Development Application Submission Form

This submission form is provided for your convenience. There is no obligation to make a submission. If you wish to make a submission, please complete this form and email to: planning@belmont.wa.gov.au or post to: City of Belmont, Locked Bag 379, Cloverdale WA 6985.

Written submissions should be lodged with the City within the required comment period. If no comments are received by the closing date, we will assume that you have no comment you wish to make and the application will be assessed and determined on its merits and without any further consultation.

Please note also that although submissions will assist the City in making a determination on the application, they should not be construed as the sole basis for the City's decision. The application will be determined on the relevant planning merits and the City may not agree with all or part of your submission.

DEVELOPMENT APPLICATION DETAILS	
DA Number:	486/2026/LAND
Property Address:	20 Ballantyne Road KEWDALE 6105 (Lot 813 PL 75972)
Proposed Development:	Change of use from Industry-General to Industry-Noxious
Zoning:	Industrial
Enquiries:	Planning Officer, Nathan Carbone (08) 9477 7290

DETAILS OF PERSON(S) MAKING SUBMISSION			
☐ I am an Owner and Occupier **or** ☐ I am an Owner **or** ☐ I am an Occupier			
Name(s):			
Affected Address:			
Postal Address: (if different to above address)			
Telephone No:		**Email:**	
Signature:		**Date:**	

Note: submissions should be based on planning merit. A 'How to Make a Submission on a Town Planning Proposal' fact sheet is available for viewing from: www.belmont.wa.gov.au.

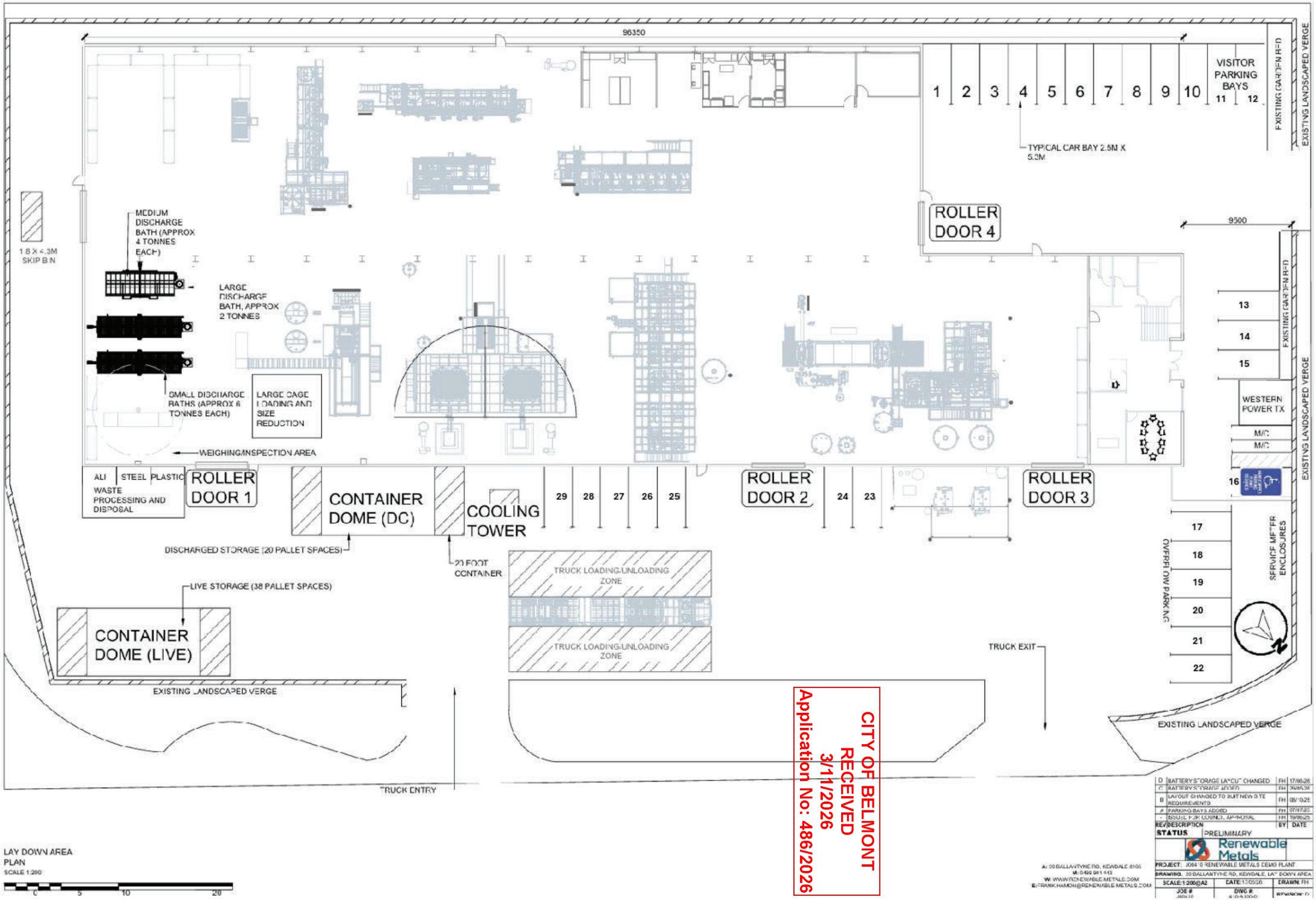
Submission:

Additional lines over page. Attach additional sheets if required.

Document Set ID: 6211380
Version: 1, Version Date: 30/10/2026

Attach additional sheets if required.

Document Set ID: 6211380
Version: 1, Version Date: 30/10/2026



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3/11/2026
Application No: 486/2026

LAY DOWN AREA
PLAN
SCALE 1:200

0 5 10 20

D	BATTERY STORAGE LAYOUT CHANGED	FH	17/06/26
C	BATTERY STORAGE ADDED	FH	29/05/26
B	LAYOUT CHANGED TO SUIT NEW SITE REQUIREMENTS	FH	08/10/25
A	PARKING BAYS ADDED	FH	07/07/25
-	ISSUED FOR COUNCIL APPROVAL	FH	19/06/25
REV	DESCRIPTION	BY	DATE

STATUS PRELIMINARY

Renewable Metals

PROJECT: 2044-0 RENEWABLE METALS DEMO PLANT
DRAWING: 20 BALLANTYNE RD, KEWDALE, LAY DOWN AREA
SCALE: 1:200@A2 | DATE: 17/06/26 | DRAWN: FH
JOB #: 2044-0 | DWG #: 4-0-A100-0 | REVISION: D

A: 20 BALLANTYNE RD, KEWDALE 6105
M: 0466 981 443
W: WWW.RENEWABLEMETALS.COM
E: FRANK.HAMON@RENEWABLEMETALS.COM

PROPERTY BOUNDARY

5

6

Accreditation No. 6IM100 — INHERENT

I certify that this complies with the The Western Australian Dangerous Goods Safety (Storage and Handling of Non-explosive) Regulations 2007

Name of Assessor: Amanda Wylde

Name of Responsible Officer: Amanda Wylde

Refer to:
- Notes on Document
- Document No: TOL0174-001-REP-001 Rev 3
- Other:

Acceptance of this document in no way relieves the contractor from responsibility for construction practice, legislative compliance, dimensional accuracy, set out, contractual obligations and other liability. Acceptance is based on information provided in this document only.

Signature: _____ Date: _____

Responsible Officer

HAZCHEM
IN EMERGENCY DIAL
000, POLICE or
FIRE BRIGADE

DG MANIFEST AND SDS LOCATED OUTSIDE ROLLER DOORS 1, 2 AND OUTSIDE GATE 1

W

MANIFEST

MUSTER POINT

MUSTER POINT 1
FRONT GATE ON
BALLENTYNE RD

YOU ARE HERE

4
ROLLER DOOR 4

3

DG MANIFEST/MSDS

OFFICE

E

ROLLER DOOR 1

MANIFEST

1

COOLING TOWER

2

ROLLER DOOR 2

MANIFEST

ROLLER DOOR 3

AIR COMPRESSOR

COMPRESSOR RECIEVERS

BOILERS

DANGEROUS GOODS TANKS

1. COPPER LSL TANK
2. COPPER LSL BACKWASH TANK
3. NICKEL LSL TANK
4. NICKEL LSL BACKWASH TANK
5. NICKEL STRIP MIXER SETTLERS (1 &2)
6. NICKEL STRIP MIXER SETTLERS (3 & 4)
7. NICKEL WASH, COPPER STRIP MIXER SETTLERS
8. COPPER STRIP EXTRACT 4 MIXER SETTLERS
9. EXTRACT SETTLERS 2 & 3
10. EXTRACT 1 AND SCRUB MIXER SETTLERS
11. NICKEL ELECTROWINNING CELLS AND TANKS
12. COPPER ELECTROWINNING CELLS AND TANKS
13. AMMONIA DISTRIBUTION TANK

H

G

MUSTER POINT 2
REAR GATE ON
SISSONS RD

Store ID no.	Dangerous goods: Proper shipping name	Class or division	Sub risk/s	UN no.	PG	Store: Type	Capacity (L/ kg)
Lithium Ion Batteries / black mass/ MHP	LITHIUM ION BATTERIES	9	n/a	3480	-	PDB	35, 000 kg
Lithium Ion Batteries / black mass/ MHP in process	LITHIUM ION BATTERIES	9	n/a	3480	-	PTP	6,550 kg
Organic mixture containing 30% LIX84I and 70% Vivasol DB0	Class C1 (COMBUSTIBLE LIQUID)	Combustible Liquid (C1)	n/a	-	-	PTP	15,000 L (13,572 kg)
Solution, containing 20% nickel sulfate	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (nickel sulphate)	9	n/a	3077	III	PTP	13,000L (15,432 kg)
Solution, containing 20% Sulfuric acid	SULFURIC ACID SOLUTION	8	n/a	2796	II	PTP	8,580L (10,296 kg)
Ammonia Solution (25%)	AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15°C in water, with more than 10% but not more than 35% ammonia (contains ammonium hydroxide)	8	n/a	2672	III	PTP	2,000L (1,820 kg)
98% Sulfuric Acid	SULPHURIC ACID	8	n/a	1830	II	PDB	6,000L (11,040 kg)
Ammonia Solution (25%)	AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15°C in water, with more than 10% but not more than 35% ammonia (contains ammonium hydroxide)	8	n/a	2672	III	PDB	3,000L (2,730 kg)
LIX84I-C	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1-(2-HYDROXY-5-TERT-NONYLPHENYL)ETHAN-1-ONE OXIME)	9	n/a	3082	III	PDB	1,000L (960 kg)
Vivasol DB0	Class C1 (COMBUSTIBLE LIQUID)	Combustible Liquid (C1)	n/a	-	-	PDB	3,000L (2,700kg)
Lithium Hydroxide	LITHIUM HYDROXIDE	8	n/a	2680	II	PDB	25kg
Class 3 Cabinet	Flammable Liquid, N..O.S.	3	n/a	1993	II & III	PDB	250L (250kg)
Class 8 Cabinet	Articles containing corrosive substance, N.O.S.	8	n/a	3547	II & III	PDB	250L (250kg)

W
E
H
G

SERVICE	STATUS
WATER MAIN	EXISTING (UPGRADE PENDING)
ELECTRICAL	EXISTING (UPGRADE PENDING)
FIRE HYDRANT	EXISTING
GAS MAIN	NEW SERVICE (LOCATION TBC)

DIRECTION	BUSINESS NAME	DESCRIPTION OF BUSINESS TYPE
NORTH WEST	CW BRANDS	INDUSTRIAL CONSTRUCTION PRODUCT SALES
NORTH EAST	VERMEER EQUIPMENT	INDUSTRIAL CONSTRUCTION PLANT SUPPLY AND MAINTENANCE
SOUTH WEST	VACANT LOT	N/A
SOUTH EAST	CALLCOTT AND DOWNEY	HYDRAULIC CYLINDER FABRICATION AND REPAIR

SITE EVACUATION PLAN SCALE 1:200

0 5 10 20

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A: UNIT 5, 9 PILBARA ST, 6106
M: 0499 901 443
W: WWW.RENEWABLE-METALS.COM
E:FRANK.HAMON@RENEWABLE-METALS.COM

REV	DESCRIPTION	BY	DATE
A	SERVICES AND MANIFEST AMENDMENTS	FH	24/09/25
-	ISSUED FOR DG CONSULTANT	FH	11/06/25

STATUS PRELIMINARY

Renewable Metals

PROJECT: J00410 RENEWABLE METALS DEMO PLANT

DRAWING: 20 BALLENTYNE RD, KEWDALE, EVACUATION PLAN (CRIB ROOM)

SCALE:1:200@A2	DATE:24/09/25	DRAWN: FH
JOB #: J00410	DWG #: REN0360-001-REP-001	REVISION: A

Our Ref: 25~039

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Application No: 486/2026/DA

16 October 2026

Attention: Alex Bott, Manager Planning Services

City of Belmont
Locked Bag 379
Cloverdale WA 6985

Dear Mr. Bott,

DEVELOPMENT APPLICATION | CHANGE OF USE – INDUSTRY-NOXIOUS | LOT 813 (20) BALLANTYNE ROAD, KEWDALE

TBB Planning acts on behalf of Renewable Metals Pty Ltd in relation to its lithium-ion battery recycling and refining facility at Lot 813 (No. 20) Ballantyne Road, Kewdale. Following our recent meeting with the City, we submit this new application for development approval to change the approved land use from Industry–General to Industry–Noxious.

In support of this application, please find enclosed:

- A completed and signed Application for Planning Approval form;
- A copy of the landowners' authorisation;
- **Appendix A** – Certificate of Title
- **Appendix B** - Copies of the existing development approvals and endorsed plans; and
- **Appendix C** - Dangerous Goods Site Licence
- **Appendix D** - Fire Prevention and Emergency Management Plan
- **Appendix E** - DFES Notification and Lodgement Record
- **Appendix F** - Terravias Works Approval Documentation

Payment of the required application fee will be arranged by Renewable Metals Pty Ltd following receipt of the invoice from the City.

Subject Site

The subject site relates to Lot 813 (No. 20) Ballantyne Road, Kewdale. The landownership details are summarised below:

Address	Owner	Plan	Volume	Folio
Lot 813 (20) Ballantyne Road, Kewdale	Chelton Holdings Pty Ltd	DP 75972	2822	511

The site comprises approximately 6,855 m^2 and is zoned Industrial under the Metropolitan Region Scheme and Local Planning Scheme No. 15 (LPS15). Renewable Metals occupies the existing industrial premises within the Kewdale industrial area.

T (08) 9226 4276
E admin@tbbplanning.com.au
tbbplanning.com.au

Address
Level 7, 160 St Georges Terrace Perth WA 6000
PO Box 7130 Cloisters Square Perth WA 6850

TBB Planning Pty Ltd
ABN 93 687 085 141 | ACN 687 085 141

Existing Approvals

The City has previously granted development approval for the use of the subject site as a lithium-ion battery recycling facility and the associated development shown on the endorsed plans. The facility has since been established and is currently undertaking trial operations.

The relevant approvals are summarised below.

Approval	Description
313/2025/DA — 6 November 2025	Approved the change of use from 'Logistics Centre' to 'Industry–General' for a lithium-ion battery recycling facility, together with the associated development detailed on the endorsed plans.
313/2025/DAAM/A — 8 September 2026	Approved the addition of two temporary container domes for covered battery storage and rearrangement of the approved parking bays. The amendment retained the conditions of the original approval and granted a 12-month approval for the temporary structures.

The original approval established the planning basis for the facility's recycling operations, including the discharge and processing of battery materials to recover valuable metals. It also imposed conditions addressing storage, vehicle access, parking, landscaping and stormwater management.

The potential for the operation to become prescribed premises was expressly recognised in the original determination, and an advice note provided that a new application would be required should this occur. This application follows that requirement.

Renewable Metals is currently operating below the applicable prescribed-premises threshold. We are instructed that DWER has confirmed these restricted trial operations may continue without a works approval.

Accordingly, this application seeks approval to increase the production capacity of the existing approved facility. That increase triggers the prescribed-premises requirements and the corresponding change in classification from Industry-General to Industry-Noxious under LPS15.

The underlying battery recycling function remains unchanged, and no additional building works are proposed as part of this application. The assessment therefore concerns the proposed increase in capacity and its associated impacts, having regard to the use and development already approved by the City.

Proposed Change of Use

Our application seeks to change the approved use of the site from 'Industry-General' to 'Industry-Noxious', as anticipated in the original application and reflected in the approval documentation. The following is provided in the context of this request:

Works Approval Requirements

Part V of the *Environmental Protection Act 1986* (EP Act) regulates emissions and discharges from prescribed premises. Premises become prescribed where their activities meet a category description and the corresponding production or design capacity specified in Schedule 1 of the *Environmental Protection Regulations 1987*. The requirements therefore relate to both the nature of the activity and its capacity.

DWER has advised that operation of the Renewable Metals facility at its intended production capacity requires approval under this framework. Renewable Metals has consequently lodged a works approval application under the following categories:

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Category	Activity	Production or design capacity threshold
31 — Chemical manufacturing	Manufacture of chemical products through a chemical process, other than pesticide manufacturing.	100 tonnes or more per year.
47 — Scrap metal recovery	Fragmentation or melting of metal scrap, subject to the category exclusions.	100 tonnes or more per year.

The thresholds refer to production or design capacity, rather than simply the cumulative quantity processed during the trial period.

The works approval process enables DWER to assess the relevant works and environmental controls. Subsequent emissions and discharges require the applicable operating authorisation, including a licence for ongoing operation. These authorisations provide for conditions governing matters such as throughput, emission controls, monitoring and reporting.

Renewable Metals' application is supported by the Terravias report at **Appendix F**. DWER confirmed validation of the application on 10 September 2026 and this is currently under assessment. We are instructed that DWER has confirmed the current restricted trial operations may continue without a works approval, with further authorisation required before progressing beyond those arrangements.

Land Use Classification under LPS15

LPS15 defines Industry-Noxious by reference to an industry that causes premises to become prescribed premises or premises subject to registration under the EP Act. The proposed production capacity therefore brings the facility within this definition and requires a change from its approved Industry-General classification. Industry-Noxious is an A use within the Industrial zone and may be approved following advertising.

Although the listed use changes, the nature of the activity remains the same. Renewable Metals will continue to receive and process lithium-ion battery materials and recover metals through the recycling and refining processes previously approved by the City. No additional building works are proposed through this application.

The application therefore seeks to allow the approved facility to progress from its restricted trial operations to its intended production capacity. The change in classification reflects the environmental requirements applying at that capacity.

Distinction from Industry Hazardous

The Industry-Hazardous land use deals with industrial activities which are deemed to present risk to the locality, human health, life, property or the biophysical environment remaining after the proposed mitigation and isolation measures have been applied. The relevant consideration is therefore the risk remaining after controls, rather than the presence of batteries or chemicals alone. We note that Industry-Hazardous is an X use (not permitted).

The facility holds Dangerous Goods Site Licence (**Appendix C**) and incorporates battery discharge, wet shredding, emission treatment, gas monitoring, process interlocks and bunded containment. The Terravias report also records that Inherent Safety Group's dangerous goods review identified no unusual hazards requiring measures outside the relevant approved code of practice. Fire prevention and emergency arrangements are addressed separately in **Appendices D and E**.

These matters support classification as Industry-Noxious. The prescribed-premises requirement arises from the activities and capacity proposed and it does not itself establish that the facility presents the significant residual risk contemplated by Industry–Hazardous.

The attached documents provide evidence of the safety measures and operating procedures in place to support compliance with the relevant standards. Renewable Metals is also working with DWER, DFES and the dangerous goods regulator to ensure the necessary approvals and agency requirements are addressed as the facility progresses to its intended production capacity.

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Planning Justification

We consider the proposed change of use appropriate having regard to the existing approvals, the industrial zoning of the site and the continuation of the approved battery recycling operations. The principal considerations are outlined below.

Planning consideration	Justification
Existing approval for the facility	The City has already approved the use of the site as a lithium-ion battery recycling facility and the associated development shown on the endorsed plans. The original determination expressly anticipated a further application should the operation become prescribed premises. This application follows that requirement and seeks to accommodate the intended production capacity of the approved facility.
Suitability of the industrial location	The site is zoned Industrial under both the Metropolitan Region Scheme and LPS15 and forms part of the established Kewdale industrial area. Industry–Noxious is an A use within the Industrial zone, allowing the City to consider its suitability having regard to the particular operation, surrounding uses and proposed controls.
Continuation of the approved activity	The proposal retains the battery recycling and refining activities previously approved by the City. The change in classification arises from the prescribed-premises requirements applying at the proposed production capacity. No additional building works or changes to the approved access and parking arrangements are proposed through this application.
Safety and risk management	The dangerous goods licence, technical reporting and emergency management documentation provide evidence of the measures and procedures in place to support compliance with the relevant standards. Renewable Metals is also working with the relevant agencies to address their requirements and obtain the approvals necessary for operation at the intended production capacity.
Environmental management and surrounding amenity	The facility incorporates battery discharge, wet shredding, emission treatment, monitoring, process interlocks and bunded containment to manage the potential impacts of its operations. The DWER assessment provides for further consideration of emissions and discharges at the proposed capacity, alongside the City's assessment of compatibility with surrounding land uses.
Existing development controls	The existing approvals establish requirements for covered storage, parking, vehicle movements, drainage and landscaping. These controls remain relevant to the continued operation of the facility and can be retained through the new determination, together with any additional conditions reasonably required to address the increased production capacity.
Resource recovery	The facility recovers valuable metals from lithium-ion battery materials, reducing waste and returning resources to productive use. This local recycling capability is increasingly important as demand for lithium-ion batteries grows, supporting the responsible management of end-of-life batteries and reducing reliance on newly extracted materials. The proposal enables this approved function to progress to its intended production capacity within an established industrial location.

The existing approvals establish the planning basis for the facility and its recycling function. The present application allows the City to assess the additional production capacity and associated management requirements under the applicable Industry–Noxious classification.

On this basis, we submit that the proposed change of use is appropriate, subject to suitable conditions and the separate environmental authorisations required for the increased production capacity.

Assessment Considerations

We request that the City proceed with acceptance, advertising and referral of the application as soon as practicable, including referral to DWER. With the facility expected to reach the applicable production threshold by February 2027, we would appreciate these processes progressing concurrently with DWER's works approval assessment to enable determination at the earliest opportunity.

The project team is available to meet with the City and referral authorities to explain the operations and address any queries arising during assessment. We would also very much welcome the opportunity to host assessing officers for a site visit and demonstration of the facility.

Conclusion

The application addresses the further approval expressly contemplated by the City when it approved the battery recycling facility. The site's industrial zoning, the existing approval and the documented safety and environmental controls support the proposed Industry–Noxious use.

We trust the information provided assists the City's assessment and respectfully request its favourable consideration of the application. Should you require any further information or clarification, please do not hesitate to contact the undersigned.

Yours sincerely,

Jarrod Ross
Associate Director
M 0457 001 050
E jarrod@tbbplanning.com.au

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FIRE PREVENTION AND EMERGENCY MANAGEMENT PLAN

Kewdale Lithium-Ion Battery Recycling Demonstration Facility

Prepared for DWER and DFES review against Guidance Note GN04

Document	Details
Site	20 Ballantyne Road, Kewdale WA 6105
Owner / operator	Renewable Metals Pty Ltd
Prepared by	Tim Hutchins, HSE & Compliance Manager
Version / status	Draft for DFES review
Date	26 August 2026
Primary reference	DFES Guidance Note GN04 – Fire Prevention and Management in a Recycling Facility

DOCUMENT CONTROL

Version	Description	Author	Reviewer / approver	Date
1	Initial GN04-aligned fire prevention and emergency management plan for DFES review	Tim Hutchins	Mark Urbani / Peter Beaven / DFES	26 August 2026

Approval and review

Name and role	Signature	Date
Tim Hutchins, HSE & Compliance Manager		26 August 2026
Mark Urbani, CTO / Technical Sponsor		27 August 2026
Peter Beaven, Chief Executive Officer		27 August 2026

Review triggers

At least annually and after each drill or fire-related incident.

Before any material change to feedstock, battery chemistry, storage quantity, storage configuration, discharge method, shredder, fire system, drainage or containment.

When DWER, DFES, WorkSafe, the City of Belmont or another approving authority requests change.

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Renewable Metals

1. PURPOSE AND SCOPE

This Plan describes Renewable Metals' arrangements to prevent, detect, contain and respond to fire at the Kewdale demonstration facility, and to support safe DFES intervention. It supplements the Site Emergency Response Plan and focuses on lithium-ion battery receival, quarantine, discharge, size reduction, shredding, black-mass handling, associated combustible materials, firefighting water and off-site impacts.

The Plan applies to all personnel, contractors, suppliers and visitors and to the external receival areas, temporary container domes, internal inspection and weighing area, discharge baths, size-reduction area, shredder, black-mass storage, waste storage and hydrometallurgical interfaces.

GN04 basis: GN04 requires a practical fire risk assessment, site maps, credible scenarios, emissions and off-site impact considerations, emergency waste actions, firefighter assistance, contacts, roles, communications, testing, an emergency information container and support for a DFES Operational Pre-Plan.

2. FACILITY AND OPERATING CONTEXT

2.1 Facility overview

Renewable Metals is commissioning a lithium-ion battery recycling demonstration facility. The front-end concept receives batteries, inspects and weighs them, segregates non-conforming or damaged items, chemically discharges batteries in cages and baths, undertakes size reduction where required, and shreds feed to produce black mass for downstream hydrometallurgical processing. The chemical discharging process is our primary first response control for damaged live batteries which sets us apart from other lithium-ion battery receival facilities.

2.2 Current staged operating basis

Stage	Operating intent	Indicative storage / capacity basis from supplied plan
Stage 1 – commissioning	Batteries arrive via truck and are unloaded into our undercover dome area. Batteries are sorted and placed into cages. Cages are crane lifted directly into discharge baths. No large capacity shredder installed.	Approximately 12 t as received, 8 t chemically discharged and 1.4 t in discharge baths.
Stage 2 – ramp-up to 960 tpa	Additional cages and baths; controlled feed to the 960 tpa shredder from bath cages to shredder conveyor.	Approximately 12 t as received, 8 t discharged and 14 t in discharge baths; DG licence is 60 t maximum total on site.
Future expansion	Second dome and further cage/bath capacity. Not part of this Plan unless separately approved through Management of Change.	Excluded from current fire operating envelope pending updated fire risk assessment and approvals.

Operating limit: The quantities above are planning assumptions from the supplied Sample Receival and Discharge Plan. The final approved limits must reconcile the current Dangerous Goods licence, DWER works approval conditions, building/fire engineering requirements and DFES advice.

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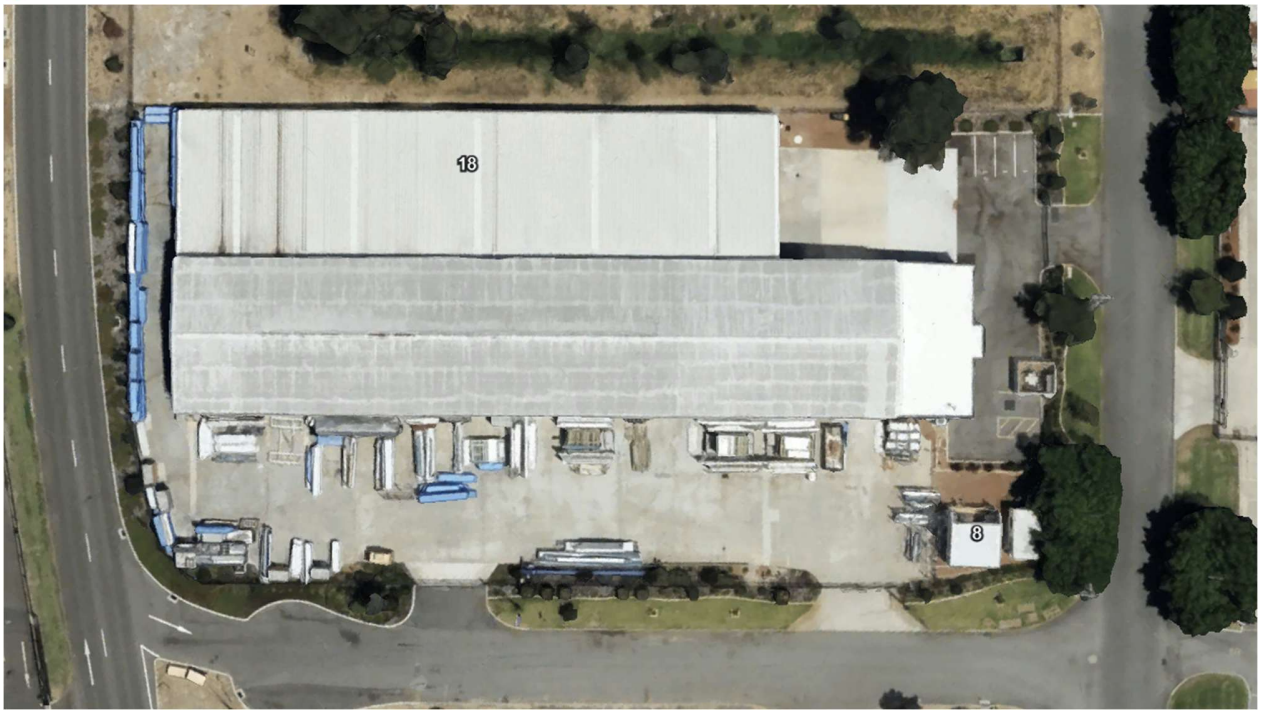


Figure 1 – Aerial image of the Kewdale facility from the existing Site Emergency Response Plan

3. FIRE SAFETY GOVERNANCE AND RESPONSIBILITIES

Role	Key responsibilities
Chief Executive Officer	Provide resources; ensure material fire and regulatory risks are escalated; approve the final Plan.
CTO / Technical Sponsor	Own technical fire-risk decisions, plant design, Management of Change and shutdown authority.
HSE & Compliance Manager	Maintain this Plan; coordinate DFES/DWER engagement, fire risk assessment, drills, audits, incident reporting and the emergency information container.
Operations Manager / Chief Warden	Control site response until emergency services assume control; stop receival/processes; account for personnel; provide site briefing.
Shift Supervisor	Control battery receival, inventory, quarantine, discharge and shredding limits; verify inspections; initiate alarm and escalation.
Operators	Inspect batteries, follow segregation and discharge controls, maintain housekeeping, report heat/smoke/damage and stop work.
Maintenance	Maintain detection, alarms, suppression, hydrants, drainage isolation, thermal monitoring and mobile plant readiness.
All personnel	Raise alarm, call 000, evacuate, report hazards and do not fight fire unless trained, authorised and safe.

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4. FIRE HAZARD IDENTIFICATION AND RISK ASSESSMENT

The following preliminary assessment identifies credible scenarios from the supplied operating documents. It must be validated through a multidisciplinary workshop and reviewed by DFES. Risk ratings are qualitative and are not a substitute for the corporate risk matrix.

Scenario / location	Potential causes	Consequences	Primary controls	Residual status
Damaged battery on receipt or in temporary storage	Impact damage, manufacturing defect, unknown state of charge, short circuit, incompatible packing	Thermal runaway, smoke generation, fire propagation, toxic products, off-site impact	Supplier acceptance information; receipt inspection; visual and thermal assessment; immediate segregation of damaged, swollen or suspect batteries; transfer of damaged batteries directly to the discharge bath wherever practicable; discharge process reducing battery charge to zero over approximately 6 hours; quarantine arrangements; rapid escalation protocol; inventory limits; clear emergency access	DFES review
Discharge bath event	Incorrect chemistry, severely damaged battery, reactive contaminant, electrical energy release, loss of circulation	Heat generation, gas evolution, splashing, localised fire, release to bunded area	Competent operators; approved operating procedure; battery immersion and charge neutralisation process; bath volume controls; bund capacity; circulation and pH monitoring; isolation from incompatible materials; ventilation; emergency shutdown; routine inspections	Validate
Shredder fire or hot material	Residual battery energy, friction, jam, overheated bearing, foreign material	Fire in plant, smoke generation, escalation to feed or black-mass storage areas	Only discharged batteries processed through the shredder; pre-processing verification; temperature monitoring; interlocks; isolation arrangements; housekeeping; controlled feed rates; fire suppression system; emergency response procedures	DFES review
Black-mass storage event	Hot material, contamination, incompatible material, moisture ingress, poor containment	Heating, dust generation, fire, contaminated runoff	Cooling verification before storage; sealed and labelled containers; segregated storage locations; inventory limits; routine inspections; exclusion of ignition sources	Validate
External container/dome fire	Damaged battery, arson, adjacent fire, vehicle impact	External fire, radiant heat exposure to buildings/containers, smoke, contaminated runoff	Segregation by battery condition; covered storage; perimeter security; vehicle separation; inventory controls; external hydrant coverage to be verified; emergency response arrangements	DFES review
Combustible waste fire	Cardboard, plastics and general packaging accumulated near battery processing activities	Rapid fire growth and spread to battery storage or processing areas	Frequent waste removal; designated waste accumulation area; no ignition sources; housekeeping inspections; separation distances maintained	Controlled
Hydromet or chemical fire/release affecting battery area	Combustible solvents, electrical fault, equipment failure, loss of containment	Smoke, toxic vapour, combustible vapour ignition, runoff contamination	Segregation; bunding; ventilation; alarm systems; emergency isolation; hazardous substances management procedures; spill response equipment	Validate
Firewater escape	Open drainage, inadequate containment, excessive hydraulic demand	Off-site pollution through stormwater system or ground contamination	Drain isolation arrangements; blind sump tank; drain mats and booms; tanker access arrangements; containment capacity calculations; emergency environmental response procedures	Open action

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5. FIRE PREVENTION CONTROLS

Renewable Metals applies a hierarchy of controls to prevent lithium-ion battery fires and minimise the consequences of any thermal event. The facility's primary fire prevention strategy is the early identification, segregation, discharge and processing of damaged batteries to eliminate stored electrical energy before downstream handling.

5.1 Receipt Inspection and Battery Assessment

All incoming batteries are inspected on receipt and assessed for:

- Physical damage;
- Swelling or deformation;
- Evidence of thermal damage;
- Leakage or contamination;
- Packaging integrity; and
- Any other indication that the battery may be unsafe to store or process.

Batteries identified as damaged, defective or suspect are segregated from general inventory and managed in accordance with site operating procedures.

5.2 Battery Discharge Process

The principal control for damaged batteries is transfer to the discharge bath.

Damaged, defective or suspect batteries are placed into a purpose-designed discharge bath as soon as practicable following identification. The discharge bath is designed to remove residual electrical energy from the battery, reducing the state of charge to zero and rendering the battery effectively inert.

The discharge process typically requires approximately six hours, after which the battery presents a significantly reduced risk of thermal runaway, ignition and fire propagation.

This control substantially reduces the risk associated with:

- Receipt and temporary storage;
- Battery handling activities;
- Mechanical processing operations;
- Shredding activities; and
- Black-mass production.

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5.3 Inventory Management

Inventory limits are maintained throughout the facility to minimise the quantity of combustible material present at any one time.

Batteries awaiting assessment, discharge, processing and storage are managed within designated areas and are subject to routine inspection.

5.4 Thermal Monitoring and Escalation

Battery storage, discharge and processing areas are routinely monitored for signs of abnormal heating or thermal activity.

Where elevated temperatures, smoke, odour or evidence of battery failure are detected, the affected batteries are isolated and managed in accordance with emergency response procedures.

5.5 Separation and Housekeeping

Combustible materials, packaging waste and general rubbish are removed regularly to prevent unnecessary fuel loading.

Batteries, black mass, chemicals and wastes are segregated to prevent incompatible interactions and reduce the potential for fire spread.

5.6 Process Controls

The facility operates under documented operating procedures which include:

- Verification of battery discharge prior to shredding;
- Equipment inspections and maintenance;
- Control of feed rates;
- Emergency isolation arrangements;
- Planned shutdown procedures; and
- Routine operator inspections.

5.7 Battery Storage Infrastructure

Battery storage areas are designed to minimise the likelihood and consequences of thermal events.

Controls include:

- Segregation of damaged, suspect and processing-ready batteries;
- Inventory management and storage limitations;
- Dedicated storage containers for battery storage and handling activities;
- Mechanical ventilation systems to prevent the accumulation of heat, flammable gases and combustion products;
- Routine inspections and thermal monitoring;
- Separation distances from adjacent assets and combustible materials; and
- Unobstructed emergency access for emergency response personnel.

5.7 Fire Suppression Systems

Battery storage and processing infrastructure incorporates active fire protection measures designed to limit escalation of a thermal event.

Controls include:

- Internal fire suppression systems installed within battery storage containers;
- Connection of battery storage containers to the site's firewater ring main system;
- Fire hydrants and water supply infrastructure;
- Portable fire extinguishers positioned throughout the facility;
- Emergency isolation arrangements;
- Site emergency response procedures; and
- Liaison arrangements with DFES and other emergency responders.

The firewater system is intended to support rapid fire suppression activities and provide cooling of affected assets in the event of a battery fire, thereby reducing the potential for fire spread to adjacent equipment, storage areas and buildings.

5.8 Fire Protection Philosophy

Renewable Metals employs a layered fire protection philosophy. The primary prevention control for damaged lithium-ion batteries is rapid transfer to the discharge bath to eliminate stored electrical energy. This control is supported by battery segregation, inventory management, ventilated storage containers, internal fire suppression systems, connection to the site firewater ring main network and site emergency response procedures. Collectively, these controls are intended to prevent thermal runaway events and minimise consequences should an event occur.

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6. FIRE DETECTION, SUPPRESSION AND FIREFIGHTER ACCESS

System / requirement	Current information from supplied documents	Action / verification required
Detection and alarm	Existing ERP identifies alarms/manual call points and thermal camera at receival.	Confirm detector technology and coverage for external storage, domes, inspection, discharge, shredder and black-mass areas; confirm alarm cause-and-effect and monitoring.
Sprinklers / suppression	Existing ERP records automatic sprinklers in warehouse and specialist extinguishing media near battery areas.	Fire engineer and DFES to confirm suitability for lithium-ion battery and shredder hazards, local protection, water application strategy and limitations.
Hydrants and hose reels	Existing ERP records four hydrants, booster and hose reels.	Obtain current flow/pressure test; verify compliant coverage, safe approach, booster visibility, external storage coverage and GN04 hydraulic duration.
Smoke management	Roller doors and warehouse ventilation are referenced.	Fire engineer to verify smoke hazard management, manual overrides and duration against NCC special-hazard expectations.
Firefighter access	Two street interfaces and roller-door access are shown.	Verify DFES appliance access, turning, hardstand, gate dimensions, overhead clearance, responder staging and unobstructed access to all storage/process areas.
Quarantine and breakup	Nally-bin quench provision and material-handling equipment are described.	Nominate dedicated quarantine/breakup area; verify size, location, drainage containment, machinery and trained operator availability.
Firewater containment	Site uses bunding and identifies blind soak/storage tanks.	Complete hydraulic demand and containment calculation; show drainage, isolation valves, outfalls, drain mats/booms, tankers and disposal route.
Firefighting doctrine: Site personnel must not conduct offensive firefighting against a developed lithium-ion battery or waste fire. Initial response is alarm, 000 call, evacuation, isolation from a safe location and provision of accurate information. First attack is limited to trained personnel, small incipient fires, suitable equipment and a maintained escape route.		

7. EMERGENCY RESPONSE PROCEDURES

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7.1 Immediate actions for heat, smoke, off-gassing or fire

Step	Action
1	**STOP work**, activate emergency stop/isolation if this can be done remotely or without exposure.
2	**RAISE the alarm**, warn others and call 000. State lithium-ion batteries, chemicals and potential toxic smoke are involved.
3	**EVACUATE** by the nearest safe route to the upwind muster point. Do not pass through smoke.
4	**ISOLATE** access. Do not open containers, move batteries or enter an affected area unless directed by DFES.
5	**INFORM DFES** on arrival using the emergency information container: location, inventory, state of charge/condition, chemicals, shutdowns, drainage and firewater controls.
6	**PROTECT** the environment from a safe location by activating approved stormwater isolation or drain protection only if trained and safe.
7	**ACCOUNT** for all personnel and maintain exclusion until DFES hands the site back.
8	**MONITOR** for re-ignition and only recover material under an approved post-incident plan.

7.2 Scenario-specific response

Scenario	Minimum response
Hot/damaged battery at receival	Stop unloading; isolate vehicle/load; raise local alarm; establish exclusion; thermal monitor from safe distance; call 000 for smoke, off-gassing, rapid heat rise or fire; move only under a pre-approved procedure and when safe.
Discharge bath abnormality	Stop charging/handling; isolate circulation/dosing where safe; evacuate for gas, heat or reaction; prevent liquid entering drains; use SDS and inform DFES of bath chemistry and quantity.
Shredder smoke/fire	Emergency stop and isolate feed/energy from safe location; activate approved fixed suppression; evacuate; do not open or dismantle; provide DFES with feed inventory, isolation points and process hazards.
External storage fire	Call 000; evacuate upwind; keep gates/access clear; prevent spread where fixed systems can be activated remotely; do not move affected stock unless directed by DFES.
Black-mass heating/fire	Isolate area; stop additions; call 000 for smoke/fire; avoid dust disturbance; identify container quantity and composition; contain runoff and contaminated residues.
Contaminated firewater	Activate approved drain isolation; deploy drain mats/booms only if safe; arrange vacuum tanker; sample/classify and dispose under environmental advice; notify DWER as required.

8. EMISSIONS, OFF-SITE IMPACTS AND FIREWATER

Hazard	Potential off-site impact	Controls / response
Smoke and combustion products	Toxic and irritant smoke affecting workers, neighbours and transport routes.	Early 000 notification; upwind muster; neighbour communication; DFES HAZMAT response; do not re-enter until cleared.
Firewater / contaminated runoff	Battery constituents, black mass, chemicals and combustion residues entering stormwater, soil or groundwater.	Automatic or rapid drain isolation; impermeable containment; blind sump/tank; drain mats/booms; tankers; sampling and lawful disposal.
Chemical release during fire	Acid, ammonia, solvent or process liquors released by heat or damaged containment.	SDS/manifest available; bunding; remote isolation; evacuation; DFES HAZMAT briefing; incompatible-material information.
Emergency wastes	Burnt batteries, contaminated absorbents, firewater, debris and soil requiring classification.	Quarantine; prevent mixing; engage authorised waste contractor; retain transport/disposal records; regulator consultation.
Open engineering action: GN04 expects primary firewater containment with net capacity not less than total hydraulic demand of installed fire systems. The supplied documents do not provide a verified hydraulic demand or containment capacity. A fire engineer/hydraulic consultant must complete and document this calculation for DFES review.		

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9. SITE ACCESS, MAPS AND EMERGENCY RESOURCES

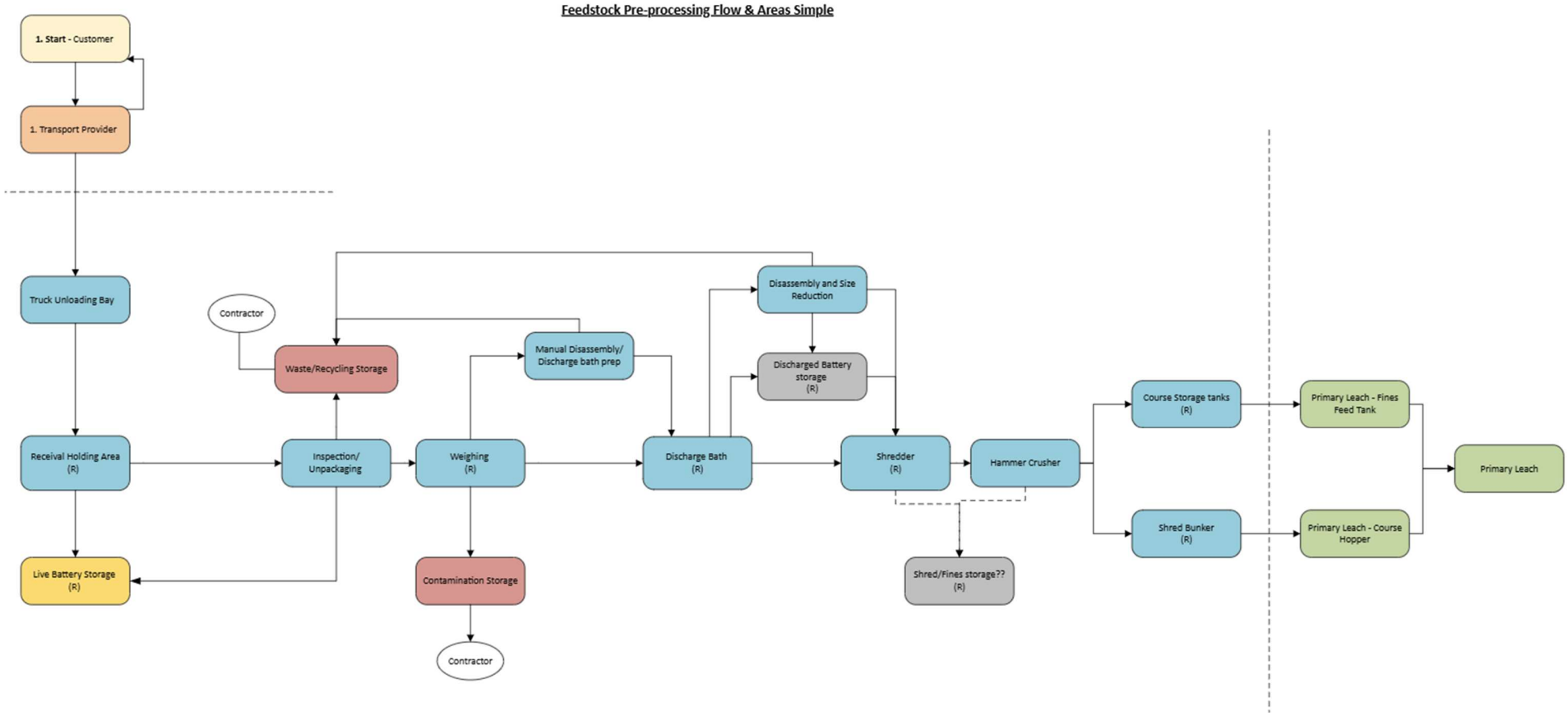


Figure 2 – Latest supplied site / process layout

Before final submission, the controlled site plan must clearly show: premises boundary; designated DFES entry; gates and widths; appliance access and hardstand; hydrants, booster, hose reels, sprinkler control valves and fire alarm panel; battery storage zones and maximum quantities; quarantine area; discharge baths; shredder; black-mass storage; chemicals; isolation points; stormwater drains/outfalls and isolation; firewater containment; emergency information container; emergency shutdowns; roller doors; exits and muster points.

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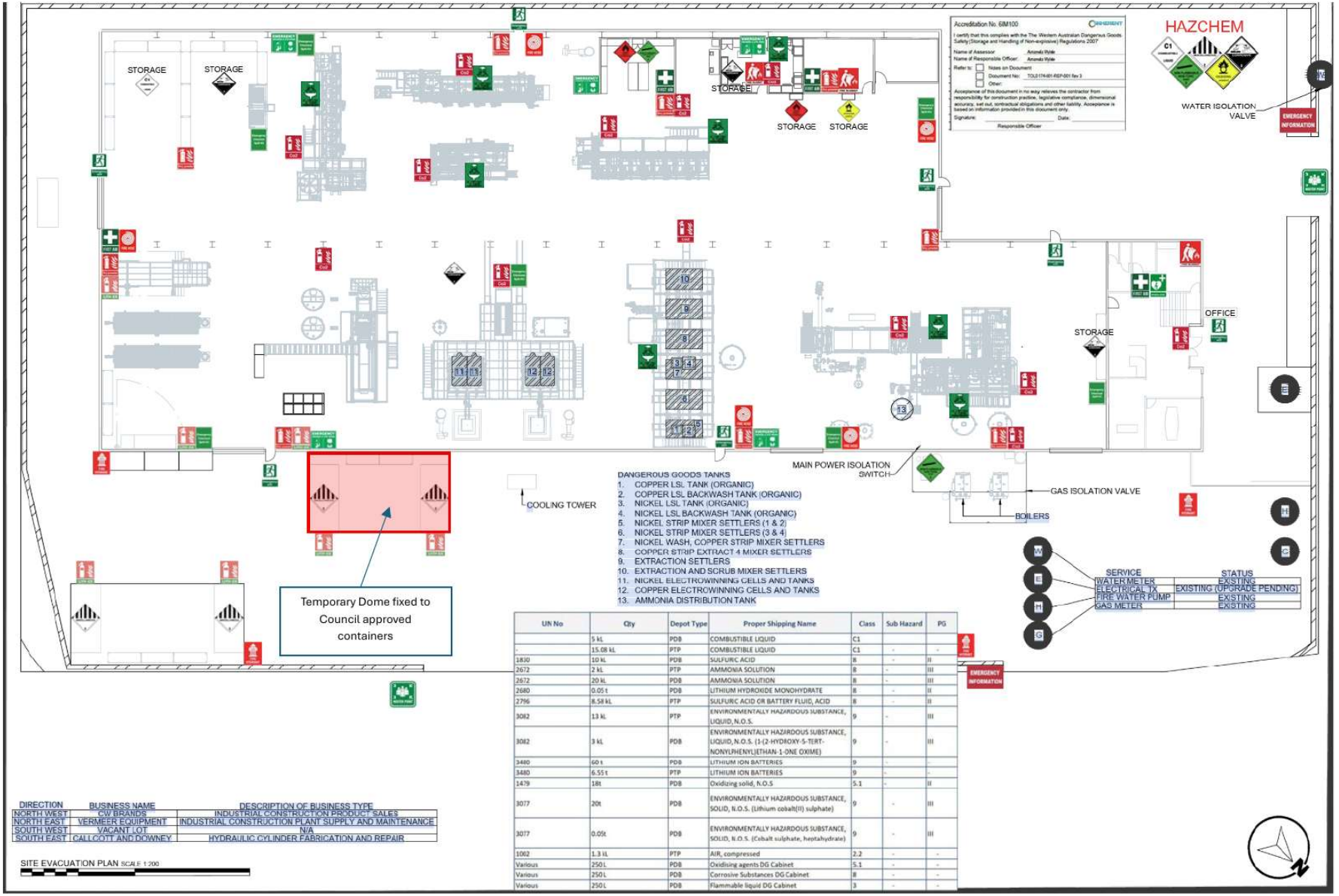


Figure 3 – Existing emergency and evacuation layout and temporary dome location supplied for 20 Ballantyne Road, Kewdale

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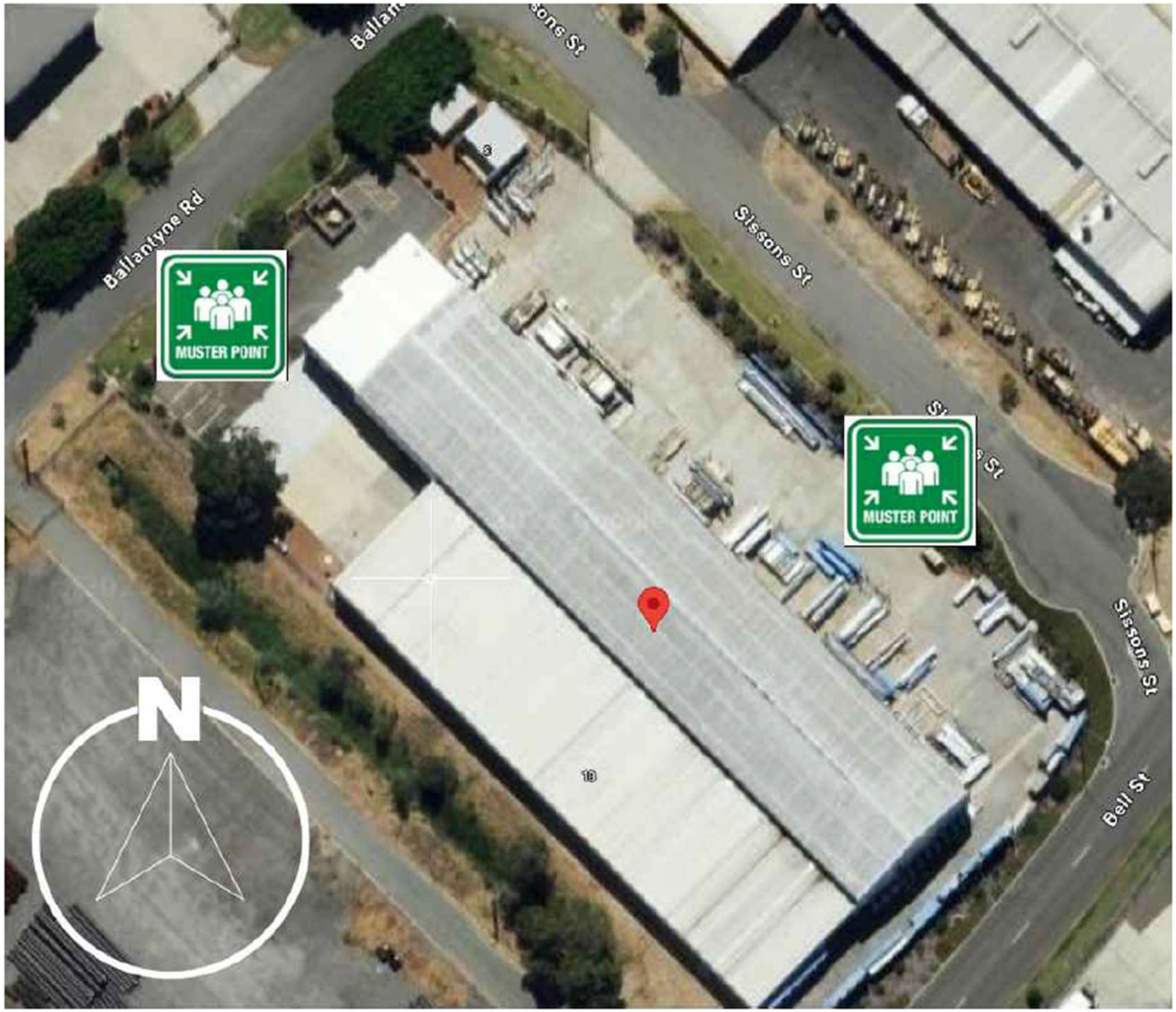


Figure 5 – Existing muster point arrangement

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10. EMERGENCY SERVICES INFORMATION CONTAINER

A weatherproof, clearly marked emergency services information container has been installed at the entry gates closest to the muster points. A location agreed with DFES will be confirmed and accessible when the site is unattended. The HSE & Compliance Manager will maintain the controlled content.

Required content	Included / action
One-page site and operations summary	Prepare from Sections 2 and 5.
Current site plan and evacuation diagram	Update to include all features listed in Section 9.
Battery inventory by location and condition	Provide current shift printout / register.
Dangerous goods manifest and SDS directory	Insert current controlled versions.
Emergency shutdown and isolation instructions	Prepare concise, equipment-specific cards.
Fire systems and water supplies	Insert hydrant/sprinkler drawings, booster details and latest flow/pressure test.
Drainage and firewater containment	Insert drainage/outfall diagram and isolation procedure.
Quarantine and stock-breakup resources	Identify area, machinery, keys and competent operators.
24-hour contacts	Insert current Chief Warden, technical, HSE, landlord and utility contacts.
Current Site Emergency Response Plan and this Plan	Insert controlled hard copies.
Licences and approvals	Insert current Dangerous Goods licence, DWER works approval/licence and relevant conditions when granted.

11. COMMUNICATION, TRAINING AND EXERCISES

- Induct all personnel in alarm, evacuation, battery fire indicators, quarantine, inventory limits, drain protection and prohibited actions.
- Train wardens, supervisors and designated operators for their assigned roles.
- Exercise the fire plan at least twice per year, including one lithium-ion battery scenario and one firewater/off-site impact scenario.
- Invite DFES participation or observation where practicable and close improvement actions.
- Conduct pre-campaign tabletop exercises before significant commissioning or throughput changes.
- Maintain training, drill, maintenance and inspection records.

Exercise schedule

Exercise	Frequency / trigger	Minimum objective
Battery thermal event desktop scenario	Before commissioning and after material change	Test alert, 000 call, escalation, inventory information and technical briefing.
Evacuation drill	At least twice yearly	Alarm, upwind muster, accountability and access for emergency services.

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Firewater containment deployment	Six-monthly and after layout change	Test drain isolation, boom/mat deployment, tanker call-out and responder safety.
Shredder fire scenario	Before shredder campaign and annually	Test emergency stop, isolation, suppression interface, exclusion and DFES handover.
After-hours response	Annually	Test contacts, emergency container access and unattended-site information.

12. INSPECTION, MAINTENANCE AND ASSURANCE

Control	Minimum assurance activity
Battery storage and quarantine	Daily condition, temperature/visual signs, segregation, quantity and access checks.
Shredder and discharge systems	Pre-start critical-control verification and end-of-shift inspection.
Housekeeping and combustible waste	Daily inspection; remove packaging and debris before accumulation.
Hydrants, hose reels, alarms and suppression	Inspection, testing and servicing to applicable design, approval and maintenance requirements.
Drain isolation and firewater equipment	Monthly functional/readiness check and after any deployment.
Site maps and emergency container	Monthly check and after any layout, inventory or contact change.
Management of Change	Formal review before any change to capacity, storage, feedstock, chemistry or fire systems.
Independent assurance	Fire engineer and DFES review before final issue; close all actions or record approved interim controls.

13. GN04 COMPLIANCE AND ACTION MATRIX

GN04 topic	Plan response	Status / evidence required
6.4 Fire risk assessment	Section 4 preliminary scenario assessment.	Workshop validation and signed risk register required.
6.5 Emergency plan	Sections 7–11 and maps.	Update controlled maps, contacts and concise EIC cards.
6.6 Firefighting intervention	Sections 6 and 9.	DFES access review; quarantine/breakup area to be agreed.
6.7 Hydrants	Section 6.	Flow/pressure test, coverage and duration verification required.
6.8 Suppression	Section 6.	Fire engineer to confirm hazard suitability and coverage.
6.9 Detection/alarm	Section 6.	Detection type, coverage, cause-and-effect and monitoring required.
6.10 Smoke management	Section 6.	Fire engineer / NCC special-hazard assessment required.
6.11 Firewater containment	Section 8.	Hydraulic demand, containment capacity, drainage and tanker plan required.
7.2 Storage management	Section 5.	Permanent footprints, quantities, separations and compatibility plan

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		required.
7.3 Internal stockpiles	Section 5.	Confirm no egress obstruction; removal capability and access widths.
7.4 External stockpiles	Sections 5 and 9.	DFES review of dome/container arrangement, separation and hydrant access.
8 Emergency information container	Section 10.	Install at DFES-agreed location and populate controlled folder.
9 DFES Operational Pre-Plan	Use this Plan, approved drawings, manifest and shutdown cards.	Request DFES site visit and OPP development.

14. PRE-SUBMISSION ACTION REGISTER

No.	Action	Owner	Priority / status
1	Conduct multidisciplinary lithium-ion battery fire risk assessment covering all reasonable and foreseeable scenarios.	HSE / CTO	Critical – open
2	Reconcile current and proposed battery quantities with the Dangerous Goods licence, DWER application and physical storage footprints.	HSE / Ops	Critical – open
3	Issue a controlled emergency site plan showing every GN04 emergency feature listed in Section 9.	Engineering	Critical – open
4	Obtain hydrant main flow/pressure test and verify booster, coverage, simultaneous outlets and required duration.	Facilities	Critical – open
5	Complete firewater hydraulic demand, drainage and containment capacity assessment.	Fire engineer	Critical – open
6	Confirm sprinkler/local suppression suitability for battery storage, discharge, shredder and black mass.	Fire engineer	Critical – open
7	Confirm detection/alarm coverage, thermal monitoring and cause-and-effect.	Fire engineer	High – open
8	Confirm smoke hazard management and roller-door manual override.	Fire engineer	High – open
9	Nominate and mark quarantine/breakup area and confirm machinery/resources available to DFES.	Ops / DFES	High – open
10	Install and populate emergency services information container.	HSE	High – open
11	Verify disposal contractors and call-out arrangements for contaminated firewater and fire debris.	HSE / Procurement	High – open
12	Undertake DFES site walkthrough and develop Operational Pre-Plan.	HSE / DFES	Critical – open
13	Run commissioning tabletop and evacuation/firewater drills; close findings.	HSE / Ops	Before campaign
14	Correct and reconcile the existing ERP fire-extinguisher guidance with DFES/fire engineer advice for lithium-ion battery fires.	HSE / Fire engineer	Critical – open

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APPENDIX A – SOURCE DOCUMENTS

- DFES Guidance Note GN04 – Fire Prevention and Management in a Recycling Facility.
- Renewable Metals Site Emergency Response Plan, Version 3.0.
- D100-OP-PLN-000-005 Sample Receival and Discharge Plan, Revision A.
- DP Front-End Operating System Development Program – Kick-Off Pack.
- Temporary dome location – 20 Ballantyne Road, Kewdale.
- Latest supplied site/process plan image.

APPENDIX B – EMERGENCY BRIEFING CARD

CALL 000: State: lithium-ion battery recycling facility, 20 Ballantyne Road, Kewdale; fire/smoke/off-gassing location; battery quantity and condition; chemicals involved; injuries; safe entry gate; caller contact. Do not hang up until instructed.

Provide DFES on arrival	Site response
Incident location and status	Point out from safe position; do not enter exclusion zone.
Battery type, quantity and condition	Use inventory register and supplier records.
Shutdown/isolation status	Confirm what has been stopped and what remains energised.
Fire systems and water	Identify booster, hydrants, suppression controls and limitations.
Drainage/firewater	Confirm isolation status, containment capacity and outfalls.
Chemicals and hazards	Provide manifest, SDS, process contents and toxic/combustible hazards.
People and neighbours	Confirm accountability, injuries, muster and any off-site notifications.
Machinery/support	Identify forklift/loader, competent operators and quarantine area; use only under DFES direction.

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OPP No 10020 Category Dangerous Goods Facilities (Licensed and less than FESERG level)

Name of Site * RENEWABLE METALS PTY LTD (Registered Business Name)

DFES Last Site Inspection Date * 29 Jun 2018

Status Edited

Administrative Information | Arrival Information/Action | Specific Hazard Information | Operational Information | Site / Floor Plans | Location Map | Other | Building / Site Inspections

Administrative Information

1. Business Details

DFES Region *	Metro North East	District Officer *	DO Swan
Station *	Belmont FRS	Platoon *	B
Nature of Site Operations *	Battery Recycling		
Physical Address *	20 BALLANTYNE ROAD	Suburb *	KEWDALE
Latitude *	-31.98319	Longitude *	115.94054
UBD Street Map Coord *	TBD	Site Administration Email *	info@renewable-metals.com
Telephone Business Hours *	0431 032 914	AH Emerg. Phone *	0431 032 914

Contact ID No 1 *	Mark Urbani	Phone *	0431 032 914	Mobile *	0431 032 914
Contact ID No 2 *	Timothy Hutchins	Phone *	0436 386 645	Mobile *	0436 386 645
SITE Contributor Name (FESGaP Admin Only)	Mark Urbani	Contributor Email (FESGaP Admin Only)	mark.urbani@renewable-met	Contributor Contact Number (FESGaP Admin Only)	0431 032 914

Emergency Control Centre Location *	Ground Floor Administration on Western side of facility		
DFES Content Manager File No. (FESGaP Admin Only)	D36014	DFES BEB File No. *	0000
Dangerous Goods Licence No. *	DGS023246 - Exp 16-10-2030	DWER Licence No. *	Under review
Direct Brigade Alarm Number *	05/065	Key Held by DFES *	No

2. Construction

Site area m2 *	6300		
Roof *	Undefined	Notes	
Floors *	Undefined	Notes	
Walls *	Undefined	Notes	
Stairs *	No		
Floor area 1 *	Eastern shed	area m2 *	1750
Floor area 2 *	Western shed	area m2 *	1250
Floor area 3 *	TBD	area m2 *	TBD
Date of Construction *	TBD		

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3. Guide Review or Site Inspection Intervals

DFES Site Inspection *	Once a year	◉	Twice a year	○	Four times a year	○	Inspection not Required	○

OPP No 10020 Category Dangerous Goods Facilities (Licensed and less than FESERG level)

Name of Site * RENEWABLE METALS PTY LTD (Registered Business Name)

DFES Last Site Inspection Date * 29 Jun 2018

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Administrative Information | Arrival Information/Action | Specific Hazard Information | Operational Information | Site / Floor Plans | Location Map | Other | Building / Site Inspections

Arrival Information/Action

1. Arrival Information/Action Required *

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Suggestions regarding site and conditions
Our site technical expert is Mark Urdani, ensure to contact him on 0431 032 914.

Battery fire:
1. Batteries are majority discharged Li Ion batteries housed in 20ft steel containers.
2. Containers have built in thermal monitoring and sprinkler systems.
3. Unless there is a visible blaze do not add additional fire water to the containers, let fire suppression do its job.

Solvent Extraction Fire:
1. Location inside facility, middle Northern section as shown on plan.
2. Facility has internal sprinkler system that will activate in a fire.
3. Organic solution is combustible, see DG Manifest.
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Name of Site * RENEWABLE METALS PTY LTD (Registered Business Name)

DFES Last Site Inspection Date * 29 Jun 2018

Status Edited

Administrative Information | Arrival Information/Action | Specific Hazard Information | Operational Information | Site / Floor Plans | Location Map | Other | Building / Site Inspections

Specific Hazard Information

1. Assessment (details on the facility that require special attention and/or areas to avoid) *

Lithium Ion batteries whilst less hazardous than lithium metal batteries create heat when damaged and can go into thermal runaway if live. Our lithium Ion batteries are discharged prior to storing, but depending on operations and logistics it is possible that some live batteries will be stored for short periods. At no time will be store more than 65t of lithium ion batteries on site. Each container can hold a maximum of 10 tonnes of batteries which are stored in nally bins. These bins will fill with water once fire suppression is activated assisting with battery cooling.

Our solvent extraction skid contains an organic chemical that is combustible.

Our facility uses sulphuric acid as part of the chemical process.

2. Dangerous Goods and/or Hazardous Materials On Site

Dangerous Goods on Site	UN No (ID No)	Class (Division)	Sub Risk	Pack. Grp.	Licence Quantity	Units	Average Quantity	Units	Location	
Manganese oxide	1479	5.1	NA	II	18	T	18	T	Warehouse racking bulka bags	Edit Delete
98% Sulfuric Acid	1830	8	NA	II	10	T	5	T	Acid distribution	Edit Delete
Lithium Hydroxide Monohydrate	2680	8	NA	II	0.05	T	0.05	T	DG racking	Edit Delete
Ammonia Solution (25%)	2672	8	NA	III	20	T	18	T	DG Storage adjacent crystallisation skid Western end of facility.	Edit Delete
Nickel Sulfate Solution (20%)	3082	9	NA	III	13	T	13	T	In process.	Edit Delete
Lithium-Ion Batteries / black mass	3480	9	NA	NA	60	T	40	T	In process and some storage adjacent shredder module.	Edit Delete
VivasolD80	N/A	C1	NA	NA	5	T	2	T	DG storage racking	Edit Delete
Organic mixture (30% LIX84I / 70% VivasolD 80)	NA	C1	NA	NA	15.8	T	15.8	T	Hydromet Solvent Extraction circuit	Edit Delete

Note: This listing is only for quick reference use by emergency services and does not replace the need for a manifest. For additional information and accurate up to date listing of hazards please refer to the current manifest, which is a mandatory requirement for premises storing/handling/processing dangerous goods/hazardous materials.

3. Safety Data Sheets/Manifest/Hazard Identification (Y or N and/or Location)					
Safety Data Sheets *	Yes	Current At	1/09/2026	Location	Other tab and or HAZMAT box
Emergency services manifest *	Yes	Current At	1/09/2026	Location	Other tab and or HAZMAT box
Gas Detectors *	Yes	Location	Ammonia - Central walkway inside facility and pole mounted at Crystallizer Skid. Hydrogen - Mount		
		Type	Ammonia; Hydrogen		
Wind direction indicator(s) *	No	Location			
Wind intensity measurement *	No	Location			
Placarding *	Yes	Location	At site entry points		
Hazard diamonds *	Yes	Location	At site entry points		

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OPP No	10020	**Category**	Dangerous Goods Facilities (Licensed and less than FESERG level)
Name of Site *	RENEWABLE METALS PTY LTD (Registered Business Name)	**DFES Last Site Inspection Date ***	29 Jun 2018
Status	Edited		

Administrative Information | Arrival Information/Action | Specific Hazard Information | Operational Information | Site / Floor Plans | Location Map | Other | Building / Site Inspections

Operational Information

1. Means of Escape and Staff Numbers

Evacuation Plan Available *	Yes	If No - Why	
		Location	In HAZMAT boxes, online and in hardcopy
Shelter-in-place Refuges *	No	Location	
Staff Evacuation Procedures *	Yes	If No - Why	
		Location of Evacuation Maps	In HAZMAT boxes, online and in hardcopy, presented in site induction
Assembly Areas Identified *	Yes	If No - Why	
		Location	Muster point locations marks with muster point signage. Locations referenced in site induction.
Ground Floor Exits	Yes	Location	Exits are through all roller doors and via front administration. There is an additional emergency exit on

Lift/s *	No	Emergency Lighting *	Yes	CCTV *	No		
Siren/Light *	Yes	Phone *	Yes	Radio *	Yes	PA System *	No

Number of People On-Site:					
Day *	16	Night *	5	Weekends/PublicHolidays *	5

2. Exposures (both on and off site) *

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3. Access

Emergency Access Location *	Main entry gate West and North of facility
Secondary Emergency Vehicle Access *	2 main entries West and North of the facility and also 2 x additional entry points (2nd Northern gate and Eastern
Staging Area *	Northern side entry on Scissons Street off Ballantyne Road. This gives the best access and vantage points.
Aerial Appliance Access *	Drone access is permitted if required.
Aerial Appliance Obstructions *	Nil

4. Security Provision

Staffed 24/7	☑	Guard Dogs	☐	Electric Fence	☐	Security Patrols After Hours	☐
Gates Locked After Hours	☐		☐		☐		☐

5. Site Resources Available in Case of an Emergency

Technical Expert *	Yes	Technical Expert Name	Mark Urbani	Technical Expert Details	Chief Technical Officer Ph: 0431 032 9

Lime (Hydrated)	Qty *	100kg	Location	Acid Distribution (20kg bags)
Dry Sand	Qty *	0	Location	
Other Neutralising Agents	Qty *	1000kg or more	Type	Extover and Cellblock Lithium Battery fire suppressant beads
			Location	DG storage

OPP No 10020 Category Dangerous Goods Facilities (Licensed and less than FESERG level)

Name of Site * RENEWABLE METALS PTY LTD (Registered Business Name)

DFES Last Site Inspection Date * 29 Jun 2018

Status Edited

Administrative Information | Arrival Information/Action | Specific Hazard Information | Operational Information | Site / Floor Plans | Location Map | Other | Building / Site Inspections

Documents

Attachment List

Select files...

- Rename PDF file names appropriately
- Please upload PDF documents only. Each file size must not exceed 50MB
- Example documents to attach, but not limited to :
  - Licences e.g. DG Licence
  - Manifest
  - Emergency Management/Response Plan
  - Evacuation Plan
  - Shut Down Procedure
  - Photographs

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DG_Licence_DGS023246_Renewable_Metals-Exp_16102030.pdf	Download	Delete	
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Works Approval Application Supporting Documentation

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Renewable Metals Pty Ltd

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Prepared For:
Renewable Metals Pty. Ltd.

Prepared by:
Terravias
terravias.com.au

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INTERNAL REVIEW

Author	Reviewed by	Approved by
Zirui Lin	Penny Norman	Dale Newsome
25-Aug-2026	27-Aug-2026	02-Sep-2026

REGISTER OF AMENDMENTS

Date	Version	Status	Prepared	Approved	Issued To
02-Sep-2026	B	FINAL	P Norman	D Newsome	T Hutchins

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1 Introduction

Terravias Pty Ltd (Terravis) have prepared this document to support a Works Approval Application for Renewable Metals Pty Ltd (Renewable Metals) (the proponent). (Appendix A ASIC extracted company details). Works Approvals are regulated by the Department of Water and Environmental Regulations (DWER) under *Part V* of the *Environmental Protection Act 1986* (EP Act)

The proponent is seeking to obtain a Works Approval, under Category 31 – Chemical Manufacturing and Category 47 – Scrap Metal Recovery, as outlined in Schedule 1 of the *Environmental Protection Regulations 1987* (EP Act). This Works Approval is being sought for the operation of a lithium-ion Battery (LiB) recycling refining facility at Lot 813 Ballantyne Road, Kewdale 6105 (the Site) (Figure 1.1). The Site is zoned as 'Industrial' under the City of Belmont (CoB) Local Planning Scheme No. 15 (LSP No. 15) and 'Industrial' under the Metropolitan Regional Scheme (MRS). A Development Application (DA) has been submitted to the CoB on the 30 June 2025, seeking a change of use from 'Industrial' to 'Industry-General' for the Site.

The facility will be the first LiB recycling refining facility (the prescribed premises, see) within Australia. The ultimate capacity of the prescribed premises will allow processing of more than 2,000 tpa of battery waste. See Figure 1.2 for illustrated prescribed premises facility within the Site.

Initial testing of the facility will take place in October 2026 with the installation of a shredder, the shredding of approximately 40-50 tonnes of discharged LiB and a pilot run of the recovery process on the shredded material.

Future installation of a Bale Shredder will take place in January 2027, at which time the capacity of the facility will be 2,000 tonnes.

1.1 Approval Requirements

1.1.1 DWER Works Approval and License

Under s54 and s57 of the EP Act, an application for a Works Approval or licence must be made in a form and in the manner approved by the Chief Executive Officer (CEO). In this regard, Renewable Metals are applying for a Works Approval under Category 31 – Chemical Manufacturing and Category 47 – Scrap Metal Recovery to establish operations at Lot 813 Ballantyne Road, Kewdale 6105. The purpose of a Works Approval is to allow DWER to assess the design and location of proposed works to ensure it is environmental acceptability. DWER applies best practice regulatory principles to all its regulatory functions to support effective and efficient water resource management and environmental regulation, as well as provide a high level of consistency and transparency.

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These principles are:

- Risk Based.
- Evidence based.
- Transparent.
- Collaborative.
- Consistent.
- Responsive.

Information on DWER's Regulatory Best Practice Principles can be found at: www.dwer.wa.gov.au. In addition to the above, DWER provides services to support the statutory functions of the Environmental Protection Authority (EPA), which provides recommendations to the Minister for Environment on matters relating to environmental policy and the environmental impact assessment of significant proposals under Parts III and IV of the EP Act. Construction activities are also considered during the Works Approval assessment process to ensure that construction works of themself do not cause unacceptable environmental impacts.

1.1.2 Referral under s38 of the Environmental Protection Act 1986

Consideration has been given to the potential environmental impacts associated with the proposed construction and operation of the LiB recycling refinery facility and the project is not considered likely to have a significant impact on the environment. On this basis, referral to the EPA under s38 of the EP Act is not required.

As demonstrated in this report, the environmental impacts and risks associated with the LiB recycling refining facility can be adequately addressed through the Works Approval and licencing processes under Part V of the EP Act.

1.1.3 Local Planning Approval

The Site is zoned as 'Industrial' under the City of Belmont's (CoB) Local Planning Scheme No.15 (LPS15), see Appendix B. On 30 June 2025, the proponent submitted a Development Application (DA) to the CoB seeking approvals for a change of use from 'Industrial' to 'Industry-General' zoning to accommodate for the prescribed premises activities within the Site. The DA was approved on 10 November 2025, see Appendix C

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1.1.4 Occupier Status

The Site is owned by Chelton Holdings Pty Ltd as confirmed by the Certificate of Title provided in Appendix D. The proponent has entered into a five-year lease agreement with the Lessor 'Chelton Holdings Pty Ltd as trustee for RG & RJ Hitchins Trust', commencing on 1 July 2025. See Appendix E for official lease agreement.

The lease includes the land and improvements to infrastructure located at Lot 813 (No.20) Ballantyne Road, Kewdale, which are to be used for activities of the prescribed premises. Upon expiry of the initial term, the Lessor has agreed to allow further lease terms of two years, commencing 1 July 2030 with clause for further terms.

The Site has, until recently, been occupied by a cabinet maker.

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Figure 1.1: Site Location

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Figure 1.2: Prescribed Premises

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1.2 Purpose and Structure of this Document

1.2.1 Purpose

This document has been prepared to fulfill the following purpose:

- To provide supporting technical information required for the Works Approval Application to DWER.

1.2.2 Document Structure

Section 1.0 - Introduction Information.

Section 2.0 - Description of the existing environmental features of the Site.

Section 3.0 - Description of the Cultural and Social Environment.

Section 4.0 - Description of operations proposed for the Site.

Section 5.0 - Potential impact and proposed management actions.

Section 6.0 - Risk Assessment.

Section 7.0 - References.

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2 Existing Environment

2.1 Climate

Kewdale experiences a mediterranean climate with hot, dry summers and mild, wet winters. The majority of rainfall occurs in the cooler months of May, June, July and August. Followed by an average six or eight warmer months of low rainfall. The Bureau of Meteorology (BoM) Perth Airport recording station (ID 009021) provides the closest long term weather data for the Site (1991 to 2021). Mean daily maximum temperatures ranges from 25.1^{O}C in February to 13.35^{O}C in August (BoM, 2025). See summary of daily temperature statistics below in Table 2.1 and Plate 2.1.

The mean annual rainfall is 699 mm. Rainfall primarily falls during the months of May, June, July, August and September, with over 66.8 % of annual mean rainfall occurring during these months (BoM, 2025). Mean monthly rainfall ranges between 15.8 mm in January to 174 mm in July. The highest recorded monthly rainfall total for the station is 250.2 mm (BoM, 2025). See summary of monthly rainfall statistics below in **Error! Reference source not found.** and Plate 2.1.

Table 2.1: Mean Daily and Maximum Temperatures © Statistical Summary (1991-2020)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean (°C)	24.95	25.1	23.2	19.95	16.5	14.25	13.35	13.7	14.85	17.25	20.2	22.95
Maximum (°C)	32.3	32.4	30.1	26.4	22.4	19.5	18.5	19.1	20.6	23.7	27	30.2
Minimum (°C)	17.6	17.8	16.3	13.5	10.6	9	8.2	8.3	9.1	10.8	13.4	15.7

Table 2.2:Monthly Rainfall (mm) Statistics Summary (1991-2020)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean (mm)	15.8	16.6	17.9	30.7	81.4	123.9	139.6	122.1	78.9	33.6	28.9	9.6
Highest (mm)	102.4	150.4	60.4	135	153.2	250.2	217.6	193.2	172.4	87.2	88.8	67.4
Lowest (mm)	0	0	0	0	12.4	23	30.6	19	27.8	4	1.8	0

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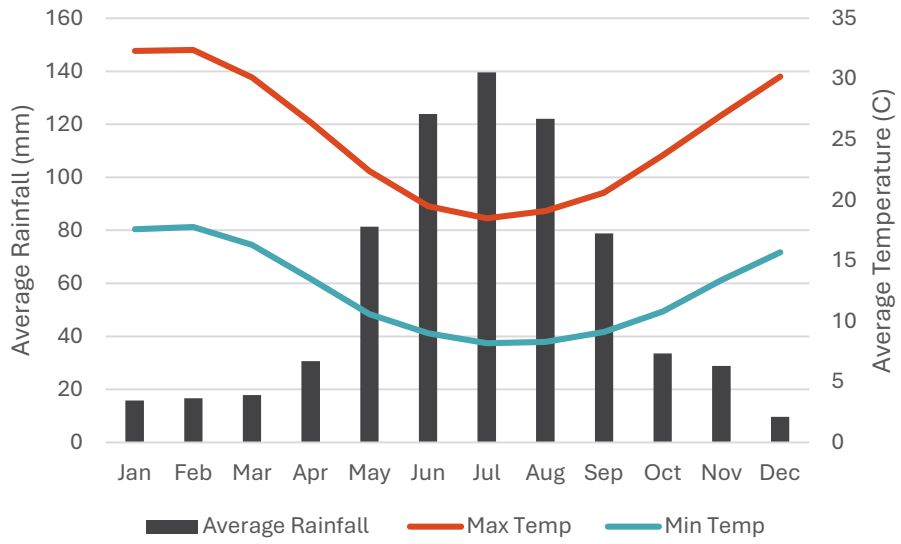


Plate 2.1: Mean Monthly Rainfall and Temperature for Perth Airport Station (ID 009021)

2.2 Topography, Soils and Geography

2.2.1 Topography

Based on the Department of Primary Industries and Regional Development (DPIRD) two metre elevation dataset (DPIRD-072), the ground elevation of the Site ranges from 14 m to 16 m in the north-western portion with a slight decreasing slope towards the south-west boundary of 12 m towards the designated stormwater drainage along Bell Street.

2.2.2 Soil

Soil Landscape Mapping - Zone (DPIRD - 017) by DPIRD indicates that the Site is within the EnvGeol S10 Phases of the Pinjarra Zone within the Pinjarra System (described below):

- EnvGeol S10 Phases: Sand as S8 as relatively thin veneer over sandy clay to clayey sand. Of eolian origin.
- Pinjarra Zone: Alluvial deposits (early Pleistocene to Recent) between the Bassendean Dunes Zone and the Darling Scarp, colluvial and shelf deposits adjacent to the Darling Scarp. Clayey to sandy alluvial soils with wet areas.
- Pinjarra System: Poorly drained coastal plain with variable alluvial and aeolian soils.

2.2.3 Acid Sulfate Soil

Mapping by DWER (DWER-050) indicates moderate to low risk of Acid Sulfate Soils (ASS) within 3 m of natural soils surface or beyond 3 m of natural surface.

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2.3 Hydrology

According to DWER Hydrography linear (DWER-031) dataset, the Site is not intersecting with any nearby surface water features or drainage features. The nearest drainage feature is 'Basin 616 - Minor Trib' which is 15 m south-east on Bell Street south of the Site.

DWER Hydrology Catchment Tool (DWER-027) indicates that the site is within the Swan Coastal Basic catchment (Basin No.616), and within the Perth South Confined Groundwater Subareas (DWER-083) of CoB.

The Site is not located within or near any Public Drinking Water Resource Areas (PDWSA) (DWER-033). The closest PDWSA is the Middle Helena Catchment Area, located approximately 11.4 km east of the Site.

2.4 Vegetation, Flora and Fauna

No clearing or remnant revegetation has been identified as a requirement within the Site. Vegetation, Flora and Fauna have been considered in the context of the values surrounding the infrastructure and are not considered to be occurring within 500 m of these areas or impacted as part of the development.

2.5 Surrounding Land Uses

2.5.1 Agricultural Land Uses

There is no known agricultural land use near the Site.

2.5.2 Industrial Land Uses

The Site is zoned ''Industrial' under the CoB's LPS15 and 'Industrial' under the MRS.

2.5.3 Sensitive Land Uses

The Site is not located within any Environmentally Sensitive Area (ESA) (DWER-046). The Site has been completely cleared since 1965. The nearest ESA is approximately 615 m north-west of the Site and the land 170 m to the north of the Site is zoned residential (Figure 2.1).

2.6 Site Contamination

A search of publicly available Contaminated Sites Database (DWER-059) was undertaken in August 2025. The Site is not registered as a contaminated site. The closest contaminated site is located approximately 300 m east of the Site (ID 55522), currently classified as 'Remediated for Restricted Use'.

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2.7 Historical Land Use

Historical aerial photographs (Landgate, 2025) of the Site and its surrounds were reviewed as part of the assessment as detailed below:

- 1953 - The Site was a natural drainage basin and contained water.
- 1965 - The entire Site was completely cleared of native vegetation.
- 1970 - The Site was filled and capped with asphalt for industrial use.
- 1974 - Infrastructure was built and vegetation was planted in the north-west entrance.
- 1974 to Present - Currently used for industrial purposes.

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Figure 2.1: Sensitive Receptors

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3 Cultural and Social Environment

3.1 Cultural Heritage

3.1.1 Aboriginal Heritage

A search of the Aboriginal Heritage Inquiry System (AHIS) indicates that no registered sites are located within the Site. The nearest Aboriginal Heritage place is located 890 m west of the Site - KEW STREET (ID 4042) and is identified as an Artefact place.

3.1.2 Heritage Listed Sites

The Site does not intersect any heritage listed sites (DPLH - 090). The closest heritage site is located 590 m northwest of the Site listed as 'Tomato Lake (ID 25897).

3.2 Local Communities

The Site is located in the CoB within an area zoned 'Industrial' under LPS15. Land use in this area has been used in an industrial capacity since the 1970s. Land use in the immediate area surrounding the Site is compatible with operations on the Site. The nearest residential lots are located 170 m from the Site, north of Leach Highway.

3.3 Consultation

During the development application process with the CoB it was considered that public consultation would not be required as the proposed facility aligns with operations that typically occur within an 'Industry-General' zoning.

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4 Proposed Development

4.1 Workforce and Hours of Operation

Renewable Metals employ internal staff to operate the facility. The proposed hours of operation of the facility are 24 hours a day, seven days a week for 365 days per year.

Operation of the facility is proposed to be structured across two 12-hour shifts, commencing 6:30 am and 6:30 pm. Facility maintenance is proposed to occur Monday to Saturday between 7:00 am and 5:00 pm.

4.2 Proposed Site Layout and Infrastructure Modifications

The entire Site is 6,855 m^2 in total and is split into three primary processing areas, see Figure 4.1.

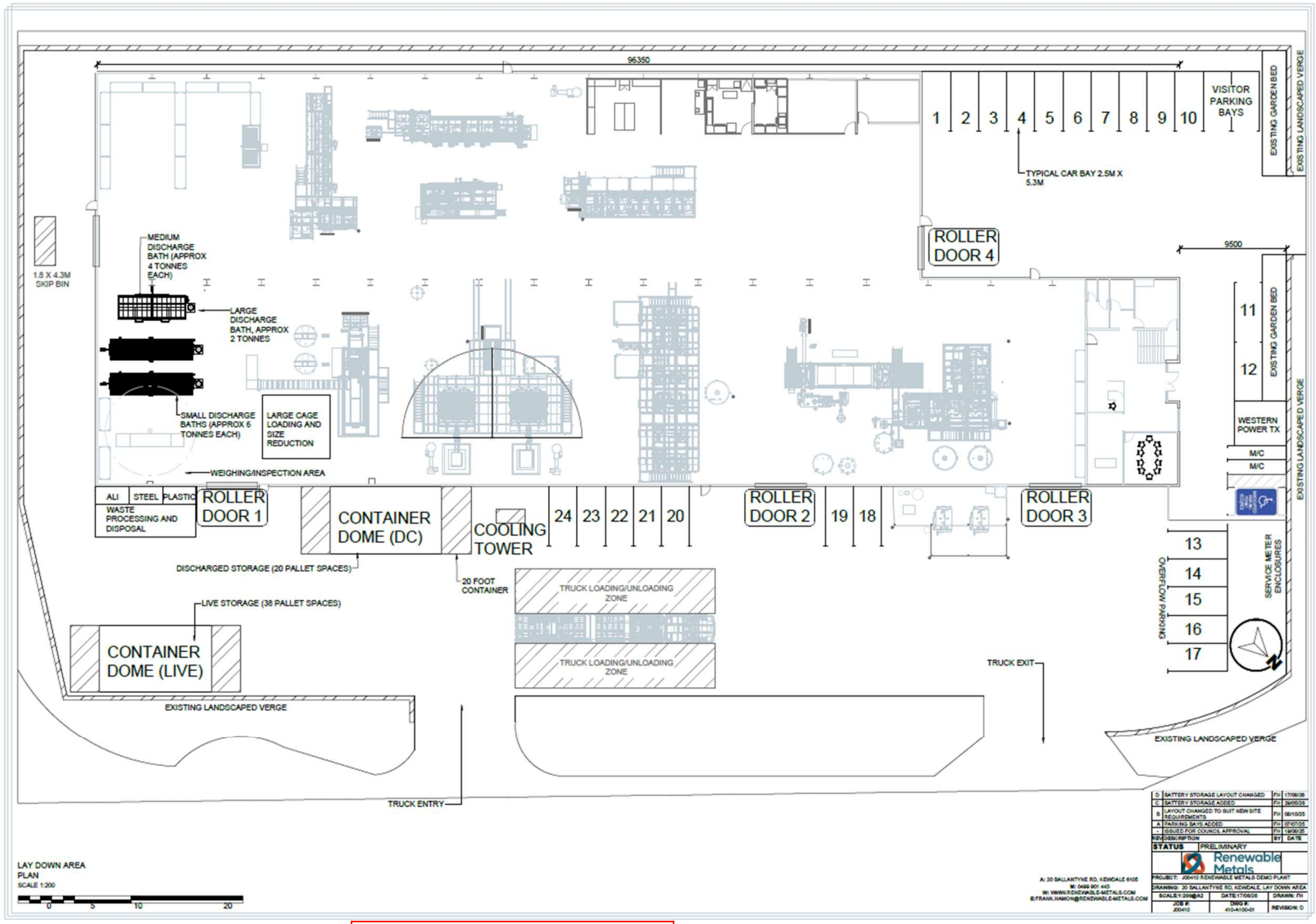
The current existing infrastructure is subjected to development modification to facilitate the activities of the prescribed premises, full detail of site works is listed in the DA application (Appendix C). See Table 4.1 below for condensed list of existing infrastructure of the proposed recycling facility and list of additional infrastructure required within the Site.

Table 4.1: Infrastructure Operational Requirements within the Site

Construction	Infrastructure
Existing Constructions	Warehouse
	Industrial floor area
	Workshop (2 bays)
	Onsite car parking
	Office and amenities
	Concrete hardstand available for access, site circulation, delivery and storage
Additional Modifications	Constructions of 'Lean-to' structure to be erected adjacent to the eastern façade of existing warehouse to accommodate machinery
	4 x 20 ft sea containers are to be positioned on site for the purpose of storage of materials.
	Revision to line marking of onsite parking bays to provide a total of 29 bays; inclusive of 21 staff bays, one universal access bay, two visitor bays and five overflow parking bays
	6 x exhaust stacks proposed to extrude from the roof of the warehouse by approximately 2m above the existing roof line.

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Figure 4.1: Laydown Area Plan – Broad Processing Areas



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4.2.1 Power Supply

Approximately 80 % of the facility will be powered by electricity from the grid, supplied by Western Power, with approximately 20 % of the facility relying on electricity generated from diesel generators (500kVA) located adjacent to the boiler area.

No fuel will be stored within the Site as an external contractor will manage the operation and refuelling of the generators on a schedule to be finalised with the Proponent.

4.2.2 Cost of Works

Fees relate to the cost of works including all capital costs (inclusive of GST) associated with the construction and establishment of the works proposed under the works approval application shown in Table 4.2.

Table 4.2: Cost of Works

Item	Cost Estimate
Commercial shredder package form ENCO	$1.2M
Chemical discharge baths	$0.1M
Power upgrades or installation of generator	$0.65M
Structural engineering review and site modifications (i.e. concrete reinforcing) for structural support if required.	$0.05M
Labour associated with installation of commercial shredder and decommissioning of the demonstration scale shredder.	$0.3M
Total	**$2.3M**

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4.3 Process Description and Components - Lithium-ion-Battery (LiB) Refining Facility

The Lithium-ion Battery (LiB) recycling refining facility uses a unique alkali process to refine critical minerals from lithium-ion battery waste such as recovering more than 95% of lithium, nickel, cobalt, copper and manganese metals without producing sodium sulfate as a chemically precipitated by-product. The facility will process >2,000 tonnes per annum (tpa) of battery waste, primarily end-of-life (EoL) batteries which are shredded before hydrometallurgical recovery of critical metals. Feedstock may also include production scrap, black mass and mixed hydroxide precipitate (from ores, not batteries).

The operational process description is listed below, see process flow charts in Figure 4.2 and Figure 4.3.

4.3.1 Process Description

4.3.1.1 Chemical Discharge

On arrival at the Site EoL batteries will be discharged in chemical discharge baths which contain salt solution that enables rapid discharge of the batteries. The submersion of batteries eliminates residual charge and reduces fire/explosion risks.

4.3.1.2 Shredding Process

EoL batteries will be prepared for hydrometallurgical processing via size reduction. This is currently carried out in a primary and secondary shredder followed by hammer crushing, before being screened. Water sprays are used in the shredders and hammer crusher to minimise the risk of fire. Off-gas from the shredding plant is collected via a wet scrubbing system, with gas composition monitoring, prior to discharge via a roof stack. The entire shredding plant is contained by an external bund with an impermeable floor and sealed drainage. Bunding is sloped with contained drainage points enabling any spills to be directed to a suitable area for recovery.

4.3.1.3 Primary Leach Stage

Both fine and coarse shredded material are transferred to the primary leach circuit. This circuit involves alkaline leaching in an ammonia and ammonium sulfate solution. Elemental copper and nickel, cobalt, lithium and manganese contained in Nickel, Manganese Cobalt (NMC) and Lithium Cobalt Oxide (LCO) batteries are extracted into the leach liquor.

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4.3.1.4 Second Leach Stage

The primary leach slurry is screened and the coarse fraction (coarse residue) is washed then discharged to a bunker. The fine fraction, which contains nickel and lithium associated with NCA and LFP batteries, is directed to the secondary leach stage. This circuit involves aeration and heating to extract lithium from LFP batteries and mild acid leaching to extra residual nickel. The leach slurry is pressure filtered to separate the leach residue from the leach liquor. The residue is washed and directed to a bunker.

4.3.1.5 Manganese Oxidation Circuit

Leach liquors from the leach stages are combined and directed to the manganese precipitation circuit where it is oxidised to precipitate manganese oxide via the addition of air. The slurry is filtered, and the filter cake (manganese product) is washed, then collected in bulk bags.

4.3.1.6 Solvent Extraction Stage

The manganese free liquor is directed to the solvent extraction circuit where nickel and copper are extracted and separated from other components in the leach liquor. Nickel and copper are recovered from the circuit as separate concentrated nickel sulfate and copper sulfate solutions.

4.3.1.7 Copper Electrowinning Plant

The copper sulfate solution is directed to the copper electrowinning plant. Copper is plated at the cathode and acid is generated at the anode which reports to the anolyte. The anolyte returns to the solvent extraction stage to recover more copper. The result of this stage is copper recovered as London Metal Exchange (LME) grade copper cathode.

4.3.1.8 Nickel Electrowinning Plant

The nickel sulfate liquor is directed to a nickel electrowinning plant. Nickel is plated at the cathode and acid is generated at the anode. Acid reports to the anolyte and is directed back to the solvent extraction stage to recover more nickel. The result of this stage is nickel recovered as LME grade nickel cathode.

4.3.1.9 Ammonia Recovery

The solvent extraction raffinate contains cobalt and lithium. Part of this liquor is used in the primary leach circuit. The remainder is subject to steam stripped in which ammonia is evaporated from the liquor. The ammonia in the off-gas is passed through a condenser and is recovered as ammonia solution for re-use in the leach circuit.

4.3.1.10 Evaporative Crystallisation

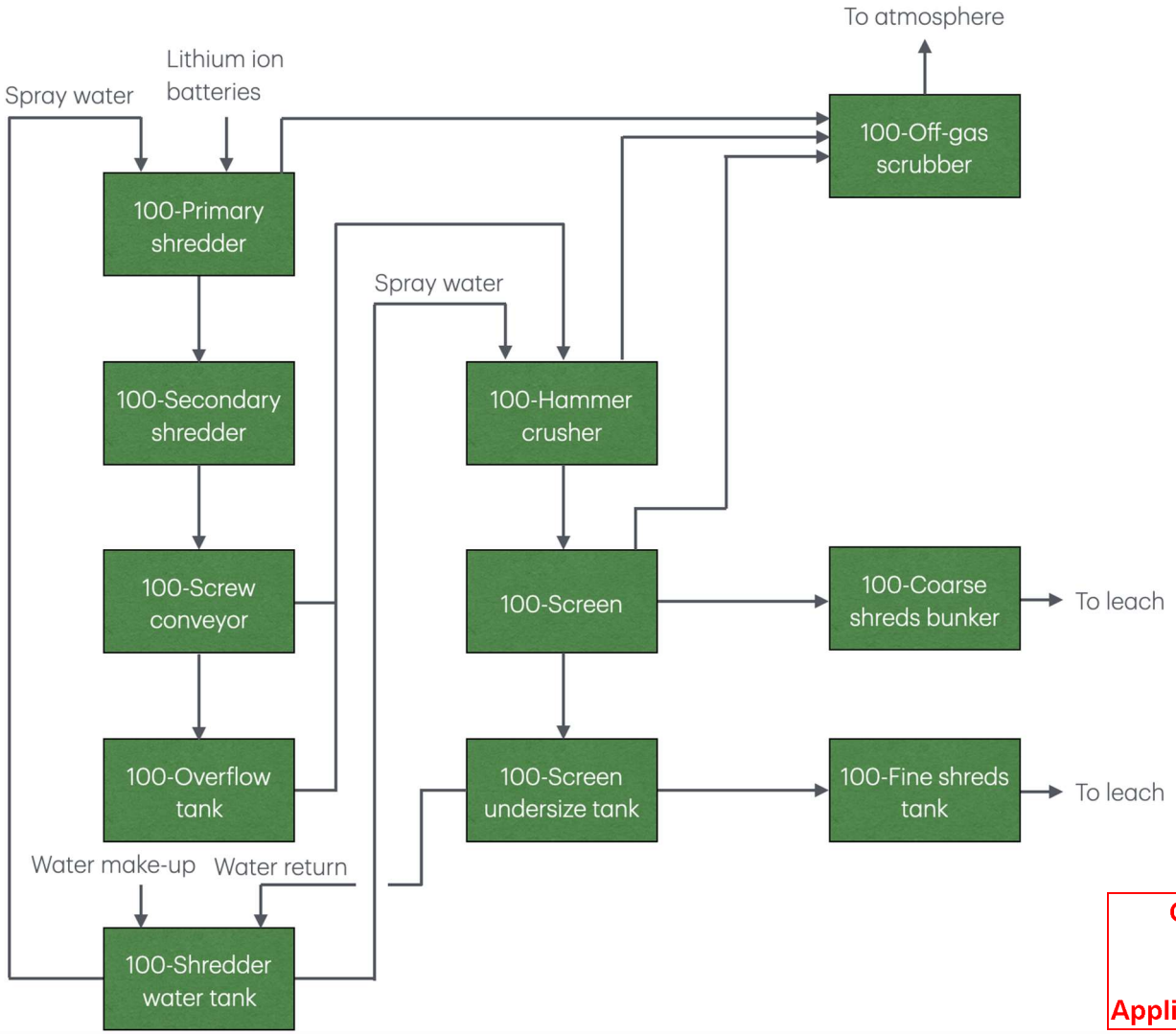
The ammonia free solution is directed to an evaporative crystalliser. The liquor is heated and put under a vacuum. This allows water to evaporate and force the crystallisation of lithium cobalt ammonium sulfate. The off gas is collected in the condenser and the condensate is re-used in the process. The slurry is transferred to a centrifuge that separates the product from the remaining liquor.

4.3.1.11 Calcination

The lithium cobalt ammonium sulfate product recovered from the crystalliser is processed through a kiln. The kiln operates at >500°C and decomposes ammonium sulfate to nitrogen and sulphur containing off-gasses. The off-gasses are collected and condensed to recover ammonium sulfate for re-use in the process. The lithium cobalt sulfate solid product is cooled then bagged.

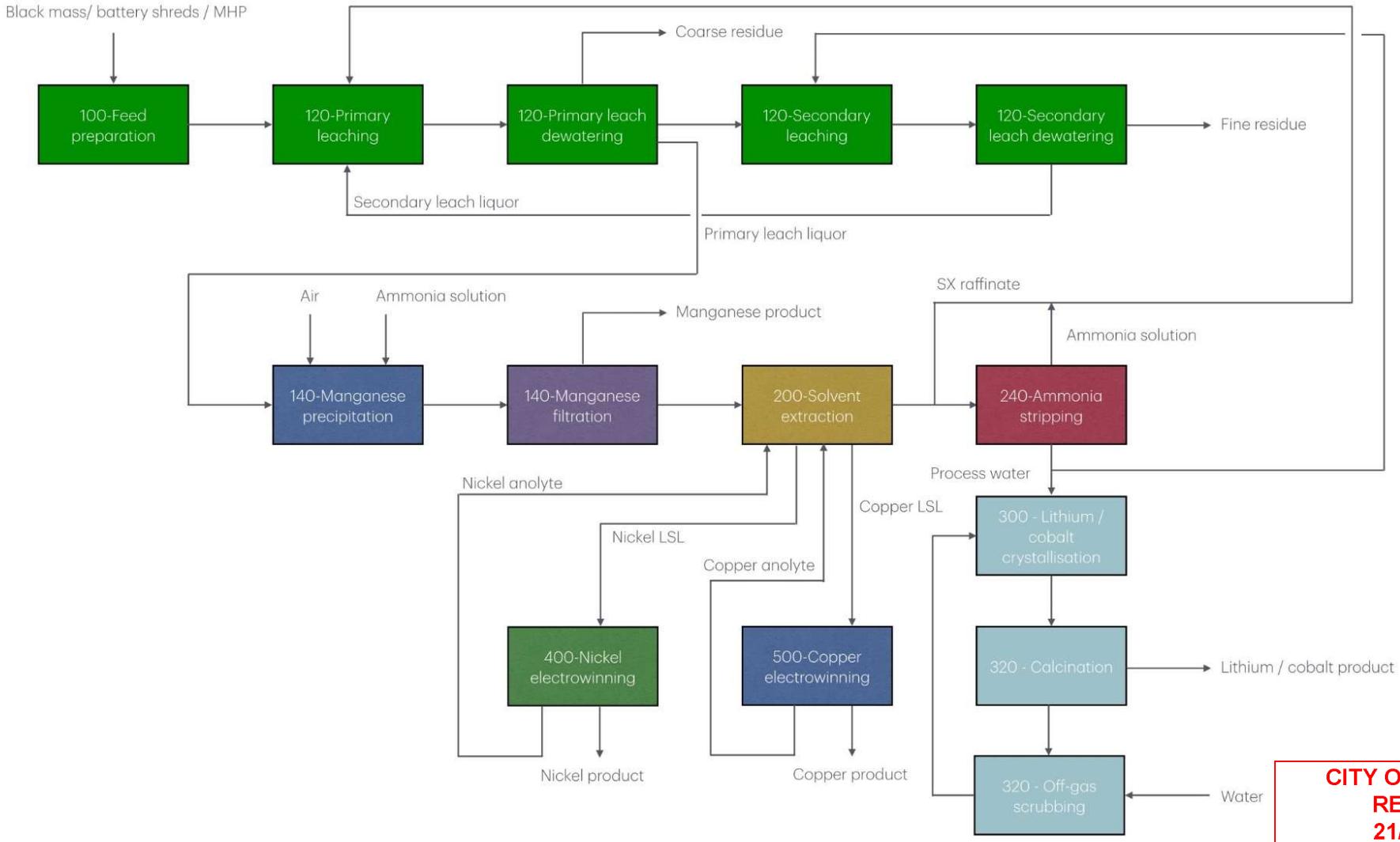
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Figure 4.2: Detailed Process Flow Chart - Shredder



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Figure 4.3: Detailed Process Flow Chart – Prescribed Premises



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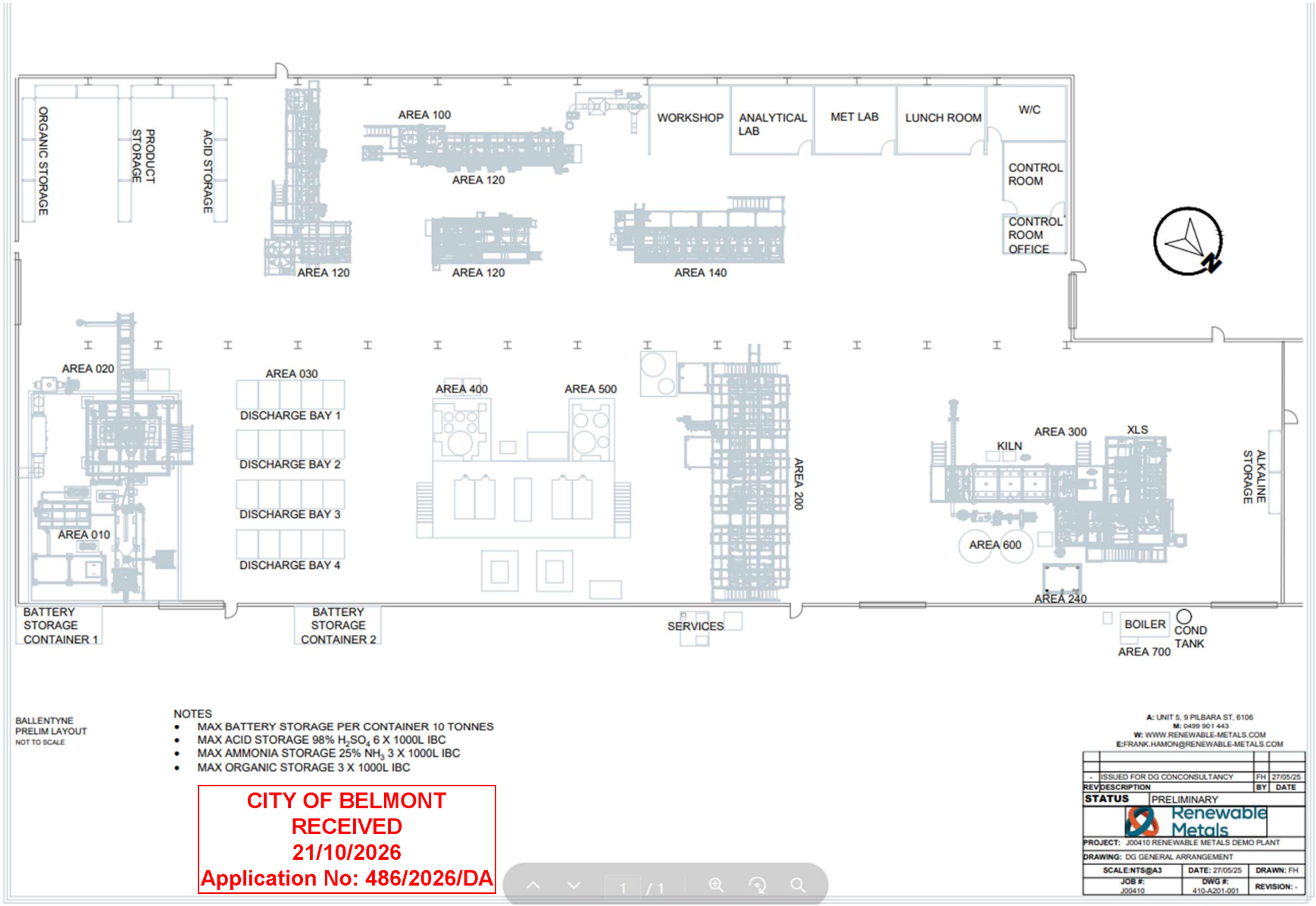
4.4 Facility Equipment, Machinery and Infrastructure Requirements

The machinery and equipment of the LiB recycling refining facility at each processing stage is shown in Figure 4.4 below, with detailed equipment of each area listed in Appendix F

The equipment process design criteria are described in Appendix G.

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Figure 4.4: Site Layout – Equipment Areas



4.5 Process Input and Process Output (End Use)

The facility is proposed to receive and process >2,000 tpa of EoL batteries. The detailed input products and output product's mass calculation are attached in Appendix H.

The input material's projected recovery by the facility is shown in Table 4.3 below.

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Table 4.3: Types, Quantities and Classification of Materials to be Received by and Recovered by Lithium-ion Battery Refining Facility

Type of material received and processed	Waste Classification	Annual Tonnage Projection	Recovered Material	Annual Recovery Projection (tonnes)	% of Total Recovered	Storage Information	End Use
Range of lithium batteries (NMC111, NMC622, LCO, NCA & LFP).	Hazardous Waste	>2000	Lithium cobalt salt (solid)	460	95	All recovered materials will be stored in the warehouse 1.	Further refinement to create input material for new battery manufacturing
			Nickel sulphate (solid)	0	0		Further refinement to create input material for new battery manufacturing
			Nickel plated (solid)	100	95		Stainless steel production
			Copper plated (solid)	200	95		For re-use in electrical and battery components
			Manganese oxide (solid)	123	95		Raw material input for stainless steel production
			Recovered plastic, aluminium and graphite (solid)	273	0		Additional analysis being done to determine if recovered plastic, aluminium and graphite can be recycled
TOTAL amount of waste received and processed (tonnes)							2000
TOTAL amount of waste recovered (tonnes)							883
TOTAL amount of solid waste disposed (tonnes)							1273
TOTAL amount of organic liquid waste disposed (tonnes)							0
Overall valuable metal recovery rate							95%*

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* These figures are based on 2000 tpa throughput post commissioning of the pack shredder in 2027 the initial 980 tpa will be roughly 50% of the amounts listed

* Due to the battery recycling process being a chemical process, although 95% of the valuable metals are recovered, this does not equate to 95% of the battery being recycled.

4.5.1 Input - Dangerous Goods

The following dangerous goods will be received at the facility for use in processing the LiB waste:

- Sulfuric acid (98%) – 7x 1000L IBC's delivered via truck.
- Ammonia solution (25%) – 3x 1000L IBC's delivered via truck.

Approximately seven (7) Intermediate Bulk Containers (IBC) of sulfuric acid and three (3) IBC of ammonia solution will be delivered to the site per week. The sulfuric acid IBCs will be stored in the acid storage area prior to being used in Area 120, Area 400 and Area 500. The ammonia solution IBCs will be stored in the alkaline storage area prior to being used in Area 240. Empty IBC containers will be picked up and either refilled or reused.

4.6 Construction Phase

The prescribed premises will require the construction additional infrastructure listed in Table 4.4 to accommodate machinery and facility processes. The planned additional infrastructure was lodged within the DA attached in Appendix C along with design layouts.

A Construction Management Plan is currently being developed and will be referable prior to construction activities, attached in Appendix I.

Table 4.4: Construction Details of Additional Infrastructure within the Site

Construction	Infrastructure
Additional Infrastructure	Construction of 'Lean-to' structure to be erected adjacent to the eastern façade of existing warehouse to accommodate machinery
	4 x 20 ft sea containers are to be positioned on site for the purpose of storage of materials.
	Revision to line marking of onsite parking bays to provide a total of 29 bays; inclusive of 21 staff bays, one universal access bay, two visitor bays and five overflow parking bays
	6 x exhaust stacks proposed to extrude from the roof of the warehouse by approximately 2 m above the existing roof line.

For the internal LiB refining facility, the processing equipment that is planned to be installed is listed in Table 4.5 below.

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Table 4.5: Construction Details of Processing Equipment

Equipment to be Installed	Construction and Installation Details
Commercial Shredder	The commercial shredder which will be received as modular form in several sea containers. The shredder then will be constructed and installed within the Site. New pipework will be stationed to allow connection between the commercial shredder and primary leach tanks.
Off-gas system for commercial shredder	Installation of a wet scrubber and off-gas stack. The stack will consist of gas detectors (HF and TVOC) and alarms.
Diesel generator	Installation of one 500kVA diesel generator in Area 700 (Appendix F) according to specified assembly instructions.
Chemical discharge baths	Installation of up to 20 chemical baths. Tanks will be designed and installed to Australian Standards - 1405-60171 Hazard Study (HAZOP)
Integration of shredder control system	Installation of shredder operation control system to allow viewing of operating conditions and any deviations to set targets.

4.6.1 Timing of Construction

The proposed construction will begin mid 2026 with completion expected end of 2026. The facility is expected to be operational as soon as the commercial shredder is constructed.

4.7 Commissioning Phase

Once the facilities infrastructure construction and installation of specialised equipment and key components are assembled, the facility will begin commissioning using power generated from the diesel generators on Site. It should be noted that LiB refining production will not be performed during the commissioning phase.

Renewable Metals will ensure that all steps to production, such as chemical testing, equipment calibration, process testing and regulatory compliance checks are undertaken. Once all systems are validated, operators must undergo required training and safety inductions prior to beginning production.

4.8 Operation Phase

Standard operational hours of the LiB refining facility will be between the following hours:

- Monday to Sunday: 24 hours a day, 7 days per week.

The facility is proposed to occur across two 12-hour shifts, one beginning at 6:30am and the other at 6:30pm. Maintenance of the facility is proposed to occur between Monday to Saturday between 7am to 5pm.

Deliveries are expected to be received Monday to Friday between 7am to 5pm.

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4.9 Complaints Management

Any feedback or complaints from the community and other stakeholders will be recorded by completing a feedback and complaints record form. Any feedback will be reviewed within five workdays and management will reply, preferably using the same mode of communication as the comment was received. The Site Manager will decide if provided feedback requires immediate action and implementation or if a different timeframe will be sufficient. Where necessary, the CoB and the associated State departments will be notified.

4.10 Records

A document distribution list/matrix will be developed and agreed by relevant management groups to ensure all interested parties receive all necessary controlled documents. Documentation and data shall be maintained to ensure that:

- They can be readily located.
- They are periodically reviewed for their adequacy by competent personnel and revised as necessary. Current versions of relevant documents and data are available to project personnel.
- Obsolete documents and data are promptly removed from all points of issue and points of use or otherwise assured against unintended use.
- Archival documents and data retained for legal or knowledge preservation purposes or both, are suitably identified.
- Environmental Management System (EMS) conforms to ISO 14001(environmental), ISO 45001(safety) and ISO 9001(quality).

Documents that are subject to control include the following listed in Table 4.6Table 4.6 below.

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Table 4.6: Record Management Requirements for Prescribed Premises

Record Types	Records Include
Regulatory and Compliance	• Environmental Approvals and Permits (air, water waste, hazardous substances). • Dangerous goods and hazardous waste licenses. • Safety Data Sheets (SDS) for all chemicals within prescribed premises. • Compliance audits and inspection reports. • Emissions monitoring records. • Waste tracking documentation.
Operational	• Site manifest and site plan to be developed and kept up to date. • Battery records (source and type). • Storage quantities and locations. • Product process logs. • Recovery rates. • Product destinations.
Operational Health and Safety (OHS)	• ISO 45001 standards. • Training and retraining records. • Drill records.
Maintenance and Equipment	• Equipment testing and inspection logs. • Equipment certifications. • Maintenance schedules and completion records. • Calibration records for monitoring equipment. • Equipment failure reports and corrective actions.
Environmental Emissions	• Energy and water consumption logs. • Aerosol emissions data. • Waste segregation and recycling records. • Residual disposal records. • Noise and dust monitoring results.
Quality Assurance and Contain of Custody	• Certificate of analysis for recovered products. • Batch testing results. • Chain of custody documents.

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4.10.1 Emergency Incident Management

An emergency management plan will be included within the Site Management Plan for the Site and communicated to all staff and personnel. Site Management Plan is attached in Appendix I.

Environmental emergency response is intrinsically linked to health and safety, as major environmental incidents often result in significant health and safety issues.

Emergency incidents include the following:

- Uncontrolled transport incidents (chemical and material handling).
- Ignition of chemicals or flammable gases.
- Electrical faults in high-temperature equipment.
- Discharge of uncontrolled fill, sediment, or water on or offsite.
- Fuel spill.
- Chemical overflow, spills or leaks.

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5 Potential Impacts and Proposed Mitigation

5.1 Construction Phase

Construction of the LiB refining facility will comprise of the following sequence of activities:

- Surveyor to mark out boundaries for construction of 'lean-to' building and set down of 'battery storage containers'.
- Identify and record the location of any existing services both above and below ground and establishment of temporary fencing and safety controls.
- Establish temporary access roadway, worker parking area, set-down area, trunk turning area, crane manoeuvring areas.
- Construction of the lean-to building structure including framework, roofing, cladding, interior and integration with existing infrastructure.
- Installation of processing plant equipment and machinery.
- Connection of utilities and essential services (power, lighting, fire detection, fire suppression, gas sensors, ventilation systems, access control and spill containment etc).

See Appendix I for Construction Management Plan.

5.1.1.1 Fencing, Access and Traffic Management

To ensure and maintain public safety, the contractor will ensure that the construction site is appropriately restricted to the public at all times during construction. This will include the installation of physical barriers such as temporary fencing around the worksite to stop pedestrians from walking into the site. Signage will also be erected on site fencing in clear view to inform the public with a message of ‘Construction Site – Keep Out’ or similar.

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All traffic related actions will adhere to the traffic and parking impact assessment attached in Appendix J, which outlines the following considerations:

- Details of the road transport routes and access to the Site.
- Road traffic predictions for the development during construction and operation.
- Swept path diagrams depicting vehicles entering, exiting and manoeuvring within the Site.
- A quantitative assessment of impacts to the safety and function of the road network and the details of any road upgrades for the development if necessary.
- Details of the proposed traffic management system to be used during construction and operation to avoid parking or queuing of trucks on the public road network.

Additionally, the contractor will supply, install and maintain regulatory, warning and advisory signage at the Site. The signage will include:

- Construction warning signs.
- Directional signs.
- Traffic management signs.

All installed signage will be maintained for the duration of the works.

5.1.1.2 Construction Noise and Vibration

During construction, the contractor will ensure that all machinery, equipment, plant and vehicles proposed to be used during any construction works shall comply with Worksafe Western Australia requirements for noise abatement. The operation of such machinery, equipment, plant and vehicles shall be certified to be within the limits of the following:

- DWER Draft Guideline on Environmental Noise for Prescribed Premises 2016 (DoER,2016).
- Environmental Protection (Noise) Regulations 1997.
- Environmental noise practices set out in Sections of AS 2436-2010: Guide to Noise and Vibration Control on Construction, Maintenance and Demolition Sites.
- CoB Construction Noise Guideline which refers to Section 6 of AS 2436-2010.

To further minimise potential impacts due to noise emissions, construction activities will only occur during daylight hours.

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5.1.1.3 Construction Waste Management

Waste generated onsite will be either transported directly offsite, placed in a dedicated skip bin, or stockpiled on a designated location approved by the Site Manager for future disposals. Waste shall be stored within fenced areas that are located as far away as practicable from drainage lines to prevent input of debris, fill, rubbish, and other deleterious material into the stormwater system.

The contractor will ensure all waste produced during the project is managed to minimise impacts on the environment and personnel. All personnel will adhere to good housekeeping standards and general waste, and recyclable waste will be segregated onsite in clearly marked waste bins that are covered and managed to minimise odours and pests.

Areas occupied by the project will be left free of waste materials at the completion of construction works. Renewable Metals will ensure that all liquid and solid waste materials generated and/or stored at the site shall not have any adverse impacts upon the surrounding environment. Renewable Metals will ensure that all waste materials generated during construction are disposed of regularly at licensed waste disposal facilities meeting regulatory requirements.

5.2 Commissioning Phase

Commissioning phase of the LiB refining facility will comprise of the following sequence of activities:

- Review construction and installations are completed according to design specifications and relevant guidelines.
- Inspection and testing of utilities, essential services, fire suppression, drainage, effluent, ventilation and fume extraction systems are connected and functional.
- Calibration and functional testing of safety and monitoring equipment.
- Inspection of storage containers to confirm structural integrity, temperature stability and dire safety performance.
- Review and approval of safety documentation, including updated emergency response procedures and risk assessments.
- Validation of record-keeping systems and compliance reporting.
- Development of operating procedures and modification record keeping system.
- Training and induction of facility staff in safety procedures, emergency response protocols, environmental risk protocols and quality control measures.

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5.2.1.1 Storage of Dangerous Goods

Renewable Metals previously engaged Inherent Safety Group Pty Ltd in June of 2025 for a Dangerous Goods compliance review of the prescribed premises, to demonstrate the facility can be safely operated in compliance with the regulations and acceptable risk to people, property and the environment. The full report is attached in Appendix K

The assessment identified the dangerous goods storage and handling conditions within the prescribed premises to be requiring a Dangerous Goods Site License under the *Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulation 2007* with the Department of Energy, Mining, Industry Regulation and Safety (DEMIRS). The licence was issued in April 2024 and is valid till 16 October 2030 (Appendix K)

The dangerous goods risk assessment evaluated the following of the prescribed premises:

- Hazardous chemicals or dangerous goods stored on site.
- Details of the storage and handling of flammable and combustible liquids
- Review of SDS for hazards arising from properties
- Hazard identification and additional controls required for the identified hazards.
- Risk assessment and risk management processes of the prescribed premises.
- Compliance check against risk control measures specified in DGS (Storage and Handling) regulations 2007 with actionable items
- Australian Standard Risk Control Action Summary.
- Dangerous goods compliance check to AS 1940-2017 The Storage and Handling of Flammable and Combustible Liquids and AS/NZS4681-2000 The Storage and Handling of Class 9 (Miscellaneous) Dangerous Goods and Articles.

The assessment determined that the storage and handling systems at the prescribed premises are fully compliant with the approved code of practice. No unusual hazards were identified, and no alternative safety measures outside the scope of the approved code were applied.

Renewable Metals will action all identified actionable items prior to the operation of the facility.

5.2.1.2 Waste Stockpiling

Disposal of waste deriving from construction debris, packaging and chemical storing materials must be separated into hazardous and non-hazardous categories. Waste stockpiling must follow regulations by the DMIRS *Dangerous Good Safety (Storage and Handling of Non-Explosives) Regulations 2007* (DMIRS, 2019).

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5.2.1.3 Traffic and Transportation

The operation of the prescribed premises is not expected to increase the heavy traffic volumes significantly along the local and regional road systems. Refer to Appendix J for the traffic and parking impact assessment that was undertaken for the Site.

It is estimated that, at maximum processing capacity, only 1 heavy vehicles (19 m semi-trailers) will access the facility per week to deliver a LiB shreds, or to dispatch recovered materials from battery recycling. Dispatch of recovered materials will occur Monday to Friday 7am to 5pm.

Prior to operation, traffic flow diagrams depicting vehicle entry, exit and on-site manoeuvring will be installed in highly visible locations at the site entrance to guide traffic movement.

5.2.1.4 Hazards and Fire Risks

The presence of battery waste within the prescribed premises presents as a fire risk. A detailed Fire Prevention and Emergency Management Plan prepared for the Department of Fire and Emergency Serviced (DFES) (Appenxix K) demonstrates compliance against Guidance Note GN04.

A fire services sprinkler system is installed within the prescribed premises (Figure 5.1). See Appendix L and Appendix M for certificate of design compliance for all sprinklers, hose reels and hydrant systems within the prescribed premises and assessment details.

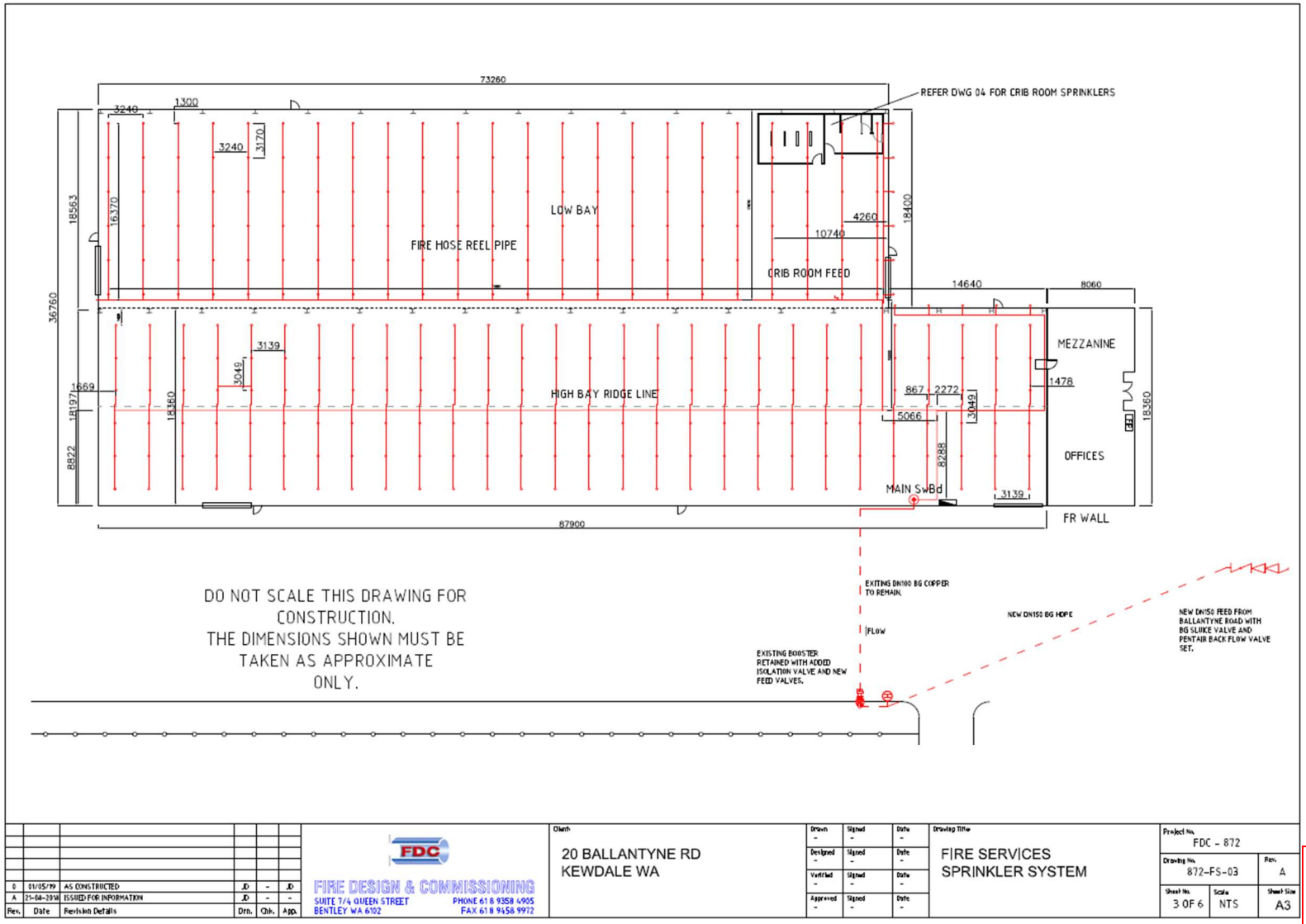
Fire protection requirements for the prescribed premises will be implemented in conjunction with DWER and fire authority DFES (Department of Fire Emergency and Services) advice prior to operation.

5.2.1.5 Emergency Evacuation Procedures

A detailed emergency evacuation plan will be implemented within the prescribed premises. The Site muster points are shown in Figure 5.2with preliminary site evacuation plan shown in Figure 5.3 below.

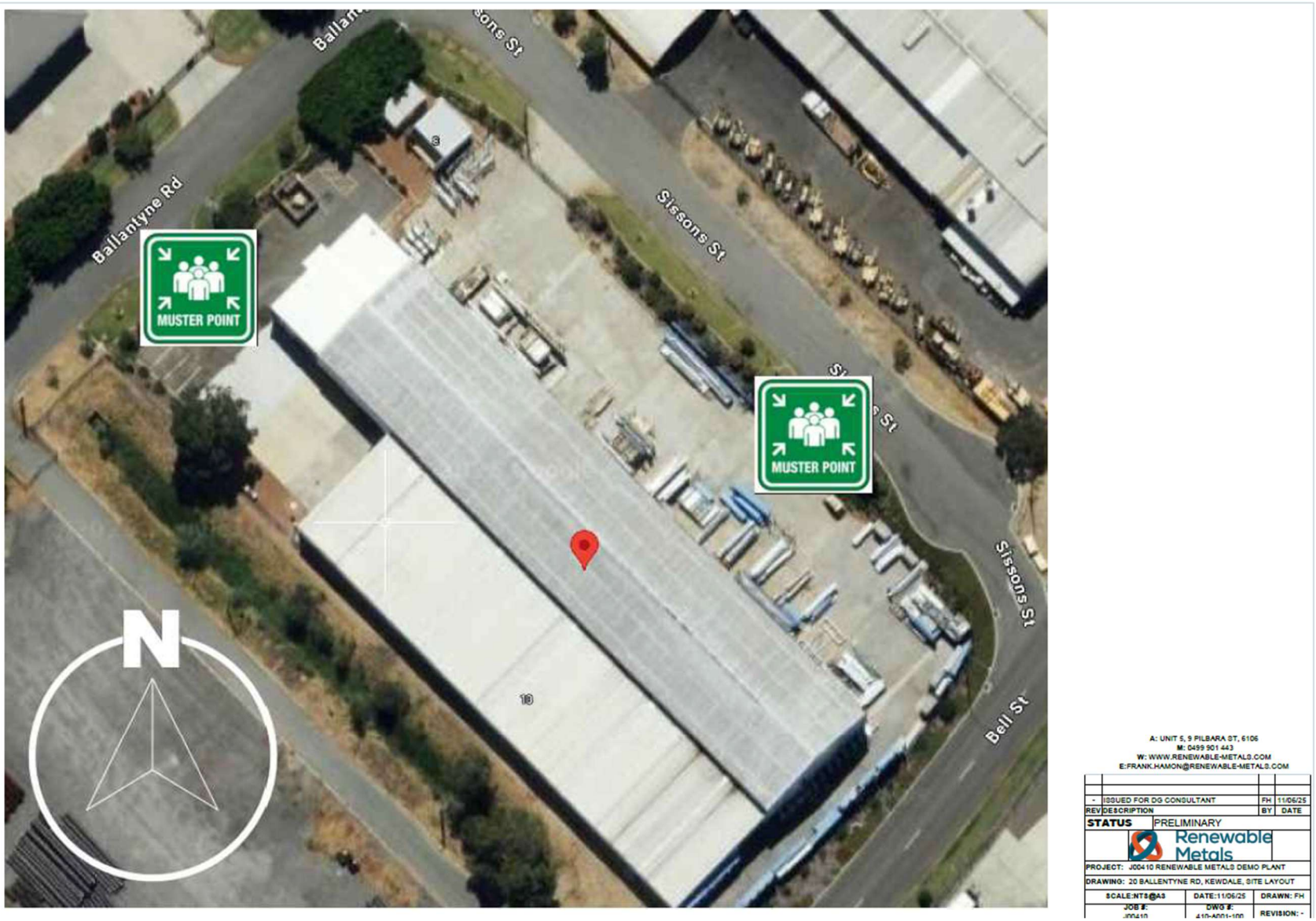
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Figure 5.1: Fire Sprinkler System



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Figure 5.2: Site Muster Locations



A: UNIT 5, 9 PILBARA ST, 6106
M: 0499 901 443
W: WWW.RENEWABLE-METALS.COM
E:FRANK.HAMON@RENEWABLE-METALS.COM

REV	DESCRIPTION	BY	DATE
-	ISSUED FOR DG CONSULTANT	FH	11/06/25

STATUS PRELIMINARY

Renewable Metals

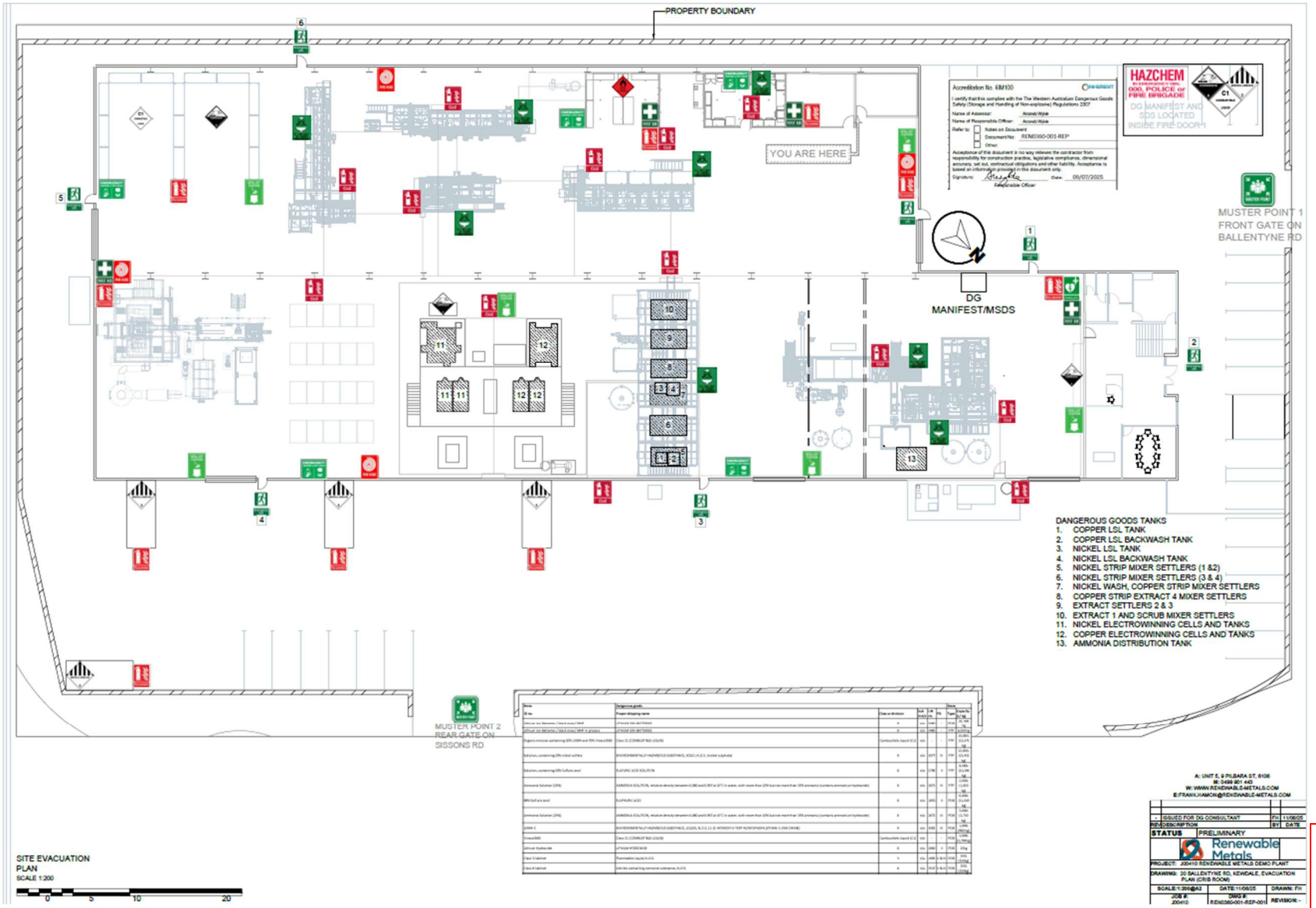
PROJECT: J0041O RENEWABLE METALS DEMO PLANT

DRAWING: 20 BALLENTYNE RD, KEWDALE, SITE LAYOUT

SCALE:NTS@A3	DATE:11/06/25	DRAWN: FH
JOB #: J0041O	DWG #: A10-A001-100	REVISION: -

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Figure 5.3: Evacuation Plan



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5.3 Operating Phase

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5.3.1.1 Airborne Emissions of Fumes and Odour

Refining of battery waste may cause the generation of 'off-gas' as result of wet chemical metallurgical process using alkaline extraction reactions during the refining process. These off-gases released during the material processing can contain components such as ammonia, volatile organic compounds (VOCs), sulfur dioxide and other particulate materials. Actions to reduce fumes will be undertaken by Renewable Metals, such as ensuring that the fumes emitted at different emission points are abated with appropriate suitable treatments such as wet scrubber with pH control etc., prior to discharge into atmosphere.

Prior to commencement, fume extraction and air filtration systems must be efficiently operational, with emphasis on the functionality of air filtration systems. Emissions may only be discharged at authorised discharge points shown in Figure 5.4.

Renewable Metals must ensure adequate air quality and odour monitoring is undertaken, and must at all times adhere to the emission guideline values outlined in the DWER Draft Air Emissions Guideline 2019 (DWER, 2019a) and DWER Odour Emissions Guideline 2019 (DWER, 2019b).

Table 5.1: Emission Sources

Emission Source	Process
Shredder	Wet process in which the electrolyte is collected within circulating water Head space of shredder is connected to an off-gas scrubber. Wet scrubber is pH controlled to neutral Off-gas monitors present in stack and detect TVOC and ammonia.
Chemical Process	Sealed ammonia tanks using mechanical seals for the agitators and EPDM rubber. Off-gas pipe is connected to the off-gas scrubber, which is pH controlled. Ammonia detector sits in the stack. Off-gas from copper and nickel electrowinning cells are contained by mist suppression and off-gas is collected and directed to separate off-gas scrubbers that a pH controlled. The feed conveyor to the plant is interlocked with the plant wide scrubber. If the scrubber fan or pump is not operating, then the feed conveyor will not operate. Run signals are seen in the SCADA system. Off-gas from the kiln, which contains ammonia and sulphur dioxide is initially quenched with water under pH control, then passed through a candle filter to collect any fume. The gas exiting the candle filter is then directed to an off-gas scrubber with pH control. Ammonia and sulfur dioxide is continually monitored/ detected in the off-gas stack. These readouts will be seen in the SCADA system, with high alarms. The off-gas scrubbers are designed to AS/NZS 2243.8: 2014. Off-gas generated in the laboratory is directed to a laboratory fume-cupboard with wet scrubbing and pH control. The off-gas exits via an off-gas stack. The laboratory fume cupboard is designed to AS/NZS 2243.8 standard.

Emission Source	Process
	All scrubbers are circulating and consist of conductivity measurement and control. The scrubber liquor is pumped into the process and replenished with water. pH is monitored and controlled automatically with chemical dosing. High and low alarms warn operators and process is interlocked on high/high and low/low alarms. All pH probes are calibrated daily using recommended procedures and buffer solutions by the probe manufacturer. A maintenance schedule will be implemented for all key instrumentation including level switches, gas monitors etc For areas 120 and 140 the skids consist of internal bunding with level switches. Level switches provide process interlocks. The capacity of the bund is >120% of the volume of the largest tank on the skids. For all other areas, the floor has been sealed with epoxy coating and external floor bunding will be installed. The bund capacity will be >120% of the volume of the largest tank on the skids.

5.3.1.2 Operational Noise and Vibrations

As the facility will operate 24 hours a day, general operational noise generated from heavy vehicle movement, operation of the battery recycling plant and maintenance activities must be managed to ensure compliance with Australian regulatory standards and minimise impacts on workers and surrounding communities. Renewable Metals must adhere to relevant noise regulations and guidelines listed below to maintain acceptable noise level:

- DWER Draft Guideline on Environmental Noise for Prescribed Premises 2016.
- Environmental Protection (Noise) Regulation 1997.
- Environmental noise practices set out in Sections of AS 2436-2010: Guide to Noise and Vibration Control on Construction, Maintenance and Demolition Sites.
- CoB Noise Guideline which refers to Section 6 of AS 2436-2010.

All operations will be undertaken within the building and have low noise emissions. The noise modelling assessment was assessed against the British Standard 4142: 2014 + A1: 2019 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142). The full report is attached in Appendix N.

The shredder system will operate for 8 hours a day and will only operate in daylight hours. There are silencers installed on all air diaphragm pumps.

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5.3.1.3 Storage of Dangerous Goods (DGs)

Input Dangerous Goods are discussed in 4.5.1. The materials recovered from the processing of recycling batteries have the potential to be classified as Dangerous Goods. All dangerous goods will be stored in IBCs or on pallets with placards in accordance with Schedule 3 of the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007.

A comprehensive Dangerous Goods Assessment for the proposed prescribed premises is provided in Appendix K. The list of DGs that are held within bunded areas within the prescribed premises is listed in Table 5.2 below to ensure compliance with the applicable DG standards and regulations.

Risks associated with the storage and handling of DGs will be minimised to ensure safety for personnel working within the Site. See **Error! Reference source not found.** for location of bunded areas within the prescribed premises.

Table 5.2: Storage Location and Description of Dangerous Goods listed under the DGC within the Prescribed Premises

Material / potential pollutant	Storage location	Dangerous Goods Classes	Packing Group Categories	Maximum quantity on site (L)	Maximum quantity on site (kg)
Lithium-ion batteries	Sea containers, industrial building (bunded area)	9	-		35,000
Lithium-ion batteries in process	Industrial building (bunded area)	9	-		6550
Organic mixture containing 30% LIX84I and 70% VivasolD80	Industrial building (bunded area)	Combustible liquid (C1)	-	15,080	13572
Solution containing 20% nickel sulfate	Industrial building (bunded area)	9	III	13,000	15432
Solution containing 20% sulfuric acid	Industrial building (bunded area)	8	III	8580	10296
Ammonia solution (25%) in process	Industrial building (bunded area)	8	III	2000	1820
Sulfuric acid (98%)	Industrial building (bunded IBC)	8	II	6,000	11,040
Ammonia solution (25%)	Industrial building (bunded IBC)	8	III	3,000	2,730
LIX84I-C	Industrial building (bunded IBC)	9	III	1000	960
VivasolD80	Industrial building (bunded IBC)	Combustible liquid (C1)	-	3000	2700
Lithium hydroxide monohydrate	Industrial building, bunded area	8	II		25
Class 3 Cabinet	Industrial building, bunded area	3	II & III	250	250
Class 8 Cabinet	Industrial building, bunded area	8	II & III	250	250

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Figure 5.4: Discharge Points



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5.3.1.4 Hazards and Fire Risks

All batteries arriving on site will be immediately discharged and processed, no extensive storage of charged batteries shall occur within the prescribed premises.

The fire services sprinkler system installed within the prescribed premises must always be operational, with maintenance adhering to *Australia Standard 1851-2012 - Routine Service of Fire Protection Systems*.

5.3.1.5 Waste Management Including Hazardous Waste

The prescribed premises will generate fine and coarse residue wastes that require disposal at a licensed facility. To determine the nature of these wastes, the proponent undertook a mineralogical analysis, which confirmed the material is inert (see Appendix O for full results).

In accordance with the DWER's *Landfill Waste Classification and Waste Definitions 1996* guidelines, inert waste may fall into three categories based on leachability. It was determined that the Fine Waste is within Class III and the Course Waste is Class V. The nominated landfill facility to receive the waste is Red Hill Waste Management Facility.

All inert waste will be tracked, transported, and disposed of under controlled conditions to ensure compliance with landfill acceptance criteria and minimise environmental impacts.

5.3.1.6 Water Quality and Soil Contamination

The facility operation utilises a completely enclosed system in order to contain liquids that contain dissolved metals. All water used during the battery recycling process will remain within the system and recycled back through the battery recycling process.

The process requires a net ingress of water i.e. there is more water coming in than exiting the plant. Water enters the facility from the mains into a low TDS water tank, this water is used throughout the process. Water exits the process via the coarse and fine residue as moisture, typically 30-40% moisture. The water balance is controlled via the use of a forced circulation crystalliser. This is a commercial scale evaporator in which process liquor is evaporated to produce crystalline salts and condensate 'clean water', which is re-used in the process.

All tanks are located in the building and within bunded areas. The process consists of a boiler and cooling tower, both located outside. Both units produce blowdown water, which is not in contact with the process. Typical volumes include:

Boiler blowdown - 1.75kg/hr; and

Coiling tower blowdown - 25kg/hr.

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Blowdown water will be collected and may be directed back into the process. Any blowdown water that does not meet process requirements from time to time will be contained and transported off site for treatment at a lawful facility and/or via a sewer discharge and under a trade waste licence. These are small volumes equal to approximately less than one (1) Intermediate bulk container (IBC) per week.

5.3.1.7 Construction and Maintenance Work

Construction and maintenance work shall not be carried out in any store in which dangerous goods are kept, except without written authorisation from a person designated for the operator. Refer to Appendix K for more details.

5.4 Emissions/Discharges and Proposed Abatements

A list of atmospheric emissions and discharge during LiB refining procedures is outlined in Table 5.3 below. Potential solid and liquid wastes generated as part of general operation is listed in Table 5.4 below.

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Table 5.3: Atmospheric Emissions and Discharges from the Prescribed Premises

Source of emission or process	Emission Type	Stack height (m)	Stack diameter (mm)	Normalised air flow (Nm^3/min)	Actual Air Flow (mg/m^3)	Proposed abatement	Concentration after treatment (mg/m^3)
Shredder scrubber off-gas stack	TVOC	12 m	900 mm	500	573	Wet scrubber with pH control, UV photo-oxygenator and carbon adsorption	20 mg/m^3
	Dust						5 mg/m^3
	Ammonia						3 mg/m^3
Process scrubber off-gas stack	Dust	12 m	315 mm	30.0	34.4	Wet scrubber with pH control	5 mg/m^3
	Ammonia						20 mg/m^3
	TVOC						20 mg/m^3
Kiln scrubber off-gas stack	Dust	12 m	160 mm	3.00	4.45	Dry dust collector, wet venturi scrubber with pH control, wet fibre filtration and second stage wet scrubber with pH control	5 mg/m^3
	Ammonia						3 mg/m^3
	Sulfur dioxide						5 mg/m^3
Copper electrowinning off-gas stack	Dust	12 m	315 mm	30.0	34.4	Wet scrubber	5 mg/m^3
Nickel electrowinning off-gas stack	Dust	12 m	315 mm	30.0	34.4	Wet scrubber	5 mg/m^3
Laboratory fume cupboard	Dust	12 m	315 mm	30.0	34.4	Wet scrubbing with pH control	5 mg/m^3
	Ammonia						3 mg/m^3

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Table 5.4: Solid and Liquid Waste Produced within the Prescribed Premises

Source of emissions or process	Emission or discharge type	Volume and frequency	Proposed Controls	Location
Fine and coarse residue waste	Dust	Not expected as residue is wet	Consigned to an appropriately classified landfill. Good housekeeping	- Area 120
General Operational Waste	General waste	-	Recycled or consigned to an appropriately classified landfill.	-
Construction waste material	General waste	-	Recycled or consigned to an appropriately classified landfill.	-
Operational: transportation packaging wastes	General Waste	-	Recycled or consigned to an appropriately classified landfill.	-
Workshop/Office Wastes	General Waste	-	Recycled or consigned to an appropriately classified landfill.	-
Rainfall or storm events	Stormwater potentially containing contaminants, sediments etc.	Stormwater and sediment volume is dependent on: • Storm/rainfall • events • Rainfall volume • Runoff/infiltration • rate. • Stormwater flow • and direction	Full encapsulation of processes will ensure no contaminants will be on the building and/or hardstand areas. A Stormwater drainage is installed on-site. All stormwater collected from the lean to and building is directed to the stormwater drains	Stormwater Drain Location Map Figure 5.5
Fire involving lithium-ion batteries within external battery receival, quarantine, discharged-battery storage or container-storage areas.	Potentially contaminated firefighting water and emergency run-off containing: • Battery and black-mass particulates • Dissolved or suspended aluminium, cobalt, copper, lithium, manganese,	Emergency-only and not a routine discharge. The design volume will be calculated from the credible simultaneous hydraulic demand of container misting or suppression, hydrants, hose streams and DFES firefighting water,	• Impermeable external concrete hardstand within a dedicated firewater-containment bund • Positive separation from the stormwater system • Graded collection surfaces • Sealed construction joints, penetrations and access interfaces; or designated recovery points • Emergency drainage isolation	External battery receival, quarantine, discharged-battery and container-storage fire zones shown on the controlled firewater-containment and drainage-isolation plan within the Fire Prevention and Emergency

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Source of emissions or process	Emission or discharge type	Volume and frequency	Proposed Controls	Location
	nickel and other metals • Electrolyte constituents • Fluoride-containing compounds • Salts • Hydrocarbons • Combustion residues • Ash • Damaged packaging and suspended solids	together with credible released liquids. The calculation will include system duration, infrastructure displacement, debris allowance and minimum freeboard.	• Containment-level monitoring; accessible tanker pump-out points • Vacuum-tanker contingency • Firewater sampling and characterisation • Removal by an authorised contractor for lawful treatment or disposal. No intentional discharge to land, groundwater, stormwater or surface water.	Management Plan (Appendix P)

5.4.1 Previous Emissions Modelling Assessments (Birmingham, England)

As part of the environmental commissioning process, it is generally recommended that any available emission modelling assessments are to be provided to DWER. During the pre-submission scoping meeting held on the 14 August 2025 with WEPL, the proponent and DWER, it was communicated that the proponent has previously established an equivalent facility in Birmingham city centre, England where emissions modelling was undertaken. Given the Birmingham facility operated with the same facility capacity likewise of the proposed prescribed premises, DWER has advised that results are acceptable to be used to as supplementary assessment information for this facility.

5.4.1.1 Air Quality

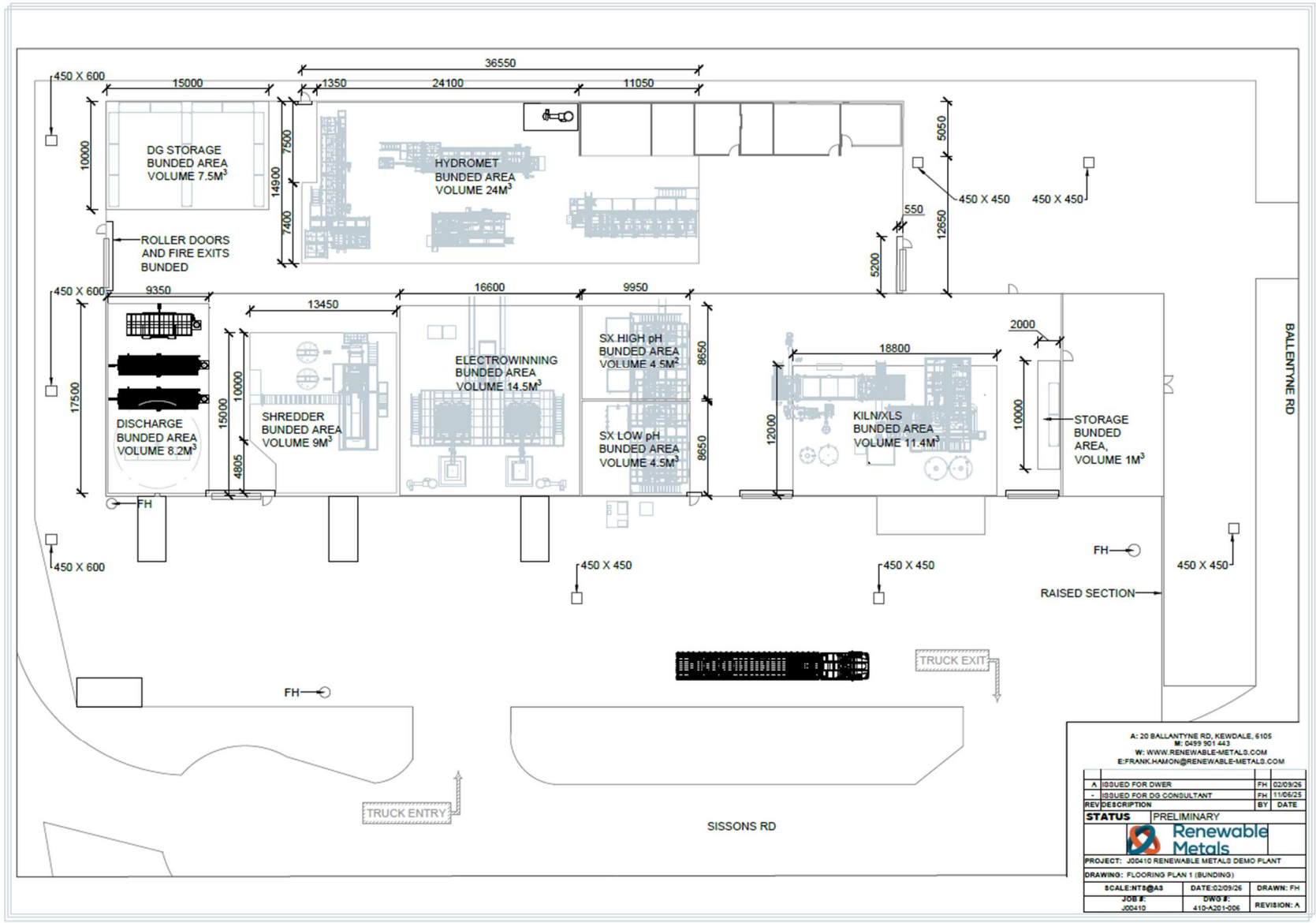
The assessment included atmospheric dispersion modelling of emissions, predictions of pollutant concentrations and potential impacts to receptor. The assessment was assessed against British legislation and guidance, the full report is attached in Appendix N.

5.4.1.2 Noise

The noise modelling assessment was assessed against the *British Standard 4142: 2014 + A1: 2019 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142)*. The full report is attached in Appendix Q.

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Figure 5.5: Stormwater Drain Locations



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6 Risk Assessment

A risk assessment has been prepared to identify the potential emissions from the proposed activities and the potential sources, pathways and receptors of those emissions, and proposed controls to manage potential emissions to determine a residual risk rating. The risk assessment has been based on the *DWER Guidance Statement: Risk Assessments* (released by the then named Department of Environmental Regulation in 2017), based on the following risk rating matrix (Table 6.1).

Table 6.1: Risk Matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium)	High

Note*: Risk = consequence x likelihood

The following criteria (DWER, 2020) are used to determine the consequence and likelihood of a risk event occurring (Table 6.2 and Table 6.3).

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Table 6.2: Consequence Matrix

Consequence	Consequence Description	
	Environment	**Health**
Severe	On-site impacts: catastrophic Off-site impacts (local scale): high level Off-site impacts (wider scale): mid-level Mid to long term or permanent impact to an area of high conservation value or special significance	Loss of life Adverse health effects: high level or ongoing medical treatment Local scale impacts: permanent loss of amenity
Major	On-site impacts: high level Off-site impacts (local scale): mid-level Off-site impacts (wider scale): low level Short term impact to an area of high conservation value or special significance	Adverse health effects: mid-level or frequent medical treatment Local scale impacts: high level impact to amenity
Moderate	On-site impacts: mid-level Off-site impacts local scale: low level Off-site impacts wider scale: minimal	Adverse health effects: low level or occasional medical treatment Local scale impacts: mid-level impact to amenity
Minor	On-site impacts: low level Off-site impacts (local scale): minimal Off-site impacts (wider scale): not detectable	Local scale impacts: low level impact to amenity
Slight	On-site impacts: minimal	Local scale impacts: minimal impacts to amenity

Table 6.3: Likelihood Matrix

Likelihood	Likelihood Description
Almost certain	The risk event is expected to occur in most circumstances
Likely	The risk event will probably occur in most circumstances
Possible	The risk event could occur at some time
Unlikely	The risk event will probably not occur in most circumstances
Rare	The risk event may only occur in exceptional circumstances

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The potential emissions, sources, pathways, and receptors that have been identified for operation of the proposal are outlined in this table also identifies the potential impacts, proposed controls and associated risk ratings. A detailed risk assessment will be undertaken for any activity that has been identified as having a 'Medium' risk rating or higher Table 6.4.

Detailed risk assessment includes:

- A description of the potential emissions, sources, pathways, and receptors.
- Any controls that have been identified for the risk event.
- An assessment of the consequence and likelihood.

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Table 6.4: Risk Assessment

Process Source of Emissions	Directed Emissions Point	Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Risk Assessment Required?
Shredding	Shredder scrubber off-gas stack	TVOC gases	Atmospheric	• Atmosphere • Neighbouring properties • Residential properties • Human receptors • Transport corridors	• Air quality • Human health–respiratory illness	• Wet shredding • Wet scrubber with pH control • Compliance with DWER Air Emissions Guideline	Slight	Possible	Low	No
		Dust	Airborne particles carried by wind and atmospheric							
		Ammonia gas	Atmospheric							
		Noise and Vibrations	Acoustics	• Neighbouring properties • Residential properties • Human receptors	• Hearing damage & occupational noise-induced hearing loss (NIHL) • Complaints from neighbouring properties	• Providing hearing protection PPE for workers • Conduct regular noise monitoring to not exceed guideline limits • Installation of a complaint's registry • Compliance with the Environmental Protection (Noise) Regulations 1997	Slight	Possible	Low	No

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Process Source of Emissions	Directed Emissions Point	Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Risk Assessment Required?
	Shredder Emission Point	Fine and coarse shred residues	• Stormwater discharge • Air dispersion via wind	• Stormwater network • Wetlands • Aquatic biota • Neighbouring properties	• Elevated contaminant load	• Fines stored in a sealed tank • Coarse stored in a bunker • Both coarse and fines are located within a bunded area, within the building	Slight	Possible	Low	No
Primary and Secondary Leach	Process scrubber off-gas stack	TVOC gases	Atmospheric	• Atmosphere • Neighbouring properties • Residential properties • Human receptors • Transport corridors	• Air quality • Human health–respiratory illness.	• Wet scrubber with pH control	Slight	Possible	Low	May require dispersion modelling
		Dust	Airborne particles carried by wind and atmospheric							
		Ammonia gas	Atmospheric							
	Solid waste bin	Leach residual solids waste (coarse residue)	Stormwater and drainage	Stormwater network Wetlands Aquatic biota Neighbouring properties	Elevated contaminant load	Coarse residue collected in drums or FIBCs and sealed Coarse residue collected within a bunded area within the building	Slight	Possible	Low	No

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Process Source of Emissions	Directed Emissions Point	Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Risk Assessment Required?
Manganese Oxidation Circuit	Manganese product bag	Manganese oxide	Stormwater and drainage	Stormwater network Wetlands Aquatic biota Neighbouring properties	Elevated contaminant load	Manganese product collected in lined FIBC and sealed Manganese product collected within a bunded area within the building	Moderate	Unlikely	Medium	No
Copper Electrowinning Plant	Copper electrowinning off-gas stack	Acid mist	• Wind dispersion • Airborne acid mist carried by atmosphere	• Neighbouring properties • Residential properties • Human receptors • Workers	• Air quality • Human health–respiratory illness.	• Wet scrubber • Providing suitable PPE for workers • Acid mis suppression • Detectors • Internal ventilation system	Slight	Unlikely	Low	No
Nickel Electrowinning	Nickel electrowinning off-gas stack	Acid mist	• Wind dispersion • Airborne particle carried by atmosphere	• Neighbouring properties • Residential properties • Human receptors • Workers	• Air quality • Human health–respiratory illness.	• Wet scrubber • Providing suitable PPE for workers • Acid mist suppression • Detectors • Internal Ventilation system	Slight	Unlikely	Low	No

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Process Source of Emissions	Directed Emissions Point	Potential Emissions	Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Consequence	Likelihood	Risk Rating	Detailed Risk Assessment Required?
Ammonia Recovery	Ammonia stripping column	Ammonia gas	• Atmospheric	• Atmosphere	Air quality	• Wet scrubber with pH control	Slight	Unlikely	Low	
Calcination	Kiln scrubber off gas-stack	Dust	• Wind dispersion • Airborne particle carried by atmosphere	• Neighbouring properties • Residential properties • Human receptors Transport corridors	• Air quality • Human health - respiratory illness	• Wet venturi scrubber with pH control • Wet fibre filtration and second stage wet scrubber with pH control	Slight	Unlikely	Low	
		Ammonia gas	• Atmospheric	• Atmosphere	• Air quality					
		Sulfur dioxide gas								
	Reverse Osmosis Plant	Membrane cleaning sludge	Stormwater and drainage	Stormwater network Wetlands Aquatic biota Neighbouring properties	Elevated contaminant load	SOP for cleaning membranes Very small RO plant	Slight	Unlikely	Low	No

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