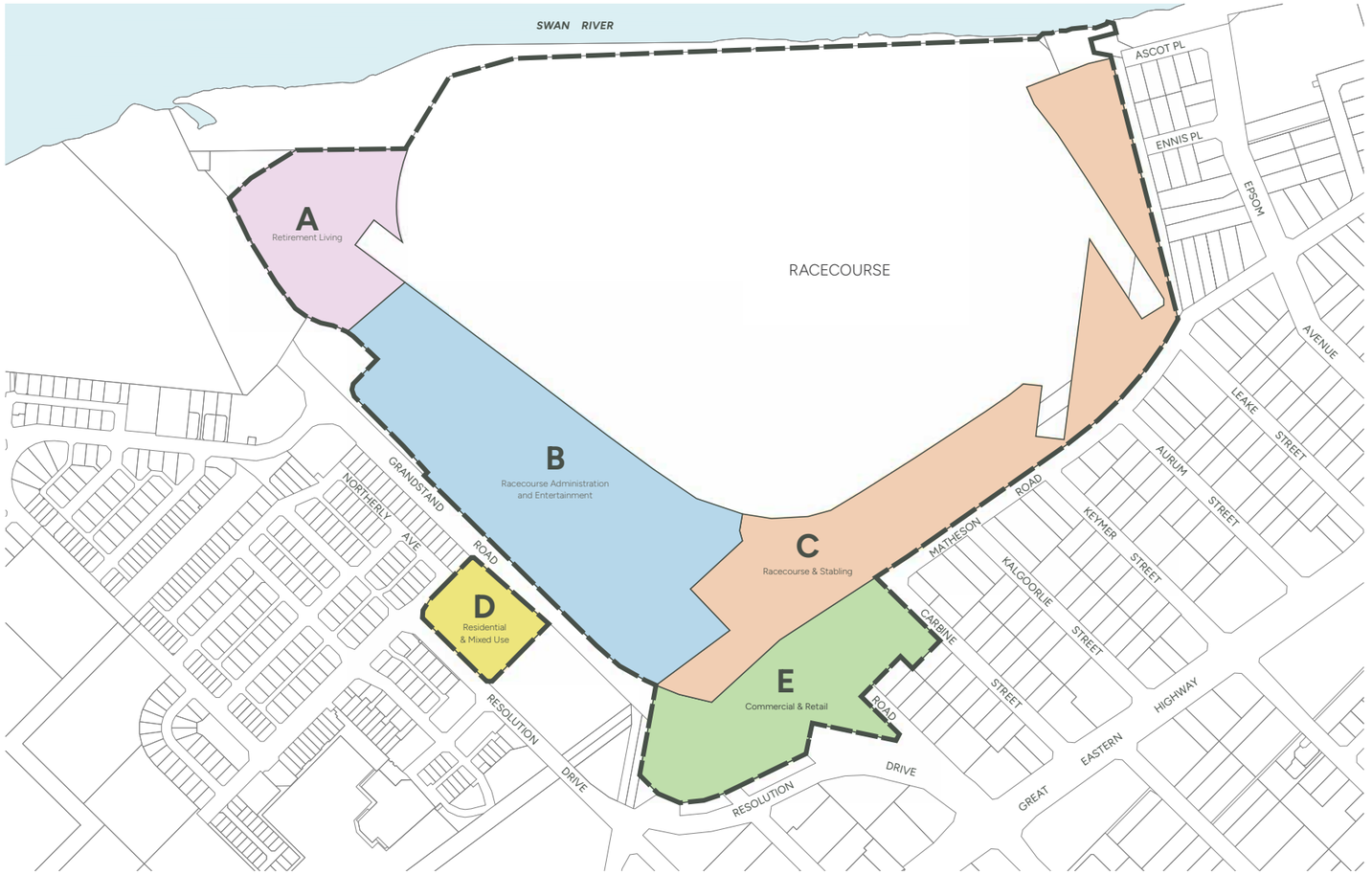
- Open space uses are to respond to the community needs and annual events of the racecourse.
- Landscapes are to be designed to to maximise efficiencies in maintenance and ongoing management, and utilise principles around water efficiency, efficient replacement and management.
- Design for landscapes and open spaces that can be efficiently maintained and managed in line with the current racecourse landscaped areas.

Attachment 12.1.8 Landscape Master Plan



Image: © SLR Consulting

11. Precincts



Attachment 12.1.8 Landscape Master Plan



11.1 Precinct A

Retirement Living

Precinct A is a highly visible area and arrival point into the City of Belmont when crossing the Garratt Road Bridge. It provides a visual link between the edges of the Swan River and the Ascot Racecourse. Its elevated location above the Swan River provides potential outlook opportunities to both this environment and the Ascot Racecourse.

- Interface with Swan River, Racecourse and Grandstand Road
- Flat open space with clear views of the race track
- No existing vegetation
- Separated from Grandstand Road by informal tree planting outside of the subject site boundary
- The precinct is very visible from Grandstand Road
- Separated from Swan River by Riparian edge vegetation, recreational path
- Limited views to river from ground level but potential for physical path links. Views from higher points in future development
- Limited views through from Grandstand Road and pedestrian path

Potentials

- Allow glimpses through future site development to the racecourse
- Glimpses through street trees to development
- Landscape to borrow from riparian vegetation along Swan River (species and character)
- Reinforce the character of the informal natural edge along Grandstand Road through planting design
- Retain glimpses to the Swan River from Grandstand Road
- Create links to other precincts by including key landmark species in planting palette that are used in Precinct B
- Create links to public walkways along Swan River
- Create outlooks to new public playgrounds in Precinct B - clear wayfinding from Waterway Crescent roundabout
- Create a "northern bookend" to the racecourse site
- Consideration of the Precinct A interface with the Swan River and foreshore areas given its proposed elevated location.
- Consideration of built form, scale and appearance and will require further material, vegetative screening and setback considerations to integrate with the appearance of the Swan River and minimise visual impacts.





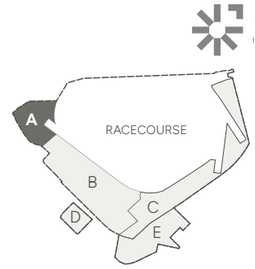


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Attachment 12.1.8 Landscape Master Plan



PRECINCT A ARRANGEMENT PLAN
1:2500 @ A3



LEGEND

- Site boundary
- Precinct boundary
- Entry sign focal point
- Enhanced entry point - vehicle / pedestrian
- Enhanced entry point - pedestrian
- Existing shaded pedestrian path along Swan River
- Enhanced vehicle / pedestrian link
- Key view lines
- Pedestrian links

1. Landscape to reflect / complement the riparian species of the Swan River foreshore
2. Grandstand Road interface planting. Informal tree and shrub planting along the edge to complement the existing public realm edge
3. Open space area that complements the character of the proposed parkland areas in Precinct B
4. Open landscapes allowing views to the racecourse and Swan River edge
5. Central communal space

NORTH

ASCOT RACECOURSE 21

Attachment 12.1.8 Landscape Master Plan



PRECINCT A INDICATIVE LAYOUT PLAN

11.2 Precinct B

Racecourse Administration & Entertainment

- Large precinct with existing established infrastructure
- Strong visitor focus
- 1 main vehicular entry point
- 1 major pedestrian entry point
- Limited views through from Grandstand Road to racecourse
- Grandstand and other structures highly visible from Grandstand Road
- Parking areas very visible and prominent from Grandstand Road
- Landmark/ feature vegetation very visible from Grandstand Road but does not maximise opportunities to either allow or screen views at appropriate points
- Carparks are open and not screened
- Fencing, planting and hoarding along southern part of Grandstand Road block views into key public areas of the racecourse from pedestrian paths and road
- Key views to the racecourse from Grandstand Road are obscured containers and 'back of house' elements
- Legibility generally poor along Grandstand Road

Potentials

- Create views through to key areas such as racecourse and open spaces from key entry points along Grandstand Road
- Limit views to car parks and 'back of house' areas through screening vegetation and quality fencing
- Promote shade in open areas such as car parks and future open space and community park areas
- Upgrade entry points to improve legibility and access to key areas in racecourse -pavement changes, vegetation, improved signage
- Upgrade interface/ presentation with Grandstand Road – high quality fencing
- Create a shaded, safe and legible pedestrian access system through a series of interconnected paths that complement the racecourse theming and promote movement through the site
- Provide a clear signage and wayfinding system throughout the site that complements the branding and character of the racecourse
- Provide a new Play and Recreation Hub
  - Playground – accessible to car park and pedestrian connections, shaded areas, themed, multi-age play equipment
  - Picnic Spaces – adjoining the playground feature, shaded picnic spaces in close proximity to the racecourse
- Minimise water usage in new landscape and open space use areas through
  - Minimising bore water usage (especially for ongoing grass maintenance),
  - Use of hardy drought tolerant species
  - Mulching to garden areas
  - Use of hard surface finishes where appropriate
  - Increased areas of planting



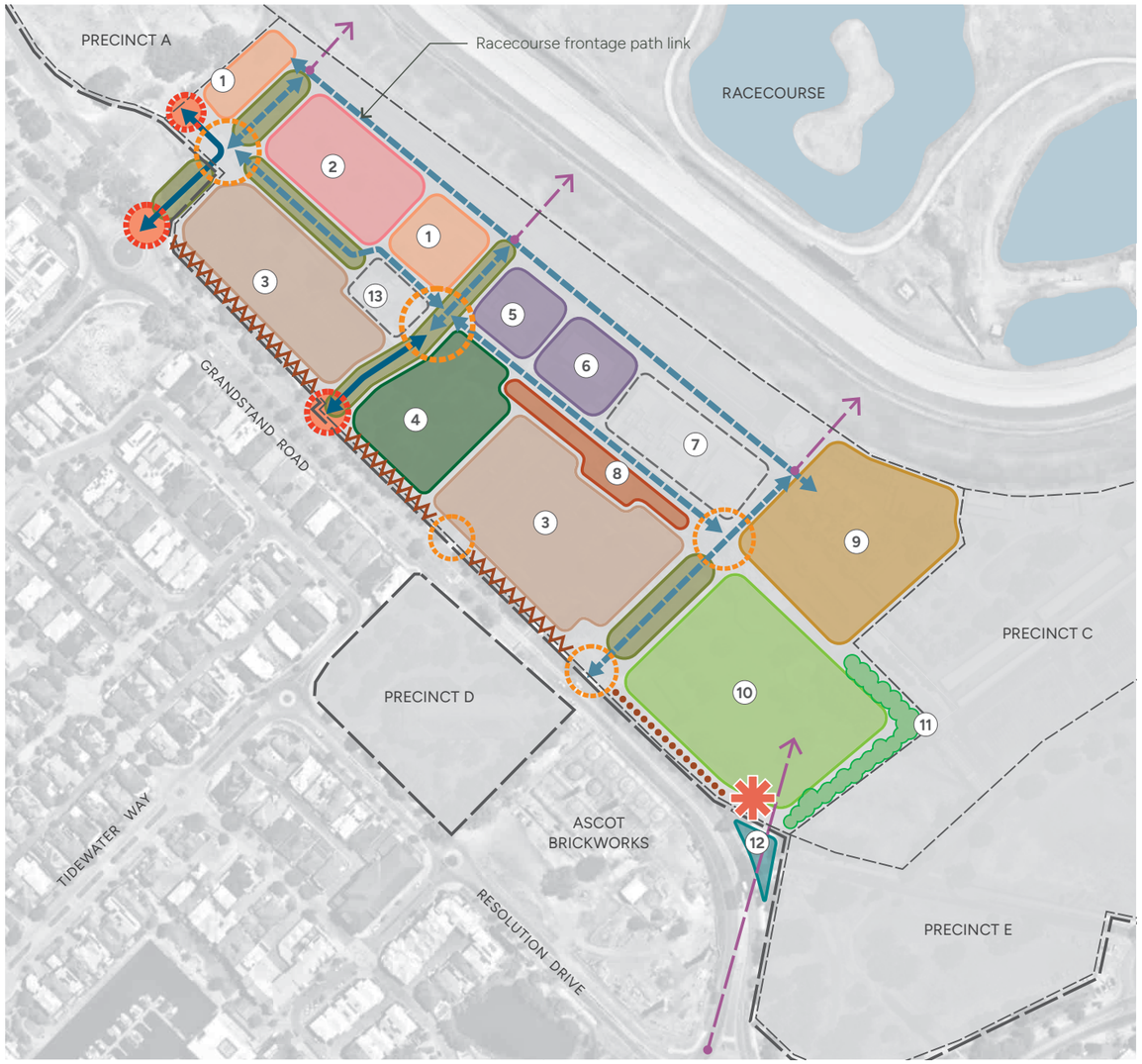


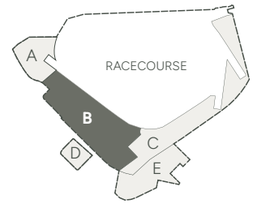




Images: © SLR Consulting

Attachment 12.1.8 Landscape Master Plan





LEGEND

- Site boundary
- Precinct boundary
- Entry sign focal point
- Enhanced entry point - vehicle / pedestrian
- Enhanced entry point - pedestrian
- Shaded pedestrian priority link
- Enhanced vehicle / pedestrian link
- Key view lines
- Grandstand Road edge upgrade - high quality fencing and planting to screen carparking but allow views to buildings
- High quality permeable fencing that allows views to the open space
- Shaded Pedestrian Avenue
- (1) Picnic space within new recreation hub
- (2) Playground within new recreational hub
- (3) Carpark edges adjusted and tree planting added
- (4) Upgraded park space
- (5) Relocated existing building
- (6) New offices / hospitality
- (7) Existing grandstand retained
- (8) Service area
- (9) Existing plaza uses and covered spaces
- (10) Open grassed function and recreational space to be retained
- (11) Buffer planting to screen horse float parking
- (12) Lower planting to allow views to entry sign and enhance vista into racecourse
- (13) Existing service area to be retained

NORTH

PRECINCT B ARRANGEMENT PLAN

Attachment 12.1.8 Landscape Master Plan



PRECINCT B INDICATIVE LAYOUT PLAN

11.3 Precinct C

Racecourse & Stabling

- Primarily for Permanent Stabling purposes and horse float and jockey on race days
- Facilities around the stabling uses that interface with the 'entertainment' and 'racing' uses
- Interface with Matheson Road important to reinforce the character of the precinct rather than to turn its back on the surrounding residential uses

Potentials

- Screen the horse float area from surrounding uses
- Reinforce the pedestrian entry and arrival point along Matheson Road and Raconteur Drive
- Avenue of street tree planting along Matheson Road to integrate with the surrounding residential area and define the edge and enhance the character of the racecourse
- Where possible facilitate views into the racecourse from nearby roads
- New stables and structures to reference and reinforce the built form character of the existing racecourse buildings.
- Enhance the character of Precinct C and the southern and eastern extents of the site along Matheson Road and Ennis Place respectively through landscape elements. These would reference existing landscape character elements within the racecourse and integrate with the surrounding residential uses through appropriate streetscape planting and landscaping around buildings
- Promote shade in open areas such as car park areas, open space and community spaces
- Shade tree planting within new car parking areas





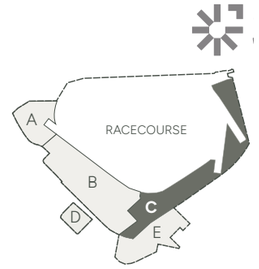



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Attachment 12.1.8 Landscape Master Plan



PRECINCT C ARRANGEMENT PLAN



LEGEND

- Site boundary
- Precinct boundary
- Staff access
- Pedestrian link
- Key view lines
- (1) Day stalls
- (2) Visitors, trainers and jockeys carpark
- (3) Buffer planting to screen horse float parking
- (4) Horse float parking
- (5) Oncourse stables
- (6) Avenue planting to enhance streetscape appearance
- (7) Interface with racetrack
- (8) Interface with Swan River

The location close to the Swan River and foreshore requires consideration of built form, scale and appearance and will require further material, vegetative screening and setback considerations to integrate with the appearance of the Swan River and minimise visual impacts.

General Note:
Landscape treatment around proposed buildings in proximity to the Swan River Foreshore (within Precinct C) will help to create shade, support habitat and complement the character of the Swan River foreshore areas.

NORTH

Attachment 12.1.8 Landscape Master Plan



PRECINCT C INDICATIVE LAYOUT PLAN

11.4 Precinct D

Residential & Mixed Use

- Current site for administration building
- Isolated from main racecourse site by Grandstand Road
- Adjoins existing low and medium density residential uses
- Existing mature trees on site
- No visible connection to Racecourse uses except for red bricks on admin building

Potentials

- Create similar interface with Grandstand Road
- Interface with Ascot Kilns where possible through the use of materials, visual links and signage
- Retain existing established trees along Grandstand Road and existing feature trees within the site where possible
- Align the character and appearance to complement the existing Ascot Waters Estate
- Minimum 1 shade tree for every 4 open air parking bays for non-residential development





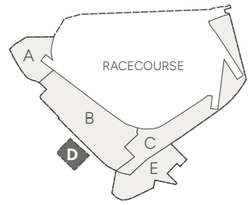




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Attachment 12.1.8 Landscape Master Plan





LEGEND

- Site boundary
- Precinct boundary
- Existing pedestrian link

1. Childcare centre
2. Residential lots
3. Internal tree-lined streets
4. Entry points to Resolution Drive
5. Existing pedestrian path linkage to be retained

NORTH

PRECINCT D ARRANGEMENT PLAN
1:2500 @ A3

Attachment 12.1.8 Landscape Master Plan



PRECINCT D INDICATIVE LAYOUT PLAN

0 10 20 30 50 100m
SCALE 1:2000 @ A3

NORTH

ASCOT RACECOURSE 31

11.5 Precinct E

Commercial & Retail

- Current existing open grassed areas used for overflow car parking
- Scattered existing vegetation along drainage lines and roads
- Low level of visual amenity
- No visible connection to Racecourse uses

Potentials

- Create edges to proposed development that focus towards key entry points and vistas toward the racecourse buildings
- Street tree theming to strongly define racecourse edge and enhance the character of the site
- Create links to the Historic Ascot Kilns through the use of strategic viewpoints along roads and between buildings. Use of kiln-related materials and colours in built form and pavements to reinforce the connections to the Ascot Kilns
- Building forms and styles to complement the existing feature buildings visible on site
- Activation of Matheson Road and Raconteur Drive to complement the proposed uses such as the food markets
- Integrate with the residential context with street tree planting that reflects the character of the site
- Creation of 'sleeve' uses around the racecourse that enhance its presentation, character and identity, especially along Resolution Drive, Grandstand Road
- Improve the appearance of the open drain along the eastern edge of Precinct E as it adjoins Resolution Drive. This could be achieved through additional planting to naturalise its appearance
- 1 shade tree for every 4 open air parking bays
- Minimum 3m wide landscaping to Grandstand Road frontage







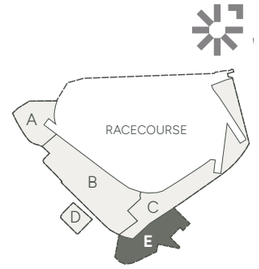


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Attachment 12.1.8 Landscape Master Plan



PRECINCT E ARRANGEMENT PLAN
1:2500 @ A3



LEGEND

- Site boundary
- Precinct boundary
- Entry sign focal point
- Enhanced entry point - vehicle / pedestrian
- Enhanced vehicle / pedestrian link
- Key view lines
- Shaded pedestrian Avenue

1. Future research facilities
2. Commercial uses
3. Vegetated buffers
4. Service area
5. Retail/ Commercial uses
6. Carparking
7. Jockey accommodation
8. Upgrade appearance of drainage corridor

NORTH

Attachment 12.1.8 Landscape Master Plan



PRECINCT E INDICATIVE LAYOUT PLAN

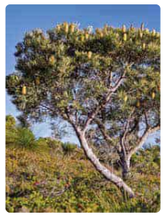
Planting Palette

PLANT SCHEDULE

SPECIES	COMMON NAME
TREES	
Agonis flexuosa	Weeping peppermint
Allocasuarina fraseriana	Western sheoak
Banksia attenuata	Candlestick banksia
Banksia grandis	Bull banksia
Banksia menziesii	Firewood banksia
Brachychiton discolour	Lacebark tree
Casuarina glauca	Swamp she-oak
Casuarina obesa	Western swamp oak
Corymbia calophylla	Marri
Corymbia ficifolia	Red flowering gum
Corymbia maculata	Spotted gum
Cupaniopsis anacardioides	Tuckeroo
Eucalyptus gomphocephala	Tuart
Eucalyptus lane-poolei	Salmon white gum
Eucalyptus marginata	Jarrah
Eucalyptus rudis	Flooded gum
Eucalyptus todtiana	Coastal blackbutt
Eucalyptus wandoo	Wandoo
Lophostemon confertus	Queensland brush box
Melaleuca quinquenervia	Broad-leaved paperbark
Melaleuca rhaphiophylla	Swamp paperbark
Melaleuca viminalis	Weeping bottlebrush
Platanus x acerifolia	London Plane
Quercus palustris	Pin Oak


Agonis flexuosa


Allocasuarina fraseriana


Banksia attenuata

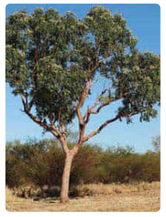

Banksia grandis


Banksia menziesii


Brachychiton discolour


Casuarina glauca

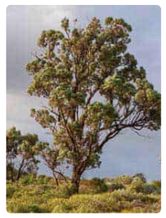

Casuarina obesa


Corymbia calophylla


Corymbia ficifolia


Corymbia maculata


Cupaniopsis anacardioides


Eucalyptus gomphocephala

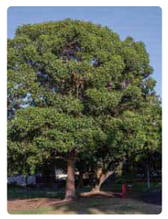

Eucalyptus lane-poolei


Eucalyptus marginata


Eucalyptus rudis


Eucalyptus todtiana


Eucalyptus wandoo


Lophostemon confertus


Melaleuca quinquenervia


Melaleuca rhaphiophylla


Melaleuca viminalis


Platanus x acerifolia


Quercus palustris

Attachment 12.1.8 Landscape Master Plan

PLANT SCHEDULE

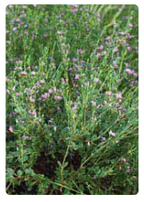
SPECIES	COMMON NAME
SHRUBS	
Adenanthos cunninghamii	Wollybush
Adenanthos cygnorum	Common Woollybush
Adenanthos obovatus	Basket Flower
Beaufortia squarrosa	Sandplains Brush Myrtle
Boronia crenulata	Aniseed Boronia
Calothamnus sanguineus	Silky-leaved Blood Flower
Callitris pyramidalis	Swamp Cypress
Darwinia citriodora	Lemon Scented Myrtle
Eremophila glabra	Tarbush
Grevillea 'Bonfire'	Grevillea
Hakea lissocarpha	Hakea lissocarpha
Hypocalymma angustifolium	White Myrtle
Melaleuca nesophila	Western Tea Myrtle
Melaleuca radula	Graceful Honey-myrtle
Verticordia plumosa	Plumed Featherflower
GROUNDCOVERS	
Anigozanthos manglesii	Kangaroo Paw
Carex appressa	Tall Sedge
Conostylis candicans	Grey Cottonheads
Dampiera linearis	Common Dampiera
Darwinia citriodora 'Seaspray'	Lemon Scented Myrtle
Dianella revoluta	Blueberry Lily
Ficinia nodosa	Knotted Club Rush
Gahnia trifida	Coast Saw-sedge
Hemiandra pungens	Snakebush
Kennedia prostrata	Running Postman
Patersonia occidentalis	Purple Flag
Poa poiformis	Coastal Poa
Themeda triandra	Kangaroo Grass


Adenanthos cunninghamii


Adenanthos cygnorum


Adenanthos obovatus


Beaufortia squarrosa


Boronia crenulata


Calothamnus sanguineus


Callitris pyramidalis


Darwinia citriodora

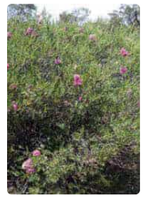

Eremophila glabra


Grevillea 'Bonfire'


Hakea lissocarpha


Hypocalymma angustifolium


Melaleuca nesophila


Melaleuca radula


Verticordia plumosa


Anigozanthos manglesii


Carex appressa


Conostylis candicans


Dampiera linearis


Darwinia citriodora 'Seaspray'


Dianella revoluta


Ficinia nodosa


Gahnia trifida


Hemiandra pungens


Kennedia prostrata


Patersonia occidentalis


Poa poiformis


Themeda triandra

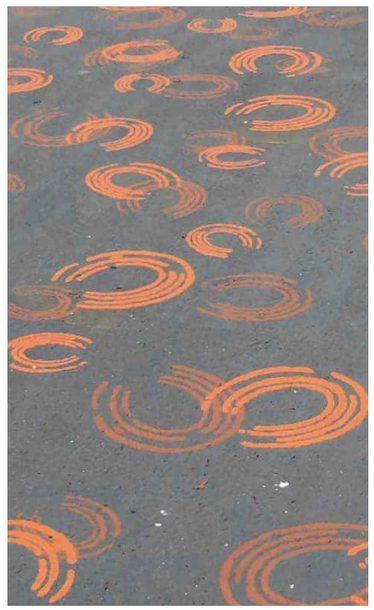
Materials Palette

















Attachment 12.1.8 Landscape Master Plan

Attachment 12.1.8 Landscape Master Plan



Attachment 12.1.9 Schedule of Modifications

Schedule of Modifications

Document	Modification No.	Section/Page	Change
Structure Plan Report	1	Throughout	Refer to the current version of the draft Golden Gateway Local Structure Plan. Council endorsed the updated version at the 25 February 2025 Ordinary Council Meeting.
Structure Plan Report	2	2.1 Precinct Objectives Precinct D (Residential & Mixed Use) – Page 18	Update Point B to "Support small-scale non-residential uses along Grandstand Road that is compatible with nearby residential development."
Structure Plan Report	3	Table 1 – Indicative Development Staging – Page 19	Include specific staging details with reference to infrastructure considerations. Include reference to small scale food and beverage uses within Precinct A.
Structure Plan Report	4	4.1.2 Land Use Permissibility – Page 20	Update the wording of the Table so that it lists the restricted uses. It should be noted that a restricted use is the only use or uses that is permitted on a specific portion of land and other uses that would otherwise be permissible in the zone are not permitted.
Structure Plan Report	5	4.1.2 Land Use Permissibility – Page 20	Ensure that 'Restricted Uses' for Precincts D and E listed in Table 2 do not include 'Fast Food Outlet/Lunch Bar', 'Funeral Parlour', 'Garden Centre', 'Pet Day Care' 'Night Club', 'Radio or TV Installation', 'Restricted Premises', 'Service Station', 'Vet Hospital' and 'Showroom'.
Structure Plan Report	6	4.1.2 Land Use Permissibility – Page 20	Update Table 2 with 'Restricted Uses' specifically applicable to Precinct A. These should be 'Nursing Home', 'Multiple Dwelling' and 'Restaurant/Café'.
Structure Plan Report	7	4.1.2 Land Use Permissibility – Page 21	Delete 'Animal Establishment' from Table 3.
Structure Plan Report	8	4.1.3 – Road Reserves – Page 21	Include information about the options for this road reserve i.e remain in private ownership or be ceded.
Structure Plan Report	9	4.1.4 – Public Open Space – Page 21	Include text that: • states public open space for 'Residential' zoned land will need to be considered as part of future applications for subdivision or development approval over the land. • Reflects existing public open space within 300m of the 'Commercial' and 'Mixed Use' zoned land in accordance with liveable neighbourhoods.
Structure Plan Report	10	4.2.2 - Development Provisions – Page 22	Precinct A - Include justification for the proposed plot ratio within the PSP or investigate and apply a more appropriate plot ratio for Precinct A.
Structure Plan Report	11	4.2.2 – Development Provisions – Page 22	Precinct C - Include a 3m wide landscaping requirement for stables fronting Matheson Road and along the eastern boundary of the precinct.
Structure Plan Report	12	4.2.2 – Development Provisions – Page 22	Precinct D - Delete "Non-residential development adjoining land used for residential purposes shall confirm with the setback requirements under Volume 1 of the Residential Design Codes" and replace with a minimum setback requirement of 3m to adjoining residential development and a requirement that this area be landscaped.
Structure Plan Report	13	4.2.2 – Development Provisions – Page 23	Precinct E - Specify that heights above two storeys are only applicable to residential and office development.
Structure Plan Report	14	4.2.2 – Development	Precinct E - Include development provisions that require activation of all street frontages.

Attachment 12.1.9 Schedule of Modifications

		Provisions – Page 23	
Structure Plan Report	15	4.2.2 – Development Provisions – Page 24	Precinct E - Include development provisions that address the interface to the Belmont Main Drain.
Structure Plan Report	16	4.3.3 – Land Assembly – Page 24	With reference to Precinct E, include additional details regarding land assembly having regard to comments provided by Water Corporation and the Land Use Management team at the Department of Planning Lands and Heritage.
Structure Plan Report	17	4.3 – Other Requirements	Include reference to the need for a local planning scheme amendment.
Structure Plan Report	18	4.3 – Other Requirements	Include reference to additional documents as follows: • Geotechnical report • Foreshore Management Plan (Applicable to Precincts A and C) • Acoustic Report • Environmental Impact Assessment • Aboriginal Heritage Management Plan
Structure Plan Report	19	4.3.2 – Heritage – Page 24	Include Aboriginal Heritage details consistent with section 2.2.2.1.
Structure Plan Report	20	4.3.2 – Heritage – Page 24	Insert "The Master Plan does not propose any development within the boundaries of the identified Aboriginal heritage places. Notwithstanding, should development occur within Precinct B that intersects the boundary of Site 3753, a DPLH file search should be undertaken to accurately determine the extent of the site, prior to any works commencing and an Aboriginal Heritage Management Plan may be required."
Structure Plan Report	21	4.3.2 – Heritage – Page 24	Insert a requirement that prior to demolition of Lee-Steere House, the site should be photographically recorded, as per the recommendations of the City's Local Heritage Survey.
Structure Plan Report	22	4.3.2 – Heritage – Page 24	Include reference to Matheson Rail Line.
Structure Plan Report	23	4.3.7 – Acid Sulphate Soils – Page 25	Insert "should ASS be encountered within a 'moderate to low' risk area, an ASS Management Plan will be prepared and implemented at subdivision and/or development stage".
Structure Plan Report	24	4.3.8 - Environmental Protection & Management – Page 25	Include a discussion on opportunities for tree retention.
Structure Plan Report	25	2.1.4.2 – Acid Sulphate Soils – Page 39	Replace text with "The Department of Water and Environmental Regulation Acid Sulphate Soils ('ASS') risk mapping indicates that the majority of the site is considered to have a 'high to moderate' risk of ASS occurrence within 3 m of the natural surface. Subdivision and development within this area will be required to undertake an ASS assessment and may require the preparation of an ASS management plan and dewatering plan as a condition of approval. A portion of the site, including parts of Precinct B, Precinct C and the Racecourse are mapped as having a 'moderate to low' risk of ASS occurring within the 3m of the natural surface. Should ASS be encountered within this area, an ASS Management Plan will be prepared and implemented at subdivision and/or development stage."
Structure Plan Report	26	2.1.4.3 Site Contamination Page 39	Update site contamination details with details included in the site investigation report and discuss implications of this for future development.
Structure Plan Report	27	2.1.6 – People Movement – Page 45	Delete "connectivity through central Perth and Bayswater Train Station" and replace with "north to destinations including Bayswater Station, Morley Bus Station/Shopping Centre and south to destinations including Belmont Forum Shopping Centre, Oats Street Station and Curtin University."

Attachment 12.1.9 Schedule of Modifications

Structure Plan Report	28	2.2.2.2.3 – Local Heritage Survey and Heritage List – Page 49	Describe the Ascot Residential and Stables Area as being partly within the precinct.
Structure Plan Report	29	2.3.1.3 – City of Belmont Activity Centre Planning Strategy – Page 52	Update this section to accurately describe what the Activity Centre Planning Strategy says about retail floorspace having regard to the following: *"The WAPC's Land Use and Employment Survey indicates that the Golden Gateway precinct and the southern side of Great Eastern Highway accommodated 4,286sqm of retail floor space in 2016. This is currently comprised of car/highway orientated retail (fast food outlets, service stations, showrooms) rather than serving the daily/weekly needs of the local residential population.* *The Retail Needs Assessment prepared to inform this Strategy anticipates a gradual increase in retail floorspace within this area (Golden Gateway precinct and southern side of Great Eastern Highway, between Belgravia Street and Hardey Road) from 4,286 in 2016 and 5,500 in 2031 to approximately 7,000sqm by 2036. This estimate provides for the establishment of a neighbourhood centre to a size of approximately 2,700sqm-3,000sqm within the Golden Gateway precinct.* *It is anticipated that redevelopment of the Golden Gateway precinct will occur over an extended period of time. It is also noted that the RNA covered land on the southern side of Great Eastern Highway, outside the Golden Gateway precinct which has capacity to accommodate additional retail floorspace. In light of this, it is considered appropriate for a 1,200sqm local centre to be developed within the Golden Gateway precinct in the first instance, without specific control on floorspace and supporting residential development.* *Following further residential development within the Golden Gateway precinct, it may be appropriate for this figure to be reviewed through a Needs Assessment or Net Benefit Test to determine where additional retail floorspace is required . This may also determine whether it is appropriate for the centre to be classified as a neighbourhood centre, using the City's RNA prepared to inform this Strategy as a guide."*
Structure Plan Report	30	2.3.3 Draft Golden Gateway Local Structure Plan – Page 56	Delete "in response to the above and of relevance to the Precinct Structure Plan area, Council resolved to:" and replace with "in response to the above and of relevance to the Precinct Structure Plan area, Council's resolution included:"
Structure Plan Report	31	2.3.3 Draft Golden Gateway Local Structure Plan – Page 56	Delete "Council also noted their desire to see the Ascot Kiln site developed into a park to allow for the wider community to access and interact with the heritage structures" and replace with "Council also resolved to require a Local Development Plan to be prepared for the Ascot Kilns site and for 10% of its area to be designated as Public Open Space."
Structure Plan Report	32	2.3.3 Draft Golden Gateway Local Structure Plan – Page 56	Update text to reflect the current status of the Draft Golden Gateway Local Structure Plan.
Structure Plan Report	33	2.3.3 Draft Golden Gateway Local Structure Plan – Page 57	Replace Figure 6 with an up to date version of the Draft Golden Gateway Local Structure Plan map.
Structure Plan Report	34	3.3 – Concept Development – Figure 7 – Page 67	Outline the Golden Gateway precinct consistent with the draft Golden Gateway Local Structure Plan
Structure Plan Report	35	3.3 – Concept Development – Figure 8 – Page 68	Remove proposed new crossover locations from the plan.
Structure Plan Report	36	4.1.1 – City of Belmont – Page 69	Delete "It is understood that the City of Belmont are supportive of this approach and would look to excise Perth Racing's landholdings from the draft Golden Gateway Structure Plan."

Attachment 12.1.9 Schedule of Modifications

Structure Plan Report	37	4.1.1 – City of Belmont – Page 70	Delete "the above feedback has been considered and addressed in the preparation of this Structure Plan" and replace with "the above feedback was considered in the preparation of this Structure Plan."
Structure Plan Report	38	4.1.4 – Community Engagement	Update this section to address the current version of the Golden Gateway Local Structure Plan.
Structure Plan Report	39	5.1 – Vision and Objectives – Page 74	Update the second objective for Precinct D to reference "that is compatible with surrounding residential development."
Structure Plan Report	40	5.2 – Urban Ecology – Page 77	Under O1.1 Include reference to the Belmont Main Drain.
Structure Plan Report	41	5.2 – Urban Ecology – Page 77	Under O1.3 Include reference to opportunities for tree retention and other sustainability initiatives/criteria.
Structure Plan Report	42	5.2.5 – Green Network – Page 81	With reference to "to support this linkage, treatments along Ascot Racecourse's existing interface to Grandstand Road are relevant and have been addressed in the supporting Landscape Master Plan" include further details on this within this section and within Part One of the Structure Plan.
Structure Plan Map	43	5.2.6 – Heritage – Page 82	Identify the 'Ascot Residential and Stables Area' site as being partly within the Precinct and included on the City's Heritage List as a Category 2 site.
Structure Plan Report	44	5.2.6 – Heritage – Page 82	Include reference to the Matheson Rail Line.
Structure Plan Report	45	Figure 83 - Page 83	Identify the Matheson Rail Line and Aboriginal Heritage Sites 3756 and 3753.
Structure Plan Report	46	5.3.1 – Northern Gateway – Page 85	Delete reference to Precinct A being within the walkable catchment of the future Golden Gateway activity centre.
Structure Plan Report	47	5.3.4 – Commercial Precinct – Page 86	Update this section to reflect advice received by the applicant from Water Corporation and the Department of Planning Lands and Heritage summarised by the applicant as follows: *"We have received advice from the Department of Lands that indicates the land is capable of accommodating car parking above it (it was previously a road) and thus the intention is that the land will be utilised and leased to provide parking of the future commercial. Water Corporation have confirmed the requirements for building parking above the mains in the old road reserve which can be accommodated."*
Structure Plan Report	48	Figure 11 – Urban Structure – Page 87	Update this plan to show walkable catchments and the Belmont Main Drain.
Structure Plan Report	49	5.4 – Public Realm – Page 89	Update O3.3 to talk about the relationship of the land to the Belmont Main Drain.
Structure Plan Report	50	5.5 – Movement – Page 97	Update the Design Element Response for O4.2 to clearly explain how the Precinct Structure Plan promotes sustainable and healthy modes of transport, reducing reliance on the private motor vehicle.
Structure Plan Report	51	5.5 – Movement – Page 97	Update the Design Element Response for O4.3 to clearly explain specific measures proposed by the Precinct Structure Plan.
Structure Plan Report	52	5.5.1 – Proposed Vehicle Access & Intersection Upgrades – Page 98	Include details about the existing gates at the intersection of Raconteur Drive and Grandstand Road and the gates along Hardey Road and Matheson Road. The impact of opening these gates on traffic within the residential and stables area must be detailed within the PSP and Transport Impact Assessment.
Structure Plan Report	53	5.5.1 – Proposed Vehicle Access & Intersection Upgrades – Page 98	Include additional details regarding the appropriateness of the proposed vehicle access arrangements. Particular attention should be paid to the impact on roads within the residential and stables precinct (e.g. Matheson Road and Ennis Place). Access from Ennis Place should be referenced within the draft PSP and TIA. There may need to be restrictions on vehicle types and access hours. Additionally, this would require access through Lot 10194 which is owned by the State of WA. Therefore, permission may also be required for access through this lot. These matters shall be referenced in the draft PSP.

Attachment 12.1.9 Schedule of Modifications

Structure Plan Report	54	5.5.2 – Proposed Pedestrian Network – Page 98	Update this section to include additional information about proposed pedestrian network improvements with a particular focus on enhancing pedestrian safety across Grandstand Road. This section should also be updated to specify who is responsible for delivering this infrastructure.
Structure Plan Report	55	5.5.3 – Parking Improvements – Page 99	Include additional details about the contents of the Travel Demand Plan and a requirement for its preparation within Part One of the Precinct Structure Plan.
Structure Plan Report	56	5.5.3 – Parking Improvements – Page 99	Update this section with a more comprehensive assessment of parking supply/demand.
Structure Plan Report	57	5.5.4 – Public Transport – Page 100	Delete "providing connectivity to the central Perth and Bayswater Train Stations" and replace with "providing connections north to destinations including Bayswater Station, Morley Bus Station/Shopping Centre and south to destinations including Belmont Forum Shopping Centre, Oats Street Station and Curtin University."
Structure Plan Report	58	Figure 14 – Movement Network – Page 101	Update this figure to clarify what 4 – Potential left in/left out relates to.
Structure Plan Report	59	5.6 – Land Use – Page 103	Under 05.1 delete "The Precinct Structure Plan facilitates a residential interface to Ascot Waters Estate" and replace with "Except for one 'Mixed Use' lot, the Structure Plan facilitates a residential interface to Ascot Waters".
Structure Plan Report	60	5.6.1.4 – Precinct E – Page 105	Delete reference within this section and throughout the document to bulky goods showrooms.
Structure Plan Report	61	5.6.2.1 – Activity Centre Considerations	Update all text references within this section and throughout the document to clarify that the future activity centre is the portion of land bound by Resolution Drive, Grandstand Road and Raconteur Drive noting that the Activity Centre Planning Strategy doesn't designate a specific location for the activity centre within the precinct.
Structure Plan Report	62	5.6.2.2 – Retail Needs Assessment – Page 107	Update this section to accurately describe what the Activity Centre Planning Strategy says about retail floorspace having regard to the following: *"The WAPC's Land Use and Employment Survey indicates that the Golden Gateway precinct and the southern side of Great Eastern Highway accommodated 4,286sqm of retail floor space in 2016. This is currently comprised of car/highway orientated retail (fast food outlets, service stations, showrooms) rather than serving the daily/weekly needs of the local residential population.* *The Retail Needs Assessment prepared to inform this Strategy anticipates a gradual increase in retail floorspace within this area (Golden Gateway precinct and southern side of Great Eastern Highway, between Belgravia Street and Hardey Road) from 4,286 in 2016 and 5,500 in 2031 to approximately 7,000sqm by 2036. This estimate provides for the establishment of a neighbourhood centre to a size of approximately 2,700sqm-3,000sqm within the Golden Gateway precinct.* *It is anticipated that redevelopment of the Golden Gateway precinct will occur over an extended period of time. It is also noted that the RNA covered land on the southern side of Great Eastern Highway, outside the Golden Gateway precinct which has capacity to accommodate additional retail floorspace. In light of this, it is considered appropriate for a 1,200sqm local centre to be developed within the Golden Gateway precinct in the first instance, without specific control on floorspace and supporting residential development.* *Following further residential development within the Golden Gateway precinct, it may be appropriate for this figure to be reviewed through a Needs Assessment or Net Benefit Test to determine where additional retail floorspace is required . This may also determine whether it is appropriate for the centre to be classified as a neighbourhood centre, using the City's RNA prepared to inform this Strategy as a guide."*
Structure Plan Report	63	Figure 16 – Golden Gateway Activity Centre – Page 110	Update Figure 16 and associated text by removing the access arrows, deleting the "Activity Centre Frame" and clarifying what the "Verge" relates to.

Attachment 12.1.9 Schedule of Modifications

Structure Plan Report	64	5.7.1 – Commercial Precinct – Page 112	Update building heights referred to for the draft Golden Gateway Local Structure Plan as per the current version of the structure plan.
Structure Plan Report	65	5.7.3 – Ascot Waters & Bristile Kilns Interface – Page 114	Include additional information addressing the interface of the 'Mixed Use' portion of Precinct D to Ascot Waters, as per modification 10.
Structure Plan Report	66	Figure 17 – Built Form – Page 115	Identify existing buildings to be retained on the Plan and update building heights to be consistent with the current version of the Golden Gateway Local Structure Plan.
Structure Plan Report	67	Cross Section A – Resolution Drive – Page 116	Update the cross section to show building heights consistent with the current version of the Golden Gateway Local Structure Plan.
Structure Plan Report	68	Throughout	Amend all text references and plans relating to Precinct A to make it clear that no development will occur within the Crown Grant in Trust land.
Structure Plan Report	69	Throughout	Update all plans to show the Belmont Main Drain as being located within the subject land.
Local Water Management Strategy	70	Throughout	Remove all references to subsurface drainage beneath road reserves and verges.
Environmental Assessment Report	71	Throughout	Update the entire report to address and identify trees on the site worthy of protection at development and subdivision stage.
Engineering Servicing Report	72	Figure 16 – Page 24	Update Figure 16 to show power lines running through a portion of Lot 100 Raconteur Drive.
Transport Impact Assessment	73	Transport Impact Assessment - 1.2 – Summary of TIA	Delete "and it is understood that through a later iteration of the concurrent Golden Gateway LSP, the City of Belmont will look to remove the Applicant's landholdings from the GGLSP."
Transport Impact Assessment	74	1.3.4 - Recent Movement Network Upgrades in Ascot – Page 2-3	Remove all information in this section that does not relate to Ascot.
Transport Impact Assessment	75	1.3.4 - Recent Movement Network Upgrades in Ascot – Page 2-3	Delete "Increase in residential development from The Springs development. City is planning to restrict one car bay per unit, allowing all other on street bays to be for visitors and people visiting the commercial shops and local businesses. The City has installed 'P' signs which have encouraged Fly-in/Fly-out (FIFO) workers and ALL DAY motorists heading to the Perth CBD."
Transport Impact Assessment	76	3.3 – Parking Impacts – Page 13-15	Review and restructure this section to provide clarity about current and future parking availability.
Transport Impact Assessment	77	6.3 – Traffic Generation	Include trip generation rates for Precinct B and Precinct C.
Transport Impact Assessment	78	3.6 – Pedestrian and Cyclist Access – Page 15, 5.4 – Pedestrian and Cyclist Accessibility – Page 17, 7.3 – Pedestrian and Cycle Accessibility – Page 25	Assess and determine necessary upgrades to pedestrian facilities surrounding Ascot Racecourse and model treatments within SIDRA to evaluate their viability.
Transport Impact Assessment	79	3.6 – Pedestrian and Cyclist Access	Detail mechanisms for future delivery of pedestrian facilities.

Attachment 12.1.9 Schedule of Modifications

		– Page 15, 5.4 – Pedestrian and Cyclist Accessibility – Page 17, 7.3 – Pedestrian and Cycle Accessibility – Page 25	
Transport Impact Assessment	80	7.5 – Analysis of the Transport Network – Page 26	Delete "It is important to note that at the time of preparing this report, the details of the Golden Gateway Local Structure Plan were still under revision. Whilst every endeavour was made to interrogate the previous traffic modelling and road network proposals in the draft reports and liaise with key project members for updates, the details were still unfinished and presented too many unknowns to be adequately and accurately incorporated into this traffic modelling intersection analyses."
Transport Impact Assessment	81	Throughout	Update the Transport Impact Assessment to adequately address increased traffic movements within the residential and stables area noting that the report recommends the intersection of Grandstand Road and Raconteur Drive be opened permanently. It is also presumed that the gates along Hardey Road and Matheson Road will also be opened. As well as include reference to traffic calming measures to deter vehicle movements through this area.
Transport Impact Assessment	82	Throughout	Update modelling and details within the report to reflect the latest version of the Golden Gateway Local Structure Plan.
Retail Assessment (Net Benefit Test)	83	7 – Net Benefit Test – Page 35	Include clear answers to the questions raised within Section 2.1 within the conclusions of the report.
Retail Assessment (Net Benefit Test)	84	7.7 – Strategic Alignment – Page 38	Delete "the proposed local centre activity is consistent with the City of Belmont's Activity Centre Plan Strategy" and include further commentary about why the proposal is not consistent with what the City's Activity Centre Planning Strategy says about retail floor area and incremental expansion.
Retail Assessment (Net Benefit Test)	85	Throughout	Include additional justification why the activity centre will be sustainable from 2026 and engage with what the Activity Centre Planning Strategy says about incremental expansion.
Retail Assessment (Net Benefit Test)	86	Throughout	Remove reference to Bulky Goods Showrooms.

Attachment 12.1.10 Schedule of Submissions

Schedule of Submissions

No.	Submitter	Summary of Submission	Officer Comment
1	Public Submitter	**Raises concerns** States that the area proposed to be used for stables is crucial for the endangered black cockatoos survival in the urban environment. Is concerned that there has been too much loss of habitat. States that it would be incredible if another option is found.	Refer to Environment section of the report.
2	Public Submitter	**Raises concerns** States that the natural food source for red and Baudin black cockatoos is diminishing on the Swan Coastal Plain. Concerned that these species are being driven to the point of extinction as suburbia encroaches and destroys their remaining feeding grounds. Highlights being a volunteer at Karrakin Black Cockatoo Conservation Centre located in Martin and sees firsthand the results of the loss of their habitat and food source. Estimates that the black cockatoo will be extinct within the next fifty years and states this is not the legacy we should be leaving for our future generations. Asks the City to reconsider the plans.	Refer to Environment section of the report.
3	Public Submitter	**Supports subject to modifications and raises concerns** Considers there is currently chaos along Grandstand Road whenever there is an event at the Racecourse. Notes that cars are banked up waiting for access, pedestrians crossing haphazardly, and through traffic at a standstill. Notes that no part of the precinct area appears to be designated for vehicle parking. Considers that Precinct B, which currently contains extensive gardens and small entertainment buildings, as well as parking, is under-utilised. Suggests that the City should require a greater part of that area to be used for parking, with Raconteur Drive continuing as the southern feeder road to divert traffic off Grandstand Road and Resolution Drive to the parking entry, with enhanced turn lanes. Considers that access from the north should be via a feeder road off Grandstand Road before the roundabout, with the gate at the roundabout closed. If this is not feasible due to the steep slope, suggests preventing a right turn from the south at the roundabout. To improve pedestrian safety across Grandstand Road, suggests installing pedestrian crossing lights (or other control measures) at each end of the area near bus stops, with railings along the road to prevent crossing at other points. Supports using part of the land in Precinct C for stabling and prefers this to be the only area in Belmont permitted for horse stabling. Following the development, proposes that the 'enclave' of racing stables between Matheson Road and Great Eastern Highway be discontinued and the land rezoned to make better use of the large blocks.	Refer to Movement section of the report. The draft PSP includes details of parking availability and access. As detailed within the Movement section of the report, a modification is proposed that clarity around the parking calculations is provided within the draft PSP and Transport Impact Assessment. The existing arrangement at the roundabout provides for safe access/egress from all directions. A separate intersection is not considered necessary or appropriate. Refer to Movement Section of the report. Noted. The future zoning and land use permissibility of properties within the residential and stables area will be further considered through the preparation of a new local planning scheme.

Attachment 12.1.10 Schedule of Submissions

		Criticises the proposal for elderly housing in Precinct A, noting that the area near the river would leave residents exposed to mosquitoes, event noise, and traffic, while being outside walking distance to shops.	These matters can be mitigated and where relevant will be further considered at development application stage.
4	Public Submitter	**Raises concerns** Notes being deeply concerned and considers that the Ascot Racecourse Precinct Structure Plan will destroy crucial habitat and food sources for the endangered Black Cockatoo. Notes that this area currently provides many hollows used for nesting, as well as an important food source for this endangered species. Observes that these birds are struggling with so much of their habitat being cleared, pushing them to the brink of extinction. Emphasises that, as a community, it is essential to support these birds so that future generations can also experience these majestic birds in the wild.	Refer to Environment section of the report.
5	Public Submitter	**Raises concerns** States that the clearing of remaining green space around the racecourse for stables and other structures in areas C and E on the map will remove vital tree canopy and green space. Notes that these established trees are essential for native species, including the endangered Carnaby's Black Cockatoos, as they provide resting, nesting, and food sources. Emphasises the importance of preserving a green corridor to allow wildlife to traverse the urban landscape, with established trees being crucial for nesting. Considers that offsetting tree clearing by replanting does not account for the time required for trees to mature enough to serve as food sources or provide nesting hollows. States that replacing green space with more concrete structures will increase heat in the area.	Refer to Environment section of the report. Noted.
6	Public Submitter	**Raises concerns** Strongly opposes the plan of clearing critical habitat.	Refer to Environment section of the report.
7	Public Submitter	**Raises concerns** States that, as a racing patron with an interest in the welfare of Carnaby’s Cockatoos, there is concern about the increasing pressure on these birds due to land clearing. Notes that the area proposed for development serves as an important remnant native stopping point for Carnabys, where they feed and water, and that destroying this area will negatively impact their survival. Emphasises that councils have a responsibility to conservation and must uphold this duty by resisting development pressures. Suggests that there are other suitable areas available for the proposed development.	Refer to Environment section of the report.

Attachment 12.1.10 Schedule of Submissions

8	Public Submitter	**Raises concerns** States that the City of Belmont must not clear 1.27 hectares of Black Cockatoo habitat. Emphasises that these birds are endangered and currently face starvation due to habitat destruction. Notes that, in addition to this issue, the community—including non-human species—faces challenges from climate change, the heat island effect, and other ecological impacts. Considers the current structure plan to reflect corporate and LGA irresponsibility. Asserts that this habitat must be preserved to protect the City's reputation.	The Precinct Structure Plan is not the City of Belmont's plan. Refer to Environment section of the report.
9	Public Submitter	**Raises concerns** States that there are vital areas frequently visited by Black Cockatoos for foraging, and that these areas are critical for their survival. Requests that these areas be left untouched.	Refer to Environment section of the report.
10	Public Submitter	**Raises concerns** States that the plans should be amended to prevent the clearing of mature trees in areas designated for horse stables. Notes that these trees provide valuable habitat for endangered Carnaby's Cockatoos and other wildlife. Highlights that Belmont has a limited tree canopy and expresses disappointment that the development proposal plans to destroy mature trees instead of valuing and incorporating them into the design.	Refer to Environment section of the report.
11	Public Submitter	**Supports** Happy with the plan proposed.	Noted
12	Public Submitter	**Raises concerns** States that horse racing is diminishing as an industry as the public becomes more aware of animal cruelty. Considers that demolishing pristine habitat for threatened species, such as Black Cockatoos, is unconscionable, as is reducing canopy that is already under threat from climate change. Requests that this destruction be halted.	Refer to Environment section of the report.
13	Public Submitter	**Raises concerns** States that cockatoo habitat and food sources should not be destroyed.	Refer to Environment section of the report.
14	Public Submitter	**Raises concerns** States that vegetation and trees supporting endangered Black Cockatoos should not be cleared.	Refer to Environment section of the report.
15	Public Submitter	**Raises concerns** States that Black Cockatoo habitat should not be destroyed, as there is so little left for them, and clearing it will hasten their demise. Urges developers to act responsibly and care for native wildlife.	Refer to Environment section of the report.
16	Public Submitter	**Raises concerns**	

Attachment 12.1.10 Schedule of Submissions

		Understands that the development will impact the environment and natural habitat for local wildlife. Opposes the decision and hopes an alternative solution to the development can be found.	Refer to Environment section of the report.
17	Public Submitter	**Raises concerns** States that they drive through the precinct most days and do not support horse and dog racing, as they believe it promotes gambling, excessive drinking, and provides opportunities for organised crime. Criticises the claim that animal welfare is a priority, asserting that making money is the true focus. Expresses strong opposition to the proposed development, noting that it threatens critical wildlife corridors that support native species like Black Cockatoos. States frustration with the proposal and warns that, when racing is eventually recognised as unethical, the city will suffer from the loss of trees and wildlife, holding the government and councils responsible.	Noted. Refer to Environment section of the report.
18	Public Submitter	**Raises concerns** Opposes the proposal to clear excess area for Ascot stables, as vegetation for the Carnaby's Cockatoos is not only vital but critical. Requests research into recent findings regarding the lack of food for Cockatoos due to the destruction of their native habitats and food sources. Appeals to consider the health and well-being of the Earth and urges looking beyond financial interests to recognise what is truly important.	Refer to Environment section of the report.
19	Public Submitter	**Raises concerns** Concerned about the clearing of 1.27 hectares of Cockatoo foraging and feeding habitat, as the birds are now at risk of starving. Urges that no further clearing take place and requests that an alternative solution be found.	Refer to Environment section of the report.
20	Public Submitter	**Raises concerns** States being stunned that endangered Cockatoo habitat could be destroyed for the expansion of horse racing facilities. Highlights the climate crisis and WA's poor record on habitat destruction, expressing disbelief that this proposal is even being considered. Urges that the woodland and its animals be left alone, noting that their world is shrinking quickly and extinction is a very real threat. Calls for taking a stand against this environmental travesty.	Refer to Environment section of the report.
21	Public Submitter	**Raises concerns** States that any development which destroys Black Cockatoo habitat and food sources is environmentally irresponsible. Emphasises the need to support these birds for their survival, noting that every area on the river is important. Strongly disagrees with the development.	Refer to Environment section of the report.
22	Public Submitter	**Raises concerns** States opposition to the clearing of Black Cockatoo habitat, highlighting that the birds are starving and that all existing bushland must be preserved to prevent their extinction.	Refer to Environment section of the report.
23	Public Submitter	**Raises concerns** States that mature, established trees should not be cleared.	Refer to Environment section of the report.

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24	Public Submitter	**Raises concerns** States that the area proposed for clearance is a vital source of food and shelter for various Australian birds, fauna, and flora. Notes that the area has been extensively developed, impacting native plants, birds, and fauna. Highlights the suffering of the endangered and fragile Black Cockatoo population due to land clearing and building, with green corridors disappearing. Points out that the extreme summer last year led to the death of many adult shrubs and trees, further limiting nesting and feeding options. Expresses concern over the increasing number of sick and injured birds being cared for at Perth Zoo, noting that they are literally starving. Emphasises that the Black Cockatoos cannot relocate, be driven to food sources, or simply leave for other areas, as all regions with these birds are under pressure from land clearance. Notes that breeding pair numbers are down this year due to hunger and that the birds are eating non-nutritional items like bottlebrush shoots. Requests reconsideration of the development, arguing that horses do not depend on nature and bushland to survive. Urges careful thought on the decision, warning that such action could lead to regret in 30 years, as the land and resources cannot be replaced.	Refer to Environment section of the report.
25	Public Submitter	**Raises concerns** States that essential habitat for endangered Carnaby's Black-Cockatoos should be protected and prioritised over racing developments.	Refer to Environment section of the report.
26	Public Submitter	**Raises concerns** States that horse racing is a business and should not be allowed to destroy native vegetation surrounding Ascot Racecourse to enable a private entity to profit further. Requests that this application be refused permission. Highlights that Black Cockatoos depend on a dwindling food source and are federally protected, though this protection seems to be ignored. Suggests that this and similar applications should be rejected.	Refer to Environment section of the report.
27	Public Submitter	**Raises concerns** States that for the best long-term community outcomes and a sustainable future, the total environmental impact must be considered. Urges consideration of the ongoing impacts of native tree canopy removal for short-term financial gain. Suggests that any activity requiring gambling as its business model should offset its negative community impact.	Refer to Environment section of the report.
28	Public Submitter	**Raises concerns** States a strong request to reconsider the plans to destroy this precious habitat, emphasising that once it's gone, it cannot be replaced. Highlights that it is the responsibility of all Western Australians to protect these areas, not destroy them for commercial gain.	Refer to Environment section of the report.
29	Public Submitter	**Supports subject to modifications** States that it is great to see a plan in place for the suburb, noting that Ascot is a good location close to the City and river, but is underused and disconnected from the river.	Noted. The Golden Gateway Local Structure and Draft Ascot Racecourse Precinct Structure Plan propose to apply zones to land to facilitate the development of shops, cafes and restaurants.

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		Observes that despite its proximity to the river, the area lacks a strong lifestyle offering, with no cafes or shops within walking distance. Suggests the addition of a coffee shop, retail shops, or a small supermarket, such as an IGA, nearby.	
30	Public Submitter	**Raises concerns** States opposition to the development, as it will clear over 700 hectares of prime foraging land for the Black Cockatoo. Highlights that these birds are facing severe food shortages due to widespread land clearing for developments, with their numbers now at critically low levels and extinction being a significant threat.	Refer to Environment section of the report.
31	Public Submitter	**Raises concerns** States that the parcel of land should not be allowed to be cleared, as Carnaby's and Red-Tailed Cockatoos are desperate for food and this area provides a vital food source. Urges the need to keep this habitat and vegetation safe for the birds and their future, requesting that no land clearance take place.	Refer to Environment section of the report.
32	Public Submitter	**Raises concerns** States objection to the proposed clearing of 1.27 hectares of Black Cockatoo foraging habitat for stables in Ascot. Notes that the population of Cockatoos has already declined due to habitat degradation and that these endangered birds are facing imminent starvation because of a decline in food resources. Highlights that the proposed development would worsen the current crisis.	Refer to Environment section of the report.
33	Public Submitter	**Raises concerns** States that the clearing of feeding and foraging areas for the threatened Black Cockatoo should not be allowed, particularly for the creation of new stables. Highlights that these birds are threatened with extinction due to the lack of feeding areas, especially along the river.	Refer to Environment section of the report.
34	Public Submitter	**Raises concerns** States that the expansion would result in the removal of over 1 hectare of bushland used by endangered Cockatoos for food. Highlights the struggle these birds are already facing, referencing Perth Zoo's reports on the increasing number of starving Cockatoos being cared for. Questions the need for expansion, noting that racing is not becoming more popular, and argues against encroaching on dwindling bush reserves. States opposition to the proposal.	Refer to Environment section of the report.
35	Public Submitter	**Supports** States that the plan has been well thought out by Perth Racing and serves the best interests of racing in WA and the City of Belmont. Considers the Plan will provide a safer environment for horses and staff, and offer an opportunity for new trainers to use the best facilities in WA, which is currently limited by the availability of houses and stables in Ascot. Considers that the plan may also allow Council to potentially rezone parts of Ascot for more housing, which could increase rates and benefit the City. Expresses full support for the plan from Perth Racing, considering it a great initiative.	Noted. The future zoning and density of properties within the residential and stables area will be further considered through the preparation of a new local planning scheme.

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36	Public Submitter	**Raises concerns** States that the racing industry represents only a small portion of the community. Considers that clearing vital Cockatoo foraging habitat will contribute to the State's legacy of extinctions and exacerbate the heat island effect in the local area.	Refer to Environment section of the report.
37	Public Submitter	**Raises concerns** States concern about the clearing of trees, particularly those used by Carnaby's and Black Cockatoos. Emphasises the importance of preserving tree canopy and building around existing trees, as they hold significant value for biodiversity and are crucial for the life and health of the Black Cockatoo population.	Refer to Environment section of the report.
38	Public Submitter	**Raises concerns** States strong opposition to the removal of 1.27 hectares of vegetation used as a food source for Black Cockatoos and other fauna, particularly for the creation of a stable that is not needed in the area. Argues that remnant bushland should be preserved, as Black Cockatoos are in crisis due to the loss of their food sources from development.	Refer to Environment section of the report.
39	Public Submitter	**Raises concerns** States concerns about turning Precinct E into commercial and retail space with parking, which would likely be used by commercial operations instead of the racecourse overflow, potentially pushing racecourse patrons into nearby residential areas. Highlights that the existing Golden Gateway activity centre is underutilised, questioning the need for further commercial and retail expansion. Raises concerns about the lack of accommodation for safe taxi and Uber pickups near the racecourse, which currently poses safety risks due to drunken pedestrians. Notes that the plan does not address traffic disruptions for events, particularly for users of Garratt Road Bridge. Suggests that the parkland with a playground needs adjustment to improve walking connectivity to the surrounding residential areas. Points out that the proposed retirement apartments may not have enough parking for the number of units and questions whether the demand for an industry-specific retirement living facility has been established. Expresses concerns about the proximity of residential areas to flood-prone zones and suggests Precinct E could be a better location for development, provided it includes sufficient parking and improves connectivity to surrounding areas and racecourse facilities.	Refer to Movement section of the report. There is currently no local centre within the Golden Gateway precinct. The City's Activity Centre Planning Strategy and Golden Gateway Local Structure Plan identify a future local centre within the area. The Transport Impact Assessment recommends the implementation of a Travel Demand Plan which could identify appropriate pickup or set down areas for taxis and ubers. Refer to Movement section of the report. Pedestrian crossing points are addressed within the Movement section of the report. The draft Precinct Structure Plan requires parking to be provided in accordance with Volume 2 of the R-Codes for residential development. The adequacy of future parking will be further considered through the development application process. While demand is not a relevant planning consideration, Perth Racing have advised that there is a strong demand for racecourse living both nationally and globally. The Structure Plan has been referred to the Department of Water and Environmental Regulation (DWER) for comment. DWER has advised that a small portion of Precinct A is located within the floodway and as such any future development would have to comply with floodplain management and meet minimum habitable floor levels. A minimum habitable floor level of 0.5m above the adjacent 1% AEP flood level is recommended to ensure adequate flood protection. The Structure Plan complies with this and requires that all structures are built 0.5m above the flood level.

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40	Public Submitter	**Raises concerns** Concerned about Area D, designated for residential use, and whether the construction and new residential development could impact existing households. Requests further details on the type of residential buildings planned for this area.	The draft Precinct Structure Plan proposes to allow three-storey dwellings within Precinct D which is no higher than existing buildings within Ascot Waters. There are currently no detailed plans for this land. Future development will be assessed in accordance with the draft Precinct Structure Plan and other relevant and applicable planning documents.
41	Public Submitter	**Supports** Supports the forward-thinking idea and considers that each precinct benefits someone.	Noted
42	Public Submitter	**Supports** Considers the plans put forward by Perth Racing and the Belmont Council as a positive step towards prioritising both the safety of horses and the public. States the current situation, with a six-lane highway carrying 55,000 vehicles a day and access to unpredictable 500kg animals, is concerning. The proposed plans are seen as a valuable initiative that will benefit both the racing industry (based in Belmont) and the wider precinct.	Noted. The Structure Plan is a private led Precinct Structure Plan. The City's role is to advertise the document, consider the submissions received and provide a recommendation to the Western Australian Planning Commission.
43	Public Submitter	**Supports subject to modifications** Considers the development plans to be a positive and long-overdue opportunity to revitalise an underutilised asset. Considers the area is in need of improved facilities and community infrastructure. Urges Perth Racing to demonstrate the necessary leadership to build for the future and implement required changes to the existing road infrastructure. Retaining the current roundabout is seen as an inadequate compromise. It is suggested to relocate the roundabout connecting Grandstand Road and Resolution Drive closer to the Grandstand, allowing a left turn to Matheson and a direct exit to Resolution Drive, to improve access to Great Eastern Highway. The provision of adequate public parking in Section C would support this change, helping to manage traffic on event days. The need for Section E (commercial and retail) is questioned, given the current development along Great Eastern Highway. Also suggests rethinking Section D as Residential and Mixed Use to align with State housing goals, potentially allowing for quality high-rise developments with commercial and retail components at the base.	Noted Refer to Movement section of the Council report. The City's Activity Centre Planning Strategy and Golden Gateway Local Structure Plan support a local centre within the precinct, including Precinct E. The intent is to accommodate small retail shops, cafés, and restaurants, distinct from the existing commercial development along Great Eastern Highway. The centre is considered appropriate within Precinct E as it will also serve future residents of Golden Gateway. Land within Precinct D is proposed to be zoned 'Residential' and 'Mixed Use' with a maximum building height of three storeys. Higher rise buildings are proposed within the Golden Gateway precinct due to its separation and distance to lower scale residential development.
44	Public Submitter	**Supports** Highlights being in favour of the plan.	Noted.
45	Public Submitter	**Raises concerns** Opposes the proposed stables area being directly opposite their house. Outlines that stables are currently spread apart, allowing odours and noise to be broken up.	Refer to responses to specific concerns below:

		Considers that compressing it all into one location is going to directly affect living and property value. <u>Noise of trainers</u> Notes that the noise of trainers early in the morning is already quite noticeable as they are very loud vocally, as well their transport for those who aren't in walking distance. Also notes that trainers will be spending more time in one location with greater population instead of one or two trainers here and there, which are broken up by buildings. <u>Noise of horses</u> States that having all these stables so close together is going to dramatically increase the noise of the horses, as more horses together will communicate with each other. <u>Noise from trucks</u> Considers that instead of having deliveries spread out over the suburb, deliveries will be compressed into one area, still receiving the same amount of deliveries. <u>Acoustics</u> States that currently, it's an open area where trainers operate, which helps break up the sound. However, with walls and barriers, noises from the horses in the stables, along with traffic, will reverberate and become amplified. <u>Odours</u> Outlines that currently, odours are spread out over the suburb, which reduces them due to the environment and wind. With all the horses and their waste in one area, the odours will be much more noticeable. <u>Neighbourhood views</u> States that their neighbourhood currently has nice views of the grass all the way down to the river. Having stables will block these views and make them less appealing. Mentions that many racetracks around the world have their onsite stables based in the centre of the racetrack, giving more clearance for residents to prevent or reduce the impacts stated above. Questions why this hasn't been considered in the plans, as there is significant unused space in the centre of the track that could be used.	Stables can already be established on the site, and the land has always been able to support more intensive horse-related activities. Notwithstanding, noise has been/will be further considered through the development application process. The acoustic study prepared in support of the recently approved stables development find that any noise associated with the proposed stables development is compliant with the Environmental (Noise) Regulations 1997 with mitigation or operational management measures proposed to address specific use of the development. Future stables will need to be managed in accordance with the City's Consolidated Local Law which requires stables to be kept in a clean and sanitary condition and as far as practicable, free from flies, rats, other vectors of disease and offensive odours. It should be noted that stables can currently be developed on the subject land irrespective of this structure plan. Notwithstanding, it is not considered that views to the river are a relevant planning consideration. The applicant has advised that a tunnel would be required to access the infield and that this would be cost prohibitive (approximately $45 million). The infield is also noted to be required for stormwater retention purposes.
46	Public Submitter	**Raises concerns** Considers any development will directly impact them as they live across the road from Precinct D. Raises major concerns regarding the height of the development, parking, and traffic noise and flow. States they can rarely park outside their house due to their neighbours not having enough car parking and taking all the street parking, leaving their visitors with	The maximum height proposed within Precinct D is three storeys which is consistent with the height of buildings within the Ascot Waters Estate. Parking requirements for future development within Precinct D will be assessed against the R-Codes and Local Planning Scheme No. 15.

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		nowhere to park. Considers this will only become worse with further development unless the Council insists that as part of the approvals each property has two parking bays, which is still not enough.	Regarding traffic, refer to the Movement section of the report.
47	Public Submitter	**Raises concerns** Raises concerns about the proposed clearing of land near the Swan River, as it includes important foraging space for Black Cockatoos. Considers that at the rate trees and habitat are being cleared in and around Perth, these birds are being driven to extinction. Requests the development be reconsidered.	Refer to Environment section of the report.
48	Public Submitter	**Raises concerns** Understands that the plan involves clearing more precious city bushland to build horse stables. Notes that following last summer's loss of many food and habitat trees, the endangered and rapidly diminishing populations of Carnaby's and Red-tailed Black Cockatoos are now starving. Urges that the bushland along the Swan River be preserved. Highlights that it is well-established that the rapid clearing of bushland is threatening the natural environment.	Refer to Environment section of the report.
49	Public Submitter	**Raises concerns** States section A is in a flood plain and understands that property on Bayswater side has been resumed because of the inability to build on such an area. Questions why an exemption applies here.	The Structure Plan has been referred to the Department of Water and Environmental Regulation (DWER) for comment. DWER has advised that a small portion of Precinct A is located within the floodway and as such any future development would have to comply with floodplain management and meet minimum habitable floor levels. A minimum habitable floor level of 0.5m above the adjacent 1% AEP flood level is recommended to ensure adequate flood protection. The Structure Plan complies with this and requires that all structures are built 0.5m above the flood level.
50	Public Submitter	**Raises concerns** Concerned about the proposal to clear 1.27 hectares of black cockatoo foraging habitat in Ascot for stables. States this area is a crucial part of the Swan River ecosystem, supporting not only endangered black cockatoos but also a range of other wildlife that relies on these green spaces. Notes that with their habitats increasingly threatened by urban development, these cockatoos are struggling to find adequate food sources along the river. Considers that clearing their foraging habitat for profit disregards the long-term environmental impacts, particularly for endangered species like the black cockatoo. Believes we need to prioritise conservation and look for alternative solutions that do not further compromise these sensitive ecosystems.	Refer to Environment section of the report.
51	Public Submitter	**Raises concerns** Expresses concerns regarding the proposed clearing of 1.27 hectares of critical foraging habitat for Carnaby Black Cockatoos and Red-tailed Black Cockatoos in Ascot. States these endangered species are already facing significant threats to their survival, and the loss of this vital habitat would further jeopardise their existence. Outlines that the Swan River corridor is a crucial refuge for these birds, providing essential food sources and resting sites. Considers removing these trees, we are directly impacting their ability to survive. Notes these majestic creatures are an integral part of our local ecosystem and we have a responsibility to protect them.	Refer to Environment section of the report.

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		Urges the City of Belmont to reconsider this proposal and prioritise the preservation of this valuable habitat.	
52	Public Submitter	**Supports** States that the project is a fantastic initiative, and the new facilities will support a vital industry and provide much needed real estate opportunities covering multiple sectors.	Noted
53	Public Submitter	**Raises concerns** Concerned about the parking for stable staff relating to on course stable and whether the side streets of Kalgoorlie Street, Keymer Street, Leake Street and Aurum Street are going to be parking lots similar to what is currently being experienced in Leake and Aurum Streets. Questions if the manure bins for on course stabling will be situated inside the race course. States that the smell of bins would be offensive if not monitored and desired particularly in the hotter months.	This level of detail has been/will be addressed through the development application process. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth This level of detail has been/will be addressed through the development application process. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth Future stables will need to be managed in accordance with the City's Consolidated Local Law which requires stables to be kept in a clean and sanitary condition and as far as practicable, free from flies, rats, other vectors of disease and offensive odours.
54	Public Submitter	**Raises concerns** Raises concerns about increased traffic on Matheson Road and adjacent feeder roads and an increase in noise and movements through the day, evening and night associated with the on-course stabling. Questions what the aesthetics of the stables will be. Notes having stables and raises concerns about the potential loss of income and loss of value of the property. Considers a rezoning to a much higher density for the precinct is the only way stable/property owners will accept on course stabling and changes to Ascot Racecourse.	Refer to Movement section of the Council report. This level of detail has been/will be addressed through the development application process. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth Potential loss of income is not a relevant planning consideration. It should be noted that stables can currently be developed without the precinct structure plan. Officers will further consider the future planning of this area through the preparation of the City's Local Housing Strategy, Local Planning Strategy and Local Planning Scheme.
55	Public Submitter	**Supports subject to modifications and raises concerns** States that heights within Precinct D need to be height restricted to fit with other properties in Ascot Vale and Ascot Waters.	A maximum building height of three storeys is proposed within Precinct D. This height is considered to integrate well with neighbouring building heights. Further comment about the interface of the 'Mixed Use' portion of Precinct D to Ascot Waters is included within the report. Noted

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		Considers a Childcare Centre is a good fit for this location. Concerned about how the impact of the increased volume of traffic on Grandstand Road will be managed. States it is already difficult to cross Grandstand Road as a pedestrian or cyclist and difficult to access and leave the roundabout at Waterway Crescent by vehicle. States that while the roundabouts on Grandstand Road look great they are becoming increasingly difficult to enter and exit from Ascot Waters. Believes they need to be fitted with traffic lights.	 Refer to Movement section of the report. Traffic lights were previously considered at the intersection of Resolution Drive, Stoneham Street and Grandstand Road. These were not supported by Main Roads Western Australia due to the proximity to the Stoneham Street and Great Eastern Highway intersection.
56	Public Submitter	**Raises concerns** Concerned that the Structure Plan would no longer allow pedestrians or cyclists to walk along the river at the point where the racecourse intends to increase their boundary line. States that it appears there will no longer be pedestrian or cyclist access or footpaths along the river edge. Requests Council not support the proposal.	 There is no change proposed to the lot boundary or pedestrian and cyclist infrastructure in this location. Noted.
57	Public Submitter	**Supports and raises questions** States that generally the plan is excellent. Wishes to know more about the development plans for Precinct D as this area is opposite the submitters home. In particular wishes to know: • Maximum height of dwellings – will they be 3 storeys? • Will there be adequate parking particularly street parking? • Will the setback from Northerly Avenue contain landscaping including trees? • How many dwellings are proposed? • What plans exist for the Kilns land e.g. public parklands?	 Noted A maximum building height of three storeys is proposed for Precinct D. Parking will need to be provided on-site in accordance with the R-Codes and the parking standards included in the Structure Plan. Landscaping of private residential development sites will need to comply with the R-Codes. A modification to the draft Structure Plan is proposed to include a provision requiring landscaping adjacent to Northerly Avenue within the 'Mixed Use' zoned portion of the lot. The structure plan applies an R60 density code to the area. While the exact number of dwellings will be subject to a subsequent development application and/or subdivision application, the indicative plan prepared by Perth Racing identifies 41 lots. The Ascot Kilns land is owned by the State and is not subject to this structure plan. The draft Golden Gateway Local Structure Plan identifies this land as subject to a separate planning process and requires the preparation of a local development plan with 10% of this area set aside as public open space.
58	Public Submitter	**Raises concerns**	

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		Questions when humans will learn that decimating native fauna habitat is not the way? Points out that Carnaby cockatoos are at a dangerously low population and that the proposal will wipe out further habitat.	Refer to Environment section of the report.
59	Public Submitter	**Raises concerns** Does not believe the expansion to the racecourse is beneficial to the residents of the surrounding areas. States the destruction of the vital naturals areas that support native animal life and human well-being is the most important thing. States that the destruction of natural areas to support gambling is not how we should be planning our future.	Noted. Refer to Environment section of the report.
60	Public Submitter	**Raises concerns** Considers that stabling on the racecourse is an excellent idea but there is inadequate parking for high usage days such as race meetings and public events. Additionally, details on traffic flow are vague. Questions if the proposal to build stables will change some of the restrictions on building in the original stables area. Considers that the requirement to allow for stables even if landowners aren't involved in the industry is a nightmare.	Parking for residential and commercial developments within the precinct will need to comply with the Structure Plan requirements and the Residential Design Codes. Regarding parking availability of patrons of the racecourse and traffic, refer to Movement section of the report. The Ascot Racecourse Precinct Structure Plan does not propose changes to the use and development of properties within the 'Residential and Stables' zone. Officers will further consider the future planning of this area through the preparation of the City's Local Housing Strategy, Local Planning Strategy and Local Planning Scheme.
61	Public Submitter	**Raises concerns** Has attended a meeting hosted by Perth Racing and raises the following concerns: Traffic management on Matheson Road and connecting roads once the oncourse stabling is completed. States that if a licensed venue were to be built, sufficient parking and access arrangements would need to be demonstrated. Mentions that Perth Racing has lost parking bays. On race days, the streets connecting to Matheson Road have cars parked on both sides of the streets. Raises safety concerns with this and believes a disaster will happen. Mentions that there was talk at the meeting about getting media and politicians involved. Believes this is not necessary if the City of Belmont looks at the impact of the proposed development.	Refer to Movement section of the report. Refer to Movement section of the report. Submissions will be reviewed and considered by Officers, Council and the Western Australian Planning Commission. The Western Australian Planning Commission will ultimately be responsible for determining the draft Precinct Structure Plan.
62	Public Submitter	**Raises concerns** States that the main concerns is the potential to construct a 'landmark' building as part of a vertical retirement village for retirees of the horse-racing industry. Does not accept it practical for retirees who in the event of an emergency would need to use staircases. Requests that building heights are kept to practical levels for retirees to manage. Notes that there is reference to "A site responsive design that integrates the aspirations of Perth Racing with the characteristics of the local area". States that buildings in the area are not 20 storeys high but considerably lower. Mentions that	All buildings will need to comply with the Building Code of Australia, which includes fire safety and accessibility requirements. Suitable emergency evacuation procedures would need to be established to ensures safety for residents. Refer to Precinct A section of the report.

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		more housing options for retirees and others should be provided but that the area shouldn't be ruined by building too high. Believes landmark buildings are the vision and objective of Council who want to pack more ratepayers into a very small part of its community and hoping that its 'northern gateway' will be the site of some building that will demonstrate Belmont as the City of Opportunity it claims to be. States fill may be required to achieve minimum groundwater clearance and that a 20 storey building may become an unsightly blot on an otherwise attractively and to date thoughtfully managed environment the Council can be proud of.	Ratepayer income is not a consideration when assessing planning frameworks. Noted.
63	Public Submitter	**Raises concerns** Writes to provide feedback on the proposed Structure Plan, particularly the oncourse stabling adjacent to their property and its implications for residents within the 'Residential and Stables' area. Notes that under the current zoning, stables are located within the 'Residential and Stables' are interspersed among residential properties. Considers that the Structure Plan's proposal to consolidate stables into "on-track" stabling introduces several significant concerns for residents whose properties are adjacent to this new development. Raises the following concerns: 1. Odour Management: Considers the relocation and consolidation of a large number of stables directly adjacent to their property significantly heightens the risk of odour issues, particularly during warmer months when stable waste becomes more challenging to manage. Highlights that this would adversely affect the quality of life for them and residents in the immediate vicinity. 2. Noise Pollution: Outlines that on-track stabling, while operationally necessary for the racecourse, creates noise associated with horses, stable operations, and transport activities. Considers that relocating this activity to an area directly adjacent to residential properties, including theirs, would intensify the level of disruption, particularly during pre-dawn hours when horse training occurs. 3. Light Pollution: States that pre-dawn stable operations require lighting, which introduces artificial light into an area traditionally residential in nature. This would further disrupt the sleep and well-being of residents living nearby.	Noted Noted. It should be noted that stables can be constructed on the subject land irrespective of the structure plan. However, Future stables will need to be managed in accordance with the City's Consolidated Local Law which requires stables to be kept in a clean and sanitary condition and as far as practicable, free from flies, rats, other vectors of disease and offensive odours. Stables can already be established on the site, and the land has always been able to support more intensive horse-related activities. Notwithstanding, noise has been/will be further considered through the development application process. The acoustic study prepared in support of the recently approved stables development find that any noise associated with the proposed stables development is compliant with the Environmental (Noise) Regulations 1997 with mitigation or operational management measures proposed to address specific use of the development. It should be noted that stables can be constructed on the subject land irrespective of the structure plan. However, Lighting has been/will be further considered through the development application process. The recently approved stables development includes a condition requiring a lighting plan to be submitted for approval prior to commencement of works. The plan must show all proposed lighting for the public spaces, landscaped areas, buildings, and carparking areas onsite The distribution of stables and future planning of the 'Residential and Stables' area will be further considered by Council through the preparation

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		Urges Council to reconsider the zoning and management of the Residential and Stables area to mitigate these impacts. Specifically, requests: 1. Reduction of stables Within the Residential Area: To counter the addition of a large number of stables in this location, considers it appropriate to revisit the distribution of stables within the area with an eye toward reducing or removing them entirely. States that this would alleviate existing land use conflict and allow for a more cohesive and sustainable residential community. 2. Rezoning to support subdivision: Considers that rezoning the area to allow for subdivision would facilitate the gradual removal of stables. States this would reduce the cumulative impacts of the new on-course stabling arrangements while creating opportunities for residential redevelopment. Considers the above approach strikes a balance by addressing the operation needs of the racecourse while safeguarding the quality of life for residents in the area. Believes it aligns with broader goals of urban liveability and sustainable development, ensuring that residents are not disproportionately affected by these changes.	of the City's Local Housing Strategy, Local Planning Strategy and new Local Planning Scheme having regard to the amenity and sensitivity of the area.
64	Public Submitter	**Raises concerns** States having lived on Ennis Place for 24 years and opposes the development of the stables complex. States that Ennis Place, a cul-de-sac with eight houses, will be the principal access to the complex which means that stable hands, strappers, riders and others will arrive from 4am until about 10am and again in the afternoon for several hours. Mentions that there will be feed truck deliveries, manure collections, horse boxes, trucks and floats using the road continually and that on race days semi trailer trucks, four wheel drives and the like will be loading horses especially when racing is at Kalgoorlie, Belmont Park, Bunbury, Northam and Pinjarra. Notes there will also be return trips from these venues late in the evening. Mentions that horses require a lot of care and this will result in 24/7 use of Ennis Place representing major traffic and noise disruptions and a hazard and nuisance for residents, particularly children, the elderly and residents' pets. States that Ennis Place is not mentioned in the documentation and that it appears the Turf Club has knowingly and callously disregarded the residents of this road. States residents were not in the loop of the implications of on course stabling with the bulldozing of the back track and the 70 or more mature trees to build three storey high stables for 480 racehorses. States they purchased the property because of the magnificent tree line, the tranquillity, the views and openness of the location. Mentions that it now appears the trees will be gone and that they will be confronted by a mass of three storey stables built directly in line of sight just 10 metres from their living room, veranda and bedrooms. States that there was never any mention of this when they bought the property and that the little sandown back track training circuit has been in continuous	Noted Access of Ennis Place was considered through the assessment of the recently approved stables complex. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth A modification is proposed to the Transport Impact Assessment to identify the possibility of access from this road. Noted. It should be noted that stables could always have been developed on the subject land without the structure plan.

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		use for at least 60 years, possibly longer and so it was understood this was a permanent fixture. Notes that the City of Bemont has been committed to cultivating a vibrant and sustainable ecosystem and spends tens of thousands of taxpayers dollars on a tree planting program each year. Also notes that City trees located on verges, in parks or reserves are managed by the City of Belmont and that it is an offence to prune, damage or remove any of the City's trees without approval. Questions whether the Trub Club of WA need permission to remove trees. Objectives to this and labels it "environmental vandalism". Mentions that CSIRO research scientist Peter Caccetta, was part of a team that mapped canopy cover above three metres using aerial photography who said: *"we found that for every increase of 10% tree canopy cover, you get 0.62 degree decrease in land surface temperature."* *"Local government authorities with low tree canopy cover tend to have higher land surface temperatures."* *"On average they can be up to five degrees hotter in land surface temperature than the suburbs that have greater canopy covers."* States the proposed stables complex with the removal of over 70 matures trees, not including the self sown saplings, will make the situation worse and be counter productive to the City of Belmont's initiative to plant more trees. Considers that the loss will significantly impact on neighbourhood character, landscape and wildlife. Quotes what the Structure Plan records about vegetation and black cockatoos foraging habitat and considers this should be of concern to Perth Racing and the City of Belmont. States it is already established that Belmont and suburbs close to the airport are regularly the hottest in Perth in summer. This is presumably due to the expanse of bitumen and concrete used for runaways and roads.	Refer to Environment section of the Council report.
		Considers that not only will the proposed development devalue their property, but there will be nuisance created by the smells and flies. States that the proposed height of three storeys would block the afternoon sea breeze. Believes their rights are being infringed upon and that their home is sacred and that losing their serene rural outlook to a 450 stable monstrosity is insane in the context. Has made a lifetime commitment to live in the Belmont community and that as a ratepayer they expect far better. States that they are standing up for their rights to not have their lifestyle ruined. References the objective of precinct C to mitigate potential land use conflict through appropriate design and management practices, and states that there is a case for mitigation having regard to the above comments.	It should be noted that stables can be developed on the subject land without the structure plan. As detailed in previous responses to submitter comments, amenity impacts have been considered during the assessment of the recently approved application. If Perth Racing do not act on this approval, amenity impacts will also be considered as part of other applications.
		Questions how the Structure Plan can say that road reserves will be maintained in their current configuration, when an extension to Ennis Place would require a crossover at the end to connect to the stables.	A modification is proposed to the structure plan for the Transport Impact Assessment to identify the possibility of access from Ennis Place.

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		References "the management of transport noise will ultimately be considered as part of future application to subdivide or develop land within the structure plan area" and points out that the volume of traffic which will use Ennis Place night and day can only be described as unprecedented and very dangerous.	Refer to Movement section of the report.
65	Public Submitter	**Raises concerns** Outlines owning a property adjacent to the area identified as 'Precinct D' and notes that this precinct is proposed to be 'Residential' and 'Mixed Use' and that the 'Mixed Use' portion could be used for a small-scale non residential use fronting Grandstand Road, including but not limited to a 'Child Care Premises.' Notes that the area adjacent to Precinct D is currently a residential area with single or 2 storey houses, and considers it ideal to either develop this area only as a residential use area by changing the zoning to 'residential' or to leave its current zoning 'place of public assembly'. States that changing the zoning to 'Mixed Use' carries the risk that this area may be used at a later date for the opening of shops, small offices, retail outlets, showrooms and other uses. Considers this will not be an ideal outcome as the adjoining area is residential and development will increase noise and create more traffic issues. Regarding the development of a childcare premises, the submitter states that the demographics of Ascot Waters and neighbouring area shows that its population mostly consists of elderly and retirees not young families who would benefit from the childcare premises. Believes this will result in additional traffic and noise along Grandstand Road as young families from distant areas come to the area for dop off and pick up. States race days will impact young couples as traffic moves very slowly on Grandstand Road on those days. Considers Precinct E is a better area for a 'mixed use' zoning instead of 'Precinct D'. Notes that Precinct D is proposed to have a height of 3 storeys, could accommodate 40+ houses and traffic movements will occur on Resolution Drive. States that residents of Ascot Waters face traffic issues at the roundabout of Grandstand Road, Resolution Drive and Stoneham Street. Questions if the impact of adding additional households or an emergency evacuation plan has been looked into. States that there are only three exist points for Ascot Waters residents and that in the case of flooding, there may be difficulty for emergency vehicle to reach the area in a timely manner. Notes that adjacent to Precinct D is the Ascot Kilns site for which a development plan has not been prepared. States that the City of Belmont should wait to see what development is planned for that land so that there is synergy between it and the entire area stretching from the Ascot Kilns site to Ascot Waters.	Noted Refer to Precinct D and Restricted Uses sections of the Report. It should be noted that child care premises can currently be proposed under the existing zoning. While the Structure Plan indicates the 'Mixed Use' portion of Precinct D may be developed as a childcare centre, access arrangements for the specific use will be further considered through the development application process. Proponents will be required to provide a Traffic Impact Assessment or Traffic Impact Statement as part of their application and consistent with the City's Local Planning Policy No. 9, will need to submit a traffic safety assessment. Refer to Precinct D and Restricted Uses sections of the Report. Properties within Ascot Waters were required to have Finished Floor Levels 0.5m above the 1% AEP flood level and so flooding is not anticipated within this precinct. Regarding traffic movements, a Transport Impact Assessment has been prepared in support of the structure plan. The assessment concludes that all intersections into Ascot Waters will have an appropriate level of service. A draft Local Development Plan has been prepared by Department of Planning, Lands and Heritage (DPLH). The future planning of this site is ultimately at the discretion of the DPLH. It is not considered necessary for the planning of this site to progress before the Precinct Structure Plan is progressed.
66	Public Submitter	**Raises concerns** Notes being excited to see movement in developing the area and the surrounding precinct. States that Ascot has always been seen as a sleeping giant. Looks forward to see the area built and used to its potential.	Noted.

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		Welcomes the structure plan and looks forward to bringing life and entertainment to the area along with safer on course stabling options. Hopes the structure plan lowers entry constraints to new trainers and boosts the industry, suburb and Council as a whole.	
67	Public Submitter	**Raises concerns** States that despite raising the issue with the City of Belmont on many occasions, traffic in the area is continually ignored. Notes on one occasion, traffic counters were placed on Carbine Street to track traffic but between the Christmas and new years break. Considers this provided inaccurate information about traffic volumes and seemed deliberate to avoid data which would reveal a genuine issue. States that occurred at least 2 years ago and since, Carbine Street and Matheson Road has become a rat race for cars wanting to avoid traffic queues on Great Eastern Highway. States that cars speed down the street which has more than 15 children under 11 years of age as residents, whirl around the bend onto Matheson Road and accelerate past horses who are coming back from their afternoon walk. States there have been multiple ducks killed on the road and complaints made but the issue is ignored. Considers that any plan to change development in the area cannot reasonably occur until detailed and proper road management consultation and investigation occurs. In their view, Carbine Street should be closed off to traffic entering from Great Eastern Highway, leaving only exiting the street possible at the Great Eastern Highway end. The submitter believes this would stop the rat race and dangerous driving and that perhaps this should occur to all streets between Matheson Road and Great Eastern Highway to prevent the issue being moved up one street. Is concerned that mixed use and commercial development at the end of Carbine Street will generate more traffic in the area. Questions whether a horse or child need to be killed before the City will take the matter seriously. Submitter does not understand why feedback from local residents is not being taken seriously. States that the area already looks abandoned and poorly maintained. The verges are rarely mowed, there are weeds waist height in the median strips on Matheson Road but nothing is done. Submitter believes it is at odds to develop the area when it is already not being maintained. Believes allowing commercial and retail uses on Carbine Street will de-value properties and cause parking chaos. States the street already has one abandoned car which has been there for months and on race days, the street is packed with cars parked. States that in the submitters five years of living in the area, a ranger has never been seen patrolling on race days. Considers the whole plan is shortsighted taking into account the current traffic issues and lack of management by the City of Belmont. States increased traffic in the area is the last thing that is needed and if anything occurs, traffic calming measures should be considered, blocking off the entry from Great Eastern Highway, and installing speedhumps and S bends in the road.	Traffic counts along Carbine Street were conducted over a three-day period from 29 December 2020. The counts did not show any abnormal patterns, and it is unlikely that conducting them at a different time would have revealed significant differences. A modification is proposed for the draft Precinct Structure Plan and Transport Impact Assessment to be updated to include further details about vehicle movements within the residential and stables area. Regarding the closure of Carbine Street, officers are not supportive at this stage as this would likely result in traffic impacts on other roads within the residential and stables area. This matter is not relevant to the precinct structure planning process. The submitter is welcome to further liaise with officers about this. Future development proposals will need to comply with the parking requirements of the Structure Plan. Regarding parking on race days, refer to the Movement section of the Council report. Refer to Movement section of the report.

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		Deeply concerned about the way the changes will impact their lifestyle and urges better consultation with Carbine Street residents who will be disproportionately affected by the proposal. Notes being happy to attend the Civic Centre and speak to representatives of the City about the issues.	The Structure Plan is not a City led plan. The City's role is to advertise the structure plan in accordance with the Planning and Development (Local Planning Schemes) Regulations 2015, consider the submissions and make a recommendation to the Western Australian Planning Commission. The submitter is welcome to request a meeting with the City.
68	Public Submitter	**Raises concerns** Notes that the plan proposes the removal of 70 mature trees and many of these trees are used by both Carnaby and Red Tail Cockatoos for feeding and nesting and that section 2.1.4.8 says: "The two conservation significant species recorded at the time of survey include one threatened species, being the Forest Red-Tailed Black Cockatoo (Zanda banksia naso) and one Priority 4 species (blue-billed duck (Oxyura australis). A total of 1.27ha of Carnaby's Black Cockatoo foraging habitat was recorded on the site, of which 0.35ha comprised primary foraging habitat and 0.92ha of secondary foraging habitat. A total of 0.84ha of Forest Red-Tailed Black Cockatoo foraging habit was recorded on the site, comprising 0.28ha of primary native habitat, 0.56ha of secondary foraging habitat. A total of 32 Black Cockatoo habitat trees were recorded during the survey, of which 29 were located within the subject site. Of the trees located on the site, four (4) trees contained hollows potentially suitable for Black Cockatoo breeding." Notes section 5.2.4 indicates that most of these trees will be removed: '"Emerge Associates also found that the site contains 1.27ha of Black Cockatoo foraging habitat and 29 habitat trees, of which four (4) trees contained hollows potentially suitable for Black Cockatoo breeding. These areas are primarily located within the eastern and southern portions of Precinct C, with a small area also located in the north-eastern corner of Precinct E. These areas generally conflict with plans for the on-course stabling and the equine welfare centre, however there may be opportunities to retain some limited areas. This will be considered further through detailed design, however in any event, a referral under the EPBC Act may be warranted prior to works being undertaken." States that whereas other local authorities are doing everything to conserve and protect cockatoos, this structure plan will remove their habitat with the proviso that more trees will be planted. Asks the City to let the cockatoos know to come back in 50 or 70 years when the trees have reached maturity. Considers it is time for Belmont Council to protect endangered species. States that the tree canopy around Belmont has been significantly impacted by the Tonkin Gap project where hundreds of mature trees were removed.	Refer to Environment section of the Council report.
69	Public Submitter	**Raises concerns** States it is striking that the current track will be maintained and presumably used for racing and that all of the area now used for parking during races will be developed and no longer used for parking.	Refer to Movement section of the Council report.

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		Questions how parking issues will be addressed. States another issue is the construction and use of stables for 400+ horses and that the support needed for such an endeavour is exceedingly limited. The submitter states that they are not a horse person and don't know how much one eats per day but just 10kg per horse means about three tonne of manure would be produced per week (likely more). States this requires large amounts of feed and "bi-products" moving through the neighbourhood streets daily. States that when the movements of horses is added, it will be devastating for the area, turning it from a relaxed residential area into an industrial zone focused on a critter that is pretty much anachronistic to the current trajectory of Belmont and Perth general. Mentions that the area has a very distinctive aroma (especially in the heat of summer). States the massive barns will make this into a daily and all year round noxious neighbourhood enhanced by the reduced tree cover increasing temperatures even more. Requests that we move beyond horse racing and see this area redeveloped completely without racing, in a responsible way.	It should be noted that stables can be constructed on the subject land irrespective of the structure plan. However, Future stables will need to be managed in accordance with the City's Consolidated Local Law which requires stables to be kept in a clean and sanitary condition and as far as practicable, free from flies, rats, other vectors of disease and offensive odours. A Waste Management Plan was submitted in support of the development application for the on-course stables. Noting that the area is used for horse related activities a level of odour within the area can be expected. Perth Racing as a private landowner are able to continue their horse racing activities. Regarding stabling within the broader area, the City of Belmont will further consider the future planning of this area through the scheme review process.
70	Public Submitter	**Supports** Believes it is a great idea. States that the property market is out of control and young and up and coming trainers will be able to stable their horse on course like the other Australian racecourses.	Noted.
71	Public Submitter	**Supports** Submitter provided a purple tick symbol.	Noted.
72	Public Submitter	**Supports** Supports the structure plan and is happy that horse racing activities will remain a part of the suburb.	Noted.
73	Public Submitter	**Raises concerns** States that traffic on the street has already increased and the speed limit is rarely adhered to. Would like to know how shops directly next door would impact traffic, what kind of demographic it would attract and how it would impact the value of the submitters home.	Shops are not proposed along Carbine Street. Regarding traffic within the area, refer to the Movement section of the Council report. Property values are not a relevant planning consideration.
74	Public Submitter	**Raises concerns** States that changing the zoning of Precinct D will increase traffic which will not be beneficial for Ascot Waters residents. On this basis, does not agree with the proposed plan.	Refer to Movement Section of the Council report.
75	Public Submitter	**Raises concerns**	

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		Notes that the area next to Ascot Waters accommodates the Ascot Racecourse office in Lee-Steere House, which is designated as Precinct D and proposed to be rezoned to Residential and Mixed Use. States that this proposal raises several concerns that warrant consideration. Notes that the area surrounding Precinct D primarily consists of single- and two-storey residential homes. Considers that, given this context, it would be more appropriate to either rezone Precinct D exclusively for residential use or retain its existing designation as a "Place of Public Assembly." States that rezoning the precinct for "Mixed Use" introduces the possibility of developments such as shops, offices, or retail outlets, which would be incompatible with the predominantly residential character of the area. Considers that such developments are likely to result in increased noise and heightened traffic congestion. Notes that the current plan includes provisions for a "Child Care Premises" within the proposed mixed-use zone. Highlights that, according to the Australian Bureau of Statistics, the area's average age is 46 years, with only about 4% of the population being under five years old. States that this demographic profile indicates limited local demand for childcare services. Considers that families from outside the area would need to drive in for drop-offs and pick-ups, further increasing traffic congestion and noise, particularly along Grandstand Road. Highlights that such impacts would negatively affect nearby properties, especially on race days when Grandstand Road is completely blocked, exacerbating congestion and delays. Notes that the portion of Precinct D proposed to be zoned for residential use, with a three-storey building height, is expected to accommodate approximately 40 houses. Considers that the traffic generated by these households would primarily use Resolution Drive, which already experiences congestion. States that residents of Ascot Waters currently face challenges navigating the roundabout at Grandstand Road, Resolution Drive, and Stoneham Street, and additional households would likely worsen these issues. Highlights that the impact of increased housing on the area's emergency evacuation plans has not been adequately addressed. Notes that the area, located within a 100-year floodplain, has only three exit points, which could hinder timely evacuation or emergency access during flooding. The submitter notes that the adjacent Ascot Kilns area lacks a finalised development plan. Considers that the City of Belmont should delay decisions on Precinct D until a cohesive plan is developed for the entire area. States that such an approach would promote synergy between Ascot Waters, Precinct D, and the Ascot Kilns area, ensuring a more harmonious and practical development strategy for the region.	Noted. Refer to Precinct D and Restricted Uses sections of the Report. It should be noted that child care premises can currently be proposed under the existing zoning. While the Structure Plan indicates the 'Mixed Use' portion of Precinct D may be developed as a childcare centre, access arrangements for the specific use will be further considered through the development application process. Proponents will be required to provide a Traffic Impact Assessment or Traffic Impact Statement as part of their application and consistent with the City's Local Planning Policy No. 9, will need to submit a traffic safety assessment. Refer to Movement section of the Council report. Properties within Ascot Waters were required to have Finished Floor Levels 0.5m above the 1% AEP flood level and so flooding is not anticipated within this precinct. A draft Local Development Plan has been prepared by DPLH. The future planning of this site is ultimately at the discretion of the DPLH. It is not considered necessary for the planning of this site to progress before the Precinct Structure Plan is progressed.
76	Public Submitter	**Raises concerns** States that changing the zoning does not align well with the existing character of the area. Notes that Ascot Waters would be the main area affected by the proposed rezoning. Highlights that Ascot Waters is primarily comprised of older or retired residents, with very few families with children. The submitter questions the appropriateness of a childcare facility at the location of the old Racecourse offices. Considers that such a facility would encourage increased	Refer to Precinct D and Restricted Uses sections of the Report. It should be noted that child care premises can currently be proposed under the existing zoning.

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		traffic in and out of the area as parents drop off and pick up children who do not reside nearby. Questions the suitability of mixed-use zoning, noting that it would bring additional traffic and people to the area. The submitter suggests building houses that are consistent with the scale and character of those surrounding the site on Grandstand Road and Tidewater Way. States that high-rise buildings would add another layer of congestion and would be better suited to Great Eastern Highway, where there is more suitable land and access to major bus routes and roadways. The submitter highlights that the races across the road already cause congestion, which would become significantly worse on race days under the proposed rezoning. Considers that only normal residential housing would be appropriate for this area.	While the Structure Plan indicates the 'Mixed Use' portion of Precinct D may be developed as a childcare centre, access arrangements for the specific use will be further considered through the development application process. Proponents will be required to provide a Traffic Impact Assessment or Traffic Impact Statement as part of their application and consistent with the City's Local Planning Policy No. 9, will need to submit a traffic safety assessment. A maximum building height of three storeys is proposed for Precinct D. It is considered that this height integrates well with existing heights within Ascot Waters. Regarding traffic, refer to Movement section of the Council Report. Regarding dwelling typology, a maximum building height of three storeys is proposed. This height is considered to integrate well with the dwelling typology and scale of residential development within Ascot Waters.
77	Public Submitter	**Raises concerns** Hopes the structure plan can stay as residential use only, to keep the natural beauty and quiet of the area.	The appropriateness of zones, density codes and land use permissibility is further detailed for each precinct within the report. A modification is proposed to the Structure Plan to address the interface of the 'Mixed Use' portion with residential development within Ascot Waters.
78	Public Submitter	**Raises concerns** Concerned about the planned construction near the neighbourhood, notes that it may disrupt daily life. Highlights the potential for noise, dust, and increased traffic to negatively impact the peaceful environment. Considers that these changes could affect the well-being of residents, including children and the elderly. Hopes that the construction team will consider measures to minimise its impact on the community. Emphasises the importance of maintaining a quiet and healthy living space and requests understanding and support in this matter.	A construction management plan will be required to accompany future building applications to ensure construction does not adversely affect health and safety. Noted.
79	Public Submitter	**Raises concerns** Notes that the adjacent area is residential and considers that this pocket should remain residential or community space. Highlights that there are sufficient opportunities for business premises along the highway and in the future planned Golden Gate project. States that the proposed plans fail to address the impact on traffic and parking, which are already problematic. Highlights that safety issues regarding emergency services access have also not been addressed.	The appropriateness of zones, density codes and land use permissibility is further detailed for each precinct within the report. Parking and traffic details are included within the Transport Impact Assessment attached to the structure plan. Further discussion on this document is contained within the Movement section of the Council report. Regarding emergency services, there is no requirement for this to be specifically addressed in the structure plan documentation.
80	Public Submitter	**Supports subject to modifications and raises concerns**	

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		Notes reviewing the draft Precinct Structure Plan including the applicants Retail Assessment (Net Benefit Test). Is concerned that the draft PSP is inconsistent with key contemporary aspects of the City of Belmont Local Planning Framework and as such has the potential to jeopardise the planning and future development of the Golden Gateway Activity Centre, as well as undermining and disrupting the City's established activity centre hierarchy. Supports the intent of the draft PSP and acknowledges that it may facilitate the development of a local centre scale activity centre as per the City's planning framework at the intersection of Grandstand Road and Resolution Drive. Requests an amendment to the amount of shop/retail floorspace proposed within the draft PSP to ensure consistency with the City's established planning framework. **Background** Understands that the draft PSP has been prepared to guide the future use and development of Perth Racing's landholdings in Ascot, including and surrounding the existing Ascot Racecourse. The PSP applies to Lots 1 (No. 88), 3 (No. 96), 13, 50, and 9002 (Nos. 71), and Lot 452 (No. 70) Grandstand Road, Lot 7005 (No. 71) Matheson Road, and Lots 51 (No. 2) and Lots 51 (No. 2) and 100 (No. 1) Raconteur Drive, Ascot. The PSP area comprises nine (9) lots with a total area 61.3294ha, all of which are owned by Perth Racing, except for one (1) lot which is owned by the WAPC. Notes that the Structure Plan designates five (5) precinct areas subject to different objectives and planning requirements: • Precinct A (Retirement Living) • Precinct B (Racecourse Administration & Entertainment) • Precinct C (Racecourse & Stabling) • Precinct D (Residential & Mixed Use) • Precinct E (Commercial) Notes that Part One – Implementation, Section 4.3.1 Activity Centre of the PSP Report states that: *'This Precinct Structure Plan includes a portion of the Golden Gateway Activity Centre (within Precinct E) and is supported by a Net Benefit Test to assess the economic demand and implications for potential retail and commercial development in this area. Refer Appendix 6 – Retail Assessment (Net Benefit Test).* *Development within the Golden Gateway Activity Centre shall be in accordance with the provisions of this Precinct Structure Plan and the requirements of State Planning Policy 4.2 – Activity Centres ('SPP 4.2').* *Development of Shop/Retail floorspace up to 3,400m² NLA is permitted within the Golden Gateway Activity Centre without requiring further assessment. Any development proposal involving net additional Shop/Retail floorspace above 3,400m² NLA within the Golden Gateway Activity Centre constitutes 'major development' and shall be supported by a further Net Benefit Test prepared in accordance with SPP 4.2'.* **Matters for Consideration**	Noted. Refer to the Precinct E section of the report.

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		Is of the opinion that shop/retail floorspace allowance within the draft PSP should be amended to comply with the City's current planning framework. Notes that the City of Belmont Activity Centre Planning Strategy (ACPS) which was adopted by Council at its meeting on 27 February 2024, identifies a new future local centre with 1,200m^2 of retail floor space within the Golden Gateway precinct and that its location will be guided by future detailed planning. Understands the updated draft Golden Gateway Local Structure Plan (LSP) which was advertised by the City during October 2024, supports the development of a 1,200m^2 local centre within the Golden Gateway precinct, with no specific site designated within the Plan. Notes Section 2.3.4.3 of the PSP Report states that, 'SPP 4.2 applies to the Precinct Structure Plan as Precinct E is intended to facilitate the development of an activity centre at the intersection of Grandstand Road and Resolution Drive, forming part of the wider Golden Gateway activity centre. The size and scale of the proposed Golden Gateway activity centre would be akin to a 'Local Centre' or a 'Neighbourhood Centre' under SPP 4.2'. Notes that both the City's ACPS and the updated draft Golden Gateway LSP support the development of a 1,200m^2 local centre within the Golden Gateway precinct. States it is also clear that neither of these planning documents support the development of a neighbourhood scale activity centre with the proposed extent of shop/retail floorspace being sought in the draft PSP. Believes it is likely that the objective of the increased floorspace is to accommodate a full line supermarket which is a use not contemplated in this location under the City's current planning framework. **Conclusion** Based on a review of the draft Ascot Racecourse PSP including the supporting Net Benefit Test, states that it appears the amount of shop/retail floorspace proposed within the PSP area significantly exceeds that specified in the ACPS and recently advertised updated draft Golden Gateway LSP. States that both the City's ACPS and updated draft Golden Gateway LSP support development of a new/future local centre with 1,200m^2 of retail floor space within the Golden Gateway precinct. Notes that although no specific site has been designated within the LSP, it does mention that the local centre may be located on Western Australian Turf Club land. States that despite this, Part One – Implementation, Section 4.3.1 Activity Centre of the draft Ascot Racecourse PSP Report states that, *'Development of Shop/Retail floorspace up to 3,400m^2 NLA is permitted within the Golden Gateway Activity Centre without requiring further assessment'.* Considers the amount of shop/retail floorspace proposed within the PSP does not comply with and is fundamentally inconsistent with the City's current planning framework, including the Retail Needs Assessment (RNA) prepared to inform the City's ACPS. In this respect, considers the PSP Report is incorrect, as development of shop/retail floorspace up to 3,400m^2 NLA is not permitted within the Golden Gateway Activity Centre without requiring further assessment. On this basis, requests an amendment to Part One – Implementation, Section 4.3.1 Activity Centre of the draft	

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		PSP, such that the development of a new/future local centre is limited to 1,200m^2 NLA of retail floor space not 3,400m^2 NLA. This amendment would ensure that the scale and composition of the future local centre is consistent with the intent of the City's planning framework and does not undermine the City's established activity centre hierarchy.	
81	Public Submitter	**Neither Supports or raises concerns** Notes that the Belmont Men's Shed Inc. is a registered charitable community service organisation serving men in the City of Belmont and surrounding areas. Highlights its range of activities and services benefiting local residents and community groups, leveraging the skills of its members. States that the organisation operates under a Board of Management, which oversees governance, ensures safety, and supports its members and visitors. Notes that membership is open to men over the age of 16 and caters to diverse ages, ethnicities, and skills, including woodworking, metalwork, and fostering fellowship. Refers to the Australian Men's Shed Association's statement that Men's Sheds deliver programs fostering community spirit, connecting communities, and contributing to inclusivity in Australia. Considers that this ethos is reflected in the Belmont Men's Shed's focus on health, wellbeing, and community engagement. Highlights the Shed's health education initiatives, including stroke education, medication advice, exercise programs, falls prevention, and first aid training. Notes that the Shed has received numerous accolades, including the Community Spirit Award at the 31st Belmont & Western Australian Small Business Awards, earning induction into the Hall of Fame for its sustained community contributions. States that the Shed's vision aligns with the values of the Men's Shed movement, providing a safe, friendly environment for men to share knowledge, engage in community projects, and connect socially. Emphasises that its diversity of backgrounds and commitment to sustainability, such as recycling and promoting Australian timber, enhances its role in the multicultural community. Considers that the proposed Ascot Racecourse Precinct Structure Plan provides an opportunity to integrate a community facility such as the Belmont Men's Shed in Precincts A and E. Suggests that Precinct A, envisioned for retirement living, could benefit from a Shed offering activities like gardening, fellowship, and skills-based projects. Notes that Precinct E, similar to the Shed's current location, could facilitate partnerships with local industries, as seen in their ongoing collaboration with Bunnings and other community initiatives. Proposes consultation with the racing community and the City of Belmont to explore opportunities for a shared vision for Precincts A and E, ensuring alignment with the Racecourse's community-focused objectives. Highlights the Shed's extensive work with over 30 local organisations, providing services like park seating, school facilities, and youth programs. Concludes that the Belmont Men's Shed Board seeks to engage in discussions regarding the Ascot Racecourse Precinct Structure Plan and considers its involvement as a valuable contribution to the wellbeing of Belmont residents and the broader community.	Noted. Noted. Noted. Noted. Noted. Noted. This is a private matter that requires discussions with Perth Racing. Given the Structure Plan is not a City led project, the Belmont Men's Shed will need to liaise with Perth Racing privately. Refer to previous comments.

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82	Public Submitter	**Raises concerns** Strongly objects to the Ascot Racecourse Precinct Structure Plan, specifically in relation to Zone C, due to concerns about the negative impacts on the character and amenity of Ennis Place. Describes Ennis Place as a quiet, no-through road with minimal traffic, providing a peaceful environment with views of the back track and surrounding trees. The location is said to foster a strong sense of community, with a low crime rate, supported by a neighbourhood watch, which ensures a safe and secure atmosphere. Raises significant concerns regarding the proposed use of Ennis Place as an access road for Zone C. It states that this would result in increased traffic congestion, involving not only cars and bikes but also trucks, trailers, and service vehicles such as feed trucks and manure removal vehicles. Believes this increase in traffic would be incompatible with the residential nature of the area, resulting in safety risks for children and a loss of security due to the heightened activity and constant comings and goings. Further mentions that the proposed plans would lead to increased noise levels, particularly at all hours, further disrupting the peaceful environment of the area. Requests that Ennis Place and the back track remain no-access zones, in order to protect the area's residential character, safety, and environmental values. Considers that the proposed plans would significantly and negatively alter the current peaceful and quiet nature of the area. In addition to the concerns about traffic and safety, the submission highlights environmental issues. It is mentioned that the proposed plans include the clearing of trees, which currently provide habitat for birds and contribute to the area's natural character. The submitter states that this would contradict the City of Belmont's focus on tree planting and enhancing urban greenery. Furthermore, concerns are raised about potential increases in rodent activity, mosquitoes, and fly populations as a result of the stabling operations, which would negatively affect the local environment.	Noted. It should be noted that stables can be developed on the subject land without the structure plan. As detailed in previous responses to submitter comments, amenity and traffic impacts have been considered during the assessment of the recently approved development application. If Perth Racing do not act on this approval, these impacts will also be considered as part of other applications. Access of Ennis Place was considered through the assessment of the recently approved stables complex. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth A modification is proposed to the Transport Impact Assessment to identify the possibility of access from this road. Refer to Environment section of the Council report.
83	Public Submitter	**Raises concerns** Mentions that despite the comprehensive documentation provided for the Ascot Racecourse Precinct Structure Plan, in conjunction with the Golden Gateway developments, all stakeholders, including government agencies, private sector third parties, and developers, should be required to declare any perceived or actual conflicts of interest in the interest of transparency and accountability. Emphasises that the primary concern is to protect and preserve the amenity of the property, which was chosen as a 'forever home' almost 24 years ago. Invites others to consider the challenges faced by residents when density increases around infrastructure that was not designed to handle it, such as the difficulties of exiting the	Elected members will be required to declare any interests under the *Local Government Act 1995*. Refer to Movement section of the Council report.

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		Resolution Drive roundabout at peak times or navigating traffic after the realignment of Grandstand Road. Expresses opposition to the introduction of mixed-use, commercial, and retail developments within Areas D and E, citing concerns about noise, waste, infrastructure load, and traffic, which would negatively affect nearby residential properties. Believes that if Area D is approved for residential use, it should remain consistent with the zoning of houses on Tidewater Way. Opposes the proposed high-rise (>5 storey) retirement village in Area A, due to concerns over its impact on traffic, particularly on the Garratt Road Bridge, and its effect on local infrastructure. Questions whether an Emergency Management Plan has been developed to address potential catastrophic events such as a Swan River storm surge and flooding, given the area's location on a 100-year floodplain. Requests assurance that the anticipated density, including humans and horses, can exit safely from the current locations within Ascot Waters and Ascot Vale Estates. Requests clarification on any implications for nearby residents due to asbestos removal from structures within the Ascot Racecourse development. States they are not opposed to development but have significant concerns regarding the potential loss of amenity, such as increased rates, decreased quality of life, and exacerbated issues with noise, traffic, and parking. Believes the current plans do not adequately address broader concerns related to labour and construction challenges, the lack of affordable housing, and the reliability of essential services. Mentions that, as one of the many affected residents, they wish to retain the amenity that existed when they first chose to live in Ascot in 2001. Calls for the area's character to be preserved, under the hashtag #SaveOurSky.	Amenity impacts such as noise and waste will be further considered as part of future development applications. Regarding residential development within Precinct D, a maximum height of three storeys is proposed by the structure plan which is considered to integrate well with neighbouring development in Ascot Waters. The appropriateness of zones, density codes and land use permissibility is further detailed for each precinct within the report. For details relating to traffic, refer to the Movement section of the report. There is no requirement for an emergency management plan to be developed. Regarding flooding, the Structure Plan has been referred to the Department of Water and Environmental Regulation (DWER) for comment. DWER has advised that a small portion of Precinct A is located within the floodway and as such any future development would have to comply with floodplain management and meet minimum habitable floor levels. A minimum habitable floor level of 0.5m above the adjacent 1% AEP flood level is recommended to ensure adequate flood protection. The Structure Plan complies with this and requires that all structures are built 0.5m above the flood level. Asbestos products will be required to be transported in accordance with Department of Health requirements. Amenity considerations will be further considered through the development application process. It is unclear why rates will increase. Traffic and Parking details are further discussed within the Movement section of the Council report. There is no requirement for this Structure Plan to address affordable housing and labour and construction challenges. The Structure Plan adequately details the availability of services for future development. Noted.
84	Public Submitter	**Raises concerns**	

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		Commercial Zones – Questions why commercial and retail developments are proposed adjacent to the racecourse in the current plans, as these areas would be better suited for mixed-use developments, particularly apartments. Highlights the aim of placing commercial and retail development along the GEH corridor in the area structure plan and suggests that a retail supermarket in Area AC3, as shown in Plan 1 or Figure 8 (Pages 68, areas 11, 12, and 13), would be better located as part of a residential development closer to the GEH corridor. Believes this would align with the intended retail and commercial use along the GEH corridor, as seen in examples such as Belmont Racecourse and Claremont Oval. **Parking** – Inquires about parking provisions for race patrons, particularly whether multistorey parking facilities will be required. Notes that the current overflow car parks are heavily used on significant race days and seeks clarification on where parking will be located for retail developments. **Traffic Flows** – Raises concerns about the proposed traffic flow in Figure 16, Page 110, which shows a right turn across traffic into Raconteur Drive, which would be problematic, especially on race days. Also questions the right turn indicated into Daly Street across traffic, suggesting this may be a drawing error as both Daly and Hargreaves Streets should be blocked for right-hand turning traffic.	A 'Mixed Use' zoning is proposed to be applied to several landholdings which would facilitate mixed use development outcomes. The 'Commercial' zoning is proposed to facilitate the development of a future local centre. Further commentary about the appropriateness of each zone is included within the report under the precinct subheadings. Land fragmentation closer to Great Eastern Highway presents a challenge to develop a local centre in that location. Land availability within Precinct E provides an opportunity for a local centre to establish that will serve future residential development within the Golden Gateway precinct. Refer to Movement section of the Council report. Refer to Movement section of the Council report.
85	Public Submitter	**Raises concerns** Concerned about the potential effects of the proposal on the community, particularly when combined with the Golden Gateway Local Structure Plan. Believes this could lead to overcrowding, traffic chaos, and congestion in an area that is already struggling. Raises additional concerns regarding the lack of infrastructure, public transport, and parking, with the belief that these issues will be exacerbated on major racing days. Suggests a solution involving the sale of the racetrack and the transfer of all racing to Belmont Park. This could allow for easier management of infrastructure, with funds from the sale potentially benefiting the broader Belmont community.	A modification is proposed that the Transport Impact Assessment be updated with details of traffic within the Golden Gateway precinct. Refer to Movement section of the report for further detail. Regarding infrastructure, an Engineering Servicing Report has been prepared in support of the Precinct Structure Plan. It identifies that all required services can be made available for future development. Regarding public transport, the draft Precinct Structure plan identifies bus routes within and surrounding the precinct. These include the 998/999 Circle route operating along Grandstand Road and the 293 and 940 routes operating along Great Eastern Highway. For parking details, refer to the Movement section of the report. This is not a relevant planning consideration of the draft Precinct Structure Plan.
86	Public Submitter	**Supports subject to modifications and raises concerns** Generally supports R60 mixed-use development of Precinct D, limited to 3 storeys in height. States that whatever is built must respect the heritage nature of the adjoining Ascot Kilns site. Generally supports the development of commercial businesses within Precinct E and considers this will provide positive amenities and services to the current residents of	Noted. The scale of residential development within this precinct (3 storeys) is consistent with building heights within Ascot Waters and will not undermine the heritage values of the Bristile Kilns. Noted.

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		Ascot, in addition to those who will occupy new residences in the proposed Golden Gateway development. Is not opposed to aged care and residential developments in Precinct A. However, does not support development of Precinct A with buildings that are 15 storeys in height, and with an R-code of RAC0. Notes that residents of Ascot Waters previously made an effective argument against a 15-storey building on the Craig Care site at 52 Grandstand Road, successfully limiting the height to 5 storeys. States that, given this precedent, Precinct A should also be limited to 5 storeys for the same arguments used at the adjoining Craig Care site with an R-Code of R160. Believes that further large-scale development in Precinct A will only exacerbate unaddressed safety issues in that area, placing additional pressure on the Grandstand Road/Waterway Crescent roundabout. Mentions that it is currently extremely difficult and sometimes unsafe to leave Ascot Waters by car at peak hour due to heavy commuter traffic at the roundabout at Waterway Crescent and Great Eastern Highway. Also highlights the challenge of crossing Grandstand Road on foot to access bus stops for the 999/998 bus routes, given traffic at peak hour and the lack of pedestrian control.	Refer to the Precinct A section of the report. Refer to Movement section of the Council report. Refer to Movement section of the Council report.
87	Public Submitter	**Raises concerns** Notes that the WA Horse Council has not been included in any of the planning structures, despite its relevance to the welfare of horses. States that this is a concern and provides contact details for the council (horsecouncilwa@gmail.com) and a link to their website (https://www.wahorsecouncil.com.au/). Mentions having been a private equine veterinarian for 40 years in Western Australia and expresses concern about the lack of planning decisions that consider the social license for racing to continue in WA, including the Five Freedom Model of equine welfare.	There is no requirement for the draft Precinct Structure Plan to be referred to the WA Horse Council. Noted.
88	Public Submitter	**Raises concerns** Concerns about the potential development of the carpark areas (E), with the belief that this will result in significant parking in local residential streets. The street is currently very quiet and not particularly wide for regular traffic flow. States that although the proposed entrance for patrons is on Grandstand Road, this road already struggles to cope with traffic on race days, often reducing to one lane. Any disruption to this traffic flow is believed to negatively impact traffic going north/south and into/out of Ascot Waters. Raises concerns about how horses will travel to the track once Matheson Road is potentially opened up and commercial premises are established across the road, which is thought to be frightening for horses. Raises concerns about the busy nature of	Refer to Movement section of the report. Refer to Movement section of the report. Refer to Movement section of the report.

		Matheson Road in the mornings, with many horses travelling to the track from rural properties. States that changing area E to commercial and retail will likely result in busier roads, increased rubbish (as observed with Hungry Jack's), and significantly increased noise from bins being emptied and patrons frequenting nearby businesses, which can be disruptive. Concern is raised about security becoming an issue if E is changed to commercial/retail, as there are believed to be unsavoury individuals who frequently stay around properties along Great Eastern Highway. States that E is not suitable for a shopping centre or supermarket due to the inadequate roads and the difficulty in managing increased traffic and cars. States that there would be no issue with E becoming high-rise residential with basic retail below, as most properties along Hardey Road are placed at the front of the block and privacy is less of an issue. Residential/retail would be considered more appropriate due to the proximity to the track, views, and the location to the city via GE Highway. Suggests an alternative of Precinct E to be utilised for the equine industry, such as additional stabling. States that once E is no longer carparking and the float area is reduced, there is likely to be insufficient parking on race days, as most trainers with external properties will continue to drive their trucks and floats, which will not be on course.	Refer to Movement section of the report. Regarding waste and noise considerations, these will be further considered through the development application process. It is likely that a waste management plan will be required for commercial developments. The connection between commercial/retail development and security issues is unclear. Any antisocial behaviour should be reported to WA Police. Refer to Movement section of the report. Noted. Residential development could be proposed within the 'Mixed Use and 'Commercial' zoned portions of Precinct E. A portion of Precinct E is intended to be used for equine related activities under the master plan. Refer to Movement section of the report.
89	Public Submitter	**Neither supports or raises concerns** No comment provided.	Noted
90	Public Submitter	**Raises concerns** Requests the following for consideration: • Retain the precious tree canopy cover that currently exists; • The impact on local wildlife, however scarce they may be within and around the precinct, particularly with the potential increase in both human and vehicular traffic; and • The aesthetics of having a tall structure next to the river. States there is no need for an "entry statement" into the City of Belmont, and contrary to opinions accepted in years past, the height and presence of the building will remain forever visible.	Refer to the Environment section of the Council report. Refer to the Precinct A section of the Council report.
91	Public Submitter	**Raises concerns** Expresses dissatisfaction with the plan due to the following: • Inadequate consideration of race day people movement and parking.	Refer to Movement section of the Council report.

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		• Inadequate consideration of what is the primary entry to the Ascot Racecourse. • The suggestion of a big box retail west of Great Eastern Highway is absurd considering the current traffic load. • Single storey stables along the east side of the racecourse will restrict view lines. • Reduced parking for trainers on the east side of the course. • Use of Precinct A for retirement towers.	It is considered that the Precinct Structure Plan makes it clear that the primary entrance will be from Grandstand Road (refer to Figure 16 as an example). A Transport Impact Assessment has been prepared in support of the structure plan. Refer to Movement section of the report for further detail. Stables can currently be proposed and built irrespective of the Structure Plan. It is not considered that views to the river are a relevant planning consideration. This level of detail has been/will be addressed through the development application process. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth While specific concerns are not raised by the submitter, it should be noted that all buildings will need to comply with the Building Code of Australia, which includes fire safety and accessibility requirements. Suitable emergency evacuation procedures would need to be established to ensure safety for residents.
92	Public Submitter	**Raises concerns** States that they moved to Perth after spending several years living on remote cattle stations in northern Australia. Ascot was chosen as the preferred location due to its unique position, proximity to schools and shops, access to the River, presence of gumtrees, and its quiet, private environment. Strongly objects to the draft Ascot Racecourse Precinct Structure Plan, asserting that it would negatively impact the community. Is concerned about the proposed designation of Ennis Place as a stable access road, which is expected to generate significant traffic starting as early as 3:30am. This would include Trainers, Stable Staff, Trackwork Riders, and Jockeys accessing the area, followed by service providers such as Vets, Farriers, Horse Dentists, Horse Chiropractors, Feed Trucks, Manure Trucks, and Horse Floats. Indicates that this activity would continue late into the night, particularly when Horse Floats return from country race meetings, resulting in relentless traffic and constant noise. Highlights environmental concerns, including the loss of mature trees that currently provide habitat for wildlife and contribute to the area's character. States that the	Noted. Access off Ennis Place was considered through the assessment of the recently approved stables complex. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth A modification is proposed to the Transport Impact Assessment to identify the possibility of access from this road. Regarding noise, this has been/will be further considered through the development application process. The acoustic study prepared in support of the recently approved stables development find that any noise associated with the proposed stables development is compliant with the Environmental (Noise) Regulations 1997 with mitigation or operational management measures proposed to address specific use of the development. Refer to Environment section of the Council report.

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		removal of these trees would increase temperatures and diminish shade over their property. Notes that daily westerly breezes would carry odours from the stables into the surrounding area, exacerbating impacts on local amenity. Additionally, is concerned about pests, including flies, rats, and mice, being attracted to the proposed stabling facilities. Argues that the proposed development would alter the area's aesthetic, replacing greenery with a more industrial character, which is considered incompatible with the neighbourhood. Concludes by urging the City to oppose the plan, stating that the project is not appropriate for the community.	It should be noted that stables can be constructed on the subject land irrespective of the structure plan. However, Future stables will need to be managed in accordance with the City's Consolidated Local Law which requires stables to be kept in a clean and sanitary condition and as far as practicable, free from flies, rats, other vectors of disease and offensive odours. Stables can currently be proposed and built irrespective of the Structure Plan. Aesthetics of any future development have been/will be further considered at development application stage.
93	Public Submitter	**Raises concerns** Is nine years old and lives on Ennis Place in Ascot. Likes to play soccer, handball, cricket and basketball on the street. States that they won't be able to play safely on the street anymore. Uses the dirt road to walk to school and walk their dogs to the river. Collects red cockatoo feathers and yellow ones from the trees near the backtrack. Can sit on the way and watch fireworks and the sunset going down. Doesn't want to live in Ascot if playing outside isn't possible.	Noted. Access of Ennis Place was considered through the assessment of the recently approved stables complex. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth A modification is proposed to the Transport Impact Assessment to identify the possibility of access from this road. Noted. This land is privately owned by the State of Western Australia with no development proposed over it. Access will be from Ennis Place. Noted. Noted. Draft PSP does not prohibit the ability for residents to continue to play outdoors.
94	Public Submitter	**Raises concerns** Loves living in Ascot with family. Has lots of friends in Ascot who love to come and play because of the open space. States it is so quiet, and cars very rarely come and disturb games. Likes to play basketball, cricket, soccer and football next to the back track. Sates that this won't be possible when the stables are built. Likes to visit friends houses and doesn't have to worry about traffic and so gets there safely.	Noted. Noted. Noted. This land is privately owned by the State of Western Australia with no development proposed over it. Access will be from Ennis Place. Access of Ennis Place was considered through the assessment of the recently approved stables complex. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link:

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		Loves to walk to school and ride bikes but will need to be driven to school soon because of the traffic.	Minute - No 65 - City of Belmont - City of South Perth A modification is proposed to the Transport Impact Assessment to identify the possibility of access from this road. The draft PSP does not prohibit the ability for residents to continue walking and cycling within the area.
95	Public Submitter	**Raises concerns** Loves living in Ascot for the past two years and likes playing cricket, handball, basketball and football in the street and on the side of their house. Asks that the stables are not built. Doesn't want to smell manure in the morning and is concerned that they won't be able to play sport in the street because of all the cars.	Noted. It should be noted that stables can be constructed on the subject land irrespective of the structure plan. However, Future stables will need to be managed in accordance with the City's Consolidated Local Law which requires stables to be kept in a clean and sanitary condition and as far as practicable, free from flies, rats, other vectors of disease and offensive odours. Access of Ennis Place was considered through the assessment of the recently approved stables complex. A copy of the Development Assessment Panel minutes for the recently approved stables can be found via the below link: Minute - No 65 - City of Belmont - City of South Perth A modification is proposed to the Transport Impact Assessment to identify the possibility of access from this road.
96	Public Submitter	**Raises concerns** States Ennis Place is a beautifully quiet street in Ascot, with only a 30 second walk to the Swan River water edge. Considers this is a great location for family especially recently coming from the outback. Is concerned about safety. Walks to the bus stop everyday on the dirt road and along Ennis Place and Epsom Avenue. Questions how they can take the bus. States that the houses along Ennis Place aren't just houses but are homes that this plan will destroy. Would like her home to remain as it is with trees, the birds, the wildlife, the view, the quiet, the fresh smell, the easy access to the river, the dirt road, and to me the most important the serenity. Submitter won't enjoy living on Ennis Place anymore.	Noted. This land is privately owned by the State of Western Australia. The submitter can use the footpath that exists along Epsom Avenue. Noted. Noted.
97	Public Transport Authority	PTA is supportive of the proposal however have some details they wish to see amended in the final report. 1. The wording on pages 45 and 100 '*are served by the 998/999 circle route which has good frequency and provides connectivity through central Perth and*	Modifications are proposed to address. Refer to Schedule of modifications.

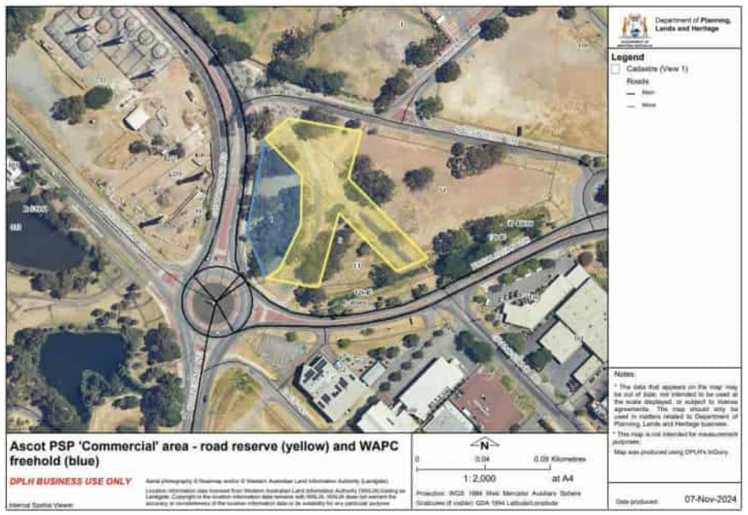
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	PO Box 8125 Perth Business Centre, WA, 6849	*Bayswater Train Station'* can be misleading as these bus routes travel to several nodes and destination attractors across Perth and does not travel directly via Central Perth. 2. The existing bus routes on Grandstand road need to remain as embayed bus stops for the 998/999 bus routes. There is potential to introduce additional bus stops on Grandstand Rd north of the roundabout within Precinct A (Retirement Village) subject to pedestrian amenity. Further potential exists along Resolution Dr around precinct E (Commercial and Retail Space). It is requested that Transperth Bus Stop and Infrastructure team be contact for involvement in future plans surrounding potential stop placements to align with the development.	Noted.
98	Water Corporation PO Box 100, LEEDERVILLE WA 6902	Major water and sewer upgrades will be required to service the proposed developments identified in the structure plan. These will be done at the developers cost. The proponent should get in contact with the Water Corporation early to discuss what is needed. There are significant Water Corporation assets located in the "A3" R-AC3 Commercial reserved lot. This includes major water distribution mains that cannot be moved or built on top of and a number of open channel drains. These assets are essential and cannot be moved or built around. Water Corporation objects to the rezoning of this section of the structure plan to commercial. The information provided above is subject to review and may change. If the proposal has not proceeded within the next 6 months, the applicant will need to contact Water Corporation to confirm that this information is still valid.	Noted Refer to Precinct E section of the report. Noted
99	Department of Education	The draft Structure Plan area spans across the student enrolment intake areas of Belmont Primary School and Belmay Primary School. However, amongst the five precincts within the Structure Plan area, Precinct D 'Residential & Mixed Use' which envisions to deliver, in part, approximately 41 residential lots of medium density, falls within the enrolment intake area of Belmont Primary School. As previously highlighted in the Department's response letter on the draft Golden Gateway Local Structure Pan, Belmont Primary School is currently operating within the student accommodation capacity. However, the cumulative increase in dwelling yield in the locality would have an impact on the student enrolment demand and capacity of the subject primary school in the long term. It is worth noting that every new residential development or intensification of residential density create demand for, or on, public schools, with this demand potentially extending beyond the boundaries of a structure plan. Whilst the Department acknowledges the planning merits of infill development, it is critical to balance the residential growth and resultant student population with public school provision in the locality. If there are insufficient provisions of public schools, this will result in significantly overcrowded school sites, insufficient parking for drop-offs and pick-ups, traffic management issues for the local community, and compromised education outcomes for students. Preliminary analysis at this stage indicates that Belmont Primary School would be under student enrolment pressure in the long term. With the school site being restricted in size (1.46 hectares in lieu of a standard 4 ha standalone primary school	Noted Noted Noted Noted

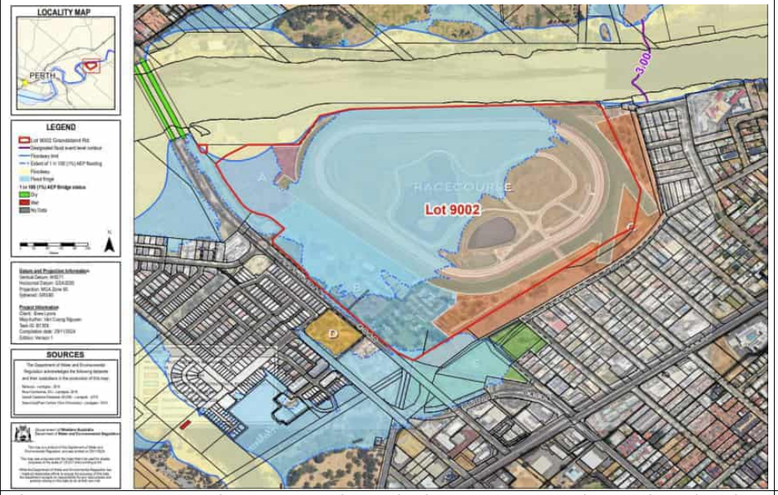
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		site), future expansion or augmentation of the school (e.g. off site early childhood facility) may be required in the future to ensure its capability of catering for the long-term student demand in the Ascot-Belmont area. Notwithstanding this, the Department has no in-principle objections to the Structure Plan. The Department will continue to monitor the student enrolment demand as development progresses within the Structure Plan and ensure that the residential growth corresponds accordingly with the provision of public schools in the locality. It is essential that the Department and the City of Belmont collaborate on future school planning within the municipality to adequately provide for the educational needs of the Town in the future.	Noted.
100	Land Use Management – Metro and Peel at the Department of Planning Lands and Heritage Locked Bag 2506, Perth WA 6001	In relation to 'Precinct A' on the PSP, being Lot 9002 on DP 60342: • Ascot Racecourse is held by the Western Australian Turf Club (WATC) as a conditional freehold tenure. It is a condition that the land is to be used solely for activities relating to the running of a public racecourse under the Land Administration Act 1997 (LAA). However, the land may be used or leased for another purpose with the written permission of the Commissioner of Crown Lands under section 10 of The Western Australian Turf Club Act 1892 (WATC Act). • The WATC has the power to lease and deal with real and personal property for the purposes of the club and requires the consent of the Governor given on the recommendation of the Minister for Lands under section 4(2a) of the Western Australian Turf Club (Property) Act 1944 (Property Act). • The WATC is also to obtain the Minister for Lands' consent to grant any lease, licence, mortgage, charge, security or other encumbrance under section 75(6) of the LAA. • Further investigation and possibly legal advice would be required regarding whether the proposed retirement living/aged care is suitable on the racecourse land that is held in conditional freehold tenure. This would also require consultation with the Department of Local Government, Sport and Cultural Industries, noting that the WATC Act and the Property Act fall under the Racing and Gaming portfolio. In relation to 'Precinct E' on the PSP: • Portions of 'Precinct E' under a proposed 'Commercial' zoning are currently road reserve (redundant residual alignments of Grandstand Road and Matheson Road) and WAPC freehold Lot 1 on Diagram 55346, as described on the attached map. • Notes that Figure 12 on page 88 of the draft PSP flags these different land tenures, in doing so describing the road reserve area as 'proposed road lease' - it would be worth further consideration from Perth Racing on this front, as leases of Crown land can only be considered where the proposed use of the land/purpose of the lease is consistent with that land's purpose (ie. use of road by the public), which would not be the case with the proposed commercial activity.	Refer to Precinct A section of the report. Refer to Precinct A section of the report. Refer to Precinct A section of the report. Refer to Precinct A section of the report. Noted. Refer to Precinct E section of the report.

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		• The WAPC freehold would also need to be resolved in some capacity, however this is outside our remit in Crown Land Management.  Notes flagging this invitation for comment with the Department's Land Use Planning division, who have deferred comment until later formal assessment of the PSP for WAPC determination.	Refer to Precinct E section of the report. Noted.
101	Department of Water and Environmental Regulation 7 Ellam Street, Victoria Park WA 6100	The Department has identified that the proposal has the potential for impact on water values and management. While the Department does not object to the proposal, key issues and recommendations are provided below and these matters should be addressed: <u>Local Water Management Strategy</u> The Department has assessed the Local Water Management strategy (LWMS) dated July 2024 prepared by Emerge Associates. The Department is satisfied that the document is acceptable for this proposal to proceed to the next stage of planning approval. <u>Floodplain Management Advice</u> The Department of Water and Environmental Regulation provides advice and recommends guidelines for development on floodplains with the object of minimising flood risk and damage. The Swan and Helena River Flood Study (2018) shows that the lot is affected during major flows with the 1 in 100 (1%) AEP flood level expected to vary from 2.9 m AHD to ~3.0 m AHD as shown in the attached map.	Noted. Noted. Noted.

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		Our floodplain management strategy for the area is: • Proposed development (i.e. filling, building, etc.) that is located outside of the floodway is considered acceptable with respect to major flooding. However, a minimum habitable floor level of 0.5 m above the adjacent 1% AEP flood level is recommended to ensure adequate flood protection. • Proposed development that is located within the floodway (yellow areas on attached plan) and is considered obstructive to major flows is not acceptable as it would increase flood levels upstream. With regard to the proposal, it appears that a small portion of the retirement living (Precinct A) is located within the floodway, and as such any future development would have to comply with floodplain management and meet minimum habitable floor levels. Please note that a failure to properly adhere to these recommendations will result in a greater exposure to risks of flood damage. This advice is related to major flooding only and other planning issues, such as environmental and ecological considerations, may also need to be addressed. 	Part 1 of the precinct structure plan requires a minimum habitable floor level of 0.5m above the 1% AEP flood level. Noted. Noted. Noted.
102	Department of Biodiversity, Conservation and Attractions	The Precinct Structure Plan area sits alongside the Swan River and is partly within the Swan River Trust Development Control Area (DCA). The Precinct Structure Plan includes the following six precincts: • Precinct A – retirement living village • Precinct B – additional car parking and new buildings for offices/hospitality • Precinct C – proposed stables, horse float parking and car parking	Noted.

Attachment 12.1.10 Schedule of Submissions

	17 Dick Perry Avenue, Technology Park, Western Precinct, Kensington WA 6151	• Precinct D – residential area and childcare centre • Precinct E – equine and jockey services, car parking and potential retail and bulky goods • Racecourse DBCA has reviewed the Precinct Structure Plan Report prepared by Rowe Group, and the supporting documents and reports, including the Environmental Assessment Report (EAR) (Emerge, 2024), the Local Water Management Strategy (Emerge, 2024), and the Landscaping Masterplan Plan (SLR, 2024) and recommends the following matters be addressed prior to approval of the Precinct Structure Plan. **Parks and Recreation foreshore areas** State Planning Policy 2.10 – Swan Canning River System (Policy 2.10) states that land adjacent to the river should be available for public access, recreation and conservation of the river. River foreshore reserves should be planned with sufficient distance between the waters of the river and development to allow for conservation of the estuarine environment, including riparian vegetation, public access and recreational use of the foreshore and the river, and landscape protection and enhancement. A stretch of foreshore land is currently reserved for parks and recreation (P&R) along the edge of the Swan River (approximately 25 to 40 metres wide), contiguous with the DCA boundary. However, most of the P&R is within Lot 9002 which is owned by Perth Racing and contains the outermost racetrack. The racetrack extends to within 4 to 5 metres of the waters of the Swan River and is delineated with a boundary fence. The result is a 600 metre long, very narrow (~4 metres wide) strip of Crown land which allows for public access, but is inadequate for providing for passive recreation, or for protecting water quality and environmental values. In addition, the limited space available for foreshore and riverbank management has necessitated the construction of a long rock revetment for erosion control, which has further reduced the amenity of the location. The proposal involves a significant intensification of the use of the land surrounding the racecourse, which will result in future increase in population and pressure on local open space and foreshore areas. With the intensification of use, including the introduction of retail, commercial and residential activities, it appropriate for the P&R reservation to be vested transferred to the Crown. This would require rehabilitation of the foreshore to a naturalized, publicly accessible recreation area. Securing a sufficient Crown reserve for the long term is crucial now, as the proposed development of the surrounding land may eliminate the possibility of realigning the racetrack in the future. As such, a Foreshore Management Plan should be prepared to guide the future management of the reserve and to provide for better public access, recreational opportunities and improve the amenity and the interface between the racecourse and the Swan River. **Local Water Management Strategy** DBCA is particularly interested in the proposed management of stormwater and groundwater associated with the structure plan area for the following reasons: • The proximity of the proposed development to the Swan River. • The lack of buffer between the racecourse and the river to assist with the improvement of water quality.	Refer to Racecourse section of the report. Refer to Racecourse section of the report. Officers are satisfied with the LWMS noting that the Department of Water and Environmental Regulation is the Agency responsible for approving these documents and has advised the following: *"The Department has assessed the Local Water Management strategy (LWMS) dated July 2024 prepared by Emerge Associates. The Department*

Attachment 12.1.10 Schedule of Submissions

		• The classification of the racecourse as 'potentially contaminated – investigation required' (discussed in the Environmental Assessment Report) due to high levels of nutrients from the historic and ongoing horse stabling and runoff from animal storage areas on the site. • Existing outflows from the site to the Swan River are not currently monitored for water quality or quantity. • DBCA has received complaints in relation to poor water quality discharging from the site and poor environmental management in general. • The presence of a synthetic racetrack which has the potential to contribute large amounts of microplastics to the groundwater and discharge to the Swan River. The proposed stormwater management outlined in the LWMS relies heavily on the utilisation of the three lakes within the centre of the racecourse, particularly for development within Precincts A, B and C. However, the LWMS has not demonstrated that the existing management of ground and surface water at the site is appropriate. There is insufficient ground and surface water quality monitoring data and no monitoring of the quality, volumes or frequency of water flowing to the river. Therefore, DBCA is not supportive of the proposal to utilise additional volume within the internal lakes unless the following the following can be demonstrated: • Appropriate measures to guarantee that discharge to the River or to ground water from the lakes is of a quality consistent with the objectives of Corporate Policy Statement 49: Planning for Stormwater Management Affecting the Swan Canning Development Control Area and Australian and New Zealand Guidelines for Fresh Water Quality (ANZECC Guidelines) trigger values at 95% species protection. • That the use of the lakes will not result in any increase in volume or frequency of overflow to the river. • Monitoring of surface water is undertaken within the lakes for an expanded list of analytes including turbidity, heavy metals, PAHs, hydrocarbons, pesticides and herbicides and PFAS and the results used to inform an amended LWMS. • A nutrient and irrigation management plan is prepared to demonstrate how the site is managed to minimise nutrient application to the land.	*is satisfied that the document is acceptable for this proposal to proceed to the next stage of planning approval."*
		Floodway protection The proposed retirement village development (Precinct A) is located partially within the floodway of the Swan River and will require a substantial amount of fill to achieve minimum habitable floor levels to comply with Department of Water and Environmental Regulation policies. DBCA recommends the proposed development be positioned outside of the floodway to reduce the amount of fill required.	The Structure Plan has been referred to the Department of Water and Environmental Regulation (DWER) for comment. DWER has advised that a small portion of Precinct A is located within the floodway and flood fringe. Any future development would have to comply with floodplain management and meet minimum habitable floor levels. A minimum habitable floor level of 0.5m above the adjacent 1% AEP flood level is recommended to ensure adequate flood protection. The Structure Plan complies with this and requires that all structures are built 0.5m above the flood level.
		Setbacks Future development within Precinct A and C will be required to comply with the setback provisions in DBCA Policy No. 48 – Planning for development setback requirements affecting the Swan Canning Development Control Area. Policy 48 indicates that any structures including retaining walls higher than 1 metre abutting the DCA require a minimum setback of 10 metres or 20 per cent of the average depth of the lot. However, where the height, bulk, scale or form, orientation or location of a development is likely to create significant visual impacts within the context of the	Noted. The draft PSP references that where necessary, setbacks shall be in accordance with DBCA's Policy. It is considered that future development is able to meet the setback requirements. This will be further considered through the development application process.

Attachment 12.1.10 Schedule of Submissions

		surrounding landscape, an increased setback may be required. In areas where fill is required to achieve compliance with minimal floor levels, DBCA encourages gradual topographic changes between foreshore reserves and adjacent development to preserve the visual amenity and enhance the community's enjoyment of the reserve. Additional information such as finished levels and location and height of any retaining or battering along the DCA will be required as part of a future development application. In addition, in accordance with Liveable Neighbourhoods (WAPC, 2009) and DBCA Policy 42 DBCA recommends the inclusion of a public road, between the private land and the existing or proposed P&R reservation to enable proper access, separation of land uses, improve passive surveillance and public safety, and support appropriate bushfire protection. **Protection of vegetation** DBCA considers that opportunities for retaining mature vegetation throughout the development area should be further explored in line with the City of Belmont Urban Forest Strategy (City of Belmont, 2014) and Better Urban Forest Planning Guidelines (WAPC, 2023). It is noted that the site contains mature native vegetation including potential black cockatoo nesting trees. This important habitat is to be retained. In its current form the Structure Plan is not supported, however DBCA officers are happy to assist with further information regarding the issues outlined above.	The creation of a public road to form a hard edge to the Parks and Recreation reserve is not considered necessary in this instance. However, the potential for a hard edge through a private road can be further considered at the development application stage for Precinct A. Refer to Environment section of the Council report.
103	Main Roads Western Australia PO Box 6202, East Perth WA 6892	Main Roads provides the following comments regarding the draft precinct structure plan: **Vehicle Access Strategy Current** "Vehicle Access Strategy" for Great Eastern Highway (GEH) close to the proposed Ascot Racecourse Precinct Structure Plan (PSP) site is to be maintained as per the Plan no. 16339-13 (attached). **Bus Priority Lane** It is recommended to investigate the feasibility for continuous east-bound bus priority lane along the Great Eastern Highway between Stoneham Street and Resolution Drive as part of the mitigation measures to reduce impacts on bus queue jump lane and existing intersections performance to accommodate future combined growth from the draft Ascot Racecourse PSP and Golden Gateway LSP. **Transport Impact Assessment – Further Information Required** 'Transport Impact Assessment' prepared by PJA Australia Pty Ltd (version B, dated 8 May 2024) is recommended to be revised addressing the followings: Pedestrian Connectivity • Section 7.3 of the TIA provided recommendations to improve pedestrian connectivity, however no detailed assessment has been undertaken. Assess and determine necessary upgrades to pedestrian facilities surrounding the Ascot Racecourse and along the Great Eastern Highway (such as Staged Pedestrian Crossings at the signalised intersections which may assist with more efficient green times utilisation to reduce the performance impacts for the GEH intersections). • Model alternate pedestrian treatments within SIDRA to evaluate their viability.	Noted. The Precinct Structure Plan area doesn't impact on the vehicle access strategy. Given Great Eastern Highway is under the care and control of Main Roads Western Australia, it is appropriate for them to undertake these investigations. Refer to Movement section of the report.

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		• Assess geometric requirements, land boundaries, and potential signal modifications. • Detail mechanisms for future delivery of pedestrian facilities is required to inform costings for a development contribution plan. SIDRA Assessment • Coordinated SIDRA network model is required for the signalised intersections replicating the existing coordinated operation on GEH and to observe any impacts due to scenarios as proposed in the draft Ascot Racecourse PSP and Golden Gateway LSP. • Existing cycle lengths for the GEH signalised intersections is required to be utilised in the SIDRA modelling existing scenarios. • Similar cycle lengths should be used to the Stoneham Street and Resolution Drive intersections with GEH in a coordinated network. It is further advised that Main Roads will require a 30 day review period to assess any revised documentation.	This matter has been addressed in response to MRWA comments on the Golden Gateway Local Structure Plan. In that case, coordination between the two signalised intersection was not done because it makes the models unstable. The PSP does not extend towards Great Eastern Highway and as such, improvements to pedestrian connectivity along Great Eastern Highway are not considered relevant.

12.3 Local Planning Policy No. 20 - Great Eastern Highway Urban Corridor

Voting Requirement	:	Simple Majority
Subject Index	:	LPP15/020
Location/Property Index	:	Various
Application Index	:	N/A
Disclosure of any Interest	:	Nil
Previous Items	:	• Draft Local Planning Policy No. 20 – Great Eastern Highway Urban Corridor: – 22 July 2025 Ordinary Council Meeting Item 12.1 • Great Eastern Highway Urban Corridor Strategy: – 22 October 2024 Ordinary Council Meeting Item 12.3. – 26 September 2023 Ordinary Council Meeting Item 12.2. – 22 May 2018 Ordinary Council Meeting Item 12.2.
Applicant	:	N/A
Owner	:	Various
Responsible Division	:	Development and Communities

Council role

Legislative	The making and adopting of local laws, local town planning schemes and Council policies.

Purpose of report

For Council to consider draft Local Planning Policy No. 20 – Great Eastern Highway Urban Corridor (LPP 20) for final adoption following public advertising.

Summary and key issues

- At the 22 October 2024 Ordinary Council Meeting (OCM), Council resolved to adopt the Great Eastern Highway Urban Corridor Strategy (the Strategy).
- The Strategy was prepared to establish a vision and coordinate future development adjacent to Great Eastern Highway. As a strategic document, the Strategy will inform future planning instruments, including the new Local Planning Scheme.

- To support its implementation in the interim, key elements of the Strategy relating to public spaces, landscape zones, connections, access, parking, building height and plot ratio, setbacks and built form transitions have been incorporated into a draft Local Planning Policy.
- This approach ensures the Strategy's key principles are applied to development assessment prior to the introduction of the new Local Planning Scheme. While some provisions are likely to remain in the Local Planning Policy, it may be appropriate for certain elements to be incorporated into the new Local Planning Scheme.
- Council adopted draft LPP 20 for public advertising at the 22 July 2025 OCM.
- Advertising occurred between 14 August 2025 and 4 September 2025 (22 days). A total of five submissions were received.
- The submissions have been reviewed and four minor changes to the Policy are recommended as detailed within the Report section.
- It is recommended that Council adopts draft modified LPP 20 contained as Attachment 12.3.1.

Officer Recommendation

That Council:

1. Adopts draft modified Local Planning Policy No 20 – Great Eastern Highway Urban Corridor contained as Attachment 12.3.1 in accordance with Schedule 2, Part 2, Clause 4 of the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA).*
2. Directs the Chief Executive Officer to:
    a. Notify those who made a submission of Council's resolution.
    b. Publish the adopted Local Planning Policy No. 20 on the City's website.

Location

Draft LPP 20 relates to lots adjacent to Great Eastern Highway, between Graham Farmer Freeway in Rivervale to land east of Ivy Street in Ascot, Redcliffe and South Guildford. The extent of the Great Eastern Highway Corridor is shown in Figure 1.



Figure 1: Extent of Great Eastern Highway Urban Corridor (marked in red)

Consultation

Draft LPP 20 was advertised from 14 August 2025 to 4 September 2025 by way of:

- A public notice being displayed in the PerthNow newspaper on 14 August 2025.
- Displaying a public notice and information on the City's website and at the Civic Centre.
- Sending letters to those who previously lodged a submission on the Strategy.

The City received five submissions during the advertising period, comprising three from agencies and two from landowners. Two of the agency submissions provided technical advice that does not require any modifications to the Policy.

The third agency submission noted that the access points to Great Eastern Highway shown in Figure 5 of the draft Policy are not supported at this time, and a minor modification is recommended to address this. Of the landowner submissions, one provided general commentary and the other suggested specific modifications. In response, a minor amendment is recommended regarding the amalgamation of adjoining sites. Further details are provided in the Report section.

A summary of the submissions is contained as Attachment 12.3.2 and Confidential Attachment 12.3.3.

Strategic Community Plan implications

In accordance with the 2024–2034 Strategic Community Plan:

Key Performance Area: Place
Outcome: 6. Sustainable population growth with responsible urban planning.
Outcome: 7. Attractive and welcoming places.
Outcome: 8. A city that is easy to get around safely and sustainably.

Policy implications

Should Council adopt LPP 20, this Policy will guide the assessment of future applications for development adjacent to Great Eastern Highway.

Statutory environment

Strategic Planning Framework

Perth and Peel @ 3.5 Million

The State strategic framework documented under the Western Australian Planning Commission (WAPC) 'Perth and Peel @ 3.5 million' impacts upon the statutory direction for the City.

The Perth and Peel region will need to accommodate significant population growth by 2050 with an additional 1.5 million people requiring approximately 800,000 new homes. The 'Perth and Peel @ 3.5 million' strategic planning framework requires that a substantial amount of this growth (i.e. 47%) be delivered through infill developments. It forecasts that the City of Belmont population will increase to 60,260 people by 2050 and to accommodate that increase, an additional 10,410 dwellings will be required.

Perth and Peel @ 3.5 Million promotes the concept of 'Urban Corridors' as a way of achieving integrated land use and transport outcomes. Great Eastern Highway is identified as an 'Urban Corridor' because it provides a connection between the Burswood and Perth Airport Activity Centres.

The framework suggests that focus should be given to investigating increased residential densities and mixed land uses along 'Urban Corridors'. In doing so, an understanding of the existing and future function of the urban corridor from both a transport and land use perspective is needed to determine future growth opportunities. When considering areas for intensification, emphasis should be given to maintaining the operational efficiency of the transport network, enhancing urban amenity and ensuring minimal impact on the surrounding urban fabric.

Statutory Planning Framework

Planning and Development (Local Planning Schemes) Regulations 2015 (WA)

The procedure for making and amending a local planning policy is outlined under Schedule 2, Part 2, Clauses 3 to 6 of the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)*.

In terms of consultation, Clause 4(1)(a) of the Deemed Provisions requires the draft Policy and a notice to be published on the City's website. If the local government considers it appropriate, a notice shall also be published in a local newspaper circulating within the Scheme area, and the Policy made available for viewing at a location within the district.

The notice is to advise the public as to the location where the draft Policy may be inspected, the subject and nature of the Policy and in what form and during what period (being not less than 21 days) submissions may be made.

Following conclusion of the consultation period Council shall review the draft Policy in the light of any submissions made and shall then resolve either to adopt the draft Policy with or without modification, or not to proceed with the draft Policy.

Clause 67 of the Deemed Provisions outlines the matters which the local government is to have due regard to when considering a development application.

Background

At the 22 October 2024 OCM, Council adopted the Great Eastern Highway Urban Corridor Strategy. The Strategy was prepared to establish a clear vision and guide coordinated future development adjacent to Great Eastern Highway. As a high-level strategic document, it is intended to inform future planning instruments, including the preparation of the new Local Planning Scheme.

To support the implementation of the Strategy in the interim, a draft Local Planning Policy has been prepared. This Policy incorporates key elements of the Strategy relating to public spaces, landscape zones, connections, access and parking, building height and plot ratio, setbacks and built form transitions.

Embedding these elements within a statutory planning framework gives them greater weight in the assessment of development proposals than would be afforded under the Strategy alone. While some provisions are likely to remain in the Policy, it may also be appropriate for certain elements to be incorporated into the new Local Planning Scheme.

Report

Draft LPP 20 was advertised between 14 August 2025 and 4 September 2025. At the close of the advertising period, five submissions were received, with three from agencies including the Department of Transport and Major Infrastructure, Water Corporation and Main Roads Western Australia (MRWA), and two from landowners.

Four amendments are recommended to the Policy as detailed below.

Access to Great Eastern Highway

The first amendment is recommended in response to comments from MRWA, who advised that they do not support any new access points onto Great Eastern Highway as shown in Figure 5 at this point in time. The front access and parking arrangements shown in Figure 5 reflect the existing situation, as these properties already have established access onto Great Eastern Highway. Any changes to access would be referred to MRWA for comment.

To reflect this arrangement, it is recommended that Clause 5.5.1 be modified to clarify that in considering any changes to access points on Great Eastern Highway, the City of Belmont will have regard to advice provided by MRWA. The updated clause reads as follows:

5.5.1 ”Access and parking associated with lots shall be provided in accordance with Figure 5 contained within Attachment A. Notwithstanding, in considering changes to access points to Great Eastern Highway, the City of Belmont will have regard to advice from Main Roads Western Australia.”

Amalgamation of Adjacent Land

The second amendment is recommended in response to a landowner submission. The submitter noted that the Great Eastern Highway Urban Corridor Strategy included a recommendation to introduce a provision clarifying the treatment of amalgamating adjacent lots not included in the Strategy area. The submitter requested that this clarification be incorporated into the draft Policy. Specifically, the Strategy sought to ensure that amalgamating land with ‘Residential’ zoned lots, or with lots adjacent to, abutting, or across the road

from 'Residential' zoned land, would not allow those lots to benefit from higher-scale development under the Strategy.

Including such a provision in the Policy is considered appropriate to provide clarity and certainty for both landowners and the City. It ensures the intent of the Strategy is implemented consistently, protects residential amenity, and provides guidance on how non-residential amalgamations could be considered.

Accordingly, Clause 5.9 Amalgamation of Adjacent Land has been included in the draft Policy. The sub-clauses read as follows:

"5.9.1 The amalgamation of land within the Strategy area with land zoned 'Residential,' or with lots adjacent to, abutting or across the road from land zoned 'Residential,' will not result in the residential land benefiting from higher development potential under this Policy.

5.9.2 Where amalgamation is proposed with non-residential zoned land, and the amalgamated lots are not adjacent to, abutting or across the road from land zoned 'Residential,' the provisions of this Policy may also be applied to the portion of land proposed to be amalgamated, treating the combined lots as a single site. However, such amalgamation must demonstrate improved built form, access and site planning outcomes without adversely impacting nearby residential areas."

Building Height and Plot Ratio

The third amendment is recommended as officers noted that the draft Policy sought to apply plot ratio and building heights consistent with the City's Local Planning Scheme or other relevant planning instruments for certain sites. Clause 4.2.3 of Local Planning Scheme No. 15 (LPS 15) states that the density (and therefore building height and plot ratio) of uncoded sites shall be determined having regard to the density code of adjoining properties.

For the Eastgate Neighbourhood Centre and Ascot Local Centre, these adjoining densities may be too low as they would only provide for two storey development while other sites such as those fronting Great Eastern Highway on either side of the Eastgate Neighbourhood Centre could accommodate heights of up to 10 storeys. It is also noted that not all centres require further detailed planning, and as such, there may be no other relevant planning instrument in place to guide plot ratio and building heights.

Given this, it is considered appropriate to provide a level of flexibility so that heights exceeding those prescribed by LPS 15 may be proposed where the matters listed in Clause 67 of the Regulations are considered and the non-compliance will have no adverse effect upon occupiers or users of the development, the inhabitants of the locality, or the likely future development of the locality. Accordingly, Clause 5.6.2 has been revised and a new Clause 5.6.3 added as follows:

5.6.2 "Building heights and plot ratio for 'Activity Centres' shall be determined having regard to the density code imposed on adjacent land but may be varied if:

a) Approval of the proposed development would be appropriate having regard to the criteria set out in Clause 67 of the Planning and Development (Local Planning Schemes) Regulations 2015 Schedule 2; and

b) The non-compliance will not have an adverse effect upon the occupiers or users of the development, the inhabitants of the locality or the likely future development of the locality."

5.6.3 Building heights and plot ratio for 'Industrial' designated sites will be subject to the building height limits contained within the City's Local Planning Scheme.

In addition, a fourth amendment is proposed to outline that building height and plot ratio guidance for lots within the Development Area 6 and Golden Gateway precincts is provided within the respective draft planning instruments. Accordingly, Clause 5.6.4 and Clause 5.6.5 are proposed to be added to the policy as follows:

5.6.4 Building heights and plot ratio for lots within Development Area 6 shall be in accordance with the Improvement Plan and draft Improvement Scheme – Redcliffe Station Precinct.

5.6.5 Building heights and plot ratio for lots within the Golden Gateway Precinct shall be in accordance with the draft Golden Gateway Structure Plan.

Conclusion

Advertising of draft Local Planning Policy No. 20 – Great Eastern Highway Urban Corridor has been undertaken in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015 (WA)*. Five submissions were received, comprising three from Government agencies and two from landowners. The draft Policy has been modified to state that in considering changes to access to Great Eastern Highway, the City will have regard to advice from MRWA, to clarify the amalgamation of adjacent land, to provide flexibility for plot ratio and building heights for activity centres, and to state that building heights and plot ratio for lots within Development Area 6 and the Golden Gateway Precinct shall be in accordance with the draft planning instruments for those areas. It is recommended that Council endorse the draft modified Local Planning Policy No. 20.

Financial implications

There are no financial implications associated with this report.

Environmental implications

There are no environmental implications associated with this report.

Social implications

Draft LPP 20 seeks to improve liveability along the Corridor through improvements to amenity, an enhanced public realm, connectivity and activation.

Attachment details

Attachment No and title
1. Draft Revised Local Planning Policy No. 20 - Great Eastern Highway Urban Corridor [**12.3.1** - 11 pages]
2. Schedule of Submissions [**12.3.2** - 8 pages]
3. CONFIDENTIAL REDACTED - Confidential Redacted - Schedule of Submissions (Confidential matter in accordance with Local Government Act 1995 (WA) Section 5.23(2)(b)) [**12.3.3** - 8 pages]

City of Belmont

Local Planning Policy No. 20

Great Eastern Highway Urban Corridor



Publication date: [00/00/00]

Local Planning Policy No. 20

This is a Local Planning Policy prepared under Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

1. Policy Basis

This Policy sets out the standards and objectives the City will use to assess development applications for land adjacent to Great Eastern Highway.

These standards align with the Great Eastern Highway Urban Corridor Strategy.

2. Policy Application

The Policy applies to lots adjacent to Great Eastern Highway between Graham Farmer Freeway in Rivervale to east of Ivy Street in Ascot, Redcliffe and South Guilford (refer to Figure 1 contained within Attachment A).

3. Policy Objectives

3.1 To implement elements of the Great Eastern Highway Urban Corridor Strategy.

3.2 To facilitate high-quality development with active frontages and landscaping along Great Eastern Highway.

3.3 To facilitate an appropriate scale and transition of built form to nearby residential areas and preserving residential amenity.

3.4 To facilitate safe and efficient vehicle movements by minimising direct vehicular access to Great Eastern Highway.

3.5 To improve the amenity of the corridor through improvements to pedestrian and cyclist infrastructure and the creation of public spaces.

3.6 To encourage public infrastructure and public spaces which enhance safety, social interaction and well-being.

4. Policy Definitions

Active Land Use

Land uses that engage with the public realm, contributing to the activation of the street.

Public realm

The public realm encompasses all spaces that are accessible to the public. This includes streets, parks, plazas, sidewalks and other public infrastructure.

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Private realm

The private realm refers to spaces which are privately owned and maintained, typically including properties, buildings and other privately managed areas. Access is generally restricted to the owner, tenants, or invited guests, and they are not open for public use.

Urban Plaza

An urban plaza is a publicly accessible space featuring hard landscaping complemented by trees for shade, integrated street furniture, and public art to foster community activity. These spaces are often used in conjunction with adjacent land uses to create vibrant, activated areas. These areas also have the potential to host small-scale cultural and community events outside of general business hours.

Pocket Park

A pocket park is a small green space that includes soft landscaping, recreational opportunities like children's play equipment, community gardens, and sports areas.

Urban Garden

An urban garden is a green space, featuring a mix of turf, paving, and swales, along with new tree planting or the retention of existing trees.

Rear access, rear parking

This access and parking arrangement requires crossovers and vehicle access to be from side streets or the rear of the lot. Parking is provided along the rear boundary of the lot.

Rear access, front parking

This access and parking arrangement requires crossovers and vehicle access from side streets or the rear of the lot, however parking can be located at the front of the lot.

Front access, front parking

This access and parking arrangement allows crossovers and vehicle access from Great Eastern Highway (left in, left out only). Parking can be located at the front of the lot.

5. Development Requirements

5.1 Land Use and Activation

The Policy area consists of activity nodes, activity corridors and a mixed employment space as shown in Figure 2 contained within Attachment A.

5.1.1 Within activity nodes, an active land use should be located on the ground floor of a development. On upper floors, residential, commercial and office land uses are encouraged.

5.1.2 Within activity corridors, active commercial uses such as showrooms and offices should be located on the ground floor of a development. On upper floors, residential, commercial and office land uses are encouraged.

5.1.3 In mixed employment areas, industrial uses may be proposed; however, land uses such as offices and small-scale showrooms are encouraged west of Fauntleroy Avenue and should be compatible with surrounding uses.

5.1.4 Windows facing the public realm must remain unobstructed to maintain visual connection between the building interior and the street. Windows shall not be covered with opaque materials such as films, signage, or permanent fixtures. Internal layouts, including the placement of walls, shelving, or furniture, must not impede views from the building to the street or from the street into the building.

5.2 Spaces

5.2.1 Spaces identified in Figure 3 contained within Attachment A are encouraged to be integrated into future development.

5.2.2 The City may give weight to the provision of a space provided in accordance with Figure 3 when considering the application of discretion in relation to development standards.

5.3 Landscape Zones

5.3.1 A landscaping strip of 4m shall be provided at the front of lots within activity nodes in accordance with Figure 4.

5.3.2 A landscaping strip of 6m shall be provided at the front of lots within activity corridors in accordance with Figure 4.

5.3.3 Landscaping should include substantial tree planting and other vegetation to provide shade to adjacent paths and buildings.

5.3.4 Where parking and access requirements limit the implementation of a landscaping strip at the front of lots, a landscaping area of similar size shall be provided elsewhere on the lot.

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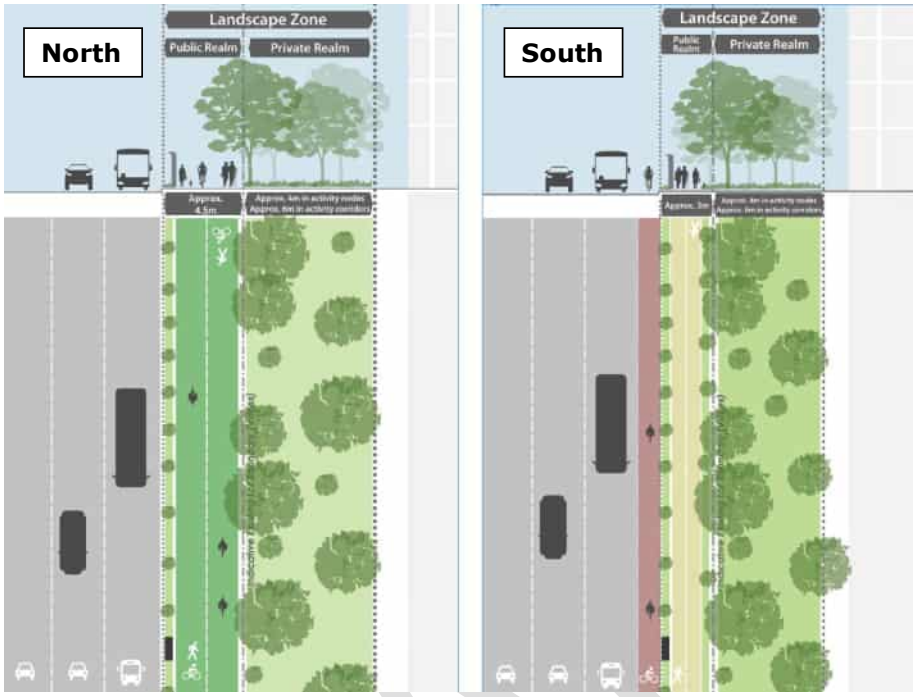


Figure 4: North and South landscape zone typologies

5.4 Connections

5.4.1 New pedestrian and cyclist connections identified in Figure 5 within Attachment A are encouraged to be integrated into future development.

5.4.2 The City may give weight to the provision of a pedestrian/cyclist connection provided in accordance with Figure 5 when considering the application of discretion in relation to development standards.

5.5 Access and Parking

5.5.1 Access and parking associated with lots shall be provided in accordance with Figure 5 contained within Attachment A. Notwithstanding, in considering changes to access points to Great Eastern Highway, the City of Belmont will have regard to advice from Main Roads Western Australia.

5.5.2 As a condition of development approval, Council may require that a public easement in gross be provided to facilitate shared vehicular access between lots.

5.5.3 While temporary crossovers will be permitted, the number of crossovers on a street block shall be minimised having regard for access via easements on adjoining lots.

5.6 Building Height and Plot Ratio

5.6.1 Building heights and plot ratio are to be in accordance with Figure 6 contained within Attachment A.

5.6.2 Building heights and plot ratio for 'Activity Centres' shall be determined having regard to the density code imposed on adjacent land but may be varied if:

a) Approval of the proposed development would be appropriate having regard to the criteria set out in Clause 67 of the Planning and Development (Local Planning Schemes) Regulations 2015 Schedule 2; and
b) The non-compliance will not have an adverse effect upon the occupiers or users of the development, the inhabitants of the locality or the likely future development of the locality.

5.6.3 Building heights and plot ratio for 'Industrial' designated sites will be subject to the building height limits contained within the City's Local Planning Scheme.

5.6.4 Building heights and plot ratio for lots within Development Area 6 shall be in accordance with the Improvement Plan and draft Improvement Scheme – Redcliffe Station Precinct.

5.6.5 Building heights and plot ratio for lots within the Golden Gateway Precinct shall be in accordance with the draft Golden Gateway Structure Plan.

5.7 Building Setback

5.7.1 Building setbacks are to be in accordance with Figure 7 contained within Attachment A.

5.7.2 Lots reflected as a 'minimal typology' are to be setback a distance between 0m-1m from the landscaping strip located within private property.

5.7.3 Lots reflected as a 'moderate typology' are to be setback a distance of 2m or more from the landscaping strip located within private property.

5.7.4 Lots reflected as a 'parking typology' will be assessed on a case-by-case basis, with consideration to increased setbacks to accommodate site constraints, parking and landscaping in the front setback area.

5.8 Transition

5.8.1 Transitions are to be in accordance with Figure 8 contained within Attachment A.

5.8.2 Lots subject to a 'low transition typology' are to be designed to minimise their impact on existing dwellings by ensuring appropriate transitions in building height, bulk and scale. Developments shall incorporate the following features to achieve this:

a) Architectural articulations to reduce visual intrusion and help mitigate the effects of taller structures on neighbouring properties.

b) Landscaping along the rear boundary.

c) Side and rear accessways and parking to further lessen the built form impacts on adjacent residential areas.

d) Stepping in of buildings from the boundary to achieve a greater setback and preserve visual privacy and solar access. This includes:

i. Podium height being one third of the total building height.
ii. Development above 2 storeys within 18m of the rear boundary contained within a 45-degree envelope.

An example of these provisions is shown in Figure 9.



Figure 9: Example of how development could transition to low scale existing residential development

5.8.3 Lots subject to a 'medium transition typology' shall complement adjacent land uses in terms of building height and rear and side setbacks. Development should be designed to minimise negative impacts associated with building bulk and scale on adjacent uses.

5.9 Amalgamation of Adjacent Land

5.9.1 The amalgamation of land within the Strategy area with land zoned 'Residential,' or with lots adjacent to, abutting or across the road from land zoned 'Residential' will not result in the residential land benefiting from higher development potential under this policy.

5.9.2 Where amalgamation is proposed with non-residential zoned land, and the amalgamated lots are not adjacent to, abutting or across the road from land zoned 'Residential,' the provisions of this Policy may also be applied to the portion of land proposed to be amalgamated, treating the combined lots as a single site. However, such amalgamation must demonstrate improved built form, access and site planning outcomes without adversely impacting nearby residential areas.

Governance References

Statutory compliance	*Planning and Development Act 2005* *Planning and Development (Local Planning Schemes) Regulations 2015* Local Planning Scheme No. 15
Industry compliance	
Organisational compliance	Great Eastern Highway Urban Corridor Strategy
Process links	

Local planning policy administration

Directorate	Officer Title	Contact
Development and Communities	Manager Planning Services	9477 7222

Document Date	Review Cycle	Next due
	Triennial	

Version	Decision to advertise	Decision to adopt	Synopsis

DRAFT

Attachment A



Figure 1: Lots subject to this policy

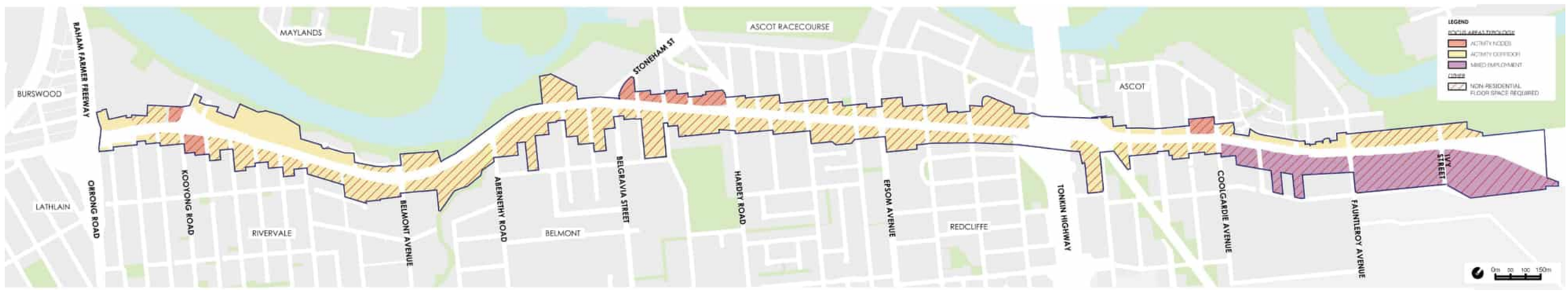


Figure 2: Locations of activity nodes, activity corridors and mixed employment area



Figure 3: Location of public spaces



Figure 5: Access and parking typologies and locations of pedestrian and cyclist connections

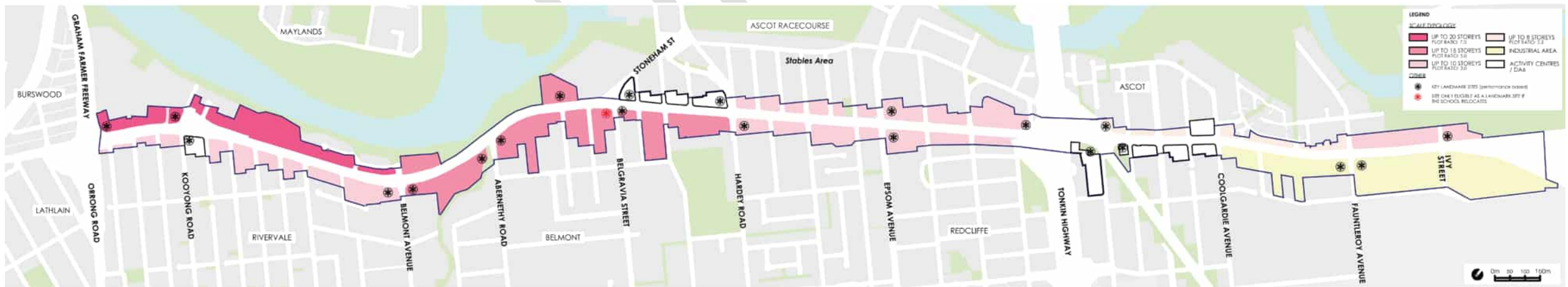


Figure 6: Building heights and plot ratio



Figure 7: Building setback typologies

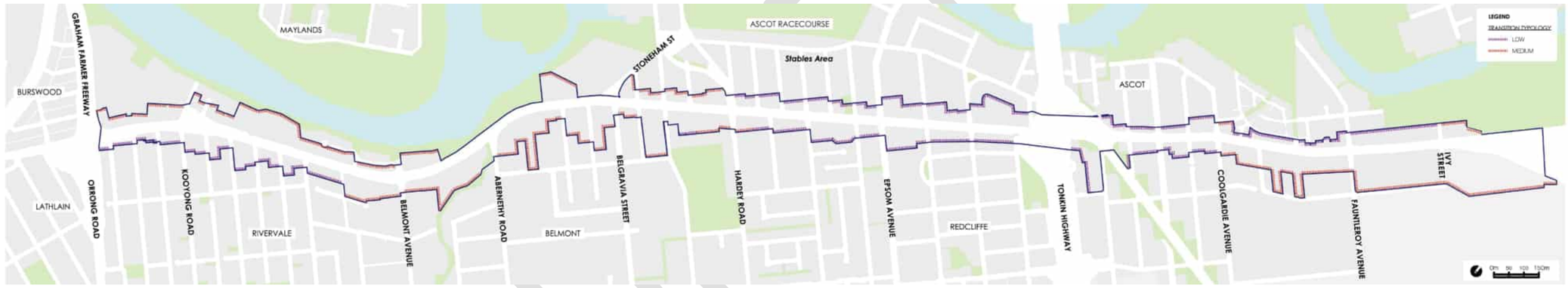


Figure 8: Transition typologies

SCHEDULE OF SUBMISSIONS

No.	Name and Address	Summary of Submission	Officer Comment
1.	Public Submitter	Outlines that combining business and residential interests and considerations is an important aspect with respect to City of Belmont residents. Highlights that no one can foresee the future with sufficient accuracy. Therefore, making 'provision' for is an important criteria. Considers that the City has been considerate of residents and hopes this continues. Considers the combination of a road and parkland corridor to separate commercial developments from the urban living aspects could go a long way. Considers that this separation may seem somewhat in conflict with urban infill, however outlines that quality of urban lifestyle is important and a parkland corridor would maintain this concept.	Noted. Noted. Noted. Noted.
2.	Public Submitter	Notes their clients are generally supportive of the Policy and the built form outcomes it seeks to achieve.	Noted.

		Request the following modifications be made to the Policy to provide greater clarity, flexibility and alignment with the recommendations of the Great Eastern Highway Urban Corridor Strategy. <u>Policy Application</u> Notes that the Policy applies to lots adjacent to Great Eastern Highway. Requests that the Policy wording be amended to clarify the treatment of amalgamating adjoining lots not included in the Strategy area. Suggests this could explain that amalgamating land with 'Residential' zoned land or with lots adjacent to, abutting or across the road from 'Residential' zoned land will not result in these benefitting from development at a higher scale in accordance with the Strategy. <u>Land Use and Activation</u> Notes being supportive of the wording proposed by clause 5.1.2: "Within activity corridors, active commercial uses such as showrooms and offices should be located on the ground floor or a development. On upper floors, residential, commercial and office land uses are encouraged.	Noted. Noted. Refer to the 'Report' section. Noted.

		Requests the clause 5.1.4 relating to window permeability be amended to instead read "No less than 60% of the total window façade shall remain unobstructed and not be covered with opaque materials such as films, signage or permanent fixtures." Notes understanding the City's intent to maintain active frontages, however considers the provision should recognise circumstances where windows facing the street may need to be obscure such as adult shops or medical centres and hospitals. Considers the suggested modified wording balances the City's activation objectives with practical operational needs and legislative requirements. <u>Spaces</u> Suggests that reference to 'Spaces' throughout the Policy is replaced with 'Public Spaces' or 'Space Typology'. Considers that in lieu of the term being defined, 'spaces' could be misinterpreted to include any form of space, rather than	Clause 5.1.4 has been drafted to facilitate windows facing the public realm in providing a clear visual connection between the building and the street. This outcome is important for achieving active frontages, improving safety through passive surveillance and enhancing the quality of the streetscape. It is recognised that in some cases, such as certain medical facilities or specialised uses, discretion may be required to allow alternative treatments. These circumstances can be considered on their merits, without including a set standard within the Policy. Introducing a 60% requirement would alter the intent of the provision and is not considered necessary given the flexibility already available through discretion. Accordingly, no modification to Clause 5.1.4 is proposed. The use of the term 'Spaces' in the Policy is consistent with the terminology of the Great Eastern Highway Urban Corridor Strategy. Supporting images provide clear guidance on the intended design and function of these areas, and each of the identified spaces is defined within the

		intended 'public spaces' identified in the Strategy in Figure 3. Considers that amending the wording would avoid ambiguity and ensure consistency with the City's intent and Figure 3 terminology. <u>Building height and plot ratio</u> Notes being supportive of the proposed building heights and plot ratios. <u>Transition</u> Suggests the inclusion of an additional clause which states "In accordance with Clause 2.1, the Transition Typologies as identified in Figure 8 may be adjusted in line with the proposed or new lot boundaries in circumstances where: • The abutting lots are proposed to be amalgamated as part of a Development Approval (and conditioned accordingly); or • Subdivision approval has been granted; or • The lots have been amalgamated. Considers this would provide additional clarity and flexibility as to how the transition typologies should be applied where lot boundaries change. Outlines that this would align with the suggested modified wording of Clause 2.1 and is consistent with LU22 of the Strategy.	Policy itself. On this basis, no modification is considered necessary. Noted. It is acknowledged that lot boundaries may change over time through subdivision or amalgamation. The application of transition typologies in these instances is best considered on a case-by-case basis, having regard to the specific site context. On this basis, no modification is proposed.

3.	Water Corporation PO Box 100 Leederville WA 6902	Outlines that there is significant Water Corporation infrastructure along the Great Eastern Highway Urban Corridor. Any development is required to adhere to the Water Corporation Technical Guidelines and Developers Manual to protect these assets. Any changes to setbacks or road layouts will require assessment by Water Corporation to ensure correct alignments for infrastructure is maintained. Any changes may be at the cost of the proponent. Any high-density development will need to be assessed on a case-by-case basis to ensure servicing is possible. Any upgrades will be at the developer's cost. Developers are expected to provide all water and sewerage reticulation if required. A contribution for water, sewerage and drainage headworks may also be required. Additionally, the developer may be required to fund new works or the upgrading of existing works and protection of all works associated with the Water Corporation. Water Corporation may also require land being provided for works.	Noted. Noted. Noted. Noted.
4.	Department of Transport and Major Infrastructure 140 William Street Perth WA 6000	The Department supports the policy objectives set out in section 3.	Noted.

		The Department notes that Figure 4: North and South landscape zones typologies shows a 4.5m shared path along the northbound lane and an on-road cycle lane with 3m pedestrian path along the south bound lane. Notes that this aligns with the Primary Long Term Cycle Network (LTCN) route along Great Eastern Highway.	Noted.
		The Department suggests that in planning for path infrastructure, reference is made to the Department's 'Planning and Designing for Active Transport in Western Australia: All Ages and Abilities Contextual Guidance' which provides recommendations on appropriate bicycle facilities based on road function.	Noted. Future planning for this infrastructure would need to occur in conjunction with the Department of Transport and Major Infrastructure as well as Main Roads WA.
		Notes support for the addition of new public spaces and pedestrian and cyclist connections per sections 5.2/figure 3 and 5.3/figure 5.	Noted.
		Outlines that construction and upgrading of paths should reflect user priority, with the path material continuing over crossovers. Suggests this be included as an additional point in section 5.5: Access and Parking.	It is not considered necessary to update the Policy to include this requirement, as it is already addressed through the City's Engineering Requirements and Specifications.
5.	Main Roads Western Australia PO Box 6202 East Perth WA 6892	In response to correspondence received on 13 August 2025, Main Roads provides the following comments on the above draft local planning policy:	

		1. The Great Eastern Vehicle Access Strategy (VAS) prepared by Main Roads has been supported by the City.	Noted. Whilst there may be differences between the MRWA Strategy Figure 5 of the draft policy, both documents aim to achieve the same outcome which is to remove direct access onto Great Eastern Highway.
		2. Great Eastern Highway between Graham Farmer Freeway and Tonkin Highway is built to its ultimate.	Noted however officers will continue to advocate for improvements where possible.
		3. Main Roads is not in a position to support the new access points onto Great Eastern Highway as shown in Figure 5 at this point in time. This has been previously advised (see attached letter). Further engagement between the City and Main Roads is required regarding this matter.	Front access, front parking has only been designated on nominated sites where rear access and rear parking has been determined to be unachievable due to topographical and/or other physical constraints. A modifications is recommended to update 5.5.1 to make it clear that in considering future access consultation will be undertaken with Main Roads.
		4. Main Roads is undertaking an Urban Road Planning Study for Great Eastern Highway east of Tonkin Highway. The study will identify strategic connections and associated access requirements to support the local road network, as well as opportunities to integrate active transport links within the corridor.	Officers recently met with MRWA and were advised of the study for the area east of Tonkin Highway. Officers will continue to engage with MRWA to advocate for improvements identified in the Great Eastern Highway Urban Corridor Strategy to be incorporated into the project.

		5. The upgrading/widening of Great Eastern Highway east of Tonkin Highway is not in Main Roads current 4-year forward estimated construction program and all projects not listed are subject to change without notice, and Main Roads assumes no liability for the information provided.	Noted

12.4 Demolition of a Single Dwelling - Lot 502 (314) Kew Street, Cloverdale

Voting Requirement	:	Simple Majority
Subject Index	:	115/001 & 34/046
Location/Property Index	:	Lot 502 (314) Kew Street, Cloverdale
Application Index	:	N/A
Disclosure of any Interest	:	Nil
Previous Items	:	Item 12.1.5
Applicant	:	City of Belmont
Owner	:	State of WA
Responsible Division	:	Development and Communities Infrastructure Services

Council role

Quasi-Judicial	The judicial character arises from the obligation for Council to abide by the principles of natural justice in making a decision on an application, e.g. development applications, building permits, applications for other permits/licences (under *Health Act*, *Dog Act* or Local Laws) and other decisions that may be appealed to the State Administrative Tribunal.

Purpose of report

To present Council with an analysis of potential options for the future of the dwelling located at Lot 502 (314) Kew Street, Cloverdale, and to identify a preferred approach for the site having regard to its heritage value, structural condition and financial considerations.

Summary and key issues

- The dwelling at Lot 502 (314) Kew Street, Cloverdale — known locally as "Stella Hay's House" — is listed as a Category 2 place on the City's Local Heritage List, signifying considerable local heritage significance.
- The property was constructed in 1951 and has remained vacant since 2022, following the surrender of the lease originally granted to Ms. Hay.

- In 2007, Council resolved to pursue demolition once the dwelling was no longer occupied, establishing a dedicated Reserve Account to support future restoration and redevelopment of the land.
- The site is co-located with the State Emergency Services (SES) building and is reserved for Parks and Recreation under the Metropolitan Region Scheme.
- In April 2023, the City formally assumed management of the site and commissioned both a structural engineer, a buildings inspector and a heritage consultant to assess its condition and heritage value.
- A structural report (July 2024) and subsequent building inspection (August 2024) confirmed the dwelling is in a severely deteriorated and unsafe condition, with extensive termite damage, ground subsidence, and structural instability affecting key components of the building.
- A Heritage Impact Statement (August 2025) concluded that demolition is acceptable, provided appropriate mitigation measures are implemented, including archival documentation and interpretive signage.
- Restoration costs are estimated to exceed $750,000, with no viable reuse plan or tenant identified. Expenses of $59,991 have been incurred since 2022 on security and maintenance, with further costs expected.
- The dwelling poses a significant safety and liability risk, with repeated unlawful access and antisocial behaviour observed on site.
- Demolition aligns with the City's strategic objectives, particularly the Public Open Space Strategy and Urban Forest Strategy, which support the enhancement of recreational land and canopy coverage.
- There are no statutory or legislative barriers to demolition under the Planning and Development (Local Planning Schemes) Regulations 2015 or the Heritage Act 2018.
- It is recommended that Council endorses Option 3 – Demolition and instructs the CEO to lodge a development application and implement interpretive measures that honour the site's heritage.

Officer Recommendation

That Council:

1. Notes the options analysis undertaken for the dwelling at Lot 502 (314) Kew Street, Cloverdale.
2. Endorses Option 3 – Demolition as the preferred approach.
3. Instructs the Chief Executive Officer to lodge a development application for demolition of the dwelling.
4. Instructs the Chief Executive Officer to develop and install interpretive signage acknowledging the history of the site as part of the site remediation.

An absolute majority of Council is required.

Location

The dwelling located at Lot 502 (314) Kew Street, Cloverdale is co-located with the current State Emergency Services (SES) building. The land is owned by the State of Western Australia, with the City of Belmont holding the management order over Reserve 48303 for the purpose of recreation.



Consultation

While no community consultation has been undertaken on this matter, the City commissioned a qualified structural engineer in July 2024 to prepare a structural condition report (refer Attachment 12.4.1), followed by a comprehensive building inspection in August 2024 (refer Attachment 12.4.2) to assess the overall integrity and habitability of the dwelling. In parallel, a heritage consultant was engaged to evaluate the heritage significance of the property, with the Heritage Impact Statement finalised in July 2025 (refer Attachment 12.4.3.

The findings of these reports have informed the options analysis and recommended approach outlined in this report.

Strategic Community Plan implications

In accordance with the 2024–2034 Strategic Community Plan:

Key Performance Area: People
Outcome: 2. A strong sense of pride, belonging and creativity.
Outcome: 3. People of all ages and abilities feel connected and supported.

Key Performance Area: Performance
Outcome: 10. Effective leadership, governance and financial management.

Policy implications

While there are no direct policy implications associated with this report, the proposed demolition and subsequent remediation of the site align with the objectives of the City of Belmont Public Open Space Strategy – A Strategic Approach to the Planning and Provision of Public Open Space (2022). The strategy supports the enhancement of recreational spaces and the integration of heritage interpretation within the public realm. In addition, the initiative complements the goals of the City of Belmont Urban Forest Strategy by promoting opportunities for increased tree canopy coverage and biodiversity within rehabilitated public spaces.

Statutory environment

City of Belmont Local Heritage List and Survey

The subject property is listed on the City's Local Heritage List and Survey as a 'Category 2' place, representing considerable significance. Development approval is required prior to any change or development of a property that is included on the Heritage List.

Metropolitan Region Scheme

The subject land is reserved 'Regional Open Space' under the Metropolitan Region Scheme. Certain forms of development, including the demolition of a property located in a heritage-protected place require approval from the Western Australian Planning Commission.

Background

The dwelling located at Lot 502 (314) Kew Street, Cloverdale — locally known as "Stella Hay's House" — was constructed in 1951 and is co-located with the existing State Emergency Services (SES) building. The property is owned by the State of Western Australia, with the City of Belmont holding a management order over Reserve 48303 for the purpose of recreation, including a power to lease.

At the Ordinary Council Meeting held on 5 June 2007, Council considered a request to obtain a management order over the property (then known as Pt Lot 1, 314 Kew Street) to facilitate the construction of a new SES facility. As part of this arrangement, the City sought to secure a lease that would allow the then-resident, Ms. Stella Hay, to remain in the dwelling until her circumstances changed. The house has remained vacant since 2022.

The 2007 Council resolution also established a dedicated Reserve Account titled "Pt Lot 1 (314) Kew Street – Hay Property" to support the restoration and development of the land following the eventual demolition of the dwelling. This resolution signaled Council's long-term intent for the building to be removed once it was no longer occupied.

The property was formally listed on the City's Local Heritage List in 1996 as a Category 2 place, indicating considerable local heritage significance. It remained on the updated Local Heritage Survey and Heritage List adopted in 2023. The City commissioned a heritage consultant, a structural engineer and a building inspector to assess the dwelling's condition and significance. The heritage assessment confirmed that while the building holds local heritage value, demolition could be supported if appropriate mitigation measures — such as archival recording — are undertaken. The structural assessment and building inspection report found the building to be in a severely deteriorated and unsafe condition, with extensive termite damage, structural instability, and significant maintenance issues.

An analysis of potential options for the future of the site — including retention, adaptive reuse, and demolition — is outlined below.

Report

Previous Council resolution

At its Ordinary Council Meeting held on 5 June 2007, Council considered a report regarding a request to obtain a management order over the property

then known as Pt Lot 1, 314 Kew Street, Cloverdale. The intent was to secure a management order in favour of the City, including the power to lease, thereby allowing the then-resident to remain in the dwelling until her circumstances changed.

The report acknowledged the property's inclusion on the City's Revised Municipal Heritage Inventory (2002), which provided the following guidance:

"Retain and conserve if possible; endeavour to conserve the significant features of the place: the original fabric remaining especially zinc light windows. Ensure that any future extensions and/or modifications reflect the character and style of the house. Photographically record the place prior to any redevelopment."

The resolution states as follows:

OFFICER RECOMMENDATION

DORNFORD MOVED, BASS SECONDED, that Council:

1. ***Request the Western Australian Planning Commission to purchase Pt Lot 1 (314) Kew Street and that when transferring the land to the State of Western Australia that Council be granted a management order with the power to lease for the following reasons.***

    - ***It would allow the Council to negotiate with the current owner Mrs Hay a suitable arrangement for her to continue residing at the property until her circumstances change.***
    - ***It would allow the Council to deal with the State Emergency Service on building on the south-east section of the subject property.***
    - ***Mrs Hay would only agree to the sale of her property if she can continue to reside in her home and the management of this is best dealt with by the Council. Council can demonstrate that it has successfully reached agreement with other owners whose land was reserved for Parks and Recreation.***

2. ***Request the Western Australian Planning Commission to consider an allocation of funds to Council to cover the cost of a heritage report on the dwelling/ improvements and the future demolition and clearing of the property.***

3. ***Request the support of the Western Australian Planning Commission to establishing the State Emergency Service headquarters being built on portion of the rear (or south-east section) of her property at Pt Lot 1 (314) Kew Street.***

4. ***Authorise the Chief Executive Officer to reach a suitable lease agreement with Mrs Hay, based on a commercial rental and that payments be placed in a separate reserve account for future expenditure on the subject land.***

5. ***Establish a Reserve Account called "Pt Lot 1 (314) Kew Street - Hay Property" for the restoration and development of land following the demolition of the Hay building.***

CARRIED 10 VOTES TO 1

For: Martin, Rossi, Hitt, Bass, Marks, Godfrey, Whiteley, Brennan, Powell, Teasdale

Importantly, Council resolved to establish a dedicated Reserve Account titled "Pt Lot 1 (314) Kew Street – Hay Property" to support the restoration and development of the land following the eventual demolition of the building. This resolution signalled Council's long-term intent for the dwelling to be removed once it was no longer occupied.

This historical decision provides a clear precedent for the current proposal and reinforces the City's longstanding objective to pursue demolition and redevelopment of the site in alignment with broader land management goals.

Building Condition

A structural condition survey was undertaken in July 2024, followed by a comprehensive building inspection in August 2024, to assess the integrity of the dwelling located at Lot 502 (314) Kew Street, Cloverdale. While the structural assessment focused exclusively on structural soundness—excluding electrical systems, energy efficiency, damp and weatherproofing, fire safety, and general amenity—the building inspection report went further, commenting specifically on the works required to bring the house up to a habitable standard.

The combined findings confirm that the building is in a severely deteriorated and unsafe condition. Extensive and costly intervention is required to address structural deficiencies, rectify water ingress and termite damage, replace compromised finishes and fixtures, and reinstate essential services. As a result, the property remains unfit for occupation.

Key Findings

- Severe structural deterioration: The building inspection confirmed extensive movement and cracking throughout the structure, with walls showing signs of displacement. Stabilisation using stainless steel reinforcement bars is required.
- Subfloor instability: Although the structural report questioned the need for restumping, the building inspection identified age-related instability requiring re-shimming and re-levelling of the floor to restore safe occupancy.
- Compromised roofing and ceiling systems: Roof tiles, flashings, and structural members are damaged, allowing moisture ingress. Ceilings are sagging, water-damaged, and in some areas partially collapsed. Full replacement is required.
- Extensive termite damage and ongoing risk: Active infestations have caused visible damage to timber flooring, skirtings, and cabinetry. The property is classified as "very high risk" for termite and timber pest activity due to surrounding vegetation and poor subfloor ventilation.

- Non-compliant framing and linings: Wall and roof framing do not meet Australian standards. Internal linings are extensively water-damaged and require full replacement.

- Essential services disconnected or degraded: Power, water, and gas are not connected. Electrical and plumbing systems would require full reinstatement, including new fixtures, appliances, and compliance upgrades.

- Restoration scope equivalent to near total rebuild: The combined findings indicate that restoration would require comprehensive reconstruction of floors, framing, linings, finishes, and services to achieve a habitable standard.

The reports conclude that while technical remediation may be possible, the cost of doing so would exceed the value of the building. The scale of deterioration, combined with safety risks and the absence of a viable reuse plan, supports demolition as the most practical and responsible course of action.

Land Use and Zoning Considerations

The subject land at Lot 502 (314) Kew Street, Cloverdale is zoned "Parks and Recreation" under both the City of Belmont Local Planning Scheme No. 15 and the Metropolitan Region Scheme. This zoning restricts future use of the site to recreational or community purposes consistent with its reserve designation.

Demolition of the existing structure would enable the site to be repurposed in accordance with the City of Belmont Public Open Space Strategy 2022–2040, adopted in 2022. The strategy provides a framework for enhancing the quality, accessibility, and functionality of public open spaces across the City, with a focus on supporting community wellbeing and environmental resilience.

Potential future uses of the site may include:

- Development as public open space;

- Continuation of the footpath to the bus stop to improve pedestrian safety and connectivity;

- Improve passive recreation;

- Creation of community facilities such as gardens or small-scale recreational amenities.

These outcomes align with the strategic direction set by the City and reflect the intended purpose of the reserve. Removal of the existing building is necessary to enable these uses to be realised.

The Local Heritage Value

The dwelling holds recognised heritage significance as a Category 2 place on the City's Local Heritage List, contributing to the historical character of Cloverdale and reflecting mid-century residential development. While its physical condition no longer supports retention, its heritage value will be acknowledged through archival documentation and interpretive measures that honour its place in the City's history.

Discussion

In balancing the reserve's purpose with its heritage significance, the City's land management approach gives careful consideration to the economic, social and environmental dimensions of land use, including the site's heritage value and potential for future community use.

Three options have been considered for the future of the dwelling located at Lot 502 (314) Kew Street, Cloverdale. These options have been assessed with regard to the site's heritage value, structural condition, financial implications, and alignment with strategic planning objectives. The options presented for Council's consideration are:

- Option 1 – Retain the existing dwelling with no adaptive reuse.
- Option 2 – Retention and adaptive reuse
- Option 3 – Demolition

A detailed analysis of each option is provided below.

Options Analysis

Option 1 – Retain the Existing Dwelling with No Adaptive Reuse

This option involves retaining the existing structure in its current state without undertaking any restoration or adaptive reuse. While this would preserve the physical heritage fabric of the site, it presents several significant concerns.

A structural condition survey undertaken in July 2024, alongside a comprehensive building inspection completed in August 2024, found the dwelling to be in a severely deteriorated and unsafe condition. While the structural report focused primarily on structural soundness, the building inspection assessed a broader range of elements including electrical systems, weatherproofing, fire safety, and general amenity. Together, the findings confirm that the property requires extensive remediation across multiple disciplines to restore it to a habitable standard.

In its current state, the dwelling poses a liability and safety risk to both the City and the community. The site has been subject to ongoing unlawful access, with evidence of drug and alcohol use regularly observed. Without intervention, these risks are likely to escalate.

Retaining the structure without a clear purpose would also require continued expenditure on security, maintenance, and risk mitigation, without delivering any tangible community benefit or alignment with the City's strategic objectives.

Given the safety, liability and financial implications, this option is not recommended.

Option 2 – Retention and Adaptive Reuse

This option involves undertaking full structural remediation and restoration to enable reuse of the building for community or administrative purposes. While this would retain the heritage structure, it is not considered viable due to the extent of deterioration and associated costs.

The structural condition survey and building inspection collectively identified a broad scope of remedial works required to restore the dwelling to a habitable standard. Key interventions include subfloor stabilisation, reinforcement of masonry walls, replacement of water-damaged ceilings, and major repairs to the roof structure and cladding. The extent of deterioration across structural and internal elements means that near-total reconstruction of floors, framing, and linings would be necessary.

The property is classified as very high risk of termite and timber pest activity, with visible damage to flooring and subfloor areas. While treatment has been undertaken to prevent further deterioration and reduce the risk of infestation, the extent of structural damage may already render remediation unviable. The surrounding vegetation and timber-rich environment further elevate the risk of ongoing pest activity, compounding long-term maintenance concerns.

Building restoration costs are estimated to exceed $750,000. In addition to the upfront investment, long-term maintenance and compliance obligations would remain with the City. No viable tenant or operator has been identified to support ongoing use, and the option is not considered financially sustainable or aligned with responsible asset management.

Given the lack of a viable reuse plan and the significant financial burden, this option is not recommended.

Option 3 – Demolition

This option involves removing the existing dwelling to enable the site's redevelopment for recreational purposes, consistent with its Metropolitan

Region Scheme (MRS) 'Regional Open Space' reservation and Council's previous resolution as detailed above.

The Heritage Impact Statement prepared by a qualified heritage consultant confirms that removal of the dwelling is acceptable, provided appropriate mitigation measures are implemented. These measures include detailed photographic recording and archival documentation prior to demolition, ensuring the building's contribution to the City's history is appropriately recognised and preserved.

To further honour the site's heritage significance, interpretive measures should extend beyond basic signage. Recommended initiatives include professionally curated archival records accessible to the public, and commemorative artwork or features that reflect Stella Hay's contribution to the local arts community. These measures will provide a meaningful and lasting tribute, consistent with the City's Strategic Community Plan and Public Open Space Strategy.

The structural report and building inspection both confirm the dwelling is in a severely deteriorated and unsafe condition. Significant issues include extensive termite damage, ground subsidence, and structural instability. Restoration to a habitable standard would require near-total reconstruction, with estimated costs exceeding $750,000. In contrast, demolition and site remediation are expected to cost approximately $250,000.

Demolition would eliminate the existing liability and safety risks associated with the deteriorated structure and remove ongoing maintenance and security costs. It would also enable the site to be remediated and repurposed for recreation in accordance with its Metropolitan Region Scheme 'Regional Open Space' reservation and consistent with the City's Public Open Space Strategy.

Importantly, this approach aligns with the intent of Council's 2007 resolution, which anticipated the eventual removal of the building once it was no longer occupied. The resolution supported future remediation and redevelopment of the site following demolition, reflecting Council's long-standing position that the building would not be retained indefinitely.

Given these considerations, demolition is considered the most practical, cost-effective and strategically aligned option for the future of the site. As the land is reserved under the Metropolitan Region Scheme, a development application for demolition will be required to be lodged with, and determined by, the Western Australian Planning Commission.

Financial Considerations

Historical Expenditure

Over the past five years, the City has incurred approximately $115,251 in costs associated with managing the property at Lot 502 (314) Kew Street,

Cloverdale. These expenses reflect ongoing efforts to maintain the site, address safety concerns, and mitigate risks associated with its deteriorated condition.

Since 2022 alone, $59,991 has been spent, primarily on maintenance, security measures, and responses to unlawful access. Despite the dwelling being vacant, the site has required frequent intervention to ensure public safety and compliance with duty-of-care obligations.

City officers have attended the property on more than 25 occasions, contributing in excess of 100 hours staff time to secure the premises and respond to incidents. While these operational efforts have not been formally costed, they represent a significant internal resource burden and highlight the unsustainable nature of retaining the structure in its current state.

Restoration vs Demolition

Restoration of the dwelling to a habitable standard is estimated to exceed $750,000, based on the combined findings of the structural and building inspection reports. This estimate accounts for extensive structural remediation—including full restumping, floor re-levelling, masonry wall stabilisation, ceiling replacement, and comprehensive roof repairs—as well as the reinstatement of essential services such as electrical, plumbing, and amenity upgrades. The figure reflects the full scope of works required to meet contemporary standards, though it may increase further due to concealed deterioration or compliance-related costs.

The building is currently in a severely deteriorated condition, with significant termite damage, structural instability, and compromised internal linings. It has been classified as very high risk for termite and timber pest activity, with the surrounding vegetation and timber-rich environment further elevating the likelihood of ongoing infestation and long-term maintenance concerns.

Demolition and basic site remediation are currently budgeted at $150,000 in the 2025–2026 Capital Works Program. Based on current estimates, the total cost to safely demolish the structure and prepare the site for future public use is approximately $250,000. The remaining funds will be drawn from the Streetscape Enhancement Renewal Budget and the Path Network Improved Access and Connectivity Budget. No additional funding is required. This integrated funding approach provides a financially sustainable and predictable outcome, consistent with the City’s long-term strategic intent for the site.

Environmental implications

The proposed demolition and transition of Lot 502 (314) Kew Street, Cloverdale to public open space presents clear environmental benefits and aligns with multiple strategic frameworks adopted by the City. Specifically, it supports the objectives of the Public Open Space Strategy, which promotes the enhancement

of recreational areas and integration of heritage interpretation within the public realm. It also complements the Urban Forest Strategy by enabling increased canopy cover and biodiversity through future landscaping initiatives and aligns with the Streetscape Enhancement Strategy by improving pedestrian connectivity and contributing to a more attractive and accessible local environment.

Social Implications

The current condition of the dwelling at Lot 502 (314) Kew Street presents ongoing amenity and safety concerns, with repeated unlawful access and antisocial behaviour impacting the surrounding area. These issues have required significant officer time and resources to manage.

While the site holds local heritage value, the social benefit of retaining the structure is outweighed by the risks and limitations it imposes. The building is not fit for occupation, and restoration is not economically viable.

The proposed demolition is consistent with the 2007 Council Resolution. Future use of the site—such as public open space, shared paths, or community facilities—will deliver broader social value and improve amenity for residents.

Conclusion

The dwelling at Lot 502 (314) Kew Street, Cloverdale has reached a point of structural deterioration and safety risk that renders retention or restoration impractical. While the site holds recognised heritage value, professional assessments confirm that demolition is both acceptable and necessary, provided appropriate interpretive measures are implemented.

Restoration costs are estimated to exceed $750,000. In contrast, demolition and basic site remediation are estimated at $250,000. This approach is significantly more financially sustainable and predictable and aligns with the City’s long-term strategic intent for the site.

Demolition will eliminate ongoing liability, enable the site to be repurposed in line with its “Parks and Recreation” zoning, and support key priorities under the Public Open Space Strategy, Urban Forest Strategy, and Environmental Sustainability Strategy.

Council’s endorsement of Option 3 – Demolition is consistent with Council’s 2007 Resolution and will allow the City to proceed with a development application and deliver a respectful and community-focused transition for the site.

Attachment details

Attachment No and title
1. Structural Report - 314 Kew Street, Cloverdale - July 2024 [**12.4.1** - 15 pages] 2. Building Inspection Report - August 2024 [**12.4.2** - 20 pages] 3. Heritage Impact Statement July 2025 [**12.4.3** - 8 pages]

AUSTRALIAN BUILDING SPECIALIST PTY LTD
STRUCTURAL ENGINEERING

STRUCTURAL INSPECTION REPORT

314 KEW STREET, CLOVERDALE

AUSTRALIAN BUILDING SPECIALIST PTY LTD
STRUCTURAL ENGINEERING

ABN: 34 644 228 580
ACN: 644 228 580

26th July 2024

Our Ref: S5527 – STI - 0

THEO SARTZIDIS

STRUCTURAL INSPECTION OF EXISTING CRACKS
314 KEW STREET, CLOVERDALE

Dear Theo,

Following your request, a representative from this office visited the above-mentioned site to carry out a structural inspection of the existing cracks. The inspection was carried out on the 16th of July 2024. The inspection was a non-invasive examination only.

Disclaimer

- This report and certification as carried out do not include certification of installation methods.
- This inspection is based on a visual, non-invasive inspection only, therefore durability measures and non-visible or inaccessible structural elements were not inspected.
- This report does not include structural or recertification of the existing structure but rather a partial visual record of the existing structures.

Inspected Structure



Figure 1 Inspected Structure

Location of inspected structures

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ABN: 34 644 228 580
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Analysis / Findings

The existing wind classification for the structure was determined to be equivalent to N2 (AS4055) in accordance with AS 4055.

Wind Region:	**A**
Terrain Category:	**TC2.5**
Topographic Class:	**T0**
Shielding Class:	**NS**

- This office was engaged to carry out a structural inspection of the existing cracks located at the above mentioned address.
- A representative from this office inspected the existing residence, which consisted of a single-story building, double brick walls and a tiled roof as covering.
- Upon inspection, existing cracks of varying damage were observed. These slight and moderate cracks were found along the external walls of the inspected structure.
- As inspected, a representative from this office observed that the existing dowpipes in all locations were cut and stopping above the ground.
- The existing downpipes as inspected were not connected to sufficient undergound drainage and soakwell systems at the time of the inspection.
- It is the opinion of this office that water from the downpipes is filtrating into the soil adjacent to the inspected house structure, causing the footings to subside due to the water ingression.
- The overall structure was inspected and based on the visual findings and information gathered at the time of the inspection, it is the professional opinion of this office that the following remedial works are required be undertaken to rectify the cracks.
- The existing wall cracks are considered to be of “Slight” and “Moderate” damage in accordance with Table C1 below.

  Appendix B of AS2870: Residential slabs and footings provide guidance in relation to the damage categories and structural implications of cracking within walls. Refer to Table C1 below.

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TABLE C1

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 1)	Damage category
Hairline cracks	<0.1 mm	0 Negligible
Fine cracks that do not need repair	<1 mm	1 Very slight
Cracks noticeable but easily filled. Doors and windows stick slightly	<5 mm	2 Slight
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weather tightness often impaired	5 mm to 15 mm (or a number of cracks 3 mm or more in one group)	3 Moderate
Extensive repair work involving breaking out and replacing sections of walls, especially over doors and windows. Window frames and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted	15 mm to 25 mm but also depends on number of cracks	4 Severe

NOTES:

1 Where the cracking occurs in easily repaired plasterboard or similar clad-framed partitions, the crack width limits may be increased by 50% for each damage category.

2 Crack width is the main factor by which damage to walls is categorized. The width may be supplemented by other factors, including serviceability, in assessing category of damage.

3 In assessing the degree of damage, account shall be taken of the location in the building or structure where it occurs, and also of the function of the building or structure.

Table C1 – Classification of Damage with Reference to Wall

Remedial Works

- All slight and moderate wall cracks are required to be stitched with Helifix brick stitching, to prevent the crack from developing any further. Refer to the link for the product application: https://www.helifix.com.au/.
- Any existing hairline cracking should be patched using Polyfilla and then painted.
- Additional grout injection is required to the underside of the existing footings around the entire perimeter of the house structure, to provide additional structural stability and support, as well as preventing the footings from potentially subsiding further.
- All existing downpipes are required to be connected to sufficient underground drainage and soakwell systems.
- Allow 6 months for any additional settlement cracks to occur. After 6 months patch and paint cracks as required.

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Conclusion

Following the analysis and based on the information gathered at the time of the inspection, it is the opinion of this office that once the above report and remedial works have been adhered to and undertaken, the inspected structure can then be considered structurally adequate.

Should you have any questions regarding the above or require further assistance please contact the undersigned on (08) 6154 2896.

Yours Sincerely



Nino Llapi
Structural Engineer
BEng (Hons) (Civil/Structural)
CPEng, NER, APEC, IntPE(Aus), MIEAust (5948108), RPEQ (31477), BLA (PE0014398)



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Appendix A



Figure 2 Structure as inspected.



Figure 3 Structure as inspected.

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Figure 4 Structure as inspected.



Figure 5 Structure as inspected.

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Figure 6 Structure as inspected.



Figure 7 Structure as inspected.

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Figure 8 Structure as inspected.



Figure 9 Structure as inspected.

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Figure 10 Structure as inspected.

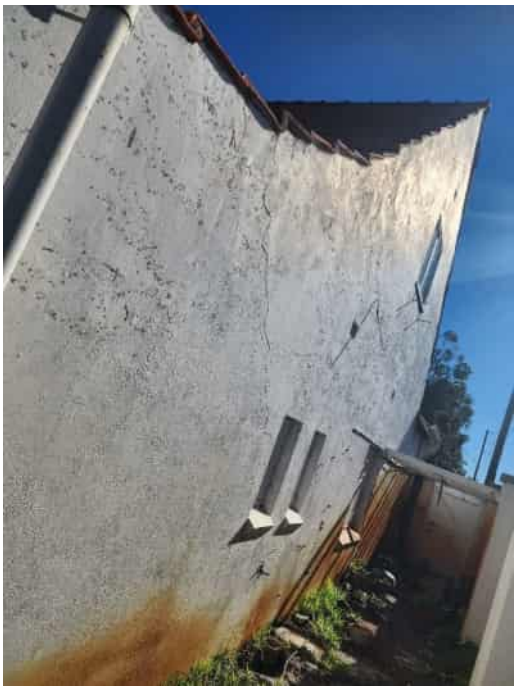


Figure 11 Structure as inspected.

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Figure 12 Structure as inspected.



Figure 13 Structure as inspected.

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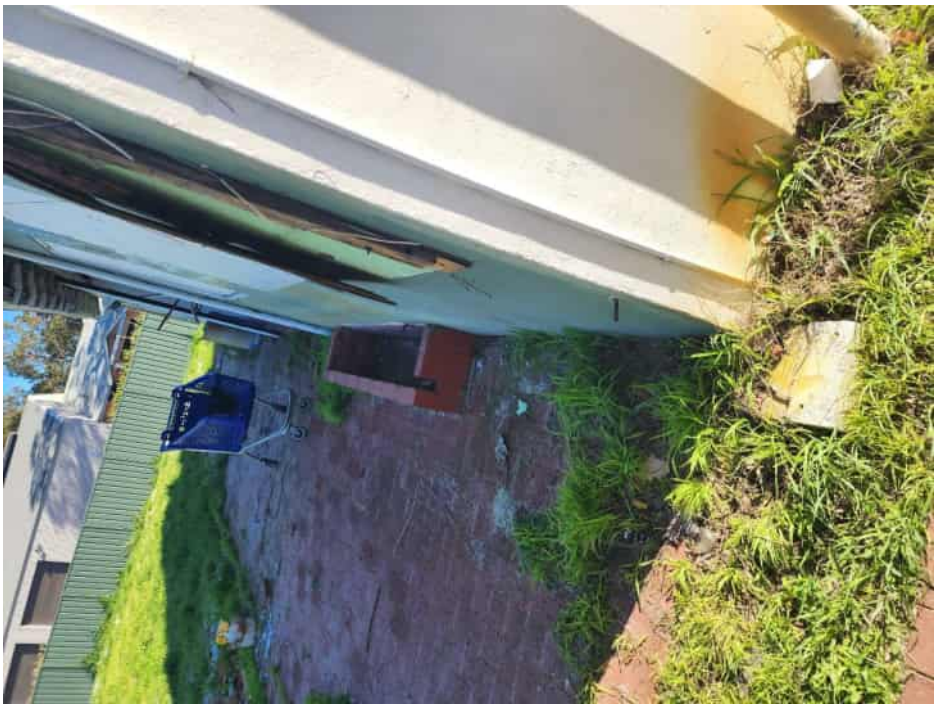


Figure 14 Structure as inspected.



Figure 15 Structure as inspected.

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Figure 16 Structure as inspected.



Figure 17 Structure as inspected.

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Figure 18 Structure as inspected.



Figure 19 Structure as inspected.

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Figure 20 Structure as inspected.



Figure 21 Structure as inspected.

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BUILDING LOCALLY

ABN 91 565 770 189
65A WEAPONESS RD
SCARBOROUGH WA 6019
PHONE: 0430 557 262
B LIC: 12815

14TH AUGUST 2024

Gerry Brien
City of Belmont
Locked Bag 379,
CLOVERDALE, WA 6985

REF: CB2405

REPORT

Attn: Gerry Brien – Building & Facilities Operations Advisor,

Re: 316 KEW ST, CLOVERDALE

The purpose of this report is determining the condition of the building in regards to its structural integrity, the extent of work required to bring the premise back to a habitable state in a like for like manner and based on that, determine a cost to remediate/renovate the property.

Included with this report will be a structural engineering report and pest & weed control report.

Australian Building Specialist Pty Ltd on the 16th July 2024 conducted their own inspection of the building and provided their Structural Building Report. (Ref: S5527 – STI – 0)
CBA Pest & Weed Control inspected the building on the 31st July 2024 to review any live infestations of termites & vermin and to provide recommendations as per their report JOB NUMBER 174,538.

DESCRIPTION

Based on information provided the home was built in 1970 approximately making it 54 years. The building is a double brick for most part on the ground level built on concrete foundation and timber framed floor, stud walls and roof to the upper floor with a clay roof tile cover. The majority of the floors to the lower level are timber floor on brick stumps with the bathroom floor being concrete.



Fig 1

1 - SITE CONDITIONS

The site comprises of sandy soil with grassed vegetation to the front and right side of the property. The remaining site has been cleared of all previous out building and trees.
To the front the building has the ground levels above the foundation levels and are set at 1 course below the finished floor level. The left, rear and right side the level is at just below door threshold levels. (Refer Fig 2 – 5)

E. & O. E.



Fig 2



Fig 3



Fig 4



Fig 5

Externally the blockwork has not been adequately waterproofed to prevent moisture ingress. The foundations are not visible and are deeper than the current ground levels. The issue with this being is that the cement blocks used are porous element that absorb and hold water content having an impact on the integrity of the wall & foundation.
The property does not have a stormwater system to capture roof water or ground surface water away from the building. The building has 1 downpipe at the rear (Fig 6), 3 downpipes to the front elevation



Fig 6



Fig 7



Fig 8



Fig 9

(Fig 7 & 8) and 1 downpipe to the left corner (Fig 9).
The stormwater discharge from these downpipes has a direct impact on the ground conditions and on the foundations. This is evident from the external cracks to the outer walls both on the left and right side of the home Fig 10 – 14).

E. & O. E.



Fig 10



Fig 11



Fig 12



Fig 13



Fig 14

Refer to Australian Building Specialist Pty Ltd Structural Building Report. (Ref: S5527 – STI – 0) for their observations and recommendations.

1.1 - RECOMMENDATION

Remove all vegetation in a 2m proximity to the building.
Remove the concrete area to the right side of the house.
Remove all paving from the left side and rear of the home.
Drop ground levels around the perimeter of the building by a minimum 2 course (172mm).
Provide 2 soakwells and stormwater system to the front of the building, for the discharge and capture of all roof water from the front of the house. (4 downpipe outlets)
Provide 1 soakwell and stormwater system to the rear of the building, for the discharge and capture of all roof water from the rear of the house. (1 existing downpipe outlet plus 1 additional outlet)
Provide grout injection to perimeter foundation of the home to stabilise ground subsidence (Refer to Australian Building Specialist Pty Ltd Structural Building Report. (Ref: S5527 – STI – 0)).
Reinstate paving at the right ground level and slope to direct ground surface water away from the building.
Provide strip drains and grates for the capture of surface ground water in to soakwells.

2 - BRICKWORK

E. & O. E.

The building has been constructed with cement blocks for the external walls and mostly single course red bricks internally. The exception appears to be the external chimney, which was laid with red bricks.
The building, on the ground floor comprises of double brickwork to left, right and front sides.
The wall between the bathroom, kitchen, dining room has backing onto the store room and the laundry is a single leaf wall. The laundry and the store are also constructed as a single leaf wall. It is evident that due to the ground subsidence and the location of the cracking, this is the weakest point on the walls (refer to Fig 15 – 17 & Australian Building Specialist Pty Ltd Structural Building Report. (Ref: S5527 – STI – 0)).



Fig 15 Right Side



Fig 16 Left Side



Fig 17

It is also observed that the planter boxes would also be contributing to water saturation of the foundations as the water discharges directly beneath them.

The external fireplace chimney on the right side to the house faces the prevailing weather coming from the South and South West directions. It is evident that the factors which have affected this corner of the home are water ingress due to access to inner side of foundation and as mentioned earlier the discharge of stormwater straight onto the ground next to the foundation (Fig 8 above, Fig 18 & 19)

E. & O. E.



Fig 18



Fig 19

To the ground floor internal walls, there does not appear to be any visible cracking other than to the wall in the dining room (Fig 20). All the walls are covered with wall paper but there does not appear to be rips or tears.



Fig 20

2.1 - RECOMMENDATION

To prevent further damage to the building, recommended actions that should be taking include:
Helifix brick stitching to right side external and affected internal wall/s.
Helifix brick stitching to left side external and any affected internal wall/s.
Helifix brick stitching to front side external wall/s.
Investigate and remediate all minor cracking throughout the building as necessary.
Refer to Australian Building Specialist Pty Ltd Structural Building Report. (Ref: S5527 – STI – 0).

3 – GROUND FLOOR

The ground floor is constructed with brick stumps without ant caps, with timber bearers and joists. The internal stumps have not been affected by the issues noted above (1 & 2). The timber bearers and joists appear to be in good condition. The floor is jarrah boards approximately 50mm wide. The floors to all rooms except the kitchen have carpets as the covering. The kitchen has a lino floor covering (most likely asbestos based product). The height from the ground to the underside of the bearers ranges between 200 to 250mm in clearance.
Inspection of the jarrah floors indicates that there has been an infestation of termites which have damaged part of the floors in most rooms (Fig 21 – 39). The worst affect floor is in the kitchen. Refer to CBA Pest & Weed Control Inspection report JOB NUMBER 174,538. The floor to the kitchen will need to be replaced. In all other floor areas, the affected boards will need to be cut out and replaced. It is evident that some skirtings, the staircase stringer and some of the built-in cabinets have been affected by white ants. The cause of the infestation is due to damp conditions around the base of the building and easy access for white ants to gain entry. Also, the subfloor does not have any ventilation vents due to how the building has been constructed.

E. & O. E.

The construction of the kitchen wall as a single leaf and location of external wall opening/s have assisted termite access. As a result, the extent of the damage to the kitchen floor.



Fig 21 Termite trail



Fig 22 Termite damage



Fig 23 Termite damage lounge



Fig 24 Termite damage lounge



Fig 25 Termite damage lounge



Fig 26 Floor hatch lounge



Fig 27 Floor hatch front bedroom



Fig 28 Termite damage front bedroom

E. & O. E.



Fig 29 Termite damage front bedroom



Fig 30 Termite damage front bedroom



Fig 31 Floor hatch 2nd bedroom



Fig 32 Termite damage 2nd bedroom



Fig 33 Under staircase



Fig 34 Termite damage stringer



Fig 35 Termite damage kitchen



Fig 36 Termite damage kitchen

E. & O. E.



Fig 37 Termite damage kitchen



Fig 38 Termite damage kitchen



Fig 39 Termite damage kitchen

The store room floor is in a poor state as it saturated due to the roof above leaking.

3.1 - RECOMMENDATION

Based on evaluation made, it is recommended
All external ground levels be lowered to reduce moisture ingress into the building.
Perimeter of building be excavated to expose wall down to foundation to waterproof wall below ground level.
Repair and point any penetrations where termites can gain access to the subfloor.
Repair any wall penetrations to the kitchen wall.
Repair all jarrah floors affect by termite damage
Refer to CBA Pest & Weed Control Inspection report JOB NUMBER 174,538 for all recommendations.

4 – UPPER FLOOR

The upper floor is timber constructed. The ceiling battens and floor joists are of jarrah and are in very good condition. The back left bedroom has a jarrah T & G floor boards with carpet on top.



Fig 40



Fig 41

E. & O. E.



Fig 42



Fig 43 Jarrah boards

The staircase is also constructed of jarrah and appears in good condition. The floor to the 2 last rooms is of particle board nature. The boards have been saturated with water due to the roof leaking the house has sustained and as such the floor feels soft to walk on Fig 44 & 45.



Fig 44



Fig 45

The stud walls appear to be in a reasonable condition. It is an opinion that the weight of the roof frame applied onto the wall framing has compressed the particle board floor. The impact of this means the wall and roof frame have shifted. What is evident from the inspection is that the rafters have bowed, and there appears to be a small gap between the rafter and the ridge beam.



Fig 46



Fig 47

The roof frame does not comply to current building standards. The under purlins are not fixed to the most rafters. There is no strapping to the rafters and ridge. There is no strapping to the strut and ridge board. The roof frame is lacking sufficient collar ties Fig 46 & 47.
In Fig 48 – 51indicate the roof rafters over the store room, kitchen veranda. What is evident are that there are no bolted connections, no strapping and evidence that there has been movement due to gaps

E. & O. E.

appearing. This occurrence seems to coincide with Australian Building Specialist Pty Ltd Structural Building Report. (Ref: S5527 – STI – 0) specifically in regards to subsidence



Fig 48



Fig 49



Fig 50



Fig 51

The roof tiles have slipped off the battens due to wire ties having rusted, roof tiles having been disturbed. Overall, the roof cover is in a poor state (Fig 48 – 53).



Fig 52



Fig 53

Where built in cabinets have been installed the wall framing is undersized and thus non-compliant to current building standards.

4.1 - RECOMMENDATION

Refer to Recommendations 1.1 and 2.1.
Based on evaluation made, it is recommended

E. & O. E.

The damaged particle board be removed and replaced with structorflor.
The stud walls are reset and secured to frame.
The wall and roof frame are made complaint to NCC standards and AS1684 Residential Timber-Frame Construction.
Remove and replace roof tiles with new. Provide sarking and pin all tiles.

5 – CEILING & WALL LININGS

Ceilings
The ground & upper floor ceilings are plasterglass boards. They have sustained extensive water damage due to leaks from the roof. Visible cracking to the plasterglass is caused by wind pressure and the dislodgement of wading. (Fig 54 – 67).

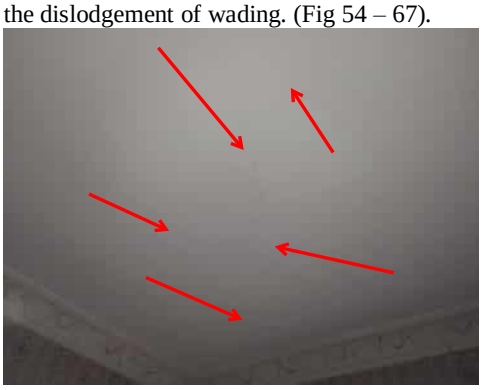


Fig 54 Front bedroom



Fig 55 Front bedroom



Fig 56 Dining



Fig 57 Dining



Fig 58 Lounge



Fig 59 Passage

E. & O. E.



Fig 60 **Passage**



Fig 61 **Entry**



Fig 61 **Kitchen - Dislodged**



Fig 62 **Kitchen**

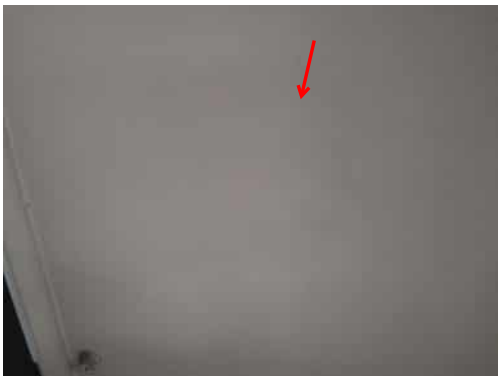


Fig 63 **Kitchen – Cracking**

E. & O. E.



Fig 64 **Sitting Rm**



Fig 65 **Sitting Room Nook**



Fig 66 **Bedroom**



Fig 67 **Store room**

Walls
The upper floor walls comprise of pinboard lining with the exception of the attic store, bedroom on the left and the stairwell void. All walls have severe water damage.

5.1 - RECOMMENDATION

Based on evaluation made, it is recommended
All ceiling and wall linings both internally and externally be removed and reinstate with 13mm plaster board. All cornices be replace with new matching plaster glass cornices.
Provide wall and ceiling insulation.

6 – WINDOW & DOORS



Fig 68 **Repair**



Fig 69 **Replace**



Fig 70 **Replace**

E. & O. E.



Fig 71 Replace



Fig 72 Replace



Fig 73 Replace kitchen & upper



Fig 74 Replace laundry



Fig 75 Replace



Fig 76 Replace



Fig 77 Replace



Fig 78 Replace

E. & O. E.

6.1 - RECOMMENDATION

Based on evaluation made, it is recommended
All window sashes be removed and replaced where the cost to replace is more cost effective than repairing.
Replace all windows where the damage to the frame and sash/es is too severe to repair.
Repair all leadlights and replace glass to NCC conditions.
Replace all external doors (like for like where possible) due to the extent of damage due to break ins and securing.
Replace all door and window hardware.

7 – CABINETRY



Fig 79



Fig 80



Fig 81



Fig 82



Fig 83



Fig 84



Fig 85



Fig 86

E. & O. E.



Fig 87



Fig 88



Fig 89



Fig 90



Fig 91

7.1 - RECOMMENDATION

Based on evaluation made, that all cabinetry to the building is not fit for purpose. It is recommended All Cabinets be removed and replaced.

8 – FINISHES

All carpets are not fit for purpose and will need to be removed and replaced.
All wall paper to entire home is in a poor condition and will need to be removed and replaced. Most of the damage has been caused due to water damage.
The walls will need to be decontaminated, resurfaced, and painted.
Painting is required to all ceilings, walls, internal woodwork including doors, windows, sills skirtings and architraves as well as the staircase and balustrade.
External painting is required to all rendered walls, all roof timbers (rafter ends, barge boards and/or other).
Rectify missing tiles in the laundry.

9 – ROOF PLUMBING

All gutters, downpipes, valley gutters, apron flashings, chimney flashings and flume need to be removed and replaced.

10 – SERVICES

Currently there is no power, gas or water connected at the house.
Electrical
The building will need a new meter box installed and power brought back into the home.
Due to the extensively poor condition of the home, it would be recommended that:

E. & O. E.

- The current wiring to switches and power points be tested and verified that it is suitable for purpose.
- Alternatively, all electrical wiring, power points and switches be renewed.

The home will require new lighting as all have been removed.
The home will require new appliances (oven & hot plate or stove, rangehood, split system air conditioner).



Fig 92

Plumbing
Currently all external water pipes have been removed. New water pipes will need to be laid to service the laundry, kitchen, store room and the bathroom.
The sewer connection will need to be inspected to make sure all drainage outlets exiting from the house are connected to the mains sewer junction (location unknown).
New plumbing fixtures will be required for the bathroom, laundry, kitchen and store (cistern for the toilet in the bathroom, is located here). Currently some fittings are missing, incomplete and/or not fit for purpose.
A new storage hot water unit is required.
It would be optional to gas or electric. Items requiring gas are the hot plate/stove, the storage hot water unit and possibly the fire place in the front room.



Fig 93

11 - REVIEW OF REPORTS

Having completed the investigation, I have reviewed the structural report conducted by Sebastian Chira from VTP Engineering.

Structural Condition Survey conducted on the 9/3/2023 by Sebastian Chira from VTP Engineering produced the report with his findings:

E. & O. E.

1. Restumping of subfloor due to its age and the requirement to re-shim and relevel floor.
2. An extensive pest inspection is recommended to determine existence of pest damage.
3. Any damp rot affected or deteriorated timbers beneath the floor
4. Re- stitching of main cracks in masonry with the use of Helifix stainless steel bars
5. Re-point the brickwork in the affected areas
6. Due to the poor conditions of the ceiling (sagging, moisture damage and water damage) replacement would be required.
7. Roof frame not compliant to current building standards but consistent with buildings of a similar age.
8. Weatherproofing of the roof cladding compromised in some areas requiring replacement of damaged tiles and roof flashings
9. Possible full removal and reroof of the entire cover
10. Roof frame upgrades more effectively performed if cover removed for frame upgrades and maintenance.

I agree with above items 2 to 10.
Note: Previous reference to outbuilding has been excluded from this report as they were removed prior to this inspection.
I do not agree with item 1 as there was no evidence of restumping required. The stumps are brick stumps and in good condition.

Building inspection conducted on 9th March 2023 and subsequent report issued by Tony D'Alonzo Director of Inspecwest P/L (present Laurence Jankulovski and Theo Sartzidis) addresses the visual condition of the home.
Findings were as follows:
INTERNALLY

- Bedroom 1 – Water and mould damage to north wall – Ceiling in poor condition & failing.
- Bedroom 2 – Window sashes deteriorated.
- Sitting Room – Ceiling condition water saturated, has failed. To be replaced.
- Study - Ceiling condition water saturated, has failed. To be replaced.
- Landing – Wall linings have failed. Need replacing
- Bedroom 3 – Water damage to wall linings (4 walls). Window sashes have seized. Ceiling poor condition. Floor poor condition.
- Attic Room – Conditions of walls and ceiling have failed. Floor poor condition, possible asbestos lino covering.
- Stairway to 1st floor – Ceiling poor condition.
- Entry – Walls & ceiling poor condition.
- Lounge – Room in reasonable condition
- Kitchen/meals – Ceiling reasonable. Floor condition terminal. Condition of cabinets aged. Condition of fixtures and appliances was not reviewed.
- Passage centre – Walls & ceilings reasonable.
- Linen Cupboard – (Under stairs) Aged
- Storage - (Under stairs) Possible asbestos lino.
- Bedroom 4 – Window condition poor. Ceiling in an average condition.
- Store room – Walls & ceiling in poor condition
- Bathroom – Floor, Walls and ceiling sound.
- Laundry – Wall tiles have fallen; ceiling is possibly asbestos due to its age. Walls reasonable condition

EXTERNALLY

- North Wall – Stepped cracks, roof tiles have slipped (water ingress occurring) roof condition poor.
- South Wall - Stepped crack, Chimney detaching, Vertical jagged crack and Horizontal crack.
- East Wall – Roof tiles have slipped
- Patio – Brick paving has subsided
- Front Portico - Cornice in poor condition. Sub board opening poor condition. Cracked tiles.
- Rear Veranda - North wall Stepped crack RH side of door, West wall Stepped crack,

E. & O. E.

Whilst the Building inspection report was a visual investigation, which I concur with, that inspection was conducted before the home have been cleaned out. The photos included in this report were taken some 4 months later as part of my investigation. It is noted that in the previous reports there were no invasive actions taken to review the sub floor, behind stud walls or inaccessible ceiling spaces. Roof frame was not investigated to assess extent or condition of the building.

12 – FINAL FINDINGS

I am of the opinion that the building is in a very poor state. The extent of the work required to bring this house to structurally adequate condition as well as renovate and refurbish the interiors and exteriors to bring this house to a habitable state, in a like for like state, will require a financial injection of the range $715,000. [Verified]

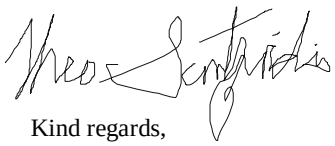
1. **PRELIMINARY COSTS:**
    a. Building Consultants
    b. Building Permits
    c. Insurance
    d. Mobilisation & Demobilisation costs
2. **SITE CONDITIONS:**
    a. Earthworks
    b. Soakwells
    c. Stormwater system
    d. Foundation stabilisation – Grout injection
3. **BRICKWORK:**
    a. Structural stitching
    b. Brick repairs
4. **GROUND FLOOR**
    a. Perimeter foundation waterproofing.
    b. Site works lower ground levels.
    c. Termite Treatment.
    d. Repairs and pointing below floor level.
    e. Repair all jarrah floors - termite damage, moisture content damage.
5. **UPPER FLOOR**
    a. Particle board removed and replacement.
    b. The stud walls reset and secure to frame.
    c. The wall and roof frame are made complaint to NCC standards and AS1684 Residential Timber-Frame Construction.
    d. Remove and replace roof tiles with new. including sarking and pinning.
6. **CEILING & WALL LININGS**
    a. All ceiling and wall linings both internally and externally removed and reinstated with boards
    b. All cornices replaced with new matching plaster glass cornices.
    c. Provide wall and ceiling insulation.
7. **WINDOW & DOORS**
    a. Replace all windows where the damage to the frame and sash/es is too severe to repair.
    b. Repair all leadlights and replace glass to NCC conditions.
    c. Replace all external doors (like for like where possible) due to the extent of damage due to break ins and securing.
    d. Replace all door and window hardware.
8. **CABINETRY**
    a. Remove & replace all cabinetry
9. **FINISHES**
    a. Carpets floor coverings.
    b. Wall paper to entire home and replaced.
    c. Decontamination, resurface, and painted of walls.
    d. Internal painting
    e. External painting
    f. Rectify finishes, laundry, store, bathroom & kitchen
10. **ROOF PLUMBING**
11. **SERVICES**
    a. **Electrical**
        i. New meter box, meter & breakers.

E. & O. E.

ii. Power Connection
iii. Testing of wiring, switches and power points.
iv. Alternatively, all electrical wiring, power points and switches be renewed.
v. Light fittings.
vi. New appliances (oven & hot plate or stove, rangehood, split system air conditioner).

b. **Plumbing**
i. New water pipes to be laid to service the house.
ii. The sewer connection inspection.
iii. New plumbing fixtures for bathroom, laundry, kitchen and store (cistern for the toilet in the bathroom, is located here).
iv. Hot water unit.
v. Optional - gas or electric. Items requiring gas are the hot plate/stove, the storage hot water unit and possibly the fire place in the front room.

I am of the opinion that the home could be demolished and rebuilt, requiring a financial injection of the range $575,000. [Unverified]



Kind regards,
Theo Sartzidis
BL R: 12815

E. & O. E.



Proposed Demolition of Stella Hay's House

At 314 Kew Street Cloverdale

Heritage Impact Statement

Prepared for

City of Belmont

By

HOCKING HERITAGE + ARCHITECTURE

July 2025

Cover Illustration:

Figure 1 View of the front of *Stella Hay's House*.
Hocking H+A, June 2025.

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HHA Job No. 202505

Rev No	Approved	Date
-	Dinah Mujati, RAIA	03 July 2025
A	Dinah Mujati, RAIA	05 August 2025

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4.0 ASSESSMENT OF IMPACT 8
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FIGURES

Figure 1 View of the front of *Stella Hay's House*. 2
Figure 2 Aerial view of 314 Kew Street Cloverdale with *Stella Hay's House* at the northern end of the block. 5
Figure 3 *Rear view of Stella Hay's House*. 7
Figure 4 *Side view of Stella Hay's House*. 7

1.0 INTRODUCTION

This Heritage Impact Statement has been prepared for the proposed demolition of the house at 314 Kew Street Cloverdale formerly known as *Stella Hays House*.

The residence was designed in the Inter War Spanish Mission style and constructed from 1951 to 1956. It is currently owned by the State Government and managed by City of Belmont.

The building has been unoccupied for a few years and is in disrepair. The City of Belmont are considering demolishing it to regain the area for parks/ recreational use.

This Heritage Impact Statement assesses the impact of the demolition of *Stella's Hays House* against the cultural heritage significance of the place.

1.1 The Site

The physical address of 314 Kew Street Cloverdale is also referred to as 314 Abernethy Road Cloverdale. *Stella Hay's House* is at the northern end of the large lot and has a tapered masonry wall along the boundary facing Abernethy Road. South of the residence is the Victoria Park SES headquarters separated by a Colorbond steel dividing fence.



Figure 2 Aerial view of 314 Kew Street Cloverdale with *Stella Hay's House* at the northern end of the block.
Courtesy *Nearmap,* accessed 30 June 2025.

1.2 Heritage Listings

Stella Hay's House has been identified as having cultural heritage significance. It is entered in the Heritage Council WA database as Place Number no. 08643 and in the City of Belmont Local Planning Scheme No. 15 Heritage List.

Statutory Listings:

Type	Status	Date	More information
Heritage List	Removed	31 Dec 1996	City of Belmont
Heritage List	Adopted	27 Jun 2023	City of Belmont

Other Listings:

Type	Status	Date	More information
Municipal Inventory	Removed	31 Dec 1996	Category 2, City of Belmont
Municipal Inventory	Removed	22 Nov 2016	Category 2, City of Belmont

1.3 Statement of Significance

The following Statement of Significance is drawn from the Register of Heritage Places Entry for *Stella Hay's House* with Place Number 08643. Acknowledgement is extended to the author of this document.

> The place has aesthetic value as a modest demonstration of the Inter War Spanish Mission style.
>
> The place is prominent in the streetscape because of its location on a high traffic road and its unusual design in the region.
>
> The place has historic value for its association with the period following World War Two when building materials were scarce and many homes were built by their occupants.
>
> The place has historic value for its association with the period following World War Two when the population of metropolitan Perth grew and the outer suburbs became more densely settled.
>
> The place is a good demonstration of the style and scale of housing in the post war period and the resourcefulness of the owner builders.
>
> The construction of the cement bricks used in this property may provide information about the techniques and materials used during the post war period.

1.4 References

- Australian Building Specialist Pty Ltd, WA, *Structural Inspection Report 314 Kew Street, Cloverdale.*
- CBA Pest & Weed Control, WA, July 2024, *Timber Pert Inspection Report.*
- InspecWest Pty Ltd, WA, March 2023, *Building Report - 314 Kew Street, Cloverdale.*
- InspecWest Pty Ltd, WA, March 2023, *Structural Condition Survey #314 Kew Street Cloverdale WA.*
- TDM Pert Solutions, WA, March 2023, *Termite Inspection Report.*

2.0 DESCRIPTION OF THE PLACE

Stella Hay's House is a two-storey asymmetrical structure with steep hipped roofs which are tiled and painted masonry walls. A stepped masonry wall runs along the northern boundary and returns for part of the east boundary which is defined by a solid metal fence. The rear of the block has been cleared and levelled.

A single chimney stack is on the southwest wall and a dormer window is present on the rear roof. At the time of this report, all the openings were boarded up with graffiti on some of the walls and a few missing roof tiles characteristic of a disused building.

Internally most of the walls were lined with wallpaper, including some of the ceilings. The fireplace in the living room is still intact, including the staircase leading to the upper storey. The timber floorboards had remnants of carpet glue. Carpentry and fitout are in poor condition.



Figure 3 *Rear view of Stella Hay's House.*
Hocking H+A, June 2025.



Figure 4 *Side view of Stella Hay's House.*
Hocking H+A, June 2025.

The structural investigations undertaken in 2023 identified that the walls were in fair condition relative to the building's age. The recommendation was to restump the floors and upgrade the wall and roof framing. Further investigations in 2024 recommended that grout injection should be undertaken to the underside of the existing footings to provide additional structural stability and support to prevent further subsidence.

3.0 PROPOSED CHANGES TO THE HERITAGE PLACE

City of Belmont have no use for the house and no intentions for its adaptive re-use to rectify existing damage and deterioration. The stated reason is the cost of retaining the building and adapting it for an alternative use.

Stella Hay's house is located in an area zoned for Parks and Recreation use. The proposal is to demolish the house and redevelop the site for recreation use for the community.

Initial sketches indicate a basketball court to be situated where the house is, with a winding path along Abernethy Road and other landscape elements and parkland.

The drawings which document the proposed works are:

- Landscape Concept Plan - Belmont POS Reviews | Abernethy Verge_Draft for Comment
- Landscape Concept Plan - Belmont POS Reviews | Stella Hays POS_Schematic Design

4.0 ASSESSMENT OF IMPACT

Demolition of *Stella Hay's House* will result in the total loss of a structure that demonstrates a late example of the Inter War Spanish Mission style architecture and craftsmanship. It is a prominent structure along the main road and its absence will diminish the visual identity of Kew Street and the area's historical character.

Demolition of the property will lead to the loss of an example of self-build homes that were common in the Post War period and are now few in number.

If demolition is accepted as the only viable outcome, it is recommended that the following strategies are employed to capture the heritage values and mitigate the negative impact of the loss of the building:

- Interpretation of the building relating to the history of the house, and Clement and Stella Hay. Any collated material should be deposited with the City of Belmont Local History Collection.
- Preparation of an Archival Record and photographic survey of the site.

5.0 CONCLUSION

The proposed demolition of *Stella Hay's House* at 314 Kew Street Cloverdale will have a negative impact on the values of the place. Its Category 2 status in the Local Heritage Scheme identifies it as a place very important to the heritage of the City of Belmont, but redevelopment of the site is acceptable.

Prior to its removal it is advised to undertake an Archival Record and photographic survey as a record of the site. The Archival Record can be based on the DPLH guide and should include the place's history, drawings (plans, elevations) and photographs of the place as it is currently.

In addition, appropriate interpretative signage should be installed to commemorate *Stella Hay's House* and maintain its connection to the site. Consideration should be given to the development and installation of engaging interpretive elements that provide historical facts, stories and contextual information about the broader area. The repurposing of salvaged elements of the building would create a tangible connection to the past.

12.5 Accounts for Payment October 2025

Voting Requirement	:	Simple Majority
Subject Index	:	54/007 - Creditors - Payment Authorisations
Location/Property Index	:	N/A
Application Index	:	N/A
Disclosure of any Interest	:	Nil
Previous Items	:	N/A
Applicant	:	N/a
Owner	:	N/A
Responsible Division	:	Corporate and Governance

Council role

Overseeing Overseeing the allocation of the City's finances and resources e.g. setting the annual budget, accepting tenders, determining what services and facilities the City is to provide, annual reports, selecting the CEO and reviewing the CEO's performance.

Purpose of report

To present to Council the list of expenditure paid for the period 01 October 2025 to 31 October 2025 under delegated authority.

Summary and key issues

A list of payments is presented to the Council each month for confirmation and endorsement in accordance with the *Local Government (Financial Management) Regulations 1996 (WA)*.

Officer Recommendation

That the Authorised Payment Listing for October 2025 as provided under Attachment 12.5.1 be received.

Location

Not applicable.

Consultation

There has been no specific consultation undertaken in respect to this matter.

Strategic Community Plan implications

In accordance with the 2024–2034 Strategic Community Plan:

Key Performance Area: Performance
Outcome: 10. Effective leadership, governance and financial management.
Outcome: 11. A happy, well informed and engaged community.

Policy implications

There are no policy implications associated with this report.

Statutory environment

Regulation 13(1) of the *Local Government (Financial Management) Regulations 1996 (WA)* states:

> "If the local government has delegated to the CEO the exercise of its power to make payments from the municipal fund or the trust fund, a list of accounts paid by the CEO is to be prepared each month showing for each account paid since the last such list was prepared:
>
> (a) the payee's name;
>
> (b) the amount of the payment;
>
> (c) the date of the payment; and
>
> (d) sufficient information to identify the transaction."

(3) A list prepared under sub regulation (1) is to be presented to Council at the next ordinary meeting of Council after the list is prepared; and recorded in the minutes of that meeting.

Regulation 13A of the *Local Government (Financial Management) Regulations 1996 (WA)* effective from 1 September 2023 states:

(1) If a local government has authorised an employee to use a credit, debit or other purchasing card, a list of payments made using the card must be prepared each month showing the following for each payment made since the last such list was prepared —

(a) the payee's name;

(b) the amount of the payment;

(c) the date of the payment;

(d) sufficient information to identify the payment.

(2) A list prepared under subregulation (1) must be —

(a) presented to the council at the next ordinary meeting of the council after the list is prepared; and

(b) recorded in the minutes of that meeting.

Background

Council has delegated to the Chief Executive Officer under Delegation 1.1.18 to make payment from the Municipal and Trust Fund account. In accordance with Regulation 13(1) of the *Local Government (Financial Management) Regulations 1996 (WA),* where this power has been delegated, a list of payments each month is to be compiled and presented to Council.

Report

The following summary of payments are recommended for confirmation and endorsement.

Payment type	Payment reference	$
Municipal Fund Cheques	788902-788903	623.40
Municipal Fund EFTs	EF098470-EF098878	7,300,688.24
Municipal Fund Payroll	October	2,512,189.15
Trust Fund EFT	EF098560-EF098561	12,910.32
Total Payments for October 2025		**9,826,391.11**

A copy of the Authorised Payment Listing is included as Attachment 12.5.1.

Financial implications

All expenditure included in the Payment Listing is in accordance with Council's Annual budget.

Environmental implications

There are no environmental implications associated with this report.

Social implications

There are no social implications associated with this report.

Attachment details

Attachment No and title
1. October 2025 Payments [**12.5.1** - 8 pages]

City of Belmont

Accounts for Payment - October 2025

Compiled : 04/11/25 14:04

Pmnt_Ref	Date	CR_Code	Supplier	Pmnt_Amnt	Description
Contractors					
EF098470	03/10/25	00346	Action Couriers	62.17	Courier Service
EF098471	03/10/25	00390	Landgate	394.65	Title Searches - GRV's Metro & DFES
EF098472	03/10/25	00391	Chemistry Centre (WA) t/as ChemCentre	4,240.12	Professional Fees - Water Sampling Testing
EF098473	03/10/25	00394	Child & Adolescent Health Service - Dept of Health WA	836.00	Immunisation Expenses - August 2025
EF098474	03/10/25	00557	City Subaru	620.09	Plant Parts & Repairs
EF098477	03/10/25	00830	Canon Production Printing Australia Pty Ltd	182.66	Photocopy Expenses
EF098478	03/10/25	00856	John Papas Trailers Pty Ltd	935.00	Plant Parts & Repairs
EF098479	03/10/25	01074	Shred - X Pty Ltd	328.35	Rubbish Removals
EF098481	03/10/25	01133	J Tagz Pty Ltd	528.55	Hardware
EF098482	03/10/25	01243	WARP Pty Ltd	25,868.34	Traffic Control - Various Locations
EF098484	03/10/25	01255	Wattleup Tractors	288.75	Plant Parts & Repairs
EF098486	03/10/25	01318	Flexi Staff Group Pty Ltd	7,620.09	Labour/Personnel Hire
EF098488	03/10/25	01499	Porter Consulting Engineers	33,990.00	Professional Fees - Revised Lcurst Design & Construction
EF098491	03/10/25	02958	Yoshino Sushi	198.88	Catering/Catering Supplies
EF098492	03/10/25	03537	Mackay Urban Design	960.00	Professional Fees - DRP Meeting
EF098493	03/10/25	03543	Labyrinth Constructions	4,015.00	Building Construction
EF098494	03/10/25	03593	Philip Swain	1,687.50	Labour/Personnel Hire
EF098498	03/10/25	04002	Ray White Urban Springs	3,080.00	Professional Fees - Ceiling Repairs
EF098499	03/10/25	04320	ABM Landscaping	3,836.25	Bricks/Bricklaying
EF098501	03/10/25	04779	One 20 Productions	7,226.67	Plant/Equipment Hire - Belmont Youth Awards
EF098504	03/10/25	05091	Shaun Chandran - Coco Bros	800.00	Music/Entertainment Expenses - Citizenship Ceremony
EF098505	03/10/25	05190	Mark Foote	198.00	Building Maintenance - COB
EF098506	03/10/25	05346	Kevin Fitzgerald	1,800.00	Music/Entertainment Expenses - Citizenship Ceremony
EF098507	03/10/25	05547	FE Technologies Pty Ltd	23,921.92	Computer Hardware Maintenance - Annual Maintenance
EF098508	03/10/25	05558	BlueFit Pty Ltd	76,053.26	Oasis Expenses - Oasis Management Subsidy
EF098509	03/10/25	05738	Double G (WA) Pty Ltd t/as Think Water Perth	3,514.00	Reticulation Parts & Repairs
EF098510	03/10/25	05776	Level 5 Design Pty Ltd	1,140.00	Professional Fees - Design Review Panel
EF098511	03/10/25	05782	Jane Wetherall	1,380.00	Professional Fees - Design Review Panel
EF098513	03/10/25	05887	1Spatial Australia Pty Ltd	17,710.00	Computer Software Maintenance - Annual Subscription
EF098514	03/10/25	05944	Delron Cleaning Pty Ltd - Ventia	630.74	Cleaning Services - Various Locations
EF098515	03/10/25	06125	Harbour Software	15,906.00	Computer Software Maintenance - Annual Subscription
EF098516	03/10/25	06142	Medical Edge Australia Pty Ltd	837.99	First Aid Service
EF098517	03/10/25	06147	CrowdPleaser Pty Ltd	72.00	Music/Entertainment Expenses - The Melody Maker
EF098518	03/10/25	06164	Brianology	439.00	Hardware - iPad
EF098519	03/10/25	06293	Freo Fire Maintenance Services Pty Ltd	924.00	Fire Equipment/Service
EF098520	03/10/25	06358	The Event Mill Pty Ltd	15,144.54	Plant/Equipment Hire - Art Awards
EF098522	03/10/25	06468	Perth Bouncy Castle Hire	548.20	Plant/Equipment Hire - Wiggle & Giggle
EF098523	03/10/25	06528	Diplomatik Pty Ltd	3,442.01	Professional Fees - Recruitment Services
EF098524	03/10/25	06592	Grosvenor Engineering Group	1,802.35	Electrical Contractor - COB
EF098527	03/10/25	06706	TLS Productions	3,014.00	Music/Entertainment Expenses - Art Awards
EF098528	03/10/25	06720	Karlka Fencewright WA Pty Ltd	126,304.20	Fencing - Volcano Playground
EF098529	03/10/25	06751	HFM Asset Management	2,266.00	Building Maintenance
EF098530	03/10/25	06773	Evolve Talent	3,352.60	Labour/Personnel Hire
EF098531	03/10/25	06841	Andrew Quilty	1,000.00	Art Awards/Exhibition - Workshop
EF098532	03/10/25	06863	Kleen Slate Services	585.00	Other Property & Services
EF098533	03/10/25	06884	McLeods Lawyers	789.36	Legal Expenses
EF098534	03/10/25	06900	AMS Installation & Maintenance Solutions	2,043.25	Airconditioning/Refrigeration Maintenance - COB
EF098536	03/10/25	07021	Gobotech Pty Ltd	144.10	Library - LED Projector
EF098537	03/10/25	07043	Kinglarp Pty Ltd T/A The Pressure King	2,942.50	Graffiti Removal - Various Locations
EF098538	03/10/25	07104	Aboriginal Land Care (Ngala - Boodja) Pty Ltd	14,421.00	Gardening Maintenance
EF098539	03/10/25	07106	Gemma Joanna Ben - Ary T/A Herbivore	450.00	Art Awards/Exhibition - Art Awards Judge
EF098540	03/10/25	07113	Jarni Creative	385.00	Public Art Project Consultancy - Speaker
EF098541	03/10/25	07141	Susanna Castleden Heidi	450.00	Art Awards/Exhibition - Art Awards Judge
EF098542	03/10/25	07150	Gerard Callinan	650.00	Library - Entertainment Expense - Oral History
EF098543	03/10/25	07168	Corestaff WA Pty Ltd	9,287.42	Labour/Personnel Hire
EF098544	03/10/25	07181	Sugarland Studios	750.00	Art Awards/Exhibition - DJ Service
EF098545	03/10/25	07187	Deluxe Detailing	300.00	Plant Parts & Repairs
EF098547	03/10/25	07195	Oddbods Custom Corporate Mascots	4,158.00	Library Expense - Belmonster
EF098565	10/10/25	00350	Veolia Environmental Services	644,489.73	Rubbish Removals - Oct 2025
EF098566	10/10/25	00390	Landgate	97.80	Title Searches - Service Fee
EF098569	10/10/25	00815	New Town Toyota	2,880.97	Plant Parts & Repairs
EF098572	10/10/25	01255	Wattleup Tractors	288.75	Plant Parts & Repairs
EF098574	10/10/25	01318	Flexi Staff Group Pty Ltd	3,939.90	Labour/Personnel Hire
EF098576	10/10/25	02172	Miss Maud	885.30	Catering/Catering Supplies
EF098578	10/10/25	02958	Yoshino Sushi	142.88	Catering/Catering Supplies
EF098580	10/10/25	03543	Labyrinth Constructions	4,246.00	Building Construction
EF098582	10/10/25	04106	Effects Picture Framing	40.00	Photography/Framing Expenses
EF098583	10/10/25	04211	Triodia Scanning Services	4,780.60	Survey Expenses
EF098584	10/10/25	04301	Michael Page - Page Personnel	5,767.52	Labour/Personnel Hire
EF098585	10/10/25	04454	FM Contract Solutions Pty Ltd	2,348.50	Professional Fees - Auditing of Sites
EF098586	10/10/25	04524	Moore Australia WA Pty Ltd	3,696.00	2025 Financial Reporting Workshop
EF098587	10/10/25	04643	Nyoongar Outreach Services Inc	6,875.00	Security Services
EF098588	10/10/25	05190	Mark Foote	495.00	Building Maintenance - COB
EF098590	10/10/25	05336	West - Sure Group Pty Ltd	576.35	Security Services
EF098591	10/10/25	05346	Kevin Fitzgerald	1,200.00	Music/Entertainment Expenses - National Tree Day

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EF098592	10/10/25	05558	BlueFit Pty Ltd	231.00	Oasis Expenses
EF098594	10/10/25	06126	Maintenance Experts Pty Ltd	4,598.00	Computer Software Maintenance - Annual Subscription
EF098595	10/10/25	06138	Cake Twist by Kim	560.00	Catering/Catering Supplies
EF098596	10/10/25	06160	SEEK Limited	2,283.60	Advertising
EF098597	10/10/25	06303	Event Bike Rack Hire	492.00	Plant/Equipment Hire - Avon Descent
EF098598	10/10/25	06414	Complete Glass & Glazing Services	460.00	Road Building Contractor
EF098600	10/10/25	06608	Robert Walters Pty Ltd	7,083.98	Labour/Personnel Hire
EF098601	10/10/25	06712	Ozipond Solutions	16,500.00	Gardening Maintenance - COB
EF098602	10/10/25	06754	Doon Raj P/L - T/as Belmont (WA) Carpet Court	13,500.00	Building Maintenance - Oasis
EF098603	10/10/25	06773	Evolve Talent	10,295.84	Labour/Personnel Hire
EF098604	10/10/25	06847	Trayd Australia Pty Ltd	99.00	Building Maintenance - COB
EF098605	10/10/25	06861	Mode Design Corp	42,713.00	Professional Fees - Civic Centre Rendering
EF098606	10/10/25	06871	Mobile Sentinel T/A Little Rippers Technology	6,107.36	Cleaning Services
EF098608	10/10/25	06960	Phase 3 Landscape Construction	557,294.48	Professional Fees - Landscaping Wilson Park Zone 2 & Faulkner Park
EF098609	10/10/25	06989	Propagule Consulting Pty Ltd	3,564.00	Professional Fees - Volcano Park Renovations
EF098610	10/10/25	07043	Kinglarp Pty Ltd T/A The Pressure King	25,226.21	Graffiti Removal - Various Locations
EF098611	10/10/25	07099	Perth Testing and Tagging	2,663.65	Building Maintenance - COB
EF098612	10/10/25	07165	Arexion Pty Ltd	7,647.20	Building Maintenance
EF098614	10/10/25	07168	Corestaff WA Pty Ltd	7,887.38	Labour/Personnel Hire
EF098618	10/10/25	07201	Meltwater Australia Pty Ltd	29,150.00	Media Monitoring Subscription
EF098636	17/10/25	00118	Australia Post	5,890.65	Postage
EF098639	17/10/25	00346	Action Couriers	37.53	Courier Service
EF098641	17/10/25	00491	Fujifilm Business Innovation Australia	2,121.90	Photocopy Expenses
EF098642	17/10/25	00699	Marketforce Pty Ltd	2,271.50	Advertising & Printing
EF098643	17/10/25	00717	Main Roads Western Australia	18,461.71	Road Building Contractor - Abernethy Rd
EF098644	17/10/25	00734	McIntosh and Son WA	7,473.71	Plant Parts & Repairs
EF098650	17/10/25	01318	Flexi Staff Group Pty Ltd	2,062.61	Labour/Personnel Hire
EF098653	17/10/25	02210	Macri Partners	1,430.00	Audit Fee
EF098654	17/10/25	02234	Blackwell and Associates Pty Ltd	780.00	Professional Fees - Planning
EF098655	17/10/25	02387	Triton Electrical Contractors Pty Ltd	280.50	Electrical Contractor
EF098656	17/10/25	02425	Prestige Alarms	132.00	Security Services
EF098658	17/10/25	02672	Ruah Community Services	61,377.15	Provision of Preventive Domestic - September
EF098659	17/10/25	02711	CPG Research and Advisory Pty Ltd	1,558.33	Professional Fees - Advisory Fee
EF098660	17/10/25	03419	Gott Health	2,060.00	Community Exercise Classes
EF098661	17/10/25	03504	Classic Tree Services	8,629.26	Tree Pruning Within CoB
EF098662	17/10/25	03824	Konica Minolta	2,654.21	Photocopy Expenses
EF098663	17/10/25	04002	Ray White Urban Springs	4,554.00	Professional Fees - Ceiling Repairs
EF098665	17/10/25	04301	Michael Page - Page Personnel	1,871.75	Labour/Personnel Hire
EF098666	17/10/25	04467	Rent a Fence Pty Ltd	55.24	Fencing
EF098668	17/10/25	05016	Cyclus Pty Ltd	224.40	Labour/Personnel Hire
EF098669	17/10/25	05127	Champion Music	847.00	Music/Entertainment Expenses - Art Awards
EF098670	17/10/25	05190	Mark Foote	2,805.00	Building Maintenance - COB
EF098671	17/10/25	05237	Crown Perth	13,900.27	Catering/Catering Supplies
EF098672	17/10/25	05283	IRP Pty Ltd	10,873.50	Labour/Personnel Hire
EF098673	17/10/25	05623	Tree Planting and Watering - Baroness Holdings	9,898.38	Street Tree Watering Services for CoB
EF098674	17/10/25	05642	Steve's Sand Sifting for Playground Services	7,540.00	Sand Sifting - Various Parks
EF098675	17/10/25	05738	Double G (WA) Pty Ltd t/as Think Water Perth	3,080.00	Reticulation Parts & Repairs
EF098676	17/10/25	06091	Engineering Technology Consultants	546.29	Professional Fees - Belvidere Street Revitalisation Project
EF098677	17/10/25	06293	Freo Fire Maintenance Services Pty Ltd	2,161.29	Fire Equipment/Service
EF098679	17/10/25	06358	The Event Mill Pty Ltd	112.34	Plant/Equipment Hire
EF098681	17/10/25	06458	ES2 Pty Ltd - One Step Group	102,124.09	Computer Software Maintenance - Netskope Subscription
EF098682	17/10/25	06468	Perth Bouncy Castle Hire	541.66	Plant/Equipment Hire
EF098683	17/10/25	06527	Jurovich Surveying	4,645.00	Survey Expenses - Easement
EF098684	17/10/25	06528	Diplomatik Pty Ltd	9,474.09	Professional Fees - Recruitment Services
EF098687	17/10/25	06602	Perth Symphony Orchestra	3,300.00	Art Awards/Exhibition - PSO singer Workshop
EF098688	17/10/25	06726	PJA Holdings (Australia) Pty Ltd	4,950.00	Audit Fee - Road Safety Audit
EF098689	17/10/25	06798	Aspire Performance Training	385.00	Professional Fees - Recruitment Services
EF098690	17/10/25	06847	Trayd Australia Pty Ltd	633.54	Building Maintenance - COB
EF098691	17/10/25	06884	McLeods Lawyers	2,302.41	Legal Expenses
EF098692	17/10/25	06901	Educated by Nature Pty Ltd	2,687.52	Music/Entertainment Expenses - Family Trial Day
EF098693	17/10/25	06907	Leanne Hampson	1,600.00	Workshop
EF098694	17/10/25	06930	Matthew Lukin Biocich	591.80	Photography/Framing Expenses
EF098695	17/10/25	07043	Kinglarp Pty Ltd T/A The Pressure King	8,708.15	Graffiti Removal - Various Locations
EF098696	17/10/25	07104	Aboriginal Land Care (Ngala - Boodja) Pty Ltd	18,876.00	Gardening Maintenance
EF098697	17/10/25	07172	Eurofins Apal Pty Ltd	1,748.69	Professional Fees - Testing
EF098698	17/10/25	07174	Joel Evans	500.00	Library - Entertainment Expense - Afterdark
EF098700	17/10/25	07193	Non - Drowsy Designs	2,750.00	Art Awards/Exhibition - Visual Projection
EF098701	17/10/25	07204	Bridged Group Pty Ltd	968.00	Computer Software Maintenance
EF098715	24/10/25	00195	Bin Bath Australia Pty Ltd	693.72	Cleaning Services
EF098716	24/10/25	00221	John Hughes Group	515.00	Plant Parts & Repairs
EF098720	24/10/25	00350	Veolia Environmental Services	2,902.04	Rubbish Removals - Oct 2025
EF098724	24/10/25	01318	Flexi Staff Group Pty Ltd	9,197.38	Labour/Personnel Hire
EF098725	24/10/25	01772	Data3 Limited	70,714.73	Computer Software - HP ProBook's
EF098726	24/10/25	01782	Belmont Automotive Engineers	1,702.50	Plant Parts & Repairs
EF098727	24/10/25	02050	Austraffic WA	3,889.60	Traffic Count - ATC Survey COB
EF098728	24/10/25	02172	Miss Maud	1,559.80	Catering/Catering Supplies
EF098730	24/10/25	02958	Yoshino Sushi	210.32	Catering/Catering Supplies
EF098731	24/10/25	03543	Labyrinth Constructions	632.50	Building Construction
EF098733	24/10/25	03772	Open Windows Australia Pty Ltd	23,665.32	Computer Software Maintenance - Annual Subscription
EF098734	24/10/25	03941	Metro Bee Services	165.00	Bee Removal

Pmnt_Ref	Date	CR_Code	Supplier	Pmnt_Amnt	Description
EF098735	24/10/25	04301	Michael Page - Page Personnel	2,264.98	Labour/Personnel Hire
EF098738	24/10/25	05190	Mark Foote	4,895.00	Building Maintenance - COB
EF098739	24/10/25	05283	IRP Pty Ltd	2,319.68	Labour/Personnel Hire
EF098740	24/10/25	05523	Go Doors Pty Ltd	561.74	Building Maintenance
EF098741	24/10/25	05623	Tree Planting and Watering - Baroness Holdings	25,544.19	Street Tree Watering Services for CoB
EF098742	24/10/25	05963	Mr Potplants	638.00	Plant/Equipment Hire
EF098743	24/10/25	06138	Cake Twist by Kim	1,180.00	Catering/Catering Supplies
EF098744	24/10/25	06293	Freo Fire Maintenance Services Pty Ltd	563.33	Fire Equipment/Service
EF098745	24/10/25	06304	Prestige Property Maintenance	28,379.73	Plants Supply - Various Parks
EF098746	24/10/25	06393	Stantec Australia Pty Ltd	2,145.00	Professional Fees - Marketing
EF098748	24/10/25	06591	Blue Tang (WA) T/A The Reef Unit Trust	1,100.00	Professional Fees - Faulkner Park Civic Centre
EF098749	24/10/25	06642	Event Artillery Pty Ltd	2,326.20	Catering/Catering Supplies - Civic Dinner
EF098752	24/10/25	06833	First Choice Gates (WA)	1,848.00	Fencing - Balbuk Reserve & BRSC
EF098753	24/10/25	06929	Brett David Investments T/A Successful Projects	1,632.49	Superintendent Service May 2025
EF098756	24/10/25	07108	Joanna Elizabeth Lamb	1,500.00	Art Awards/Exhibition - Mentorship Program
EF098757	24/10/25	07119	Maxey Plumbing Pty Ltd	146.03	Plumbing Maintenance/Supplies
EF098758	24/10/25	07183	Durst Industries (Aust) Pty Ltd	4,164.60	Fire Equipment/Service
EF098771	31/10/25	00027	ABB Australia Pty Limited	9,702.00	Reticulation Parts & Repairs
EF098773	31/10/25	00083	Ascot Veterinary Hospital	260.00	Pound Expenses
EF098776	31/10/25	00195	Bin Bath Australia Pty Ltd	129.98	Cleaning Services
EF098778	31/10/25	00221	John Hughes Group	3,302.36	Plant Parts & Repairs
EF098780	31/10/25	00247	CAI Fences	2,464.00	Fencing
EF098782	31/10/25	00295	Capital Recycling	3,366.00	Rubbish Removals
EF098783	31/10/25	00346	Action Couriers	75.85	Courier Service
EF098784	31/10/25	00391	Chemistry Centre (WA) t/as ChemCentre	2,044.55	Professional Fees - Water Sampling Testing
EF098785	31/10/25	00557	City Subaru	480.90	Plant Parts & Repairs
EF098787	31/10/25	00613	Qualcon Laboratories Pty Ltd	6,270.00	Core Analysis and Asphalt Testing
EF098789	31/10/25	00665	Kennards Hire Pty Ltd	343.20	Plant/Equipment Hire
EF098791	31/10/25	00718	Major Motors Pty Ltd	2,061.56	Plant Parts & Repairs
EF098792	31/10/25	00726	T - Quip	3,615.14	Plant Parts & Repairs
EF098793	31/10/25	00734	McIntosh and Son WA	102,080.00	Plant purchase
EF098794	31/10/25	00815	New Town Toyota	1,530.87	Plant Parts & Repairs
EF098795	31/10/25	00830	Canon Production Printing Australia Pty Ltd	445.66	Photocopy Expenses
EF098797	31/10/25	00856	John Papas Trailers Pty Ltd	935.00	Plant Parts & Repairs
EF098798	31/10/25	00917	Positive Auto Electrics	3,318.44	Plant Parts & Repairs
EF098800	31/10/25	00931	Sonic HealthPlus Pty Ltd	1,004.50	Pre Employment Medicals
EF098801	31/10/25	00972	Repco Auto Parts	2,735.32	Plant Parts & Repairs
EF098802	31/10/25	00988	Reece Australia Pty Ltd	4,849.90	Plumbing Maintenance/Supplies
EF098803	31/10/25	01058	Slater - Gartrell Sports	1,045.00	Belmont Oasis - Hardwood Flooring
EF098804	31/10/25	01059	Sledgehammer Concrete Cutting Service	133.03	Concrete Contractor
EF098806	31/10/25	01090	St John Ambulance Australia Inc	285.00	Hardware
EF098807	31/10/25	01138	E & M J Rosher Pty Ltd	1,872.89	Plant Parts & Repairs
EF098808	31/10/25	01186	ZircoDATA Pty Ltd	1,968.37	Records Storage
EF098809	31/10/25	01199	Toyota Material Handling Pty Ltd	193.88	Plant Parts & Repairs
EF098810	31/10/25	01233	Stihl Shop Redcliffe	1,948.90	Tools/Tool Repairs
EF098811	31/10/25	01237	Wren Oil	2,035.00	Rubbish Removals
EF098812	31/10/25	01243	WARP Pty Ltd	4,198.72	Traffic Control - Various Locations
EF098819	31/10/25	01499	Porter Consulting Engineers	2,750.00	Professional Fees - Stormwater Management Review
EF098823	31/10/25	01712	Donegan Enterprises Pty Ltd	7,852.06	Gardening Maintenance
EF098824	31/10/25	01721	Fulton Hogan Industries	4,137.98	Road Building Contractor - Asphalt
EF098827	31/10/25	01976	Ecoscape Australia Pty Ltd	2,660.35	Professional Fees - Wilson Zone 2
EF098828	31/10/25	02049	NVMS - Noise and Vibration Measurement Systems	1,243.00	Plant Parts & Repairs
EF098829	31/10/25	02059	Western Resource Recovery Pty Ltd	297.00	Rubbish Removals
EF098831	31/10/25	02298	Pelican Linemarking	3,443.00	Line Marking
EF098832	31/10/25	02303	Ultimo Catering and Events	2,935.10	Catering/Catering Supplies - Council Dinner
EF098833	31/10/25	02387	Triton Electrical Contractors Pty Ltd	781.00	Electrical Contractor - COB
EF098834	31/10/25	02410	System Maintenance T/A Systems By Ballantyne	6,641.15	Plumbing Maintenance/Supplies
EF098835	31/10/25	02411	Allsports Linemarking	1,807.30	Line Marking - Gerry Archer
EF098836	31/10/25	02425	Prestige Alarms	7,619.70	Security Services
EF098840	31/10/25	02589	Zenien	1,001.00	Security Services
EF098841	31/10/25	02627	Dunbar Services WA Pty Ltd	276.10	Cleaning Services
EF098842	31/10/25	02779	Natural Area Holdings Pty Ltd	1,173.70	Gardening Maintenance
EF098843	31/10/25	02837	GLG Greenlife Group	6,949.69	Gardening Maintenance - Verge Mowing
EF098848	31/10/25	03197	West Coast Turf	12,342.00	Turf Maintenance - COB
EF098849	31/10/25	03366	Daimler Trucks Perth	185.89	Plant Parts & Repairs
EF098850	31/10/25	03464	Bridgestone Australia Ltd	2,584.85	Plant Parts & Repairs
EF098851	31/10/25	03498	Talis Consultants Pty Ltd	12,100.00	Provision of Consultancy Service - Belvidere St
EF098853	31/10/25	03567	Gardner Autos Pty Ltd t/as Gardner Isuzu	1,927.55	Plant Parts & Repairs
EF098855	31/10/25	03599	Donald Cant Watts Corke (WA) Pty Ltd	8,382.00	Professional Fees - Wilson Zone 2 Superintendent Svc & Belmont Hub
EF098856	31/10/25	03707	Access Unlimited International Pty Ltd	6,886.00	Plant Parts & Repairs
EF098857	31/10/25	03824	Konica Minolta	1,994.17	Photocopy Expenses
EF098858	31/10/25	03941	Metro Bee Services	165.00	Bee Removal
EF098859	31/10/25	04046	Beacon Equipment	3,916.00	Plant Parts & Repairs
EF098861	31/10/25	04120	Randstad Pty Ltd	27,174.06	Labour/Personnel Hire
EF098862	31/10/25	04131	Total Green Recycling Pty Ltd	3,969.69	Rubbish Removals
EF098863	31/10/25	04211	Triodia Scanning Services	2,535.50	Survey Expenses
EF098864	31/10/25	04391	Lifeskills Australia	1,210.00	Professional Fees - Analysis
EF098865	31/10/25	04454	FM Contract Solutions Pty Ltd	2,348.50	Professional Fees - Auditing of Sites
EF098866	31/10/25	04474	Aquamonix	328.90	Gardening Contractor
EF098867	31/10/25	04496	Azure Painting Pty Ltd	2,420.00	Painting Contractor

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EF098868	31/10/25	04594	Website Weed and Pest W A Pty Ltd	2,849.00	Weed Control - Kerbs & Paths
EF098869	31/10/25	04689	Hempfield Small Motor Service	13.45	Plant Parts & Repairs
EF098873	31/10/25	05190	Mark Foote	330.00	Building Maintenance - COB
EF098874	31/10/25	05252	AAAC Towing Pty Ltd	3,197.70	Towing Vehicles
EF098875	31/10/25	05339	Elliotts Filtration Pty Ltd	1,133.00	Reticulation Parts & Repairs
EF098876	31/10/25	05427	Horizon West Landscape & Irrigation Pty Ltd	5,812.40	Gardening Maintenance - Various Locations
EF098879	31/10/25	05576	NPB Security Australia	2,517.77	Security Services - Art Awards
EF098880	31/10/25	05771	Alsco Pty Ltd	205.62	Cleaning Services
EF098881	31/10/25	05840	Commercial Aquatics Australia Pty Ltd	1,633.50	Oasis Expenses - Monthly Maintenance
EF098882	31/10/25	05897	HopgoodGanim Lawyers	1,501.50	Legal Expenses
EF098883	31/10/25	05944	Delron Cleaning Pty Ltd - Ventia	5,208.90	Cleaning Services - Various Locations
EF098884	31/10/25	05953	DADAA Limited	1,956.74	Music/Entertainment Expenses - Art Awards
EF098886	31/10/25	06067	TK Elevator Australia Pty Ltd	2,811.49	Building Maintenance
EF098887	31/10/25	06094	Boyan Electrical Services	8,248.88	Electrical Contractor - COB
EF098888	31/10/25	06276	Efficient Site Services (WA)	880.00	Building Construction
EF098889	31/10/25	06282	Dell Financial Services Pty Ltd	19,916.49	Plant/Equipment Hire - July to Sept
EF098890	31/10/25	06293	Freo Fire Maintenance Services Pty Ltd	2,041.81	Fire Equipment/Service
EF098891	31/10/25	06304	Prestige Property Maintenance	3,109.32	Building Maintenance
EF098892	31/10/25	06345	SoCo Studios - Travis Hayto Photography	1,732.50	Photography/Framing Expenses
EF098893	31/10/25	06362	Marjan Partitions Pty Ltd t/as M & M Interiors	35,323.83	Building Construction - Miles & Centenary Park Comm Cnt & Reserve
EF098894	31/10/25	06389	Netstar Australia Pty Ltd	286.00	Security Services
EF098896	31/10/25	06458	ES2 Pty Ltd - One Step Group	1,771.44	Computer Software Maintenance - NCM Renewal
EF098897	31/10/25	06469	Element Advisory Pty Ltd	313.50	Professional Fees - Building
EF098898	31/10/25	06472	Overall Perth Gutter Cleaning	1,595.00	Cleaning Services
EF098899	31/10/25	06552	Iconic Security Services Pty Ltd	1,253.87	Security Services
EF098900	31/10/25	06570	Industrias Services Group Pty Ltd	884.30	Building Maintenance
EF098901	31/10/25	06573	Orikan Australia Pty Ltd	1,320.00	Computer Software Maintenance
EF098903	31/10/25	06591	Blue Tang (WA) T/A The Reef Unit Trust	2,750.00	Professional Fees - Faulkner Park Civic Centre
EF098904	31/10/25	06592	Grosvenor Engineering Group	9,597.80	Electrical Contractor - COB
EF098909	31/10/25	06718	Empire Roofing Services	5,550.00	Building Maintenance - COB
EF098910	31/10/25	06743	East African Coffee	945.00	Catering/Catering Supplies - R U Ok & Mental Health
EF098911	31/10/25	06776	Easy Access Lifts	539.00	Plant Parts & Repairs
EF098913	31/10/25	06829	Fenix Structural Engineers Pty Ltd	2,200.00	Professional Fees - Glasshouse Damaged Concrete
EF098915	31/10/25	06847	Trayd Australia Pty Ltd	1,242.23	Building Maintenance - COB
EF098916	31/10/25	06857	Arion Service	2,574.00	Building Maintenance - COB
EF098917	31/10/25	06874	Bug Busters	3,712.50	Pest Control
EF098918	31/10/25	06875	Jimbu4J	1,133.00	Catering/Catering Supplies - WorkSafe
EF098919	31/10/25	06884	McLeods Lawyers	6,634.76	Legal Expenses
EF098920	31/10/25	06888	Veolia Water Operations Pty Ltd T/A Allpipe Technologies	1,329.83	Building Maintenance - COB
EF098921	31/10/25	06900	AMS Installation & Maintenance Solutions	4,407.34	Airconditioning/Refrigeration Maintenance - COB
EF098922	31/10/25	06929	Brett David Investments T/A Successful Projects	1,443.57	Superintendent Service Sep 2025
EF098923	31/10/25	06934	Positively Green Pty Ltd	443.66	BSRC Bowling Green Maintenance
EF098924	31/10/25	06995	Jerra Nominees & Neil Norrish T/A State Wide Turf Services	40,987.23	Gardening Maintenance - Mulch COB
EF098925	31/10/25	06996	Newground Facilities Management Pty Ltd	182.00	Turf Maintenance - COB
EF098926	31/10/25	07004	I Know	1,500.00	Creative Cultural Conversation Programme
EF098928	31/10/25	07119	Maxey Plumbing Pty Ltd	11,425.84	Plumbing Maintenance/Supplies
EF098929	31/10/25	07143	The Ortin Family Trust t/a Eastside Concrete	15,048.00	Building Maintenance
EF098930	31/10/25	07145	Airline Laundry Services Australia Pty Ltd	135.30	Cleaning Services
EF098933	31/10/25	07173	Philippa Lewi	330.00	Library - Entertainment Expense - Artist Talk Series
EF098934	31/10/25	07182	Brightmark Group Pty Ltd	2,438.15	Cleaning Services - COB
	Contractors Total			**2,928,227.34**	
Councillor Payments					
EF098487	03/10/25	01369	Philip Marks	3,248.15	Elected Member Remuneration
EF098489	03/10/25	02145	Robert Rossi	13,102.13	Elected Member Remuneration
EF098497	03/10/25	03916	Bernard Ryan	3,248.15	Elected Member Remuneration
EF098502	03/10/25	05084	Jenny Davis	3,248.15	Elected Member Remuneration
EF098503	03/10/25	05085	George Sekulla	3,248.15	Elected Member Remuneration
EF098512	03/10/25	05828	Deborah Sessions	5,342.13	Elected Member Remuneration
EF098526	03/10/25	06704	Christopher John Kulczycki	3,248.15	Elected Member Remuneration
EF098535	03/10/25	06968	Jarod Harris	3,248.15	Elected Member Remuneration
	Councillor Payments Total			**37,933.16**	
Credit Card 2310					
EF098764	27/10/25	03526	Winners Circle	4.99	Stationery
EF098764	27/10/25	03526	SP From You Flowers	81.90	Flowers
EF098764	27/10/25	03526	Officeworks	2.25	Photo Frame
EF098764	27/10/25	03526	Work Health & Safety	990.00	Training
EF098764	27/10/25	03526	Work Health & Safety	990.00	Training
EF098764	27/10/25	03526	Coles Supermarkets Aust Pty Ltd	220.00	Gratuity Gift
EF098764	27/10/25	03526	Ebay	87.62	R U OK Day - Cake Toppers
EF098764	27/10/25	03526	Walga	1,375.00	Registration
EF098764	27/10/25	03526	IIA - Australia	990.00	Conference Expenses
EF098764	27/10/25	03526	Coles Supermarkets Aust Pty Ltd	220.00	Gratuity Gift
EF098764	27/10/25	03526	Business Excellence	1,400.00	Subscription
	Credit Card 2310 Total			**6,361.76**	
Credit Card 4739					
EF098767	27/10/25	06409	ASIC	20.00	Company Search
EF098767	27/10/25	06409	DMIRS	31.28	Application Fee
EF098767	27/10/25	06409	Dept of Justice	194.30	Legal Expenses
EF098767	27/10/25	06409	Dept of Justice	194.30	Legal Expenses
EF098767	27/10/25	06409	CEDA	820.00	Subscription

Pmnt_Ref	Date	CR_Code	Supplier	Pmnt_Amnt	Description
EF098767	27/10/25	06409	ChatGPT	31.52	Subscription
EF098767	27/10/25	06409	ChatGPT	31.52	Subscription
EF098767	27/10/25	06409	Australian Financial Services Authority	15.00	Company Search
EF098767	27/10/25	06409	Google	12.98	Subscription
EF098767	27/10/25	06409	News	36.00	Subscription
	Credit Card 4739 Total			**1,386.90**	
Credit Card 7563					
EF098768	27/10/25	06834	Kynd Coffee	19.33	Staff Meeting
	Credit Card 7563 Total			**9,362.03**	
Credit Card 7996					
EF098765	27/10/25	05121	Brianlogy	50.48	Hardware
EF098765	27/10/25	05121	8 Yolks	10.65	Coffee - Meeting
	Credit Card 7996 Total			**61.13**	
Credit Card 8380					
EF098766	27/10/25	06342	Dept of Racing & Gaming	60.50	Licence Fee
	Credit Card 8380 Total			**7,773.63**	
Credit Card 8670					
EF098769	27/10/25	06849	99 Bikes	500.00	Staff Car Free Week Gift Vouchers
EF098769	27/10/25	06849	Winners Circle	50.00	Corporate Smart Rider Card
EF098769	27/10/25	06849	Winners Circle	45.00	Corporate Smart Rider Card
EF098769	27/10/25	06849	Oxlade Bros	106.56	Badges
EF098769	27/10/25	06849	WA Electric Bicycles	4,372.23	COB Fleet - eBike
EF098769	27/10/25	06849	8 Yolks	33.48	Catering - Team Meeting
EF098769	27/10/25	06849	Western Power	1,329.50	Application Fee - Centenary Park Metering
EF098769	27/10/25	06849	Live Payments	31.08	Taxi - IPWC Conference
EF098769	27/10/25	06849	Transport for NSW	20.00	Transport - Conference
EF098769	27/10/25	06849	Airport Link Company	40.00	Transport - Conference
	Credit Card 8670 Total			**6,527.85**	
Fuels and Utilities					
788902	01/10/25	00392	Department of Transport - Fleet Licensing	260.50	Vehicle Licences
EF098467	03/10/25	00042	Alinta Energy	557.30	Light, Power, Gas
EF098483	03/10/25	01252	Water Corporation	6,894.46	Water, Annual & Excess
EF098485	03/10/25	01274	Synergy	1,805.61	Light, Power, Gas
EF098490	03/10/25	02474	Digital Marketing Australia - Captivate Connect	1,320.00	Phone/Internet expenses
EF098521	03/10/25	06424	Telstra Limited	7,491.23	Phone/Internet expenses
EF098573	10/10/25	01274	Synergy	2,731.26	Light, Power, Gas
EF098577	10/10/25	02471	Western Power	3,300.00	Light, Power, Gas
EF098581	10/10/25	03592	Steven Harling	98.31	Fuel, Oil, Additives
EF098635	17/10/25	00042	Alinta Energy	180.90	Light, Power, Gas
EF098648	17/10/25	01252	Water Corporation	1,681.71	Water, Annual & Excess
EF098649	17/10/25	01274	Synergy	7,685.02	Light, Power, Gas
EF098657	17/10/25	02631	Ampol - Caltex	2,262.08	Fuel, Oil, Additives
EF098680	17/10/25	06424	Telstra Limited	3,942.23	Phone/Internet expenses
EF098712	24/10/25	00042	Alinta Energy	6,351.60	Light, Power, Gas
EF098722	24/10/25	01252	Water Corporation	12,553.20	Water, Annual & Excess
EF098723	24/10/25	01274	Synergy	79,772.54	Light, Power, Gas
EF098747	24/10/25	06424	Telstra Limited	19,194.87	Phone/Internet expenses
EF098772	31/10/25	00042	Alinta Energy	301.85	Light, Power, Gas
EF098813	31/10/25	01252	Water Corporation	8,657.72	Water, Annual & Excess
EF098816	31/10/25	01274	Synergy	28,746.17	Light, Power, Gas
EF098854	31/10/25	03592	Steven Harling	130.91	Fuel, Oil, Additives
EF098895	31/10/25	06424	Telstra Limited	7,608.21	Phone/Internet expenses
EF098905	31/10/25	06614	Oracle Customer Management Solutions	6,380.16	Phone/Internet expenses
EF098908	31/10/25	06707	Motorpass - 0177 - WEX Card Fee	4.95	Fuel, Oil, Additives
	Fuels and Utilities Total			**220,550.06**	
Materials					
EF098469	03/10/25	00317	Coles Supermarkets Aust Pty Ltd	238.61	Groceries
EF098500	03/10/25	04491	Woolworths Group - Functions/Catering only	398.64	Groceries
EF098563	10/10/25	00203	BOC Gases Australia Ltd	118.10	Welding Equipment/Supplies
EF098567	10/10/25	00617	Jacksons Drawing Supplies Pty Ltd	70.40	Craft/Display Materials
EF098568	10/10/25	00664	Kmart Australia Limited	48.50	Stationery & Printing
EF098571	10/10/25	01073	Spotlight Pty Ltd	192.05	Craft/Display Materials
EF098575	10/10/25	01398	Winc Australia Pty Ltd	17.81	Stationery & Printing
EF098589	10/10/25	05295	Kentico Software Pty Ltd	9,843.90	Computer Software - Standard Custom License
EF098593	10/10/25	05966	Light Application Pty Ltd	252.45	Lights & Light Fittings
EF098599	10/10/25	06457	Wall Art Australia Pty Ltd	369.28	Signs
EF098613	10/10/25	07167	Khodal Krupa WA	116.90	Publications/Newspapers
EF098615	10/10/25	07178	BioBag World Australia Pty Ltd	5,644.94	Cleaning Products
EF098616	10/10/25	07184	Mane Liquor Osborne Park Pty Ltd	3,357.40	Beverages
EF098617	10/10/25	07200	Blue Sky Beverages Pty Ltd	26,840.00	Beverages - Bespoke Watter Bottles
EF098637	17/10/25	00311	Cloverdale Hardware and Western Supply	30.00	Hardware
EF098638	17/10/25	00317	Coles Supermarkets Aust Pty Ltd	941.99	Groceries
EF098645	17/10/25	00778	Modern Teaching Aids Pty Ltd	894.14	Library Furniture Replenishment
EF098647	17/10/25	01083	SERCUL South East Regional Centre for Urban Landcare	2,614.37	Gardening - Water Sampling Collection
EF098664	17/10/25	04053	Totally Workwear TWW	104.74	Safety Clothing/Equipment
EF098667	17/10/25	04491	Woolworths Group - Functions/Catering only	302.54	Groceries
EF098699	17/10/25	07184	Mane Liquor Osborne Park Pty Ltd	152.13	Beverages
EF098714	24/10/25	00185	Benara Nurseries	20,102.50	Gardening - Winter Tree Planting
EF098717	24/10/25	00231	Bunnings Group Ltd	48,400.87	Hardware
EF098718	24/10/25	00285	City of Armadale	110.55	LSL Portability

Pmnt_Ref	Date	CR_Code	Supplier	Pmnt_Amnt	Description
EF098719	24/10/25	00317	Coles Supermarkets Aust Pty Ltd	139.50	Groceries
EF098721	24/10/25	01175	Vision Australia	57.00	Hardware
EF098729	24/10/25	02201	Neverfail Springwater Limited	31.40	Beverages
EF098732	24/10/25	03660	Safe T Card Australia Pty Ltd	53.90	Safety Clothing/Equipment
EF098736	24/10/25	05036	Smedia Pty Ltd	500.00	Books/CDs/DVDs
EF098751	24/10/25	06684	CADplanners Pty Ltd T/A EventDraw	3,294.50	Computer Software - Annual Event Draw Licence
EF098754	24/10/25	06957	Booktopia Direct	353.50	Books/CDs/DVDs
EF098755	24/10/25	07027	Future Village Placemaking Pty Ltd	44,000.00	Gardening - Faulkner Civic Precinct Landscaping
EF098774	31/10/25	00132	Bolinda Publishing Pty Ltd	4,400.00	Books/CDs/DVDs
EF098775	31/10/25	00185	Benara Nurseries	8,187.41	Gardening - Streetscape Strategy & Plants
EF098777	31/10/25	00203	BOC Gases Australia Ltd	21.23	Welding Equipment/Supplies
EF098779	31/10/25	00233	Bunzl Limited	4,792.04	Cleaning Products
EF098781	31/10/25	00278	Chefmaster Australia	2,193.71	Cleaning Products
EF098788	31/10/25	00627	Jason Signmakers	2,898.68	Signs
EF098790	31/10/25	00697	Nutrien AG Solutions Ltd	712.80	Gardening Maintenance
EF098796	31/10/25	00850	Pacific Safety Wear Malaga	461.73	Safety Clothing/Equipment
EF098799	31/10/25	00923	Pope Packaging	616.00	Cleaning Products
EF098805	31/10/25	01083	SERCUL South East Regional Centre for Urban Landcare	5,151.71	Gardening - Soil Sampling Collection
EF098814	31/10/25	01265	Westbooks	1,693.55	Books/CDs/DVDs
EF098817	31/10/25	01325	Poolegrave Signs and Engraving	88.00	Signs
EF098818	31/10/25	01398	Winc Australia Pty Ltd	2,144.38	Stationery & Printing
EF098820	31/10/25	01568	Allstate Safety Products	190.30	Safety Clothing/Equipment
EF098821	31/10/25	01570	Blackwoods	539.36	Hardware
EF098825	31/10/25	01906	Frazzcon Enterprises	3,561.25	Street & Parking Sign Maintenance
EF098826	31/10/25	01955	Image Extra - Starmix Holdings Pty Ltd	5,821.20	Building Material
EF098830	31/10/25	02088	Lock Stock & Farrell Locksmith	338.00	Hardware
EF098837	31/10/25	02431	Look Brilliant Pty Ltd	4,847.70	Promotional Items
EF098838	31/10/25	02498	City of South Perth	5,090.50	Impound Fee - Dogs & Cats
EF098839	31/10/25	02516	Advance Press	1,886.50	Stationery & Printing
EF098844	31/10/25	02862	James Bennett Pty Ltd	2,480.73	Books/CDs/DVDs
EF098845	31/10/25	02912	Sanity Music Stores Pty Ltd	377.91	Books/CDs/DVDs
EF098846	31/10/25	03117	Six Axis Nominees T/A OCP Sales	450.45	Safety Clothing/Equipment
EF098847	31/10/25	03144	COS Complete Office Supplies Pty Ltd	1,769.70	Stationery & Printing
EF098852	31/10/25	03539	Environment Essentials Pty Ltd, Victoria	2,420.00	Compliance Register - Environment
EF098860	31/10/25	04053	Totally Workwear TWW	2,317.19	Safety Clothing/Equipment
EF098870	31/10/25	04759	StrataGreen	284.74	Gardening Maintenance
EF098871	31/10/25	05055	Statewide Cleaning Supplies	557.83	Cleaning Products
EF098872	31/10/25	05082	Accidental Health and Safety Perth	2,424.55	Medical/First Aid Supplies
EF098877	31/10/25	05465	QBD Books	313.85	Books/CDs/DVDs
EF098885	31/10/25	05992	Corsign WA	74.80	Signs
EF098902	31/10/25	06589	OverDrive Australia Pty Ltd	735.02	Books/CDs/DVDs
EF098907	31/10/25	06681	Prefet Pty Ltd T/A Minuteman Press Perth	5,362.14	Stationery & Printing - Various Events
EF098912	31/10/25	06800	The Aivish Family Trust T/as Fruit Break	3,046.76	Groceries
EF098914	31/10/25	06844	Print and Sign Co	2,070.45	Stationery & Printing
EF098927	31/10/25	07015	Supagas Pty Ltd	65.69	Welding Equipment/Supplies
EF098932	31/10/25	07167	Khodal Krupa WA	116.90	Publications/Newspapers
EF098935	31/10/25	07190	Green Plant Enterprises Pty Ltd - Bloomin Boxes	392.50	Flowers
	Materials Total			**250,489.87**	
Other					
EF098468	03/10/25	00140	Australian Library & Information Association	1,100.00	Membership Fee
EF098476	03/10/25	00795	LGISWA	7,893.79	Insurance Premiums
EF098480	03/10/25	01094	Stormwater Industry Association (W A) Inc	165.00	Subscription
EF098495	03/10/25	03595	Ascot Eagles Junior Cricket Club Inc	150.00	Community Contribution Fund - Multisport
EF098496	03/10/25	03760	Wilmot Loh	2,288.10	Adachi 2026
EF098525	03/10/25	06613	Host Tel	145.00	State Emergency Services Expense
EF098548	03/10/25	99998	Lop Leasing	1,649.54	Rates Refund
EF098549	03/10/25	99998	Kai Gornall	100.00	Cloth Nappy Rebate
EF098550	03/10/25	99998	Clare D Barber	67.22	Application Fee
EF098551	03/10/25	99998	Natalie Schultz	900.00	Sports Donation
EF098552	03/10/25	99998	Choon Hong Tan	900.00	Sports Donation
EF098553	03/10/25	99998	Rentwest Trust Account	66.72	Pool Levy Refund
EF098554	03/10/25	99998	FAI WAH YAP	50.28	Rates Refund
EF098555	03/10/25	99998	RH Property	2,457.40	Rates Refund
EF098556	03/10/25	99998	Housesmart Realestate	99.12	Pool Rates Refund
EF098557	03/10/25	99998	Harry Young	10,000.00	Art Awards Winner
EF098558	03/10/25	99998	Leah T Mannes	500.00	Art Awards Winner
EF098564	10/10/25	00296	City of Gosnells	10,312.50	Switch Your Thinking 2025-26 Membership
EF098579	10/10/25	03071	Department of Transport - Vehicle Owner Searches	499.80	Vehicle Ownership Searches
EF098607	10/10/25	06896	Benjamin White	822.50	Sister City Expenses
EF098622	10/10/25	99998	Michael & Larissa Williams	100.00	Art Awards Winner
EF098623	10/10/25	99998	RJ Akerstrom	1,060.54	Rates Refund
EF098624	10/10/25	99998	Zubaida Zafar	785.20	Pensioner Concessions
EF098625	10/10/25	99998	RICHARDSONS STRATA MGT	147.00	Application Fee
EF098626	10/10/25	99998	Kiam Dee Art	1,000.00	Art Awards Winner
EF098627	10/10/25	99998	J C Meleisea	500.00	Art Awards Winner
EF098628	10/10/25	99998	Zephyr Lane	500.00	Art Awards Winner
EF098629	10/10/25	99998	Madhugiri R Shivaram	189.27	Rates Refund
EF098630	10/10/25	99998	Lucy Lilleyman	500.00	Art Awards Winner
EF098631	10/10/25	99998	Burgess Rawson WA	773.82	Rates Refund
EF098632	10/10/25	99998	St Vincent De Paul Society	920.00	Rates Refund

Pmnt_Ref	Date	CR_Code	Supplier	Pmnt_Amnt	Description
EF098633	10/10/25	99998	Joburne Pty Ltd Trust A/C	409.50	Rates Refund
EF098634	10/10/25	99998	Joburne Pty Ltd Trust A/C	472.50	Rates Refund
EF098646	17/10/25	00793	LGIS Insurance Broking - JLT	22,930.29	Insurance Premiums
EF098651	17/10/25	01599	WA Rangers Association Inc	100.00	Membership Fee
EF098652	17/10/25	01711	Irrigation Australia Ltd	1,584.00	Irrigation Testing Signs
EF098685	17/10/25	06553	Darren Trengove	243.25	Staff Reimbursement - Mental Health Initiative
EF098686	17/10/25	06595	Helen Karageorgiou	27.37	Staff Reimbursement - Parking
EF098702	17/10/25	07209	Bijay Humagain	30.00	Staff Reimbursement - Visitor Pass
EF098703	17/10/25	07210	Cameron Dixon	118.00	Staff Reimbursement - Flowers
EF098704	17/10/25	99998	Sandra Curtis	1,488.33	Rates Refund
EF098705	17/10/25	99998	Monica Malaga Mindani	64.77	Rates Refund
EF098706	17/10/25	99998	Monica Malaga Mindani	79.26	Rates Refund
EF098707	17/10/25	99998	Cynthia C Henderson	60.51	Rates Refund
EF098708	17/10/25	99998	Hannii Pty Ltd	17,133.00	Rates Refund
EF098709	17/10/25	99998	Carrooda Pty Ltd	90.42	Application Fee
EF098710	20/10/25	01236	Department of Fire and Emergency Services	3,042,521.86	Emergency Services Levy September 2025
788903	24/10/25	00893	Petty Cash - Library	362.90	Petty Cash Recoup
EF098713	24/10/25	00177	Belmont Park Tennis Club Inc	32,000.00	Grants General - Turf Maintenance
EF098737	24/10/25	05135	Umbrella Multicultural Community Care Inc	900.00	Workshop - Dementia
EF098750	24/10/25	06653	Forget - Me - Not Dementia Support Inc	200.00	Grants General - Connecting with Dementia
EF098762	24/10/25	99998	K&R Taylor	500.00	Sports Donation
EF098763	24/10/25	99998	Victoria Gilkes	100.00	Cloth Nappy Rebate
EF098770	31/10/25	01244	Western Australian Treasury Corporation	539,241.69	Loan Repayment
EF098815	31/10/25	01270	Perth Racing - WA Turf Club	2,520.84	Irrigation of Grandstand Road & Ascot
EF098936	31/10/25	07209	Bijay Humagain	29.93	Staff Reimbursement - Airport Parking
EF098937	31/10/25	07222	Waivpay Ltd	502.95	Staff Recognition Program
EF098938	31/10/25	99998	Heamasi V Akauola	295.00	Application Fee
EF098939	31/10/25	99998	Yohanna Nathasia	195.00	Application Fee
EF098940	31/10/25	99998	Perth Patio Magic	147.00	Application Fee
EF098941	31/10/25	99998	David Davis	147.00	Application Fee
EF098942	31/10/25	99998	Joyce Property Investment	514.50	Rates Refund
EF098943	31/10/25	99998	Antoniet Riddell	787.55	Vendor Pensioner Rebate
EF098944	31/10/25	99998	Joyce Property Investments A371622	514.50	Rates Refund
EF098945	31/10/25	99998	Khalil Bourgy	61.65	Application Fee
EF098946	31/10/25	99998	Nadine Klein	79.45	Cloth Nappy Rebate
EF098947	31/10/25	99998	JE Asselin	676.64	Rates Refund
EF098948	31/10/25	99998	Barbara L Klng	829.55	Vendor Pensioner Rebate
EF098949	31/10/25	99998	Christopher Hummel	225.00	Art Sales
EF098950	31/10/25	99998	Grayson M Harper	56.25	Art Sales
EF098951	31/10/25	99998	Sky D Edwards	150.00	Art Sales
EF098952	31/10/25	99998	Parvathi Ranjan	375.00	Art Sales
EF098953	31/10/25	99998	Esa Mika Johannes Nykanen	412.50	Art Sales
EF098954	31/10/25	99998	MR P & MRS SP ZOETHOUT	234.37	Art Sales
EF098955	31/10/25	99998	Jo Anne Haythornthwaite	487.50	Art Sales
EF098956	31/10/25	99998	Maram Dalab	150.00	Art Sales
EF098957	31/10/25	99998	Easy transaction	187.50	Art Sales
EF098958	31/10/25	99998	Adela Ulrychova	117.75	Art Sales
EF098959	31/10/25	99998	GA MJ Pirie	37.50	Art Sales
EF098960	31/10/25	99998	Georgia Derham	359.25	Art Sales
EF098961	31/10/25	99998	GENEVIEVE J HARTNEY	712.50	Art Sales
EF098962	31/10/25	99998	Saskia Lopes	862.50	Art Sales
EF098963	31/10/25	99998	Zephyr Lane	187.50	Art Sales
EF098964	31/10/25	99998	Cole Baxter	2,318.18	Art Sales
EF098965	31/10/25	99998	DAVID BRIAN PRIOR	1,125.00	Art Sales
EF098966	31/10/25	99998	PATRCIA ANN REMEDIOS	48.75	Art Sales
EF098967	31/10/25	99998	Lucy Gray	131.25	Art Sales
EF098968	31/10/25	99998	Pamela L Hulshoff	262.50	Art Sales
EF098969	31/10/25	99998	Miss Vanessa Maree Lombardo	337.50	Art Sales
EF098970	31/10/25	99998	Tate Orsini	120.00	Art Sales
EF098971	31/10/25	99998	Dinah M Pantic	337.50	Art Sales
EF098972	31/10/25	99998	TR and MR Shilton	712.50	Art Sales
EF098973	31/10/25	99998	Elizabeth J Turnbull	262.50	Art Sales
EF098974	31/10/25	99998	Annette Nestor	487.50	Art Sales
EF098975	31/10/25	99998	Emma Harradine	112.50	Art Sales
EF098976	31/10/25	99998	Transaction Account Gita Caroline GOPALK	599.25	Art Sales
EF098977	31/10/25	99998	Anne O'Leary	172.50	Art Sales
EF098978	31/10/25	99998	Rhian Healy	375.00	Art Sales
EF098979	31/10/25	99998	Ai Chen Lee	600.00	Art Sales
EF098980	31/10/25	99998	Josephine A Johnson	825.00	Art Sales
EF098981	31/10/25	99998	JOANNE ROSE WHITE	112.50	Art Sales
EF098982	31/10/25	99998	LW and PME Hegvold	1,875.00	Art Sales
EF098983	31/10/25	99998	Percival & Helen Morris	672.05	Vendor Pensioner Rebate
	Other Total			**3,730,644.11**	
Property, Plant & Equipment					
EF098640	17/10/25	00377	Dell Australia Pty Ltd	91,960.00	Computer Hardware Subscription
EF098678	17/10/25	06332	New Eagle International Pty Ltd T/A UMart	229.00	Computer Hardware
EF098906	31/10/25	06640	Arteil (WA) Pty Ltd	1,012.00	Office Furniture
EF098931	31/10/25	07148	Digital Imaging Express Pty Ltd	31.40	Computer Hardware
	Property, Plant & Equipment Total			**93,232.40**	
Salaries/Wages					

Pmnt_Ref	Date	CR_Code	Supplier	Pmnt_Amnt	Description
WG011025	01/10/25	COB	City of Belmont Payroll	1,183.60	Salaries/Wages
WG021025	02/10/25	COB	City of Belmont Payroll	169,776.29	Salaries/Wages
EF098559	07/10/25	99971	SuperChoice	182,149.14	Superannuation Contribution
SL081025	09/10/25	COB	City of Belmont Payroll	801,617.36	Salaries/Wages
EF098619	10/10/25	99952	Child Support Agency	1,626.69	Salaries/Wages
EF098620	10/10/25	99954	City of Belmont Social Club	440.00	Salaries/Wages
EF098621	10/10/25	99962	LGRCEU - WA Shire Councils Union	144.00	Salaries/Wages
WG151025	16/10/25	COB	City of Belmont Payroll	167,693.95	Salaries/Wages
EF098711	21/10/25	99971	SuperChoice	200,834.35	Superannuation Contribution
SL211025	21/10/25	COB	City of Belmont Payroll	6,772.03	Salaries/Wages
SL221025	23/10/25	COB	City of Belmont Payroll	809,960.13	Salaries/Wages
EF098759	24/10/25	99952	Child Support Agency	2,073.70	Salaries/Wages
EF098760	24/10/25	99954	City of Belmont Social Club	465.00	Salaries/Wages
EF098761	24/10/25	99962	LGRCEU - WA Shire Councils Union	276.00	Salaries/Wages
WG241025	24/10/25	COB	City of Belmont Payroll	1,548.06	Workers Compensation
WG291025	30/10/25	COB	City of Belmont Payroll	165,628.85	Salaries/Wages
	Salaries/Wages Total			**2,512,189.15**	
Training and Conferences					
EF098475	03/10/25	00602	Local Government Professionals Australia WA	190.00	Conference Expenses
EF098546	03/10/25	07194	HiLogic Pty Ltd	3,738.90	Training
EF098562	10/10/25	00108	Australian Institute of Building Surveyors	420.00	Training
EF098570	10/10/25	00953	Planning Institute of Australia Limited	1,100.00	Conference Expenses
EF098786	31/10/25	00601	Institute of Public Works Engineering Sydney	1,144.00	Training
EF098822	31/10/25	01605	ATM Australian Training Management	1,945.00	Training
EF098878	31/10/25	05550	Remix Summits Pty Ltd	203.50	Subscription
	Training and Conferences Total			**8,741.40**	
MUNI Total				**9,813,480.79**	
Trust Funds					
EF098560	10/10/25	150748	Building and Construction Industry Training Fund	351.75	Building and Construction Industry Training Fund
EF098561	10/10/25	154102	Building and Energy - Building Services Levy	12,558.57	Building and Energy - Building Services Levy
	Trust Funds Total			**12,910.32**	
TRUST Total				**12,910.32**	
Grand Total				**9,826,391.11**	
				9,826,391.11	
			Breakdown - Cheques :	623.40	
			EFT :	9,825,767.71	

12.6 Monthly Financial Report for October 2025

Voting Requirement	:	Simple Majority
Subject Index	:	32/009 Financial Operating Statements
Location/Property Index	:	N/A
Application Index	:	N/A
Disclosure of any Interest	:	Nil
Previous Items	:	N/A
Applicant	:	N/A
Owner	:	N/A
Responsible Division	:	Corporate and Governance

Council role

Overseeing Overseeing the allocation of the City's finances and resources e.g. setting the annual budget, accepting tenders, determining what services and facilities the City is to provide, annual reports, selecting the CEO and reviewing the CEO's performance.

Purpose of report

To provide Council with relevant monthly financial information for the 2025-26 financial year.

Summary and key issues

The following report includes a concise list of material variances for the month ending 31 October 2025.

Officer Recommendation

That the Monthly Financial Reports as at 31 October 2025 as included in Attachment 12.6.1 be received.

Location

Not applicable.

Consultation

There has been no specific consultation undertaken in respect to this matter.

Strategic Community Plan implications

In accordance with the 2024–2034 Strategic Community Plan:

Key Performance Area: Performance
Outcome: 10. Effective leadership, governance and financial management.

Policy implications

There are no policy implications associated with this report.

Statutory environment

Section 6.4 of the *Local Government Act 1995 (WA)* (the Act) in conjunction with Regulations 34 (1) of the *Local Government (Financial Management) Regulations 1996 (WA)* (the Regulations) requires monthly financial reports to be presented to Council.

Regulation 34(1) requires a monthly Statement of Financial Activity reporting on revenue and expenditure.

Regulation 34(5) determines the mechanism required to ascertain the definition of material variances which are required to be reported to Council as a part of the monthly report.

Background

The Regulations prescribe that a Local Government is to prepare each month a Statement of Financial Activity.

Regulation 34(2) requires the Statement of Financial Activity to be accompanied by documents containing:

1. Explanation for each material variance identified between year to date budgets and actuals

2. Any other supporting information considered relevant by the Local Government.

Regulation 34 (5) states that "Each financial year, a Local Government is to adopt a percentage or value, calculated in accordance with the Australian Accounting Standards, to be used in statements of financial activity for reporting material variances."

This regulation requires Council to annually set a materiality threshold for the purpose of disclosing budget variances within monthly financial reporting.

The materiality threshold has been set by Council at $100,000 for the 2025-26 financial year.

Report

At the June 2025 Ordinary Council Meeting, Council adopted the materiality threshold for the 2025-26 financial year as $100,000. The table below provides a summary of significant variances based on this materiality threshold. The detailed financial activity report is included at Attachment 12.6.1.

Report Section	Budget YTD	Actual YTD	Report Comments
OPERATING ACTIVITIES			
Revenue from operating activities			
Operating grants, subsidies and contributions			
Finance	181,029	70,128	Workers' compensation reimbursements to be claimed from LGIS
Interest earnings			
Finance	2,241,364	3,369,989	Variance reflects interest amounts earned on amounts not spent as budgeted. Return on investments is as anticipated.
Expenditure from operating activities			

Employee costs			
Parks, Leisure & Environment	(1,473,813)	(1,327,120)	Salaries are below budget due to vacancies which are currently being recruited by the City.
Materials and contracts			
Governance, Strategy & Risk	(450,757)	(209,726)	Costs arising from the Local Government Elections, including engaging the WAEC to undertake the election, have not yet been received.
Information Technology	(1,588,591)	(1,762,826)	Suppliers invoicing marginally ahead of expectations.
Works	(3,030,878)	(2,470,261)	October waste invoices to be received and paid.
Parks, Leisure & Environment	(3,241,135)	(1,763,964)	This reflects delays in seasonal projects due to weather conditions; however, the projects have now commenced.
Economic & Community Development	(882,032)	(632,950)	Expenditure associated with several City-funded community and economic programs has not yet occurred.
Library, Culture & Place	(1,136,422)	(795,240)	Various projects in progress with some timing variances.
Utility charges			
City Facilities & Property	(401,286)	(216,569)	Delay in receiving utility bills for the current period.
INVESTING ACTIVITIES			
Inflows from investing activities			

Non-Operating grants, subsidies and contributions			
Works	Nil	311,289	MRRG funding was received ahead of schedule.
City Facilities & Property	25,000	171,701	Grant payment received for Middleton Park lighting works carried out in 24/25.
Proceeds from disposal of assets			
Outflows from investing activities			
Payments for property, plant and equipment			
Information Technology	(580,000)	(72,179)	Tender for Network Implementation project is expected to be presented to March 2026 OCM.
Payments for construction of infrastructure			
City Projects	(5,139,743)	(2,476,579)	Awaiting Superintendent approval of invoices for Esplanade and Wilson Park.
Parks, Leisure & Environment	(2,047,544)	(822,165)	This reflects delays in seasonal projects due to weather conditions.

Financial implications

The presentation of these reports to Council ensures compliance with the Act and associated Regulations, and also ensures that Council is regularly informed as to the status of its financial position.

Environmental implications

There are no environmental implications associated with this report.

Social implications

There are no social implications associated with this report.

Attachment details

Attachment No and title
1. Monthly Financial Report October 2025 [**12.6.1** - 12 pages]

CITY OF BELMONT

MONTHLY FINANCIAL REPORT

(Containing the required statement of financial activity and statement of financial position)

For the period ended 31 October 2025

LOCAL GOVERNMENT ACT 1995
LOCAL GOVERNMENT (FINANCIAL MANAGEMENT) REGULATIONS 1996

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CITY OF BELMONT
STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 31 OCTOBER 2025

	Note	Adopted Budget Estimates (a)	YTD Budget Estimates (b)	YTD Actual (c)	Variance* $ (c) - (b)	Variance* % ((c) - (b))/(b)	Var.
		$	$	$	$	%	
OPERATING ACTIVITIES							
Revenue from operating activities							
General rates		63,219,787	62,818,211	**62,778,336**	(39,875)	(0.06%)	
Grants, subsidies and contributions		2,438,054	475,567	**373,679**	(101,888)	(21.42%)	▼
Fees and charges		11,585,080	9,111,776	**9,157,843**	46,067	0.51%	
Interest revenue		6,091,426	2,241,362	**3,381,715**	1,140,353	50.88%	▲
Other revenue		754,365	237,863	**428,224**	190,361	80.03%	▲
Profit on asset disposals		34,012	(612)	**0**	612	100.00%	
		84,122,724	**74,884,167**	**76,119,797**	**1,235,630**	1.65%	
Expenditure from operating activities							
Employee costs		(31,456,949)	(10,785,379)	**(10,461,735)**	323,644	3.00%	▲
Materials and contracts		(39,253,111)	(13,514,616)	**(10,919,265)**	2,595,351	19.20%	▲
Utility charges		(2,558,409)	(974,568)	**(689,400)**	285,168	29.26%	▲
Depreciation		(12,617,329)	(4,205,776)	**(4,205,776)**	0	0.00%	
Finance costs		(488,408)	(209,100)	**(209,100)**	0	0.00%	
Insurance		(896,361)	(896,361)	**(848,842)**	47,519	5.30%	
Other expenditure		(1,579,803)	(510,447)	**(472,710)**	37,737	7.39%	
		(88,850,370)	**(31,096,247)**	**(27,806,828)**	**3,289,419**	10.58%	
Non cash amounts excluded from operating activities	2(c)	12,646,636	4,206,388	**4,008,286**	(198,102)	(4.71%)	▼
Amount attributable to operating activities		**7,918,990**	**47,994,308**	**52,321,255**	**4,326,947**	9.02%	
INVESTING ACTIVITIES							
Inflows from investing activities							
Proceeds from capital grants, subsidies and contributions		6,582,066	749,424	**1,190,748**	441,324	58.89%	▲
Proceeds from disposal of assets		661,489	0	**0**	0	0.00%	
		7,243,555	**749,424**	**1,190,748**	**441,324**	58.89%	
Outflows from investing activities							
Acquisition of property, plant and equipment		(5,070,672)	(942,056)	**(450,556)**	491,500	52.17%	▲
Acquisition of infrastructure		(20,873,136)	(8,088,169)	**(4,205,673)**	3,882,496	48.00%	▲
		(25,943,808)	**(9,030,225)**	**(4,656,229)**	**4,373,996**	48.44%	
Amount attributable to investing activities		**(18,700,253)**	**(8,280,801)**	**(3,465,481)**	**4,815,320**	58.15%	
FINANCING ACTIVITIES							
Inflows from financing activities							
Transfer from reserves		36,475,834	0	**0**	0	0.00%	
		36,475,834	**0**	**0**	**0**	0.00%	
Outflows from financing activities							
Payments for principal portion of lease liabilities		(39,341)	0	**0**	0	0.00%	
Repayment of borrowings		(666,575)	(330,142)	**(330,142)**	0	0.00%	
Transfer to reserves		(25,199,613)	0	**0**	0	0.00%	
		(25,905,529)	**(330,142)**	**(330,142)**	**0**	0.00%	
Amount attributable to financing activities		**10,570,305**	**(330,142)**	**(330,142)**	**0**	0.00%	
MOVEMENT IN SURPLUS OR DEFICIT							
Surplus or deficit at the start of the financial year	2(a)	560,958	560,958	**(532,987)**	(1,093,945)	(195.01%)	▼
Amount attributable to operating activities		7,918,990	47,994,308	**52,321,255**	4,326,947	9.02%	▲
Amount attributable to investing activities		(18,700,253)	(8,280,801)	**(3,465,481)**	4,815,320	58.15%	▲
Amount attributable to financing activities		10,570,305	(330,142)	**(330,142)**	0	0.00%	
Surplus or deficit after imposition of general rates		**350,000**	**39,944,323**	**47,992,645**	**8,048,322**	20.15%	▲

KEY INFORMATION

▲▼ Indicates a variance between Year to Date (YTD) Budget and YTD Actual data outside the adopted materiality threshold.
▲ Indicates a variance with a positive impact on the financial position.
▼ Indicates a variance with a negative impact on the financial position.
Refer to Note 3 for an explanation of the reasons for the variance.

This statement is to be read in conjunction with the accompanying notes.

CITY OF BELMONT
STATEMENT OF FINANCIAL POSITION
FOR THE PERIOD ENDED 31 OCTOBER 2025

	Actual 30 June 2025	Actual as at 31 October 2025
	$	$
CURRENT ASSETS		
Cash and cash equivalents	4,466,071	1,561,500
Trade and other receivables	4,214,595	20,009,976
Other financial assets	85,941,157	118,678,912
Inventories	239,454	252,414
Contract assets	260,661	0
Other assets	3,604,985	3,303,769
TOTAL CURRENT ASSETS	98,726,923	143,806,571
NON-CURRENT ASSETS		
Trade and other receivables	415,855	396,037
Property, plant and equipment	340,667,856	340,825,435
Infrastructure	300,802,125	300,948,159
Right-of-use assets	166,998	166,998
Intangible assets	136,843	136,843
TOTAL NON-CURRENT ASSETS	642,189,677	642,473,472
TOTAL ASSETS	740,916,600	786,280,043
CURRENT LIABILITIES		
Trade and other payables	11,062,651	6,756,701
Contract liabilities	67,053	67,053
Capital grant/contributions liabilities	368,476	0
Other liabilities	1,038,346	1,955,647
Lease liabilities	84,567	84,567
Borrowings	666,573	336,431
Employee related provisions	5,160,838	5,103,503
TOTAL CURRENT LIABILITIES	18,448,504	14,303,902
NON-CURRENT LIABILITIES		
Other liabilities	127,197	127,197
Lease liabilities	52,499	52,499
Borrowings	10,309,794	10,309,794
Employee related provisions	553,045	553,045
TOTAL NON-CURRENT LIABILITIES	11,042,535	11,042,535
TOTAL LIABILITIES	29,491,039	25,346,437
NET ASSETS	**711,425,561**	**760,933,606**
EQUITY		
Retained surplus	181,531,744	231,039,789
Reserve accounts	82,270,250	82,270,250
Revaluation surplus	447,623,567	447,623,567
TOTAL EQUITY	**711,425,561**	**760,933,606**

This statement is to be read in conjunction with the accompanying notes.

CITY OF BELMONT
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 31 OCTOBER 2025

1 BASIS OF PREPARATION AND MATERIAL ACCOUNTING POLICIES

BASIS OF PREPARATION

This prescribed financial report has been prepared in accordance with the *Local Government Act 1995* and accompanying regulations.

Local Government Act 1995 requirements
Section 6.4(2) of the Local Government Act 1995 read with the *Local Government (Financial Management) Regulations 1996,* prescribe that the financial report be prepared in accordance with the *Local Government Act 1995* and, to the extent that they are not inconsistent with the Act, the Australian Accounting Standards. The Australian Accounting Standards (as they apply to local governments and not-for-profit entities) and Interpretations of the Australian Accounting Standards Board were applied where no inconsistencies exist.

The *Local Government (Financial Management) Regulations 1996* specify that vested land is a right-of-use asset to be measured at cost, and is considered a zero cost concessionary lease. All right-of-use assets under zero cost concessionary leases are measured at zero cost rather than at fair value, except for vested improvements on concessionary land leases such as roads, buildings or other infrastructure which continue to be reported at fair value, as opposed to the vested land which is measured at zero cost. The measurement of vested improvements at fair value is a departure from AASB 16 which would have required the City to measure any vested improvements at zero cost.

Local Government (Financial Management) Regulations 1996, regulation 34 prescribes contents of the financial report. Supplementary information does not form part of the financial report.

Accounting policies which have been adopted in the preparation of this financial report have been consistently applied unless stated otherwise. Except for cash flow and rate setting information, the financial report has been prepared on the accrual basis and is based on historical costs, modified, where applicable, by the measurement at fair value of selected non-current assets, financial assets and liabilities.

PREPARATION TIMING AND REVIEW
Date prepared: All known transactions up to 31 October 2025

THE LOCAL GOVERNMENT REPORTING ENTITY
All funds through which the City controls resources to carry on its functions have been included in the financial statements forming part of this financial report.

All monies held in the Trust Fund are excluded from the financial statements.

MATERIAL ACCOUNTING POLICES
Material accounting policies utilised in the preparation of these statements are as described within the 2024-25 Annual Budget. Please refer to the adopted budget document for details of these policies.

Critical accounting estimates and judgements
The preparation of a financial report in conformity with Australian Accounting Standards requires management to make judgements, estimates and assumptions that effect the application of policies and reported amounts of assets and liabilities, income and expenses.

The estimates and associated assumptions are based on historical experience and various other factors believed to be reasonable under the circumstances; the results of which form the basis of making the judgements about carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

As with all estimates, the use of different assumptions could lead to material changes in the amounts reported in the financial report.

The following are estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year and further information on their nature and impact can be found in the relevant note:
- Fair value measurement of assets carried at reportable value including:
  - Property, plant and equipment
  - Infrastructure
- Impairment losses of non-financial assets
- Estimated useful life of intangible assets
- Measurement of employee benefits
- Estimation uncertainties and judgements made in relation to lease accounting

CITY OF BELMONT
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 31 OCTOBER 2025

2 NET CURRENT ASSETS INFORMATION

(a) Net current assets used in the Statement of Financial Activity

	Note	Adopted Budget Opening 1 July 2025	Actual as at 30 June 2025	Actual as at 31 October 2025
Current assets		$	$	$
Cash and cash equivalents		14,829,264	4,466,071	1,561,500
Trade and other receivables		3,722,485	4,214,595	20,009,976
Other financial assets		52,496,278	85,941,157	118,678,912
Inventories		234,387	239,454	252,414
Contract assets		50,000	260,661	0
Other assets		3,574,704	3,604,985	3,303,769
		74,907,118	98,726,923	143,806,571
Less: current liabilities				
Trade and other payables		(1,919,484)	(11,062,651)	(6,756,701)
Other liabilities		(1,345,261)	(1,038,346)	(1,955,647)
Lease liabilities		(9,948)	(84,567)	(84,567)
Borrowings		(692,211)	(666,573)	(336,431)
Employee related provisions		(4,791,653)	(5,160,838)	(5,103,503)
Other provisions		(744,717)	0	0
		(9,503,274)	(18,012,975)	(14,236,849)
Net current assets		65,403,844	80,713,948	129,569,722
Less: Total adjustments to net current assets	2(b)	(80,964,173)	(81,246,935)	(81,577,077)
Closing funding surplus / (deficit)		**(15,560,329)**	**(532,987)**	**47,992,645**

(b) Current assets and liabilities excluded from budgeted deficiency

Adjustments to net current assets				
Less: Reserve accounts		(82,270,250)	(82,267,210)	(82,267,210)
Add: Current liabilities not expected to be cleared at the end of the year				
- Current portion of lease liabilities		9,948	84,567	84,567
- Current portion of borrowings		692,211	666,573	336,431
- Current portion of employee benefit provisions held in reserve		603,918	269,135	269,135
Total adjustments to net current assets	2(a)	**(80,964,173)**	**(81,246,935)**	**(81,577,077)**

(c) Non-cash amounts excluded from operating activities

	Adopted Budget Estimates 30 June 2026	YTD Budget Estimates 31 October 2025	YTD Actual 31 October 2025
	$	$	$
Adjustments to operating activities			
Less: Profit on asset disposals	(34,012)	612	0
Add: Depreciation	12,617,329	4,205,776	4,205,776
Non-cash movements in non-current assets and liabilities:			
- Pensioner deferred rates			19,818
- Employee provisions	63,319		(217,308)
Total non-cash amounts excluded from operating activities	**12,646,636**	**4,206,388**	**4,008,286**

CURRENT AND NON-CURRENT CLASSIFICATION

In the determination of whether an asset or liability is current or non-current, consideration is given to the time when each asset or liability is expected to be settled. Unless otherwise stated assets or liabilities are classified as current if expected to be settled within the next 12 months, being the local governments' operational cycle.

CITY OF BELMONT
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 31 OCTOBER 2025

3 EXPLANATION OF MATERIAL VARIANCES

The material variance thresholds are adopted annually by Council as an indicator of whether the actual expenditure or revenue varies from the year to date actual materially.
The material variance adopted by Council for the 2025-26 year is $100,000.

Description	Var. $	Var. %	
	$	%	
Revenue from operating activities			
Grants, subsidies and contributions	**(101,888)**	**(21.42%)**	▼
Finance - Workers compensation reimbursements to be claimed. - ($110,901)		Timing	
Interest revenue	**(1,770,859)**	**50.88%**	▲
Finance - Variance reflects interest amounts earned on amounts not spent as budgeted. Return on investments is as anticipated. - $1,128,625		Timing	
Expenditure from operating activities			
Employee costs	**562,719**	**3.00%**	▲
Salaries are below budget due to vacancies which are currently being recruited by the City		Permanent	
Materials and contracts	**2,700,355**	**19.20%**	▲
Works - October waste invoices to be received and paid. - $560,616		Timing	
Parks, This reflects delays in seasonal projects due to weather conditions, however, the projects have now commenced. - $1,477,172		Timing	
Information Technology - Suppliers invoicing marginally ahead of expectations.- ($174,235)		Timing	
Economic & Community Development - Expenditure associated with several City-funded community and economic programs has not yet occurred.- $249,081		Timing	
Library, Culture & Place - Projects in progress with some timing variances - $341,182		Timing	
Governance, Strategy & Risk - Costs arising from the Local Government Elections, including enaging the WAEC to undertake the election, have not yet been incurred.- $241,031		Timing	
Utility charges	**285,168**	**29.26%**	▲
City Facilities & Property - Delay in receiving utility bills for the current period. - $184,717			
Inflows from investing activities			
Proceeds from capital grants, subsidies and contributions	**201,172**	**58.89%**	▲
Works - MRRG funding received ahead of schedule. - ($311,289)		Timing	
City Facilities & Property - Grant payment received for Middleton Park lighting works carried out in 24/25.- ($146,701)		Timing	
Proceeds from disposal of assets	**140,627**	**0.00%**	
Design, Assets & Development-New vehicles were delivered ahead of schedule, resulting in the early disposal of old vehicles prior to the allocated budget timeline.-($140,627)		Timing	
Outflows from investing activities			
Acquisition of property, plant and equipment	**725,927**	**52.17%**	▲
Information Technology -Tender for Network implementation project expected to be presented to March OCM.-$507,821		Timing	
Acquisition of infrastructure	**3,615,055**	**48.00%**	▲
City Projects - Awaiting Superintendent approval of invoices for Esplanade and Wilson Park.- $2,663,164		Timing	
Parks, Leisure & Environment - Reflects the delays to programs as a result of weather conditions however program timelines have been adjusted - $1,225,379		Timing	

CITY OF BELMONT

SUPPLEMENTARY INFORMATION

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BASIS OF PREPARATION - SUPPLEMENTARY INFORMATION

Supplementary information is presented for information purposes. The information does not comply with the disclosure requirements of the Australian Accounting Standards.

CITY OF BELMONT
SUPPLEMENTARY INFORMATION
FOR THE PERIOD ENDED 31 OCTOBER 2025

1 CASH AND FINANCIAL ASSETS

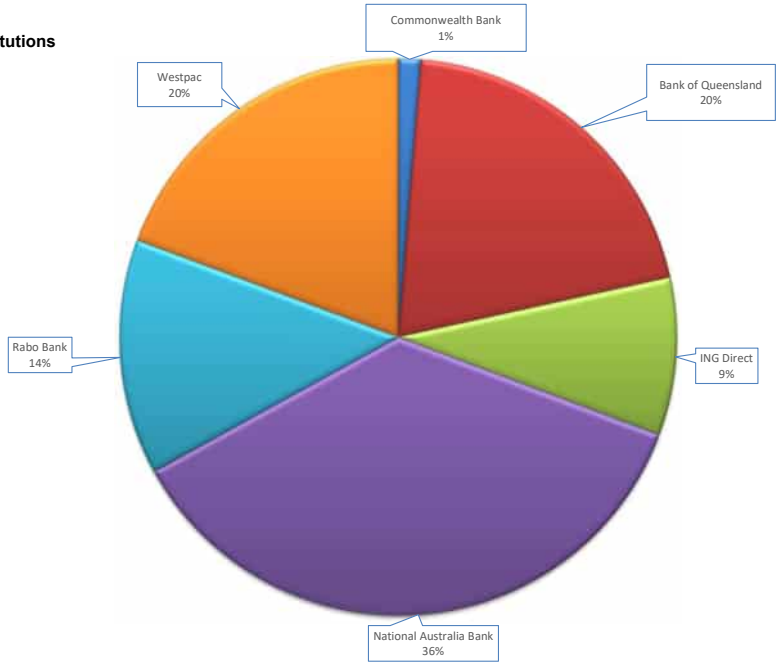
BY INVESTMENT HOLDINGS

	Municipal $	Reserve $	Trust-Reserve $	Total $	Total %
Municipal Account	286,085	-	-	286,085	0%
On-Call Account	1,272,365	-	-	1,272,365	1%
Term Deposits	39,000,000	79,479,863	(0)	118,479,863	99%
	40,558,449	79,479,863	(0)	120,038,312	100.00%

BY INSTITUTION

	Rating	Municipal $	Reserve $	Trust-Reserve $	Total $	Total %	Policy Max %
Commonwealth Bank		1,558,449	-	-	1,558,449	1%	40%
Bank of Queensland		8,000,000	16,308,898	-	24,308,898	20%	30%
ING Direct		-	10,999,808	-	10,999,808	9%	30%
National Australia Bank		27,000,000	16,557,050	-	43,557,050	36%	40%
Rabo Bank		4,000,000	12,413,664	-	16,413,664	14%	30%
Westpac		-	23,200,443	-	23,200,443	19%	40%
		40,558,449	79,479,863	-	120,038,312	100.00%	

Investment Institutions



BY CREDIT RATINGS

Rating	Municipal $	Reserve $	Trust Reserve $	Total $	Total %	Policy Max %
AAA	-	-	-	-	0%	100%
AA	28,558,449	39,757,493	-	68,315,942	57%	100%
A	12,000,000	39,722,370	-	51,722,370	43%	80%
BBB / NR	-	-	-	-	0%	60%
	40,558,449	79,479,863	-	120,038,312	100.00%	

CITY OF BELMONT
SUPPLEMENTARY INFORMATION
FOR THE PERIOD ENDED 31 OCTOBER 2025

2 RESERVE ACCOUNTS

	Budget				Actual			
Reserve account name	Opening Balance	Transfers In (+)	Transfers Out (-)	Closing Balance	Opening Balance	Transfers In (+)	Transfers Out (-)	Closing Balance
	$	$	$	$	$	$	$	$
Reserve accounts restricted by legislation								
Other provisions [describe]	70,632	4,511	0	75,143	67,592	0	0	67,592
Reserve accounts restricted by Council								
Administration building Reserve	269,135	17,187	(286,322)	0	269,135	0	0	269,135
Aged Accommodation Reserve	1,049,911	67,435	0	1,117,346	1,049,911	0	0	1,049,911
Aged Community Care Reserve	249,649	15,943	0	265,592	249,649	0	0	249,649
Aged persons housing Reserve	315,479	16,344	0	331,823	315,479	0	0	315,479
Aged Services Reserve	1,156,701	77,555	0	1,234,256	1,156,701	0	0	1,156,701
Ascot Waters Marina Maintenance & Restoration	1,155,801	73,811	(50,000)	1,179,612	1,155,801	0	0	1,155,801
Belmont District Band Reserve	53,561	3,420	(56,981)	0	53,561	0	0	53,561
Belmont Oasis Refurbishment Reserve	12,279,947	301,458	(243,163)	12,338,242	12,279,947	0	0	12,279,947
Belmont Trust Reserve	1,686,073	112,196	(222,324)	1,575,945	1,686,073	0	0	1,686,073
Building Reserve	9,764,967	374,132	(403,471)	9,735,628	9,764,967	0	0	9,764,967
Capital Projects Reserve	5,195,085	5,250,000	(1,580,828)	8,864,257	5,195,085	0	0	5,195,085
Carry Forward Projects Reserve	1,362,715	0	(1,097,493)	265,222	1,362,715	0	0	1,362,715
District valuation Reserve	119,745	1,580	(121,325)	0	119,745	0	0	119,745
Election expenses Reserve	83,879	567	(84,446)	0	83,879	0	0	83,879
Employee Entitlements Reserve	0	3,267,756	(162,678)	3,105,078	0			0
Environment Reserve	969,567	61,918	(808,095)	223,390	969,567	0	0	969,567
Faulkner Park Retirement Village Buy Back Reserve	3,036,050	171,380	0	3,207,430	3,036,050	0	0	3,036,050
Faulkner Park Retirement Village Owners Maintenance Reserve	562,135	35,042	(200,000)	397,177	562,135	0	0	562,135
History Reserve	189,628	12,110	(201,738)	0	189,628	0	0	189,628
Information Technology Reserve	1,574,755	100,566	(70,000)	1,605,321	1,574,755	0	0	1,574,755
Infrastructure Reserve	0	1,176,781		1,176,781	0			0
Insurance Reserve	1,481,646	94,620	0	1,576,266	1,481,646	0	0	1,481,646
Land Acquisition Reserve	11,535,626	0	(11,535,626)	0	11,535,626	0	0	11,535,626
Long Service Leave Reserve - Salaries	1,970,332	0	(1,970,332)	0	1,970,332	0	0	1,970,332
Long Service Leave Reserve - Wages	319,943	0	(319,943)	0	319,943	0	0	319,943
Miscellaneous Entitlements Reserve	760,227	0	(760,227)	0	760,227	0	0	760,227
Parks Development Reserve	0	0	0	0	0	0	0	0
Plant replacement Reserve	1,820,649	110,123	(1,368,476)	562,296	1,820,649	0	0	1,820,649
Property development Reserve	15,218,474	13,445,007	(13,524,656)	15,138,825	15,218,474	0	0	15,218,474
Public Art Reserve	435,650	27,859	(24,000)	439,509	435,650	0	0	435,650
Ruth Faulkner library Reserve	52,366	3,344	(55,710)	0	52,366	0	0	52,366
Streetscapes Reserve	0	0	0	0	0	0	0	0
Urban Forest Strategy Management Reserve	1,132,489	0	(1,132,489)	0	1,132,489	0	0	1,132,489
Waste Management Reserve	6,397,433	320,873	(195,511)	6,522,795	6,397,433	0	0	6,397,433
Underground Power Reserve	0	56,095	0	56,095	0			0
	82,270,250	**25,199,613**	**(36,475,834)**	**70,994,029**	**82,267,210**	**0**	**0**	**82,267,210**

CITY OF BELMONT **INVESTING ACTIVITIES**
SUPPLEMENTARY INFORMATION
FOR THE PERIOD ENDED 31 OCTOBER 2025

3 CAPITAL ACQUISITIONS

Capital acquisitions	Adopted Budget	YTD Budget	YTD Actual	YTD Variance
	$	$	$	$
Buildings	2,032,196	186,076	146,142	(39,934)
Furniture and equipment	1,620,000	640,000	95,131	(544,869)
Plant and equipment	1,368,476	110,424	209,283	98,859
Other property, plant and equipment	50,000	5,556	0	(5,556)
Acquisition of property, plant and equipment	**5,070,672**	**942,056**	**450,556**	**(491,500)**
Infrastructure - roads	4,704,029	767,219	840,941	73,722
Infrastructure - Reserve Improvements	15,110,668	7,142,704	3,233,456	(3,909,248)
Infrastructure - Footpath Network	718,865	160,746	72,095	(88,651)
Infrastructure - Drainage Network	339,574	17,500	59,181	41,681
Acquisition of infrastructure	**20,873,136**	**8,088,169**	**4,205,673**	**(3,882,496)**
Total capital acquisitions	**25,943,808**	**9,030,225**	**4,656,229**	**(4,373,996)**
Capital Acquisitions Funded By:				
Capital grants and contributions	6,582,066	749,424	0	(749,424)
Other (disposals & C/Fwd)	661,489	0	0	0
Reserve accounts				
Administration building Reserve	286,322	0	0	0
Ascot Waters Marina Maintenance & Restoration	50,000	0	0	0
Belmont District Band Reserve	56,981	0	0	0
Belmont Oasis Refurbishment Reserve	243,163	0	0	0
Belmont Trust Reserve	222,324	0	0	0
Building Reserve	403,471	0	0	0
Capital Projects Reserve	1,580,828	0	0	0
Carry Forward Projects Reserve	1,097,493	0	0	0
District valuation Reserve	121,325	0	0	0
Election expenses Reserve	84,446	0	0	0
Environment Reserve	808,095	0	0	0
Faulkner Park Retirement Village Owners Maintenance R	200,000	0	0	0
History Reserve	201,738	0	0	0
Information Technology Reserve	70,000		0	0
Land Acquisition Reserve	11,535,626	0	0	0
Long Service Leave Reserve - Salaries	1,970,332	0	0	0
Long Service Leave Reserve - Wages	319,943	0	0	0
Miscellaneous Entitlements Reserve	760,227	0	0	0
Parks Development Reserve	0	0	0	0
Plant replacement Reserve	1,368,476	0	0	0
Property development Reserve	13,524,656	0	0	0
Public Art Reserve	24,000	0	0	0
Ruth Faulkner library Reserve	55,710	0	0	0
Streetscapes Reserve	0	0	0	0
Urban Forest Strategy Management Reserve	1,132,489	0	0	0
Waste Management Reserve	195,511	0	0	0
Insurance Reserve	0	0	0	0
Infrastructure Reserve	0	0	0	0
Underground Power Reserve	0	0	0	0
Employee Entitlements Reserve	162,678	0	0	0
Contribution - operations	18,413,931	8,280,801	4,656,229	(3,624,572)
Capital funding total	**62,133,320**	**9,030,225**	**4,656,229**	**(4,373,996)**

KEY INFORMATION

Initial recognition
An item of property, plant and equipment or infrastructure that qualifies for recognition as an asset is measured at its cost.

Upon initial recognition, cost is determined as the amount paid (or other consideration given) to acquire the assets, plus costs incidental to the acquisition. The cost of non-current assets constructed by the City includes the cost of all materials used in construction, direct labour on the project and an appropriate proportion of variable and fixed overheads. For assets acquired at zero cost or otherwise significantly less than fair value, cost is determined as fair value at the date of acquisition.

Assets for which the fair value as at the date of acquisition is under $5,000 are not recognised as an asset in accordance with *Local Government (Financial Management) Regulation 17A(5).* These assets are expensed immediately.

Where multiple individual low value assets are purchased together as part of a larger asset or collectively forming a larger asset exceeding the threshold, the individual assets are recognised as one asset and capitalised.

Individual assets that are land, buildings and infrastructure acquired between scheduled revaluation dates of the asset class in accordance with the City's revaluation policy, are recognised at cost and disclosed as being at reportable value.

Measurement after recognition
Plant and equipment including furniture and equipment and right-of-use assets (other than vested improvements) are measured using the cost model as required under *Local Government (Financial Management) Regulation 17A(2).* Assets held under the cost model are carried at cost less accumulated depreciation and any impairment losses being their reportable value.

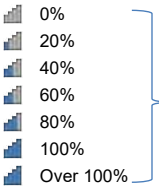
Reportable Value
In accordance with *Local Government (Financial Management) Regulation 17A(2),* the carrying amount of non-financial assets that are land and buildings classified as property, plant and equipment, investment properties, infrastructure or vested improvements that the local government controls.

Reportable value is for the purpose of *Local Government (Financial Management) Regulation 17A(4)* is the fair value of the asset at its last valuation date minus (to the extent applicable) the accumulated depreciation and any accumulated impairment losses in respect of the non-financial asset subsequent to its last valuation date.

CITY OF BELMONT **INVESTING ACTIVITIES**
SUPPLEMENTARY INFORMATION
FOR THE PERIOD ENDED 31 OCTOBER 2025

3 CAPITAL ACQUISITIONS (CONTINUED) - DETAILED

Capital expenditure total
Level of completion indicators



Percentage Year to Date Actual to Annual Budget expenditure where the expenditure over budget highlighted in red.

Account Description	Adopted Budget	YTD Budget	YTD Actual	Variance (Under)/Over
City Projects	9,166,347	5,139,743	2,476,576	2,663,167
Parks and Environment	6,142,484	2,047,544	822,166	1,225,378
Buildings and facilities	1,834,033	141,493	80,856	60,637
Infrastructure Capital Works	5,762,468	945,465	972,217	(26,752)
Furniture and equipment	1,620,000	640,000	95,131	544,869
Plant and equipment	1,368,476	110,424	209,283	(98,859)
Other	50,000	5,556	0	5,556

CITY OF BELMONT
SUPPLEMENTARY INFORMATION
FOR THE PERIOD ENDED 31 OCTOBER 2025

4 BUDGET AMENDMENTS

Amendments to original budget since budget adoption. Surplus/(Deficit)

Description	Council Resolution	Classification	Non Cash Adjustment	Increase in Available Cash	Decrease in Available Cash	Amended Budget Running Balance
			$	$	$	$
Budget adoption						350,000
October Budget Review	October OCM#12.3	Opening surplus(deficit)			(5,473,434)	(5,123,434)
October Budget Review	October OCM#12.3	Operating revenue			(244,623)	(5,368,057)
October Budget Review	October OCM#12.3	Operating expenses			(298,567)	(5,666,624)
October Budget Review	October OCM#12.3	Capital grants			(459,285)	(6,125,909)
October Budget Review	October OCM#12.3	Capital expenses			(2,106,212)	(8,232,121)
October Budget Review	October OCM#12.3	Non cash item			8,582,121	350,000
				0	**0**	**350,000**

12.7 Annual Report 2024-25

(Report to follow).

13 Reports by the Chief Executive Officer

13.1 Request for leave of absence

13.2 Notice of motion

Nil.

14 Matters for which the meeting may be closed

14.1 NAIDOC Awards 2025 Nominations

This report is included in the Ordinary Council Meeting – Confidential Matters Agenda in accordance with Section 5.23(2) of the *Local Government Act 1995 (WA)*, which permits the meeting to be closed to the public for business relating to the following:

Section 5.23(2)

(b) the personal affairs of any person.

15 Closure