

Appendix 12 Environmental Noise Assessment

### **UPSG Facility EIS**

### **Environmental Noise Assessment**

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### Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Characteristic	Associated with a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined in accordance with the Guidelines for the use of the Environment Protection (Noise) Policy (Noise Policy) to be fundamental to the nature and impact of the noise.
Continuous noise level	A-weighted noise level of a continuous steady sound that, for the period over which the measurement is taken using fast time weighting, has the same mean square sound pressure as the noise level which varies over time when measured in relation to a noise source and noise-affected premises in accordance with the Noise Policy
Day	Between 7 am and 10 pm as defined in the Noise Policy
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of loudness.
dB(A)	Units of the A-weighted sound level.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
Indicative noise level	Indicative noise level determined under clause 5 of the Noise Policy.
L <sub>90</sub>	Noise level exceeded for 90 % of the measurement time. The $L_{90}$ level is commonly referred to as the background noise level.
L <sub>eq</sub>	Equivalent Noise Level—Energy averaged noise level over the measurement time.
L <sub>max</sub>	The maximum instantaneous noise level.
Night	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the Noise Policy
Noise source	Premises or a place at which an activity is undertaken, or a machine or device is operated, resulting in the emission of noise
Quiet locality	A locality is a quiet locality if the Planning & Design Code provisions that make land use rules for the locality principally promote land uses that all fall within either or both of the following land use categories: (a) Residential; (b) Rural Living;

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### **Executive Summary**

This report outlines the environmental noise assessment for the proposed Battery Anode Material (BAM) Facility at Robinson Road, Bolivar in South Australia.

The potential noise emissions from the development have been assessed at the existing adjacent noise sensitive receptors. The potential environmental noise emissions impact has been assessed against the:

- South Australia, Planning & Design Code
- South Australian Environmental Protection (Noise) Policy 2007

Project delivery will be staged, with Stage 1 capacity to be doubled in Stage 2 expansion. The noise assessment has considered the following scenarios:

- Stage 1 construction
- Stage 2 construction (including contribution from Stage one operation)
- Stage 1 operation
- Stage 1 and 2 operation.

A summary of the noise assessment, outcomes and indicative mitigation recommendations are outlined in Table 1.

Noise source	Outcomes and recommendations
Construction equipment	<ul> <li>Adopt standard noise mitigation measures as required by the Noise Policy</li> <li>Construction activities should generally be limited to standard hours (7am to 7pm Monday to Saturday) other than intrinsically low noise activities, or where it can be demonstrated that there is no adverse impact based on the existing ambient noise environment.</li> <li>Additional mitigation measures to be developed in the CEMP</li> </ul>
Micronising & Spheronising Mill Buildings	<ul> <li>Limit the sound level of the micronising exhaust stacks as described in Table 18</li> <li>Facade construction to be metal cladding with 12 mm fibre cement sheet (or equivalent) directly flush to the metal cladding on the internal side of the external walls (where required) and roof as described in Table 18</li> <li>Roller doors and other external openings to be shut except to allow for timely ingress and egress of staff and vehicles.</li> </ul>
Kiln	<ul> <li>Limit the sound level of noise sources as described in Table 18 and Table 23</li> <li>Facade construction to be upgraded to metal cladding with 12 mm fibre cement sheet (or equivalent) directly flush to the metal cladding on the internal side of external walls (where required) and roof as described in Table 18</li> </ul>
Purification Building	<ul> <li>Limit the sound level of noise sources as described in Table 18 and Table 23</li> <li>Facade construction to be upgraded to metal cladding with 12 mm fibre cement sheet (or equivalent) directly flush to the metal cladding on the internal side of the external walls (where required) and roof as described in Table 18</li> </ul>
Waste Water Treatment Plant (WWTP)	<ul> <li>Equipment selections and detailed design to limit the contribution of the WWTP to achieve L<sub>eq</sub> 35 dB(A) or less at the nearest receivers.</li> </ul>

#### Table 1 Assessment summary and outcomes

Noise source	Outcomes and recommendations
Demineralisation plant	<ul> <li>Equipment selections and detailed design to limit the contribution of the Demineralisation Plant to achieve L<sub>eq</sub> 35 dB(A) or less at the nearest receivers.</li> </ul>
Reagent areas	<ul> <li>Equipment selections and detailed design to limit the contribution of the reagent areas to achieve L<sub>eq</sub> 35 dB(A) or less at the nearest receivers.</li> </ul>
Compressors	Fully enclose the compressors in a profile metal shed or equivalent
Workshop and warehouse facility	<ul> <li>Roller doors and other external to be shut except to allow for timely ingress and egress of staff and vehicles.</li> </ul>
Externally located air conditioning condenser	<ul> <li>No specific acoustic treatments are required based on indicative noise data. To be reviewed during detailed design to confirm.</li> </ul>
Heavy vehicle deliveries and service vehicles	• Use broadband reversing alarms only, or eliminate the need for heavy vehicle reversing movements on site
Light vehicles and car park	<ul> <li>No specific acoustic treatments are required (to be reviewed during detailed design to confirm)</li> </ul>
Forklifts	<ul><li>Forklifts should be gas or electric</li><li>Use broadband reversing alarms only</li></ul>

This assessment shows that, with the indicative on-site noise mitigation treatments detailed in this report, the noise emissions from construction and operation of the proposed development are expected to comply with the relevant environmental noise criteria, except at three neighbouring receiver locations where noise from operation of the project may exceed the night time Noise Policy criteria by up to 6 dB(A) during a nominal worst-case scenario.

The predicted exceedance is primarily due to truck movements. It is expected that up to 1-2 trucks may enter the site during the night time period (i.e. up to four night time truck movements entering and exiting the site).

It should be noted that there are already relatively frequent existing truck movements on Robinson Road, which generate similar or higher noise emissions at noise sensitive receiver locations, than those expected from the proposed Project.

Noise from trucks associated with the Project cannot practically be further mitigated (e.g. through noise barriers or similar) since trucks must enter the site from Robinson Road. It is understood that restricting trucks to daytime hours only is likely to result in unreasonable costs associated with additional storage infrastructure and driver labour. Additionally, the flexibility to receive emergency parts or materials via truck delivery during night time hours is required in order to avoid the significant costs that would otherwise be associated with halting production.

Noise emissions from operation of Stage 1 of the Project, in the absence of truck movements, is predicted to comply with the relevant daytime and night time environmental noise criteria at all locations. Cumulative noise from operation of Stage 1 and 2 of the Project, in the absence of truck movements, is predicted to comply with the environmental noise criteria at all locations except one residence where noise may exceed the night time Noise Policy criteria by up to 2 dB(A) during a nominal worst-case scenario.

Clause 20(6) of the Noise Policy acknowledges that a potential inability to meet the objective night time criteria is, in itself, no indication that excessive noise would be generated by the proposed development. The predicted noise levels are less than existing average ambient night time noise levels at this location, and all reasonable and practicable noise mitigation measures will be adopted to minimise noise emissions.



On this basis the proposed development will be able to operate within the relevant noise provisions in the Planning & Design Code, Environmental Protection (Noise) Policy, and Environment Protection Act.

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### 1 Introduction

### 1.1 Overview

Renascor Resources Ltd (Renascor) are proposing to construct a purpose-built Battery Anode Material (BAM) Facility in the Bolivar area of Adelaide's northern suburbs as part of the Siviour Battery Anode Material Project (Siviour BAM Project).

The BAM facility (the proposed development) will complement Renascor's Siviour graphite mining operation on the Eyre Peninsula, South Australia (SA). The proposed development consists of an industrial downstream processing facility for refinement and purification of graphite and will produce a micronised, spheronised and highly purified (>99.95% Carbon) PSG graded by particle size, from graphite concentrate mined on the Eyre Peninsula under Mining Lease (ML) 6495.

Graphite, when refined to PSG, is an essential mineral resource in the manufacture of anodes for lithium-ion batteries, a sector which is projected to experience significant growth in the coming decades. In order to capitalise on this opportunity, Renascor has been conducting feasibility and technological studies into the potential for Siviour graphite to be processed into PSG in SA. The Siviour BAM Project is the resultant strategy, incorporating best-practice technologies and processes into a vertically integrated graphite mining and PSG production project wholly within SA. This provides an opportunity for SA to become global leader in the manufacture of lithium-ion battery anode material.

Renascor's ambition is to supplement the economic benefit of the Siviour mining operation through in-country downstream processing to produce a refined graphite product for direct use by the global battery anode manufacturing sector at world-competitive prices. Renascor's stated aim is to become a global leader in the supply of sustainable, Australian made battery anode material with a focus on sound environmental management. A key aspect of this is the development of a purification process that is significantly more environmentally friendly than prevailing global PSG production technologies. Renascor's purification process avoids the use of hydrofluoric acid (HF) as a reagent chemical, offering a cleaner and safer HF-free process.

As a key part of the Siviour BAM Project, the BAM Facility is considered to be a project of state significance. Accordingly, the BAM Facility was declared by the Minister to be an Impact Assessed Development under Section 108(c) of the Planning, Development and Infrastructure Act 2016 (the PDI Act) on 8 December 2022, requiring preparation of an Environmental Impact Statement (EIS).

#### 1.2 Proposed development

The proposed development comprises two discrete but integrated industrial plants—mechanical shaping and purification—with associated equipment and reagents. The BAM Facility will conduct micronisation and spheronisation of graphite concentrate (milling), followed by a caustic roast purification process (chemical works). Additionally, equipment for the packaging and distribution of a range of PSG products and related by-products will be incorporated into the proposed development. Proposed development delivery is anticipated to be staged, with Stage 1 capacity to be doubled in Stage 2 expansion.

The key components of the BAM Facility in relation to noise generation include:

- Kiln Building
  - Rotary kiln
    - Alkaline gas scrubbing unit
    - Spherical graphite kiln feed bin
    - Rotary kiln dust collector
    - Scrubber unit
- Mills Building

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- Dust collector
- Cyclone
- Mill
- Motor control panel
- Purification building
  - Spiral flash dryer
  - Spiral flash dryer dust collector
  - SPG bagging plant
  - Product silo
  - Caustic leach filters
  - Acid leach filters
- Water treatment plant facility
- Demineralisation plant facility
  - RO processing
- Workshop and warehouse facility
- Administration Building
- Emergency and first aid facility
- PSG shifts change ablutions
- Product storage building

During the projected Stage 2 expansion of the BAM Facility, the overall PSG production capacity is anticipated to double, subject to ongoing analysis of market demand and commercial feasibility. Subsequently, some of the key components of the BAM Facility will require stepped expansion commensurate with production volume. The land parcel for the BAM Facility has been chosen with this expansion in mind, such that available land area is adequate to meet the projected scale of the Stage 2 expansion.

Details of plant design, such as the capacity and dimensions of storage silos, loading and unloading facilities, industrial buildings, hardstand area and conveyance equipment, are not yet finalised and remain subject to change according to the outcome of the forthcoming DFS and further plant engineering design, which is anticipated to be informed by the impact assessment process.

There is potential for noise emissions from construction activities from Stage 2 expansion. Significant construction activities include the following:

- Site preparation and civil works
- Processing plant construction

Appendix A—Site layout shows the preliminary site plan for Stage 1 and Stage 2 of BAM Facility.

#### **1.3** Purpose of the report

This report outlines the environmental noise assessment for the proposed Battery Anode Material (BAM) Facility at Robinson Road, Bolivar in South Australia.

This report includes the following:

- Description of the proposed development, including activities with potential significant noise emissions during construction and operation;
- Location of the proposed development and significant noise sources;
- Locations of the nearest noise sensitive receivers;
- Relevant noise criteria for assessment of noise from the facility during construction and operation;
- Description of the baseline noise environment;

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- Assessment methodology including details of acoustic modelling parameters and assumptions.
- Prediction of worst-case noise emissions during the following scenarios:
  - Stage one construction
  - Stage two construction (including contribution from Stage one operation)
  - Stage one operation
  - Stage one and two operations
- Assessment of predicted daytime and night time noise levels against the relevant criteria
- Mitigation of noise emissions to comply with the relevant criteria, where reasonable and practicable.

The potential noise emissions from the development have been assessed against the requirements of:

- South Australia's Planning & Design Code
- South Australian Environmental Protection (Noise) Policy 2007.

### 2 Proposed development

### 2.1 Location

The proposed development is located at Robison Road, Bolivar, South Australia 5110 within CT 5723/299 and comprises the majority of Allotment 3 (F115108AL3) and portions of Allotment 4 (F115108AL4) as shown in Figure 1.



Figure 1 Locality of the site

### 2.2 Operation

The BAM Facility is proposed to operate 24 hours a day, 7 days a week. Note the following hours are relevant to the day and night-time periods as per *Environmental Protection (Noise) Policy* 2007:

- Day: 7 am 10 pm
- Night: 10 pm 7 am.

The proposed activities outlined in Table 2. This is based on the following:

- Estimated average vehicle movements per day is derived from 'Renascor Resources Definitive Feasibility Study: Chapter 11 Logistics'
- Information provided by Renascor
- Noise measurements undertaken from similar projects
- Noise data from Resonate's database

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For the operation of the BAM facility is 24/7, the proposed activities remain consistent for both day and night time periods.

#### Table 2 Proposed operational activity

Noise sources	Period		
	Day—7 am to 10 pm	Night—10 pm to 7 am	
Micronising & Spheronising Mill Building	All equipment (as outlined in Table 23) operating at 100% capacity		
Kiln Building	All equipment (as outlined in Table 23) operating at 100% capacity		
Purification Building	All equipment (as outlined in Table 23) operating at 100% capacity		
Compressor	All compressors operating at 100% capacity		
Waste Water Treatment Plant (WWTP)	All equipment (as outlined in Table	e 23) operating at 100% capacity	
Demineralisation	All equipment (as outlined in Table	e 23) operating at 100% capacity	
Workshop and warehouse facility	<ul> <li>Workshop activities</li> <li>Assumed internal noise level of L<sub>F</sub> required for staff</li> </ul>	75 dB(A). No hearing protection	
Reagent storage	All equipment (as outlined in Table 23) operating at 100% capacity		
Storage / bagging	<ul><li>Dry goods storage only</li><li>2 gas forklift movements</li></ul>		
Condensers	All plant operating at 100% capac	ity	
Vehicle movements	for both light and boost upbialog and a		

• The vehicle movements adopted for both light and heavy vehicles are derived from the information shown in Table 3.

• It is assumed that the proposed site will adopt sealed internal roads, however, a change to unseal roads will not materially affect the outcomes of the noise assessment.

Light vehicles and car park	• 20 car movements per 15-minute period assessment period and 75 number of parking space.
Heavy vehicle deliveries and service vehicles	1 heavy vehicle movement per 15-minute assessment period

Estimated average vehicle movements per day during operation of the Project is provided in Table 3.

#### Table 3 On-site daily vehicle trips during operation

Vehicle type	Details	Stage 1	Stage 2
Light vehicles	Personal vehicles	52	69
	Food truck	2	2
Heavy vehicles	Fuel Truck B double	1 per month	1 per month
	Product haulage truck (AB- triple or A-double) trips	4	7-8

Vehicle type	Details	Stage 1	Stage 2
	Miscellaneous delivery	2	2
	Over-width load	1 per month	1 per month

### 2.3 Construction

The construction of the facility proposed to occur between 7 am to 7 pm Monday to Sunday.

The proposed activities outlined in Table 4. This is based on the following:

- Estimated average vehicle movements per day is derived from 'Renascor Resources Definitive Feasibility Study: Chapter 11 Logistics'.
- Information provided by Renascor
- Noise measurements undertaken from similar projects
- Noise data from Resonate's database

#### Table 4 Proposed construction activities

Activities	Details
C1: Site preparation and civil works	All equipment (as outlined in Table 22) operating at 100% capacity
C2: Processing plant construction (structural works)	All equipment (as outlined in Table 22) operating at 100% capacity

The estimated average vehicle movements in and out of the site per day during construction of the development is outlined in Table 5, which is further adopted for the noise assessment.

#### Table 5 Vehicle movements during construction

Vehicle type	Details	Average trips each day
Heavy vehicles	Equipment (inc modules) and misc. deliveries	1 – 2
	Fuel	< 1 <sup>(1)</sup>
	1 x flat- bed truck	1
	1 x 20-seater bus	1 <sup>(1)</sup>
Light vehicles	Utes	35
	Food truck	2

(1) Assumed quantity – no number provided in logistics report

#### 2.4 Proposed construction

The facade constructions of the development (without additional noise mitigation) have been advised by Renascor or shown in concept drawings, which are outlined in Table 6.

#### Table 6 Building facade construction (without additional noise mitigation)

Element	Construction
Micronising & Spheronising Mill Building	<ul> <li>Profile metal cladding to the external walls and roof</li> <li>Roller doors remain shut when not required for access and egress</li> </ul>
Kiln	Profile metal roof
Purification	Profile metal roof
Compressors	Profile metal roof
Reagents	Fully open
Condensers	Fully open
Workshop and warehouse	<ul> <li>Profile metal cladding to the external walls and roof</li> <li>Roller doors remain shut when not required for access and egress</li> </ul>

### 3 Planning & Design Code

### 3.1 Zoning

#### 3.1.1 Subject site

The subject site is located within the City of Salisbury Council in a Rural Horticulture zone and is located within CT 5723/299 and comprises the majority of Allotment 3 (F115108AL3) and portions of Allotment 4 (F115108AL4). The relevant Assessment Provisions for the Rural Horticulture zone are outlined in Table 7.

Assessment Provisions			
Desired Outcome			
DO1	Intensive agriculture in the form of horticulture and associated value-adding enterprises and activities.		
DO 2	The establishment of appropriately scaled industries fo washing, processing, bottling and packaging primary produce and servicing and supporting horticulture.		
DO 3	Manage interface conflict between horticulture and oth land uses.		
Performance Outcomes	Deemed-to-Satisfy Criteria / Designated Performance Feature		
PO 4.3	DTS/DPF 4.3		
Industry, storage, warehousing, transport distribution or	Buildings and associated activities:		
similar activities are sited, designed and of a scale that maintains rural function and character in a manner that	(a) are setback at least 50m from all road and allotment boundaries		
respects landscape amenity.	(b) are not sited within 100m of a sensitive receiver in other ownership		
	(c) have a building height not greater than 10m above natural ground level		
	<ul> <li>(d) incorporate the loading and unloading of vehicles within the confines of the allotment.</li> </ul>		

#### Table 7 Relevant Assessment Provisions—Rural Horticulture zone

#### 3.1.2 Adjacent land and noise sensitive receivers

The closest noise affected receptors located around the site are shown in Figure 2, with details as outlined in Table 8. It is noted that there are no existing buildings at Receiver Numbers R17, R20 and R21.



Figure 2 Subject site with respect to adjacent receptors

Receptor Number	Address	Land Use	Zoning	Desired Outcomes
R01	146-156 St Kilda Rd, Waterloo Corner SA 5110	Agriculture	Rural Horticulture	Table 7
R02	134-144 St Kilda Rd, Waterloo Corner SA 5110 (St Kilda Roses)	Agriculture	Rural Horticulture	Table 7
R03	118 St Kilda Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7
R04	120-132 St Kilda Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7
R05	102-114 St Kilda Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7

Table 8 Closest noise affected receptors with respect to the subject site

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Receptor Number	Address	Land Use	Zoning	Desired Outcomes
R06	111 Robinson Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7
R07	107 Robinson Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7
R08	108-122 Robinson Rd, Waterloo Corner SA 5110	Horticulture	Rural Horticulture	Table 7
R09	103-105 Robinson Rd, Waterloo Corner SA 5110	Livestock	Rural Horticulture	Table 7
R11	102 Robinson Rd, Waterloo Corner SA 5110	Horticulture	Rural Horticulture	Table 7
R12	84-96 Robinson Rd, Waterloo Corner SA 5110	Horticulture	Rural Horticulture	Table 7
R13	95-97 Robinson Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7
R14	87-89 Robinson Rd, Waterloo Corner SA 5110	Horticulture	Rural Horticulture	Table 7
R15	83-85 Robinson Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7
R16	79-81 Robinson Rd, Waterloo Corner SA 5110	Rural Residential	Rural Horticulture	Table 7
R17	2-10 Driver Rd, Waterloo Corner SA 5110	Horticulture	Rural Horticulture	Table 7
	12-20 Driver Rd, Waterloo Corner SA 5110			Table 7
	22-30 Driver Rd, Waterloo Corner SA 5110			Table 7
R20	32-40 Driver Rd, Waterloo Corner SA 5110	Horticulture	Rural Horticulture	Table 7
R21	42-50 Driver Rd, Waterloo Corner SA 5110	Horticulture	Rural Horticulture	Table 7
R22	1-61 Driver Rd, Waterloo Corner SA 5110	Recreation/Reserves	Rural Horticulture / Open Space	Table 7 / Table 9

The relevant Desired Outcome for the Open Space zone is outlined in Table 9.

#### Table 9 Relevant Desired Outcome—Open Space zone

Desired Outcome	
DO1	Areas of natural and landscaped open space provide for biodiversity, tree canopy cover, urban cooling and visual relief to the built environment for the health and enjoyment of the community.

#### 3.2 Interface between land uses

Interface between Land Uses is a General Development Policy that is relevant to the subject site. The relevant Assessment Provisions relating to noise are outlined in Table 10.

#### Table 10 Relevant Assessment Provisions—Activities generating noise or vibration

Rele	vant Assessment Provisions		
Desi	red Outcome		
DO1		Development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses.	
Perf	ormance Outcome	Deemed-to-Satisfy Criteria / Designated Performance Feature	
PO 4	l.1	DTS/DPF 4.1	
Development that emits noise (other than music) does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers).		Noise that affects sensitive receivers achieves the relevant Environment Protection (Noise) Policy criteria.	
PO 4	.2	DTS/DPF 4.2	
Areas for the on-site manoeuvring of service and delivery vehicles, plant and equipment, outdoor work spaces (and the like) are designed and sited to not unreasonably impact the amenity of adjacent sensitive receivers (or lawfully approved sensitive receivers) and zones primarily intended to accommodate sensitive receivers due to noise and vibration by adopting techniques including:		None are applicable.	
<ul> <li>a) locating openings of buildings and associated services away from the interface with the adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers</li> </ul>			
<ul> <li>b) when sited outdoors, locating such areas as far as practicable from adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers</li> </ul>			
<ul> <li>housing plant and equipment within an enclosed structure or acoustic enclosure</li> </ul>			
d)	providing a suitable acoustic barrier between the plant and / or equipment and the adjacent sensitive receiver boundary or zone.		

### 4 Noise criteria

### 4.1 Legislation

The general environmental duty in section 25 of the *Environment Protection Act* 1993 (EP Act) states that: A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to present or minimise any resulting environmental harm.

Under the EP Act, pollution includes the emission of noise.

### 4.2 Environmental Protection (Noise) Policy

As noted in DTS/DPF 4.1, environmental noise emissions from the subject site should comply with the *Environment Protection (Noise) Policy* 2007 (Noise Policy).

The noise goals in the Noise Policy are based on the zoning of the development and the closest noise affected premises. The land uses primarily promoted by the zones are used to determine the environmental noise criteria with the indicative noise factors shown in Table 11.

#### Table 11 Excerpt from Noise Policy—Table 2(subclause(1)(b))

Land use category	Indicative noise factor dB(A)			
	Day (7 am to 10 pm)	Night (10 pm to 7 am)		
Rural living	47	40		
Rural industry	57	50		

Based on the zoning and the relevant Assessment Provisions for the zones of the subject site and the adjacent receptors, the primarily promoted land uses and the relevant criteria for the receptors in each zone are outlined in Table 12. In accordance with Part 5 of the Noise Policy, the relevant criteria is the average of the relevant indicative noise factors less 5 dB(A).

Table 12 Summary of zones, land uses, an	nd Noise Policy criteria
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Site	Zone	Land use(s)	Criteria	
			Day (7 am to 10 pm)	Night (10 pm to 7 am)
Subject site	Rural Horticulture Zone	Rural Industry	N/A	N/A
R01 to R22	Rural Horticulture Zone	Rural Industry	52	45
R22	Open Space zone	Rural Living	47 40 L <sub>max</sub> 60 <sup>(1)</sup>	

(2) A maximum noise criterion of L<sub>max</sub> 60 dB(A) at night, 10 pm to 7 am is applicable as the receptors are located within a 'quiet locality' (being a residential and rural living zone).

Penalties can also be applied to a noise source for a variety of characteristics, such as impulsive, low frequency, modulating or tonal characters. For a characteristic penalty to be applied to a noise source it must be fundamental to the impact of the noise and dominate the overall noise impact. Application of the characteristic penalty is discussed in the noise emission assessment.

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We note that under Part 5, Clause 20(6) of the Noise Policy, exceedance of the recommended criterion does not necessarily mean action is required under the Noise Policy. Part 5, Clause 20(6) of the Noise Policy as follows:

If a predicted source noise level (continuous) or predicted source noise level (maximum) for the development exceeds a relevant level prescribed in subclause (3) or (4), the Authority much have regard to the following matters in determining its response:

(a) the amount in dB(A) by which the predicted source noise level (continuous) or predicted source noise level (maximum) exceeds the relevant level and the likely frequency and duration of the noise levels that give rise to that result;

(b) any component f the ambient noise or extraneous noise that-

(i) has a noise level similar to or greater than the predicted source noise level (continuous) or predicted source noise level (maximum); and

(ii) has a similar noise character or similar regularity and duration to the noise from the noise source;

(c) the times of occurrence of the noise from the noise source;

(d) the number of persons likely to be adversely affected by the noise from the noise source and whether there is or is likely to be any special need for quiet at noise-affected premises;

(e) the land uses existing in the vicinity of the noise sources;

(f) any other matter required to be taken into account under section 25 if the Act or determined to be relevant by the Authority.

#### 4.2.1 Construction noise

Noise from construction activity is subject to Part 6, Division 1 of the Noise Policy as follows:

The following provisions apply to construction activity resulting in noise with an adverse impact on amenity:

(a) subject to paragraph (b), the activity-

(i) must not occur on a Sunday or other public holiday; and

(ii) must not occur on any other day except between 7.00 a.m. and 7.00 p.m.;

(b) a particular operation may occur on a Sunday or other public holiday between 9.00 a.m. and 7.00 p.m., or may commence before 7.00 a.m. on any other day—

(i) to avoid an unreasonable interruption of vehicle or pedestrian traffic movement; or

(ii) if other grounds exist that the Authority or another administering agency determines to be sufficient;

(c) all reasonable and practicable measures must be taken to minimise noise resulting from the activity and to minimise its impact, including (without limitation)—

(i) commencing any particularly noisy part of the activity (such as masonry sawing or jack hammering) after 9.00 a.m.; and

(ii) locating noisy equipment (such as masonry saws or cement mixers) or processes so that their impact on neighbouring premises is minimised (whether by maximising the distance to the premises, using structures or elevations to create barriers or otherwise); and

(iii) shutting or throttling equipment down whenever it is not in actual use; and

(iv) ensuring that noise reduction devices such as mufflers are fitted and operating effectively; and

(v) ensuring that equipment is not operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation that is audible at noise-affected premises; and

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. . .

(vi) operating equipment and handling materials so as to minimise impact noise; and

(vii) using off-site or other alternative processes that eliminate or lessen resulting noise.

For the purposes of this clause, construction activity results in noise with an adverse impact on amenity if measurements taken in relation to the noise source and noise-affected premises show—

(a) that the source noise level (continuous) exceeds 45 dB(A); or

(b) that the source noise level (maximum) exceeds 60 dB(A).

However-

(a) if measurements of ambient noise at the noise-affected premises show that the ambient noise level (continuous) exceeds 45 dB(A), the construction activity does not result in noise with an adverse impact on amenity unless the source noise level (continuous) exceeds the ambient noise level (continuous);

(b) if measurements of ambient noise at the noise-affected premises show that the ambient noise level (maximum) consistently exceeds 60 dB(A), the construction activity does not result in noise with an adverse impact on amenity unless the source noise level (maximum) exceeds the ambient noise level (maximum) or the frequency of the occurrence of the ambient noise level (maximum).

Baseline noise measurement results described in Section 5 show that average daytime ambient noise levels are 57 dB(A) L<sub>eq</sub> or more, and average night time ambient noise levels are 52 dB(A) L<sub>eq</sub> or more at sensitive receiver locations. On this basis 57 dB(A) L<sub>eq</sub> is considered to be an appropriate threshold for construction noise which may have an adverse impact on amenity for out-of-hours construction works occurring between 7am and 7pm on Sundays. No out-of-hours night time construction work is proposed.

### **5 Baseline Noise Environment**

### 5.1 Details

Background noise monitoring was undertaken over a period of 7 days between 21 November to 28 November 2022 to capture the existing ambient noise environment at adjacent land uses near the project. Additional noise monitoring results from a campaign undertaken from 16 February to 3 March 2022 are also included in the summary below.

The monitoring locations with respect to the subject site are presented in Figure 3.



Figure 3 Noise monitoring locations with respect to the subject site

### 5.2 Instrumentation

The noise measurements were taken with the equipment summarized in Table 13 below. The Rion NL-42 sound level meter is a Type 2 instrument suitable for field and laboratory use. The sound level meter was calibrated both before and after the measurements using a Type 1 Brüel & Kjær 4231 (Serial Number: 2528316) sound level calibrator, and the calibration was found to have not drifted. Both the sound level meters and calibrator carry current calibration certificates from a NATA accredited laboratory. Copies of the calibration certificates are available on request.

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Date	Location ID	Location Name	Equipment	Serial Number
16/02/2022	NL1	SEA Gas pump station	Rion NL-42	00946975
03/03/2022				
16/02/2022 –	NL2	Adj. 79 Robinson Road	Rion NL-42	01000315
03/03/2022				
21/11/2022 -	NL3	Adelaide Zoo	Rion NL-42	01000248
28/11/2022				
23/11/2022 -	NL4 <sup>(1)</sup>	Adj. 102 Robinson Road	Rion NL-42	01000319
28/11/2022				
21/11/2022 – 28/11/2022	NL5 <sup>(2)</sup>	Adj. 87 Robinson Road	Rion NL-42	01000315

#### Table 13 Background noise monitoring equipment summary

(1) Noise monitor was relocated per stakeholder request. Measured noise levels presented are only after the monitor relocation.

(2) Noise monitor was stolen, and noise data is unattainable.

Exclusions have been made based on periods where the measured noise levels may have been influenced by weather, namely where wind speed exceeded 5 m/s or rainfall exceeded 0.2 mm/hr in a given period, based on weather data recorded at BOM station.

#### 5.3 Results

A brief summary of the average measured noise levels during the monitoring period is presented in Table 14 and Table 15. Plots of the daily measured levels are attached to this report as Appendix B—Daily measured noise levels.

Location	Type/SN	Date period	Average measured noise level dB(A)		Maximum noise level dB(A)
			L <sub>eq, 15</sub> min	L90, 15 min	L <sub>Fmax</sub>
NL1	NL-42 00946975	16/02/2022 – 03/03/2022	56.7	45.7	97.2
NL2	NL-42 01000315	16/02/2022 – 03/03/2022	57.4	41.4	97.7
NL3	NL-42 01000248	21/11/2022 – 28/11/2022	61.4	37.8	98.7
NL4	NL-42 01000319	23/11/2022 – 28/11/2022	67.1	43.3	91.6
NL5	NL-42 01000315	-	-	-	-

Table 14 Noise monitoring results summary - Day

#### Table 15 Noise monitoring results summary - Night

Location	Type/SN	Date period	Average measured noise level dB(A)		Maximum noise level dB(A)
			Leq, 15min	L90, 15 min	L <sub>Fmax</sub>
NL1	NL-42 00946975	16/02/2022 – 03/03/2022	51.8	42.9	92.9
NL2	NL-42 01000315	16/02/2022 – 03/03/2022	52.1	39.3	96.6
NL3	NL-42 01000248	21/11/2022 – 28/11/2022	55.8	36.9	88.3
NL4	NL-42 01000319	23/11/2022 – 28/11/2022	62.3	38.9	90.0
NL5	NL-42 01000315	-	-	-	-

### 6 Assessment methodology

### 6.1 Modelling parameters

Noise emissions from site have been modelled in SoundPLAN Environmental Software v8.2 program, using the Conservation of Clean Air and Water in Europe (CONCAWE) algorithms. The model takes into consideration:

- attenuation of noise source due to distance
- barrier effects from buildings, topography and the like
- air absorption
- ground effects
- weather conditions (wind speed, wind direction, time of day, and cloud cover)

CONCAWE has six difference meteorological categories—CONCAWE meteorological category 1 represents weather conditions that are least conducive to noise propagation (best case situation with the lowest predicted noise levels), CONCAWE meteorological category 4 represents neutral weather conditions, and CONCAWE meteorological category 6 represents weather conditions that are the most conducive to noise propagation (the worst case situation with the highest predicted noise levels). In accordance with the *Guidelines for the use of the Environmental Protection (Noise) Policy 2007*, CONCAWE meteorological category 5 has been used for day time noise emissions and CONCAWE meteorological category 6 has been used for night time noise emissions.

#### 6.2 Noise modelling scenarios

Noise emissions from the proposed development have been assessed from the scenarios outlined in Table 16 for a 15-minute assessment period.

Scenarios	Activity	Criteria
Scenario 1	Stage 1 construction	Noise Policy Part 6 Division 1 (refer to Section 4.2.1)
Scenario 2	Stage 1 operation	Noise Policy day and night (refer to Table 12)
Scenario 3	<ul><li>Stage 1 operation</li><li>Stage 2 construction</li></ul>	Noise Policy Part 6 Division 1 (refer to Section 4.2.1) <sup>(1)</sup>
Scenario 4	<ul><li>Stage 1 operation</li><li>Stage 2 operation</li></ul>	Noise Policy day and night (refer to Table 12)

#### Table 16 Noise modelling scenarios

(3) Noise from Stage 1 operation has been included in this scenario in order to present the most accurate representation of Project noise impacts during Stage 2 construction, however we note that operational noise is not typically assessed against Part 6 Division 1 of the Noise Policy.

#### 6.3 Characteristic noise penalties

Penalties should be applied to noise predictions in accordance with the Noise Policy to recognise annoyance associated with noise that is dominated by tonal, modulating, low frequency, or impulsive characteristics. A 5 dB(A) penalty is applied for one characteristic, an 8 dB(A) penalty is applied for two characteristics, and a 10 dB(A) penalty is applied for three or more characteristics.

For a characteristic penalty to be applied to a noise source it must be fundamental to the noise and dominate the overall noise impact.

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Application of a characteristic penalty will depend on the received noise levels compared with the background noise levels, to determine whether or not the characteristic(s) are fundamental to the noise and dominate the overall noise impact.

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### 7 Construction noise assessment

#### 7.1 Construction noise sources

Indicative construction noise sources are presented in Appendix C. In general, construction of each Stage 1 and Stage 2 may occur in two broad sub-stages:

- C1: Site preparation and civil works
- C2: Processing plant construction (structural works)

Noise from each of these construction stages has been assessed on a worst-case basis with all sources assumed to be operating simultaneously.

### 7.2 Predicted noise levels

Nominal worst-case predicted noise levels during construction are presented in Table 17 overleaf. Note that predicted noise levels from Stage 2 construction includes cumulative noise from Stage 1 operation, assuming mitigation is adopted as described in Section 8.2.

Predicted worst-case construction noise levels are above the Noise Policy limit of 57 dB(A)  $L_{eq}$  (based on existing ambient noise levels) for works occurring on Sundays between 7am and 7pm, at up to five noise sensitive receiver locations.

We note that construction noise levels are likely to be significantly less than those presented in Table 17 for the majority of the time, and a variety of construction activities can likely be carried out without exceeding the Noise Policy limit of 57 dB(A) applicable during the daytime on Sundays. In particular, noise emissions from activities which use lower noise equipment or which are undertaken in parts of the site that are more distant or shielded from the nearest noise sensitive receivers can be expected to be within this criteria.

More detailed construction noise predictions can be undertaken (for example as part of a Construction Noise Management Plan) one more detail is known about the construction methodology and equipment, to determine which activities are permissible on Sundays.

Construction noise during standard hours (7am to 7pm Monday to Saturday) will comply with the Noise Policy provided the mitigation measures described below are adopted.

### 7.3 Construction noise mitigation

We recommend that a construction noise management plan is developed as part of the CEMP once a contractor has been appointed and a detailed construction methodology has been developed.

Construction may occur outside of Standard Hours (during the daytime on Sundays) if an activity is intrinsically low noise, or where it can be demonstrated through monitoring or detailed modelling that works are not expected to have an adverse effect on amenity (that is, the predicted or measured noise level is less than 57 dB(A)  $L_{eq}$  at receiver locations).

As a minimum, the following construction noise mitigation measures will be adopted for all works as required by the Noise Policy:

• commencing any particularly noisy part of the activity (such as masonry sawing or jack hammering) after 9.00 a.m.; and

- locating noisy equipment (such as masonry saws or cement mixers) or processes so that their impact on neighbouring premises is minimised (whether by maximising the distance to the premises, using structures or elevations to create barriers or otherwise); and
- (shutting or throttling equipment down whenever it is not in actual use; and
- ensuring that noise reduction devices such as mufflers are fitted and operating effectively; and
- ensuring that equipment is not operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation that is audible at noise-affected premises; and
- operating equipment and handling materials so as to minimise impact noise; and
- using off-site or other alternative processes that eliminate or lessen resulting noise.

Additional construction noise and vibration mitigation measures will be developed as part of the Construction Environmental Management Plan (CEMP) prior to commencement of construction. In addition to the above measures required by the Noise Policy, measures could include consulting with potentially affected neighbours and programming high noise works to avoid particularly sensitive times if required.



#### Table 17 Predicted nominal worst-case construction noise levels

		Zoning		Noise Policy Criteria, L <sub>eq</sub> dB(A)		Predicted noise levels Leq dB(A)			
number	Title		Building Use	Standard	Out of hours	Stag	e 1 Stage 2 <sup>(1)</sup>		age 2 <sup>(1)</sup>
				hours	(Sunday daytime)	C1	C2	C1	C2
R01	CT 5710 798	Rural Horticulture	Workshop	No	-	52	50	47	46
R02	CT 5395 689	Rural Horticulture	Residential	quantitative criteria	57	52	50	48	46
R03	CT 5427 926	Rural Horticulture	Residential		57	50	49	48	46
R04	CT 5710 802	Rural Horticulture	Residential		57	52	50	48	46
R05	CT 5553 275	Rural Horticulture	Residential		57	51	49	48	46
R06	CT 5755 245	Rural Horticulture	Residential		57	55	53	50	48
R07	CT 6088 360	Rural Horticulture	Residential		57	57	54	53	51
R08	CT 5606 363	Rural Horticulture	Residential		57	42	39	37	36
R09	CT 5808 917	Rural Horticulture	-		-	59	57	55	52
	CT 5808 918	Rural Horticulture	Shed		-	-	-	-	-
R11	CT 6161 442	Rural Horticulture	Residential		57	59	56	53	51
R12	CT 5916 884	Rural Horticulture	-		-	-	-	-	-
R13	CT 6206 190	Rural Horticulture	Office		-	64	61	58	56
	CT 6206 190	Rural Horticulture	Residential		57	61	59	57	55
R14	CT 6179 957	Rural Horticulture	Residential (TBC)		57	66	62	62	58

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		Zoning		Noise Policy Criteria, L <sub>eq</sub> dB(A)		Predicted noise levels L <sub>eq</sub> dB(A)			
number	Title		Building Use	Standard	d Out of hours (Sunday daytime)	Stage 1		Stage 2 <sup>(1)</sup>	
				hours		C1	C2	C1	C2
R15	CT 5111 400	Rural Horticulture	Residential		57	65	62	64	60
R16	CT 5383 171	Rural Horticulture	Residential		57	65	62	66	63
R17	CT 5383 536	Rural Horticulture	-		-	-	-	-	-
	CT 5383 157	Rural Horticulture	-		-	-	-	-	-
	CT 5383 534	Rural Horticulture	-		-	-	-	-	-
R20	CT 5383 533	Rural Horticulture	-		-	-	-	-	-
R21	CT 6177 367	Rural Horticulture	-		-	-	-	-	-
R22	CT 5753 590	Open Space	Recreation use	]	-	48	46	51	49
	CT 5747 216	Rural Horticulture	-	]	-	-	-	-	-

(1) Includes contribution from Stage 1 operational noise, assuming operational noise mitigation is adopted as described in Section 8.2.

### 8 Operational noise assessment

#### 8.1 Noise sources

Table 23 shown in *Appendix C—Noise sources* outlines the equipment required on site and the adopted sound power levels.

We note that at this stage of the project, details of the plant design and equipment selections are not finalised and subject to change. Consequently, noise data for each item is indicative for the purpose of assessment, based on preliminary selections. Equipment manufacturer's noise data was used where available, otherwise noise data for equivalent or similar equipment items was obtained from Resonate's database.

### 8.2 Mitigation

Indicative noise mitigation options have been developed in collaboration with the Project team as an iterative process as design of the Project has progressed. In general, indicative noise mitigation options presented in Table 18 have been targeted to sources which were found through preliminary noise modelling to contribute most significantly to overall noise emissions at receiver locations.

As noted above, details of the plant design and equipment selections are not finalised, therefore mitigation options should be considered to be indicative for the purposes of showing that noise emissions from the project can be reduced to acceptable levels using reasonable and practicable measures. In general, noise data for many sources has been provided or adopted as a reasonable upper limit. If lower noise equipment items are able to be procured during detailed design, the required extent of facade treatment could be reduced, for example.

ID	Mitigation items	Description
M1	Micronising/Spheronising stacks	Install silencers to each micronising and spheronising stack to limit noise exhaust to $L_W70~\text{dB}(A)$
M2	Train building doors	Close the roller doors to the train buildings at all times other to allow for personnel and vehicle access when necessary.
М3	Train building	<ul> <li>Upgrade the walls and roof constructions of the train buildings as follows:</li> <li>Metal cladding</li> <li>1 x 12 mm fibre cement sheet directly flush to the metal cladding on the internal side of the roof and indicative extent of walls as shown in Figure 4 below</li> </ul>
M4	Purification Plant building	Fully enclose the purification plant.
		<ul> <li>Opgrade the wall and roor construction of purification building as follows:</li> <li>Metal cladding</li> <li>1 x 12 mm fibre cement sheet directly flush to the metal cladding on the internal side of the roof and indicative extent of walls as shown in Figure 4 below</li> </ul>

#### Table 18 Indicative mitigation options

ID	Mitigation items	Description
M5	Kiln building	Fully enclosing the kiln extent.
		<ul> <li>Upgrade the wall and roof constructions of the kiln building as following:</li> <li>Metal cladding</li> <li>1 x 12 mm fibre cement sheet directly flush to the metal cladding on the internal side of the roof and indicative extent of walls as shown in Figure 4 below</li> </ul>
M6	Reagent areas	Equipment selections and detailed design to limit the contribution of reagent areas to achieve $L_{eq}$ 35 dB(A) or less at the nearest receivers.
M7	Kiln exhaust silencer	Install a silencer to both Stage 1 and Stage 2 kiln exhausts to limit exhaust sound power level to $L_W$ 80 dB(A).
M8	Wastewater Treatment Plant sources	Equipment selections and detailed design to limit the contribution of WWTP to achieve $L_{eq}$ 35 dB(A) or less at the nearest receivers.
M9	Demineralisation plant sources	Equipment selections and detailed design to limit the contribution of Demineralisation plant to achieve Leq 35 dB(A) or less at the nearest receivers.
M10	Alkaline scrubber exhaust silencer	Install a silencer to scrubbers to limit exhaust sound power level to $L_W$ 85 dB(A).
M11	Kiln scrubber exhaust silencer	Install a silencer to scrubbers to limit exhaust sound power level to $L_{\rm W}85$ dB(A).
M12	Compressors	Fully enclosing the compressors area extent



Figure 4 Indicative facade upgrade extent

#### 8.3 Predicted noise levels

The predicted noise levels during operation of Stage 1, and Stage 1 and 2 (with indicative noise mitigation) are presented in Table 19 below. Note that based on the proposed 24/7 operation there is no significant difference in daytime and night time operational activity. Noise predictions have been presented for night time only for brevity (using CONCAWE Category 6 meteorological conditions).

Receiver	Certificate of		Building	Noise Po L <sub>eq</sub>	licy Criteria, dB(A)	Predicted noise levels L <sub>eq</sub> dB(A)	
number	Title	Zoning	Use	Daytime	Night time	Stage 1	Stage 1 and 2
R01	CT 5710 798	Rural Horticulture	Workshop	52	-	35	37
R02	CT 5395 689	Rural Horticulture	Residential	52	45	35	37
R03	CT 5427 926	Rural Horticulture	Residential	52	45	33	35

Table 19 Predicted noise levels during operation (with noise mitigation)

Receiver	Certificate of		Building	Noise Policy Criteria, L <sub>eq</sub> dB(A)		Predicted noise levels L <sub>eq</sub> dB(A)	
number	Title	Zoning	Use	Daytime	Night time	Stage 1	Stage 1 and 2
R04	CT 5710 802	Rural Horticulture	Residential	52	45	35	36
R05	CT 5553 275	Rural Horticulture	Residential	52	45	34	35
R06	CT 5755 245	Rural Horticulture	Residential	52	45	38	39
R07	CT 6088 360	Rural Horticulture	Residential	52	45	40	41
R08	CT 5606 363	Rural Horticulture	Residential	52	45	26	27
Doo	CT 5808 917	Rural Horticulture	-	-	-	-	-
RU9	CT 5808 918	Rural Horticulture	Shed	-	-	42	43
R11	CT 6161 442	Rural Horticulture	Residential	52	45	41	42
R12	CT 5916 884	Rural Horticulture	-	-	-	-	-
<b>D</b> 40	CT 6206 190	Rural Horticulture	Office	52	-	45	46
R13	CT 6206 190	Rural Horticulture	Residential	52	45	43	45
R14	CT 6179 957	Rural Horticulture	Residential <sup>(1)</sup>	52	45	47	47
R15	CT 5111 400	Rural Horticulture	Residential <sup>(2)</sup>	52	45	49	49
R16	CT 5383 171	Rural Horticulture	Residential	52	45	50	51
	CT 5383 536	Rural Horticulture	-	-	-	-	-
R17	CT 5383 157	Rural Horticulture	-	-	-	-	-
	CT 5383 534	Rural Horticulture	-	-	-	-	-
R20	CT 5383 533	Rural Horticulture	-	-	-	-	-
Receiver	Certificate of Title	Zoning	Building Use	Noise Policy Criteria, L <sub>eq</sub> dB(A)		Predicted noise levels L <sub>eq</sub> dB(A)	
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number				Daytime	Night time	Stage 1	Stage 1 and 2
R21	CT 6177 367	Rural Horticulture	-	-	-	-	-
R22	CT 5753 590	Open Space	Recreation use	-	-	34	36
	CT 5747 216	Rural Horticulture	-	-	-	-	-

(1) Horticultural site with a building that is assumed to be an occupied residence, however this has not been confirmed

(2) Not currently inhabited

We note that no character penalties have been applied to noise emissions from the site on the basis that:

- Noise from processing plant items is generally fan, pump and exhaust stack noise which is generally broadband and continuous. There are no items with known significant tonal or low frequency character. In addition, the overall noise processing plant emissions (excluding trucks) at receptor locations include contributions from hundreds of sources with no single item dominating overall levels.
- Modulating character typically associated with noise from trucks is not expected to be fundamental to the impact of the noise and dominate the overall noise impact at receiver locations, because these receivers are exposed to existing noise from trucks travelling on Robinson Road, which are closer and travel at higher speeds.
- Forklifts will be fitted with broadband (i.e. not tonal) reversing alarms. The site layout has been designed to eliminate the need for truck reversing movements.

Worst-case predicted noise levels comply with the day time criteria at all receivers.

Worst-case predicted noise levels at all receivers comply with the night time criteria, other than at:

- R14, where the night time criteria is exceeded by up to 2 dB
- R15, where the night time criteria is exceeded by up to 4 dB
- R16, where the night time criteria is exceeded by up to 5-6 dB

The likely impact of noise emissions is discussed in the following section.

#### 8.4 Discussion

The predicted exceedance of night time criteria is primarily due to truck movements, and may occur up to four times in a per night from a maximum of 1-2 trucks entering and exiting the site during combined operation of Stage 1 and 2.

It should be noted that there are already relatively frequent existing truck movements on Robinson Road, which generate similar or higher noise emissions at noise sensitive receiver locations, that those expected from the proposed Project.

Noise from trucks associated with the Project cannot be further physically mitigated (e.g. through noise barriers or similar) since trucks must enter the site from Robinson Road. The need for a wide vehicle cross-over to accommodate AB-triple or A-double turning movements would result in a large gap in any site acoustic fence which would largely negate any potential reduction of truck noise emissions from the site.

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It is understood that feasibility of restricting trucks to daytime hours only has been investigated, and it was found that this is likely to result in unreasonable costs associated with additional storage infrastructure and driver labour. Additionally, flexibility to receive emergency parts or materials via truck delivery during night time hours is essential in order to avoid the significant costs that would otherwise be associated with halting production.

It is recommended that the following noise management and mitigation measures are implemented in relation to truck noise:

- Where practicable, truck movements should be scheduled to arrive and depart the site during daytime hours, and night time movements should only occur where necessary to avoid unreasonable operational costs.
- Trucks should not idle unnecessarily while on site.
- Trucks should be limited to speeds of no more than 20 km/h on site.
- Use of low noise trucks (for example, electric trucks) could be investigated in the future, noting that the site is expected to operate for many years. To be clear, this mitigation measure is not expected to be reasonable or practicable in the immediate future.

For information and context, noise emissions from operation of the Project (excluding trucks) have been predicted and are presented in Table 20 below.

Receiver	Certificate of Title	Zoning	Building Use	Noise Policy Criteria, L <sub>eq</sub> dB(A)		Predicted noise le∨els L <sub>eq</sub> dB(A)	
number				Daytime	Night time	Stage 1	Stage 1 and 2
R01	CT 5710 798	Rural Horticulture	Workshop	52	-	33	35
R02	CT 5395 689	Rural Horticulture	Residential	52	45	33	35
R03	CT 5427 926	Rural Horticulture	Residential	52	45	32	33
R04	CT 5710 802	Rural Horticulture	Residential	52	45	33	34
R05	CT 5553 275	Rural Horticulture	Residential	52	45	32	34
R06	CT 5755 245	Rural Horticulture	Residential	52	45	36	37
R07	CT 6088 360	Rural Horticulture	Residential	52	45	37	38
R08	CT 5606 363	Rural Horticulture	Residential	52	45	23	25
R09	CT 5808 917	Rural Horticulture	-	-	-	-	-
	CT 5808 918	Rural Horticulture	Shed	-	-	39	41

#### Table 20 Predicted noise levels during operation with mitigation-excluding trucks

Receiver	Certificate of Title	Zoning	Building Use	Noise Policy Criteria, L <sub>eq</sub> dB(A)		Predicted noise levels L <sub>eq</sub> dB(A)	
number				Daytime	Night time	Stage 1	Stage 1 and 2
R11	CT 6161 442	Rural Horticulture	Residential	52	45	39	40
R12	CT 5916 884	Rural Horticulture	-	-	-	-	-
	CT 6206 190	Rural Horticulture	Office	52	-	42	44
RIJ	CT 6206 190	Rural Horticulture	Residential	52	45	40	42
R14	CT 6179 957	Rural Horticulture	Residential (TBC)	52	45	42	43
R15	CT 5111 400	Rural Horticulture	Residential	52	45	45	45
R16	CT 5383 171	Rural Horticulture	Residential	52	45	44	47
	CT 5383 536	Rural Horticulture	-	-	-	-	-
R17	CT 5383 157	Rural Horticulture	-	-	-	-	-
	CT 5383 534	Rural Horticulture	-	-	-	-	-
R20	CT 5383 533	Rural Horticulture	-	-	-	-	-
R21	CT 6177 367	Rural Horticulture	-	-	-	-	-
R22	CT 5753 590	Open Space	Recreation use	-	-	32	35
	CT 5747 216	Rural Horticulture	-	-	-	-	-

Noise emissions from operation of Stage 1 of the Project, in the absence of truck movements, is predicted to comply with the relevant daytime and night time environmental noise criteria at all locations. Cumulative noise from operation of Stage 1 and 2 of the Project, in the absence of truck movements, is predicted to comply with the environmental noise criteria at all locations except at one residence where noise may exceed the night time Noise Policy criteria by up to 2 dB(A) during a nominal worst-case scenario.

As outlined in Section 4.2, exceedance of the objective criteria does not necessarily mean that noise emissions are excessive or that action is required under the Noise Policy. Instead, the matters from Clause 20(6) of the Noise Policy outlined in Table 21 should be considered when assessing the likely impact of the noise. Each item has been addressed with additional commentary.

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#### Table 21 Matters for consideration under Part 5 Clause 20(6) of the Noise Policy

Part 5 Subclause 6	Comments			
The amount in dB(A) by which the predicted source noise level (continuous) or predicted source noise level (maximum) exceeds the relevant level and the likely frequency and duration of the noise levels that give rise to that result;	<ul> <li>Worst-case noise emissions (including trucks) exceed the relevant night time criteria by up to 6 dB(A), while worst-case noise emissions excluding trucks exceed the relevant criteria by up to 2 dB(A).</li> <li>A maximum of 1-2 truck trips are expected per night (i.e. up to four entry or exit movements).</li> <li>It should also be noted that predictions are based on all noise sources operating simultaneously under worst-case (CONCAWE Category 6) meteorological conditions. These conditions are expected to occur infrequently in practice, and receiver noise levels under neutral or northerly/easterly conditions are expected to be less.</li> <li>Noise predictions are also conservative in the sense that all sources are assumed to be operating simultaneously, and where a range of levels exists in the available data for a particular source, a level representing the upper end of the range bas been adopted</li> </ul>			
<ul> <li>Any component of the ambient noise or extraneous noise that— <ul> <li>(i) has a noise level similar to or greater than the predicted source noise level (continuous) or predicted source noise level (maximum); and</li> <li>(ii) has a similar noise character or similar regularity and duration to the noise from the noise source</li> </ul> </li> </ul>	At R14, R15 and R16, the predicted noise levels are controlled by the truck noise, which has a similar nature to the existing environment which is dominated by road traffic noise, including truck movements on Robinson Road. Measured ambient noise levels described in Section 5 and plots presented in Appendix B show relatively high existing noise levels, with measured existing noise levels at all monitoring locations frequently exceeding 51 dB(A) L <sub>eq</sub> during night time hours. In the absence of any other significant night time noise sources observed in the vicinity of the site, these levels are assumed to be due to road traffic (including trucks).			
The times of occurrence of the noise from the noise source;	The Project will operate on a 24/7 basis, however it should be noted that the majority of truck movements will occur during daytime hours.			

Part 5 Subclause 6	Comments		
The number of persons likely to be adversely affected by the noise from the noise source and whether there is or is likely to be any special need for quiet at noise-affected premises;	Only three receivers (R14, R15 and R16) are potentially affected by noise levels exceeding the Policy night time criteria. It should also be noted that these noise levels are based on predictions at the western (front yard) side of R15 and R16 and noise levels to the rear (where outdoor living spaces are more likely to be situated) are less.		
	Renascor have attempted to determine which residences on Robinson Road were in use or not, and we were able to determine the following:		
	R14 – possibly inhabited		
	R15 – uninhabited		
	R16 – inhabited		
	We note that the Rural Horticulture zoning is likely to limit the addition of any other noise sensitive development on these sites under the Planning & Design Code.		
The land uses existing in the vicinity of the noise source;	The subject site and all potentially affected receivers are situated in a Rural Horticulture with horticultural land uses, including dwellings on some sites.		
	Subjectively the area does not currently enjoy high levels of residential or rural amenity, with a number of other relatively high-noise land uses in the vicinity, including the SA Gun Club, Southern Go Kart Club, SA Water facilities, and the Northern Connector (North-South Motorway).		
Any other matter required to be taken into account under section 25 of the Act or determined to be relevant by the	Section 25 of the Environment Protection Act 1993 (EP Act) states that:		
Authority.	A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to present or minimise any resulting environmental harm.		
	Extensive investigation and modelling of noise mitigation options has been undertaken, resulting in the list of indicative options presented in Table 18. Renascor have committed in principle to implementing these measures, noting that they may be subject to refinement during detailed design.		
	Renascor will continue to explore any additional measures during detailed design, construction, and operation; and is committed to implementing measures which are found to be reasonable and practicable.		

#### Summary

Clause 20(6) of the Noise Policy acknowledges that a potential inability to meet the objective night time criteria is, in itself, not an indication that excessive or unreasonable noise would be generated by the proposed development.

When considering the likely magnitude and frequency of predicted noise levels in the context of the existing noise environment, noise emissions from the Project are not expected to have a significant adverse impact on noise sensitive receivers.

All reasonable and practicable noise mitigation measures will be taken to minimise the potential noise impact of the Project.

#### 9 Conclusion

An environmental noise impact assessment has been undertaken for the proposed Battery Anode Material (BAM) Facility at Robinson Road, Bolivar.

This assessment has demonstrated that, with the indicative on-site noise mitigation treatments detailed in this report, the noise emissions from construction and operation of the proposed development will be able to comply with the relevant environmental noise criteria, except at three neighbouring receiver locations where noise from operation of the project could exceed the night time Noise Policy criteria by up to 6 dB.

When considering relevant factors in accordance with Clause 20(6) of the Noise Policy, noise emissions from the Project are not expected to have a significant adverse impact on noise sensitive receivers in the context of the existing noise environment. All reasonable and practicable measures will be implemented to minimise the impact of noise emissions from construction and operation of the Project.

On this basis the proposed development will be able to operate within the relevant noise provisions in the Planning & Design Code, Environmental Protection (Noise) Policy, and Environment Protection Act.



**Appendix A—Site layout** 

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L	м				
GENERAL NOTES					
1-THIS DEVELOPMENT WILL INCLUDE A GREEN BUFFER ZONE 10m WIDE ON THE NORTH, NORTH-WEST & SOUTH-WEST BOUNDARIES. NATIVE TREES AND VEGETATION WILL CREATE A SCREEN FOR PROCESS PLANT INFRASTRUCTURE. 2-STORMWATER STRUCTURES IN CORRIDOR ALONG ROBINSON ROAD BY OTHERS.					
LEGEND					
	EXISTING U/G GAS PIPELINE				
	NEW U/G GAS PIPELINE TO BAM INFRASTRUCTURE				
	EXISTING U/G CATHODIC PROTECTION CABLE				
	U/G ELECTRICAL CABLES	3			
	RAW WATER SUPPLY & TREATED WATER ABOVE GROUND				
<b>0</b> -	RAW WATER SUPPLY & TREATED WATER UNDERGROUND				



Appendix B—Daily measured noise levels

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#### NL1 – SEA Gas pump station



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NL2



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NL3



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NL4



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#### **Appendix C—Noise sources**

Plant items which may be used on site during construction are presented below. Equipment is indicative based on our experience on similar sites.

#### Table 22 Indicative construction noise sources

Equipment item	Quantity on site	Sound power level, dB(A) Leq				
C1: Site preparation and civil works						
Concrete batching	1	115				
Concrete truck	1	107				
Dozer	1	110				
Excavator 30T	2	103				
Mulcher	1	114				
Dump truck / tipper truck	2	108				
Water truck	1	108				
Grader	1	115				
Vibratory roller	1	102				
Generators	2	102				
Indicative activity sound power	level	121				
C2: Processing plant construction (structural works)						
Crane	2	110				
Franna crane	1	99				
Trucks	3	108				
Generator	2	102				
Air compressor	1	91				
Lighting towers	2	95				
Hand tools	5	105				
Indicative activity sound power	118					

#### Table 23 Operational noise sources

Sources	Equipment	Quantity	Sound level (per item)	
Micronising &	Micronising exhaust stack	TBC <sup>(1)</sup>	Lw 70 dB(A)	
Spheronising Mill Building	Mill	TBC <sup>(1)</sup>	L <sub>p</sub> 85 dB(A) at 1 m	
Kiln Building	Scrubber exhaust	1 each stage	Lw 85 dB(A)	
	Rotary kiln muffle exhaust stack	1 each stage	L <sub>W</sub> 80 dB(A)	
	Alkaline gas scrubber stack	1 each stage	Lw 85 dB(A)	
	All other internal equipment	1 each stage	Lw 99 dB(A)	
Purification Building	Spiral flash dryer stack	1 each stage	L <sub>W</sub> 75 dB(A)	
	All internal equipment	1 each stage	Lw 94dB(A)	
Compressors	Compressors	3 each stage	L <sub>w</sub> 88 dB(A)	
Waste Water Treatment	External equipment	1 each stage	Lw 85 dB(A)	
Plant (WWTP)	Pumps (internal)	4 each stage	Lw 80 dB(A)	
Demineralisation Plant	All equipment	1 each stage	Lw 90 dB(A)	
Workshop and Warehouse Facility	Workshop activities	1	L <sub>p</sub> 85 dB(A)	
Sulphuric Acid Reagents	All equipment	1 each stage	Lw 80 dB(A)	
Caustic Reagents	All equipment	1 each stage	L <sub>W</sub> 82 dB(A)	
Sodium Aluminate Reagents	All equipment	1 each stage	Lw 78 dB(A)	
Lime Silo Reagents	All equipment	1 each stage	Lw 88 dB(A)	
Administration Building	Externally located air conditioning condenser	10	L <sub>w</sub> 78 dB(A)	
Emergency Response and First Aid Facility	Externally located air conditioning condenser	2	Lw 78 dB(A)	
Security Gate House	Externally located air conditioning condenser	1	L <sub>w</sub> 78 dB(A)	
Deliveries and Service Vehicles	Heavy vehicles	1 per 15-minute assessment period	Lw 104 dB(A)	
Light vehicles and Car Park	Light vehicles	20 vehicle movements per 15- minute assessment period and 50 number of parking space	Lw 85 dB(A)	
Storage / bagging	Gas forklift	2 per stage	L <sub>W</sub> 96 dB(A)	

(1)

A conservative number of stacks were modelled based on preliminary engineering design. Final number of stacks to be determined through detailed engineering