

Appendix O

Noise Impact Assessment

Bromelton Compost Manufacturing Facility

Acoustic Assessment

SOILCO Pty Ltd

28 August 2024

→ **The Power of Commitment**



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Executive summary

GHD has been engaged by SOILCO Pty Ltd to prepare an acoustic assessment of the construction and operational phases of a Compost Manufacturing Facility (the Project) to support the material change of use (MCU) development application under Bromelton State Development Area (SDA) Planning Scheme (referred to as an SDA development application) and the Environmental Authority application for environmentally relevant activities. This acoustic assessment determines any potential impacts on the nearby sensitive receivers, and identifies any specific mitigation measures required.

Potentially impacted receivers surrounding the Project site (Lot 4 on RP85497 and Mitchell Road (road parcel)) were identified via aerial imagery. The nearest types of receivers were comprised of residential and industrial receivers. The nearest identified residential receiver is 1,370 metres south of the site, and the nearest industrial receiver is 1,230 metres east of the site.

The applicable noise criteria for the different noise generating aspects of the Project were established. They are based on relevant legislation, regulations and guidelines for the Project. They include:

- *Environmental Protection Act 1994*
- *Environmental Protection (Noise) Policy 2019*
- TMR Code of Practice – Volume 1 and 2

Noise modelling was undertaken to determine the potential noise impacts of different aspects of the Project. The results show the following:

- All construction activities are expected to comply with the established criteria at all receivers. This includes the construction of Mitchell Road.
- Construction road traffic noise is expected to comply with the established criteria at all receivers.
- Operational activities are expected to comply with the established criteria at all receivers during the day time period.
- Operational activities are expected to comply with the established criteria at all receivers during the 6am to 7am 'morning shoulder' period.
- Mechanical plant expected to run 24/7 are expected to comply with the established criteria at all receivers for all time periods.
- Operational road traffic noise is expected to comply with the established criteria at all receivers. This includes the road traffic noise from Mitchell Road on nearby sensitive receivers.

Noise mitigation and management measures to be considered and implemented include:

- For construction, measures should be implemented where reasonable and feasible as part of best practice. This is detailed in Section 7.2.
- For operations, measures should be implemented to mitigate and manage the noise impacts from the site. Site specific noise mitigation and management measures are detailed in Section 7.3.1.
- For operations, best practice environmental management measures should also be implemented. These are detailed in Section 7.3.2.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.4, and the assumptions and qualifications contained throughout the report.

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1. Introduction

1.1 Background

SOILCO Pty Ltd (SOILCO) are preparing a approvals application documentation for a Compost Manufacturing Facility (the Project). This assessment encompasses the construction and operation of the Compost Manufacturing Facility, which is expected to utilise a relatively small portion of the 161 hectare (ha) lot and will process Garden Organics (GO) and Food Organics & Garden Organics (FOGO). The Project is located at 260 Mitchell Road, Lot 4, Bromelton, Queensland.

1.2 Purpose of this report

GHD has been engaged by SOILCO to prepare an acoustic assessment of the construction and operational phases of the Project to support the material change of use (MCU) development application under Bromelton State Development Area (SDA) Planning Scheme (referred to as an SDA development application) and the Environmental Authority application for environmentally relevant activities.

An acoustic assessment that determines any potential impacts on the nearby sensitive receivers, and identifies any specific mitigation measures required.

1.3 Scope of works

The scope of works undertaken as part of the acoustic assessment included the following:

- Identifying and mapping noise-sensitive receivers potentially impacted by the operation of the site.
- Undertaking background noise monitoring for a period of one week at two locations representative of the nearest sensitive receivers.
- Determining noise criteria for the site based on the background noise levels in accordance with the *Environmental Protection (Noise) Policy 2019* and Department of Environment, Science and Innovation (DESI) Guidelines.
- Reviewing sound power data provided by the client or, used for past composting projects considered relevant.
- Preparing a computer noise model using topographic elevation contours, to determine sound power levels for noise producing activities.
- Predicting noise level emissions from the use of the composting facility to nearest sensitive receivers.
- Determining potential impacts of noise generated by traffic entering and leaving the site.
- Determining any noise reduction measures required for the composting facility (if necessary), to carry out the proposed operations.
- Preparing an acoustic assessment report (this document) including:
 - Ambient noise monitoring results
 - Potential noise mitigation measures to allow for the proposed operating hours

1.4 Limitations

This report has been prepared by GHD for SOILCO Pty Ltd and may only be used and relied on by SOILCO Pty Ltd for the purpose agreed between GHD and SOILCO Pty Ltd as set out in Section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than SOILCO Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

GHD has prepared this report on the basis of information provided by SOILCO Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer Section 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

1.5 Assumptions

The following assumptions were relied upon in preparation of this acoustic assessment:

- Sensitive receivers were identified using aerial photography and may not include all existing or future receivers near the Project site. The information provided in this report is considered representative at the time of assessment.
- Mitchell Road is being developed to service the Project. The intended traffic volumes on the road at the time of assessment is limited to that required for the construction and operation of the Project.

Additional assumptions are also established throughout the report as appropriate.

1.6 Terminology

Terminology used in this report is outlined in Table 1.1.

Table 1.1 *Project-specific terminology*

Term	Meaning
CMF	The Bromelton Compost Manufacturing Facility.
Construction footprint	The 21 ha area where the proposed facility construction activities are planned.
Permanent footprint	The 18.5 ha area where the proposed facility will be permanently occupied.
Project site	The Bromelton CMF Project site includes all of Lot 4 on RP85497 and Mitchell Road (road parcel).
Project lot boundary	The boundary of Lot 4 on RP85497, which has a total area of 106 ha.
Study area	The study area represents the extent of the desktop searches undertaken for environmental assessments, and includes a 5 km buffer around the approximate centre point (latitude and longitude -27.97819,152.91026) of the Bromelton CMF Project site.

2. Project description

The Bromelton Compost Manufacturing Facility (the 'Bromelton CMF Project') is an organics facility located along Mitchell Road in Bromelton, South East Queensland. The Bromelton CMF Project will involve the construction and operation of this facility for the receipt, processing, composting, and storage of the following materials: garden, food, wood wastes, manures and soil for the sale and distribution of finished compost, mulch and soil products. SOILCO Pty Ltd (referred to as SOILCO) will design, construct and operate the Bromelton CMF Project.

SOILCO are seeking the following approvals for the Project:

- A State Development Area (SDA) Material Change of Use approval for works within the Bromelton SDA under the *State Development and Public Works Organisation Act 1971*.
- An Environmental Authority (EA) Approval for the following Environmentally Relevant Activities (ERAs):
 - ERA 33(1): Crushing, milling, grinding or screening more than 5,000t of material in a year.
 - ERA53(a): Organic material processing – processing more than 200 t of organic material in a year by composting
 - ERA 54(2)(c): Mechanical waste reprocessing – operating a facility for receiving and mechanically reprocessing more than 10,000 t a year of general waste

The Bromelton CMF Project aligns with the objectives set out in the Queensland Government Queensland Organics Strategy 2022–2032, by reducing the amount of organic waste going to landfill. It will also offer economic and social benefits through employment and local business opportunities in South East Queensland.

SOILCO commenced composting operations in 1985 in Australia, where they have a strong distribution network across agricultural and urban markets. SOILCO are a manufacturer of quality-assured compost, mulch and soil blends; and specialise in the design, construction and operation of innovative organics recycling facilities in Australia. SOILCO's mission is to transform organic resources into the world's best products, to regenerate and enhance the health and productivity of soil, and to maximise their contribution to clean energy and sustainable communities.

SOILCO successfully operates a state-of-the-art network of licensed organics processing facilities across Eastern Australia. SOILCO's infrastructure experience spans various technology solutions, including:

- Open Windrow (OW)
- In-Vessel Composting (IVC) tunnels
- Aerated Static Piles / Covered Aerated Static Piles (ASP / CASP)

For the Bromelton CMF Project, SOILCO will utilise ASP & OW technologies.

Table 2.1 and Figure 2.1 summarise and depict the key components of the Bromelton CMF Project.

Table 2.1 *Project summary*

Project Component	Details
Lot on Plan	Lot 4 on Plan RP85497 and Mitchell Road (Local government road parcel)
Summary of proposed works	Construct and operate a Compost Manufacturing Facility (CMF) at 260 Mitchell Road, Bromelton for the sale and distribution of finished compost, mulch and soil products. The site will be split into 3 different processing areas: receival, decontamination and composting; utilizing a Forced Aeration Pad system (ASP).
Construction disturbance area within Lot 4 RP85497	21 hectares
Operational footprint within Lot 4 RP85497	18.5 hectares
Proposed output of the compost facility and type of material to be received and processed	Receipt, processing, composting, and storage of up to 250,000 tpa of the following materials: garden, food and wood wastes and manure.

Project Component	Details
	Receipt, processing, storage and blending of up to 150,000 tpa of sand and soil products for manufacturing (Virgin Excavated Natural Materials (VENM)).
Technology used	Two composting technologies will be utilised to handle different feedstocks: – 100,000 tpa of garden organics (GO), composted by Passive Open Windrow (OW) method. – 150,000 tpa of Food Organics and Garden Organics (FOGO), processed on a Forced Aeration Pad system (ASP). Wood wastes and manure will make up a small portion of the composting feedstocks and will be blended with the GO & FOGO, based on onsite capacity. VENM will be received and stored as required based on demand of finished products. Due to the seasonal nature of feedstock generation, up to 15% of the total annual waste may be received in any one month. This would typically occur around spring and autumn.
Key infrastructure and structures	– Access from Mitchell Road – Weigh bridges – Internal road network – Maintenance and storage shed – Final screening and manufacturing area – Water tanks – Aeration Pad system – Office, carparking and amenities – FOGO receival area – 3 x leachate ponds – 1 x freshwater dam – Open windrows pad – FOGO maturation pad – Hardstand areas – Retaining wall – Upgrade of Mitchell Road
Hours of operation	Monday–Friday: 6am to 6pm Saturday: 6am to 4pm Sunday and public holidays: 9am to 4pm
Operational staff	22 employees
Access arrangements	Mitchell Road will connect the Bromelton CMF Project to the road network. Mitchell Road will be upgraded to accommodate the traffic from the Bromelton CMF Project.
Timeframe	Construction and commissioning: 7 April 2025 – 30 January 2026



Paper Size ISO A4
0 25 50 75 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



SOILCO Developments Pty Ltd
Bromelton Compost Manufacturing Facility
Acoustic Assessment

Project No. 12626213
Revision No. A
Date 26/08/2024

Proposed site layout

FIGURE 2.1

3. Existing environment

3.1 Sensitive receivers

Potentially impacted receivers surrounding the Project site have been identified via aerial imagery and are listed below in Table 3.1, and depicted in Figure 3.1. They primarily consist of rural residential and industrial properties. The existing environment consists of rural open land with residential buildings and industrial operations scattered around. The main road servicing the area is Beaudesert Boonah Road.

Table 3.1 Identified sensitive receivers

ID	Address	Type	Distance and direction from Project site
R01	140 Tilley Road, Bromelton QLD	Residential	1,640 m north-east
R02	15 Tilley Road, Bromelton QLD	Residential	1,440 m north
R03	2430 Beaudesert Boonah Road, Bromelton QLD	Residential	1,425 m north
R04	388 Swan Gully Road, Bromelton QLD	Residential	2,000 m south-west
R05	194 Swan Gully Road, Bromelton QLD	Cattle Yard ¹	1,400 m south
R06a	Bush's Proteins QLD 358 Sandy Creek Road, Bromelton QLD	Industrial ¹	1,800 m south-east
R06b	358 Sandy Creek Road, Bromelton QLD	Residential	2,320 m south-east
R07	28 Swan Gully Road, Bromelton QLD	Industrial ¹	1,700 m south-east
R08	Quickcell Technology Products Pty Ltd 2613 Beaudesert Boonah Road, Bromelton QLD	Industrial ¹	1,150 m east
R09	SCT Logistics 2603 Beaudesert Boonah Road, Bromelton QLD	Industrial ¹	1,830 m north-east
R10	Beaudesert Saleyards 2563 Beaudesert Boonah Road, Bromelton QLD	Industrial ¹	860 m north-east

¹ Industrial receivers and Cattle Yards are not considered as noise sensitive receivers in the EPP (Noise), but have been included in this assessment for reference.

3.2 Acoustic environment

3.2.1 Noise monitoring

3.2.1.1 Methodology

The methodology for the noise monitoring program included the following:

- The nearest sensitive receivers were identified, including residences and other sensitive land uses, in the vicinity of the proposal.
- Noise logging was conducted from Wednesday 19 June 2024 to Wednesday 26 June 2024 at two locations near the Project site. The objectives of the logging were to determine the background noise levels at representative locations around the site and establish operational noise emission levels of the facility.
- All equipment was calibrated by a NATA calibrated calibrator (Larson Davis CAL200 (S/N: 9193)). Field calibration was performed before and after measurements and no significant drift (less than 0.8 dB) to reference noise level was noted.
- Noise monitoring was undertaken using Svan 977 environmental noise loggers. The noise loggers was programmed to accumulate L_{A90}, L_{A10}, and L_{Aeq} noise descriptors continuously over the entire monitoring period.

- The data collected by the logger was downloaded and analysed, and any invalid data removed. Invalid data generally refers to periods of time where average wind speeds were greater than 5 m/s, or when rainfall occurred, which is consistent with the approach recommended by *AS 1055:2018 Acoustics – Description and measurement of environmental noise* and the Department of Environment and Science *Noise Measurement Manual* (ESR/2016/2195). Meteorological data was sourced from a portable weather station deployed at a logger location.

3.2.1.2 Noise monitoring details

Two noise loggers were deployed near the Project site to capture ambient and representative background levels near the area. The logger locations were selected to capture noise characteristics considered representative of the Project area. Selection considerations included the location of nearby sensitive receivers, topography and contribution from other noise generating activities (such as road noise). The logger locations used for the assessment are considered to be representative of the existing background and ambient noise environment in the Project area.

Details of the noise monitoring equipment and locations are provided in Table 3.3 and Figure 3.1. Noise logger data results are summarised in Table 3.2. Noise monitoring charts are presented in Appendix A.

Table 3.2 Noise monitoring results

Location	Background noise descriptors ($L_{A90}(\text{Period})$) ⁽¹⁾			Ambient noise descriptors ($L_{Aeq}(\text{period})$) ⁽²⁾		
	Day ³	Evening ³	Night ³	Day ³	Evening ³	Night ³
ML1	37	25	23	55	47	47
ML2	31	23	22	46	41	41

¹ Background noise descriptors determined as the L_{A90} in line with the QLD Department of Environment and Science Noise Measurement Manual (v4.01).

² Ambient noise descriptors determined as the as the energy average of the L_{Aeq} noise levels over the period.

³ Day time: 7:00 am to 6:00 pm, evening: 6:00 pm to 10:00 pm. Night time: 10:00 pm to 7:00 am.

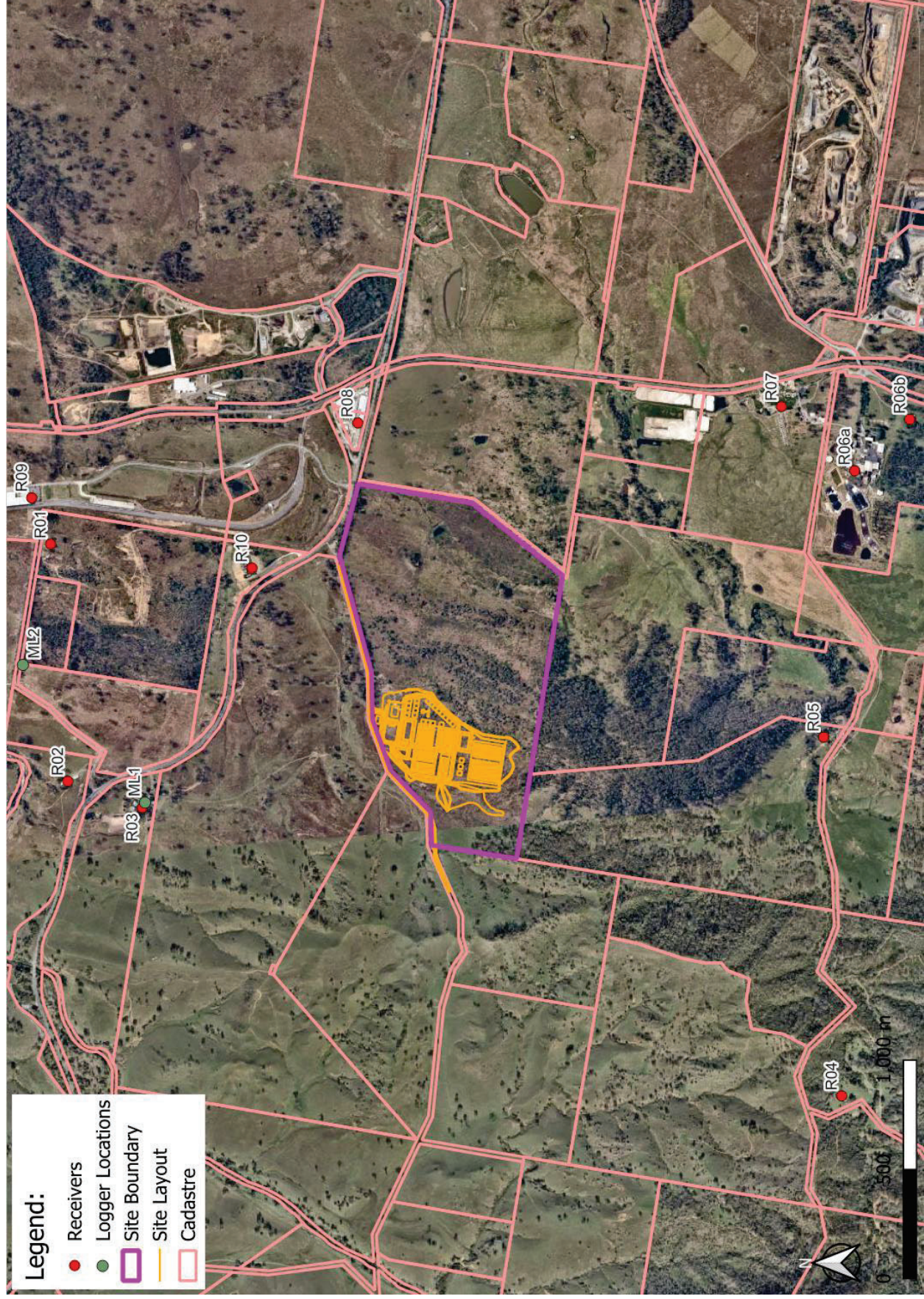


Figure 3.1 Identified receivers and noise logging locations

Table 3.3 *Unattended noise monitoring details*

Noise Logger ML1	
Location	2430 Beaudesert Boonah Road
Equipment type (serial)	SVAN 977 (s/n 98420)
Measurement started	19/6/24, 12:45 pm
Measurement ceased	26/06/24 ,8:45 am
Frequency weighting	A-weighted
Photo	
Noise Logger ML2	
Location	Tilley Road
Equipment type (serial)	SVAN 977 (s/n 98418)
Measurement started	19/06/24, 1:30 pm
Measurement ceased	26/06/24, 10:15 am
Frequency weighting	A-weighted
Photo	

3.2.2 Assumed minimum backgrounds

The noise levels measured for the area around the Project site are considered to be very low, as they are below the minimum background noise levels for isolated rural areas (Table 2 of the Noise Measurement Manual, v2.04). The minimum background noise levels presented in Table 3.4, are to be adopted as the background levels for assessment where the measured background noise level is lower than the deemed minimum background noise level.

Table 3.4 *Deemed background noise levels for isolated rural areas*

Time	Deemed background noise level (L _{A90}) dBA
Day period (7am to 6pm)	35
Evening period (6pm to 10pm)	30
Night period (10 pm to 7 am)	25
Morning period (6am to 7am)	30

4. Assessment criteria

4.1 Construction

4.1.1 TMR Code of Practice Volume 2

The Department of Transport and Main Roads (TMR) *Code of Practice Volume 2* (CoP Vol 2) prescribes external noise criteria for general construction works. Table 4.1 presents the work periods for construction activities (including construction-related traffic).

The determination of construction noise criteria is typically based on the background noise level of the surrounding area; however, the noise monitoring conducted for this assessment yielded low background noise levels (refer to Section 3.2.1). The minimum noise criteria set out in CoP Vol 2 have been adopted for this Project, as the evaluation of the criteria based on the measured background noise level would be below the minimum noise criteria. The Project's noise criteria are presented in Table 4.2.

Table 4.1 Project work periods

Work period	Schedule for general construction and construction traffic
Standard hours	Monday–Friday: 7:00 am to 6:00 pm Saturday: 8:00 am to 1:00 pm
Non-Standard hours – day/evening	Monday–Friday: 6:00 pm to 10:00 pm Saturday: 1:00 pm to 10:00 pm Sunday (or public holidays): 7:00 am to 10:00 pm
Non-Standard hours – night time	Monday–Sunday: 10:00 pm to 7:00 am

Table 4.2 Project noise criteria

Receiver type	External noise criteria ($L_{Aeq,adj,15min}$ dB(A)) ¹			
	Standard hours (when in use)		Non-standard hours	
	Lower limit	Upper limit	Evening	Night
Residential	50 ³	65	45 ³	45 ³

¹ Noise levels will be adjusted to account for distinct noise characteristics (tonality, low frequency, impulsiveness, etc).

² For a single short event in a 24-hour period, the upper limit may be increased by:

For standard hours:

- 2 dB(A) for event of 6 minutes to 15 minutes
- 10 dB(A) for event of 1.5 minutes to 6 minutes
- 15 dB(A) for event of less than 1.5 minutes.

For non-standard hours:

- 5 dB(A) for event of less than 1.5 minutes.

This single short event adjustment is designed to account for unusual and one-off events and does not apply to regular high-noise levels that occur more frequently than once per day.

³ Minimum lower limit is 50 dB(A) for standard hours and 45 dB(A) for non-standard hours

4.2 Operation

4.2.1 Environmental Protection Act 1994

In Queensland, the environment is protected under the *Environmental Protection Act 1994* (EP Act). The objective of the EP Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends ('ecologically sustainable development').

4.2.2 Environmental Protection (Noise) Policy 2019

In relation to noise, the EP Act is supported by the *Environmental Protection (Noise) Policy 2019* (EPP Noise). The EP Act establishes a number of environmental protection policies. The key environmental values for the acoustic environment are outlined within Section 7 of the EPP Noise as detailed below:

The environmental values to be enhanced or protected under the EPP Noise are:

- a. *the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems*
- b. *the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following:*
 - i. *sleep*
 - ii. *study or learn*
 - iii. *be involved in recreation, including relaxation and conversation*
- c. *the qualities of the acoustic environment that are conducive to protecting the amenity of the community.*

Acoustic quality objectives

The site is required to comply with requirements of the Policy, which states the following Acoustic quality objectives that are to be maintained and achieved and are outlined in Table 4.3.

Table 4.3 Acoustic quality objectives

Sensitive receivers	Time of day	Acoustic quality objectives (dB(A)) (measured at the receivers)			Environmental value
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}	
Residence (outdoors)	Daytime and evening	50	55	65	Health and wellbeing
Residence (indoors)	Daytime and evening	35	40	45	Health and wellbeing
	Night-time	30	35	40	Health and wellbeing, in relation to the ability to sleep
Commercial and retail activity (indoors)	When the activity is open for business	45	-	-	Health and wellbeing, in relation to the ability to converse

Note: daytime = 7:00 am to 6:00 pm, evening = 6:00 pm to 10:00 pm. Night time = 10:00 pm to 7:00 am.

Background creep

The site is required to comply with requirements of the *Environmental Protection (Noise) Policy 2019* (EPP Noise). Section 9, Subsection 2 of the EPP Noise states:

1. *To the extent it is reasonable to do so, noise must be dealt with in a way that ensures—*
 - a. *The noise does not have any adverse effect, or potential adverse effect, on an environmental value under this policy; and*

- b. Background creep in an area or place is prevented or minimised.

It is recommended that to control background creep, noise that is continuous (such as from a mechanical plant) (measured by $L_{Aeq,T}$) should be no more than 5 dB greater than that of the existing environment (measured by $L_{A90,T}$) during the day and evening; and no more than 3 dB greater than that of the existing environment (measured by $L_{A90,T}$) during the night.

4.2.3 Project-specific noise targets

The project specific noise targets for the Project are summarised in Table 4.4.

Table 4.4 Project specific noise targets

Receiver type	Time	Noise limit (external) ^{1,2} ($L_{Aeq, adj, 1hr}$) dBA
Residential (R01, R04, R06b)	Morning shoulder period (6am to 7am)	33
	Day period (7am to 6pm)	40
	Evening period (6pm to 10pm)	35
	Night period (10 pm to 7 am)	28
Residential (R02, R03)	Morning shoulder period (6am to 7am)	33
	Day period (7am to 6pm)	42
	Evening period (6pm to 10pm)	35
	Night (10 pm to 7 am)	28
Industrial	When in use	N/A

¹ A +7 dB adjustment to the indoor acoustic quality objective has been applied to convert the indoor level to an outdoor level, by accounting for the transmission loss through a partially open window.

² Project target noise limit (preservation of amenity) is based on existing background level + 5 dB(A) during day/evening and + 3 dB(A) during night, (not exceeding quality objectives).

4.3 Road traffic noise

4.3.1 TMR Code of Practice Volume 1

TMR's *Code of Practice Volume 1* (CoP Vol 1) prescribes external noise criteria for road traffic noise. Table 3.2(a) of CoP Vol 1 summarises the road traffic noise criteria for the different sensitive receivers for different road categories. The road categories and associated noise criteria applicable to the Project is shown in Table 4.5.

Table 4.5 Road traffic noise criteria

Category	Criteria		
	Existing residences (façade corrected)	Educational, community and health buildings (façade corrected)	Outdoor educational and passive areas (including parks) (free field)
New Road – Access Controlled	63 $L_{A10(18hr)}$, existing level >55 $L_{A10(18hr)}$ 60 $L_{A10(18hr)}$, existing level ≤55 $L_{A10(18hr)}$	58 $L_{A10(1hr)}$,	63 $L_{A10(12hr)}$,
Upgrading Existing Road	68 $L_{A10(18hr)}$	65 $L_{A10(1hr)}$,	63 $L_{A10(18hr)}$,

Note: Time periods are defined as 18hr: 6:00 am to 10:00 pm, 12hr: 6:00 am to 6:00 pm, 1hr: during operation hours.

5. Noise impact assessment

5.1 Construction

5.1.1 Noise modelling methodology

Noise modelling was undertaken using CadnaA 2023 MR2, to predict the effects of noise generated by the anticipated construction works associated with the Project.

CadnaA is a computer program for the calculation, assessment and prognosis of noise propagation. Computer modelling has been undertaken according to *ISO 9613-2 (1996), Acoustics - Attenuation of Sound During Propagation Outdoors*, Part 2: General Method of Calculation prediction algorithm; as implemented in the CadnaA software. The noise model predicts sound pressure levels under meteorological conditions favourable to propagation (mild temperature inversion with slight downwind) from sources of known sound emission.

The general noise model parameters used in CadnaA are presented below in Table 5.1.

Table 5.1 Noise model parameters

Variable	Parameters
Calculation method	ISO 9613 prediction algorithm
Meteorology	Average temperature of 10°C Average humidity of 70% The ISO 9613-2 algorithm assumes a noise-enhancing source to receiver wind or a moderate temperature inversion.
Ground absorption coefficient	0.8 = mix of hard and soft ground (0 represents hard ground, and 1 represents soft ground)
Reflection from surfaces	Order of reflection = 0
Ground topography	A digital terrain model with a 2.0 metre resolution has been used
Receiver heights	1.5 m above ground level
Shielding	The model doesn't take into account shielding from nearby buildings or structures

5.1.2 Noise sources and scenarios

Noise levels at the site will be dynamic and vary based on the construction activities being undertaken. To understand the operational noise impacts of the site on the surrounding area, the construction scenarios included in Table 5.2 were modelled to predict potential noise impacts.

Indicative and conservative sound power levels for all anticipated mobile plant and equipment have been sourced from GHD's database and manufacturer's technical datasheets. The noise model will be based on noise sources that are moving around the site with an average noise emission height of 2 metres above ground level.

Table 5.2 Anticipated construction scenarios and associated noise sources (Project site)

Scenario ID	Activity	Equipment	Qty	Sound power level (dB(A))	Equivalent sound power level (dB(A))
S1	Earthworks	D10 dozer	1	116	119
		20T excavator	1	99	
		5T excavator	1	93	
		Skid steer loader	1	96	
		Tipper truck	1	109	

Scenario ID	Activity	Equipment	Qty	Sound power level (dB(A))	Equivalent sound power level (dB(A))
		Vibratory roller	1	105	
		Grader	1	115	
		Drum roller	1	103	
S2	Slab construction	Concrete pump	1	96	107
		Concrete truck	1	107	
S3	Building construction	50T slew crane	1	110	112
		25T franna crane	1	98	
		Boom lift	1	95	
		Forklift	1	100	
		Delivery vehicles	1	108	
S4	Other	Water cart	1	109	109

Table 5.3 Anticipated construction scenarios and noise sources (Mitchell Road)

Scenario ID	Activity	Equipment	Qty	Sound power level (dB(A))	Equivalent sound power level (dB(A))
S5	Embankment/pavement works	Dump truck	2	108	119
		Vibratory roller	2	103	
		Tracked excavator	2	107	
		Grader	2	115	
		Compactor	1	106	
S6	Sealing works	Tracked excavator	1	107	120
		Drum roller	1	108	
		Dump truck	2	108	
		Front end loader	2	114	
		Aggregate spreader	2	95	
		Bitumen sprayer	2	106	

5.1.3 Results

Construction noise levels have been predicted at the identified receivers within the study area. The predicted $L_{Aeq}(15min)$ noise levels at the most-affected sensitive receivers are presented in Table 5.4 and Table 5.5. The noise modelling assumes that all pieces of equipment in the scenario are operating at maximum capacity simultaneously at the closest distance between the construction works and the receiver. As such, the predicted noise levels are often highly conservative and actual noise levels are likely to be lower than those the levels presented below for most of the time.

Table 5.4 Predicted construction noise levels (Project site)

Receiver ID	Criteria	S1	Compliant?	S2	Compliant?	S3	Compliant?	S4	Compliant?
R01	50	32	Y	18	Y	24	Y	20	Y
R02	50	36	Y	24	Y	30	Y	24	Y
R03	50	40	Y	27	Y	33	Y	27	Y
R04	50	20	Y	<10	Y	12	Y	<10	Y

Receiver ID	Criteria	S1	Compliant?	S2	Compliant?	S3	Compliant?	S4	Compliant?
R05	N/A	21	Y	<10	Y	13	Y	<10	Y
R06a	N/A	27	Y	14	Y	20	Y	17	Y
R06b	50	25	Y	12	Y	18	Y	14	Y
R07	N/A	28	Y	14	Y	20	Y	17	Y
R08	N/A	35	Y	22	Y	28	Y	24	Y
R09	N/A	30	Y	17	Y	22	Y	19	Y
R10	N/A	44	Y	32	Y	37	Y	32	Y

Table 5.5 Predicted construction noise levels (Mitchell Road)

Receiver ID	Criteria	S5	Compliant?	S6	Compliant?
R01	50	36	Y	35	Y
R02	50	34	Y	34	Y
R03	50	37	Y	36	Y
R04	50	19	Y	20	Y
R05	N/A	22	Y	23	Y
R06a	N/A	27	Y	27	Y
R06b	50	25	Y	25	Y
R07	N/A	28	Y	28	Y
R08	N/A	50	Y	50	Y
R09	N/A	35	Y	34	Y
R10	N/A	53	Y	53	Y

The noise modelling indicates that:

- Noise levels during the construction phase of the Project complies with the established noise criteria at all identified receivers.
- Noise levels during the construction of Mitchell Road complies with the established noise criteria at all identified.

Although the construction works are expected to comply at all identified receivers, the application of reasonable and feasible mitigation measures at the source is considered best practice and will be implemented.

5.1.4 Construction road traffic noise

The site will generate additional traffic into the road network, which may cause noise impacts on sensitive receivers along the road network near the site.

It is anticipated that the site will generate the following daily construction road traffic:

- Day period (6am to 10pm) – 12 light vehicle and 2 heavy vehicle movements

Beautesert Boonah Road

Beautesert Boonah Road is an arterial road which will have a high traffic volume compared to that generated from the construction of the Project. As such, the additional volume generated by the construction of the Project is not anticipated to increase the existing road traffic noise generated by Beautesert Boonah Road.

Mitchell Road

The construction of Mitchell Road forms a part of the overall Project construction. As such, no road traffic is expected on Mitchell Road during the construction phase.

5.2 Operation

5.2.1 Noise modelling methodology

Acoustic modelling was undertaken using CadnaA 2023 MR2 and was conducted with the same methodology as that detailed for construction noise (refer to Section 5.1.1). Operational noise modelling is based on the layout shown in Figure 2.1.

5.2.2 Noise sources

The noise model includes noise sources that are modelled moving point sources around the site.

The A-weighted sound power levels for the major noise sources associated with the site and a description of their location on the site in each scenario are presented in Table 5.6 below.

Sound power levels are based on information provided by SOILCO. Where additional information was required, information was sourced from GHD's database and manufacturer's technical datasheets.

Table 5.6 Operational noise sources

Source	Sound power level (dBA)	Qty	Relative noise height above ground (m)	Location
Volvo L90	105	2	2	All over site
Volvo L150	108	2	2	All over site
Cat 323 excavator	101	2	2	Manufacturing, Maturation and Storage
Dump truck 25T capacity	109	1	2	All over site
Eggersmann A75 Windrow turner	108	1	2	Manufacturing, Maturation and Storage Open Windrow
Komptech Multistar XXL2	97	1	1.5	Manufacturing, Maturation and Storage
Komptech Nemus 2700 Trommel screen	98	1	1.5	Manufacturing, Maturation and Storage
Conveyors	93	9	1.5	FOGO Receival and Sort
Trommel screen	93	1	1.5	FOGO Receival and Sort
Overbelt magnet	93	1	1.5	FOGO Receival and Sort
Lights recovery separator	79	1	1.5	FOGO Receival and Sort
Shredder (E50 or similar)	115	1	2	FOGO Receival and Sort
ASP fans	97	2	0.5	ASP Pad
Fresh water pump	73	2	0.5	Bore and freshwater dam
Leachate pump	88	2	0.5	Leachate ponds

5.2.3 Modelling scenarios

Noise levels on the site will be dynamic and varies based on the activities being undertaken. To understand the operational noise impacts of the site on the surrounding area, two scenarios were modelled to predict the potential noise impacts.

- Worst case business hours operations with the time outlined in Table 5.7:
 - All equipment listed above operating simultaneously
- 24/7 plant operations:
 - 2 x ASP fans only

5.2.4 Results

Operational noise levels have been predicted at the sensitive receivers within the study area, with consideration to the project specific noise criteria. The predicted $L_{Aeq}(15min)$ noise levels at the identified receivers are presented in Table 5.7.

Table 5.7 Predicted operational noise levels

Receiver ID	Worst-case business hours operations (Day period – 7am to 6pm)				Worst-case business hours operations (Morning shoulder period – 6am to 7am)				24/7 plant operations		
	Criteria	Predicted noise level ($L_{Aeq, 15min}$)	Compliant?	Criteria	Predicted noise level ($L_{Aeq, 15min}$)	Compliant?	Criteria	Predicted noise level ($L_{Aeq, 15min}$)	Criteria	Predicted noise level ($L_{Aeq, 15min}$)	Compliant?
R01	40	27	Y	33	27	Y	28	<10	28	<10	Y
R02	42	30	Y	33	30	Y	28	10	28	10	Y
R03	42	32	Y	33	32	Y	28	13	28	13	Y
R04	40	19	Y	33	19	Y	28	<10	28	<10	Y
R05	40	18	Y	33	18	Y	28	<10	28	<10	Y
R06a	N/A	26	Y	N/A	26	Y	N/A	<10	N/A	<10	Y
R06b	40	22	Y	33	22	Y	28	<10	28	<10	Y
R07	N/A	26	Y	N/A	26	Y	N/A	<10	N/A	<10	Y
R08	N/A	31	Y	N/A	31	Y	N/A	11	N/A	11	Y
R09	N/A	26	Y	N/A	26	Y	N/A	<10	N/A	<10	Y
R10	N/A	35	Y	N/A	35	Y	N/A	15	N/A	15	Y

The noise modelling indicates that:

- Noise levels during the worst case business hours operations are expected to comply with the established Project noise criteria at all receivers during the day.
- Noise levels during the worst case business hours operations are expected to comply with the established Project noise criteria at all receivers during the morning shoulder period (6am to 7am).
- Noise levels of the 24/7 plant operations are expected to comply with the established Project noise criteria at all receivers during the evening and night.

5.2.5 Operational road traffic noise

The site will generate additional traffic into the road network, which may cause noise impacts on sensitive receivers along the road network near the site.

It is anticipated that the site will generate the following daily operational road traffic:

- Day period (6am to 10pm) – 15 light vehicles and 81 heavy vehicles

Beaudesert Boonah Road

Since Beaudesert Boonah Road is an arterial road which will have a high traffic volume compared to that generated from the Project. As such the additional volume generated by the Project is not anticipated to increase the existing road traffic noise generated by Beaudesert Boonah Road.

Mitchell Road

Based on the fact that the road is not yet built and will be primarily servicing the Project, the assessment has been conducted based on the traffic at the site for the purposes of the Project only.

The road traffic noise has been predicted using US Federal Highway Administration's Traffic Noise Model (v3.2). The nearest sensitive receiver is approximately 1 km away from Mitchell Road. The predicted noise level for receiver is shown in Table 5.8. The Project is predicted to comply with the established road noise criteria for all receivers.

Table 5.8 Predicted operational road traffic noise levels at receiver closest to the road

Scenario	Criteria ($L_{A10,18hr}$)	Predicted noise level (dBA) ¹ (L_{A10})	Compliant?
Day period	60	20	Yes

¹ Predicted noise level includes a +2.5 façade correction.

6. Discussion and recommendations

The results from the construction noise assessment conducted (refer to Section 5.1) indicate that construction works are expected to comply with the established noise criteria. Although the construction activities are predicted to comply, a number of mitigation measures will be implemented as part of the Project (refer to Section 7.2).

The results from the operational noise assessment conducted (refer to Section 5.2) indicates that the site will comply with the established noise criteria during the day period.

During its operations from 6am to 7am, which fall under the morning shoulder period, the predicted noise level of the site is close to the established noise criteria (within 2 dB) at two (2) receivers (R02 and R03). Further investigation of the noise contributions at these receivers indicate that the dominant noise contributors will be the dump trucks, loaders and shredder.

Section 7.3 provides operational noise mitigation and management measures that should be implemented, where reasonable and feasible. It also provides examples of best practice environmental management measures to be implemented to minimize noise impacts.

A Noise Management Plan (NMP) for the site will be prepared prior to the site being operational. Section 7.3 contains details of information that is to be captured in the site's NMP.

7. Mitigation and management measures

7.1 In-principle noise control methods

The measures provided below are considered best practice, and will be implemented to minimise potential noise and vibration impacts, where reasonable and feasible.

In-principle, there are three approaches to controlling noise and vibration:

- Control at the source
- Control on the source-to-receiver pathway
- Control at the receiver

7.1.1 Control at the source

Control at the source is considered to be the most cost-effective in the reduction of noise and vibration levels and as such should be given highest priority when considering mitigation options. The solutions available include:

- Substitution of equipment:
 - Substitution involves where reasonably practicable the use of less noisy or vibration intensive. Equipment should be selected to meet the needs of the project or process it is required for, and not be excessive.
- Modification of existing equipment:
 - Modification of equipment involves the addition of acoustic treatments to parts of the machinery. These include but are not limited to improved mufflers, stiffening of panels and surface coating of resonance dampening material. These options would often require discussion with the supplier and manufacturer of the equipment.
- Use and siting of equipment:
 - Plant should always be used in accordance with the manufacturer's instructions. Where possible, the location of equipment should be away from noise and vibration sensitive areas. This includes taking into consideration the emission direction of equipment and directing this away from sensitive receivers. Plant used intermittently should be shut down during the intervening periods or throttled down to a minimum.
- Regular and effective maintenance:
 - Maintenance should be carried out regularly to ensure equipment is running at optimal conditions.

7.1.2 Control along the path

There are two ways of mitigating noise along the transmission path:

- Increasing the distance between the source and receiver.
- Where distance is limited, screening of noise may be considered. In some circumstances it may also be possible to enclose the equipment during the operation.

Table 7.1 provides typical noise attenuation provided by noise control methods.

Table 7.1 Typical attenuations for source to receiver noise control methods

Control method	Nominal noise reduction possible (dB) (total A-weighted sound pressure level (LpA))
Distance	Approximately 6 for each doubling of distance
Screening	Normally 5 to 10, maximum of 15
Enclosure	Normally 15 to 25, maximum of 50

7.1.3 Control of noise at the receiver

Reasonable and feasible mitigation measures at the receivers for this Project are limited to effective community consultation at this stage of the design. It is envisioned that design focused mitigation measures (i.e. control at the source) will help the Project achieve compliance at all receivers during all time periods.

In the event that there are exceedances at sensitive receivers after all reasonable and feasible mitigation measures are implemented at the site, noise treatments at the receiver property may need to be considered.

7.2 Construction noise mitigation and management measures

The noise mitigation measures detailed in Table 7.2 are recommended where reasonable and feasible to reduce the impact on the surrounding receivers and sensitive land uses during the construction phase.

Table 7.2 Mitigation measures for construction noise and vibration

Action required	Details
General controls	
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction should include: – All relevant project-specific and standard noise and vibration mitigation measures – Relevant licence and approval conditions – Permissible hours of work – Location of nearest sensitive receivers – Construction employee parking areas – Designated loading / unloading areas and procedures – Site opening / closing times (including deliveries) – Environmental incident procedures
Behavioural practices	– No swearing or unnecessary shouting or loud stereos / radios on-site – No dropping of materials from height, throwing of metal items and slamming of doors
Implement community consultation measures	Contact will be established with the local residents, as deemed necessary, and the construction program and progress communicated on a regular basis, particularly when noisy or vibration generating activities are planned. This may include local community update letters for specific construction activities and a Project information line.
Implement complaints management measures	Complaints will be managed in accordance with the procedure outlined below. Signage on-site will visibly provide a contact number and name to receive complaints / enquiries about construction. Potential complaints specific to these works could include: – A cluster of noise complaints In this instance, the response would be to: – Verbally respond to the complainant; or provide a written response within seven (7) calendar days, if the complaint cannot be resolved verbally – Log the complaint, and any actions taken with regards to the complaint within a complaints register – Undertake monitoring at the complainant's residence(s), where appropriate – Investigate the nature and causes of the impact – Investigate and implement further mitigation measures to minimise the impact

Action required	Details
Source controls	
Construction hours and scheduling	– Comply with the recommended standard construction hours outlined in Section 4.1.1, unless out of hours work has been approved. – No truck movements before 7.00 am or after 6.00 pm. – For any work that would take place outside of normal construction hours: – Undertake an assessment of the potential noise and vibration impacts associated with the proposed activities and outline specific mitigation measures. – Minimise consecutive night activities in the same locality and provide periods of quiet if activities occur for extended periods during the night. – Conduct activities in a manner that eliminates or minimises the need for audible warning alarms.
Equipment selection	Use quieter and less vibration emitting construction methods where reasonable and feasible.
Use and siting of plant	– Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided. – The offset distance between noisy plant and adjacent sensitive receivers is to be in accordance with this report. – Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers, where possible.
Plan worksites and activities to minimise noise and vibration	Plan traffic flow, parking and loading unloading areas to minimise reversing movements within the site.
Minimise disturbance arising from delivery of goods to construction sites	– Loading and unloading of materials/deliveries is to occur during standard construction hours. – Contractors are to avoid dropping materials from height where practicable, during loading and unloading. – Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.

7.3 Operational noise mitigation and management measures

7.3.1 Site specific mitigation and management measures

The following noise mitigation and management measures are recommended where reasonable and feasible to reduce the impact on the surrounding receivers and sensitive land uses during operations.

- A Noise Management Plan (NMP) is to be prepared for the Project. It should contain (but not be limited to):
 - A noise complaints management system is to be implemented whilst the completed facility is in operation. The following process should be established to ensure all complaints are dealt with in an appropriate manner:
 - A staff member will be nominated to deal with complaints from the community. Contact details of nominated staff member will be displayed at entry point of the site.
 - All complaints will be logged within a complaint register. An archive of complaints will be maintained, documenting the nature of the complaint and the actions implemented for resolving the complaint.
 - SOILCO will endeavour to attend to these complaints within 48 hours of receipt.
 - The complaint log should be reviewed at regular intervals to identify common complaints and recurring issues. The review can be used to adjust operations to reduce the number of complaints moving forward.
 - The complaints log will be made available to relevant regulatory authorities on request.
 - Details of the noise mitigation measures implemented by the site.
- Clear signage should be erected at site entrances advising people that they must not generate excessive noise and leave the site in a quiet and sensible manor to minimise any potential impacts of the surrounding amenity.

7.3.2 Best practice environmental management practices

Best practice environmental management practices are measures implemented to mitigate the impact of activities associated with high noise levels, as outlined below:

- All works to be within nominated hours of operation.
- Switch off equipment when not in use.
- Select the quietest machinery and equipment available and find quieter processes or ways of performing tasks (e.g. investigate whether there are suitable alternatives to reversing alarms on vehicles and select vehicles with low noise emissions), where possible.
- Ensure that roads have a suitable and well-maintained surface and limit the amount, type, times and speed of vehicle movements.
- Start plant and vehicles sequentially rather than all at the same time.
- Use existing screens or site features to their advantage to reduce noise.
- If the noise is directional, point the source away from noise-sensitive locations, where possible.
- Ensure that equipment, vehicles and acoustic screens or other noise mitigation devices are properly maintained.
- Ensure that each staff member is aware of their responsibilities to reduce noise emissions, and how this can be achieved.

Noise at the sensitive and commercial places should be periodically monitored to ensure that noise mitigation strategies are effective. Monitoring is to be undertaken at a sufficient frequency (e.g. after 12 months of operating) to demonstrate that the activity is not causing or likely to cause environmental harm. This may include background monitoring of a sufficient period to demonstrate a background level, taking into consideration natural and seasonal variations.

Best practice environmental management practices include the implementation of an environmental management system as per *AS/NZS ISO 14001:2016 Environmental management systems – Requirements with guidance for use*.

8. Conclusion

GHD has been engaged by SOILCO to prepare an acoustic assessment of the construction and operational phases of the Project to support the SDA development application and the environmental authority application for environmentally relevant activities. An acoustic assessment that determines any potential impacts on the nearby sensitive receivers, and identifies any specific mitigation measures required.

The applicable noise criteria for the different noise generating aspects of the Project were established with respect to:

- *Environmental Protection Act 1994*
- *Environmental Protection (Noise) Policy 2019*
- TMR Code of Practice – Volume 1 and 2

The results of the acoustic assessment indicate that the following noise generating aspects of the Project will comply with the established noise criteria at all identified receivers:

- Construction noise
- Construction road traffic noise
- Operational noise
- Operational road traffic noise

Although compliance is expected, it is still recommended that noise mitigation and management measures (refer to Section 7) should be considered and implemented where reasonable and feasible as part of best practice to reduce the noise impacts.

9. References

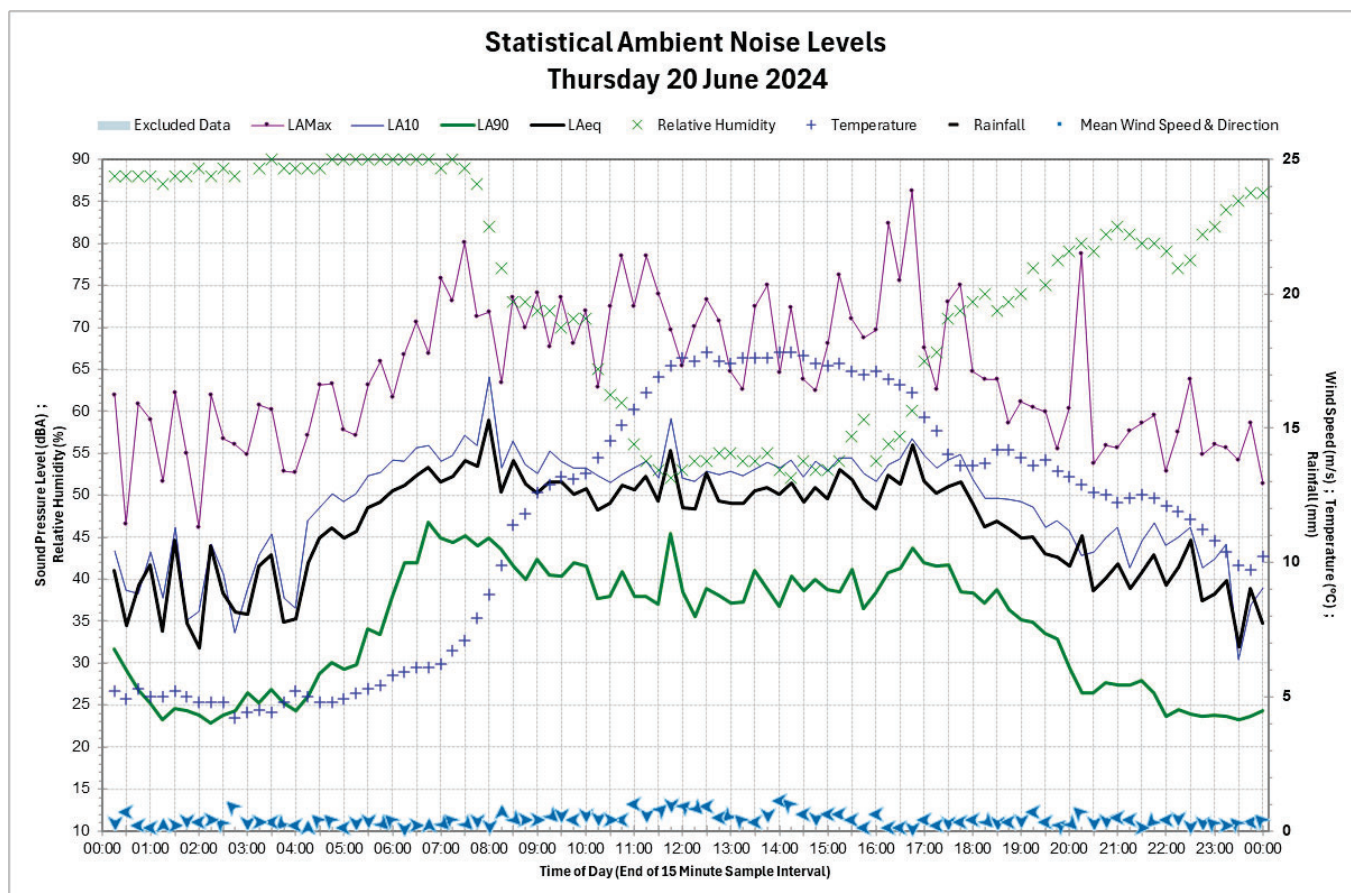
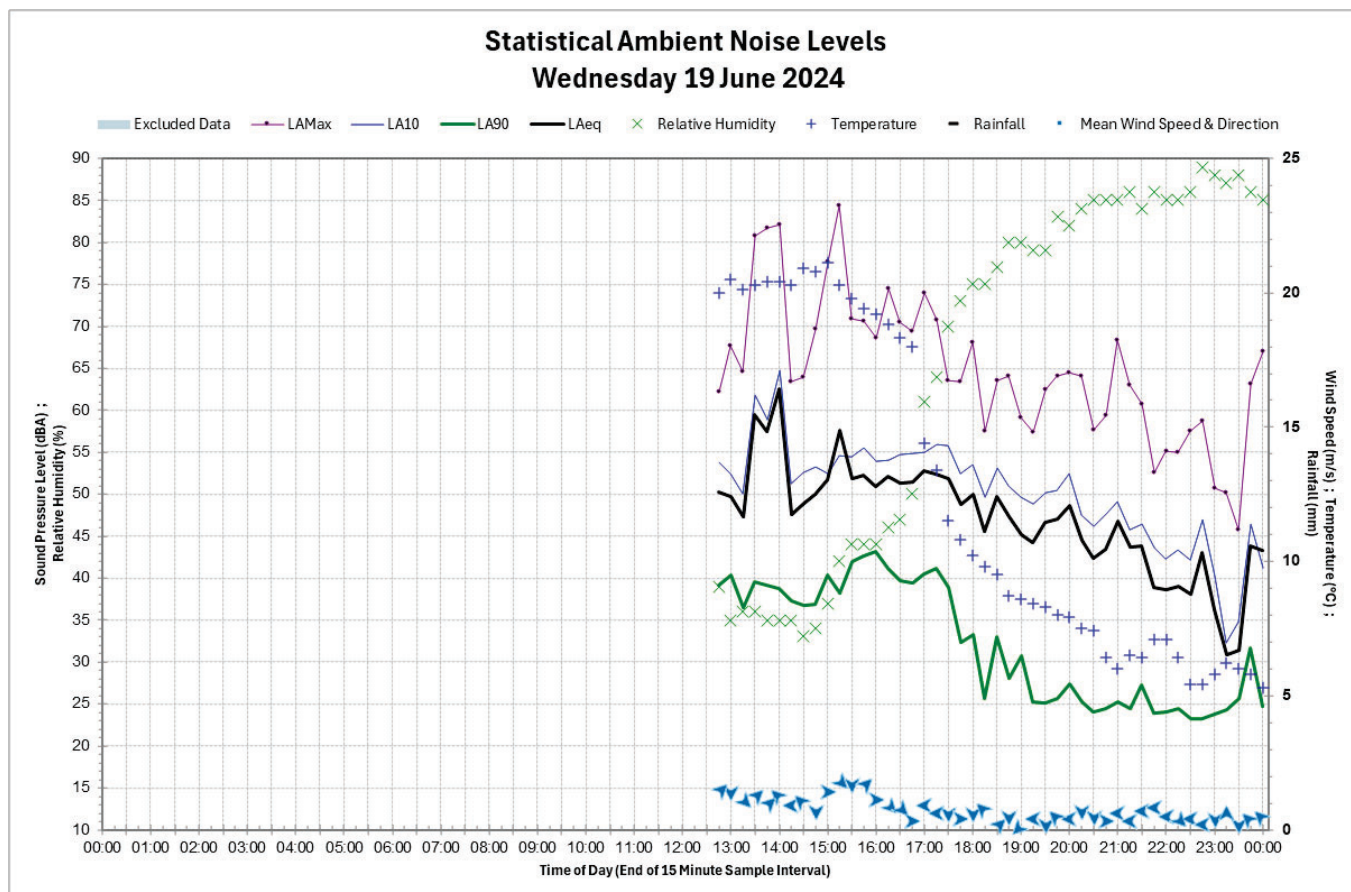
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Appendices

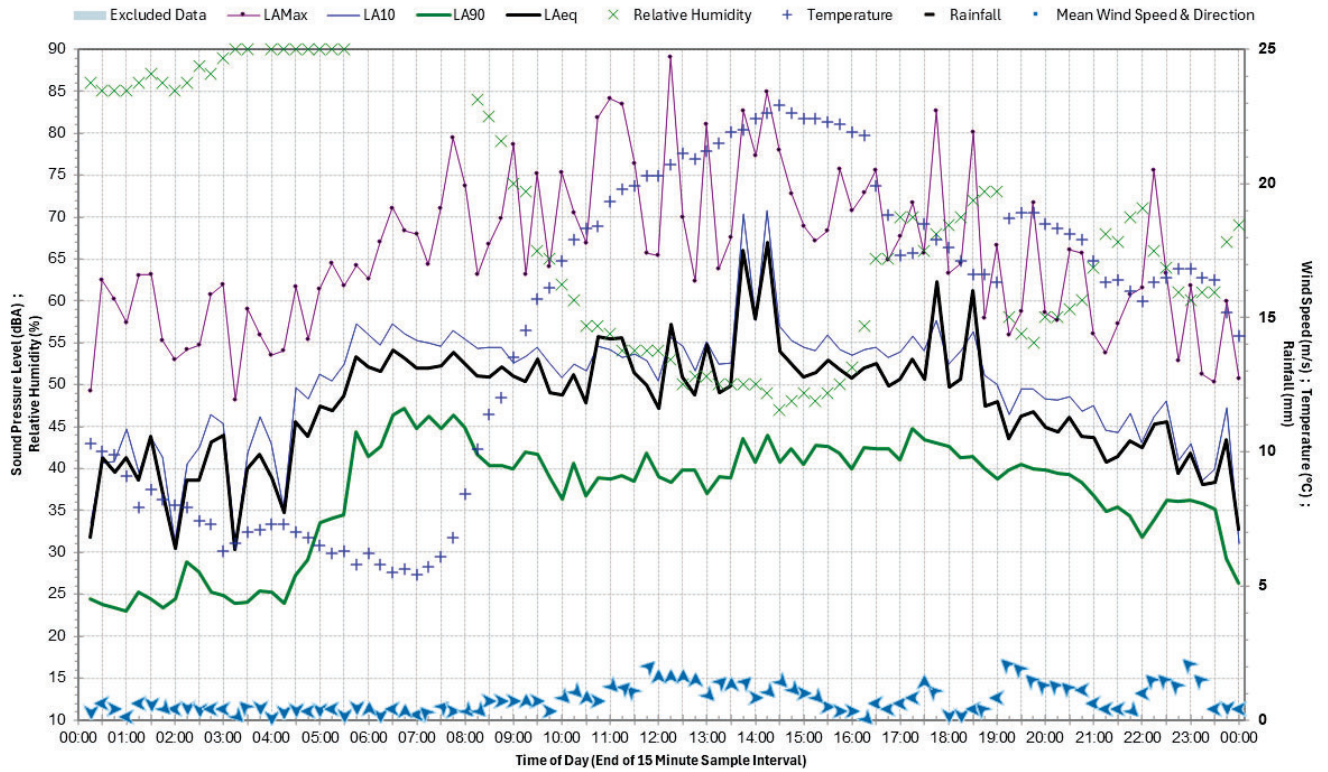
Appendix A

Noise monitoring charts

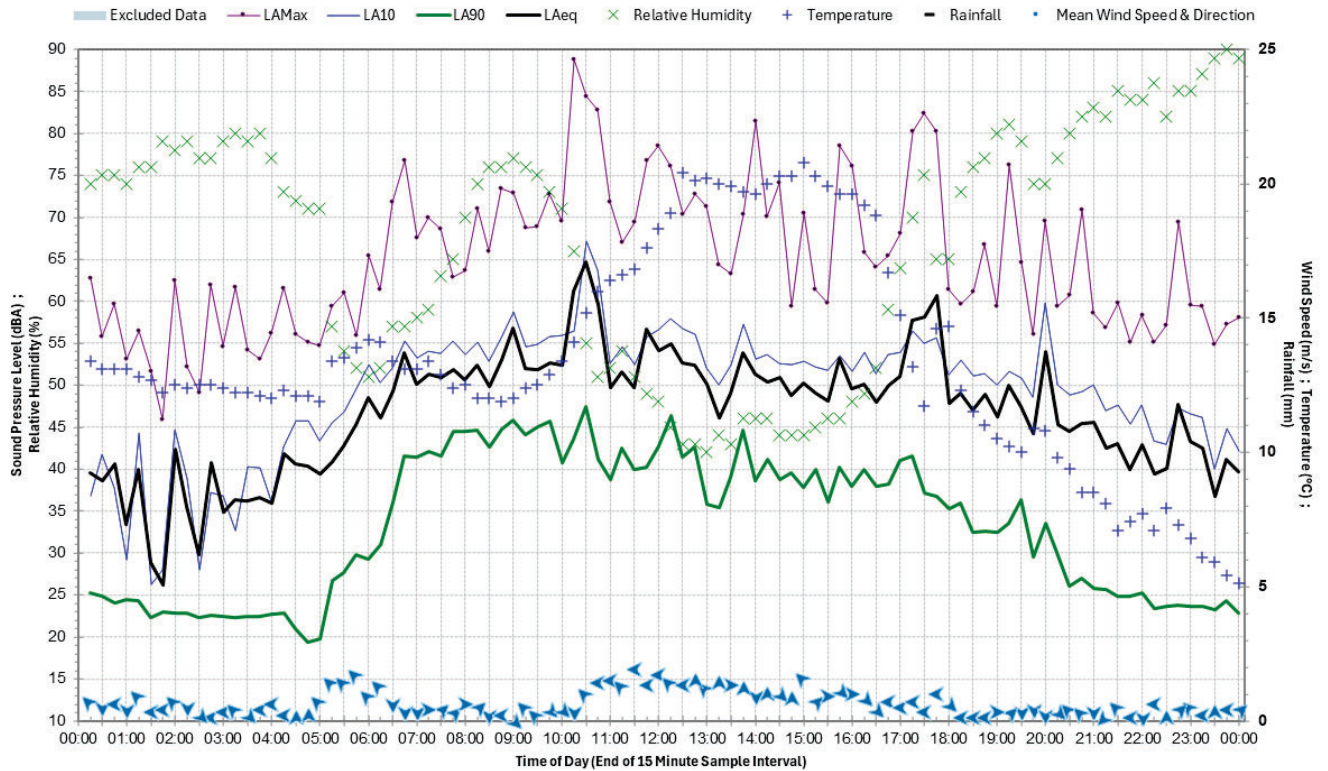
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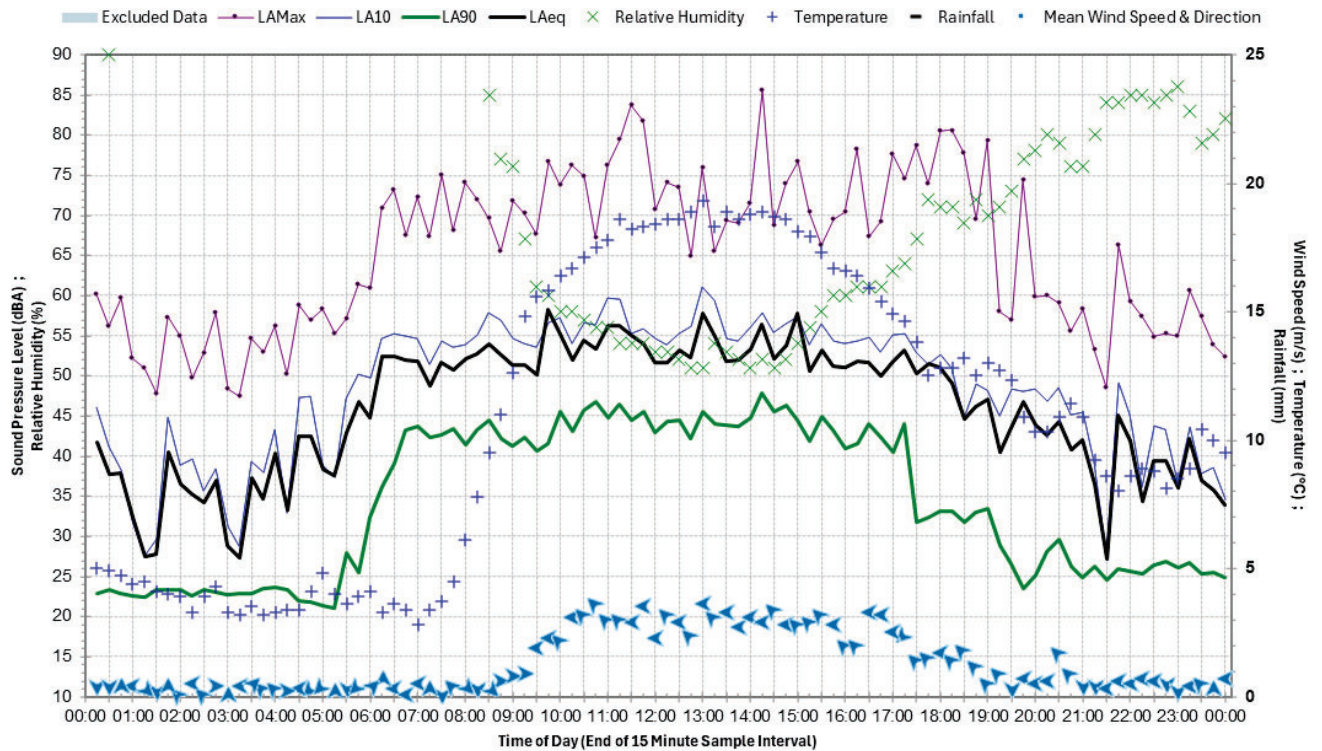
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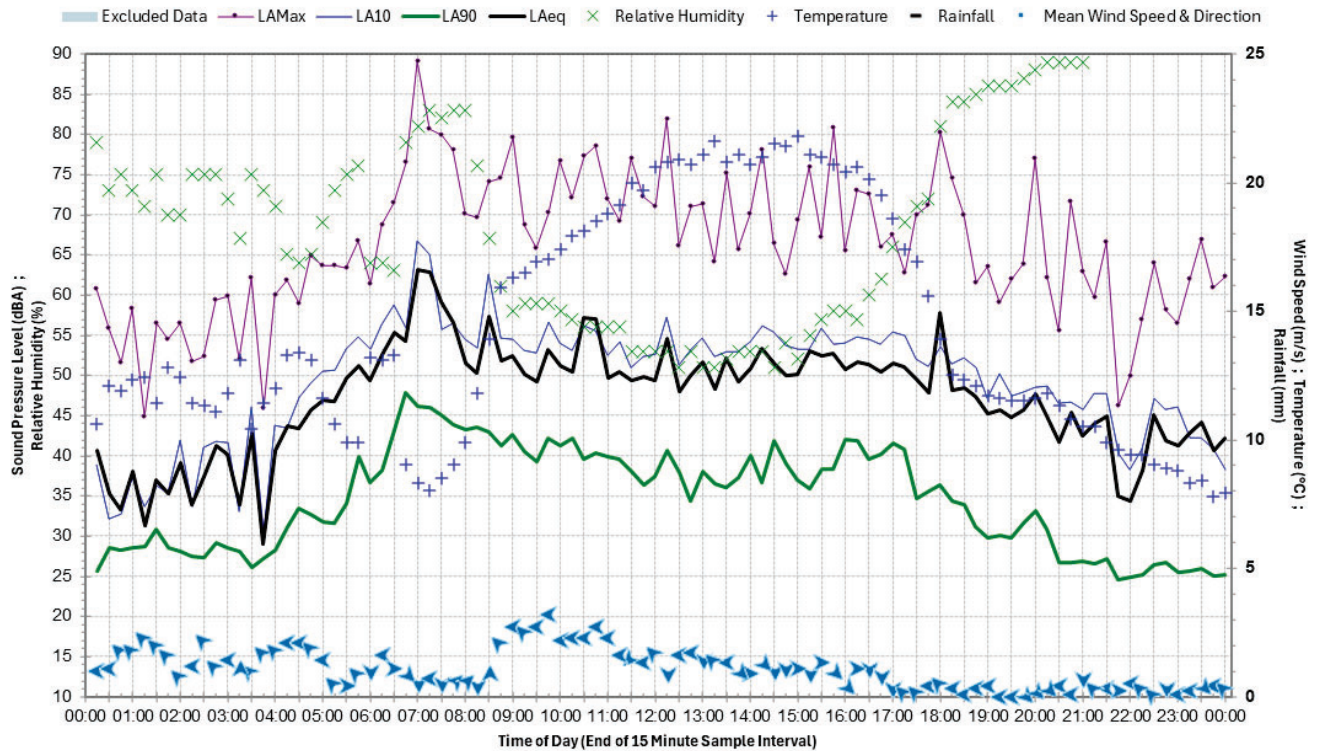
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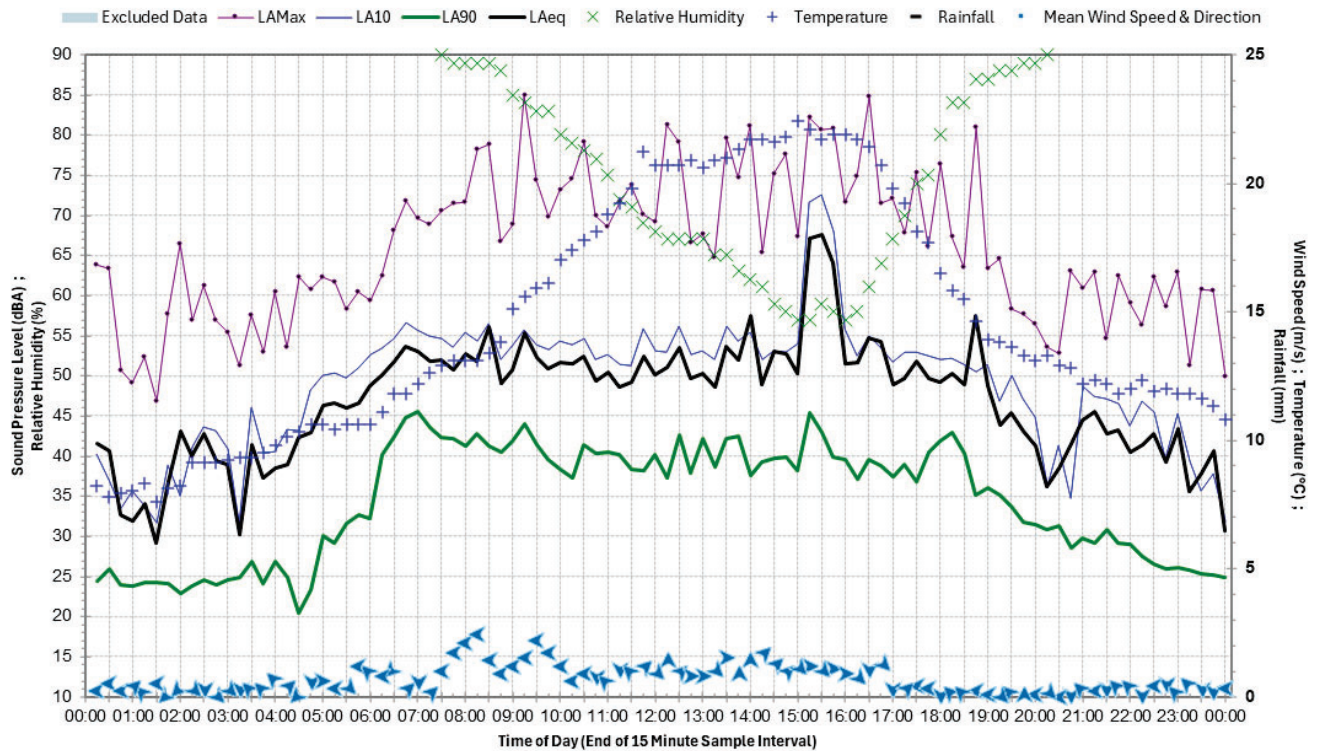
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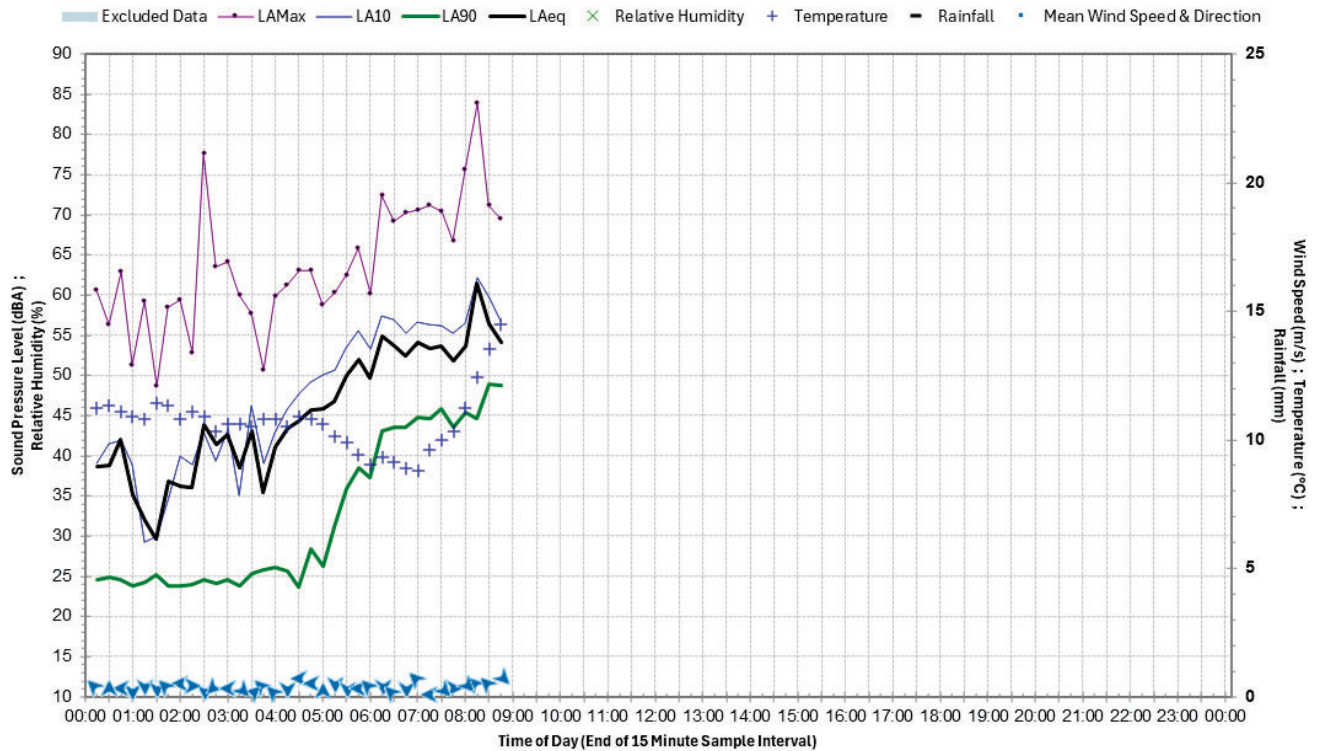
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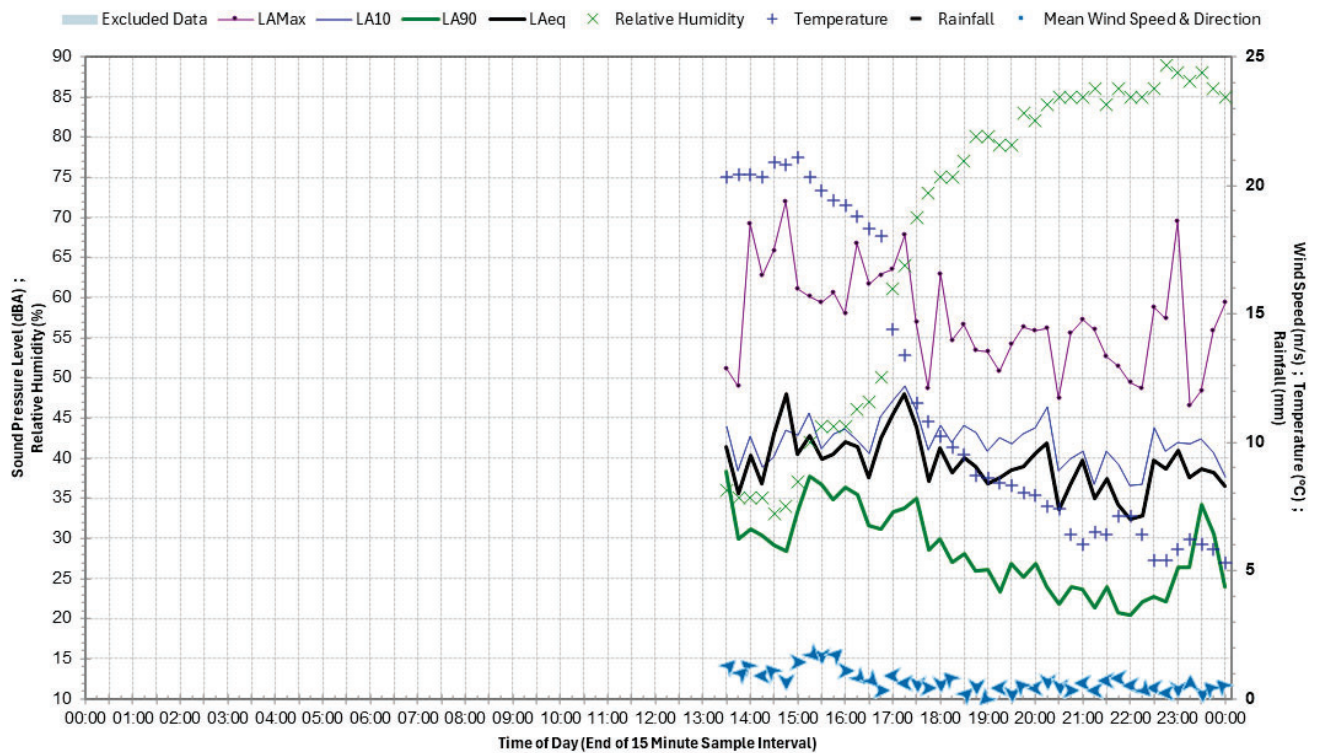


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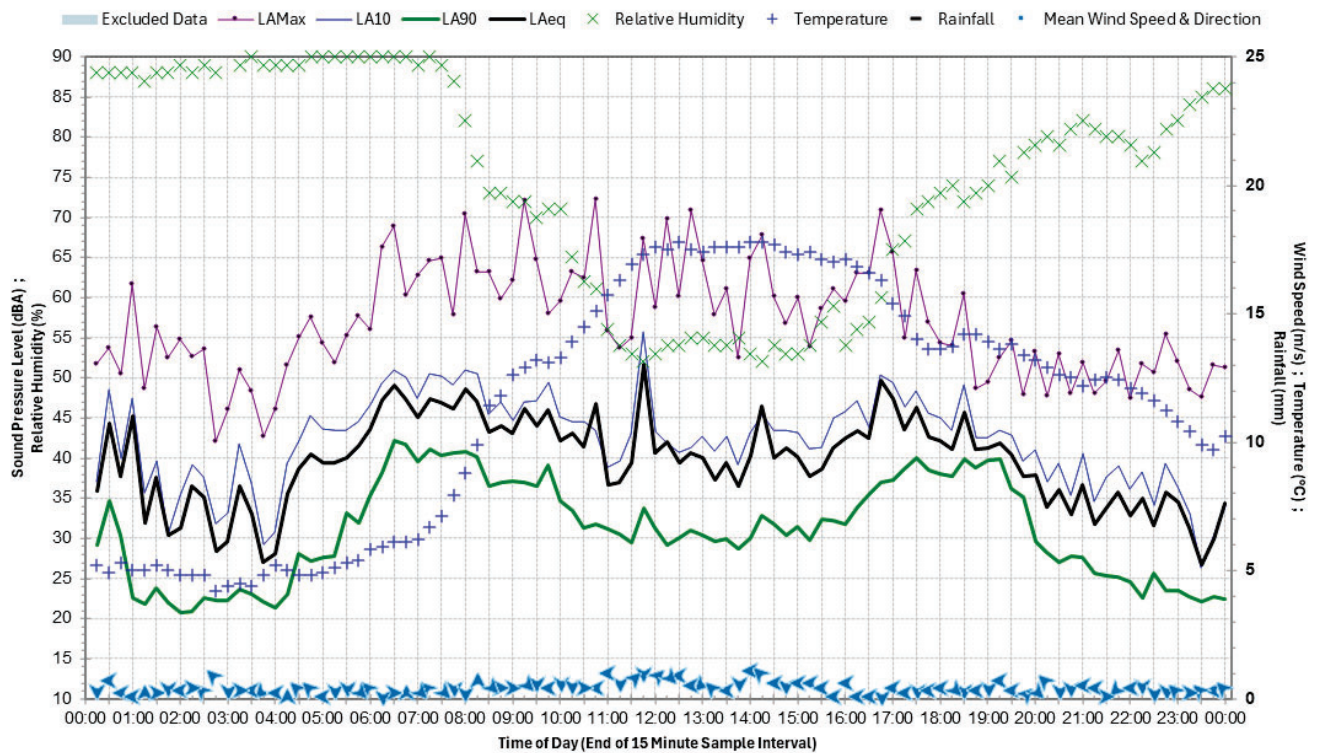


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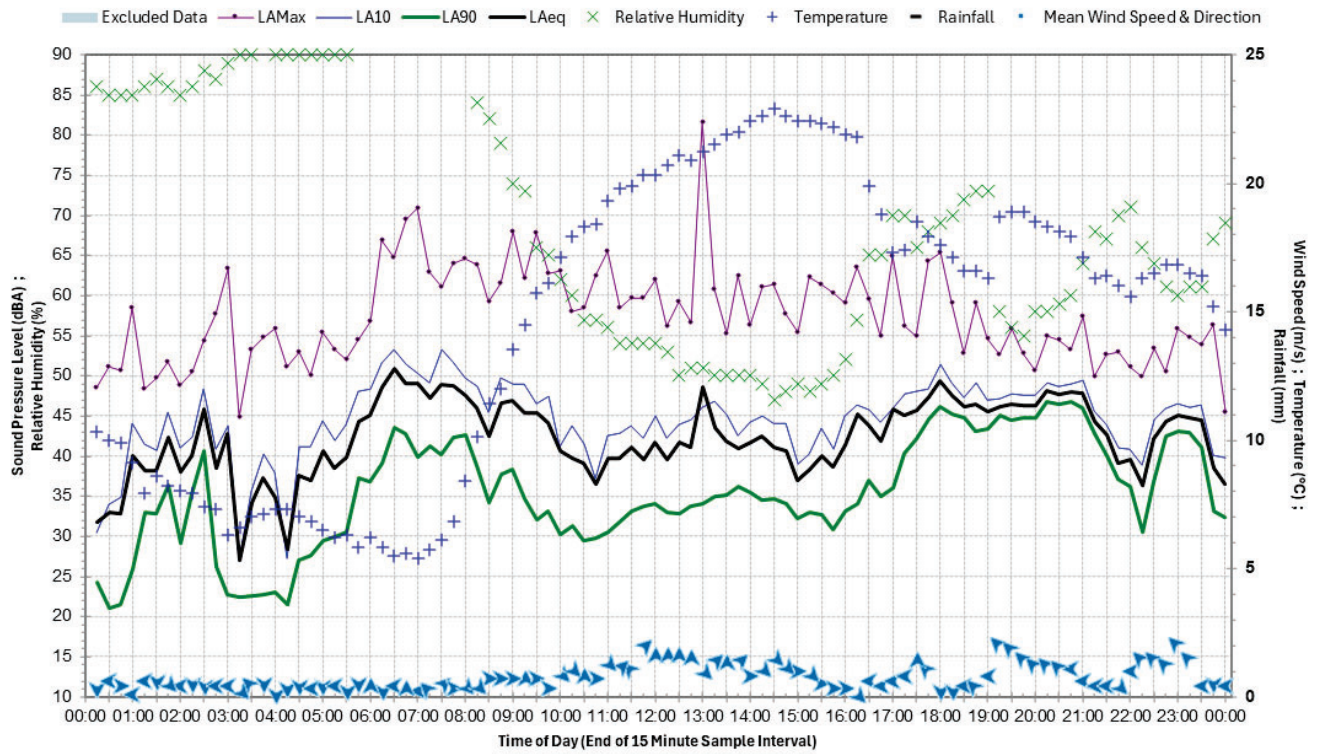
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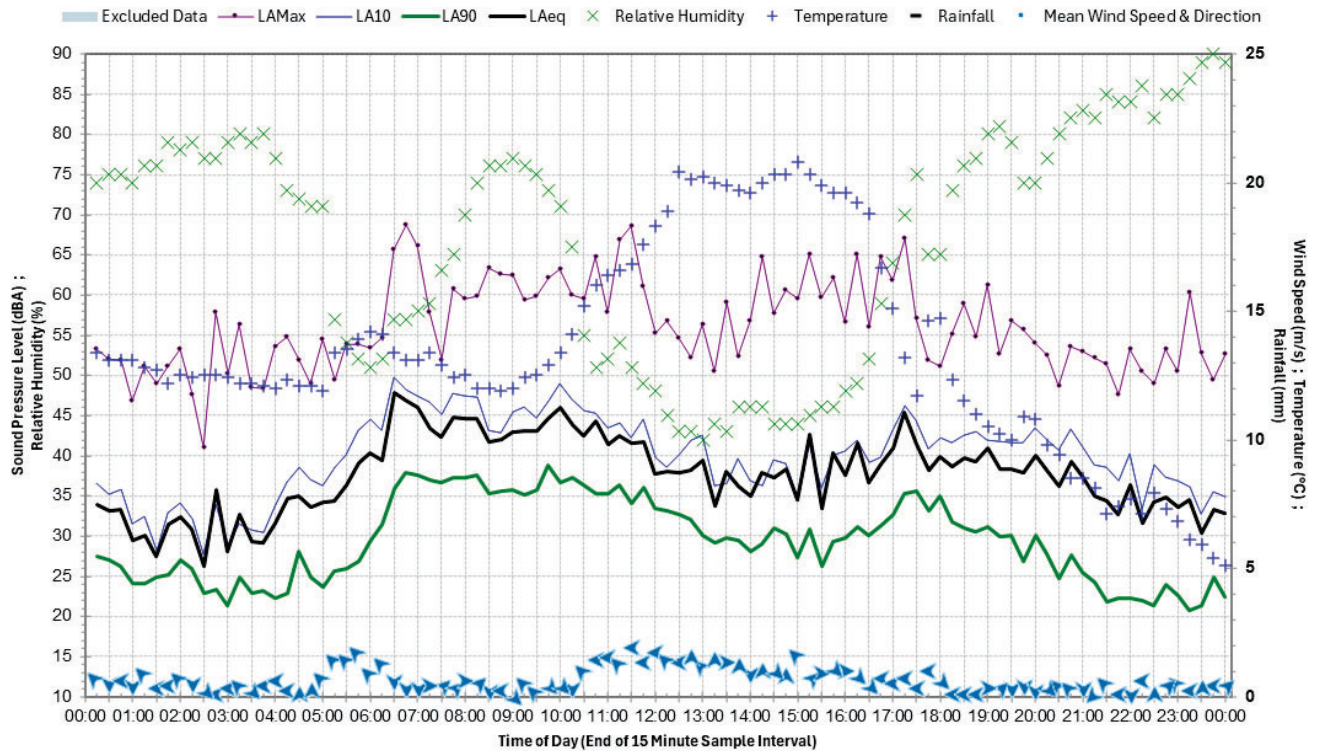
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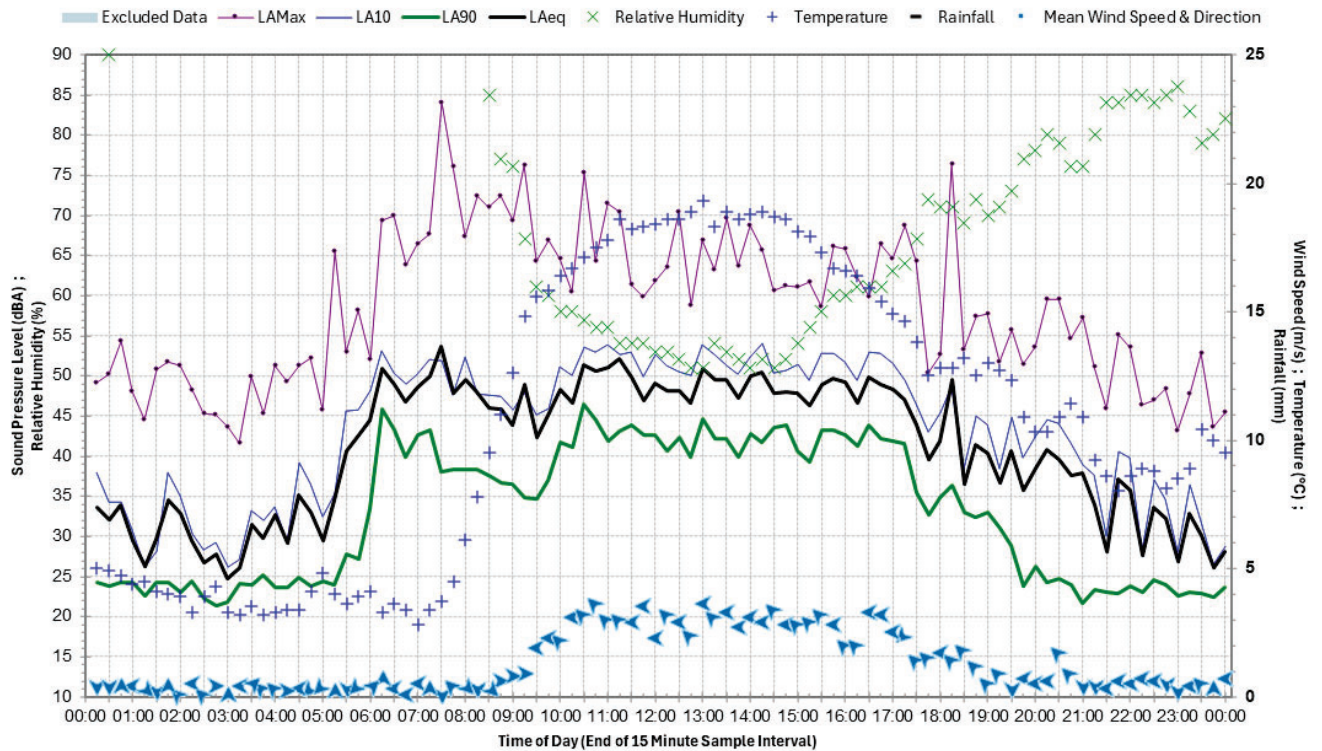
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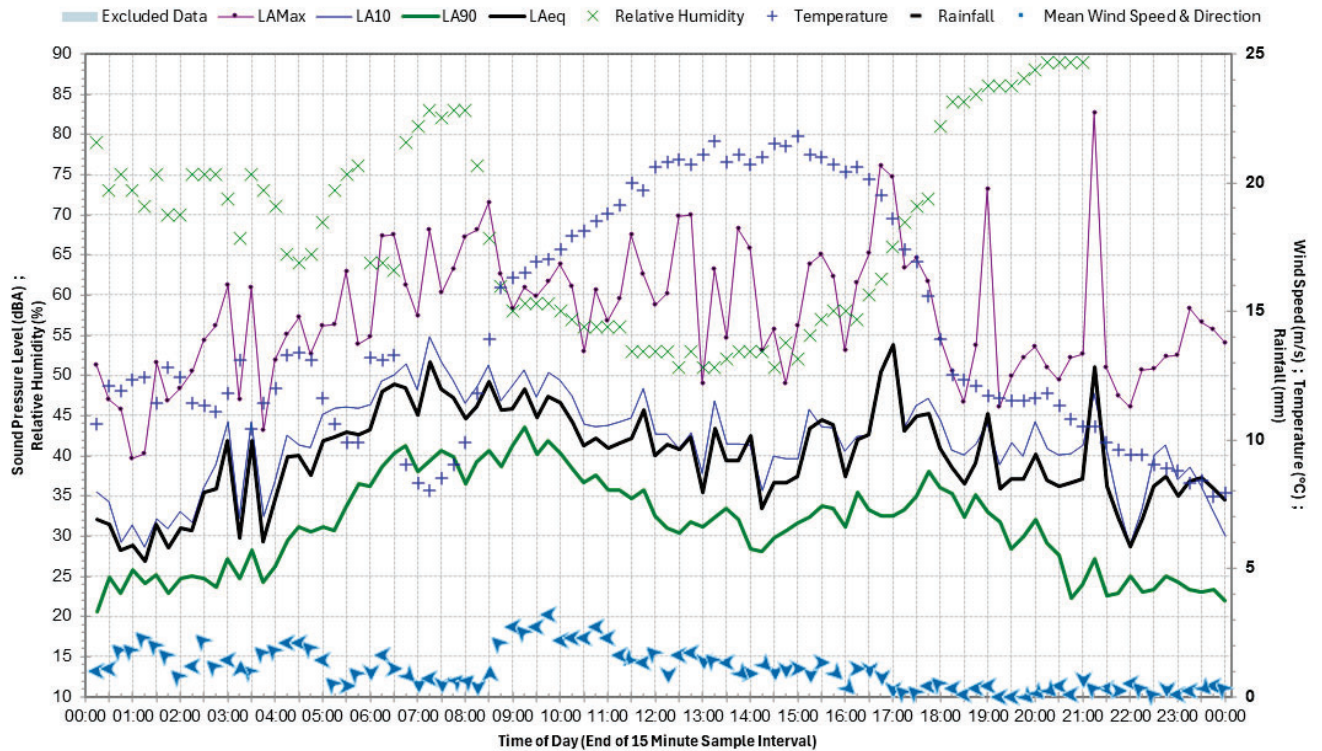
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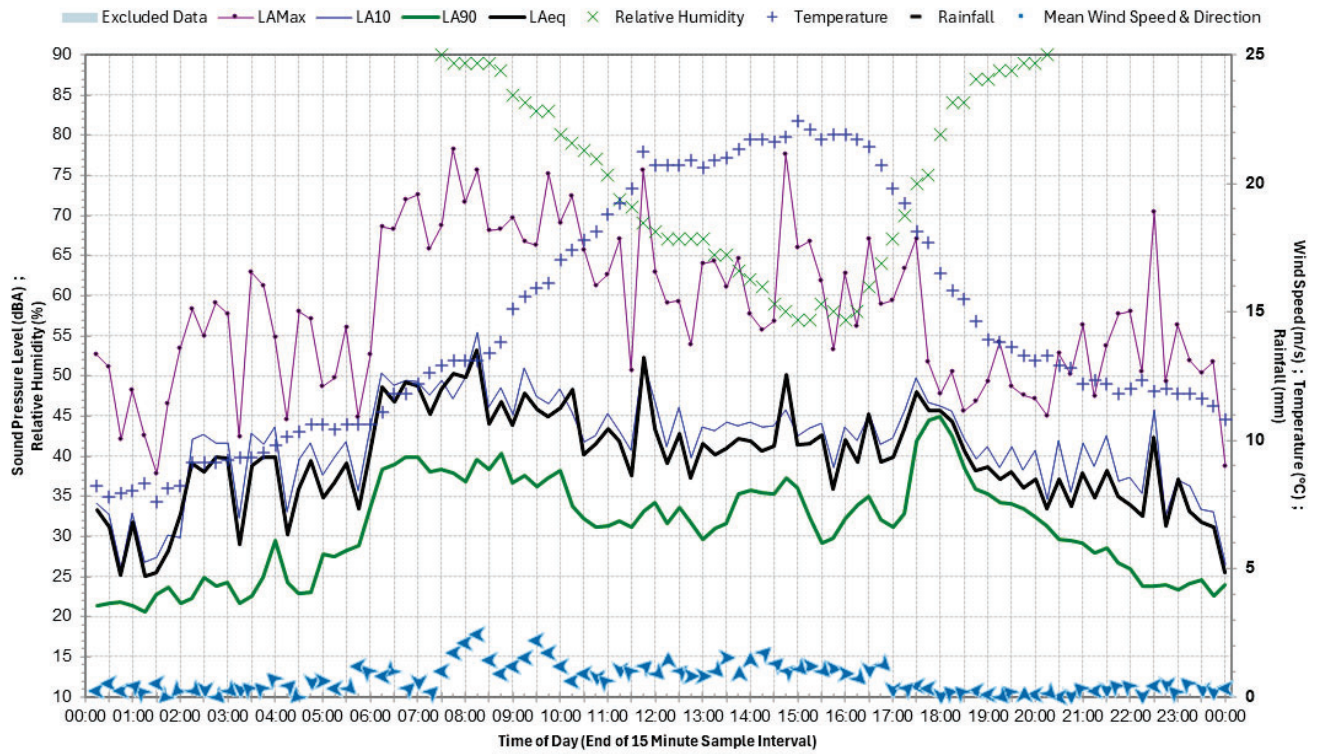
Statistical Ambient Noise Levels Sunday 23 June 2024



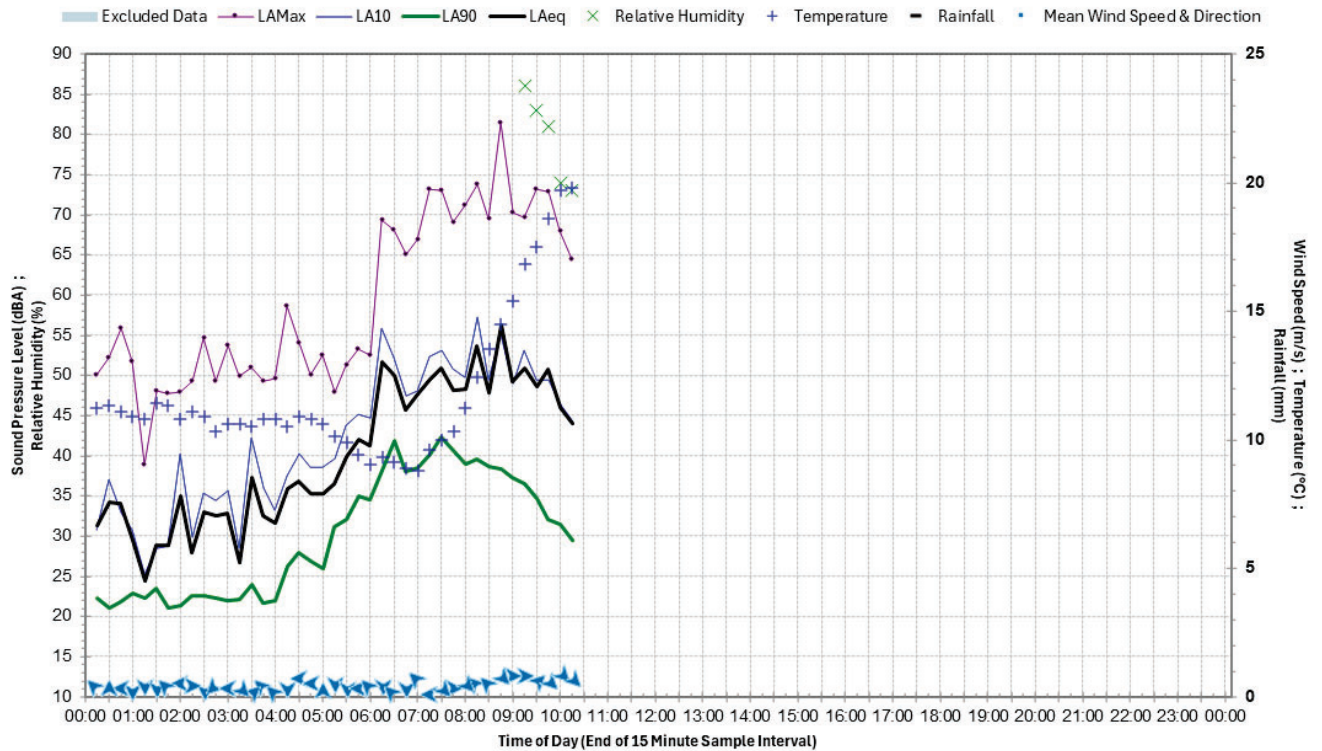
Statistical Ambient Noise Levels Monday 24 June 2024



Statistical Ambient Noise Levels Tuesday 25 June 2024



Statistical Ambient Noise Levels Wednesday 26 June 2024





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Appendix P

Groundwater Assessment



Bromelton Compost Manufacturing Facility

Groundwater Assessment

SOILCO Pty Ltd

13 August 2024

→ The Power of Commitment



Project name		Bromelton Compost Manufacturing Facility					
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1. Introduction

1.1 Project background

SOILCO Pty Ltd (SOILCO) are preparing a Development Application (DA) for a compost production facility (the Project), licensed for the production of 400,000 tonnes per annum (tpa) of compost. The project site is located at 260 Mitchell Road, Bromelton, Queensland, on Lot 4 on Plan RP85497 (the Lot) (Figure 1.1). The facility will utilise a small portion of the 161-hectare (ha) lot.

The Lot is a heavily disturbed area, which was extensively cleared in 2021 and previously used for grazing. In 2008, Bromelton was declared a State Development Area (SDA) encompassing roughly 15,000 ha of greenfield land for medium to large scale industrial activities (State of Queensland, 2023). The surrounding landscape supports a mix of cropping, remnant woodlands and industrial facilities.

1.2 Purpose of this report

The purpose of this report is to document a desktop groundwater assessment that describes the existing groundwater environment and identifies potential groundwater sensitive receptors. The desktop groundwater assessment has reviewed and summarised available information (listed in Table 3.1). Based on the proposed construction and operation of the facility, potential impacts to groundwater have been identified and mitigation measures outlined to manage and reduce potential impacts.

1.3 Terminology

Terminology used in this report is outlined in Table 1.1. Acronyms and abbreviations used in this report are presented in Table 1.2.

Table 1.1 Report terminology definitions

Term	Meaning
Lot	Lot 4 on Plan RP85497.
Project area	The Project area includes Lot 4 RP85497 and a portion of Mitchell Road from Beaudesert-Boonah Road to the Project footprint.
Project footprint	The Project footprint represents the direct disturbance footprint for the proposed compost manufacturing facility. The Project footprint is presented on Figure 1.1.
Study area	The Study area represents the extent of the desktop searches. The study area represents a 2 km buffer around the approximate boundary of Lot 4 RP85497.

Table 1.2 Acronyms and abbreviations

Acronyms & Abbreviations	
AHD	Australian Height Datum
ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
ASP	Aerated Static Piles
BGL	below ground level
BOM	Bureau of Meteorology
CASP	Covered Aerated Static Piles
CMF	Compost Manufacturing Facility
CRD	Cumulative rainfall departure
DA	Development Application
DGV	Default guideline values

Acronyms & Abbreviations	
DoR	Department of Resources
DRDMW	Department of Regional Development Manufacturing and Water
EA	Environmental Authority
EC	Electrical conductivity
EP Act	Environmental Protection Act 1994
EPP 2019	Queensland Environmental Protection (Water and Wetland Biodiversity) Policy 2019
ERA	Environmentally Relevant Activity
FOGO	Food Organics and Garden Organics
GDE	Groundwater dependant ecosystem
GO	Gardin Organics
IVC	In-Vessel Composting
OW	Open Windrow
RN	Registered number
SDA	State Development Area
SILO	Scientific Information for Land Owners
SOILCO	SOILCO Pty Ltd
SWL	Standing water level
VENM	Virgin Excavated Natural Materials
WMIP	Water Monitoring Information Portal

Units of measure	
cfu/mL	Colony forming unit per millilitre
ha	Hectare
L/s	Litres per second
m	Metres
mg/L	Milligrams per litre
m/s	Metres per second
tpa	Tonnes per annum

1.4 Scope of work

The scope of work was a desktop assessment that included:

- Review data from of available publicly accessible databases
- Review of site-specific studies applicable to groundwater
- Review of proposed project description
- Identification of potential impacts to groundwater and sensitive receptors, and outlining proposed mitigation measures

The desktop assessment was undertaken to assess local geological, hydrogeological and water licence data from public databases, mapping layers and other publicly available sources within a 2 km radius of the Project area, as well as review of site-specific studies. This desktop assessment report includes information sourced from data sources summarised in Table 1.3.

Table 1.3 Database searches and available reports

Database name / report	Owner / source	Purpose of desktop search
Public databases		
Rainfall	Long Paddock Scientific Information for Land Owners (SILO)	SILO is a database of Australian climate data from 1889 to the present. Review and describe localised long-term climate and weather to determine groundwater levels / recharge patterns
Geology: Detailed 1:100K Geology Mapping	Queensland Government, Department of Resources (DoR)	Review descriptions and characteristics of local geology to assess groundwater occurrence and quality
Registered bores: Groundwater Database – Queensland	Queensland Government, Department of Regional Development, Manufacturing and Water (DRDMW)	Review and assess existing groundwater supply facilities
Groundwater monitoring: Queensland Water Monitoring Information Portal (WMIP)	Queensland Government, DRDMW	Review and assess groundwater monitoring data to determine groundwater quality
Water licences: Queensland Water Entitlement Database	Queensland Government, Open Data Portal	Identify and assess groundwater users and water licences holders within the area
GDE mapping	Queensland Government, Wetland maps	Identify and assess groundwater dependent ecosystems
Environmental Authority	Queensland Government	Identify nearby potentially groundwater contaminating activities in nearby lots
Reports		
Report on Geotechnical Investigation	East Coast Geotechnical Pty Ltd, 27 July 2021	Geotechnical report
Draft Water Report	John Powell, 1 December 2023	Geo Drill Australia bore assessment report
Water bore drilling log (DRDMW)	Jonathan Berchie, 10 May 2024	Driller's borehole log, submitted to DRDMW
Results of water analysis	Environmental Analysis Laboratory, Southern Cross University, 24 May 2024	Laboratory analysis results from water supply bore sample

1.5 Scope and limitations

This report has been prepared by GHD for SOILCO Pty Ltd and may only be used and relied on by SOILCO Pty Ltd for the purpose agreed between GHD and SOILCO Pty Ltd as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than SOILCO Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

GHD has prepared this report on the basis of information provided by SOILCO Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.6 Assumptions

The following assumptions were relied upon in preparation of this groundwater assessment, including

- Sensitive receptors were identified from public databases and may not include all existing or future receptors in the study area.



Paper Size ISO A4

0 50 100 150 200
Metres



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56



SOILCO Pty Ltd
Bromelton Compost Manufacturing Facility

Project No. 12626213
Revision No. A
Date 8/08/2024

Project area and locality

FIGURE 1-1

2. Project description

The Bromelton Compost Manufacturing Facility (the Bromelton CMF Project) is an organics facility located along Mitchell Road in Bromelton, in South East Queensland. The Bromelton CMF Project will involve the construction and operation of a facility for the receipt, processing, composting, and storage of the following materials: garden, food, wood wastes, manures and soil for the sale and distribution of finished compost, mulch and soil products. SOILCO Pty Ltd (referred to as SOILCO) will design, construct and operate the Bromelton CMF Project.

SOILCO are seeking the following approvals for the Project:

- A State Development Area (SDA) Material Change of Use approval for works within the Bromelton SDA under the *State Development and Public Works Organisation Act 1971*.
- An Environmental Authority (EA) Approval for Environmentally Relevant Activities (ERAs) ERA:
 - ERA 33(1): Crushing, milling, grinding or screening more than 5,000t of material in a year.
 - ERA 53(a): Organic material processing – processing more than 200 t of organic material in a year by composting
 - ERA 54(2)(c): Mechanical waste reprocessing – operating a facility for receiving and mechanically reprocessing more than 10,000 t a year of general waste

The Bromelton CMF Project aligns with objectives in the Queensland Government Queensland Organics Strategy 2022–2032 by reducing the amount of organic waste going to landfill and it will offer economic and social benefits through employment and local business opportunities in South East Queensland.

SOILCO commenced composting operations in 1985 in Australia and has a strong distribution network in agricultural and urban markets in Australia. SOILCO are a manufacturer of quality assured compost, mulch and soil blends and specialise in the design, construction and operation of innovative organics recycling facilities in Australia. SOILCO's mission is to transform organic resources into the world's best products to regenerate and enhance the health and productivity of soil and to maximise our contribution to clean energy and sustainable communities.

SOILCO successfully operates a state-of-the-art network of licensed organics processing facilities across Eastern Australia. SOILCO's infrastructure experience spans different technology solutions, including:

- Open Windrow (OW)
- In-Vessel Composting (IVC) tunnels
- Aerated Static Piles/ Covered Aerated Static Piles (ASP/CASP)

For the Bromelton CMF Project, SOILCO will utilise ASP & OW technologies.

Table 2.1 summarises and depicts the key Bromelton CMF Project components.

Table 2.1 *Project component details*

Project component	Details
Lot on Plan	Lot 4 on Plan RP85497 and Mitchell Road (Local government road parcel)
Summary of proposed works	– Construct and operate a Compost Manufacturing Facility (CMF) at 260 Mitchell Road, Bromelton for the sale and distribution of finished compost, mulch & soil products – The site will be split into 3 different processing areas: Reveal, decontamination and composting utilizing Forced Aeration Pad system (ASP).
Construction disturbance area within Lot 4 RP85497	21 hectares
Operational footprint within Lot 4 RP85497	18.5 hectares

Project component	Details
Proposed output of the compost facility and type of material to be received and processed	Receipt, processing, composting, and storage of up to 250,000 tpa of the following materials: – Garden, Food and Wood wastes and manure. Receipt, processing, storage and blending of up to 150,000 tpa of sand and soil products for manufacturing (Virgin Excavated Natural Materials or VENM).
Technology used	Two composting technologies will be utilised to handle different feedstocks: – 100,000 tpa of garden organics (GO) composted by Passive Open Windrow (OW) method. – 150,000 tpa of Food Organics and Garden Organics (FOGO) is to be processed on a Forced Aeration Pad system (ASP). Wood wastes and manure will make up a small portion of the composting feedstocks and will be blended with the GO & FOGO based on onsite capacity. VENM will be received and stored as required based on demand of finished products. Due to the seasonal nature of feedstock generation, up to 15% of the total annual waste may be received in any one month. This would typically occur around spring and autumn.
Key infrastructure and structures	– Access from Mitchell Road – Weigh bridges – Internal road network – Maintenance and storage shed – Final screening and manufacturing area – Water tanks – Aeration Pad system – Office, carparking and amenities – FOGO receival area – 3 x leachate ponds – 1 x freshwater dam – Open windrows pad – FOGO maturation pad – Hardstand areas – Retaining wall – Upgrade of Mitchell Road
Hours of Operation	Monday – Friday 6 am to 6 pm Saturday – 6 am to 4 pm Sunday and public holidays – 9 am – 4 pm
Operational Staff	22 employees
Access arrangements	Mitchell Road will connect the Bromelton CMF Project to the road network. Mitchell Road will be upgraded to accommodate the traffic from the Bromelton CMF Project.
Timeframe	Construction and Commissioning: 7 April 2025 – 30 January 2026

The CMF features that have the potential to impact groundwater includes the following:

All buildings

The administration office and amenity building will have water tanks located adjacent to the buildings for rainwater collection.

The receival building will be a steel portal frame construction 30 m (w) x 80 m (l) x 9 m (h) with Colorbond cladding on the walls and roof. A water tank will be located adjacent to the building for rainwater collection.

Forced aeration pad

The forced aeration pad consists of a 9,000 m² concrete pavement arranged with 18 bays that house a series of parallel PVC pipes laying lengthwise, incorporated in the concrete. The pipes have tapered plastic nozzles (spigots) that provide the mechanism for the supply of air and collection of leachate known as the “aeration floor”.

Open windrow pad

The open windrow pad will be approximately 24,000 m² with an area of 9,000 m² for garden organics receipt and finished compost transfer. Compacted crushed rock will be used to form the hardstand area and the pad will be graded to drain water run off to the leachate collection dam. A number of water supply connections from the leachate dam and the fresh water supply will be positioned around the area for irrigation of the piles.

The compacted crushed rock will be compacted to achieve a permeability less than 1x10⁻⁹ m/s.

Maturation, manufacturing and distribution area

A proposed hardstand area of 51,000 m² will be utilised to mature and store the compost, receive and store virgin excavated natural materials, screen and blend finished compost, mulches and soils. The pad will be constructed from crushed compacted rock and will be graded to drain water run off to the leachate collection dam.

The compacted crushed rock will be compacted to achieve a permeability less than 1x10⁻⁹ m/s.

Workshop and fuel storage area

The workshop will be a 25 m (w) x 48 m (l) x 6 m (h) shed of steel construction with colorbond cladding. The floor will be concrete with bunding around the outside of the shed. Maintenance activities will be carried out on mobile plant and equipment in the undercover area.

Self-bunded diesel and adblue tanks will be installed adjacent to the workshop with a bunded area for fuelling of vehicles onsite. Storage of oils and lubricants for the maintenance of plant and machinery will be located within a covered, bunded area within the shed.

Leachate ponds

The facility will have a designated leachate management system. Leachate ponds are proposed to manage dirty water generated within the receipts building, as well as from the aerated composting pad area, the passive open windrow composting area and the manufacturing storage and distribution areas. Two ponds are proposed to handle the leachate run off from the site and will be sized according to Department of Environment, Science and Innovation requirements.

To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the QLD ERA 53 Organic material processing guidelines:

- 600 mm thick recompacted clay with a permeability of less than 1x10⁻⁹ m/s; or
- A High-density polyethylene geomembrane liner with a minimum thickness of 1.5 mm.

Leachate ponds will be positioned in the most suitable site location, based on existing site topography and grading to allow gravity drainage from process areas to the ponds. Each pond will be fitted with a pumping system to deliver water to the composting areas and will be fully fenced to limit fauna and human access.

Freshwater storage dam

A freshwater storage dam with overflow spillway will be constructed to store uncontaminated water run off on the site. The water will be utilised in the composting process and will be distributed to the composting and manufacturing areas by a pump and piping system. For efficient water collection, determination of the dam location, will be based on site drainage requirements and topography. The size of the dam will be based on yearly rainfall data and capacity requirements

Groundwater

It is understood that groundwater will not be abstracted for construction and/or operational water supply.

3. Regulatory context

A summary of the Project's overarching legislation, regulations and guidelines, which apply to all aspects of the Project, is detailed in the *Environmental Assessment Report* (GHD, 2024).

The legislation, standards and guidelines that apply specifically to groundwater are:

- Queensland *Environmental Protection Act 1994* (EP Act)
- Queensland *Water Act 2000* (Water Act)
- Queensland *Water Regulation 2016*
- *Water Plan (Logan Basin) 2007*
- State Planning Policy
- *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (EPP 2019)
- National Water Quality Management Strategy: *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018)
- *Minimum Construction Requirements for Water Bores in Australia* (2020)
- *Seqwater Development Guidelines for Water quality Management in Drinking Water Catchments*

Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting (DESI, 2024) outlines the requirements for best practice for preventing groundwater contamination, as detailed in Table 3.1.

Table 3.1 Extract from ERA 53 – Best practice environmental management practices

Performance outcome	Best practice environmental management practices
The operation is managed so that the site does not adversely impact on the environmental values of groundwater quality.	Groundwater monitoring is undertaken unless it can be proven: – Groundwater is at such a significant depth that it will not be impacted by leaching or percolation of contaminants or – The geotechnical composition of the composting pad surface and / or subsurface is sufficiently impermeable so that groundwater will not be impacted. An adequate hard stand area is used to prevent the leaching of contaminants to groundwater. Where soil permeability creates a risk of groundwater contamination, liners and leachate management systems are installed. Adequate erosion and sediment control measures are implemented and maintained to minimise contact of surface water with groundwater. Adequate direction of stormwater management around contamination sources is achieved. An environmental management system is implemented per AS/NZS ISO 14001:2016 Environmental management systems - Requirements with guidance for use (or most recent versions).

4. Existing environment

4.1 Surrounding land use

The surrounding landscape supports a mix of cropping, remnant woodlands and industrial facilities, which are summarised in Table 4.1.

Table 4.1 Immediate surrounding land use

Direction	Land use description
North	– Mitchell Road – track (undeveloped road corridor) – Lot 22 SP121037 – cattle grazing – Lot 21 SP121037 – cattle sale yards (Beaudesert sale yards) – Lot 51 SP213384 – industrial – Lot 1 RP80463 and Lot 100 SP223082 – industrial use. Owned by National Hide Processors Pty Ltd, subject to EA EPPR00456613: • ERA 55 - Other waste reprocessing or treatment; 2(a) - Operating a facility for receiving and either reprocessing or treating, in a year, the following quantity of category 2 regulated waste - 5,000t or less • ERA 39 - Tanning; Operating a tannery or facility for tanning, curing or finishing 100t or more of leather products in a year
East	– Lot 1 RP45234 – cattle grazing – Lot 3 RP858122 and Lot 4 SP207168 – waste collection and recycling facility (Quickcell Technology Products Pty)
South	– Lot 2 RP12397, Lot 2 RP85497, Lot 1 RP43189, Lot 2 RP68584 – industrial use. Owned by AJ Bush & Sons Pty Ltd, subject to EA EPPR00531113: • ERA 15 – Fuel burning; Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour • ERA 25 – Meat Processing; 3(b) - Rendering, without any other processing, in a year, the following quantity of meat or meat products - more than 500t • ERA 63 – Sewage Treatment; 1(a-i) - Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21 to 100EP - if treated effluent is discharged from the works to an infiltration trench or through an irrigation
West	– Lot 100 W312081 – cattle grazing

4.2 Rainfall

Daily rainfall data were obtained from the Scientific Information for Land Owners (SILO) database operated by the Queensland Government - Department of Environment and Science (DES 2024). SILO patched point data are based on historical data from a particular Bureau of Meteorology (BOM) station with missing data interpolated from nearby stations. For this assessment, SILO data were obtained for grid point -28.00, 152.90, which is located within proximity to the Project site.

Rainfall is seasonal and the higher rainfall totals occur from October to March and lowest totals occurring between April and September. The SILO data was plotted onto a cumulative rainfall residual (CRD) plot (refer to Figure 4.1) and shows that below average rainfall was occurring between 2000 and the peak of the millennium drought to 2007. Most recently below average rainfall was observed between September 2018 to December 2021.

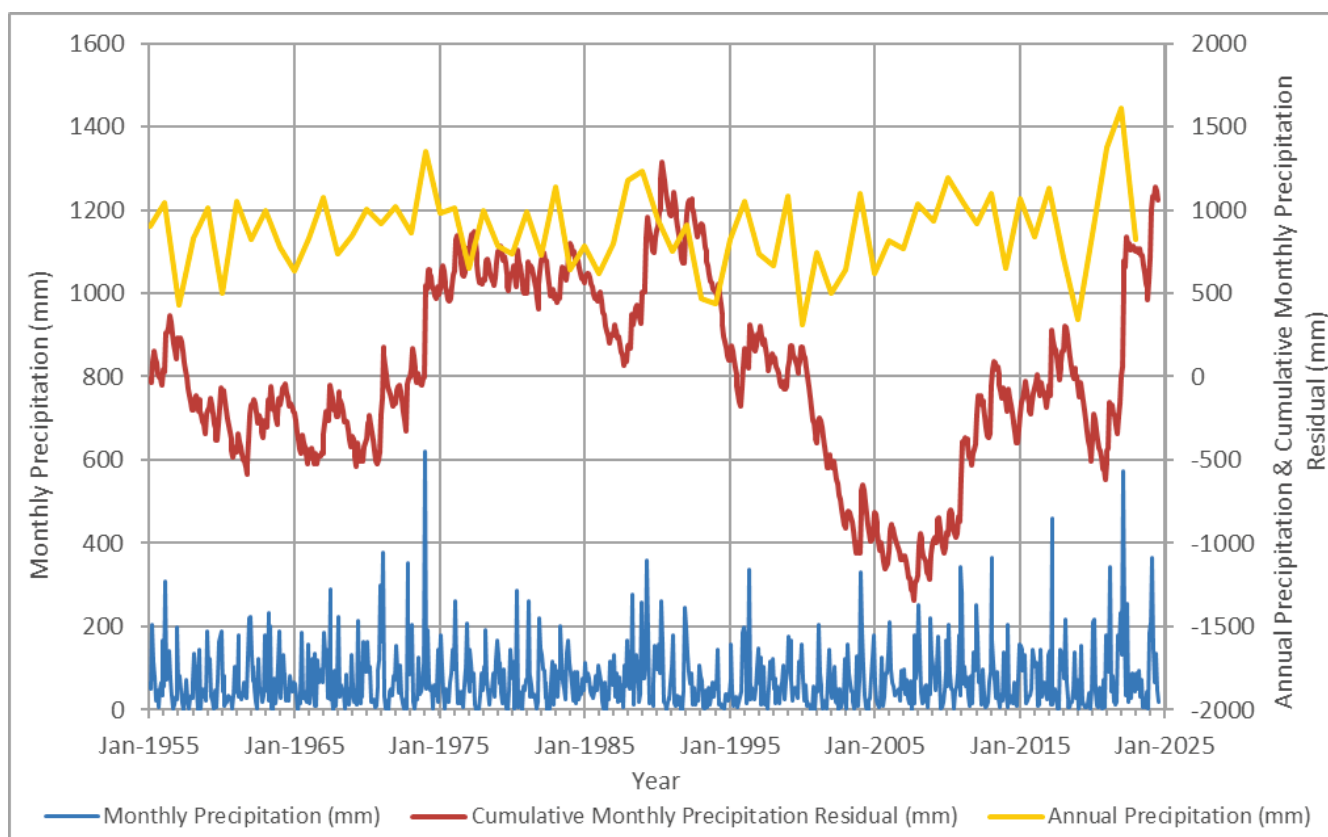


Figure 4.1 Cumulative Rainfall Residual – SILO data (point -28.00, 152.90)

4.3 Surface waters

The regional topography in the vicinity of the Project site includes foothills and valleys extending from an unnamed ridge, which is located 6km south of the Project site. The Project site is undulating with a high elevation within the south of the Lot, and steeply dips towards the north. The site elevations range from 165 m AHD at the southern boundary of the Project site to 81 m AHD at the northern-eastern corner of the Lot boundary. The grade of west-east undulations at the Project site are up to 24%.

Three first order drainage lines of Allan Creek, intersect the Project site, which drain north to adjoin a third order, north-easterly flowing tributary of Allan Creek. Allan Creek is a fourth order tributary of the Logan River, at the confluence of these waterways. There are two farm dams located within the Lot boundary, approximately 650 to 700 m east of the Project area.

The drainage lines tend to hold water for a period of time after rainfall events. For example, a site visit was conducted on 11 June 2024 where water was observed within the drainage line near the northern boundary, with the upper catchment trickling water into lower portion of the drainage line that flattens out. A previous rainfall event occurred 1-2 June with 13 mm over two days (BOM station 40941).



Figure 4.2 First order stream along northern boundary (Mitchell Road) holding water

4.4 Soils and geology

4.4.1 Soils

Soil mapping

A review of the Australian Soil Classification mapping (via Queensland Globe, accessed April 2024), shows the six unique soil classifications with the Project area. Mapped soils and their descriptions are presented in Table 4.2 and are shown in Figure 4.3.

Table 4.2 Soil classifications within development area – Australian Soil Classification

Mapping name	Mapping code	Classification	Description
Mundoolun	Mu	Sand or loam over friable or earthy clay - Chromosols, Kurosols	Shallow, slightly acidic brown or grey texture contrast to gradational soils on sandstone. Soils are frequently bleached and/or mottled and may also be slightly saline.
Richards	Ri	Friable non-cracking clay or clay loam soils - Dermosols, Ferrosols	Moderately to very deep, mottled, grey, slightly acidic to alkaline gradational or uniformly fine soils over siltstone or sandstone from 0.65m.
Cedar Vale	Cv	Sand or loam over friable or earthy clay - Chromosols, Kurosols	Very shallow to shallow, red, strongly acidic to neutral texture contrast, gradational or uniformly fine soils over sandstone or siltstone from 0.3m.

Mapping name	Mapping code	Classification	Description
Drynan	Dn	Sand or loam over friable or earthy clay - Chromosols, Kurosols	Moderately deep (also shallow), red, texture contrast soil on siltstone and sandstone, generally underlain by grey clays.
Koukandowie-Lowood Complex	Kk	Sand or loam over sodic clay - Sodosols, Kurosols	Moderately deep to very deep, neutral to alkaline brown, black or occasionally yellow sodic texture contrast soils on siltstone or sandstone. Subsoils are neutral to strongly alkaline, mottled and may be calcic. Often saline.

Geotechnical investigation

A geotechnical investigation was conducted in 2021 by East Coast Geotechnical (*Report on Geotechnical Investigation*, 2021). The geotechnical investigation involved advancing 22 boreholes up to 6 m depth and collecting soil samples for analysis.

The results of the testing reported:

- Groundwater was not encountered in the boreholes
- The soil lithology encountered was described as low to high plasticity clays and silts
- The soil samples were assessed as having high to extreme plasticity
- Five soil samples reported Emerson Class values of 1 (complete dispersion), 2 (partial dispersion), and 4 (dispersive, presence of carbonate). This indicates that the soils at the site are dispersive and prone to erosion.

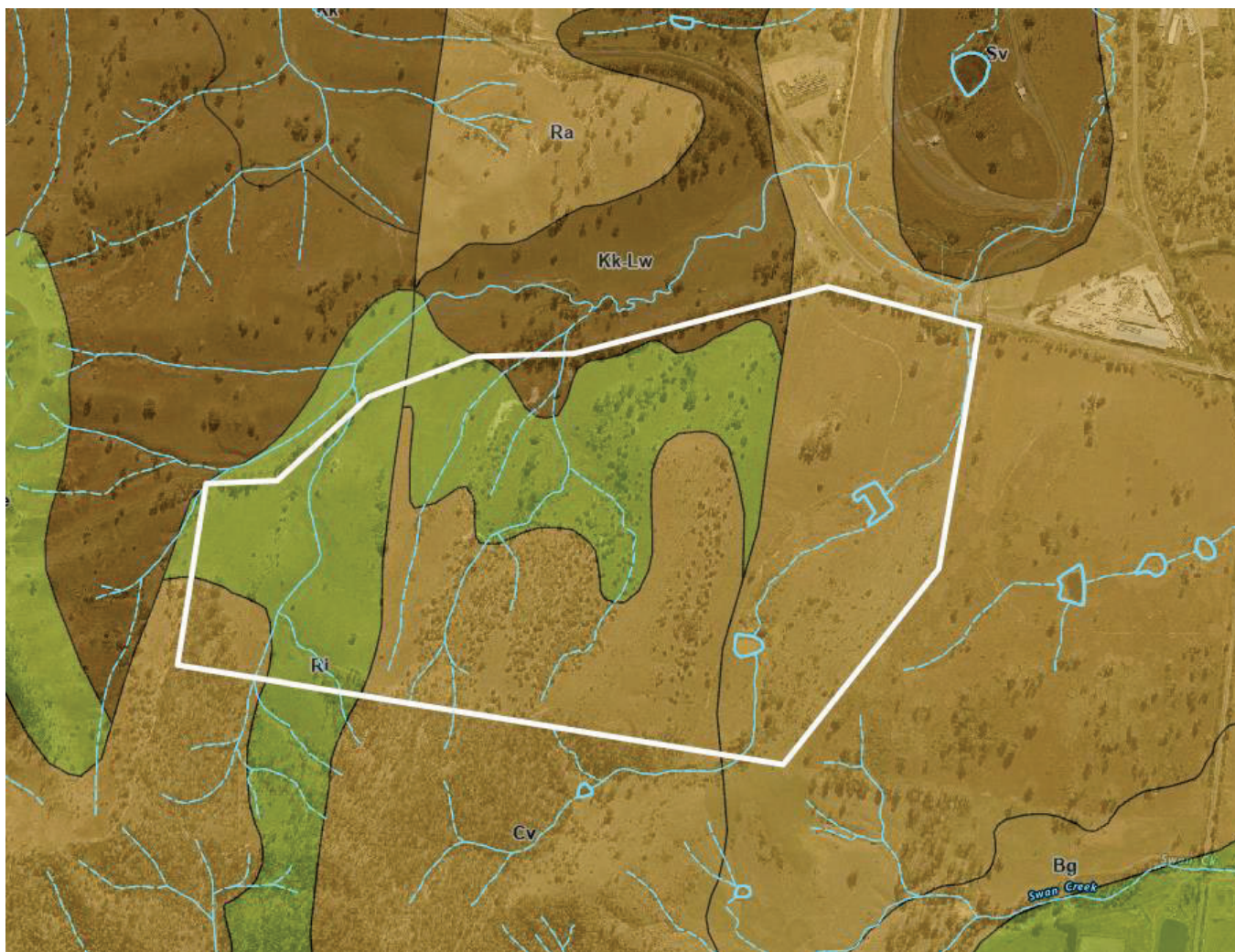


Figure 4.3 Soils mapping (1:50,000 scale Australian Soil Classification, via QLD Globe)

4.4.2 Geological units

Geology mapping

A review of the Geological Survey of Queensland detailed surface geology mapping (1:100k via Queensland Globe, accessed April 2024), showed the geological units mapped within the Project area are (youngest to oldest) the Walloon Coal Measures, Heifer Creek Sandstone Member and Koukandowie Formation, which are described as (Jell, 2013):

- **Jw – Walloon Coal Measures:** Middle Jurassic unit comprising mudstone, carbonaceous siltstone, volcanilithic sandstone, coal seams, bentonitic siltstone, minor oil shale, minor cone-in-cone limestone; clay ironstone, weathering to iron concretions at the surface
- **Jbmkh – Heifer Creek Sandstone Member:** Middle Jurassic formation that is a member of the Koukandowie Formation. The member comprises coarse-grained, cross-bedded, quartzose, throughout the Clarence-Moreton Basin, diachronous, prominent topographic features (Jell, 2013).
- **Jbmk – Koukandowie Formation:** Early to Middle Jurassic formation that is part of the Marburg Subgroup with mixed sandstone, siltstone and shale (Jell, 2013). The Koukandowie Formation unit comprises lithofeldspathic labile and sublabile to quartzose sandstone, siltstone, shale, minor coal, ferruginous oolite marker (QLD Globe, 2024).

The three geological units strike north-south within the development area. The units form part of the Clarence-Moreton basin. Mapped surface geology is shown on Figure 4.4. There are no mapped significant structural geological features (e.g., faults) within the Project area which may influence groundwater flow or recharge.'

There is no mapped alluvium within the Project area. Alluvium appears to be restricted to the main watercourses of Allan Creek to the north and Swan Creek to the south.

Geotechnical investigation

The geotechnical investigation conducted by East Coast Geotechnical reported:

- Depth to extremely weathered rock ranged between 0.8 m and 5.5 m. Depth to competent rock ranged from 0.9 m to 5.7 m. The rock type was not identified in the borehole logs.
- Many of the borehole encountered auger refusal before reaching the target depth of 6 m. Refusal depth ranged from 0.9 m to 5.7 m depth across the Lot.
- Traces of coal were noted on some of the borehole logs.

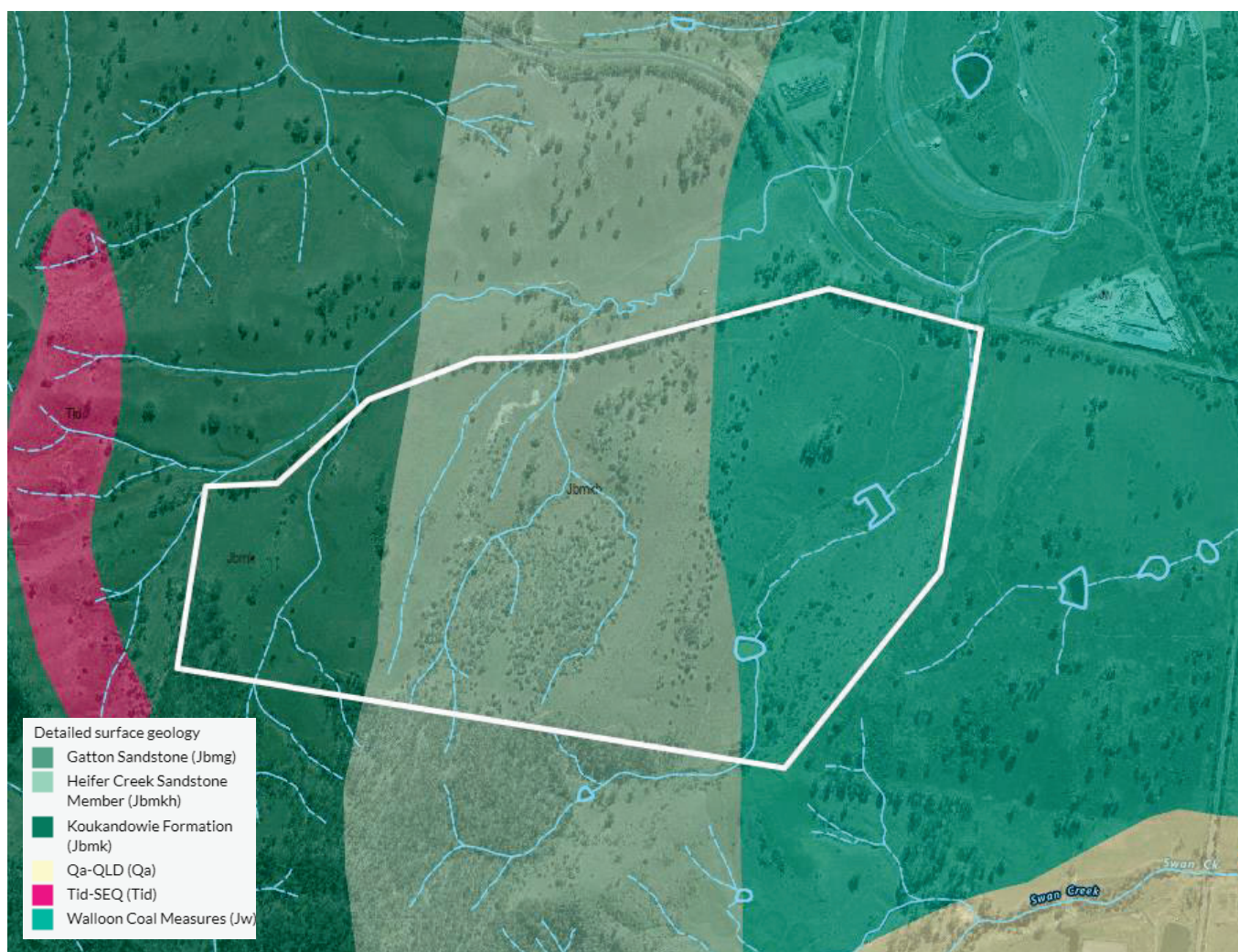


Figure 4.4 1:100K geological mapping (QLD Globe, 2024)

4.5 Groundwater

4.5.1 Hydrostratigraphy

A summary of the mapped geological units within the development area and their associated hydrogeological characteristics is provided in Table 4.3.

Table 4.3 Hydrostratigraphic units within the development area

Period	Formation	Dominant lithology (QLD Globe, 2024)	Main water bearing horizons / hydrogeological properties
Middle Jurassic	Walloon Coal Measures	Shale, siltstone, sandstone, coal seams	The coal seams are generally the primary hydraulically conductive strata within the unit

Period	Formation	Dominant lithology (QLD Globe, 2024)	Main water bearing horizons / hydrogeological properties
Early to Middle Jurassic	Koukandowie Formation	Lithofeldspathic labile and sublabile to quartzose sandstone, siltstone, shale, minor coal, ferruginous oolite marker	Northern Rivers Geology (2013): Deposited in a fluvial environment. Woody fragments that will present as coal. The unit is generally thought to be an impermeable unit. Generally, there is not much fresh water in the unit, because: 1. The finer grained components of the formation tend to contain more salt due to the some of the sedimentary depositional environment 2. The formation tends to show very little lateral porosity, meaning water is stored in smaller localised aquifers of low long-term yield.
Middle Jurassic	Heifer Creek Sandstone Member	Sublabile to quartzose sandstone, siltstone, shale	A member of the Koukandowie Formation. Sandy bedload channel deposition. Low permeability aquifer / aquitard (Bioregional Assessment, 2014)

4.5.2 Registered groundwater bores

A search of the Queensland Groundwater Database (DRDMW, 2024) lists 28 registered groundwater bores within a 2 km radius of Lot 4 RP85497 (Queensland Globe, accessed April 2024). The search has identified the registered bores are within seven hydrogeological units, including alluvium, undefined quaternary, Walloon Coal Measures, Koukandowie Formation, and Heifer Creek Sandstone Member.

The relevant details held in the Groundwater Database for the registered bores is provided in Appendix A and summarised in Table 4.4.

Table 4.4 Summary of aquifer properties for the geological units near the site (Groundwater database data)

Hydrogeological unit	No. bores	Aquifer depth range (m BGL)	Screened lithology description	SWL (m BGL)	Yield (L/s)	Water quality
Allan Creek Alluvium	4	6.0 – 18.5	Sand, gravel, sandy clay, clayey gully wash, clay	3.0 – 9.0	0.4 – 2.25	Potable to 2,100 µS/cm
Swan Creek Alluvium	2	10.5 – 14.0	Silty sand, clay	9.0 – 12.0	0.06	No data
Logan River alluvium	4	9.0 – 10.0	Fine sand, fine to medium sand, fine to coarse sand	No data	No data	No data
Undefined Quaternary	3	6.0 – 13.5	Clay, clayey sand, gravelly sand, sandy clay with sand and gravel	4.0 – 7.0	0.1 – 0.5	Potable to 5,000 µS/cm
Walloon Coal Measures	6	9.0 – 55.0	Ironstone, sandstone, siltstone, coal, mudstone	8.0 – 10.0	0.08 – 1.13	2300 – 4800 µS/cm
Heifer Creek Sandstone Member	2	15.0 – 17.0	Siltstone, coarse-grained sandstone, silty sand, sandstone	8.0 – 14.0	0.06 – 0.3	3800 – 4220 µS/cm
Koukandowie Formation	2	6.0 – 11.0	Coarse quartz and sandstone	1.8 – 8.5	0.1 – 0.19	Potable to 650 µS/cm

Of the registered bores, five of them are registered as existing water supply bores, which identified as one of the sensitive receptors. A summary of the water supply bores is presented in Table 4.5. The nearest water supply bore is RN 138924 within the Bromelton Saleyards. The bore would typically be used when cattle are in the yard for sale.

Table 4.5 Location of registered water supply bores within 2 km of the site

RN	Lot on Plan	Distance from Project area	Aquifer	SWL (m BGL)	Water quality
RN 124866	2/SP140638	1.1 km north	Allan Creek Alluvium	3.0	Potable
RN 138924	21/SP121037	800 m northeast	Allan Creek Alluvium	—	—
RN 142889	4/SP207168	1.4 km east	Walloon Coal Measures	8.0	2,300 µS/cm
RN 152689	7/RP32768	1.6 km north	Allan Creek Alluvium	9.0	2,400 µS/cm
RN 169490	51/SP213384	1.8 km northeast	Quaternary – undefined	4.5	5,000 µS/cm

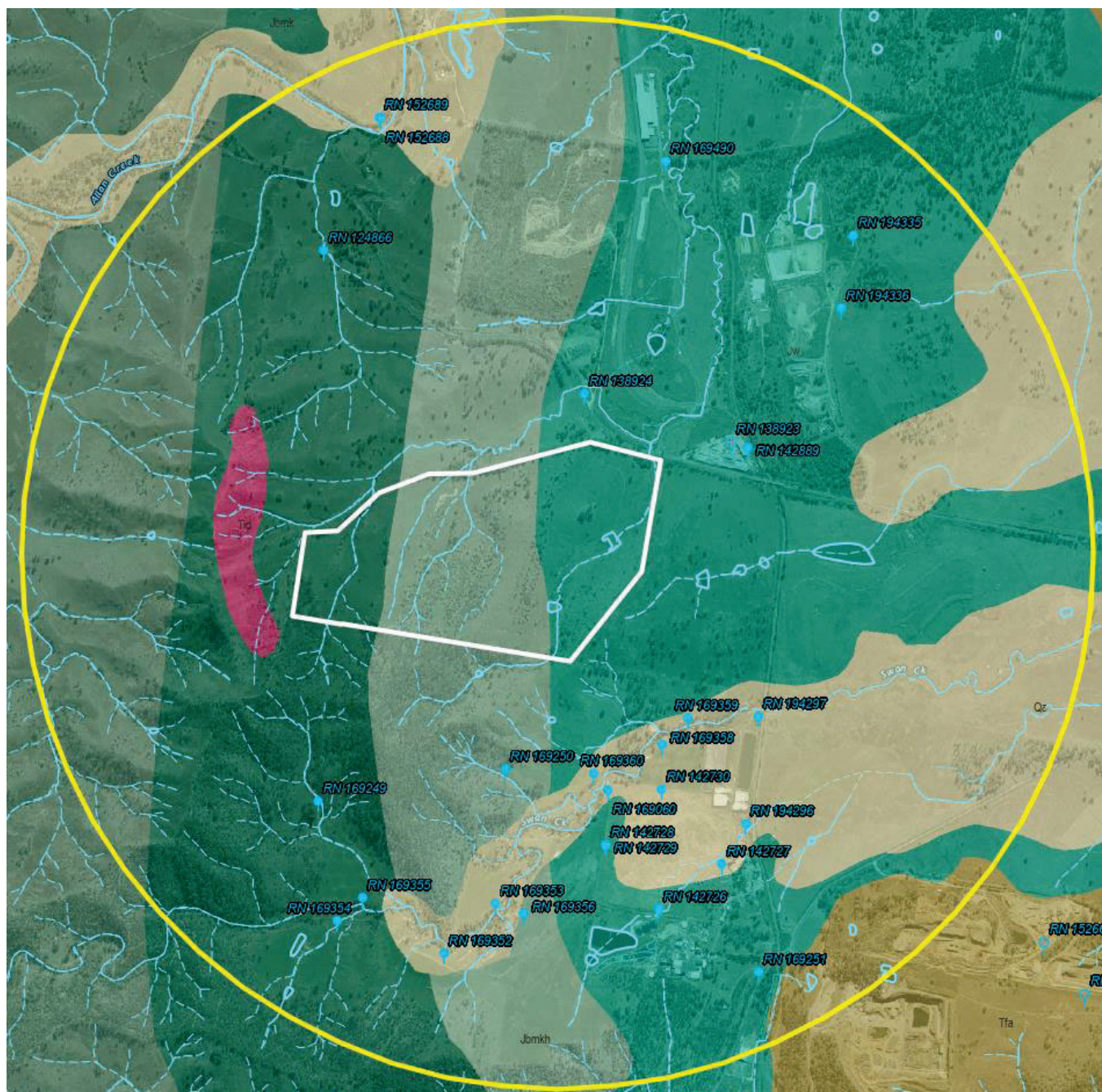


Figure 4.5 Registered groundwater bores (Queensland Globe, 2024)

4.5.3 Water supply bore

4.5.3.1 Water bore drilling log

SOILCO commissioned the installation of a water supply bore near the northern boundary of the Lot on 10 May 2024. The driller's water bore drilling log (submitted to the DRDMW) is included in Appendix B. It should be noted that the GPS location noted on the driller's bore drilling log is incorrect. A handheld GPS was recorded of the installed bore (-27.975556, 152.913333) during a site inspection on 11 June 2024.

The bore's details from the driller's log included:

- Water bearing strata were encountered 18 m below ground level (BGL) and again at 33 m BGL
- Screened from 18 to 39 m BGL, with gravel packing from 7 to 40 m BGL.
- Screened lithology was described on the driller's log as basalt, grey/brown, grey, and dark brown. It should be noted that the lithology has been misidentified by the driller, as there is no basalt mapped near the site, and inspection of the drill chip samples that were sampled at 1 m intervals during drilling indicated that the lithology encountered was fine-grained sandstone, siltstone, shale and coal.
- Estimated yield of 0.487 L/s (approx. 1,750 L/hr) (airlift over 2 hours). Sustainable yield is unknown.
- Field measured electrical conductivity (EC) was recorded as 1,400 µS/cm

4.5.3.2 Groundwater quality

Laboratory water analysis was completed on a sample collected from the water supply bore. The laboratory analysis certificate is included in Appendix C and the results are compared with water quality guidelines in Table 4.6. The results indicated water quality was relatively good, generally meeting the Australian Drinking Water Guidelines (2011) for key parameters, except for salinity, hardness, sodium and chloride. All tested ANZG 2018 default guideline values (95 % aquatic species protection for moderately to slightly disturbed systems) are met except for zinc, which slightly exceeded the default guideline values (DGV).

Table 4.6 Laboratory test results and Australian Drinking Water Guidelines (2011)

Parameter	Sample 1 – Bromelton Bore	Drinking water guidelines	ANZG 2018 (default guideline values) (95% species protection)
pH	7.89	6.5-8.5	–
Conductivity (EC) (dS/m)	2.15	–	–
Total Dissolved Salts (mg/L)	1,459	600	–
Turbidity (NTU)	3.93	–	–
Total Alkalinity (mg/L CaCO ₃ equivalent)	777	–	–
Water Hardness (mg/L CaCO ₃ equivalent)	592	200	–
Phosphate (mg/L P)	0.008	–	–
Nitrate (mg/L N)	0.018	–	–
Ammonia (mg/L N)	0.06	–	0.9
Sodium (mg/L)	309	180	–
Potassium (mg/L)	6.45	–	–
Calcium (mg/L)	71.6	–	–
Magnesium (mg/L)	100	–	–
Sodium Absorption Ratio (SAR)	5.52	–	–
Chloride (mg/L)	374	250	–
Sulfate (mg/L SO ₄ ²⁻)	51.8	250	–

Parameter	Sample 1 – Bromelton Bore	Drinking water guidelines	ANZG 2018 (default guideline values) (95% species protection)
Chloride/Sulfate Ratio	7.22	–	–
Total Coliforms (cfu/100 ml)	52,000	–	–
E.Coli (cfu/100 ml)	<100	–	–
Aluminium (mg/L)	0.028	0.2	0.055
Arsenic (mg/L)	0.003	–	–
Cadmium (mg/L)	<0.001	–	0.0002
Chromium (mg/L)	<0.001	–	0.001 (CrVI)
Copper (mg/L)	<0.001	1	0.0014
Iron (mg/L)	0.046	0.3	–
Manganese (mg/L)	0.019	0.1	1.9
Nickel (mg/L)	0.000	–	0.011
Lead (mg/L)	0.000	–	0.0044
Zinc (mg/L)	0.014	3	0.008

4.5.4 Water entitlements and allocations

A search of the water entitlement viewer (Queensland Government, 2024) was completed on 22 June 2024, and the results are summarised in Table 4.7.

The Lot does not fall within an underground water management area

Table 4.7 Water entitlements within 2 km

Entitlement type	Lot on Plan	Authorisation number	Authorisation type	Name of watercourse	Nominal entitlement per water year
Water licence – Watercourse	1/SP140861; 121/SP137949; 991/SP158127; 992/SP154614	604245	Authorised purpose	Swan Creek	0.00

4.5.5 Groundwater dependent ecosystems

The site is mapped as exclusion zones, with high confidence (QLD Globe, 2024).

According to the Wetlands Info website (Queensland Government 2017) the definition of exclusion zones is: “Some rocks (such as some fine-grained sedimentary rock, metamorphic rock and igneous rock) and unconsolidated sediment (such as clay deposits) have very low permeability. Due to this very low permeability, much of the water from rainfall is unable to infiltrate the land surface and becomes surface water run-off. These very low permeability rocks and sediments do not have enough inter-granular pore space, voids or fractures to contain groundwater or enable flow. As a result of this GDEs are not located in areas within these very low permeability rocks or sediment.”

The Project area only supports cleared, ephemeral drainage lines and there are no watercourses, wetlands or permanent water sources present, however, farm dams are present within the eastern portion of the Lot (refer to Figure 4.6 and Figure 4.7).



Figure 4.6 *Downstream dam*



Figure 4.7 *Upstream dam*

4.6 Summary of hydrogeological conditions

The geological units underlying the proposed construction area comprises the Koukandowie Formation and associated member Heifer Creek Sandstone, both of which have been noted to be low permeability aquifer or aquitard. Therefore, the geological units are not considered to be a regional water source.

The shallow soils at the site are high plasticity clays and silts, with a high shrink/swell, with highly to extremely weathered rock underlying the shallow soils. Therefore, recharge of groundwater through these soils is likely to be low and slow, and the majority of rainfall is more likely to run-off given the steep terrain. Based on site observations, the drainage lines tend to hold some water after rainfall events.

The water supply bore that was drilled on site in May 2024 encountered groundwater at 18 m BGL and is located at a low point within the site near one of the drainage lines. The airlift yield of the bore was relatively low with an estimated supply of 0.487 L/s over 2 hours. A pumping test was not completed on the bore so the sustainable yield is unknown, however given the hydrogeological properties of the Heifer Creek Sandstone, it is suspected that the sustainable yield would be much lower, and therefore the potential drawdown in the aquifer would be limited.

Groundwater was not encountered during the geotechnical investigation carried out in 2021, which investigated up to 6 m BGL.

Given the geology, generally steep terrain and investigations conducted at the site, it is suspected that groundwater occurs at depth. However, this type of terrain may also induce springs to pop out of the side of the hills following large and prolonged rainfall events, which was noted by East Coast Geotechnical (2021) in their report:

“We anticipate water seepage where the more permeable strata overlies the less permeable strata, which may cause some problems in excavating down to this level or deeper. This seepage may also cause collapse of excavations which will increase concrete volumes significantly above those normally anticipated. Furthermore, if a delay occurs between the time the footing is excavated and when the concrete is placed, the recommended foundation soil may soften, loosen or collapse, which will require further excavations and further increase in concrete volumes.”

There are no groundwater receptors (GDEs) or users within the Lot. The closest groundwater user is the Bromelton Stockyards that abstract groundwater from a water supply bore (RN 138924) located approx. 800 m from the proposed CMF. It should be noted that RN 138924 is screened within a different aquifer (Allan Creek Alluvium) than the geological units underlying the site.

The groundwater quality generally meets the aquatic ecosystem guideline values for metals and ammonia. The groundwater is considered to be brackish and not suitable for use as drinking water. There are also a number of contaminating industries to the north, east and south of the Lot that could be contaminating groundwater. It is therefore recommended that SOILCO establish baseline groundwater conditions at the site prior to commencement of construction.

Coal was noted in the geotechnical borehole logs (East Coast Geotechnical, 2021), as well as chips from the drilling of the water supply bore. Coal may have sulfidic minerals present that could react when disturbed during construction, causing acidic leachate. It is recommended that if coal is encountered during subsequent geotechnical investigations that samples are tested for acid rock drainage (ARD).

5. Groundwater potential impacts and mitigation measures

5.1 Construction

The proposed construction activities that may impact on groundwater resources have been identified and listed in Table 5.1, along with the proposed mitigation measures.

Table 5.1 Potential impact from construction and proposed mitigation measures

Construction activity	Potential impact	Mitigation measures
Excavations: The construction of the facility proposes to excavate high points (could be up to 10 m depth in selected locations) and utilise the excavated material as fill.	There is potential for groundwater seepage into excavations. East Coast Geotechnical (2021) noted in their report that seepage could result in structural instability of excavation walls	– Conduct additional geotechnical investigations to target depth of below the proposed level of excavation to determine groundwater levels. – If groundwater is likely to be intercepted during construction, design of the facility should include management of excavation walls, and seepage controls. – The contractor must prepare a Groundwater Management Plan
Excavations: Excavations may intercept the groundwater table and/or springs may develop	If groundwater is intercepted, the seepage water must be managed (collected, tested and disposed / discharged)	– The construction contractor must prepare a Groundwater Management Plan that details the capture, testing, treatment (if required), and disposal / discharge of seepage.
Leaks/spills from plant/machinery, vehicle washdowns, chemical storage	Contamination of soils, surface water and groundwater from unintentional spills and leaks of hazardous substances	– The construction contractor must prepare a Hazardous Materials and Waste Management Plan, that will outline measures for managing fuel and chemical handling, storage, distribution, spill response and cleanup, and managing generated waste during construction.
Excavation and filling works	Change in landform (clearing and change ground levels), resulting in potential changes to groundwater levels and recharge dynamics	– The desktop assessment identified that groundwater is likely to be at depth, and recharge is likely low within the Project footprint, therefore changes in groundwater levels are not expected. – On-going groundwater monitoring of the proposed groundwater monitoring bores during and after construction will allow for early detection of any changes.
Cut and fill utilising rock excavated at the site.	Acid rock drainage (ARD) from using sulfidic rock fill (Walloon Coal Measures and Heifer Creek Sandstone geological units may have coal)	– Conduct additional geotechnical investigations to target depth of below the proposed level of excavation to determine presence of potential ARD materials – If during excavation coal is encountered, the material should be segregated and stockpiled for ARD testing. The stockpile should be placed on an impervious base and leachate generated from the stockpile must be captured, tested, treated if required, prior to discharge/disposal. – If the stockpile material is confirmed to produce acid, the rock must be managed in accordance with the Hazardous Material and Waste Management Plan, prepared by the construction contractor.

Construction activity	Potential impact	Mitigation measures
Importation of fill material	Fill material could potentially be contaminated, leaching contaminants into the groundwater	– The construction contractor is required to source fill from a reputable supplier, that has a quality assurance system. – All imported fill must be certified as 'clean', prior to entering the site, and is to be free of debris, weeds and potential contaminants. – A register will be kept of all fill materials imported to the site (source and destination).

5.2 Operation

Operational activities that have the potential to impact on groundwater resources has been identified and listed in Table 5.2, along with the proposed mitigation measures.

Table 5.2 *Potential impact from operation of the facility and proposed mitigation measures*

Operational activity	Potential impact	Mitigation measures
Hardstand areas and water harvesting	Changes in landform resulting in potential changes groundwater recharge dynamics	– The desktop assessment identified that groundwater is likely to be at depth, and recharge is likely low within the Project footprint, therefore changes in groundwater levels are not expected in the vicinity of the facility. – Maintain environmental flows in downstream water courses, so that recharge of alluvium in Allan Creek is not altered.
Transport and storage of hazardous substances	Leak/spill from hazardous substances storage / transport, contaminating soils, surface water and groundwater	– SOILCO must prepare Hazardous Materials and Waste Management Plan, that will outline measures for managing fuel and chemical handling, storage, distribution, spill response and cleanup, and managing generated waste during operation of the facility.
Seepage from harvest water dam	Generally good quality water, seeping into groundwater	– Design of the freshwater storage dam indicates that the dam will be lined to limit seepage.
Seepage from leachate dams	Contaminated water, seeping into groundwater	– Design of the leachate dam indicates that the dam will be fully lined with either: • 600 mm thick recompacted clay with a permeability of less than 10⁻⁹ m/s; or • A high-density polyethylene geomembrane liner with a minimum thickness of 1.5 mm. – The facility will have a designated leachate management system, as per the QLD ERA 53 Organic material processing guidelines. – Seepage may be detected through installation of spears around the dam.
Seepage of contaminants through the hardstand underlying the aeration pad, windrow pad, and maturation area	Contaminated leachate, seeping into soils and groundwater	– Hardstand areas are to be constructed with a low-permeability base that prevents leachate from seeping into underlying soils and groundwater. – The facility will have a designated leachate management system, as per the QLD ERA 53 Organic material processing guidelines.

6. Conclusion

A desktop groundwater assessment was completed to determine potential impacts to groundwater resources from the construction and operation of the Project. Several potential impacts were identified that could occur during construction including groundwater seepage in excavations, collection and disposal of seepage, contamination of soil and groundwater from unintentional spills of hazardous substances, ARD from potentially sulfidic-containing rock used as fill, importation of contaminated fill, and changes in the landform resulting in altered groundwater levels.

Operationally, potential impacts were related to changes in groundwater levels from reduced recharge, contamination of soil and groundwater from unintentional spills of hazardous substances, and seepage of contaminated leachate to groundwater.

Best Practice Environmental Management Guideline *ERA 53(a) Organic material processing by composting* (DESI, 2024) outlines the requirements for best practice for preventing groundwater contamination. The proposed mitigation measures outlined in Section 5 are in line with the ERA 53(a) guidance for groundwater protection.

To comply with the groundwater protection requirements of ERA 53(a), groundwater monitoring is required unless:

- Groundwater is at such a significant depth that it will not be impacted by leaching or percolation of contaminants; or
- The geotechnical composition of the composting pad surface and / or subsurface is sufficiently impermeable so that groundwater will not be impacted.

The depth to groundwater within the CMF footprint is currently unknown, but drilling of the water supply bore downgradient of the CMF indicated that groundwater could be up to 18 m BGL. SOILCO propose to undertake additional geotechnical investigation within the CMF footprint and installation of up to four groundwater monitoring bores to confirm the depth to groundwater.

Additionally, the design of the facility includes the following groundwater protection measures, including:

- Hardstand areas include installing compacted material that will achieve a low permeability of minimum hydraulic conductivity of 1×10^{-9} m/s
- Leachate ponds will be lined with low permeability material (either recompacted clay or HPDE) to achieve a minimum hydraulic conductivity of 1×10^{-9} m/s
- A leachate management system will be implemented to capture leachate from compost handling areas.
- A stormwater management system will be implemented to capture and retain rainfall in non-compost handling areas to manage the erosion and sediment.

If the Project implements the proposed mitigation measures the risk to groundwater resources is considered low.

7. References

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- Southern Cross University, 2024. Environmental Analysis Laboratory, 24 May 2024

Appendix A

Summary table – Registered groundwater bores

Registered Bore Details					Stratigraphy					Aquifer				Water	
RN	Drilled Date	Easting	Northing	Facility Role & Status	Screen	Top (mbgl)	Base (mbgl)	Lithology	Formation	Top	Base	Yield (L/sec)	SWL (mbgl)	Conductivity	
124866	3/09/2005	490838	6906801	WS	EX		0	1 TOP SOIL	ALLAN CREEK ALLUVIUM					3 Potable	
							1	6 SANDY LOAM							
						6	11	9 SAND COARSE *		6		2.25			
							9	11 GRAVEL *							
							11	13 CLAY							
							13	SANDSTONE							
138923	6/01/2009	492738	6905712		AD		0	0.5 FILL							
							0.5	9 LIGHT BROWN CLAY							
							9	19 BROWN CLAY							
							19	30 BROWN & PURPLE CLAY							
							30	32 COAL, CLAY & OILY SHALE							
							32	33 DIRTY COAL							
							33	40 GREY CLAY & OILY SHALE							
							40	40.5 MUDSTONE & OILY SHALE							
							40.5	55 GREY CLAY & OILY SHALE							
138924	7/01/2009	492053	6905937	WS	EX		0	1.5 HEAVY DARK BROWN CLAYEY SOIL	ALLAN CREEK ALLUVIUM					6	2100
							1.5	2.5 LIGHT BROWN CLAY							
							2.5	4.5 DARK BROWN CLAY							
							4.5	9 LIGHT GREY SANDY CLAY							
						10	24	12 GULLY WASH							
							12	13 SANDY GREY CLAY		12	23	0.4			
							13	23 CLAYEY GULLY WASH							
							23	29 GREY SILTSTONE & OILY SHALE							
							29	31 GREY SANDSTONE							
142726	10/02/2011	492401	6903545	SM	EX		0	0.3 TOPSOIL	Not recorded						
							0.3	4.8 COARSE SAND							
							4.8	6.4 FINE SAND							
							6.4	7.8 MEDIUM TO COARSE SAND							
						9	12	12 FINE SAND							
142727	11/02/2011	492696	6903756	SM	EX		0	1.2 FINE TO MEDIUM SAND	LOGAN RIVER ALLUVIUM						
							1.2	3.5 FINE TO COARSE SAND							
						12	15	15 SILTSTONE WITH FINE SAND		10					
142728	9/02/2011	492155	6903844	SM	EX		0	1.8 FINE TO MEDIUM SAND	LOGAN RIVER ALLUVIUM						
							1.8	3.2 FINE SAND							
							3.2	4.6 FINE TO COARSE SAND							
						12	15	15 FINE TO MEDIUM SAND		10					
142729	10/02/2011	492155	6903844	SM	EX		0	0.4 TOPSOIL	LOGAN RIVER ALLUVIUM						
							0.4	2 FINE SAND, SOME GRAVEL							
							2	3.4 FINE TO MEDIUM SAND							
							3.4	4.8 FINE SAND							
						12	15	15 FINE COARSE SAND		10					
142730	9/02/2011	492415	6904103	SM	EX		0	1.8 FINE TO MEDIUM SAND	LOGAN RIVER ALLUVIUM						
							1.8	3.2 FINE TO MEDIUM SAND WITH FINE GRAVEL							
							3.2	4.6 FINE TO COARSE SAND							
						9	12	12 FINE TO MEDIUM SAND		9					
							0	6 SANDY LOAM						8	2300
142889	15/11/2011	492815	6905688	WS	EX		6	20 HARD BROWN CLAY & SANDSTONE MIX							
							20	25 BROWN SANDSTONE							
							25	30 IRONSTONE	WALLOON COAL MEASURES	26	30	0.13			
							30	45 GREY SANDSTONE WITH GREY CLAY BANDS							
						49	61	55 GREY SANDSTONE		47	55	1.13			
							55	64 GREY SANDSTONE WITH GREY CLAY BANDS							

Registered Bore Details					Screen		Stratigraphy				Aquifer			Water	
RN	Drilled Date	Easting	Northing	Facility Role & Status	Top	Base	Top (mbgl)	Base (mbgl)	Lithology	Formation	Top	Base	Yield (L/sec)	ISWL (mbgl)	Conductivity
152688	11/05/2014	491103	6907213	SM	EX		0	0.5	BROWN SANDY TOPSOIL	ALLAN CREEK ALLUVIUM					9
							0.5	1.5	BROWN SANDY LOAM						
							1.5	9.5	BROWN & GREY SANDY CLAY						
							9.5	10.5	BROWN SAND		9.5	18.5	1.2		
							10.5	14	GREY SANDY CLAY						
							14	14.5	SAND						
							14.5	15	GREY CLAY						
						15	15	16	FINE GRAINED BROWN SAND						
							16	17	MEDIUM TO COARSE GRAIN BROWN SAND						
							17	17.5	GREY CLAY & WOOD						
							17.5	18.5	SAND & SMALL GRAVEL						
							18.5	20	GREY SANDY CLAY						
							20	21.5	BROWN SANDSTONE	KOUKANDOWIE FORMATION					
152689	7/06/2014	491099	6907218	WS	EX		0	0.5	BROWN SANDY TOPSOIL	ALLAN CREEK ALLUVIUM					9
							0.5	1.5	BROWN SANDY LOAM						
							1.5	9.5	BROWN & GREY SANDY CLAY						
							9.5	10.5	BROWN SAND		9.5	18.5	1.2		
							10.5	14	GREY SANDY CLAY						
							14	14.5	SAND						
							14.5	15	GREY CLAY						
						15	15	16	FINE GRAINED BROWN SAND						
							16	17	MEDIUM TO COARSE GRAIN BROWN SAND						
							17	17.5	GREY CLAY & WOOD						
							17.5	18.5	SAND & SMALL GRAVEL						
							18.5	20	GREY SANDY CLAY						
169060	3/07/2015	492165	6904098	SM	EX		0	2	BLACK CLAY	KOUKANDOWIE FORMATION					4
							2	5	BROWN SANDY LOAM						
							5	12	WHITE YELLOW CLAYS		6	12			
169249	19/08/2015	490814	6904047	SM	EX		0	5	ORANGE BROWN SANDY CLAY	QUATERNARY - UNDEFINED					8.5
							5	11	DARK GREY SANDSTONE						
							11	14	COARSE QUARTZ & SANDSTONE	KOUKANDOWIE FORMATION	11	14	0.1		
169250	18/08/2015	491687	6904196	SM	EX		0	6	ORANGE BROWN SILTY CLAY	QUATERNARY - UNDEFINED					8
							6	15	ORANGE BROWN SILTSTONE/SANDSTONE	HEIFER CREEK SANDSTONE MEMBER					
							15	17.5	DARK GREY SILTSTONE		15		0.06		
169251	18/08/2015	492868	6903255	SM	EX		0	2	ORANGE BROWN SILTY CLAY	QUATERNARY - UNDEFINED					10
							2	4	ORANGE BROWN SILTSTONE/SANDSTONE	WALLOON COAL MEASURES					
							4	18	LIGHT GREY SILTSTONE/SANDSTONE						
							18	38	DARK GREY SILTSTONE/SANDSTONE						
							38	41.5	COAL SEAM		38		0.1		
169352	19/10/2015	491401	6903340	SM	EX		0	2	WHITE FINE SAND	SWAN CREEK ALLUVIUM					9
							2	5.5	GREY/BROWN SAND						
							5.5	11	BROWN SILTY SAND		10.5	11			
							11	11.4	BROWN SANDSTONE	HEIFER CREEK SANDSTONE MEMBER					
169353	19/10/2015	491641	6903572	SM	EX		0	2	WHITE FINE SAND	SWAN CREEK ALLUVIUM					12
							2	5	BROWN SILTY CLAY						
							5	6	BROWN SAND						
							6	8	BROWN SILTY CLAY						
							8	14	CLAY, GREY SILT SAND		11.5	14	0.06		
							14	15	COARSE GRAIN SANDSTONE	HEIFER CREEK SANDSTONE MEMBER					
169354	20/10/2015	490902	6903490	SM	EX		0	6	BROWN CLAYEY SAND	QUATERNARY - UNDEFINED					1.8 Potable
							6	7	BROWN SANDSTONE	KOUKANDOWIE FORMATION	6		0.19		
							7	11	GREY SANDSTONE						

Registered Bore Details					Screen		Stratigraphy				Aquifer			Water	
RN	Drilled Date	Easting	Northing	Facility Role & Status	Top	Base	Top (mbgl)	Base (mbgl)	Lithology	Formation	Top	Base	Yield (L/sec)	ISWL (mbgl)	Conductivity
169355	20/10/2015	491021	6903598	SM EX			0	0.5	GREY CLAY	QUATERNARY - UNDEFINED					7 Potable
							0.5	2.5	BROWN SILTY SAND						
					7	13	2.5	10	BROWN GRAVELLY SAND		7			0.1	
							10	11.5	GREY BROWN SANDSTONE	KOUKANDOWIE FORMATION					
							11.5	13	DARK GREY SANDSTONE						
169356	20/10/2015	491772	6903525	SM EX			0	1	GREY SILT	SWAN CREEK ALLUVIUM				14	4220
							1	3	RED BROWN SAND						
							3	7	RED BROWN SANDY CLAY						
							7	11	GREY SANDSTONE	HEIFER CREEK SANDSTONE MEMBER					
							11	17	GREY MUDSTONE						
					17	20	17	19	QUARTZOSE BROWN SANDSTONE		17		0.3		
							19	20	BROWN SILTSTONE						
169358	20/10/2015	492417	6904309	SM EX			0	1	GREY SILT	SWAN CREEK ALLUVIUM				9	3125
							1	5	BROWN GREY SANDSTONE	WALLOON COAL MEASURES					
					8	14	5	12	DARK BROWN MUDSTONE						
							12	13	GREY SANDSTONE		12		0.08		
							13	14	GREY MUDSTONE						
169359	21/10/2015	492538	6904433	SM EX			0	3	BROWN GREY SAND	SWAN CREEK ALLUVIUM				8	
							3	5	LIGHT BROWN SAND						
					5	11	5	9	DARK BROWN MUDSTONE	WALLOON COAL MEASURES					
							9	14	BROWN SANDSTONE		9				
169360	21/10/2015	492097	6904176	SM EX			0	2	BROWN SILTY CLAY	QUATERNARY - UNDEFINED				9	
							2	5.5	BROWN GREY MUDSTONE	WALLOON COAL MEASURES					
							5.5	8	BROWN SANDSTONE						
					8	14	8	13.5	GREY SANDSTONE		11				
							13.5	14	BROWN SANDSTONE						
169490	2/03/2016	492433	6907016	WS EX			0	0.1	BROWN TOPSOIL	QUATERNARY - UNDEFINED				4.5	5000
							0.1	1.5	BROWN CLAY						
							1.5	8	BROWN CLAYEY LOAM						
							8	10.5	STIFF BROWN & GREY CLAY						
							10.5	12	BROWN SANDY CLAY						
							12	13.5	SOFT BROWN SANDY CLAY						
					15	29	13.5	16	BROWN SANDY CLAY & SMALL GRAVEL		13.5		0.5		
							16	24	BROWN SANDY CLAY WITH LAYERS OF SAND & GRAVEL						
							24	30	SANDY LIGHT GREY CLAY WITH THIN SEAMS OF SAND						
							30	32	WALLOON COAL MEASURES	WALLOON COAL MEASURES					
194296	13/04/2021	492807	6903943	SM EX					MONITORING BORE 8.7M DEEP	Not recorded					
194297	13/04/2021	492866	6904441	SM EX					MONITORING BORE 8.7M DEEP	Not recorded					
194335	5/05/2021	493306	6906672	SM EX			0	1	GRAVELLY CLAY	Not recorded					
							1	7	SANDY CLAY						
							7	43	GREY CLAY						
					42	48	43	47.5	WEATHERED SANDSTONE		43				
194336	5/05/2021	493251	6906334	SM EX			0	1	GRAVELLY CLAY	Not recorded					
							1	2	RED/BROWN CLAY						
							2	8	SANDY CLAY						
							8	25	SILTY CLAY						
					27.5	33.5	25	33.5	FINE SANDY CLAY		28	33.5			

Appendix B

**Water supply bore – DRDMW Water bore
drilling log**



Water bore drilling log

Ensure you have generated a Log ID number prior to submitting >

Click to generate log ID

Authorisation details

Registered number

Development permit number

Works reference number

SECTION A—LOCATION DETAILS

Name of landholder

Soilco Infrastructure Queensland Pty Ltd

Postal address

2603 BEAUDESERT BOONAH RD,BROMELTON

Real property address

Real property description Lot

Plan

or Bore location GPS, Latitude

Easting

Longitude

Northing

SECTION B—BORE COMPLETION DETAILS

Date commenced

09/05/2024

Date completed

10/05/2024

SECTION C—DRILLING METHOD

☐ Rotary mud

☐ Cable tool

☐ Auger

☒ Rotary air

☐ Other

SECTION D—HOLE SIZE

Diameter (mm)

201

Location (metres)

From

0

To

40

SECTION E—CASING DETAILS

Type (PVC, steel etc)

PVC N 9

Size O.D. (mm)

141

Wall thickness (mm)

4.65

Location (metres)

From

0

To

18

SECTION F—CENTRALISERS

Type

Location (metres)

From

To

SECTION G—PERFORATIONS/ SLOTS/ SCREENS

Type

PVC

Size O.D. (mm)

141

Aperture (mm)

3

Location (metres)

From

18

To

39

SECTION H—CEMENTING/GRAVEL PACK/ANNULAR FILL DETAILS

Type & material size

GROUT

Hole diameter (mm)

201

Casing diameter (mm O.D.)

141

Location (metres)

From

0

To

6

SECTION I—BORE PURPOSE

☐ Domestic

☐ Stock

☐ Irrigation

☐ Commercial

☐ Urban

☐ Industrial

☒ Other (please specify)

DUST SUPPRESSION

SECTION J—PARTICULARS OF STRATA

From (metres)

To (metres)

Strata description (use more than one line if required)

Water bed thus(*)

0

3

CLAY/DARK BROWN

3

7

HIGHLY WEATHERED BASALT/BROWN

7

15

WEATHERED BASALT/YELLOW BROWN

15

22

BASALT GREY/BROWN

*

22

27

GREY/BASALT

27

30

BASALT GREY/BROWN

*

30

40

BASALT/DARK BROWN

SECTION K—WATER BEARING BEDS

Depth struck (metres)

18

Water rose to (metres)

15

Supply (litres/second)

0.093

Conductivity (µS/cm)*

1400

pH

-

SECTION L—SUB ARTESIAN BORE ON COMPLETION

Depth to standing water level from ground level

9

Final Conductivity (µS/cm) :

1400

Final pH: -

-

SECTION M—ARTESIAN BORE ON COMPLETION

Estimated supply

0.487

Duration of test (hours)

2

Drawdown level from surface (metres)

-

SECTION N—REMARKS

1M FALL-IN (DRILL CUTTINGS)

SECTION O—CERTIFICATION

I hereby certify that the bore is drilled and constructed according to the conditions of my driller's licence and the information provided is true and accurate.

Driller name

JONATHAN BERCHE

Driller's licence no.

3463

Trainee Driller name

SHANE GANNON

Driller's licence no.

-

Signature of driller

GD WATER SOLUTION

Date

10/05/2024

Contractor name

WZF136 v6

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2022

Collection of information on this form is authorised by section 983L of the *Water Act 2000* and will be used by the Department for the purpose of processing your application. For these purposes disclosure to other third parties may be required by or of the Department. The information may be searchable, disclosed to and used by the public as allowed, authorised or required by legislation. A copy of the completed log must be provided to the Department. It is recommended that a copy is also provided to the landholder and a copy retained by the driller.

Appendix C

Water supply bore – Laboratory test results

RESULTS OF WATER ANALYSIS

1 sample supplied by Solico Pty Limited on 16/05/2024. Lab Job No. R4326.
Samples submitted by Dom Flanagan. Your Job: PO 100161
2/132 West Dapto Road KEMBLA GRANGE NSW 2527

Parameter	Methods reference	Sample 1 Bromelton Bore
	Job No.	R4326/1
pH	APHA 4500-H ⁺ -B	7.89
Conductivity (EC) (dSm)	APHA 2510-B	2.15
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	1,459
Turbidity (NTU)	APHA 2130	3.93
Total Alkalinity (mg/L CaCO ₃ equivalent)	** Total Alkalinity - APHA 2320	777
Water Hardness (mg/L CaCO ₃ equivalent)	** Using Ca and Mg calculation	592
Phosphate (mg/L P)	APHA 4500 P-G	0.008
Nitrate (mg/L N)	APHA 4500 NO ₃ -F	0.018
Ammonia (mg/L N)	APHA 4500 NH ₃ -H	0.060
Sodium (mg/L)	APHA 3125 ICPMS ^{Notes 1 &2}	309
Potassium (mg/L)	APHA 3125 ICPMS ^{Notes 1 &2}	6.45
Calcium (mg/L)	APHA 3125 ICPMS ^{Notes 1 &2}	71.6
Magnesium (mg/L)	APHA 3125 ICPMS ^{Notes 1 &2}	100
Sodium Absorption Ratio (SAR)	** By calculation	5.52
Chloride (mg/L)	APHA 3125 ICPMS ^{Notes 1 &2}	374
Sulfate (mg/L SO ₄ ²⁻)	APHA 3125 ICPMS ^{Notes 1 &2}	51.8
Chloride/Sulfate Ratio	** Calculation	7.22
Total Coliforms (cfu/100 ml)	APHA 9222-B	52,000
E.Coli (cfu/100 ml)	ColBlue Membrane Filtration	<100
Aluminium (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	0.028
Arsenic (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	0.003
Cadmium (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	<0.001
Chromium (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	<0.001
Copper (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	<0.001
Iron (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	0.046
Manganese (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	0.019
Nickel (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	0.000
Lead (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	0.000
Zinc (mg/L)	Total Available - APHA 3125 ICPMS ^{Notes 1 &2}	0.014

Notes:

1. Total metals - samples digested with nitric acid; Total available (acid soluble/ extractable) metals - samples acidified with nitric acid to pH <2; Dissolved metals - samples filtered through 0.45µm cellulose acetate and then acidified with nitric acid prior to analysis
2. Metals and salts analysed by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS).
3. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
4. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
5. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
6. Analysis conducted between sample arrival date and reporting date.
7. ** NATA accreditation does not cover the performance of this service.
8. .. Denotes not requested
9. This report is not to be reproduced except in full.
10. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal or on request).
11. Results relate only to the samples tested.
12. This report was issued on 24/05/2024.





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Appendix Q

Bushfire Hazard Assessment and Management Plan

BUSHFIRE HAZARD ASSESSMENT AND MANAGEMENT PLAN

Compost Manufacturing Facility, Bromelton

PREPARED FOR
SOILCO PTY LTD
C/- GHD

AUGUST 2024



BUSHFIRE PLANNING





ACKNOWLEDGEMENT OF COUNTRY

Meridian Urban acknowledges the Traditional Custodians of the lands and waters where we live and work.

As resilience practitioners we have a responsibility in listening to and elevating Indigenous voices through our practice, and meaningfully engaging in processes of reconciliation. We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers, and pay our respect to Elders past and present.

Meridian Urban's 'Reflect' Reconciliation Action Plan (RAP) details our commitments to advancing cultural change, active participation and inclusive and informed approaches, with a focus on increasing economic and social equity for Aboriginal and Torres Strait Islander peoples and supporting First Nations self-determination. A copy of our RAP can be viewed online at meridianurban.com.

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13/08/2024

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13/08/2024

APPROVED FOR ISSUE BY

Laura Gannon

13/08/2024

REVISION SCHEDULE

Rev No.	Date	Description	Prepared by	Reviewed by	Approved by
00	13/08/2024	Final	AA	LG	LG

FPAA NSW BPAD Accreditation No. 33131

Member Planning Institute of Australia
Member Fire Protection Association of Australia
Member International Association of Wildland Fire
Member Natural Hazard Mitigation Association (USA)
Member of Association of Fire Ecology



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It is acknowledged and agreed that the site may be subject to a degree of bushfire hazard. The client acknowledges and agrees that Meridian Urban has not created or contributed to the creation or existence of this hazard and the Client indemnifies Meridian Urban for claims arising out of or resulting from a bushfire event except to the extent attributable to the negligence of Meridian Urban.

The Client agrees that the Consultant shall have no liability in respect of any damage or loss incurred as a result of bushfire.

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Compost Manufacturing Facility, Bromelton

Bushfire hazard assessment and management plan

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1 Introduction

Meridian Urban has been commissioned by SOILCO Pty Ltd C/- GHD to provide a bushfire hazard assessment and associated bushfire management plan for the proposed compost manufacturing facility at 260 Mitchell Road / Beaudesert-Boonah Road, Bromelton.

This report supports an application to the Office of the Coordinator-General for high impact industry in the Bromelton State Development Area (SDA).

The site is partially mapped as Bushfire Prone Area in the interactive mapping system that supports the State Planning Policy 2017 (SPP 2017).

This bushfire hazard assessment and management plan has been prepared to support the SDA application. It includes assessment against the Bromelton SDA development scheme, to the extent relevant to bushfire matters.

Guidance has also been sought from other instruments including Scenic Rim Regional Council Planning Scheme, and the Natural Hazards, Risk and Resilience (Bushfire) State Interest of the SPP 2017, including the Bushfire Resilient Communities Technical Reference Guide prepared by Queensland Fire and Emergency Services (QFES).

2 Site and Locality Context

This section of the report provides a description of the site and the locality.

2.1 Overview of the Site Details

Table 1 - Site Details

Site Address	Beaudesert – Boonah Road / 260 Mitchell Road, Bromelton
RP Description	Lot 4 on RP85497 (Figure 1)
Lot Area	1,192,790sqm (119.279ha)
State Development Area	Bromelton
Local Government	Scenic Rim Regional Council
Tenure	Freehold
Current Land Use	Vacant
Proposed Land Use	High Impact Industry
Local Brigade	Beaudesert Fire Station



Figure 1 - The Site

(Source: Queensland Globe 2024)

2.2 Description of the Site

The site is located on Beaudesert – Boonah Road in Bromelton. It is formally described as Lot 4 on RP85497. It has a total area of approximately 119ha and is currently vacant and used for agricultural (grazing) purposes.

The proposed development footprint / disturbance area is limited to an approximate 21ha portion of Lot 4, as shown indicatively in yellow in Figure 2.

The site also has frontage to road reserve (Mitchell Road) along its north-eastern boundary, however this road reserve currently does not contain a formed road.

The slope of the site is currently comprised of a series of undulating hills and valleys. The development footprint itself generally slopes down from the southern boundary toward the northern boundary. There are two small gullies either side (to the east and west) of the development footprint.

The development footprint contains only scattered vegetation, however is adjacent to denser vegetation on adjoining land to the south and within the gully to the east.

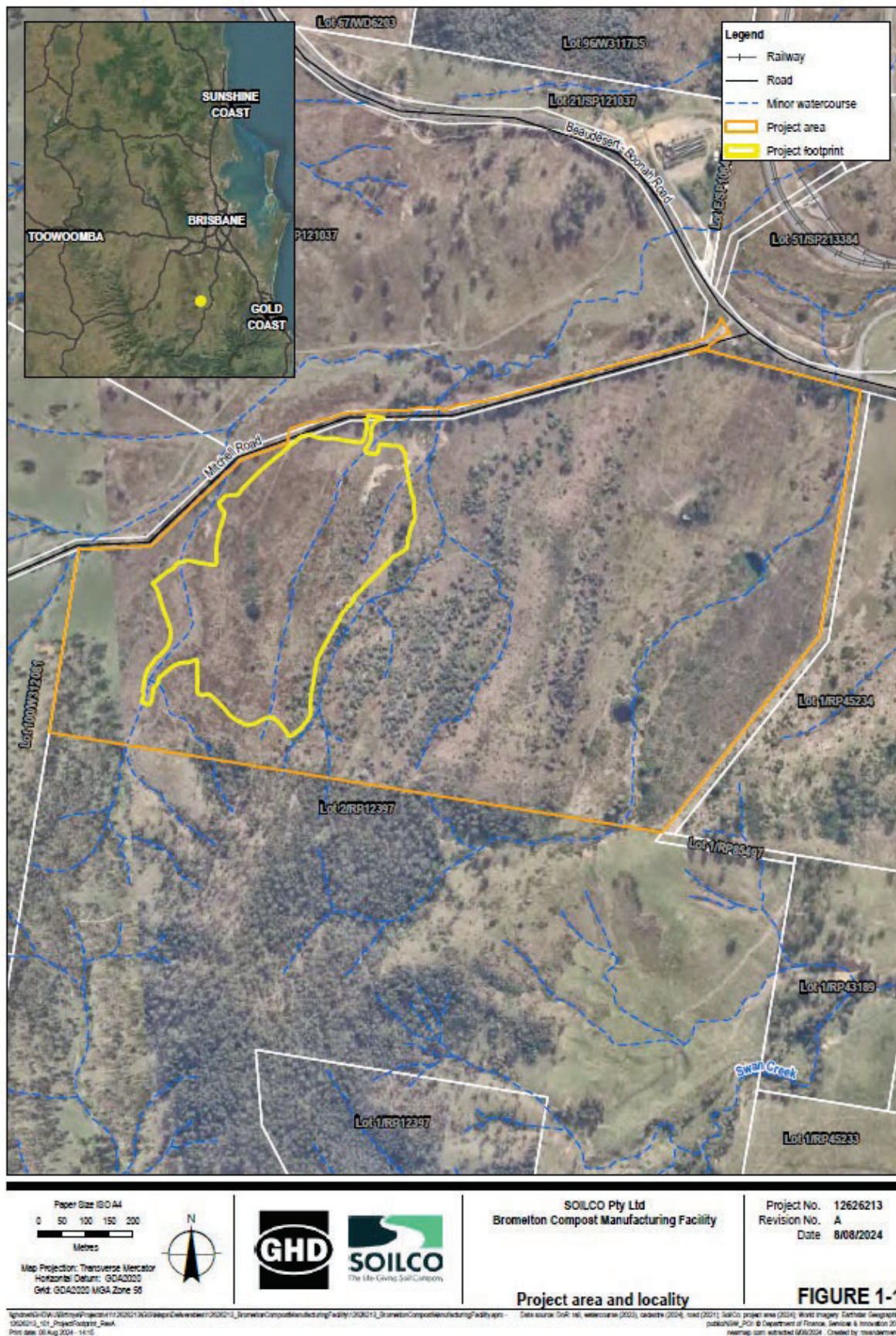


Figure 2 - Development Footprint
(Source: GHD)

2.3 Description of the Locality

The site is approximately 7km west of the township of Beaudesert.

The site is in the emerging industrial area of the Bromelton State Development Area (SDA). The site is central to the 15,610ha SDA and is in the Special Industry Precinct.

The rail corridor is a short distance to the east of the site.

As an emerging industrial area, the surrounding land uses include a mix of existing rural, rural industry, extractive industry and newly established industrial uses.

Refer to Figure 3 for the context of the site in the locality.



Figure 3 - The Locality

3 Proposed Development

It is proposed to establish a composting facility on the site. The facility includes the receipt, processing, composting, and storage of garden, food, wood wastes, manures and soil for the sale and distribution of finished compost, mulch and soil products.

The proposed vehicle access to the site will be via the construction of approximately 800m of a new road within the existing Mitchell Road reservation, from the intersection with Beaudesert-Boonah Road to the entrance of the site. The road will be constructed to a rural collector standard – dual-width carriageway (9.0m wide pavement).

Built form and other infrastructure on the site will include:

- Office, maintenance shed and storage shed and associated water tanks and solar
- Weighbridge
- Carparking
- Two-way road through the centre of the site for heavy vehicle access
- One-way road around the edge of the site.
- Leachate dams for stormwater runoff and freshwater storage dam
- Workshop and fuel storage area (including engine oil, hydraulic oil, waste oil, degreaser, diesel, Adblue).
- Fire storage tanks and hydrant pump / booster at frontage entry and hydrant ring main around the site as required.

There will be 3 processing areas on site for receipt, decontamination and composting.

It is expected that the entire development footprint will be cleared of any remaining vegetation to accommodate the development.

The proposed development layout is shown in **Figure 4**.

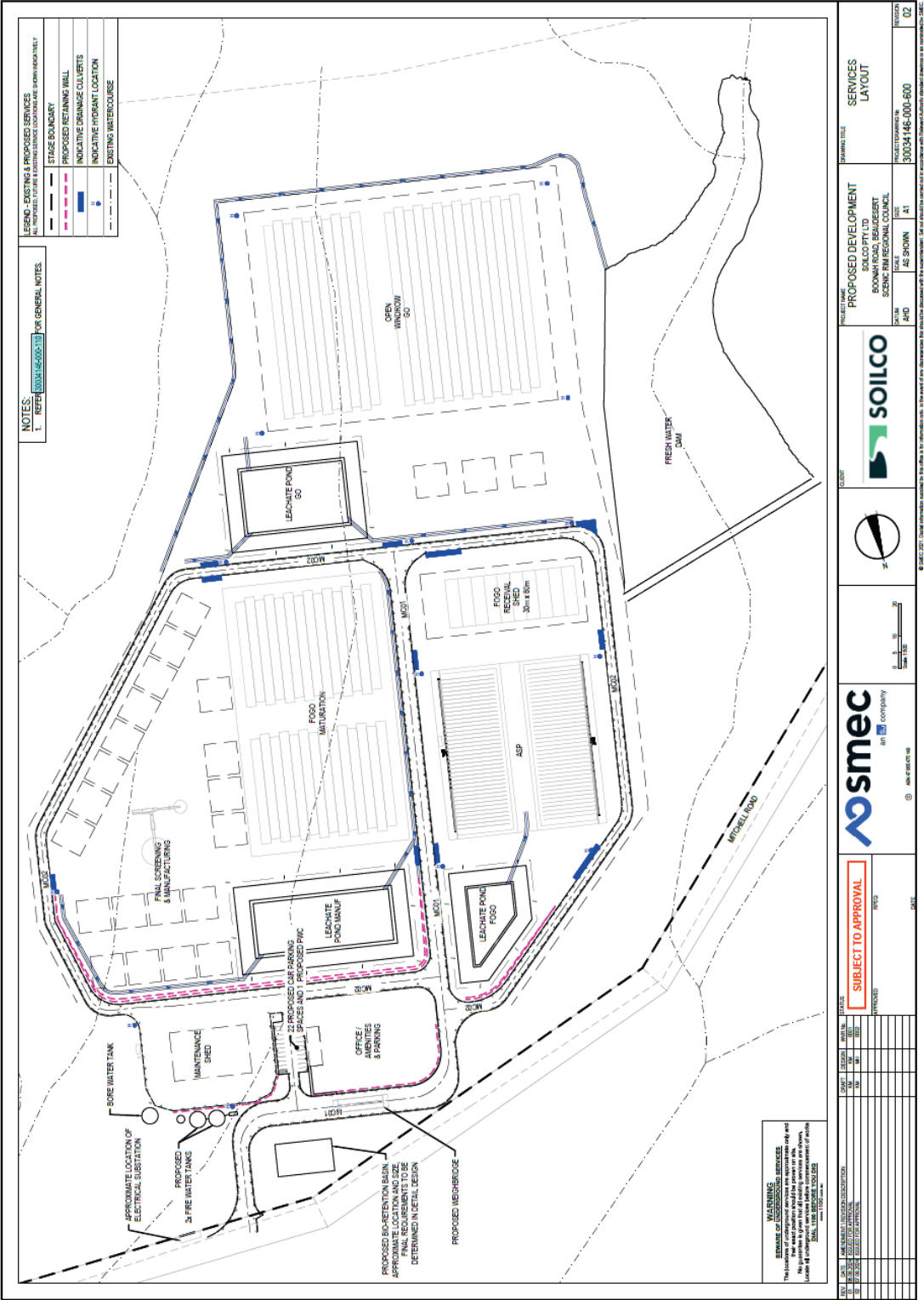


Figure 4 - Proposed Development Plan
(Source: SMEC)

4 Understanding Bushfire Hazard

Bushfires have long remained a fundamental characteristic of the Australian bush landscape. There remains a number of common factors which are associated with bushfire events, and these include the incidence of fire weather, availability of fuel along with its type, structure and continuity or fragmentation, and development at the bushland interface.

4.1 Bushfire Attack

Bushfire attack refers to the various methods in which bushfire may impact upon life and property and principally encompasses:

- Direct flame contact
- Ember and firebrand attack
- Radiant heat flux
- Fire-driven wind
- Smoke.

During the progression of a bushfire event, these methods either exclusively or in concert interact (**Figure 5**). It is estimated that approximately 80 to 90 per cent of buildings located within 100m of the bushland interface are lost to bushfire, hence the relevance of statutory provisions and recommendations implemented across Australia which respond to various types of buildings (and occupants) within 100m of adjacent classifiable vegetation.

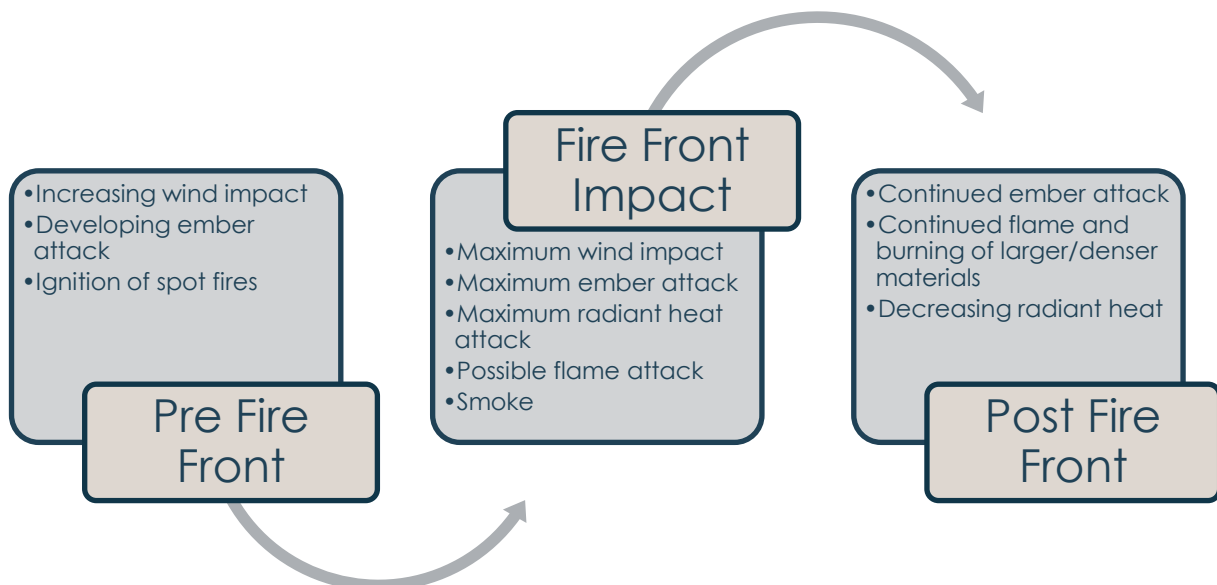


Figure 5 – The Typical Phases of Bushfire Attack

(Derived from Ramsay & Rudolph, 2003)

4.1.1 Direct Flame Contact

Direct flame attack refers to flame contact from the main fire front, where the flame which engulfs burning vegetation is one and the same as that which assumes contact with the building. It is estimated that only 10 to 20 per cent of buildings lost to bushfire occur as a direct result of flame attack based on research conducted by the CSIRO.

4.1.2 Ember and Firebrand Attack

The convective forces of bushfire raise burning embers into the atmosphere on prevailing winds and deposit them to the ground ahead of the fire front. Typically, ember attack occurs prior to the arrival of the fire front and continues during the impact of the fire front and for several hours afterwards, thus it is the longest lasting impact of bushfire attack. Firebrands occur in a very similar manner but relate to larger items of debris that may still be carried by the wind when alight, such as candle and ribbon barks.

In essence, building loss via ember attack relates largely to the vulnerabilities and peculiarities of each building, its distance from the classifiable vegetation and whether an occupant (or the like) is present to actively defend it. It is estimated by the CSIRO that approximately 80 to 90 per cent of buildings lost by bushfire are lost as a result of ember attack either in isolation or in combination with radiant heat impact.

4.1.3 Radiant Heat Flux

Exposure to radiant heat remains one of the leading threats to infrastructure assets associated with bushfire events (**Figure 6**). Measured in kilowatts per m², radiant heat is the heat energy released from the fire front which radiates to the surrounding environment, deteriorating rapidly over distance. Radiant heat can pre-heat materials making them more susceptible to ignition or can cause non-piloted ignition of certain materials if the energy transmitted reaches a threshold level. Radiant heat can also damage building materials, reducing the ability for the structure or asset to withstand.

Radiant heat flux (kW/m ²)	Potential effects
Greater than 40	- unpiloted ignition of timber walls and fences - direct flame contact likely - extreme levels of radiant heat
29–40	- failure of toughened glass - direct flame contact possible, extreme levels of radiant heat - unpiloted ignition of some timber species after prolonged exposure (e.g. several minutes)²⁹
19	failure of screened float glass
16	blistering of skin with > 5 seconds exposure
12.5	- failure of plain glass - piloted ignition of dry timber elements after prolonged exposure (e.g. several minutes)³⁰
10	- fabrics inside a building could ignite spontaneously with long exposure - critical limit for emergency services – firefighters cannot operate - life threatening with < 1 minute exposure in protective clothing.
7	fatal to an unprotected person after exposure for several minutes
4.7	firefighter in protective clothing will feel pain (60 seconds exposure)
3	firefighters can operate for a short period (10 minutes)
2	- pain is felt on bare skin after 1 minute exposure (non-fatal) - firefighters with protective clothing can withstand this exposure level for a few minutes however, they are likely to experience rise in core body temperature
1	maximum for indefinite skin exposure
0.5	direct sunlight at noon on a bright sunny day

Figure 6 – The Effects of Radiant Heat

(Source: Queensland Fire and Emergency Services, 2019)

4.1.4 Fire Driven Wind

The convective forces of bushfire typically result in strong to gale force fire-driven winds, which in itself can lead to damage. The typical effects of fire driven wind include the conveyance of embers, damage from branches and debris hitting the assets, as well as direct damage to vulnerable components. Fire driven wind is not a form of bushfire attack that is currently addressed by planning and building provisions, beyond those required for wind loads generally.

4.1.5 Smoke

Smoke emission remains a secondary effect of bushfire and is one which is typically not addressed by bushfire hazard assessment, or by planning and building provisions. Irrespective, it is important to note the potentially severe impact of smoke emission on the human respiratory system. It can lead to difficulties in breathing, severe coughing, blurred or otherwise compromised vision, and can prove fatal. It is also important to note that toxic smoke can occur during bushfire, particularly where buildings or materials are ignited.

4.2 Vegetation Communities

Fuel load and arrangement represents a considerable component in dictating to a large degree the behaviour of fire in terms of intensity, rate of spread and flame height, and dead plant material. On this basis, different vegetation groups yield very different fire behaviour and intensity by virtue of their characteristics, structure, arrangement and fuel loads. The characteristics are not necessarily related to ecological values but remain a function of the propensity for certain groups of vegetation to ignite and sustain fire due to fuel load and arrangement, it can guide estimates on how quickly fire might spread and the likely fire behaviour and intensity which may occur.

Vegetation type, density and arrangement can further influence fire behaviour and intensity. Vertical and horizontal continuity is also a significant element. Thus, vegetation forms a critical element of analysis throughout this report.

4.3 Topography and Aspect

Topography (effective slope) and to a lesser degree, aspect, are also factors which influence fire behaviour and intensity. Topography influences the rate of spread, doubling for every 10 degrees of upslope and slowing by half for every 10 degrees downslope, as a general rule. Aspect can also affect bushfire behaviour where areas with northerly and / or westerly aspects experience a higher level of solar access than those areas with a southern or eastern aspect. Notwithstanding, in times of drought and below average rainfall moisture levels in soil and vegetation in more sheltered areas with southerly and easterly aspects can also decrease substantially giving rise to significantly higher fuel abundance where the preceding fire regime has been less frequent or intense.

4.4 Fire Weather

It remains important to understand the influence of fire weather with regard to how it can affect bushfire risk levels on a daily, weekly or seasonal basis.

In south-eastern Queensland, hot-air fire wind is typically generated by west, north-west and south-westerlies which are prevalent during south-western Queensland's fire season which extends from August to March, annually. However, intense fire conditions can occur on different wind directions and cannot be discounted.

Notwithstanding the above, it is noted bushfires do not always conform to widely-accepted characteristics. Other fire weather conditions must also be contemplated such as preceding weather conditions such as low rainfall, heatwave, drought, air temperature and relative humidity. If the area has been subject to drought or low rainfall for a period of time, vegetation

health tends to deteriorate with increased leaf drop, curing and drying. This contributes to increased ground fuel loads and general increased ignition susceptibility. Prolonged dry periods also reduce soil moisture content.

Air temperatures and extended periods of higher than average air temperatures also contribute to fire weather. In conjunction, low relative humidity (i.e. low air moisture content) is also a contributing factor to increased fire weather.

In concert, all of the above factors can impact on the ability for fire to propagate, and alter behaviour and intensity characteristics and as such, fire weather is a significant component of bushfire hazard. Whilst an assessment of vegetation types, fuel loads, effective slope and other factors can be readily undertaken, fire weather can fluctuate across days, weeks and seasons and can have a significant impact on the potential for bushfire threat as well as influence bushfire behaviour and intensity.

The Forest Fire Danger Index (FFDI) is a commonly used method to readily advise the community of the likely ability of fire suppression based on fire weather, which is used to inform¹ the Fire Danger Rating (FDR) System at **Figure 7**. It is important to maintain awareness as to the level of local fire danger during the fire season.

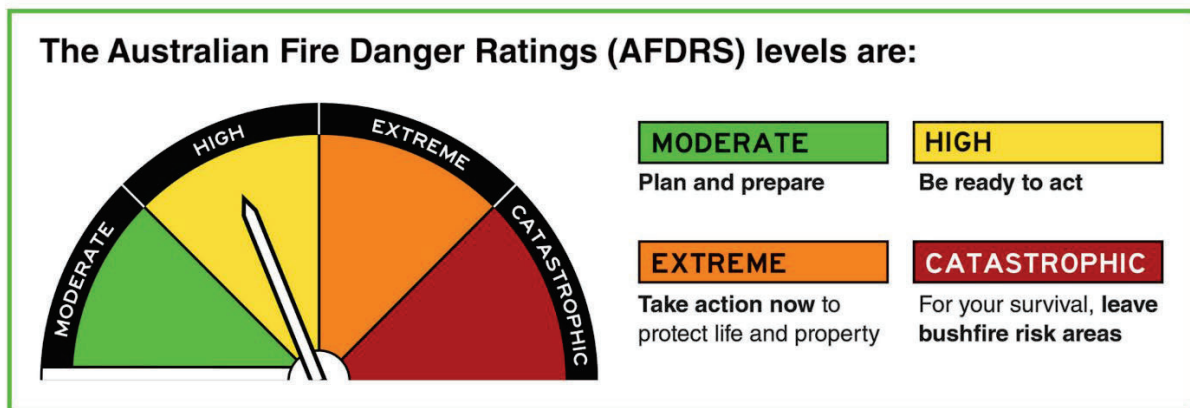


Figure 7 – Australian fire danger rating system

(Source: AFAC, 2022)

¹ Via the 'fire behaviour index'

5 Bushfire Regulatory Context

This section of the report sets out an overview of the regulatory context for the assessment of bushfire hazard relevant to the development and site. This includes identification of the relevant statutory planning instruments including the **Bromelton State Development Area Development Scheme (December 2017)**.

Guidance is also sought from other relevant planning instruments:

- **Scenic Rim Planning Scheme 2020:**
 - Bushfire Hazard Overlay Map
 - Bushfire Hazard Overlay Code
 - Planning Scheme Policy 4 – Bushfire Management Plans
- **State Planning Policy 2017:**
 - Natural Hazards, Risk and Resilience State Interest, including:
 - State Interest Policies.
 - Assessment benchmarks.
 - Supporting Technical Reference Guide 'Bushfire Resilience Communities 2019.'

Commentary is also provided on any relevant Building Assessment Provisions that may be applicable to subsequent building applications, for information and guidance purposes only.

5.1 Bromelton SDA Development Scheme

The Bromelton State Development Area (SDA) Development Scheme (December 2017) regulates land use in the Bromelton SDA.

The site is in the Special Industry Precinct of the development scheme. The application is to be assessed against the following provisions of the development scheme:

- Strategic Vision;
- Overall Objectives;
- Preferred development intent for the development precinct; and
- SDA wide assessment criteria.

A review of the abovementioned sections of the development scheme have identified the following provisions Table 2 relevant to bushfire hazard and risk.

Table 2 - Bromelton SDA Development Scheme bushfire compliance assessment

Bromelton SDA Development Scheme Sections	Relevant Bushfire Provisions	Response
Strategic Vision	None relevant	N/A
Overall Objectives	(1) Development within the Bromelton SDA will: ... (i) manage the risks associated with natural hazards, to protect people and property.	Complies: Bushfire risk to the proposed development can be managed through the implementation of a suite of mitigation measures, as described further in Section 8.
Special Industry Precinct Preferred Development Intent	None relevant	N/A

Bromelton SDA Development Scheme Sections	Relevant Bushfire Provisions	Response
Assessment Criteria	2.5.6 Natural hazards – other: (1) Development, in accordance with current best practice: (a) identifies relevant natural hazards that may impact upon the development (b) appropriately manages risk associated with the identified hazards and (c) avoids increasing the severity of the natural hazard.	Complies: This report includes an assessment of the extent of bushfire hazard in relation to the proposed development and identifies a series of recommended mitigation measures to reduce the risk to people and property to a tolerable level.

5.2 Scenic Rim Planning Scheme

5.2.1 Relevant Planning Scheme

The site is within the Scenic Rim Planning Scheme 2020 area. The current version of the planning scheme is the version dated 30 June 2023.

5.2.2 Bushfire Hazard Overlay

Part 8.1 7. c. of the Planning Scheme identifies the Bushfire Hazard Overlay as an overlay for the planning scheme. The overlays are mapped in Schedule 2 (Mapping) of the planning scheme.

Figure 8 is an extract from the Bushfire Hazard Overlay Map as it pertains to the site, as well as the area surrounding the development footprint out to 150m, shown indicatively (blue dashed line).

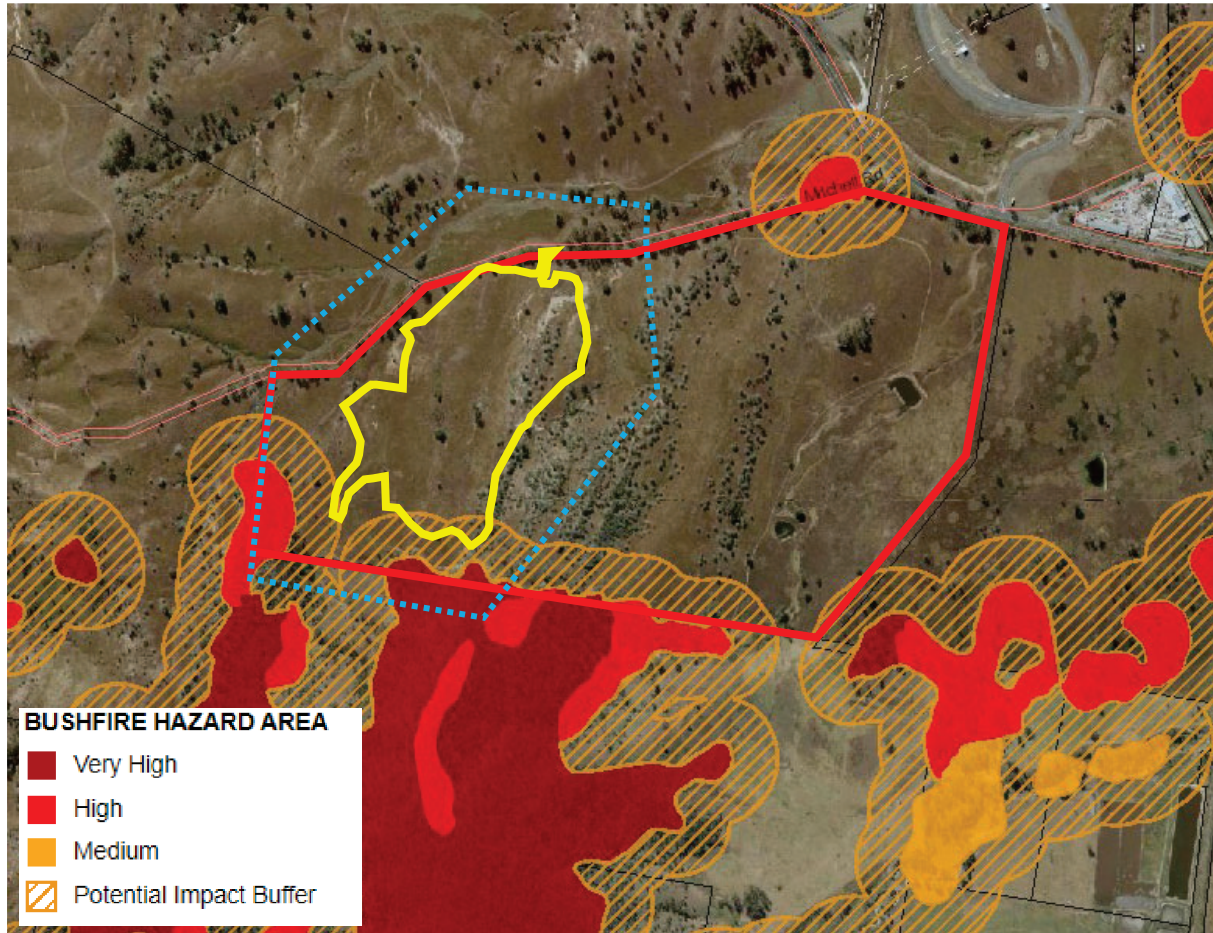


Figure 8 - Extract from the Bushfire Hazard Overlay Map

(Source: Scenic Rim Planning Scheme 2020)

Based on this Council mapping, the majority of the development footprint is outside the mapped bushfire hazard area, with only a minor encroachment into the potential impact buffer. This encroachment is in proximity to the open windrow composting area and the freshwater dam of the proposed facility.

Within 150m of the development footprint, particularly to the south of the site, there is mapped very high and high hazard area and potential impact buffer.

Bushfire hazard is also present across the wider locality (**Figure 9**), particularly to the west and south west of the site towards the elevated and vegetated lands between Beaudesert and Boonah.

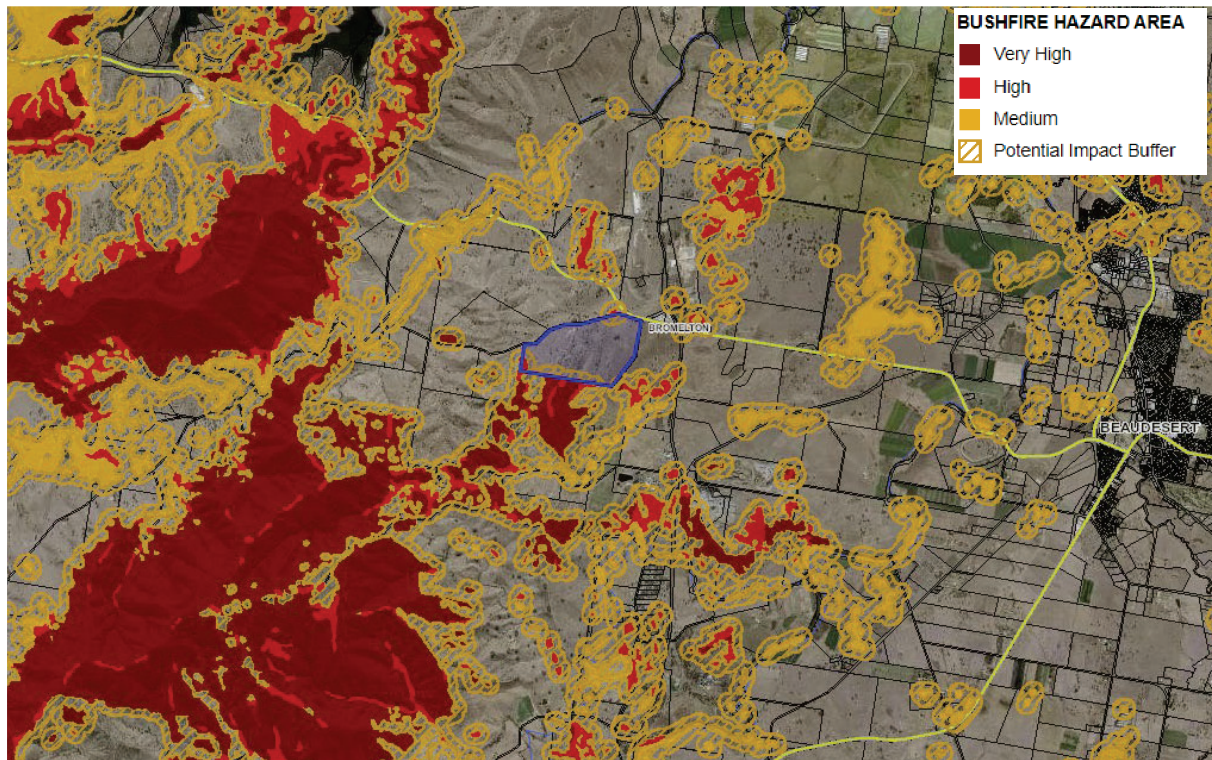


Figure 9 - Bushfire Hazard in the Wider Locality

(Source: Scenic Rim Planning Scheme 2020))

5.2.3 Bushfire Hazard Overlay Code

The Bushfire Hazard Overlay Code is identified as an assessment benchmark for assessable development where in the bushfire hazard overlay area.

This report has had consideration to the Bushfire Hazard Overlay code and the associated Planning Scheme Policy 4 – Bushfire Management Plans.

Whilst the majority of the development footprint is outside the bushfire hazard overlay, a complete assessment against the Bushfire Hazard Overlay Code is provided in **Appendix A**. This assessment relies on the outcomes of the bushfire hazard assessment and recommendations of the bushfire management plan as described in Sections 6 to 8 of this report.

This assessment demonstrates the development complies with the Bushfire Hazard Overlay Code.

5.3 State Planning Policy 2017

The Scenic Rim Planning Scheme (section 2.1) states that the State Planning Policy (SPP) 2017, including those aspects relevant to Natural hazards, risk and resilience, is reflected in the planning scheme. As this application is within the Bromelton SDA, assessment against the SPP has been carried out, despite the integration with the planning scheme.

5.3.1 State-wide Bushfire Prone Areas Map

The SPP 2017 is underpinned by the State-wide bushfire prone area mapping. An extract of that mapping relevant to the site is provided in **Figure 10**.

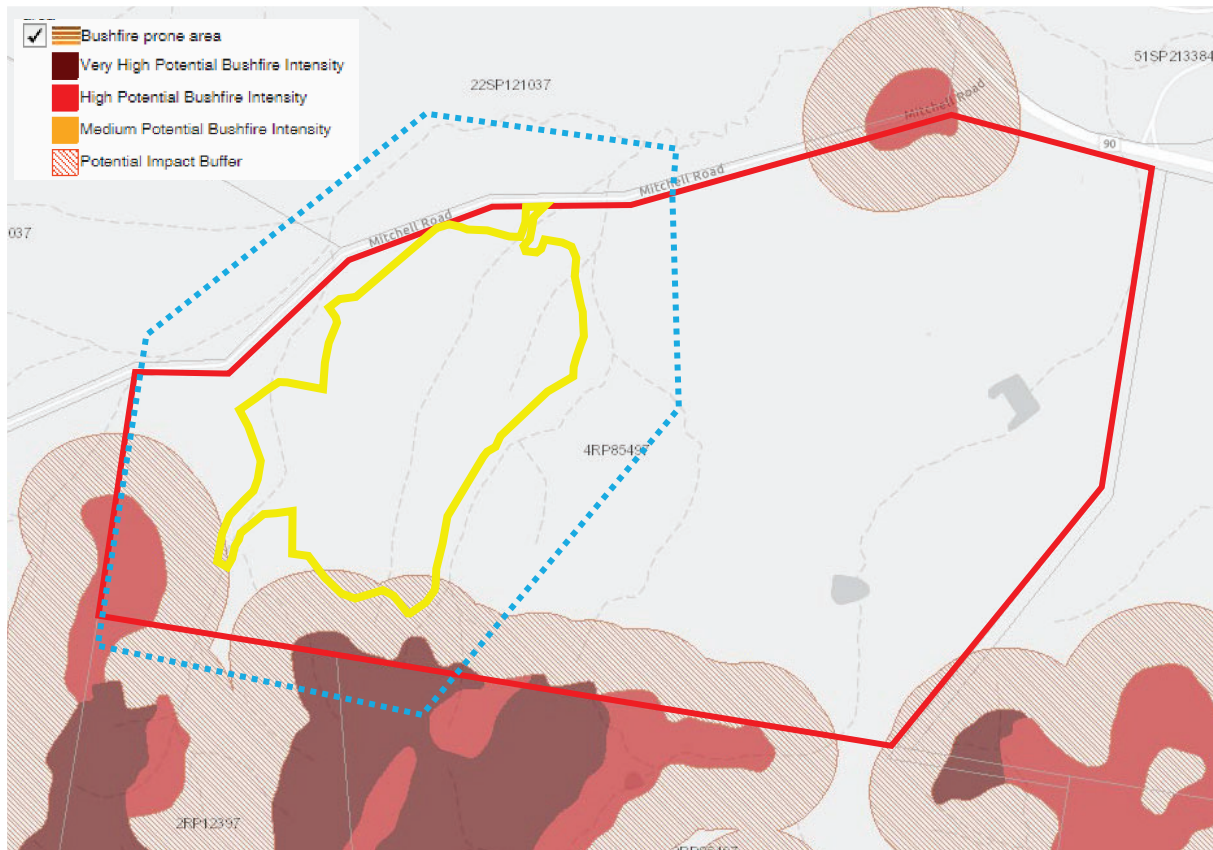


Figure 10 - Extract of the SPP Bushfire Prone Areas Map

(Source: State Planning Policy Interactive Mapping System)

As is evident, the SPP Bushfire Prone Area mapping is consistent with the Bushfire Hazard Overlay mapping in the planning scheme.

5.3.2 Relevant State Interest Policies and Assessment Benchmarks

For the purpose of this report the Natural Hazards, Risk and Resilience State Interest Policy statements (4),(5) and (6) and Assessment Benchmarks (3), (4), (5), (6) and (7) are applicable and have been assessed below and in Table 3. This assessment relies on the outcomes of the bushfire hazard assessment and recommendations of the bushfire management plan as described in **Sections 6 to 8** of this report.

Policy (4) Development in bushfire.... natural hazard areas:

(a) avoids the natural hazard area; or

(b) where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.

Compliance Statement – Refer to response to assessment benchmark 3 below.

Policy (5) Development in natural hazard areas:

(a) supports, and does not hinder disaster management capacity and capabilities

(b) directly, indirectly and cumulatively avoids an increase in the exposure or severity of the natural hazard and the potential for damage on the site or to other properties

(c) avoids risks to public safety and the environment from the location of the storage of hazardous materials and the release of these materials as a result of a natural hazard

(d) maintains or enhances the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.

Compliance Statement – Refer to response to assessment benchmarks 4, 5, 6 and 7 below.

Policy (6) Community infrastructure is located and designed to maintain the required level of functionality during and immediately after a natural hazard event.

Compliance Statement – Community infrastructure in the context of bushfire hazard is not explicitly defined in the State Planning Policy. However, a definition is provided in the Example planning scheme assessment benchmarks guidance material that supports the SPP. The use would not fit within that definition of community infrastructure. It also does not have any attributes or characteristics that would warrant its categorisation as community infrastructure.

Table 3 - SPP State interest policy compliance assessment

SPP Natural Hazards Assessment Benchmark	Compliance Statement
Assessment benchmark 1 (erosion prone areas)	Not applicable
Assessment benchmark 2 (erosion prone areas)	Not applicable
Assessment benchmark 3 Development avoids natural hazard areas, or where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.	Complies - The development footprint largely avoids the mapped bushfire prone area, with the exception of a very minor encroachment into the Potential Impact Buffer at the southern extent of the site in proximity to the open windrow area and freshwater dam. Whilst these use areas, as shown on the development plan included in Figure 4 are largely, if not entirely, outside the bushfire prone area, a suit of mitigation measures are recommended due to the close proximity to the mapped area and to contribute toward tolerable risk to people and property. These mitigation measures include: • The siting of the use and provision of separation of hazardous vegetation (Asset protection zone). • Use of the perimeter track around the facility. • Access and egress arrangements • Reticulated and static water supply • Provisions for fencing.

SPP Natural Hazards Assessment Benchmark	Compliance Statement
	Operational provisions that relate to cessation of operations and evacuation of the facility, ignition management and emergency management, including updated bushfire emergency provisions as part of the Site Emergency Plan are also to be implemented.
Assessment benchmark 4 Development supports and does not hinder disaster management response or recovery capacity and capabilities.	Complies – Disaster management response and recovery capacity and capabilities is supported by the proposed development through the provision of: • Sufficient water supply is to be available. • Separation between the proposed development footprint and the hazardous vegetation to provide access for emergency services. • Emergency management procedures to support operations. • Land and fuel management practices including grassland hazard management on the balance of the land through cattle grazing (until the balance land is further developed)
Assessment benchmark 5 Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties.	Complies - The proposed development does not include significant changes to the vegetation hazard class adjacent to the development footprint through rehabilitation or revegetation. Therefore it is not expected to increase the severity of bushfire hazard on or adjoining the site.
Assessment benchmark 6 Risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard are avoided.	Complies – The risk to public safety and the environment from the manufacture and storage of hazardous materials on the site can be mitigated through the siting of these uses at the frontage of the site, as far as practicable from the hazardous vegetation (and in this case outside the mapped Bushfire Prone Area), and suitable operational procedures for emergency events.
Assessment benchmark 7 The natural processes and the protective function of landforms and the vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.	Not applicable - The natural processes and surrounding landforms will not be affected by the proposal in a way that would increase risk associated with bushfire hazard.

5.3.3 Bushfire Resilient Communities 2019

The 'Bushfire Resilient Communities – Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire' (October 2019)' (BRC) supports the SPP and associated SPP guidance material.

It provides technical guidance and the policy positions of QFES and is relevant to making or assessing development applications. The technical guidance includes procedures for undertaking a Bushfire Hazard Assessment and preparing a Bushfire Management Plan.

Scenic Rim Planning Scheme – Bushfire Management Planning Scheme Policy also includes guidance for the preparation of Bushfire Hazard Assessments and recommendations for mitigation options to be incorporated into Bushfire Management Plans. This report includes consideration of that Planning Scheme Policy, however to the extent it is in conflict with BRC, the methodology for preparing a bushfire hazard assessment and other guidance material set out in BRC will be relied upon as the State Government's current technical guidance material supporting the State Planning Policy.

The Bushfire Hazard Assessment and Management Plan prepared for this application (see following **Sections 6 to 8** of this report) have been prepared in accordance with the methodology set out in BRC.

Assessment against the relevant policy positions of BRC (as per Section 2 of that document) are provided below.

- ***Policy 4 – Disaster management capacity and capabilities are maintained to mitigate the risks to people and property to an acceptable and tolerable level.***

Response: Refer to response to SPP assessment benchmark 4.

- ***Policy 6 – Vulnerable uses are not located in the bushfire prone area unless there is an overwhelming community need for the development of a new or expanded service, there is no suitable alternative location and site planning can appropriately mitigate the risk.***

Response: Not applicable, the proposal is not for a vulnerable use.

- ***Policy 7 – Revegetation and rehabilitation avoids an increase in the exposure or severity of bushfire hazard.***

Response: Refer to response to SPP assessment benchmark 5.

- ***Policy 8 – Development does not locate buildings or structures used for stage or manufacture of materials that are hazardous in the context of a bushfire within a bushfire prone area unless there is no suitable alternative location.***

Response: Refer to response to SPP assessment benchmark 6.

- ***Policy 9 – The protective function of vegetation arrangements that can mitigate bushfire risk are maintained.***

Response: Refer to response to SPP assessment benchmark 7.

- ***Policy 10 – Community infrastructure for essential services are not located in bushfire prone areas unless there is an overwhelming community need for the development of a new or expanded service and there is no suitable alternative location, and further, the infrastructure can be demonstrated to function effectively during and immediately after a bushfire event.***

Response: Not applicable, refer to response to SPP Policy 6.

5.4 Building Assessment Provisions

Whilst this report supports a planning application, it is relevant to note that a subsequent building application may be required for parts of the proposal. Certain building applications are subject to additional requirements (building assessment provisions) where in a bushfire prone area. It is not within the scope of this report to address the building assessment provisions. The following advice is provided to assist with consideration of potential building assessment provisions.

5.4.1 Designated Bushfire Prone Area for Building Purposes

A planning scheme may designate all, or part, of its area as a designated bushfire prone area for the purposes of the assessment of building applications under the *Building Act 1975*. Designation will trigger certain building applications to be assessed against the building assessment provisions that apply to a building in bushfire prone areas, including the Building Code of Australia (BCA). The BCA is the document called the National Construction Code (NCC) (volume 1 and 2, including Qld appendixes).

The BCA / NCC bushfire provisions are applicable to Class 1 (dwelling), Class 2 (more than one dwelling), Class 3 (residential building providing long-term or transient accommodation), select Class 9 (health-care building, early childhood centre, primary or secondary school (or similar educational establishment) and residential care building) and associated Class 10a structures.

Section 1.6, Table 1.6.1 of the Scenic Rim Planning Scheme states that land identified in the Bushfire Hazard Overlay Map **are** designated bushfire prone areas for the purposes of the BCA.

Notwithstanding, based on the information provided to Meridian Urban, it is assumed that the proposal will not include any of the Class 1, Class 2, Class 3 or Class 9 buildings described above. As such, assessment against the building assessment provisions will not be applicable to this development.

6 Bushfire Hazard Assessment

6.1 Methodology

This Bushfire Hazard Assessment has been conducted in accordance with Part 5 of the Bushfire Resilient Communities guidance material supporting the implementation of the State Planning Policy, prepared by QFES.

Section 5 of the Bushfire Resilient Communities Technical Reference Guideline articulates the process for undertaking a bushfire hazard assessment. The process includes the three stages illustrated below (**Figure 11**). The reliability assessment is provided at Section 6.2 and the hazard assessment in Section 6.3. The separation and radiant heat discussions are provided at **Section 8** of this report.

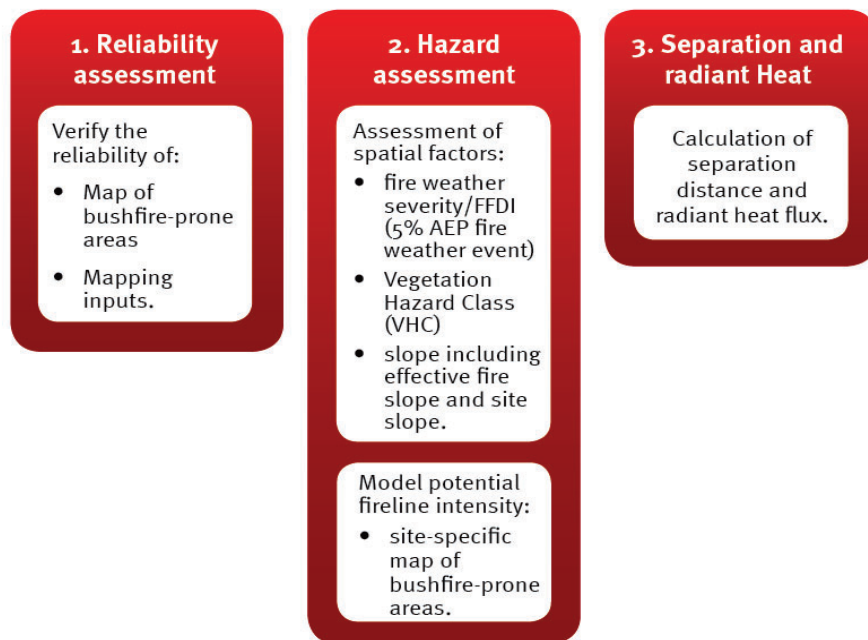


Figure 11 – Overview of the Bushfire Hazard Assessment process as per Bushfire Resilient Communities

(Source: Queensland Fire and Emergency Services, 2019)

A range of instruments have been utilised to perform a desktop analysis to complement available site data. These instruments include:

- State-wide bushfire prone area mapping
- Concept plans and supporting information
- Aerial imagery (Queensland Globe)
- QFES Catalyst Fire Management System
- State Planning Policy July 2017
- Bushfire Resilient Communities Guideline
- Scenic Rim Planning Scheme:
 - Bushfire Hazard Overlay Code.
 - Planning Scheme Policy 4 – Bushfire Management Plans

A field inspection was conducted on 22 May 2024.

6.2 Reliability Assessment

Section 5.3 of the BRC allows for a reliability assessment to be undertaken as the first stage of a Bushfire Hazard Assessment to determine whether the site's observed characteristics are consistent with the inputs used to create the state-wide bushfire prone area mapping (and in this instance the planning scheme mapping) previously discussed in **Section 5.3.1** of this report.

Having regard to the vegetation hazard classes, topography and fire weather severity inputs used to inform the current state-wide bushfire prone area mapping, the vegetation hazard classes (discussed at Section 6.3.2) remain largely consistent with that observed on site during the field inspection conducted on 22 May 2024, including type and extent. On this basis, the inputs are considered to remain 'generally consistent'² with the state-wide bushfire prone area mapping and this is covered in more detail in Section 6.3.

6.3 Hazard Assessment

6.3.1 Fire Weather

The QFES Catalyst Fire Management System includes Forest Fire Danger Index (FFDI) mapping which is climate-adjusted for a 5 per cent annual exceedance probability (AEP) fire weather event as at 2050. Catalyst identifies this area of South East Queensland as subject to an **FFDI of 57**.

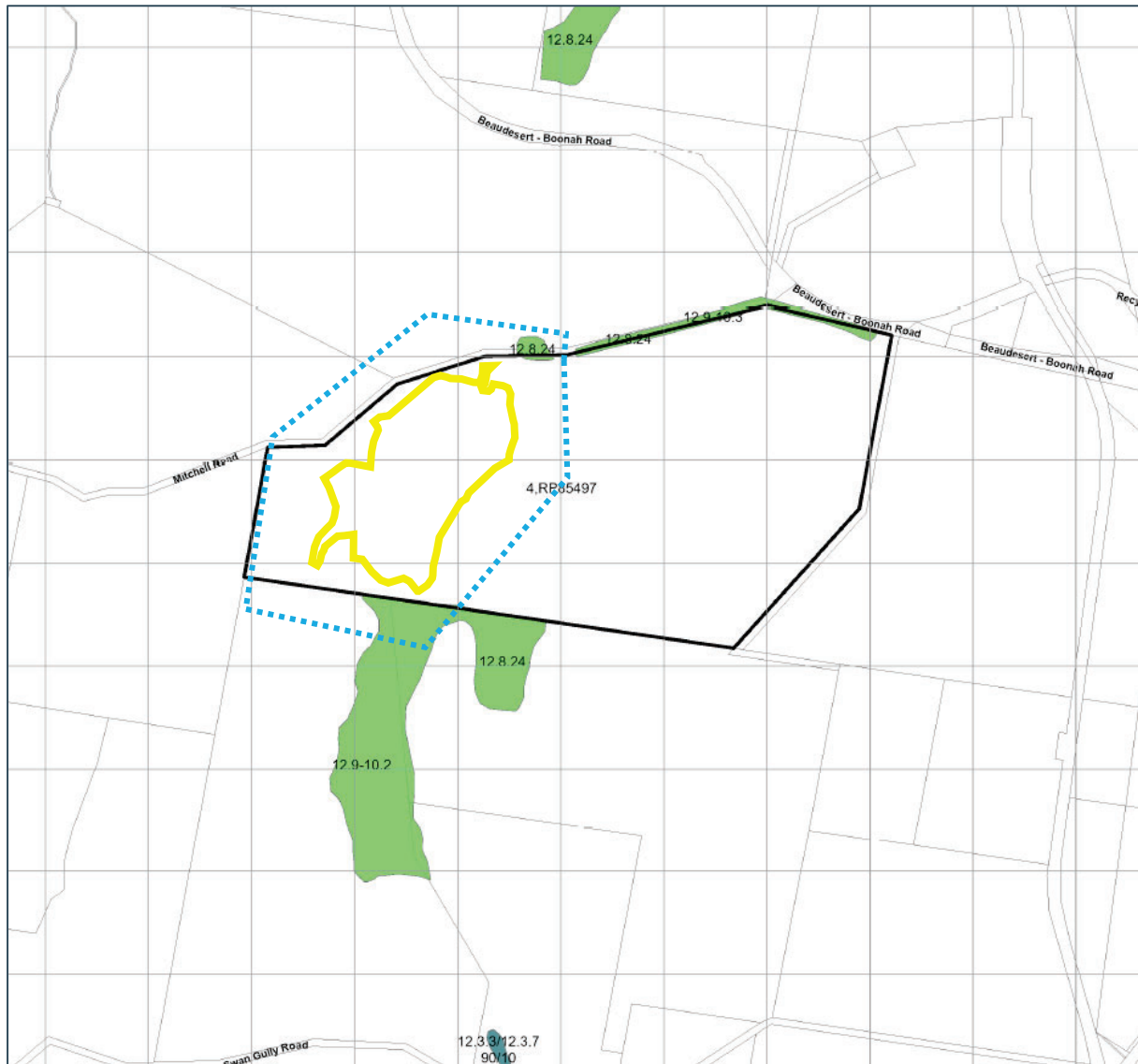
6.3.2 Vegetation Communities

Vegetation classification is important for a number of reasons, namely it is an indicator of the level of fire intensity and fire behaviour associated with specific types of vegetation and it also indicates the fuel loads which may exist in certain locations. The vegetation communities within 150m of the development footprint form the basis of this assessment, as per that required by the Bushfire Resilient Communities Guideline process for undertaking a bushfire hazard assessment.

It is expected that there will be some clearing of scattered vegetation within the development footprint to accommodate the use. To this end, the following assessment relates to retained vegetation within 150 metres of the development boundary, which includes vegetation on adjoining land. The assessment has also considered vegetation communities in proximity to the new road (Mitchell Road).

The broad vegetation group within this area is **3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b) (Figure 12)**.

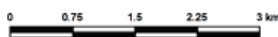
² Terminology as used by the Bushfire Resilient Communities reliability assessment methodology at Section 5.3.1 of that document.



Remnant 2021 Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- Selected Lot and Plan
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Old) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Non-remnant vegetation, cultivated or built environment
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 MGA Zone 56

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.

The label consists of 3 components: bioregion, land zone, and vegetation community - the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.

Non-remnant vegetation includes regrowth and disturbed native vegetation.

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Figure 12 - Remnant 2021 Regional Ecosystem within the Site and the 150m Vegetation Assessment Area

(Source: The Department of Environment and Science, 2023, Broad vegetation Group Map – Version 6.0)

Figure 13 below identifies the current extent of relevant vegetation communities, illustrated via VHC tiles mapping in the QFES Catalyst Fire Management System. The development footprint and immediate surrounds (within 150m) contain:

- BVG 9-15 Eastern eucalypt woodlands to open forests.

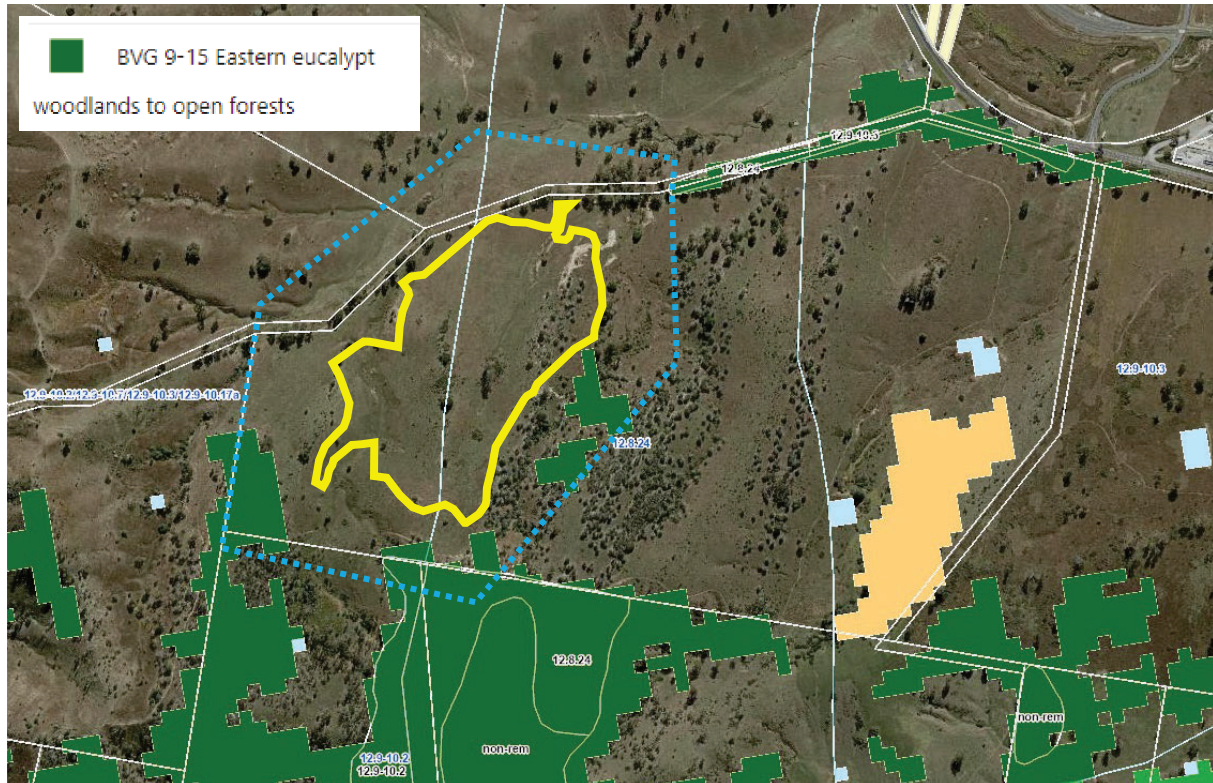


Figure 13 - Catalyst Fire Management System Vegetation Hazard Class (VHC) Tiles

(Source: QFES, 2024)

The Vegetation Hazard Class (VHC) conversion and associated potential fuel loads are set out in the table following (Table 4), pursuant to Part 6 of the BRC. These vegetation communities align with those verified in the project Ecology Assessment Report (within 150m of the nearest use area – i.e. the composting area at the southern extent of the site).

Areas of non-remnant vegetation which have not yet reached maturity are assessed as mature communities, accounting for the future hazard profile of lands within 150m of the development area.

Photographs of VHCs observed on site during the field inspection have also been included in **Appendix B**.

Table 4 - Vegetation Communities within the site and within 150m of the development footprint (remnant and non-remnant)

RE	RE Description	RE Structure Code	VHC	VHC Description	Understorey (Surface) Potential Fuel Load (t/ha)	Total Potential Fuel Load (t/ha)
12.8.24	Corymbia citriodora subsp. variegata open forest on Cainozoic igneous	Open Forest	10.1	Spotted gum dominated open forests	16.3	20.8

RE	RE Description	RE Structure Code	VHC	VHC Description	Understorey (Surface) Potential Fuel Load (t/ha)	Total Potential Fuel Load (t/ha)
	rocks especially trachyte					
12.9-10.2	Corymbia citriodora subsp. variegata +/- Eucalyptus crebra open forest on sedimentary rocks	Open Forest	10.1	Spotted gum dominated open forests	16.3	20.8

The vegetation which potentially constitutes a hazard within 150m of the development footprint is confirmed to be dominated by a mix of remnant and non-remnant vegetation.

The highest fuel load observed within the same area described above is 20.8 t/ha according to the Regional Ecosystem data.

Images have been captured across the site during the field inspection and are included in **Appendix B**.

The vegetation hazard classes observed on the site are generally consistent / align with both the mapped Regional Ecosystems provided by the Queensland Herbarium and the vegetation hazard classes and fuel loads used to inform the state-wide bushfire prone areas mapping.

Pursuant to the vegetation structural classes assessment of Part 6 of the Bushfire Resilient Communities Guideline, the vegetation (within 150m of the development footprint) is characterised broadly as Woodland, as per

Table 5.

Table 5 - Assessment of Vegetation Structure in accordance with Part 6 of the BRC

RE	Vegetation structure class	Dominant life form	Density
12.8.24	Trees closed to mid-dense	Trees	Closed to mid-dense
12.9-10.2	Trees sparse – very sparse		Sparse to very sparse

6.3.3 Effective Slope and Site Slope

Effective slope relates to the topography beneath classified vegetation, as this influences fire speed and rate of spread – namely, that the speed of fire doubles for every 10 degrees incline.

An effective slope assessment has been conducted based on contour data from Qld Globe (for a distance of 150m from the development footprint) in **Figure 14**.

The mapped hazardous vegetation is to the south and south-west of the site. The slope beneath this vegetation is upslope of the proposed development footprint. Vegetation within 150m of the north-west, north, north-east and eastern boundaries of the development footprint are not within the bushfire prone area and therefore an effective slope assessment is not required in these locations.

The overall site slope (the slope within the development footprint itself) in proximity to the southern boundary of the site has been estimated to be approximately 6.5 degrees from the southern boundary, down toward the north. It is noted that the overall site slope within the development footprint will be subject to cut and fill to create flat pads to facilitate the development.

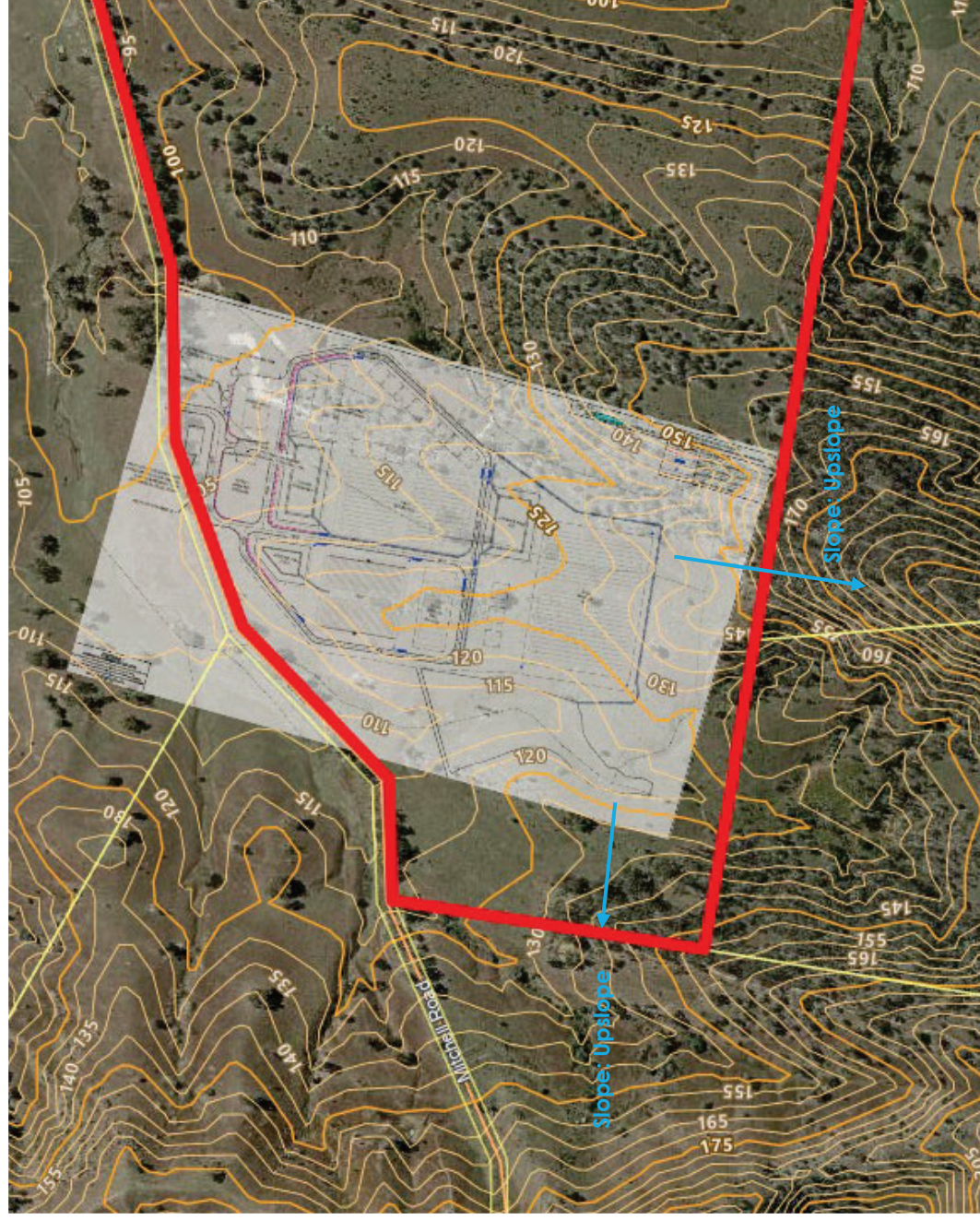


Figure 14 - Effective slope assessment

(Source: Qld Globe, 2024 and Services Layout Plan 30034145-000-600)

6.3.4 Aspect

Aspect can affect bushfire behaviour where slopes with northerly and/or westerly aspects experience a higher level of solar access than those areas with a southern or eastern aspect. This generally translates to drier fuels with lower moisture content and increased dead/drying/curing material.

Notwithstanding, in times of drought and below average rainfall, moisture levels in soil and vegetation in more sheltered areas with southerly and easterly aspects can also decrease substantially giving rise to significantly higher fuel abundance where the preceding fire regime has been less frequent or intense. Thus, aspect is of only partial consequence in this respect and this is reflected by the current SPP mapping methodology and information made publicly available by QFES.

The development footprint generally maintains a northerly and north-westerly aspect.

6.3.5 Fire History

In relation to historical fire activity in the area, ignitions do occur in the general region.

A review of fire scar mapping using the Queensland Globe platform identifies wildfire or hazard reduction burns on the site and in the immediate area over many years (between 1987 – 2022), including recent events in the last 10 years (**Figure 15**). This same data is included as part of the QFES Catalyst Fire Management System.

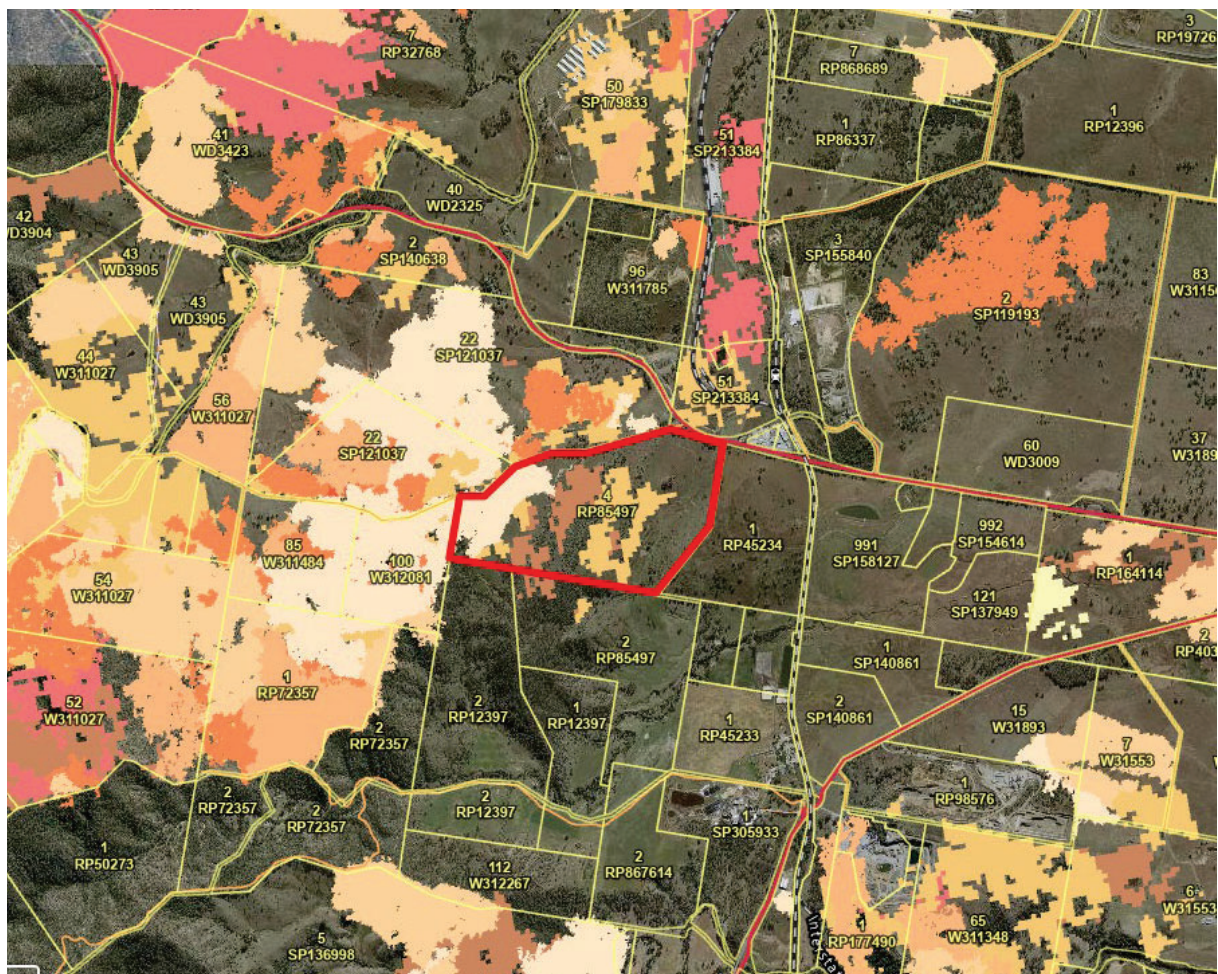


Figure 15 - Historical Fire Scar Mapping within the Site and Locality

(Source: Queensland Globe, 2024)

6.3.6 Ignition Sources

Likely ignition sources in the area include accidental ignition from agricultural and extractive industry uses and other machinery and equipment, sparking, roadside ignition (potentially caused by cigarette butts thrown from vehicles), arcing powerlines and other rural and industrial activities. Ignitions may also occur from activities on nearby rural residential properties such as lawnmowing, use of power tools and so on.

In terms of the ignition potential of the proposed Composting Facility, as an industrial activity ignition may occur from various activities on site, including use of machinery and fuel storage. Ignition from the composing process itself may also occur. Ignition management of the Composting Facility is understood to be the subject of broader facility management plans and strategies and is not within the remit of this assessment.

7 Qualitative Assessment: Bushfire Behaviour Assessment, Extent of Hazard and Bushfire Intensity

This section of the report provides commentary on bushfire behaviour on and around the site and fireline intensity within proximity to the development footprint.

7.1 Fire runs and disruptions

In terms of fire runs, fire advancing toward the composting facility site could come from any direction, such is the nature of the surrounding landscape. Vegetation to the north and east is more fragmented in nature. Whilst rural paddocks used for grazing and other agricultural activities could offer some ability for fire suppression, these may offer less of a suppression opportunity under more extreme fire weather conditions with grassfire events which can lead to rapid rates of spread. Fire runs therefore must be assumed to possibly occur from any direction but may be more probable from the south and south-west due to the level of fuel connectivity and limited extent of fuel disruptions (i.e. roads, paddocks, etc.). This is also the area of mapped hazard, noting the grassfire hazard is not mapped and it's not identified as a planning matter, however its likelihood requires awareness.

The terrain in this area is steep, and generally heavily undulating which is likely to influence fire behaviour. This land is generally upslope from the site over some distance, which may reduce rate of spread and fire intensity on approach toward the site. Whilst this may be the case, other forms of bushfire attack such as ember attack may occur.

The land to the north, east and west does provide uphill runs toward the site (which typically can give rise to increased rate of spread and intensity), however there is significantly less vegetation cover in these directions and furthermore, it is not identified as Bushfire Prone Area. Despite this, grassfire rate of spread may be heightened due to the landscape topography.

Wind conditions in any event are likely to have a substantial effect on fire behaviour.

A key disruption to fuel continuity and connectivity is provided by the rail corridor, existing developed area and existing cleared areas within the Bromelton SDA to the north-east and east of the site.

The development footprint itself is largely clear of vegetation.

7.2 Fireline intensity

It is appropriate to consider the potential fireline intensity of vegetation within 150m of the development footprint for each of the vegetation classes identified and using the highest effective slope metric observed.

There are two (2) vegetation hazard classes identified within 150m the site.

To the south and south-west the slope under classified vegetation (with a VHC of 10.1) is upslope of the development footprint and consequently a medium potential bushfire intensity is identified (Figure 16 and Figure 17), despite the Bushfire Prone area mapping showing this area as High and Very High Potential Bushfire Intensity.

RE code	RE Label	Vegetation Hazard Class	Potential Fuel Load (t/ha)	Fire Weather Severity (FFDI)	Maximum Landscape Slope (degrees)	Potential Fireline Intensity (kw/m) *	Potential Bushfire Intensity *
12.8-24	Corymbia citriodora subsp. variegata open forest on Cainozoic igneous rocks especially trachyte	10.1	20.8	57	0	15,289	Medium
Cells in yellow can be modified							
* From: Leonard, J., Newnham, G., Opie, K., and Blanchi, R. (2014) A new methodology for state-wide mapping of bushfire prone areas in Queensland. CSIRO, Australia.							
For further information or advice on the use of this tool contact sdu@qfes.qld.gov.au							

Figure 16 - Fireline intensity verification - QFES Fireline Intensity Calculator prepared by CSIRO (south – upslope)

RE code	RE Label	Vegetation Hazard Class	Potential Fuel Load (t/ha)	Fire Weather Severity (FFDI)	Maximum Landscape Slope (degrees)	Potential Fireline Intensity (kw/m) *	Potential Bushfire Intensity *
12.9-10.2	Corymbia citriodora subsp. variegata +/- Eucalyptus crebra open forest on sedimentary rocks	10.1	20.8	57	0	15,289	Medium
Cells in yellow can be modified							
* From: Leonard, J., Newnham, G., Opie, K., and Blanchi, R. (2014) A new methodology for state-wide mapping of bushfire prone areas in Queensland. CSIRO, Australia.							
For further information or advice on the use of this tool contact sdu@qfes.qld.gov.au							

Figure 17 - Fireline intensity verification - QFES Fireline Intensity Calculator prepared by CSIRO (south-west – upslope)

8 Bushfire Management and Mitigation

There are a number of options available to address and mitigate the risk to and from the proposed composting facility. This includes opportunities to:

- reduce the likelihood of bushfire on the subject site; and
- provide measures that target any vulnerabilities and ignition potential of the composting facility, relative to the bushfire prone areas.

This section articulates the combined range of bushfire protection and management measures relevant to the site and the proposed composting facility for consideration to address risk. The suite of mitigation measures relate to:

- Asset protection zones
- Site layout
- Building construction
- Access and egress
- Water supply and fire-fighting infrastructure
- Land and fuel management
- Operational procedures.

8.1 Asset Protection Zones

Stage 3 of the Bushfire Resilient Communities Technical Reference Guide for undertaking a bushfire hazard assessment requires an assessment of radiant heat exposure and required separation, or asset protection, to mitigate the use from potential bushfire hazard threat.

An asset protection zone (APZ) is an area which surrounds a building and/or structure and is intended to be maintained in perpetuity in a no or low fuel condition to aid in the protection of buildings / structures from the effects of flame contact, radiant heat exposure and to assist in the protection of people and property. It also offers defensible space for firefighters to work in relative safety from radiant heat exposure.

BRC 2019 (section 9.4) requires an APZ that achieves a radiant heat flux level of 10 kW/m² or less for uses that provide an essential service and/or are vulnerable to the impacts of bushfire. This is based on a 1,200 degree Kelvin flame temperature input. Given the proposed composting facility includes components that could be hazardous in the context of bushfire such as operations that may cause ignitions, a 10kW/m² APZ is recommended.

FLAMESOL calculations are provided in **Figure 18** to demonstrate the required separation (APZ) from the development footprint and hazardous vegetation to achieve a 10 kW/m² radiant heat flux level. This APZ distances are a function of fire weather, fuel load and topography.

Based on these calculations it is recommended that an **APZ of 38.4m** is provided along the southern boundary of the development footprint (measured from the outermost point of the open windrow). The proposed layout provides a separation well in excess of 38.4m between the open windrow and the nearest hazardous vegetation.

An APZ along the south-western boundary is not necessarily due to the separation from the nearest hazardous vegetation by the proposed fresh water dam.

Whilst APZs to grassfire hazard are not regulated, it is noted that a one-way road for heavy vehicles is provided at the perimeter of the site, effectively separating the activities of facility from adjacent grass hazard.



Calculated June 4, 2024, 4:53 pm (MDc v.4.9)

Southern APZ

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	57	Rate of spread	1.11 km/h
Vegetation classification	Forest	Flame length	9.74 m
Understorey fuel load	16.3 t/ha	Flame angle	71.5 °, 77.5 °, 83.5 °, 86.5 °, 87.5 ° & 91.5 °
Total fuel load	20.8 t/ha	Elevation of receiver	3.32 m, 2.99 m, 2.24 m, 1.18 m, 0.49 m & 0 m
Vegetation height	n/a	Fire intensity	11,981 kW/m
Effective slope	0 °	Transmissivity	0.871, 0.855, 0.832, 0.8090000000000001, 0.797 & 0.738
Site slope	6.5 °	Viewfactor	0.4096, 0.3025, 0.2035, 0.1381, 0.1121 & 0.0302
Flame width	100 m	Minimum distance to < 40 kW/m ²	11.3 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	15.4 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	22.8 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m ²	32.3 m
		Minimum distance to < 10 kW/m ²	38.4 m

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Figure 18 – Flamesol Calculation for Southern APZ

8.2 Site Layout

With regard to the proposed site layout, the development footprint has safe and convenient access to the road network (via the upgrade of Mitchell Road) for evacuation purposes and access for emergency services.

Adequate separation from hazardous vegetation in proximity to the site is achieved. To ensure that separation is maintained an APZ is recommended discussed above.

Some of the most vulnerable components of the facility, such as the fuel storage areas and buildings are at the northern extent of the development footprint, located outside the bushfire prone area and as far as practicable from hazardous vegetation. Other components of the use, as such the composting areas have been set back off the rear boundary and provide sufficient room for the recommended asset protection zone.

8.3 Building Construction

It is expected that the proposal will not include any Class 1, Class 2, Class 3 or select Class 9 buildings (or associated Class 10a buildings). Therefore, further consideration of the building assessment provisions of the NCC for building in bushfire prone areas has not been carried out.

Notwithstanding, it is recommended that any materials used on site are largely non-flammable or are fire resistant in nature, such as concrete and steel. It is recommended that the use of timber for construction is minimised.

8.3.1 Fencing and retaining

Any fencing or barriers must not be constructed from timber. Instead, fencing and barrier materials must be fire resistant.

In addition, any retaining walls required should be constructed of fire resistant or fire retardant material such as concrete, stone, masonry or the like and not constructed from timber.

The above is recommended across the entire site.

8.4 Access and Egress

Access and egress are significant in terms of a range of aspects of bushfire prevention and to facilitate bushfire fighting. Road design must cater for emergency access and egress in times of potential bushfire events.

It is noted that the development is well connected to the local road network, with site access obtained directly from Mitchell Road, subject to upgrades. Mitchell Road connects with Beaudesert-Boonah Road a short distance (approx. 720m) from the site. Beaudesert-Boonah Road is a State-controlled road that provides east-west connection between the township of Beaudesert in the east (and the Mount Lindesay Highway) and the community of Boonah in the west (and the Ipswich-Boonah Road).

At the intersection of Mitchell Road and Beaudesert-Boonah Road, the new road passes through a patch of mapped Bushfire Prone Area. However it is assumed the majority of this vegetation will be removed, resulting in a fragmented patch that will likely reduce the extent of the hazard area.

The local and broader road network is therefore considered to be of an adequate standard to accommodate emergency access to and from the site and evacuation.

8.5 Water supply and Fire-Fighting Infrastructure

It is understood the composting facility will be provided with static water supply in the form of water tanks and booster pump. In addition to static water supply required for the operation of the facility, static water supply solely for the purposes of fire-fighting should be provided on site.

An additional 45,000L static water supply tank (solely for bush fire-fighting purposes) is required on site, and this is in addition to other industrial fire-fighting water supply requirements. The tank:

- should be of non-flammable construction
- allows medium rigid vehicle (15 tonne fire appliance) clear access within six metres of the tank
- a 50mm male camlock fitting for emergency fire service use (or as otherwise instructed by QFES) is required.

8.6 Rehabilitation / Revegetation and Landscaping

Details about any rehabilitation / revegetation proposed on the site have not been provided. If rehabilitation / revegetation is proposed on the site, a further hazard assessment may need to be undertaken to ensure that any rehabilitation / revegetation areas do not affect the vegetation hazard class or increase the severity of the hazard.

Further, if landscaping is proposed, the approach should adopt landscaping principles and species selection in accordance with the provisions set out in Section 8 of BRC 2019, as a minimum. These principles include the following elements:

- low threat (flammability) species are adopted
- tree specimens are smooth-barked species only and are not within 20m of the proposed facility

- the use of organic mulches in garden beds should be avoided.

Landscaping design and plant selection should accord with *Figure 20: Characteristics of low flammability species and effect on performance in bushfire situations* (BRC 2019).

8.7 Land and Fuel Load Management

Ongoing land and fuel load management practices, both within and beyond the APZ, can assist in reducing bushfire risk to people and property.

It is recommended that the land outside the development footprint, particularly within 100m of the southern boundary of the site, is kept in a low fuel state. Meridian Urban understands this land will continue to be used for cattle grazing, until such time as further development occurs.

8.8 Operational Procedures

As an industrial facility, it is expected that various operational procedures will be implemented on site that may be relevant to bushfire hazard management and mitigation. These may include:

- **Evacuation procedures and site emergency plans** – these should include relevant provisions for bushfire. This may include:
 - Where an advice, watch and act or emergency warning is issued for a location within 5kms of the site, advice is sought from emergency services and/ or the site operations are immediately ceased and the facility is evacuated:
 - Staff, contractors and visitors are directed to a safe location off-site (i.e. Beaudesert township for example) to be accounted for. Direction to return to site or leave the area can then be provided.
 - Under no circumstance should sheltering in place on site occur.
 - For warnings (advice, watch and act or emergency) issued for locations within 10kms of the site or in the surrounding area more broadly, contact is made with the fire brigade's fire warden for status and advice, and prepare to cease operations and prepare to evacuate the site. Further information is available directly from:
 - Queensland Fire and Emergency Services website and social media
 - Queensland Police social media
 - Scenic Rim Regional Council's Disaster Dashboard
 - ABC radio.
 - For a fire that is ignited on the site or in immediate proximity (i.e. smoke is visible from the site):
 - Cease operation and evacuate the site immediately, if safe to do so
 - Call 000.
 - On 'Extreme' and 'Catastrophic' fire danger days, or under 'total fire bans':
 - Activities that may generate an ignition threat are not conducted
 - Monitoring of emergency services media regularly throughout operation hours to check for local warnings
 - Follow emergency services advice.

Forecasted fire weather and fire danger days are available three (3) days in advance from both the Bureau of Meteorology and Queensland Fire and Emergency Services.

9 Conclusion

This report considers the bushfire hazard profile and mitigation measures required for a new composting facility in the Bromelton SDA area. Based upon this detailed analysis, it is considered that the proposed development offers the ability to implement a suite of measures that contribute to mitigating the threat of bushfire hazard.

This assessment has identified a range of mitigation measures that should be implemented to reduce the risk to people and property to a tolerable level.

Despite the above, bushfire remains endemic to the Australian bush and it remains the responsibility of site operators to implement all relevant emergency protocols, and manage and maintain the site to limit the threat of potential bushfire attack.



APPENDICES



Appendix A – Assessment against the Scenic Rim Planning Scheme 2020 Bushfire Hazard Overlay Code

Overall Outcomes

Purpose and Overall Outcome		Response
2. The purpose of the code will be achieved through the following overall outcomes:		
a. Development that potentially increases the exposure of people and property to natural hazards: i. avoids areas of bushfire risk; or ii. where areas of bushfire risk cannot be practicably avoided, development is designed, located and managed to ensure the risk to the safety of people and the damage to property is mitigated to an acceptable or tolerable level before, during and after a natural hazard event;		Complies – The majority of the development footprint is outside the BPA and therefore avoids areas of bushfire risk. For the development within or in close proximity to the BPA, the risk to people and property can be reduced to a tolerable level through the implementation of a suite of mitigation measures, as set out in this report.
b. Development in areas at risk from bushfire hazard is compatible with the nature of the hazard;		Complies – The proposed development is considered to be compatible with the nature of the hazard as the majority of the development is outside the BPA and the component that falls within close proximity to the BPA (the composting area) can be adequately separated from nearby hazardous vegetation, thereby reducing the risk to the development.
c. Development is designed and operated in accordance with any Bushfire Management Plan prepared for the site;		Complies – This report provides a recommended BMP and associated mitigation measures.
d. Development avoids involving the establishment or intensification of vulnerable uses and community infrastructure within or near areas that are subject to bushfire hazard;		Not Applicable – The proposal is not for a vulnerable use or community infrastructure.
e. Development does not result in a material increase in the extent or severity of bushfire hazard;		Complies - The proposed development does not include significant changes to the vegetation hazard class adjacent to the development footprint through rehabilitation or revegetation. Therefore it is not expected to increase the severity of bushfire hazard on or adjoining the site.
f. Bushfire risk mitigation treatments are accommodated in a manner that avoids or minimises impacts on the natural environment and ecological processes, and conserves biodiversity values;		Complies – The proposed recommended mitigation measures are not expected to have a detrimental impact on the natural environment, ecological processes or biodiversity values, as the recommended APZ is in a largely cleared part of the site.
g. Development involving the manufacture or storage of hazardous materials does not increase the risk to public safety or the environment in a bushfire event;		Complies – The risk to public safety and the environment from the storage of hazardous materials on the site can be mitigated through the siting of these uses at the frontage of the site, as far as practicable from the hazardous vegetation (and in this case outside the mapped Bushfire Prone Area), and suitable operational procedures for emergency events.

Purpose and Overall Outcome		Response
h. Development contributes to, and does not unduly burden, effective and efficient disaster management response and recovery capabilities; and i. Development is located on landforms which can limit the intensity of a bushfire and that have other protective functions or community values.		Complies – Disaster management response and recovery capacity and capabilities is supported by the proposed development through the provision of: - Sufficient water supply is to be available. - Separation between the proposed development footprint and the hazardous vegetation to provide access for emergency services. - Emergency management procedures to support operations. - Land and fuel management practices including hazard reduction on the balance of the land through ongoing cattle grazing.
		Complies – The development footprint is on land that is largely cleared of vegetation and is not steeply sloping.

Assessment benchmarks – For Accepted and Assessable Development

Performance outcomes		Acceptable outcomes	Response
Access for Firefighting Appliances			
PO1 All premises are provided with vehicular <u>access</u> that enables safe evacuation for occupants and easy <u>access</u> by fire-fighting appliances. Note: A <u>site specific</u> assessment prepared by a <u>suitably qualified person</u> in accordance with <u>Planning Scheme Policy 4 – Bushfire Management Plans</u>, may be required to determine compliance with PO1.			
		AO1.1 Development has a driveway from a <u>constructed road</u> with: 1. a minimum vertical clearance of 4.8m; and 2. a minimum formed width of 3.5m.	Complies – The proposed driveway will be constructed of a standard (including clearances) to accommodate heavy vehicle access.
		AO1.2 1. a driveway does not exceed a length of 60m from a <u>constructed road</u>; OR 2. where a driveway from a <u>constructed road</u> is longer than 60m, it is designed to accommodate turning bays for firefighting appliance vehicles in accordance with Queensland Fire and <u>Emergency Services</u>, Fire Hydrant and vehicle access guidelines for residential, commercial and industrial lots (2019).	Complies – The proposed driveway, to the outer extent of the development footprint, does not exceed a length of 60m.

Assessment benchmarks – For Assessable Development

Performance outcomes		Acceptable outcomes		Response
All Development				
PO1 Development is located where it is not at risk from bushfire hazard. Note: A site specific assessment prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans will be required to determine compliance with PO1.	AO1 A site specific assessment determines that bushfire hazard is unlikely on any part of the site affected by the development.		Refer to responses to PO2 to PO22 below.	
The following Outcomes (PO2 – PO22) must be addressed only where it is determined through AO1 above that the site is at risk from Bushfire Hazard and a Bushfire Management Plan is required				
PO2 Development complies with a site specific Bushfire Management Plan (BMP), prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans. The BMP demonstrates: 1. that the safety of people and property in a bushfire event can be managed and risks mitigated; and 2. how the specific outcomes of this Code can be achieved.	AO2 No Acceptable Outcome is prescribed.		Complies – This report constitutes a bushfire management plan which has been prepared in accordance with PSP 4. The report concludes that the risk to people and property can be mitigated through a suite of measures.	
PO3 Development does not increase the number of people living, congregating or working on land in a bushfire hazard area, unless a Bushfire Management Plan (BMP), prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans, demonstrates that the safety of people and property in a bushfire event can be managed and risks mitigated.	AO3.1 Development does not increase the number of people living, congregating or working on land in a bushfire hazard area.		Complies with PO3 – A small component of the development footprint is in the BPA or in close proximity to the BPA and therefore will potentially involve people working in close proximity to the BPA. However, the bushfire mitigation measures recommended by this report are considered to reduce the risk to people to a tolerable level.	
	AO3.2 Development involving a vulnerable use is not established in a bushfire hazard area.		Not Applicable – The proposal is not for a vulnerable use. Whilst the proposal is for an industry activity and involves the storage of hazardous materials, these are not	

Performance outcomes		Acceptable outcomes	Response
PO4 Emergency services and uses providing community support services: 1. are able to function effectively and safely during and immediately after a bushfire hazard event; and 2. can demonstrate, by a Bushfire Management Plan prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 - Bushfire Management Plans, that the safety of people and buildings in a bushfire event can be managed and lives protected during a bushfire event.	AO4 Emergency services and uses providing community support services; 1. are not located in a bushfire hazard area; and 2. ensures the development footprint, including internal driveways between buildings and from buildings to the roadway, does not traverse a bushfire hazard area.	considered to be in bulk and are located outside the BPA. Not Applicable – The proposal is not for emergency services or a use providing a community support service.	
PO5 Development does not cause: 1. an adverse risk to people, property and the environment due to the impact of bushfire on hazardous materials; and 2. excess danger or difficulty for emergency services to provide an emergency response or evacuation.	AO5 Development involving the storage, handling or manufacture of hazardous materials is not located within a bushfire hazard area.	Complies – Any hazardous materials (i.e. fuels) stored on site are located at the northern extent of the development footprint and outside the BPA.	
PO6 Landscaping and fuel sources within the bushfire prone area between hazardous vegetation and building envelopes does not increase the potential for bushfire hazard.	AO6 Landscaping treatments and fuel sources within a bushfire prone area, and any hazardous vegetation and building envelopes are designed and managed to achieve: 1. a potential available fuel load which is less than 5 tonnes/hectare in aggregate; and 2. a fuel structure which is discontinuous. Note - A landscape maintenance plan may be required to identify the long-term management arrangements to be implemented to achieve the above Acceptable Outcome.	Not Applicable – No landscaping treatments are proposed as part of this application.	

Performance outcomes		Acceptable outcomes	Response
PO7 Development is designed to minimise vegetation clearing and avoid or minimise impacts on the natural environment and ecological processes.	AO7 Development is located in an area that does not require the removal of native vegetation.		Complies with PO – The majority of the development footprint is located on existing cleared land. Any vegetation clearing will not be of a scale that would impact on natural environmental or ecological processes.
PO8 Development outside reticulated water supply areas include a dedicated static supply that is available solely for fire-fighting purposes and can be accessed by fire-fighting appliances.	AO8 A water tank is provided within 10 metres of each building (other than a class 10 building) which: 1. is either below ground level or of non-flammable construction; 2. has a take-off connection at a level that allows the following dedicated, static water supply to be left available for access by fire fighters; a. 10,000 litres for residential buildings; b. for industrial, commercial and other buildings, a volume specified in AS 2304–2011; 3. includes shielding of tanks and pumps in accordance with AS2304–2011; 4. includes a hardstand area (concrete or construction standard gravel) allowing medium rigid vehicle (15 tonne fire appliance) access within 6 metre of the tank; 5. is provided with rural fire brigade tank fittings if serviced by a rural fire brigade (i.e. 50 mm ball valve and male camlock coupling and, if underground, an access hole of 200mm (minimum) to accommodate suction lines); and 6. is clearly identified by directional signage at the street frontage.		Complies with PO8– The bushfire mitigation measures recommended in this report provide for static water supply (solely for fire-fighting purposes).
PO9 Where development is undertaken in an urban area or is for urban purposes a constructed perimeter road with reticulated water supply is established between the lot or building	AO9.1 Lot boundaries or building envelopes are separated from hazardous vegetation by a public road which: 1. has a two-lane sealed carriageway clear of hazardous vegetation; 2. contains a reticulated water supply;		Complies with Overall Outcomes of the Code - The proposed development is for an industrial activity. No new lots or building envelopes are proposed in this instance. A constructed perimeter road with water supply has not been provided as the

Performance outcomes		Acceptable outcomes	Response
envelope and is readily accessible at all times for urban fire fighting vehicles. The access to the perimeter road is available for both fire-fighting and maintenance works for hazard reduction purposes. <i>Note - For a material change of use perimeter roads are unlikely to be required where a development site involves less than 2.5ha and alternative access is available.</i>		3. is connected to public roads at both ends and at intervals of no more than 500 m; 4. accommodates geometry, turning radii and vertical clearance in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines and the Department of Transport and Main Roads' Planning and Design Manual; and 5. allows and does not impede access for fire-fighting and maintenance for fire-fighting purposes.	majority of the development is outside the BPA and adequately separated from hazardous vegetation. The only component of the use in proximity to hazardous vegetation is the composting area. A separation, in the form of an APZ, is recommended along the southern boundary of the compost area to provide and maintain adequate separation to the hazardous vegetation. It is understood the composting area is irrigated and will be regularly monitored (including temperature). On this basis, a further perimeter road with reticulated water supply in this location is not considered necessary.
		AO9.2 Where a reticulated water supply is available, fire hydrants are designed, sited and installed in accordance with AS2419.1-2009 Fire Hydrant Installations - System Design, Installation and Commissioning, and connected to a reticulated water supply, unless otherwise specified by the relevant water entity.	Not applicable. The proposed development will not be connected to a reticulated water supply.
PO10 During a bushfire event, development can be accessed from a road network suitable for use by emergency service vehicles and evacuation vehicles.		AO10 Development is accessed from either: 1. two different vehicular access routes, both of which connect to the public road network, provide safe access and egress to two different safe destinations and are available at all times and under all weather conditions; or 2. a singular vehicular access route which connects to the public road network, that provides safe access and egress to a safe destination and is available at all times and under all weather conditions. The full extent of the	Complies -The proposed development will have direct access to Mitchell Road, then Beaudesert – Boonah Road, which provides for safe access to Beaudesert township, a short distance to the east of the site. Whilst part of the route is partially affected by mapped bushfire prone areas, including the new section of Mitchell Road, there is limited vegetation in proximity to the road and therefore is considered suitable for use

Performance outcomes	Acceptable outcomes	Response
	route can be traversed safely during a bushfire hazard event. Note: When assessing singular vehicle access routes, consideration must be given to mitigation of risks for the route to: 1. become blocked to access or evacuation by fallen trees, smoke or other hazards; and 2. bushfire hazard of the route, which should not be of a higher bushfire hazard level than the subject development.	by emergency service vehicles and evacuation.
PO11 Where development is undertaken for non-urban purposes either a constructed perimeter road or a formed, all weather fire trail is established between the development (including lots or building envelopes) and the hazardous vegetation, and is readily accessible at all times for the type of fire-fighting vehicles servicing the area. The access to the perimeter road or fire trail is available for both fire-fighting and maintenance works or hazard reduction activities. Note - For a material change of use fire trails are unlikely to be required where a development site involves less than 2.5ha and alternative access is available.	AO11 Lot boundaries or building envelopes are separated from hazardous vegetation by a public road (as per AO19), or a fire trail which has: 1. a reserve or easement width of at least 20 metres; 2. a minimum trafficable (cleared and formed) width of 4 metres and no less than 4.8 metres vertical clearance, with 3 metres each side cleared of all flammable vegetation greater than 10 centimetres in height; 4. no cut or fill embankments or retaining walls adjacent to the 4 metres wide trafficable path; 5. the trail must be capable of accommodating a 10 tonne vehicle; 6. the balance 10 metre width of the easement has managed vegetation to remove major surface hazards; 7. turning areas and vertical clearances for firefighting appliances in accordance with Queensland Fire and Emergency Services' Fire hydrant and vehicle access guidelines; 8. a maximum gradient of 12.5 per cent a cross-fall of no greater than 10 degrees; 9. drainage and erosion control devices in accordance with the standards prescribed in Planning Scheme Policy 1: Infrastructure Design;	Not Applicable – The proposal is for an urban purpose (industrial activity).

Performance outcomes		Acceptable outcomes	Response
		10. vehicular access at each end, which is connected to the public road network at intervals of no more than 500 metres; 11. designated fire-trail signage; 12. if used, has gates locked with a system authorised by Queensland Fire and Emergency Services; 13. if a fire trail, has an access easement that is granted in favour of council and Queensland Fire and Emergency Services; and 14. allows and does not impede access for firefighting and maintenance for firefighting purposes.	
PO12 Development is not located on slopes and land forms that expose people or property to an intolerable level of risk to life or property.		AO12.1 Development along ridgelines, saddles and crests where adjacent slopes exceed 14 degrees is avoided	Complies with PO12 – The proposed development footprint is on land that is gently sloping, towards the foot of adjoining upslope land and thus, is not on a ridgeline, crest or upon a saddle. Adjoining land to the south, within the bushfire prone area, has effective slopes of potentially greater than 14 degrees, however this land is upslope of the proposed development. Therefore the slope is not expected to expose the development to an intolerable level of risk.
		AO12.2 Development is located where the effective slope is less than 5 degree downslope.	
PO13 To ensure the protection of peoples' lives and property, an area designated for revegetation or rehabilitation will not create an additional bushfire prone area. <i>Note - if the acceptable outcomes are not met a bushfire hazard assessment in accordance with Planning Scheme Policy 4 – Bushfire Management Plans will need to be conducted to demonstrate areas designated for revegetation or</i>		AO13.1 The dimensions and configuration of an area designated for revegetation or rehabilitation ensure the area does not have the ability to become a medium, high or very high bushfire prone area in the future; OR The landscaping treatments are designed to achieve; 1. potential available fuel load which is less than 5 tonnes/hectare in aggregate; and	Response to AO13.3 - Not Applicable – There is no revegetation or rehabilitation areas or landscaping treatments proposed.

Performance outcomes		Acceptable outcomes	Response
rehabilitation will not create additional bushfire prone areas.		2. fuel structure which is discontinuous.	
		AO13.2 A landscape maintenance plan specifies long-term management arrangements necessary to ensure that: 1. potential available fuel load is maintained at less than 5 tonnes/hectare in aggregate; and 2. fuel structure remains discontinuous.	
PO14 Where required, recreational parks or open space are located to act as a buffer between bushfire hazard areas and development and do not create additional bushfire hazard areas.		AO14.1 Recreational parks or open space are designed and located between buildings, building envelopes or lot boundaries and adjacent bushfire hazard areas.	Not Applicable – The proposal does not include any new recreation parks or open space.
		AO14.2 Recreational parks or open space are designed to ensure that: 1. potential available fuel load is maintained at less than 5 tonnes/hectare in aggregate; and 2. fuel structure remains discontinuous.	
PO15 Essential infrastructure is designed or located to minimise the creation of ignition sources that would increase the potential risk of bushfires to people and property.		AO15 Major electricity infrastructure, electricity distribution and transmission networks within the bushfire hazard area, are managed in accordance with Electrical Safety Act 2002 and Regulation 2013.	Not Applicable – The proposal is not for major electricity infrastructure, electricity distribution or transmission networks.
Reconfiguring a Lot (PO16 - PO21)			
PO16 – PO21		AO16.1 – AO21	Not Applicable – The proposal does not involve ROL.

Appendix B - Fuel Hazard Assessment Site Images



FIGURE 1



FIGURE 2



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