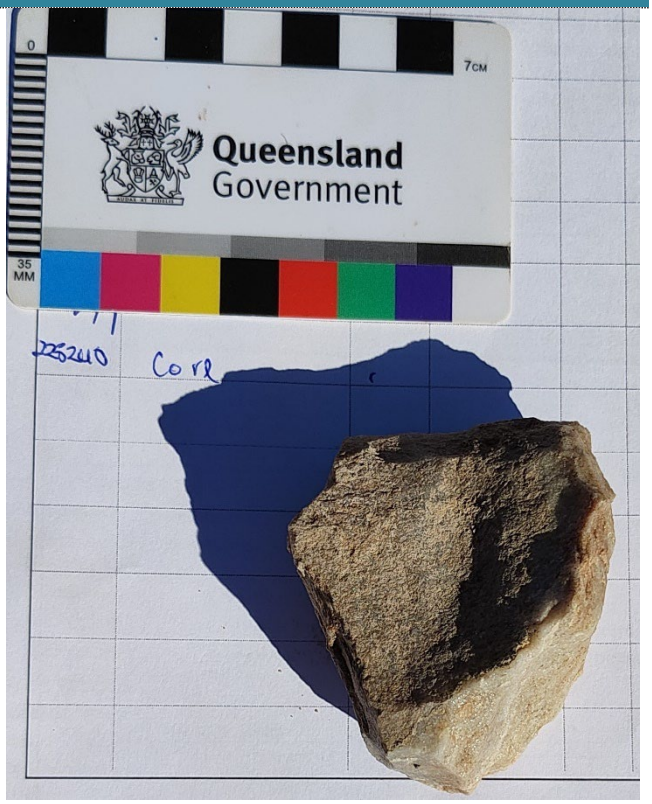
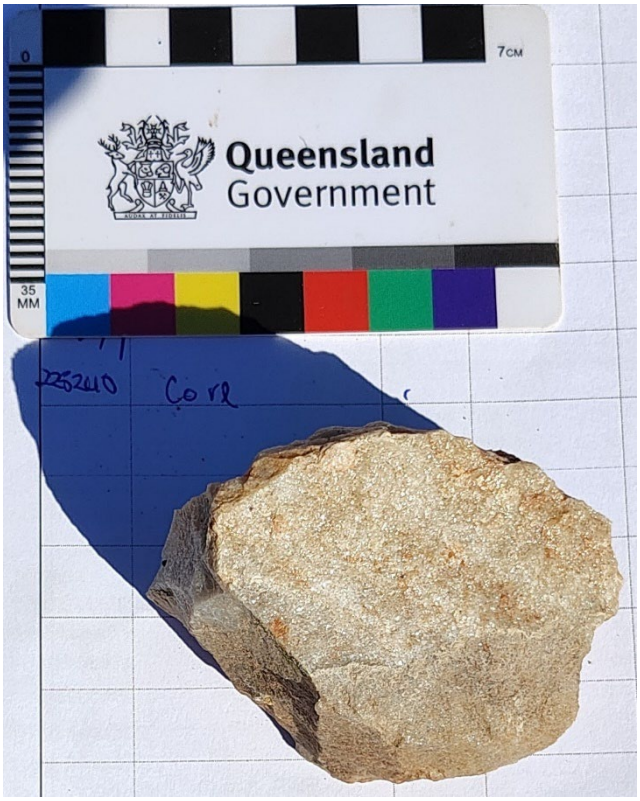
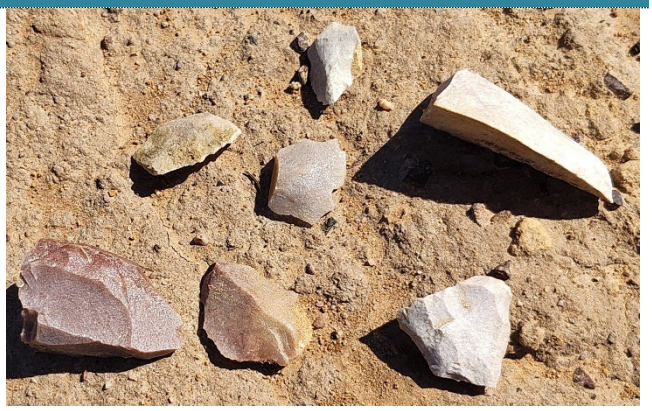
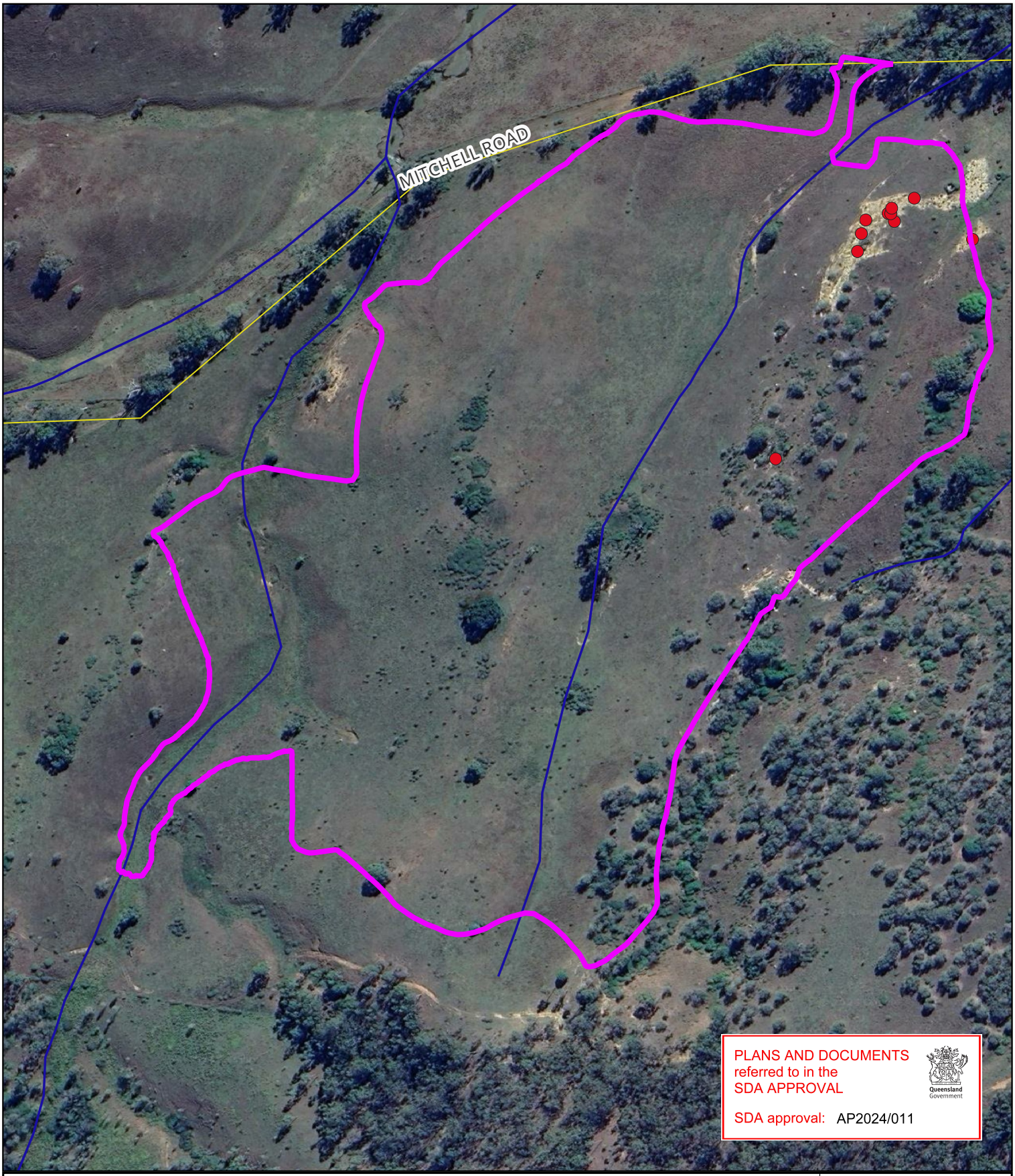
| Heritage value | Location Found | Description and Required Action | Image |
|---|---|---|---|
| SA2252410 | -27.975925, 152.912618 | A quartzite flaked core showing flake scars on both surfaces.<br><br>Traditional Owner liaison is required.<br><br>See more detailed recommendations in Section 8. |  <br>  |

| Heritage value | Location Found | Description and Required Action | Image |
|---|---|---|---|
| SA2252411 | -27.977592, 152.911778 | A quartzite flaked piece showing a bulb of percussion on the ventral surface and negative flake scarring on the dorsal surface.<br><br>Traditional Owner liaison is required.<br><br>See more detailed recommendations in Section 8. |  <br>  |

| Heritage value | Location Found | Description and Required Action | Image |
|---|---|---|---|
| SA2252412 | | A series of flakes, silcrete and quartzite showing negative flake scarring on the dorsal surface.<br>Traditional Owner liaison is required.<br>See more detailed recommendations in Section 8. |  |
| SA2252413 | | A quartzite core showing flake scarring.<br>Traditional Owner liaison is required.<br>See more detailed recommendations in Section 8. |  <br>  |




PLANS AND DOCUMENTS referred to in the SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

## Legend

- Project Footprint 20240803
- Roadway
- Watercourses
- Indigenous Heritage Values

CRS: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Scale 1:2,600 (A4)

0 25 50 75 m

N

Map 5 Survey values at or near the proposed Compost Manufacturing Facility, Bromelton.

| Rev | Description | Drawn | Approved | Date |
|---|---|---|---|---|
| O | Issued for use | PD | TM | 13/08/2024 |
| A | | | | |

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## 6.2 Site Photos

*Table 8 Site Photos.*

| Site Photos | |
|---|---|
| **Photo 1.** -27.979854, 152.909458.<br><br>The proposed site area, showing the dense ground vegetation and topography.<br><br>Facing Northwest. |  |
| **Photo 2.** -27.978755, 152.908715<br><br>The proposed site area, showing the dense ground vegetation and topography.<br><br>Facing West. |  |

## Site Photos

**Photo 3.** -27.976824, 152.909844

The proposed site area, showing the dense ground vegetation and topography.

Facing West.



**Photo 4.** -27.976838, 152.912999.

The proposed site area, showing the dense ground vegetation and topography.

Facing Southwest.



**Photo 5.** -27.977161, 152.912792

The proposed site area, showing the dense ground vegetation and topography.

Facing North.



## Site Photos

**Photo 6.** -27.975955, 152.912393.

A washout area where many Indigenous Values were found.

Facing Southeast.



**Photo 7.** -27.976473, 152.912193.

A washout area where many Indigenous Values were found.

Facing South.



**Photo 8.** -27.978021, 152.911451.

Some mature trees that remain within the project area.

Facing West.



## Site Photos

**Photo 9.** -27.978268, 152.910779.

A large mature tree within the project area.

Facing Northwest.



**Photo 10.** -27.975446, 152.910537.

A mature tree remaining in the project area.

Facing West.



## Site Photos

**Photo 11.** -27.976566, 152.913123

A mature fig tree within the project area.

Facing Northeast



**Photo 12.** -27.977087, 152.912979

Exposed rocks along a ridgeline within the project area.

Facing Northeast



# 7 Duty of Care Risk Assessment

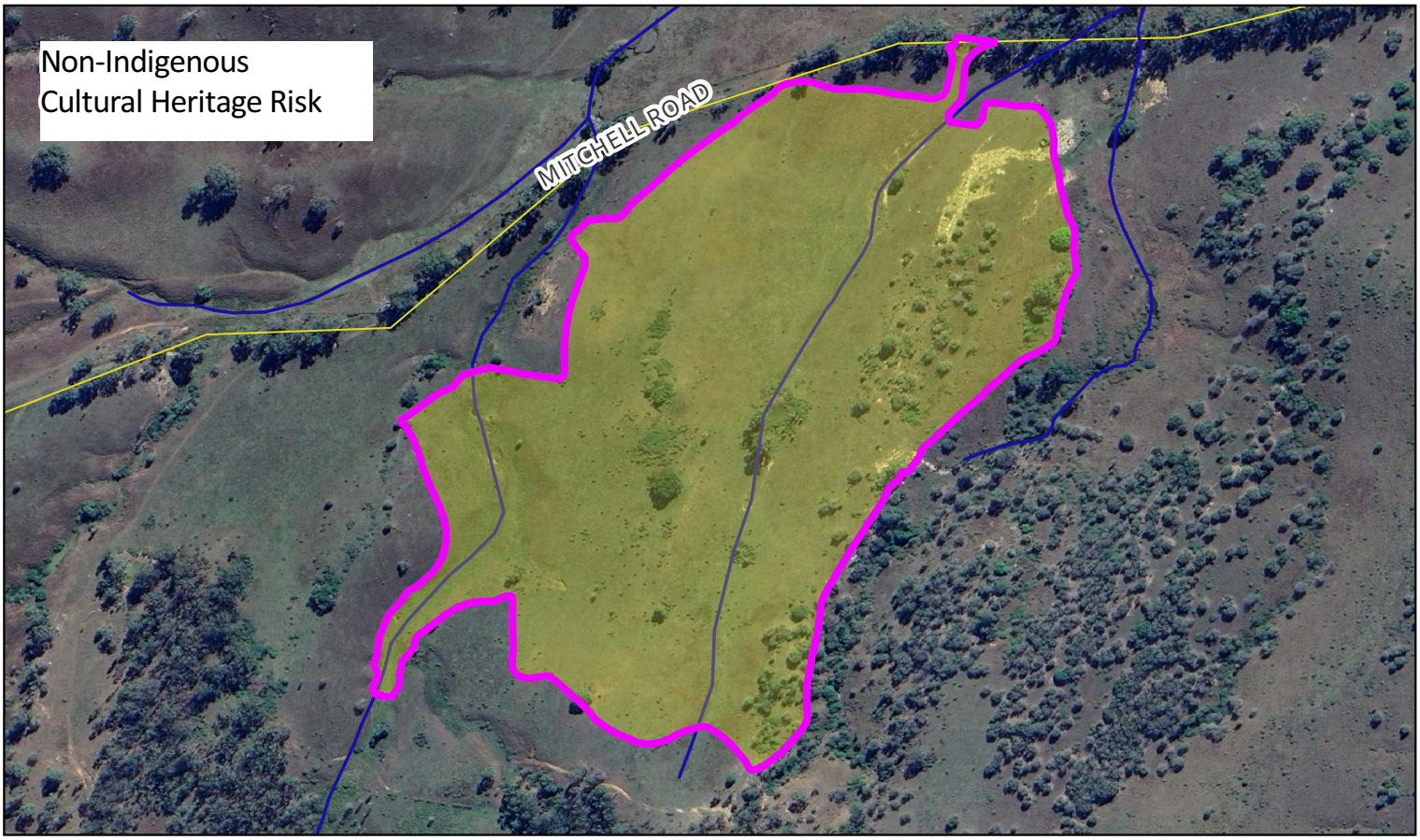
Known and potential Aboriginal cultural heritage values and non-Indigenous heritage values at the Commonwealth, State and Local levels, as well as Native Title, were assessed for the proposed project areas. Currently there are at least eighteen (18) known Indigenous artefacts identified in the immediate proposed works area, and no non-Indigenous values within or near the works area. Some risk factors were identified in the landscape such as remnant vegetation, watercourses, wetlands, and ridgelines. The Duty of Care requirement provides for a risk assessment matrix for Indigenous heritage values, which is summarised in Table 9. A matrix for the assessment of non-Indigenous heritage is shown in Table 10. The cultural heritage risk assessment is mapped in Map 6.

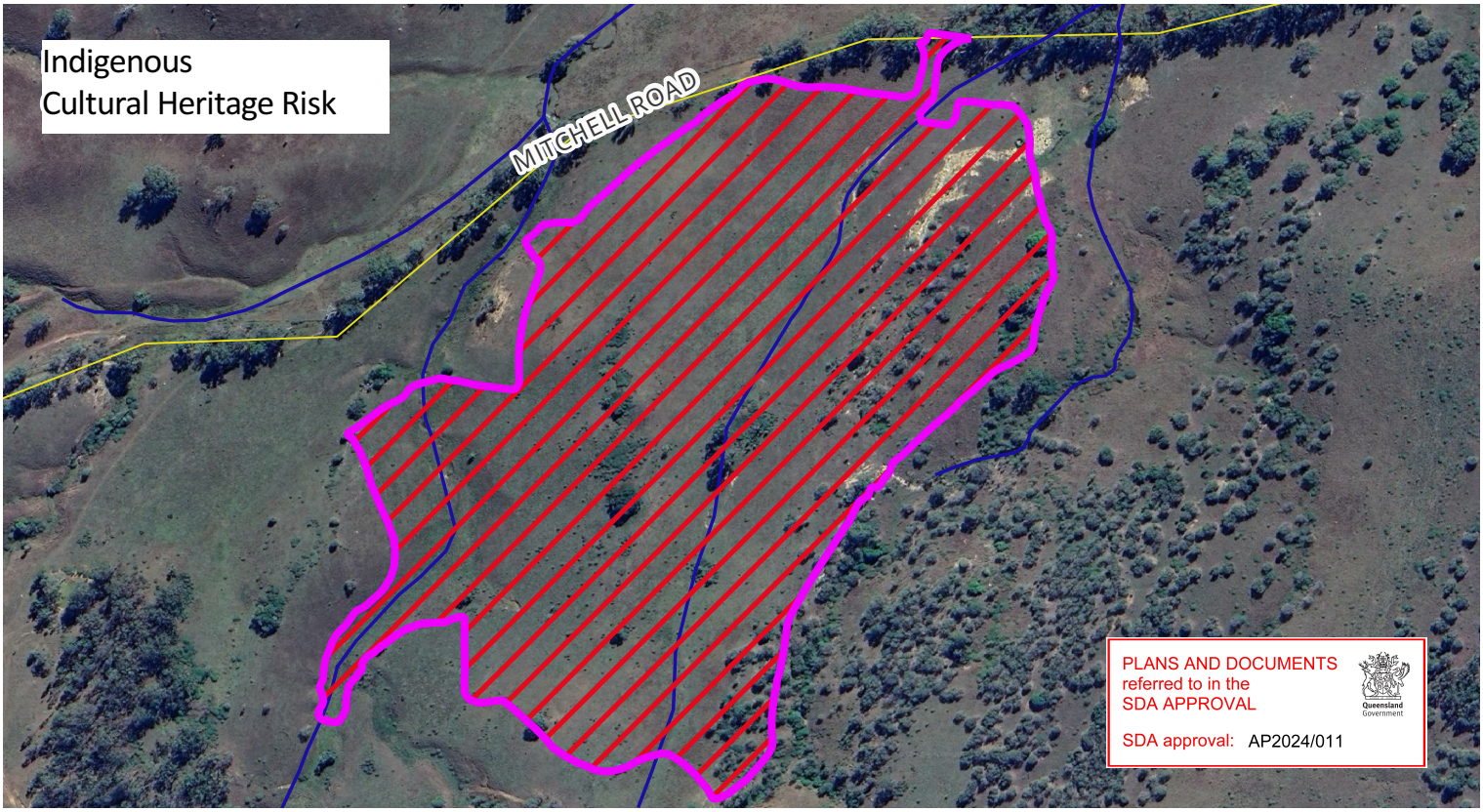
*Table 9 Duty of Care Assessment Risk Matrix for Indigenous Heritage Values*

| Category | Description | Mapped Symbol |
|---|---|---|
| Category 1 | Where an activity involves no Surface Disturbance of an area it is generally unlikely that the activity will harm Aboriginal cultural heritage, and the activity will comply with these guidelines. In these circumstances, it is reasonable and practicable for the activity to proceed without further cultural heritage assessment. | |
| Category 2 | Where an activity causes No Additional Surface Disturbance of an area it is generally unlikely that the activity will harm Aboriginal cultural heritage or could cause additional harm to Aboriginal cultural heritage to that which has already occurred, and the activity will comply with these guidelines. In these circumstances, subject to mitigation measures, it is reasonable and practicable for the activity to proceed without further cultural heritage assessment. | |
| Category 3 | Where an activity is proposed in a Developed Area it is generally unlikely that the activity will harm Aboriginal cultural heritage, and the activity will comply with these guidelines.<br>In these circumstances it is usually reasonable and practicable that the activity proceeds without further cultural heritage assessment. | |
| Category 4 | Where an activity is proposed in an area which has previously been subject to Significant Ground Disturbance it is generally unlikely that the activity will harm Aboriginal cultural heritage, and the activity will comply with these guidelines. In these circumstances, subject to mitigation measures it may be reasonable and practicable that the activity proceeds without further cultural heritage assessment. | |
| Category 5 | Where an activity is proposed under category 5 there is generally a high risk that it could harm Aboriginal cultural heritage. In these circumstances, the activity should not proceed without cultural heritage assessment. Cultural heritage assessment should involve consideration of the matters a Court may consider under section 23(2) of the Act. Particular care must be taken where it is proposed to undertake activities causing additional surface disturbance to the features likely to have cultural heritage significance. | |

*Table 10 Risk Assessment symbology for Non-Indigenous heritage.*

| Risk Rating | Description | Symbol |
|---|---|---|
| High Risk | Non-Indigenous heritage values are known to exist or have a very high likelihood of existing sub-surface; and/or heritage-listed places are located at or near the proposed works site. Additional mitigation measures are required, such as monitoring by an archaeologist, an Archaeological Management Plan, a finds procedure, a Notification of Discovery, or more, as discussed below in Assessment and Recommendations. | |
| Medium Risk | Non-Indigenous heritage values are likely of existing sub-surface, and/or heritage-listed places are located near the proposed works site. Additional mitigation measures may be required, such as monitoring by an archaeologist, an Archaeological Management Plan, a finds procedure, a Notification of Discovery, or more, as discussed below in Assessment and Recommendations. | |
| Low Risk | No or little evidence suggests that non-Indigenous heritage values exist at the proposed works site. | |




## Legend

- Project Footprint 20240803
- Roadway
- Watercourses
- Non-Indigneous Cultual Heritage Risk - Low
- Indigenous Cultural Heritage Risk - Category 5

CRS: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Scale 1:4,500 (A4)

0 25 50 75 m

N

Map 6: Cultural Heritage Risk Assessment at the proposed Compost Manufacturing Facility, Bromelton.

| Rev | Description | Drawn | Approved | Date |
|---|---|---|---|---|
| O | Issued for use | PD | TM | 14/08/2024 |
| A | | | | |

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# 8 Assessment and Recommendations

The potential for cultural heritage values in the vicinity of the proposed works area has been assessed in this report (Map 6). Potential heritage values can be avoided by the proposed works through the implementation of appropriate protection measures. It is considered appropriate that the proposed works proceed following the cultural heritage recommendations below.

## 8.1 Indigenous Heritage Assessment

1. **Category 5 Risk**: Numerous stone artefacts were found within the works area on areas where the ground surface was able to be seen. These artefacts were situated along the top of ridgelines and within washout areas. Dense ground vegetation in other areas resulted in values remaining unseen in the landscape. As there are ridgelines, watercourses and some mature vegetation within the project area, the likelihood of further cultural heritage values is significantly high. Traditional Owner consultation will be required to avoid harm to Indigenous cultural heritage under the *Aboriginal Cultural Heritage Act 2003*.

   Possible outcomes of consultation between SOILCO Pty Ltd and the Party that will likely result in an agreement. This may be in the form of:

   - A Cultural Heritage Management Plan is legally required when an EIS is required, however they can be done voluntarily.

     The legislation contains provisions under Division 2 to ensure the protection of Aboriginal cultural heritage for certain projects that require environmental approvals or assessments. The key requirements are as follows:

     a. Environmental Impact Statement Required (Section 87)

     If an Environmental Impact Statement (EIS) is required for a project under another Act, the authority for that project cannot be granted unless one of the following conditions is met:

     b. Other Environmental Assessments (Section 88)

     For certain prescribed types of projects requiring an environmental assessment (but not an EIS), the same rules apply as above - either an approved cultural heritage management plan is needed first, or approval conditions prohibiting excavation/construction until a plan is approved.

   - A Cultural Heritage Management Agreement may be requested by the party.
   - A Cultural Heritage Field Agreement or similar.

   Redleaf cannot predict the outcome of consultation with the Cultural Heritage Party. What is likely to be included in agreements of any of the above types are provisions about meetings with the Cultural Heritage Party, Field surveys with a representative of the Party, Monitoring of earthworks, and similar.

## 8.2 Non-Indigenous Heritage Assessment

2. No significant Non-Indigenous Heritage Values were found within the project area. The risk of discovery of subsurface values is low. Site Protocols in Section 8.4 must be followed at all times.

## 8.3 Native Title Findings

3. If it can be proven that the freehold tenure was validly declared prior to 23 December 1996, then Native Title is extinguished in this area. If Native Title has been validly extinguished for this reason, then it need not be considered further for this project.

## 8.4 Site Protocols

**Site Inductions**

4. Provide machinery and road/traffic personnel with relevant cultural heritage training to ensure they:
   i. Understand the Duty of Care requirements under the *Aboriginal Cultural Heritage Act 2003*.
   ii. Understand where machinery, stockpiles etc. should be located.
5. The site induction can be delivered by the responsible cultural heritage officer (Tim Menkins 0497 259 960).
6. During Works (these guidelines are developed from the Department of Environment and Science Procedural Guide for Managing Indigenous Cultural Heritage. For further information see Department of Environment and Science 2015):
   6.1 FIND: An item of potential Cultural Heritage is found.
   6.2 STOP: All work at the FIND location shall cease. The item shall not be removed or disturbed and an exclusion zone must be installed around the area.
   6.3 NOTIFY: The Contractor shall immediately notify a 'responsible person'.
   6.4 MANAGE: This may include precluding access to that area and liaison with relevant Aboriginal party/parties. The Contractor shall notify all site personnel of the object and/or area and proposed treatment of the object and/or area as soon as possible, but prior to commencing work on the next working day. Please immediately notify the responsible cultural heritage officer should further historical or Indigenous heritage values be identified (Tim Menkins 0448 119 104).

Note: the recommendations provided in this report do not preclude adherence to the ACH Act and the need for an appropriate Environmental Management Plan (EMP), which identifies steps to be taken in the event of previously unidentified cultural heritage values being found while undertaking the proposed works.

**Archaeological Discoveries**

Under section 89 of the *Queensland Heritage Act 1992* (QHA), if values are, or could be, of State significance, a notification of discovery must be made to the Department of Environment and Science (DES). Under section 90 of the QHA, unless the chief executive gives consent, or if a person has a reasonable excuse, the archaeological artefact must not be interfered with until at least 20 business days after the giving of notice. When an archaeological discovery is reported, DES assesses the finds to determine if it is an important source of information about Queensland's history. Discoveries may be assessed as:

- Not important.
- Important and requiring management strategies.
- Important and eligible for entry in the Queensland Heritage Register.

Archaeological discoveries can occur regardless of land tenure. Archaeological Management Plans can help to provide a framework of processes in the event of finding artefacts, or items of cultural heritage significance.

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# 10 Glossary

| Term | Definition |
|---|---|
| Aboriginal cultural heritage | Anything that is a significant Aboriginal area in Queensland; or a significant Aboriginal object; or evidence of archaeological significance, historic significance or of Aboriginal occupation of an area of Queensland.<br><br>Aboriginal cultural heritage is protected by the *Aboriginal Cultural Heritage Act 2003.*<br><br>*Examples include:*<br>• Stone artefacts (e.g. flints, blades, axe heads)<br>• Old campfires and hearths<br>• Middens<br>• Rock Art<br>• Scarred and carved trees (culturally modified trees)<br>• Remains of rock quarries and axe grinding grooves<br>• Human remains<br>• Ceremonial and ritual areas. |
| Additional surface disturbance | Surface disturbance inconsistent with previous surface disturbance. |
| Adjoining property | Properties that share a common boundary, including premises that meet at a single point on a common boundary. |
| Aesthetic significance | The visual significance of a place or artefact, including its visual merit or interest. A place may have aesthetic significance if it has qualities that affect the senses of the viewer or observer. |
| Archaeological artefact | Any artefact that is evidence of an aspect of Queensland's history, whether it is located in, on, or below the surface of land.<br><br>**Note:** Under the *Queensland Heritage Act* 1992, an archaeological artefact does not include:<br>• a thing that is Aboriginal cultural heritage under the *Aboriginal Cultural Heritage Act 2003* or Torres Strait Islander cultural heritage under the *Torres Strait Islander Cultural Heritage Act 2003*; or<br>• underwater cultural heritage artefact. |
| Archaeological Management Plan | A form of Conservation Management Plan (CMP) or Heritage Management Plan (HMP) tailored specifically for places with archaeological significance. Refer to the *Burra Charter* for further information.<br><br>**Note:** Under the *Queensland Heritage Act* 1992 an AMP is a plan for managing archaeological sites and artefacts developed according to specific guidelines. |
| Artefact | *Artefact* means an archaeological artefact or underwater cultural heritage artefact. |
| Building envelope | The area of a lot defined by metres and bounds within which all development including but not limited to a building, structure, private open space, car park, storage, on-site wastewater treatment and associated clearing of vegetation must be confined other than a boundary fence. The term does not include a driveway from a road to the building envelope area. |
| Burra Charter | The charter that provides guidance for the conservation and management of places of cultural significance and is based on the knowledge and experience of Australian International Council on Monuments and Sites (ICOMOS) members. |

| | |
|---|---|
| Catchment | A catchment is an area where water is collected by the natural landscape to a surface location or storage. |
| Conservation | Conservation means all the processes of looking after a place so as to retain its cultural heritage significance and includes protection, stabilisation, maintenance, preservation, restoration, reconstruction and adaptation. |
| Conservation Management Plan (CMP) | A plan that outlines what is significant about a place and how to manage changes over time to ensure the significance is retained. CMPs are used primarily for Queensland Heritage Places, following guidelines developed by the Queensland Government.<br><br>**Note:** This is different from a Cultural Heritage Management Plan, which are used for places of Indigenous cultural heritage significance. |
| Cultural heritage body/party | The cultural heritage party/ies for the area of the proposed works according to Native Title. If there is no current Native Title claim over the area, previously registered Native Title claimants ('last claim standing') *may* be the relevant cultural heritage body. To identify details about statutory Aboriginal or Torres Strait Islander parties for an area, please visit the Aboriginal and Torres Strait Islander Cultural Heritage online portal. |
| Cultural heritage criteria | The criteria for entry in the Queensland Heritage Register stated in the *Queensland Heritage Act 1992.* |
| Cultural heritage find | An object or area in, or around, the work area that is suspected to constitute Aboriginal cultural heritage or historical (non-Indigenous) cultural heritage.<br><br>**Note:** These may also be referred to as *potentially significant* objects or artefacts. |
| Cultural Heritage Management Plan (CHMP) | An agreement between a land user (sponsor) and Traditional Owners (endorsed party) developed under Part 7 of the *Aboriginal Cultural Heritage Act 2003* and *Torres Strait Islander Cultural Heritage Act 2003.*<br><br>A CHMP explains how land use activities can be managed to avoid or minimise harm to Aboriginal or Torres Strait Islander cultural heritage. A CHMP must be developed and approved under Part 7 of the legislation when an environmental impact statement is required for a project.<br><br>**Note:** This is different from a Conservation Management Plan, which are used for places of non-Indigenous cultural heritage significance. |
| Cultural heritage significance | Of a place or feature of a place, or object, referring to the aesthetic, architectural, historical, scientific, social, or other significance, to the present generation, past, or future generations.<br><br>Cultural heritage significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places, and related objects. Places may have a range of values for different individuals or groups. |
| Cultural heritage values | Also referred to as 'heritage values', it is the aesthetic, historic, scientific, or social significance of a place and can include both Indigenous non-Indigenous (historic) cultural heritage.<br><br>**Note:** this term is often used interchangeably with cultural heritage significance. |
| Culturally modified tree | Also known as: scar trees, scarred trees, and carved trees. Culturally modified trees (CMTs) are trees that have been scarred or modified by Aboriginal people through the deliberate removal of bark or wood, typically modified prior to European settlement. CMTs were used to make items such as canoes, shield, and boomerangs, but may have also been used for wayfinding and denoting significant areas in the landscape. |

| | |
|---|---|
| | Scar trees may also date to post-European settlement and may have been modified by either by Indigenous people, or European settlers. |
| Designated landscape area | Under the repealed *Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987*, an area was declared a 'designated landscape area' (DLA) if it was deemed necessary or desirable for it to be preserved or to regulate access.<br><br>DLAs are recorded on the Aboriginal and Torres Strait Islander cultural heritage register in accordance with section 162 of the *Aboriginal Cultural Heritage Act 2003* and *the Torres Strait Islander Cultural Heritage Act 2003*. |
| Developed area | An area that is developed or maintained for a purpose such as a park, garden, railway, road or other access route, navigation channel, municipal facility, or infrastructure facility, such as power lines, telecommunication lines or electricity infrastructure. |
| Development | Development as defined under the *Planning Act 2016*. |
| Disturbed, cleared or modified areas | Includes any area that will be disturbed, cleared, or modified as a result of approved development and any area where historical disturbance, clearing or modification, being natural (e.g. due to invasive pest species) or unnatural is evident. |
| Exclusion zone | Under the *Aboriginal Cultural Heritage Act 2003* and *the Torres Strait Islander Cultural Heritage Act 2003*, it is an area that has been cordoned off and has restricted access arrangements in place. |
| Fabric | All the physical material of the place including elements, fixtures, contents, objects, archaeological features, and deposits, |
| Heritage agreement or local heritage agreement | An agreement under the *Queensland Heritage Act 1992* to manage a State Heritage Place or a Local Heritage Place. |
| Land tenure | The means of identifying who has the right to use and occupy land in accordance with the varying degrees of ownership, governed by the *Land Act 1994*. Strictly speaking, the word 'tenure' refers only to a lease or freehold which conveys possession of land to a person. For convenience, in this report the term is also used to embrace other forms of occupation such as licences, permits to occupy and State reserves.<br><br>The provisions of the Commonwealth and State Native Title Acts—that is, the *Native Title Act 1993 (Cwlth)* and the *Native Title (Queensland) Act 1993*—must be satisfied before any dealings under the Land Act can be undertaken in relation to non-freehold land. |
| Laydowns | A temporary, designated area to place equipment and machinery necessary for the proposed works. |
| Local Heritage Place | A place identified in a local government's planning scheme, or on a Local Heritage Register as having cultural heritage significance to the local community. Local Heritage Places (LHP) are protected under the *Queensland Heritage Act 1992*.<br><br>**Note:** Assessable development on a Local Heritage Place is governed by the *Planning Act 2016.* |
| Local Heritage Register | A register identifying places of local cultural heritage significance, administered by a local government area (E.G. Brisbane City Council) under the *Queensland Heritage Act 1992*. |
| Maintenance | Maintenance means the continuous protective care of a place, and its setting. Maintenance is to be distinguished from repair which involves *restoration* or *reconstruction*. |

| | |
|---|---|
| Native Title Party | The Native Title party for an area is defined as:<br>• Native Title holders – that is where Native Title has been recognised by the Federal Court of Australia.<br>• Registered Native Title claimants – Native Title claims currently before the Federal Court of Australia.<br>• Previously registered Native Title claimants (the 'last claim standing') – Native Title claims that have been removed from the Register of Native Title Claims administered by the National Native Title Tribunal (NNTT).<br>Previously registered Native Title claimants will continue to be the Native Title party for that area providing:<br>• There is no other registered Native Title claimant for the area.<br>• There is not, and never has been, a Native Title holder for the area.<br>• The Native Title party maintains this status within the external boundaries of the claim even if Native Title has been extinguished. |
| No additional surface disturbance | Surface disturbance not inconsistent with previous surface disturbance. |
| Non-Indigenous (historical) cultural heritage | A place or features of a place that have cultural heritage significance to present, past, or future generations. Non-Indigenous cultural heritage is protected by the *Queensland Heritage Act 1992*.<br><br>Examples include:<br>• Historical dwellings and buildings<br>• Abandoned town sites/settlements<br>• Evidence of historic settlement<br>• Industrial & mining sites<br>• Cemeteries and graves<br>• Historical roads and streetscapes<br>• Survey marks, pegs, or blazed trees<br>• Places of historical interest. |
| Preservation | Maintaining the fabric of a place in its existing state and retarding deterioration. |
| Project area | In relation to a project, means the area the subject of the project, whether in construction or operational phases. |
| Queensland Heritage Register | A register identifying places of cultural heritage significance to the State of Queensland, administered by the Department of Environment and Science (DES) under the *Queensland Heritage Act 1992*. |
| Reconstruction | Reconstruction means returning a place to a known earlier state and is distinguished from restoration by the introduction of new material. |
| Registered significant area | An area recorded in the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register as a significant Aboriginal or Torres Strait Islander area. |
| Registered significant object | An object recorded in the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register as a significant Aboriginal or Torres Strait Islander cultural heritage object.<br><br>**Note:** This is the term used for *registered* artefacts relating to Indigenous cultural heritage under the *Aboriginal Cultural Heritage Act 2003* and *Torres Strait Islander Cultural Heritage Act 2003,* rather than *archaeological artefact* as defined under the QHA. |
| Remnant vegetation | As defined under the *Vegetation Management Act 1999*. |

| | |
|---|---|
| | For the purposes of this report, it broadly refers to vegetation that has not been cleared since European settlement. |
| Restoration | Returning a place to a known earlier state by removing accretions or by reassembling existing elements without the introduction of new material. |
| Setting | The immediate and extended environment of a place that is part of a place or contributes to its cultural heritage significance and distinctive character.<br><br>Setting may include structures, spaces, land, water, and sky; the visual setting including views to and from the place, and along a cultural route; and other sensory aspects of the setting such as smells and sounds.<br><br>Settings may also include historical and contemporary relationships, such as use and activities, social and spiritual practices, and relationships with other places, both tangible and intangible. |
| Significant ground disturbance | Disturbance by machinery of the topsoil or surface rock layer of the ground, such as by ploughing, drilling, or dredging; the removal of native vegetation by disturbing root systems and exposing underlying soil. |
| Significant object | An object or artefact of cultural heritage significance to Indigenous peoples. (See also *registered significant object*). |
| State Heritage Place | A place of state-level cultural heritage significance, entered onto the Queensland heritage register under part 4 of the *Queensland Heritage Act 1992.*<br><br>**Note:** Development on a State Heritage Place is also governed by the *Planning Act 2016.* |
| Stockpile | A designated area where construction materials are piled and to manage handling. Materials are transported to and from the project site as needed. |
| Surface disturbance | Any disturbance of an area which causes a lasting impact to the land or waters during the activity or after the activity has ceased. |
| Use | The functions of a place, including the activities and traditional and customary practices that may occur at the place or are dependent on the place. |

# Appendix A – DSDSATSIP Indigenous Cultural Heritage Register Search

# Cultural Heritage Database and Register Search Report

Search report reference number: 156962

The Aboriginal and Torres Strait Islander Cultural Heritage Database (cultural heritage database) and Aboriginal and Torres Strait Islander Cultural Heritage Register (cultural heritage register) have been searched in accordance with the location description provided, and the results are set out in this report.

The cultural heritage database is intended to be a research and planning tool to help Aboriginal and Torres Strait Islander parties, researchers, and other persons in their consideration of the cultural heritage values of particular areas.

The cultural heritage register is intended to be a depository for information for consideration for land use and land use planning, and a research and planning tool to help people in their consideration of the Aboriginal cultural heritage values of particular objects and areas.

Aboriginal or Torres Strait Islander cultural heritage which may exist within the search area is protected under the *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Cultural Heritage Act 2003* (the Cultural Heritage Acts), even if the Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships (the Department) has no records relating to it.

The placing of information on the database is not intended to be conclusive about whether the information is up-to-date, comprehensive or otherwise accurate.

Under the Cultural Heritage Acts, a person carrying out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal or Torres Strait Islander cultural heritage. This applies whether or not such places are recorded in an official register and whether or not they are located on private land.

Please refer to the Department website https://www.qld.gov.au/firstnations/environment-land-use-native-title/cultural-heritage/cultural-heritage-duty-of-care to obtain a copy of the gazetted Cultural Heritage Duty of Care Guidelines, which set out reasonable and practicable measure for meeting the cultural heritage duty of care.

In order to meet your duty of care, any land-use activity within the vicinity of recorded cultural heritage should not proceed without the agreement of the Aboriginal or Torres Strait Islander Party for the area, or by developing a Cultural Heritage Management Plan under Part 7 of the Cultural Heritage Acts.

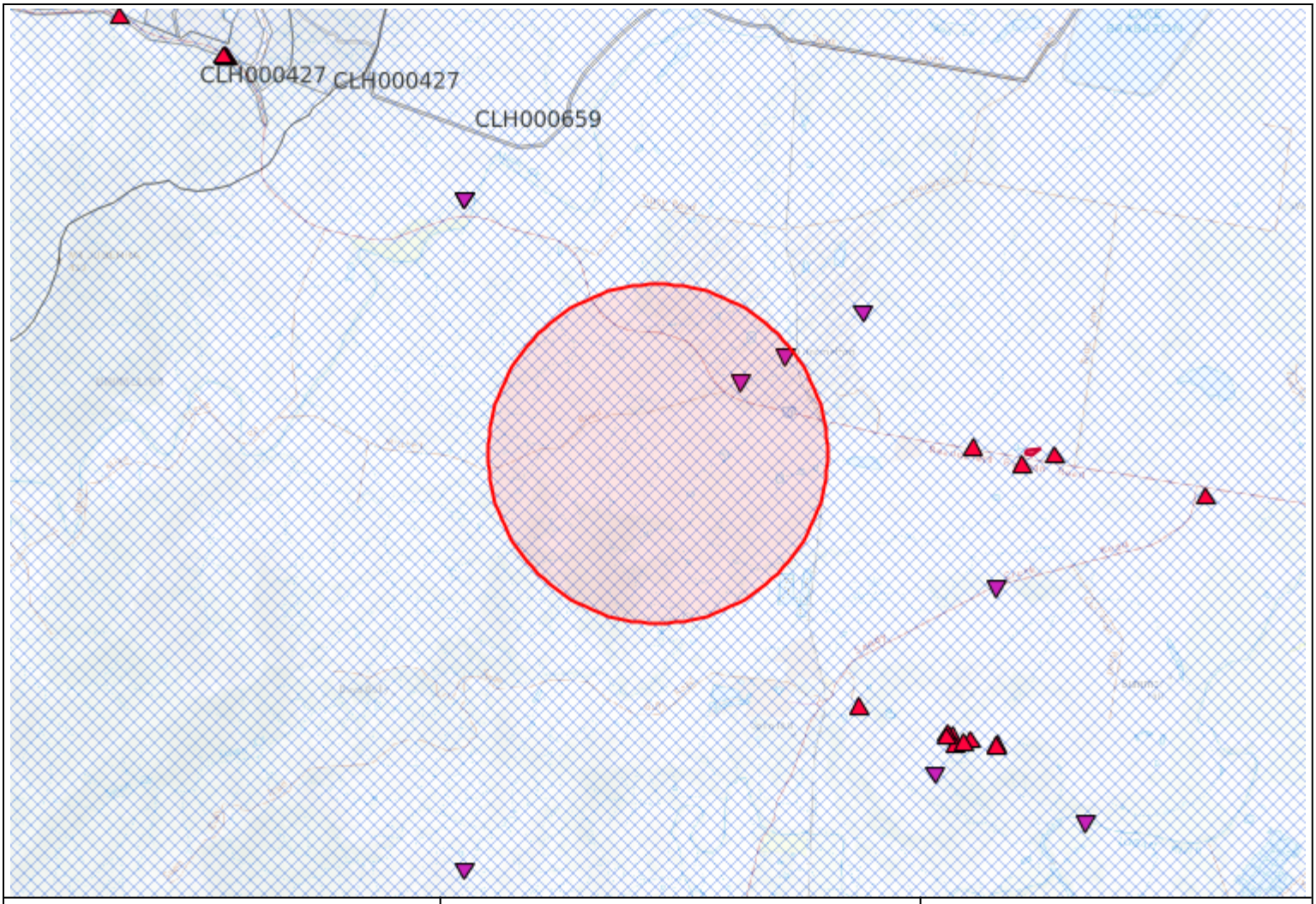
The extent to which the person has complied with Cultural Heritage Duty of Care Guidelines and the extent the person consulted Aboriginal or Torres Strait Islander Parties about carrying out the activity – and the results of the consultation – are factors a court may consider when determining if a land user has complied with the cultural heritage duty of care.

Should you have any further queries, please do not hesitate to contact the department via email: cultural.heritage@dsdsatsip.qld.gov.au or telephone: 1300 378 401.



Queensland Government

# Cultural Heritage Database and Register Search Report




## LEGEND

- CH Parties
- CH Bodies
- CHMPs
- Study Areas
- DLAs

Reference Number: 156962
Latitude: -27.97775
Longitude: 152.9152
Buffer Distance: 1500 m
Shire: Scenic Rim Regional

**Cultural Heritage Sites**

- Pre-2015 Point Site
- Post-2015 Point Site
- Mitigated Point Site
- Pre-2015 Area Site
- Post-2015 Area Site
- Mitigated Area Site

**Map Projection: Geographic Latitude & Longitude (GDA2020).**

**The Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships (DSDSATSIP) is the custodian of spatial data provided by various third parties for inclusion in the Aboriginal and Torres Strait Islander cultural heritage online portal. This includes spatial data provided by the National Native Title Tribunal and Aboriginal and Torres Strait Islander parties.**

**Features shown on this map have been obtained from available sources. It is possible that errors and omissions may exist. The DSDSATSIP disclaims any liability for any errors or omissions that appear in this document.**

**Copyright protects this publication. Except for purposes permitted by the Copyright Act, reproduction by whatever means is prohibited without the prior written permission from the DSDSATSIP.**

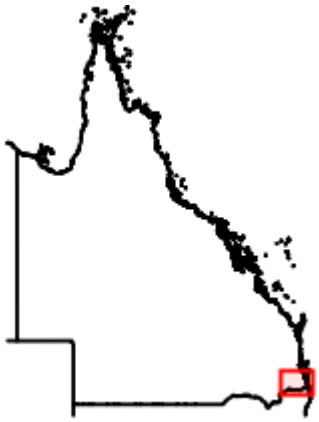
**Map produced by the Cultural Heritage Unit, DSDSATSIP, Brisbane, Queensland, Australia on 2 April 2024.**

Queensland Government

1:57,301

Metres 1,000 2,000

## LOCALITY






Search report generated on Apr 2, 2024, 2:22 PM

# Cultural Heritage Database and Register Search Report

Cultural heritage site points for the area:

| Site ID | Latitude | Longitude | Date Recorded | Attribute | Cultural Heritage Party |
|---|---|---|---|---|---|
| KB:C87 | -27.972972 | 152.921766 | 11/03/1999 | Artefact Scatter | Danggan Balun (Five Rivers) People |
| KB:C87 | -27.971169 | 152.925326 | 11/03/1999 | Artefact Scatter | Danggan Balun (Five Rivers) People |

There are no Aboriginal or Torres Strait Islander cultural heritage site polygons recorded in your specific search area.

Cultural Heritage Party/ies for the area:

| Reference No. | Federal Court No. | Name | Contact Details |
|---|---|---|---|
| QC2017/007 | QUD331/2017 | Danggan Balun (Five Rivers) People | Danggan Balun (Five Rivers)<br>Queensland South Native Title Services<br>PO Box 10832<br>BRISBANE QLD 4000<br><br>Freecall: 1800 663 693<br>Phone: (07) 3224 1200<br>Email: reception@qsnts.com.au |

There are no Cultural Heritage Bodies recorded in your specific search area.

There are no Cultural Heritage Management Plans recorded in your specific search area.

There are no Designated Landscape Areas (DLA) recorded in your specific search area.

There are no Registered Cultural Heritage Study Areas recorded in your specific search area.

There are no National Heritage Areas (Indigenous values) recorded in your specific search area.

## Glossary

**Cultural Heritage Body:** An entity registered under Part 4 of the Cultural Heritage Acts as an Aboriginal or Torres Strait Islander cultural heritage body for an area. The purpose of a cultural heritage body is to:

- identify the Aboriginal or Torres Strait Islander parties for an area
- serve as the first point of contact for cultural heritage matters.

**Cultural Heritage Management Plan (CHMP):** An agreement between a land user (sponsor) and Traditional Owners (endorsed party) developed under Part 7 of the Cultural Heritage Acts. The CHMP explains how land use activities can be managed to avoid or minimise harm to Aboriginal or Torres Strait Islander cultural heritage.

**Cultural Heritage Party:** Refers to a native title party for an area. A native title party is defined as:

- Registered native title holders (where native title has been recognised by the Federal Court of Australia).
- Registered native title claimants (whose native title claims are currently before the Federal Court of Australia).
- Previously registered native title claimants (the 'last claim standing') are native title claims that are no longer active and have been removed from the Register of Native Title Claims administered by the National Native Title Tribunal. Previously registered native title claimants will continue to be the native title party for that area providing:
    - there is no other registered native title claimant for the area; and
    - there is not, and never has been, a registered native title holder for the area.

The native title party maintains this status within the external boundaries of the claim even if native title has been extinguished.

**Cultural heritage site points (pre 2015):** Aboriginal and Torres Strait Islander cultural heritage sites and places recorded in the database as point data **before** 1 July 2015.

**Cultural heritage site points (post 2015):** Aboriginal and Torres Strait Islander cultural heritage sites and places recorded in the database as point data **after** 1 July 2015.

**Cultural heritage site points (post 2015 mitigated):** Aboriginal and Torres Strait Islander cultural heritage sites and places recorded in the database as point data after 1 July 2015 where the recorder has advised the department that the site has been mitigated.

**Cultural heritage site polygons:** Aboriginal and Torres Strait Islander cultural heritage sites and places recorded in the database as a polygon.

**Designated Landscape Areas (DLA):** Under the repealed *Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987*, an area was declared a 'designated landscape area' (DLA) if it was deemed necessary or desirable for it to be preserved or to regulate access.

**Indigenous Protected Areas (IPA):** Areas of land and sea managed by Indigenous groups as protected areas for biodiversity conservation through voluntary agreements with the Australian Government. For further information about IPAs visit https://www.environment.gov.au/land/indigenous-protected-areas

**National Heritage areas:** Places listed on the National Heritage List for their outstanding heritage significance to Australia and are protected under the *Environment Protection and Biodiversity Conservation Act 1999*. For further information about the National Heritage List visit https://www.environment.gov.au/heritage/about/national

**National Heritage Areas (Indigenous values):** Places listed on the National Heritage list (Indigenous values) are recognised for their outstanding Indigenous cultural heritage significance to Australia and are protected under the *Environment Protection and Biodiversity Conservation Act 1999.* These areas are now included in the cultural heritage

register.

**Registered Cultural Heritage Study Areas:** Comprehensive studies of Aboriginal and or Torres Strait Islander cultural heritage in an area conducted under Part 6 of the Cultural Heritage Acts for the purpose of recording the findings of the study on the register.

**Traditional Use of Marine Resources Agreement (TUMRA):** Areas subject to agreement between Great Barrier Reef Traditional Owners and the Australian and Queensland governments on the management of traditional use activities on their sea country. For further information about TUMRAs visit https://www.gbrmpa.gov.au/our-partners/traditional-owners/traditional-use-of-marine-resources-agreements

**World Heritage Areas:** Places inscribed on the World Heritage List pursuant to the World Heritage Convention adopted by the United Nations Education, Scientific and Cultural Organisation (UNESCO) and are protected under the *Environment Protection and Biodiversity Conservation Act 1999*. For further information about World Heritage places in Queensland visit https://parks.des.qld.gov.au/management/managed-areas/world-heritage-areas

***Disclaimer:*** *The Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships is the custodian of spatial data and information provided by various third parties for inclusion in the Aboriginal and Torres Strait Islander cultural heritage online portal. This includes spatial data provided by the National Native Title Tribunal and Aboriginal and Torres Strait Islander parties. Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships is not responsible for the accuracy of information provided by third parties or any errors in this search report arising from such information.*

# Appendix B – Historical Aerial Imagery

*Table 11 Historical aerial imagery of the proposed site.*

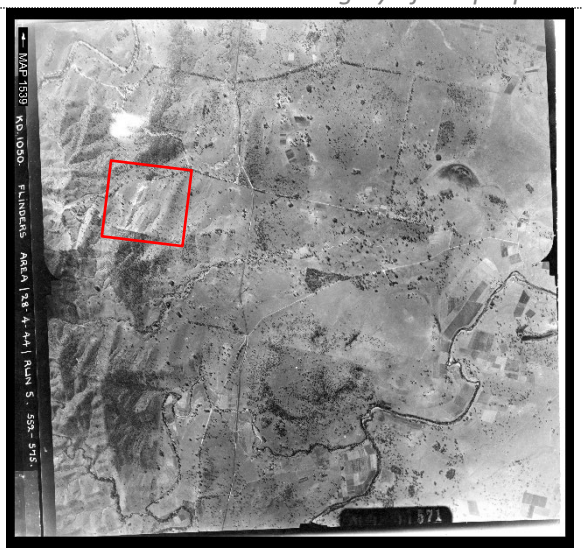



*Figure 8 1944 aerial imagery (MAP 1539 Frame 571; Queensland Government 2022b).*

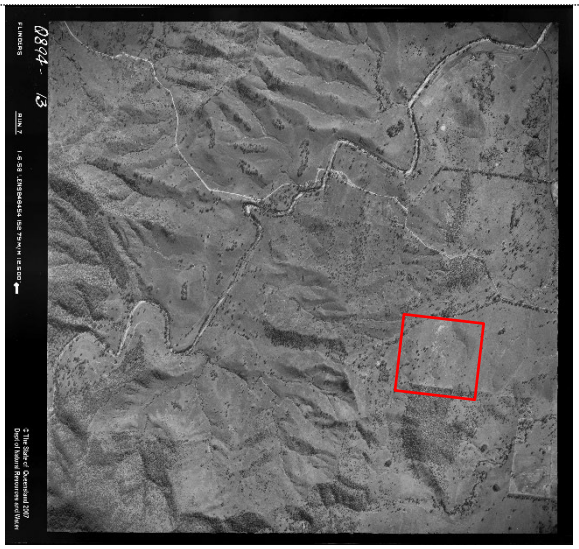



*Figure 9 1958 aerial imagery (Film QAP0894 Frame 013; Queensland Government 2022b).*




*Figure 10 1979 aerial imagery (Film CAB0362 Frame 193; Queensland Government 2022b).*



*Figure 11 1990 aerial imagery (Film QAP 4853 Frame 036; Queensland Government 2022b).*

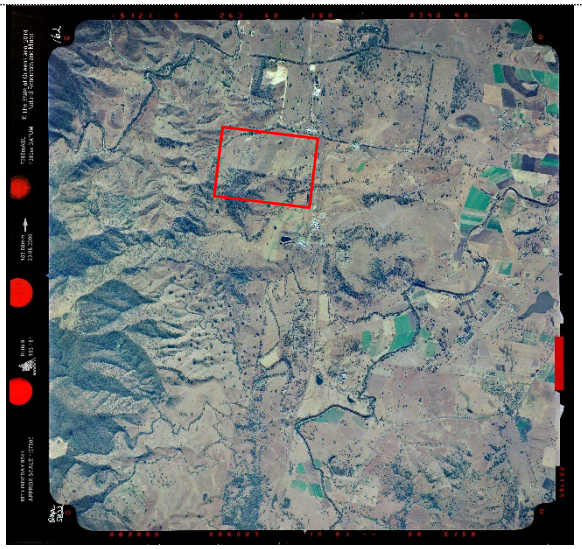


*Figure 12 2000 aerial image (Film QAP 5822 Frame 162; Queensland Government 2022b).*

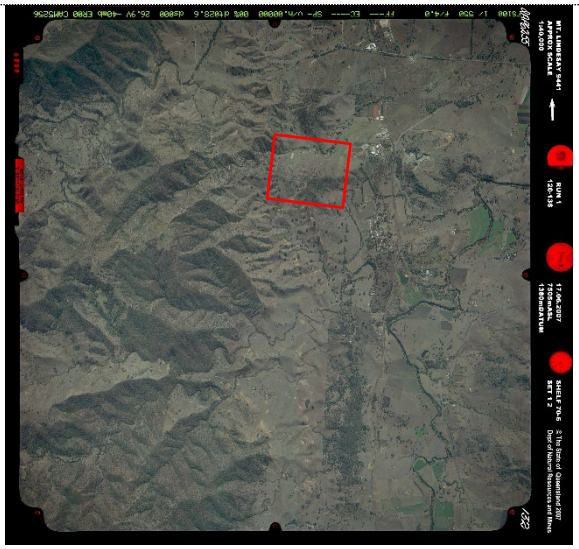


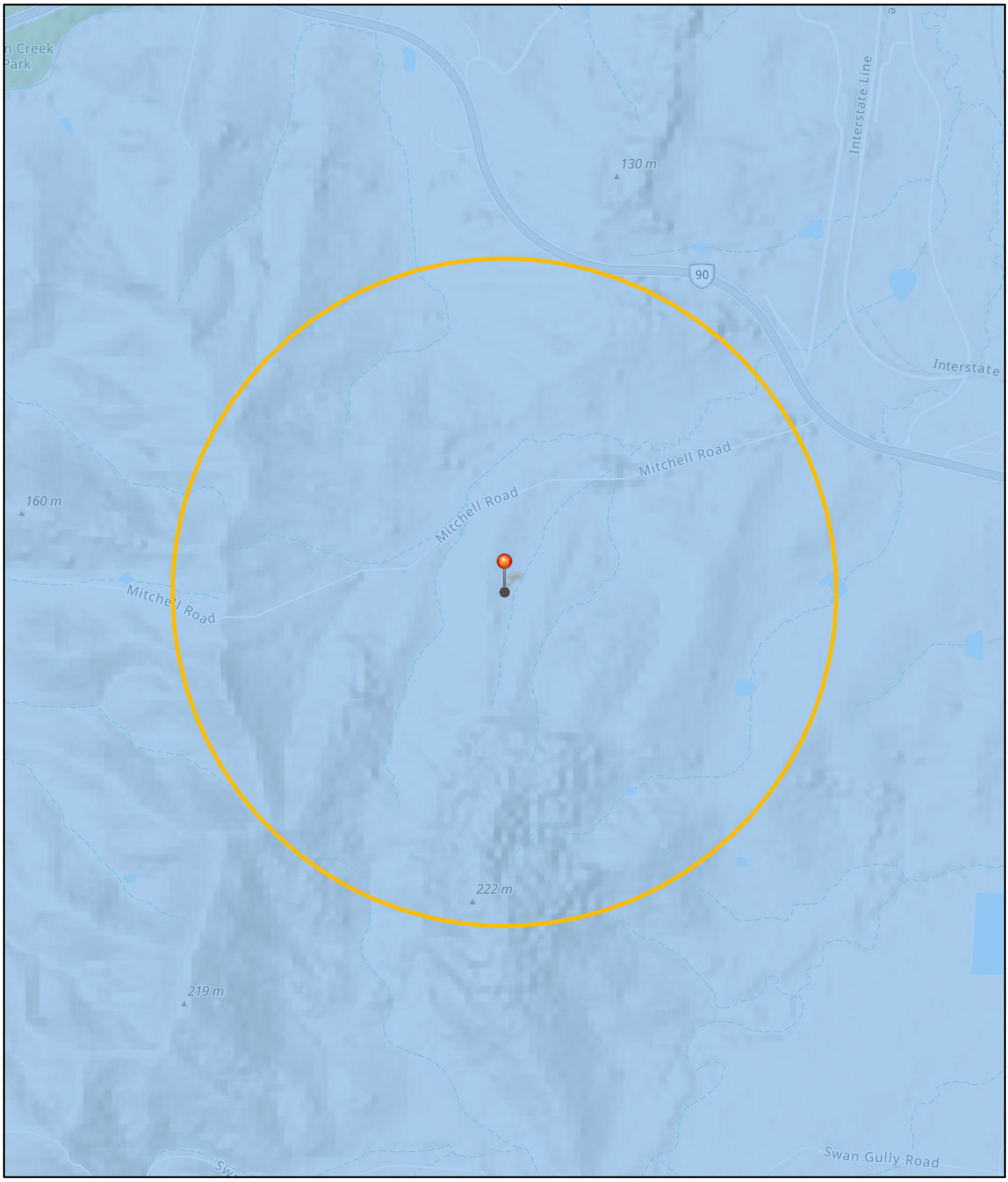
*Figure 13 2007 aerial imagery (Film QAP6255 Frame 132; Queensland Government 2022b).*



*Figure 14 2017 aerial imagery (L16-7575E-3432N; Queensland Government 2022b).*

# Appendix C – Native Title Vision Map

# Native TitleVision Web Map




4/26/2024, 9:04:26 AM

1:18,056

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Applications (RNTC)

Applications (Schedule)

Esri Community Maps Contributors, Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Esri, Geoscience Australia, NASA, NGA, USGS

Native TitleVision

Esri Community Maps Contributors, Department of Resources, Dept.of Environment and Science, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS | Esri,

# Appendix D – RNTC Extract Number QC2017-007

National Native Title Tribunal

# Extract from the Register of Native Title Claims

## Application Information

| | |
|---|---|
| **Application Reference:** | **Federal Court number:** QUD331/2017<br>**NNTT number:** QC2017/007 |
| **Application name:** | Ted Williams & Ors on behalf of the Danggan Balun (Five Rivers) People v State of Queensland |
| **Registration History:** | Registered from 14/09/2017 |

## Register Extract (pursuant to section 186 of the *Native Title Act 1993* (Cth))

| | |
|---|---|
| **Application filed with:** | Federal Court of Australia |
| **Date application filed:** | 27/06/2017 |
| **Date claim entered on Register:** | 14/09/2017 |
| **Additional Information:** | Not Applicable |
| **APPLICANT:** | |
| **Person/s authorised as applicant:** | Gordon "Ted" Williams, Rose Page, Louisa Bonner, Shaun Davies, Germaine Paulson |
| **Condition/s on authority:** | Not Applicable |
| **Address for service:** | Ricardo Martinez<br>Queensland South Native Title Services<br>Level 4, 293 Queen Street<br>Brisbane QLD 4000<br>**Phone:** 07 3224 1200<br>**Email**: ricardo.martinez@qsnts.com.au |

**DESCRIPTION OF THE AREA COVERED BY THE CLAIM:**

Information identifying the boundaries of

a) the area covered by the application; and

b) any areas within those boundaries that are not covered by the application.

In relation to (a) above, a description of the area of land and waters covered by the application is provided at **"Attachment B"**.

In relation to (b) above, areas within the boundary identified in Attachment B that are not covered by the application are outlined below.

1. The area covered by the application excludes any land or waters that is or has been covered by:

a) a scheduled interest;

b) a freehold estate;

c) a commercial lease that is neither an agricultural lease nor a pastoral lease;

d) an exclusive agricultural lease or an exclusive pastoral lease;

e) a residential lease;

f) a community purpose lease;

g) a lease dissected [from] a mining lease and referred to in section 23B(2)(c)(vii) of the *Native Title Act 1993* (Cth);

h) any lease (other than a mining lease) that confers a right of exclusive possession over particular land or waters.

2. Subject to paragraphs 4 and 5, the area covered by the application excludes any land or waters covered by the valid construction or establishment of a public work commenced on or before 23 December 1996.

3. Subject to paragraphs 4 and 5, exclusive possession is not claimed over area, which are subject to valid previous non-exclusive acts done by the Commonwealth or State of Queensland.

4. Subject to paragraph 6, where the act specified in paragraphs 1, 2 and 3 falls within the provisions of:

a. Section 23B(9) – Exclusion of acts benefiting Aboriginal Peoples or Torres Strait Islanders;

b. Section 23B(9A) – Establishment of a national park or state park;

c. Section 23B(9B) – Acts where legislation provides for non-extinguishment;

d. Section 23(9C) – Exclusion of Crown to Crown grants; and

e. Section 23(10) – Exclusion by regulation.

the land and waters covered by the act are not excluded from the application.

5. Where an act specified in paragraphs 1, 2 and 3 affects or affected land or waters referred to in:

- Section 47– Pastoral leases etc covered by claimant application;
- Section 47A – Reserves etc covered by claimant application;
- Section 47B – Vacant Crown land covered by claimant application,

the area covered by the act is not excluded from the application.

6. The area covered by the application excludes land or waters where the native title rights and interests claimed have been otherwise extinguished.

Where there is any discrepancy between the map provided at “Attachment C” and the written description contained here and in “Attachment B”, the latter prevails.

For the avoidance of doubt, the above sections relate to sections contained in the *Native Title Act 1993* (Cth).

**PERSONS CLAIMING TO HOLD NATIVE TITLE:**

Those persons who are descendants of the following apical ancestors and who identify and are recognised under the traditional laws and customs of the native title claim group as being affiliated (including by adoption) to country within the Application area:

1. Sarah *Warri/Warru* Clarke;

2. George *Daramlee* Drumley;

3. Jack Slab/Slabb Snr (husband of Lizzie *Waggil* Slabb & father of Charlotte, Frank, John/Jack Jnr, Olive & Victor);

4. Kitty Blow (wife of Joseph Blow & mother of Frank Blow & Hughie Blow);

5. *Bilin Bilin* aka Bilinba Jackey aka Jackey Jackey aka John “Johnny” Logan (father of Emily Logan & Johnny Logan);

6. Kipper Tommy Andrews (father of Lizzie Malay (nee Tommie));

7. Billy *Terribah/Didiba* Andrews;

8. Julia Sandy (wife of Arthur Ford);

9. Kitty Sandy, the mother of Arthur Ford;

10. Mary Ann Sandy nee Mitchell (mother of Mary Ann Drumley (nee Sandy), Ida Bell (nee Sandy), Janet Sandy, Norman Sandy Snr & Lindsay Sandy);

11. William "Billy" Mitchell and his wife, Lizzie Sandy;

12. Unnamed mother of Matilda “Mittie” Fogarty (nee Sandy) and Lizzie (mother of William “Billy” Stanley Brown Jnr);

13. *Coolum* (husband of Nancy Culham (nee Coolwell) & father of Joseph “Joe”, Maude, Lucy & Lena);

14. Unnamed mother of Nancy Culham (nee Coolwell) (wife of *Coolum* & mother of Joseph “Joe”, Maude, Lucy & Lena);

15. Yarry (father of Frederick “Fred” Yarrie/Yarry);

16. Jennie, mother of Joseph Coolwell (husband of Polly Allen/Dalton & father of Alice Edwards (nee Coolwell), Alfred Coolwell Jnr, Eva, Edward, Rose, Campbell, Michael & Andrew);

17. Polly Allen/Dalton (wife of Joseph Coolwell & mother of Eva, Edward, Rose, Campbell, Michael & Andrew);

18. Unnamed mother of Elizabeth Tomes/Clark nee Wheeler;

19. Jim Edwards Snr (husband of Topsy (of Ipswich) & father of Jimmy Edwards Jnr);

20. William Williams (Snr);

21. *Bullum Bullum* aka John Allen;

22. Alice/Alison Parsons nee Moree, mother of Thomas Parsons;

23. John "Johnny" Bungaree / Bungary (father of Norman Sandy Snr, Lindsay Sandy and Stella Bungera/Bungary).

**REGISTERED NATIVE TITLE RIGHTS AND INTERESTS:**

**The following Native Title Rights & Interests were entered on the Register on 07/11/2022**

1. Where exclusive native title can be recognised (such as areas where there has been no prior extinguishment of native title or where s.238 and/or ss.47, 47A and 47B apply), the native title claimants as defined in this application, claim the right to possession, occupation, use and enjoyment of the lands and waters of the application area to the exclusion of all others subject to the valid laws of the Commonwealth and the State of Queensland.

2. Where exclusive native title cannot be recognised, the native title claimants as defined in this application, claim the following non-exclusive rights and interests including the right to conduct activities necessary to give effect to them:

a) the right to access the application area;

b) the right to use and enjoy the application area;

c) the right to move about the application area;

d) the right to camp on the application area;

e) the right to erect shelters and other structures on the application area;

f) the right to enter and remain on the application area;

g) the right to hold meetings on the application area;

h) the right to hunt on the application area;

i) the right to fish in the application area;

j) the right to have access to and use the natural water resources of the application area;

k) the right to gather and use the natural resources of the application area (including food, medicinal plants, timber, tubers, charcoal, wax, stone, ochre and resin as well as materials for fabricating tools, hunting, implements, making artwork and musical instruments);

l) the right to share and exchange resources derived from the land and waters within the application area;

m) the right to participate in cultural and spiritual activities on the application area;

n) the right to maintain and protect places of importance under traditional laws, customs and practices in the application area;

o) the right to conduct ceremonies and rituals on the application area;

p) the right to transmit traditional knowledge to members of the native title claim group including knowledge of particular sites on the application area.

**REGISTER ATTACHMENTS:**

1. QC2017_007 Attachment B - External boundary description, 6 pages - A4, 10/10/2022
2. QC2017_007 Attachment C - Map of the application area, 2 pages - A4, 10/10/2022

*Note: The Register of Native Title Claims may, in accordance with section 188 of the Native Title Act 1993 (Cth), contain confidential information that will not appear on the Extract.*

# Appendix E – SNTC Extract Number QC2017-007

National Native Title Tribunal

# Extract from Schedule of Native Title Applications

| | |
|---|---|
| **Application Reference:** | Federal Court number: QUD331/2017<br>NNTT number: QC2017/007 |
| **Application Name:** | Ted Williams & Ors on behalf of the Danggan Balun (Five Rivers) People v State of Queensland |
| **Application Type:** | Claimant |
| **Application filed with:** | Federal Court of Australia |
| **Date application filed:** | 27/06/2017 |

| | |
|---|---|
| **Current stage(s):** | Notification Complete |
| **Registration information:** | Please refer to the Register of Native Title Claims/National Native Title Register (as appropriate) for registered details of this application.<br>**Date claim entered on Register of Native Title Claims:** 14/09/2017<br>**Registration decision status:** Accepted for registration<br>**Registration history:** Registered from 14/09/2017 |

| | |
|---|---|
| **Applicants:** | Gordon "Ted" Williams, Rose Page, Louisa Bonner, Shaun Davies, Germaine Paulson |
| **Address(es) for Service:** | Ricardo Martinez<br>Queensland South Native Title Services<br>Level 4, 293 Queen Street<br>Brisbane QLD 4000<br>**Phone:** 07 3224 1200<br>**Fax**: 07 3229 9880 |

**Additional Information**

Not applicable

**Persons claiming to hold native title:**

Those persons who are descendants of the following apical ancestors and who identify and are

recognised under the traditional laws and customs of the native title claim group as being affiliated (including by adoption) to country within the Application area:

1. Sarah *Warri/Warru* Clarke;

2. George *Daramlee* Drumley;

3. Jack Slab/Slabb Snr (husband of Lizzie *Waggil* Slabb & father of Charlotte, Frank, John/Jack Jnr, Olive & Victor);

4. Kitty Blow (wife of Joseph Blow & mother of Frank Blow & Hughie Blow);

5. *Bilin Bilin* aka Bilinba Jackey aka Jackey Jackey aka John “Johnny” Logan (father of Emily Logan & Johnny Logan);

6. Kipper Tommy Andrews (father of Lizzie Malay (nee Tommie));

7. Billy *Terribah/Didiba* Andrews;

8. Julia Sandy (wife of Arthur Ford);

9. Kitty Sandy, the mother of Arthur Ford;

10. Mary Ann Sandy nee Mitchell (mother of Mary Ann Drumley (nee Sandy), Ida Bell (nee Sandy), Janet Sandy, Norman Sandy Snr & Lindsay Sandy);

11. William "Billy" Mitchell and his wife, Lizzie Sandy;

12. Unnamed mother of Matilda “Mittie” Fogarty (nee Sandy) and Lizzie (mother of William “Billy” Stanley Brown Jnr);

13. *Coolum* (husband of Nancy Culham (nee Coolwell) & father of Joseph “Joe”, Maude, Lucy & Lena);

14. Unnamed mother of Nancy Culham (nee Coolwell) (wife of *Coolum* & mother of Joseph “Joe”, Maude, Lucy & Lena);

15. Yarry (father of Frederick “Fred” Yarrie/Yarry);

16. Jennie, mother of Joseph Coolwell (husband of Polly Allen/Dalton & father of Alice Edwards (nee Coolwell), Alfred Coolwell Jnr, Eva, Edward, Rose, Campbell, Michael & Andrew);

17. Polly Allen/Dalton (wife of Joseph Coolwell & mother of Eva, Edward, Rose, Campbell, Michael & Andrew);

18. Unnamed mother of Elizabeth Tomes/Clark nee Wheeler;

19. Jim Edwards Snr (husband of Topsy (of Ipswich) & father of Jimmy Edwards Jnr);

20. William Williams (Snr);

21. *Bullum Bullum* aka John Allen;

22. Alice/Alison Parsons nee Moree, mother of Thomas Parsons;

23. John "Johnny" Bungaree / Bungary (father of Norman Sandy Snr, Lindsay Sandy and Stella Bungera/Bungary).

**Native title rights and interests claimed:**

1. Where exclusive native title can be recognised (such as areas where there has been no prior extinguishment of native title or where s.238 and/or ss.47, 47A and 47B apply), the native title claimants as defined in this application, claim the right to possession, occupation, use and enjoyment of the lands and waters of the application area to the exclusion of all others subject to the valid laws of the Commonwealth and the State of Queensland.

2. Where exclusive native title cannot be recognised, the native title claimants as defined in this application, claim the following non-exclusive rights and interests including the right to conduct activities necessary to give effect to them:

a) the right to access the application area;

b) the right to use and enjoy the application area;

c) the right to move about the application area;

d) the right to camp on the application area;

e) the right to erect shelters and other structures on the application area;

f) the right to enter and remain on the application area;

g) the right to hold meetings on the application area;

h) the right to hunt on the application area;

i) the right to fish in the application area;

j) the right to have access to and use the natural water resources of the application area;

k) the right to gather and use the natural resources of the application area (including food, medicinal plants, timber, tubers, charcoal, wax, stone, ochre and resin as well as materials for fabricating tools, hunting, implements, making artwork and musical instruments);

l) the right to share and exchange resources derived from the land and waters within the application area;

m) the right to participate in cultural and spiritual activities on the application area;

n) the right to maintain and protect places of importance under traditional laws, customs and practices in the application area;

o) the right to conduct ceremonies and rituals on the application area;

p) the right to transmit traditional knowledge to members of the native title claim group including knowledge of particular sites on the application area.

**Application Area:**

**State/Territory:** Queensland
**Brief Location:** South of Brisbane, abutting the QLD/NSW border
**Primary RATSIB Area:** Southern and Western Queensland Region
**Approximate size:** 3130.1714 sq km
(Note: There may be areas within the external boundary of the application that are not claimed.)
**Does Area Include Sea:** Yes

**Area covered by the claim (as detailed in the application):**

Information identifying the boundaries of

a) the area covered by the application; and

b) any areas within those boundaries that are not covered by the application.

In relation to (a) above, a description of the area of land and waters covered by the application is provided at **"Attachment B"**.

In relation to (b) above, areas within the boundary identified in Attachment B that are not covered by the application are outlined below.

1. The area covered by the application excludes any land or waters that is or has been covered by:

a) a scheduled interest;

b) a freehold estate;

c) a commercial lease that is neither an agricultural lease nor a pastoral lease;

d) an exclusive agricultural lease or an exclusive pastoral lease;

e) a residential lease;

f) a community purpose lease;

g) a lease dissected [from] a mining lease and referred to in section 23B(2)(c)(vii) of the *Native Title Act 1993* (Cth);

h) any lease (other than a mining lease) that confers a right of exclusive possession over particular land or waters.

2. Subject to paragraphs 4 and 5, the area covered by the application excludes any land or waters covered by the valid construction or establishment of a public work commenced on or before 23 December 1996.

3. Subject to paragraphs 4 and 5, exclusive possession is not claimed over area, which are subject to valid previous non-exclusive acts done by the Commonwealth or State of Queensland.

4. Subject to paragraph 6, where the act specified in paragraphs 1, 2 and 3 falls within the provisions of:

a. Section 23B(9) – Exclusion of acts benefiting Aboriginal Peoples or Torres Strait Islanders;

b. Section 23B(9A) – Establishment of a national park or state park;

c. Section 23B(9B) – Acts where legislation provides for non-extinguishment;

d. Section 23(9C) – Exclusion of Crown to Crown grants; and

e. Section 23(10) – Exclusion by regulation.

the land and waters covered by the act are not excluded from the application.

5. Where an act specified in paragraphs 1, 2 and 3 affects or affected land or waters referred to in:

- Section 47– Pastoral leases etc covered by claimant application;
- Section 47A – Reserves etc covered by claimant application;
- Section 47B – Vacant Crown land covered by claimant application,

the area covered by the act is not excluded from the application.

6. The area covered by the application excludes land or waters where the native title rights and interests claimed have been otherwise extinguished.

Where there is any discrepancy between the map provided at “Attachment C” and the written description contained here and in “Attachment B”, the latter prevails.

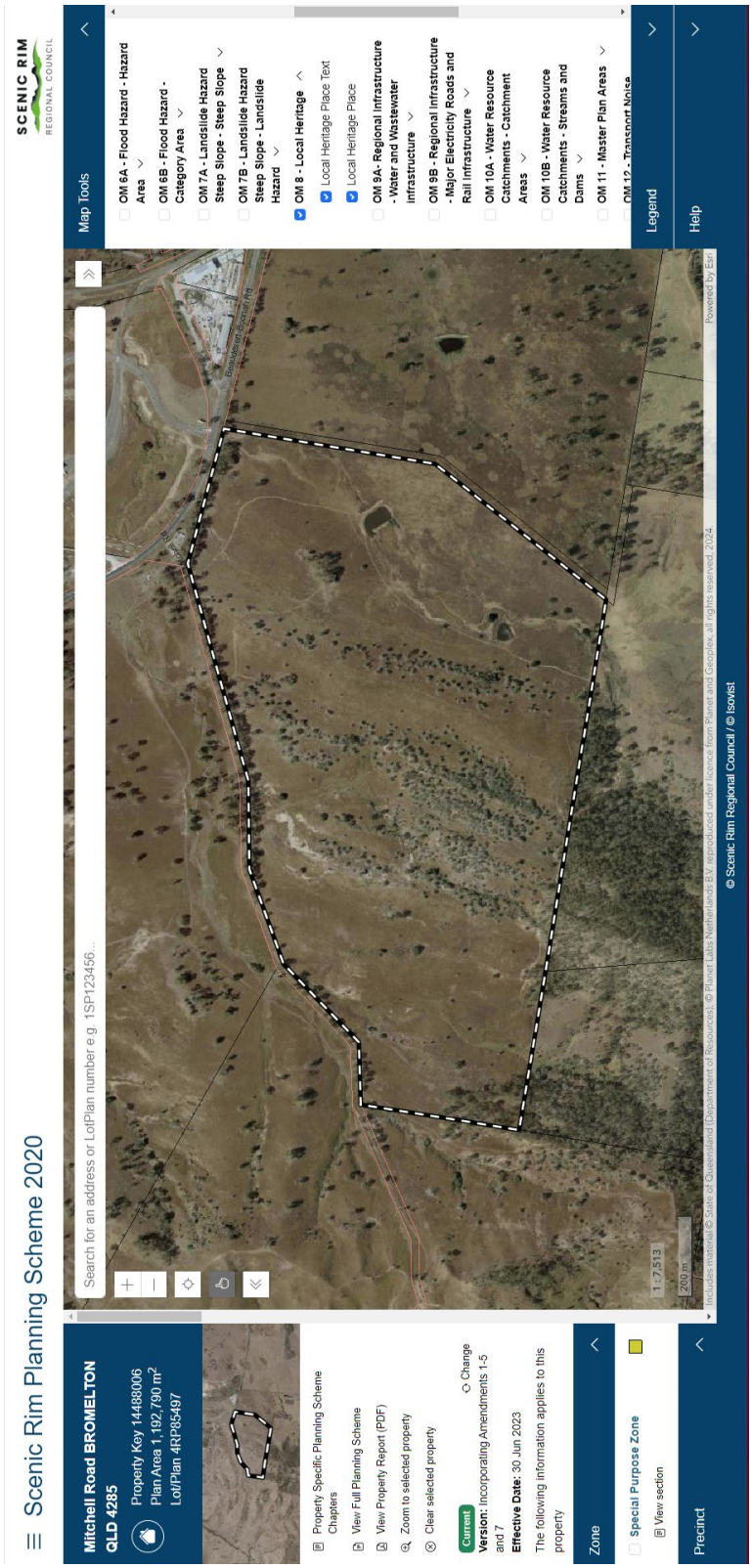
For the avoidance of doubt, the above sections relate to sections contained in the *Native Title Act 1993* (Cth).

**Attachments:**

1. QC2017_007 Attachment B - External boundary description, 6 pages - A4, 10/10/2022
2. QC2017_007 Attachment C - Map of the application area, 2 pages - A4, 10/10/2022

End of Extract

# Appendix F – Scenic Rim Regional Council Local Heritage Register



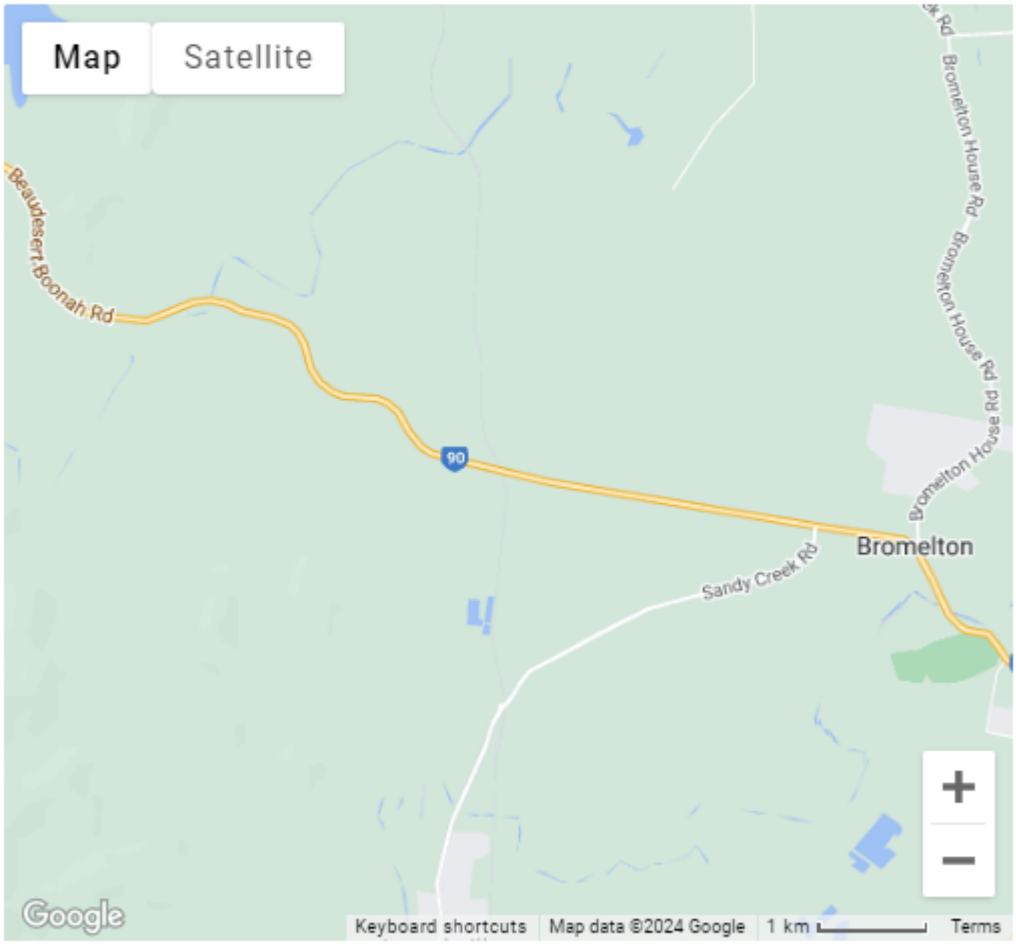
# Appendix G – Queensland Heritage Register Map

Print

## Heritage register map

Displaying **1796** places

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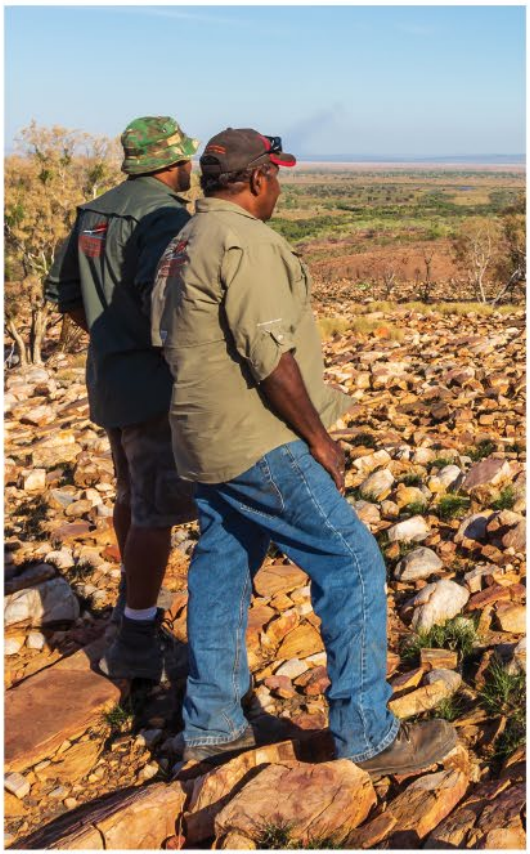
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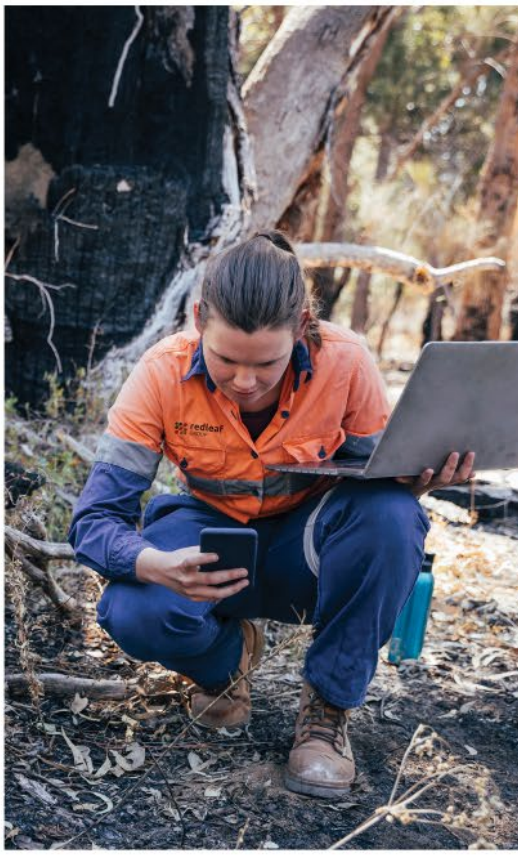
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SDA approval: AP2024/011

Queensland Government

# Bromelton Compost Manufacturing Facility

## Greenhouse Gas Assessment

SOILCO Pty Ltd
22 May 2025

→ **The Power of Commitment**



| | | | | | | | |
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Appendix A Greenhouse Gas Inventory
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# Abbreviations and acronyms

| Abbreviation/acronym | Definition |
|---|---|
| BCDF | Business Case Development Framework |
| BCMF | Bromelton Compost Manufacturing Facility |
| EIS | Environmental Impact Statement |
| EP Act | *Environmental Protection Act 1994* |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* |
| FTE | Full-Time Equivalent |
| IPCC | Intergovernmental Panel on Climate Change |
| IS | Infrastructure Sustainability |
| ISC | Infrastructure Sustainability Council |
| kL | Kilolitre |
| km | Kilometre |
| $ktCO_2$-e | Kilotonnes of carbon dioxide (gas) equivalent |
| kV | Kilovolt |
| kWh | Kilowatt hour |
| NDC | Nationally Determined Contribution |
| NGER | National Greenhouse and Energy Reporting |
| NGER Act | *National Greenhouse and Energy Reporting Act 2007* |
| SSP | Shared Socioeconomic Pathway |
| $tCO_2$-e | Tonnes of carbon dioxide (gas) equivalent |
| tkm | Tonne-kilometre |
| UNFCCC | United Nations Framework Convention on Climate Change |

# 1. Introduction

The Bromelton Compost Manufacturing Facility (the Bromelton CMF Project) is a proposed 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 197*1.
– An Environmental Authority (EA) Approval for Environmentally Relevant Activities (ERAs):
    - ERA 53(a) Organic material processing: Processing more than 200 t of organic material in a year by composting.
    - ERA 54 Mechanical waste processing: 2 (c) – operating a facility for receiving and mechanically reprocessing more than 10,000 t a year of general waste.
    - ERA 33(1): Crushing, milling, grinding or screening more than 5,000 t of material in a year.

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 Southeast 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 and OW technologies. A summary of the key components of the Project is outlined in Table 1-1.

***Table 1-1 Summary of key Bromelton CMF Project components***

| Project Component | Details |
|---|---|
| **Lot on Plan** | Lot 4 on Plan RP85497 and Mitchell Road (Local government managed road) |
| **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<br>The site will be split into 3 different processing areas: Receival, decontamination and composting utilising Forced Aeration Pad system. |
| **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:<br>Garden, Food and Wood wastes and manure.<br><br>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:<br>– 100,000 tpa of garden organics (GO) composted by Passive Open Windrow (OW) method.<br>– 150,000 tpa of Food Organics and Garden Organics (FOGO) is to be processed on a Forced Aeration Pad system .<br>Wood wastes and manure will make up a small portion of the composting feedstocks and will be blended with the GO and FOGO based on onsite capacity.<br>VENM will be received and stored as required based on demand of finished products.<br>Due to the seasonal nature of feedstock generation, up to 11% 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<br>– Weigh bridges<br>– Internal road network<br>– Maintenance and storage shed<br>– Final screening and manufacturing area<br>– Water tanks<br>– Aeration Pad system<br>– Office, carparking and amenities<br>– FOGO receival area<br>– 3 x leachate ponds<br>– 1 x freshwater dam<br>– Open windrows pad<br>– FOGO maturation pad<br>– Hardstand areas<br>– Retaining wall<br>– Upgrade of Mitchell Road |
| **Hours of Operation** | Monday – Friday: 6am to 6pm<br>Saturday: 6am to 4pm<br>Sunday and public holidays: 9am - 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<br>Early 2026 |

## 1.1 Construction

The majority of the construction works will involve grading/excavation of the existing site, construction of semi-open composting facilities, establishment of hardstand areas and installation of plant to be used in general operation of the site.

Construction of the facility will involve:

– Bulk earthworks (Cut and fill in order to level terrain for the facility)
– Establishment of open-air compost manufacturing areas
– Establishment of the Aerated Static Pile areas
– Construction of weighbridges
– Concrete pads for loading bays
– Construction of leachate ponds.

Construction activities with potential to lead to dust generation are outlined in Table 1-2.

***Table 1-2 Dust generating construction activities***

| Construction phase | Expected activities |
|---|---|
| Site establishment | – Delivery of site amenities and surveying and pegging of site. |
| Earthworks | – Establishment of access road to work area.<br>– Grading, excavation and general movement of earth materials. |
| Roadworks and intersection works | – Removal of trees/ stripping of topsoil<br>– Box out to required levels<br>– Subgrade and base course<br>– Asphalting<br>– Line Marking<br>– Signage installation<br>– Defect inspection and cleaning |
| Civil works | – Demolition and earthworks<br>– Civil works.<br>– Ponds and other civil structures |
| Mechanical installation | Installation of the following items:<br>– Shredder<br>– Drum screen<br>– Platforms<br>– Storage tanks/platforms<br>– Blowers<br>– Leachate system<br>– Water system<br>– Picking station<br>– Control system & instrument mech<br>– Odour control system<br>– Interconnecting pipework. |
| Electrical installation | Installation of the following items:<br>– Blowers<br>– Pumps<br>– Screens<br>– Motor control centre works<br>– Interconnecting cabling<br>– Electrical installation complete. |

# 1.2 Operation

## 1.2.1 Site layout

The proposed composting facility is shown in Figure 1-1 and Figure 1-2 . The following sections of the facility are relevant to the operations:

– Site office and Weighbridge
– FOGO receival building
– Aerated Static Pad
– Fogo maturation area
– Open Windrows GO
– Final Screening and Manufacturing (Manure)
– Leachate Ponds (GO, FOGO and Manufacturing).




*Figure 1-1 Layout of Bromelton Compost Manufacturing Facility*

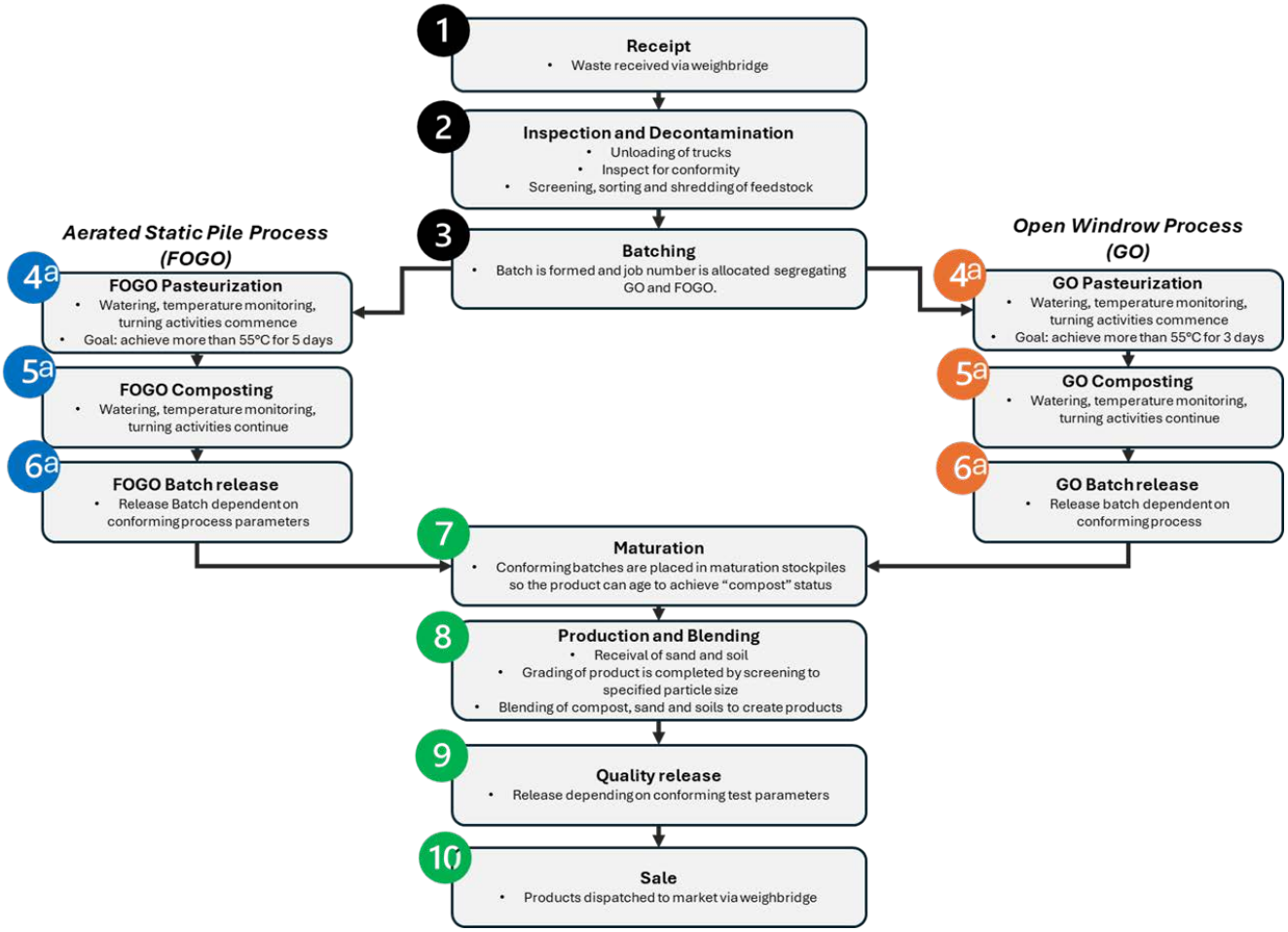



*Figure 1-2 Operational process flowchart*

## 1.2.2 Composting Process

The facility will operate in accordance with the process flow outlined in Figure 1-1 and Figure 1-2. The process flow can be divided into two branches and includes the following steps:

- Material will enter site, be weighed on a weigh bridge and inspected for conformity to process requirements.
- FOGO will be delivered to the decontamination line, which will then be screened, sorted, decontaminated and shredded depending on the size of material (>60 mm in diameter material will be shredded).
    - Shredded and decontaminated FOGO will then be placed into windrows on Aerated Static Piles pads for 21 days.
        - Aerated Static Piles pads will aerate FOGO with 18,000 $m^3$/hour of air.
        - Windrows will be turned completely one time during the three-week period.
    - Once 21 days have passed, FOGO will be transferred to the manufacturing, maturation & storage area, and will be aged for a further eight weeks.
        - Virgin Excavated Natural Material (VENM) will also be stored in this area and will be blended into completed compost as required.
- Garden Organics (GO) will be sorted and then directly deposited onto open windrows for composting and maturation, which will sit for 8 weeks.
    - Windrows will be turned two times completely during the eight-week period.
    - Maturation windrows will undergo water humidification periodically.
    - VENM and manure will also be mixed into finished GO compost as required.
        - Manure will be stored in the final screening and manufacturing area.
- Once material has been composted sufficiently, it will be directly transported off site or stored in “bunker” areas until it is ready to be transported off site.

A summary of the proposed composting process is outlined in Table 1-3.

***Table 1-3 Proposed composting process***

| Step | Summary | Timing |
|---|---|---|
| 1. Receipt | – Unloading in the Receival Building, which is undercover and partially enclosed. | 30 mins |
| 2. Decontamination | – Screening, sorting and shredding of feedstock.<br>– Size reduction of feedstock in preparation for batching and composting. | 1 – 2 days |
| 3. Batching | – Placement on primary and/or secondary composting pad - designated areas for unloaded materials.<br>– Batch/stockpile is formed according to input material and composting procedure.<br>– Job number allocated according to feedstock type (i.e. GO, FOGO).<br>– Additional inputs such as sand, soil or manure are added (if required). | 1 – 2 days |
| 4. Pasteurisation | – Controlled microbiological transformation of organic materials under aerobic and thermophilic conditions for a designated number of days, turns and specified temperature (above 55°C).<br>– Watering, temperature monitoring, turning activities commence.<br>– Objective is to achieve greater than 55°C for 3 days for a minimum of 3 turns. | Material to remain on the aerated static pile between 18 – 21 days (depending on conditions and seasonal variation). |
| 5. Composting | – Aerobic conditions continue to be maintained as per pasteurisation for a designated number of days, turns and specified temperature (below 55°C), conformance to resource recovery orders assessed prior to removal.<br>– Watering, temperature monitoring and turning activities continue.<br>– A minimum of two additional 2-turns to complete batch. | |

| Step | Summary | Timing |
|---|---|---|
| 6. Batch release | – Removal from composting pads and stockpiling for maturation.<br>– Release dependent on conforming process parameters including pH, EC, moisture temperature profile and turn profile.<br>– Batch can be pulled out and stockpiled with other conforming batches.<br>– Ungraded, conforming product may be used as a component in other products. | 1 – 2 days |
| 7. Maturation | – Conforming batches are placed in single maturation stockpile.<br>– Aging of product in stockpile provides additional time to achieve compost status.<br>– Although the compost temperature is close to ambient during the curing phase, chemical reactions continue to occur that make the remaining organic matter more stable and suitable for use with plants. Drying of material from above 40% moisture during pasteurisation and composting to approximately 25% prior to screening and quality release is also achieved. | 4 -6 weeks |
| 8. Production | – Blending with other inputs to create products for sale and distribution.<br>– Grading of product is done by screening to specified particle size.<br>– A new batch number is used for this process. | 1 week |
| 9. Quality release | – Screening and stockpiling of finished goods for testing to relevant standards then distribution following conformance.<br>– Release dependant on conforming test parameters including particle size, physical contamination, pH, EC bulk density and Solvita® assessment for maturity. | 1 week |
| 10. Sale | – Released product is stockpiled according to batch number.<br>– Products are designed to be fit for purpose. | 4 weeks |

Figure 1-3 provides a summary of the greenhouse gas emissions that are likely to be generated in each step of the composting process.

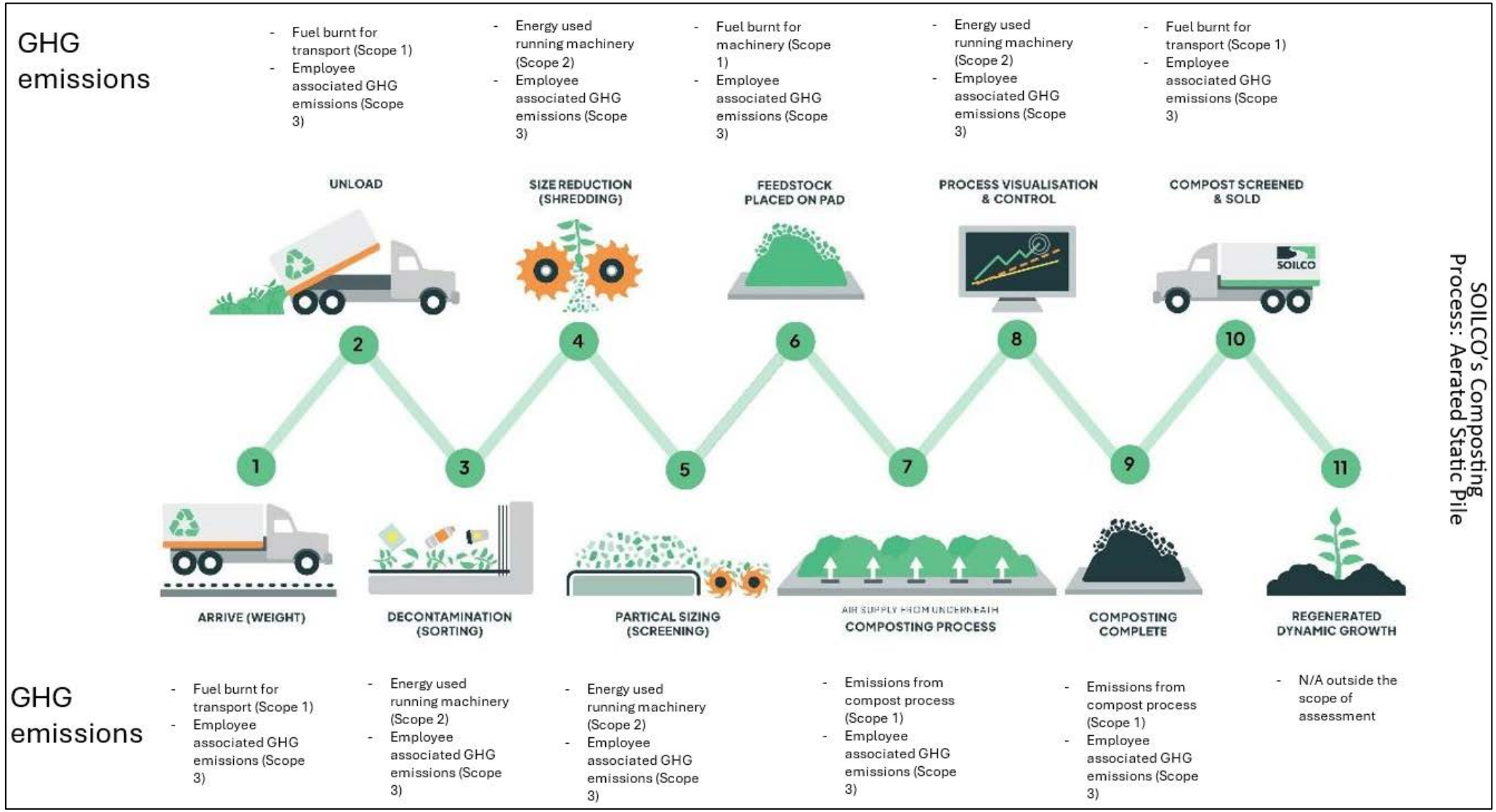



***Figure 1-3 Summary of Greenhouse gas emissions during operation***

## 1.3 Purpose of this report

This greenhouse gas assessment report has been prepared to support the assessment of the Project impacts and forms part of the supporting documentation for EA Approval for ERA 53(a), ERA 54(2)(c) and ERA 33(1). It also has been developed in response to the information request from the Office of the Coordinator General for the Material Change of Use (MCU) Development Application (Reference: OUT24/5995) 6 January 2025 (Reference D24/202645).

This document complies with the Queensland Government Guideline – Greenhouse gas emissions.

This report has been written to help understand the potential greenhouse gas impacts and to nominate mitigation and management principles to avoid, reduce, substitute or offset these emissions. This assessment comprises Scope 1, 2 and 3 emissions associated with construction, operation and decommissioning of the Project. Information in this report draws on best available estimates at the time of analysis and will be revised as new data becomes available. The assessment it is not a formal lifecycle assessment.

### 1.3.1 Scope

The scope of this assessment includes the calculation of greenhouse gas emissions for the Project. In addition, mitigations and management principles have been nominated to avoid, reduce, substitute or offset these emissions. This assessment comprises Scope 1, 2 and 3 emissions associated with the Project works, during both construction and operation as well as decommissioning of the Project as described in Section 1.

### 1.3.2 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 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 information reviewed at the date of preparation of the report. Subsequent to report finalisation based on the information provided at time of finalisation, GHD is not obliged to update this report as it is not within the current scope of work.

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.

# 2. Legislative context

## 2.1 International framework

Several international organisational bodies have policy for governments to use as guidance on greenhouse gas mitigation and management. These are listed in the sections below with an explanation and description of relevance to this assessment.

### 2.1.1 Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard

The Greenhouse Gas Protocol (WRI & WBCSD, 2004) provides the internationally accepted framework for accounting and reporting standards from organisations to report greenhouse gas emissions. The main principles as presented for project accounting are:

– **Relevance**: The greenhouse gas emissions assessment is to present information that users need for making decisions.
– **Completeness**: Appropriate emission sources within the assessment boundary must be accounted for so that users will find the assessment comprehensive and meaningful.
– **Consistency**: Accounting approaches, assessment boundary and calculation methodology must be consistent, so that greenhouse gas emissions can be compared over time.
– **Transparency**: Information and appropriate assumptions are to be documented clearly in the assessment so that users can attest to its credibility; and that all parameters, values (and units) are accessible and presented within the assessment.
– **Accuracy**: Data presented should be credible to effect precise emissions quantification, so as to permit users to make decisions.
– **Conservativeness**: Using conservative assumptions and values where uncertainty (e.g. source data, or bill of quantities information) is high. Applying this principle will lead to a more likely overestimate of greenhouse gas emissions and underestimate of greenhouse gas removals (WRI & WBCSD, 2005).

The Greenhouse Gas Protocol further defines greenhouse gas emissions through the concept of emission scopes that are:

– ‘Scope 1’ means direct emissions of greenhouse gases from sources within the boundary of the facility and as a result of the facility’s activities (including emissions from land/vegetation clearing).
– ‘Scope 2’ means emissions of greenhouse gases from the production of electricity, heat, or steam that the facility will consume, but that are physically produced by another facility.
– ‘Scope 3’ means indirect emissions of greenhouse gases generated in the wider community other than Scope 2 emissions, occurring as a consequence of the activities of a facility project but arise from sources not owned or controlled by that facility’s business (WRI & WBCSD, 2004).

Scope 3 emissions, also referred to as value chain emissions, typically constitute the predominant portion of a project’s total greenhouse gas emissions assessment (Figure 2-1). These emissions originate from sources that are not owned or directly controlled by the reporting entity but are nonetheless associated with its operations. This category encompasses emissions from the procurement of goods and services, upstream and downstream transportation and distribution, waste generated in operations, and the end-use of sold products. Accurately quantifying and managing Scope 3 emissions is imperative for organisations striving to minimise their overall carbon footprint and achieve comprehensive sustainability objectives.

The Greenhouse Gas Protocol’s Scope 3 Standard offers a robust framework for the systematic measurement and reporting of these emissions. It enables organisations to pinpoint the most significant emission sources within their value chain and formulate targeted mitigation strategies. Addressing Scope 3 emissions not only enhances an organisation’s environmental performance but also bolsters its reputation, aligns with stakeholder expectations, and provides a competitive edge in the marketplace.

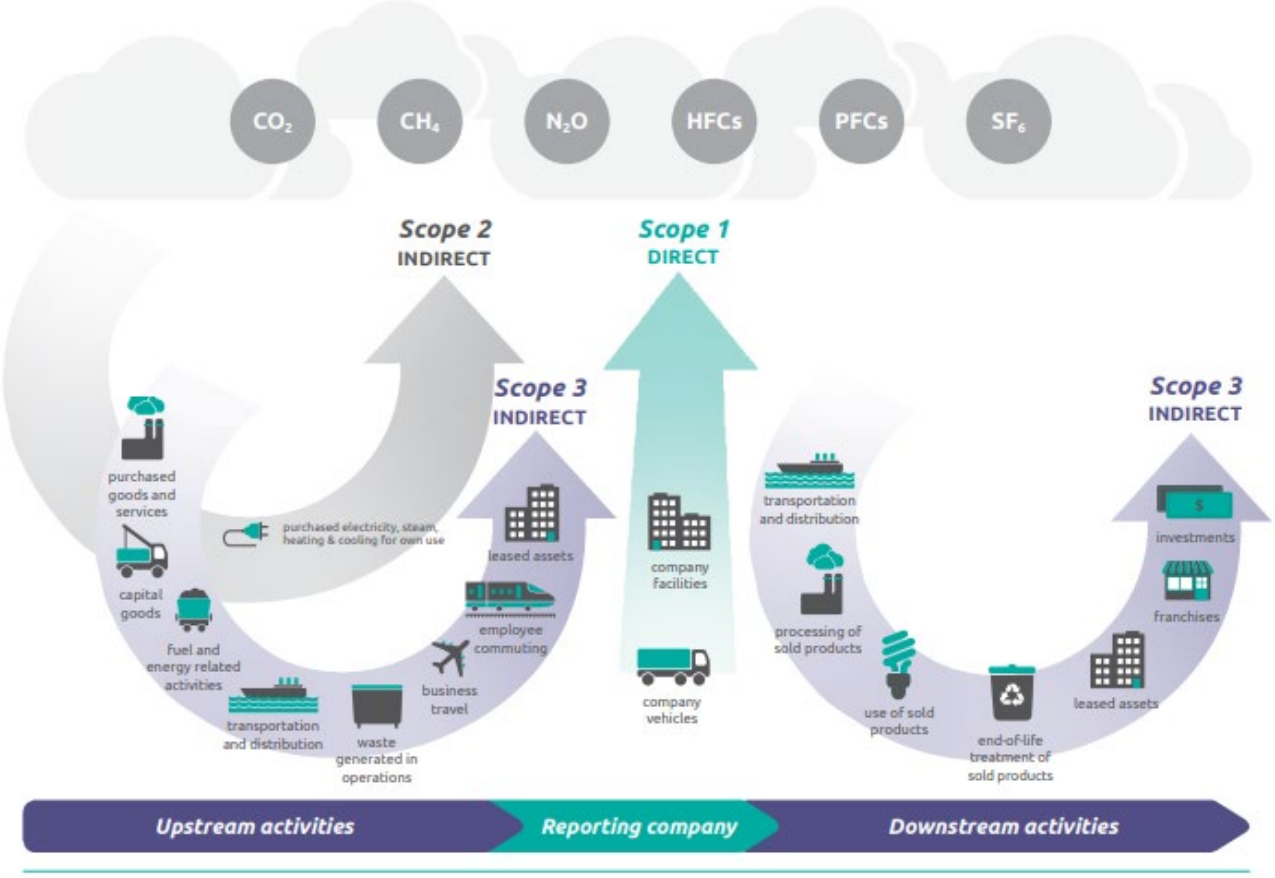



*Figure 2-1* *Overview of Greenhouse Gas Protocol scopes and emissions across the value chain (Source: WRI and WBCSD, 2004)*

### 2.1.2 Paris Agreement under the United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) establishes the overall framework for intergovernmental organisations to address climate change issues. Under the UNFCCC, governments:

– Commit to reducing greenhouse gas emissions through national policies and international agreements, such as the Paris Agreement
– Receive support for climate adaptation and mitigation efforts, including financial aid, technology transfer, and capacity-building initiatives
– Report and monitor their progress in addressing climate change, ensuring transparency and accountability through regular submissions of national communications and greenhouse gas inventories.

The Paris Agreement is a landmark international treaty adopted in 2015 during the 21st Conference of the Parties (COP21) to the UNFCCC. Its chief objective is to constrain the rise in global temperatures to well below 2°C above pre-industrial levels, with a concerted effort to limit the increase to 1.5°C. The agreement mandates comprehensive and ambitious climate actions from nearly all nations, fostering both mitigation and adaptation strategies, with a particular emphasis on supporting developing countries. Additionally, it establishes a robust framework for transparency, requiring regular monitoring, reporting, and enhancement of national climate commitments over time.

As Australia is party to the Paris Agreement, efforts must be made to halt the increase of global average temperatures, and the Australian Government has made a commitment to a 28 percent reduction of greenhouse gas emissions below 2005 levels by 2030. These targets should influence the selection of greenhouse gas emission mitigation within the Project.

### 2.1.3 Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is a body of scientific experts established in 1988 by the World Meteorological Organisation and the United Nations Environment Programme to provide independent climate change advice. The IPCC produces detailed reports on various aspects of climate change and its impacts, using the latest climate science to develop practical response strategies. Despite the adoption of the UNFCCC in 1992, the IPCC remains the primary source of scientific and technical data on climate change and greenhouse gas emissions.

The IPCC Sixth Assessment Report (AR6) is based on more recent literature since the publication of the AR5 in 2014. It summarises the state of understanding of climate change risk and impacts, mitigation and adaptation.

Following the progression of the AR6 development and worldwide commitments, the Australian Government has committed to net-zero emissions by 2050 (Nationally Determined Contributions (NDCs)). This includes:

– Reduce greenhouse gas emissions:
  - 2015 NDC: committed to reduce emissions by 26 to 28 percent below 2005 levels by 2030
  - 2020 NDC update: affirmed the 2030 target
  - 2021 NDC update: committed to net-zero 2050.
– Track progress towards those commitments
– Report each year on Australia's greenhouse gas emissions.

These targets should influence the selection of greenhouse gas emission mitigation within the Project.

However, for the purposes of applying the global warming potential of specific greenhouse gases, these remain sourced from AR5, which Australia's legislative instrument – the *National Greenhouse and Energy Reporting Regulation 2008* as amended, also adopted.

## 2.2 Australian framework

### 2.2.1 *National Greenhouse and Energy Reporting Act 2007*

The Australian Government enacted the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) in July 2008. The NGER Act establishes a national framework for Australian corporations to report Scope 1 and Scope 2 greenhouse gas emissions, and energy consumption and production.

The NGER Act together with its subordinate legislative instruments identified below, underpins the National Greenhouse and Energy Reporting (NGER) Scheme:

– The *National Greenhouse and Energy Reporting Regulations 2008* (and its amendments) which provide the necessary details that allow compliance with, and administration of, the NGER Act
– The *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (and its amendments) which provides methods and criteria for calculating greenhouse gas emissions and energy data under the NGER Act
– The *National Greenhouse and Energy Reporting (Audit) Determination 2009* which sets out the requirements for preparing, conducting and reporting on greenhouse and energy audits.

A summary of what is covered by the legislation is presented in Table 2-1.

***Table 2-1 Greenhouse gas legislation summary***

| | |
|---|---|
| NGER Act and Regulations | Details reporting greenhouse gas emissions, energy production, and energy consumption by corporations in Australia. It aims to provide robust data to inform government policy and international reporting obligations.<br>It also details specific information companies must report and the methods for calculating emissions and energy data. This ensures consistency and accuracy in the data collected. |
| *National Greenhouse and Energy Reporting* | Provides methods, criteria and emission factors for calculating greenhouse gas emissions and energy data under the NGER Act and Regulations. |

| | |
|---|---|
| *(Measurement) Determination 2008* | |

These frameworks have been relied upon to produce the greenhouse gas assessment applicable to the Project.

## 2.3 Queensland framework

Within the *Clean Economy Jobs Act 2024* the Queensland government has made a commitment to reach net-zero by 2050. To achieve this, all sectors will need to contribute to meeting a net-zero emissions target, recognising the level of emissions they release to the atmosphere and their varying opportunities and capacities to avoid and mitigate their emissions.

A range of policy and legislative provisions will be required to facilitate a transition to a low-carbon economy:

– Guideline – Greenhouse Gas Emissions
– Air – EIS Information Guideline
– Queensland's 2035 Clean Economy Pathway.

The Guideline – Greenhouse Gas Emissions clarifies the Queensland Government's minimum expectations for emissions management under the *Environmental Protection Act 1994* (EP Act) and how such requirements to manage emissions will be mandated through environmental authorisations. These guidelines also state that for national reporting purposes, Scope 3 emissions are to be accounted for.

This assessment is also underpinned by the EP Act and the *Environmental Protection Regulations 2019* of Queensland. The EP Act aims to protect the environment while allowing for sustainable development. It establishes an environmental management program, policies for specific environmental aspects, and a licensing system for regulated activities. The *Environmental Protection Regulations 2019* and other policies provide detailed processes and guidelines to achieve the EP Act's objectives. This framework ensures that development is balanced with environmental protection.

# 3. Methodology

## 3.1 Overview

This greenhouse gas assessment has been prepared to estimate the greenhouse gas emissions for the Project and develop management opportunities to monitor and reduce greenhouse gas emissions.

The tasks shown in Figure 3-1 have been completed as part of this greenhouse gas assessment. The greenhouse gases being assessed include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride ($SF_6$), where relevant.

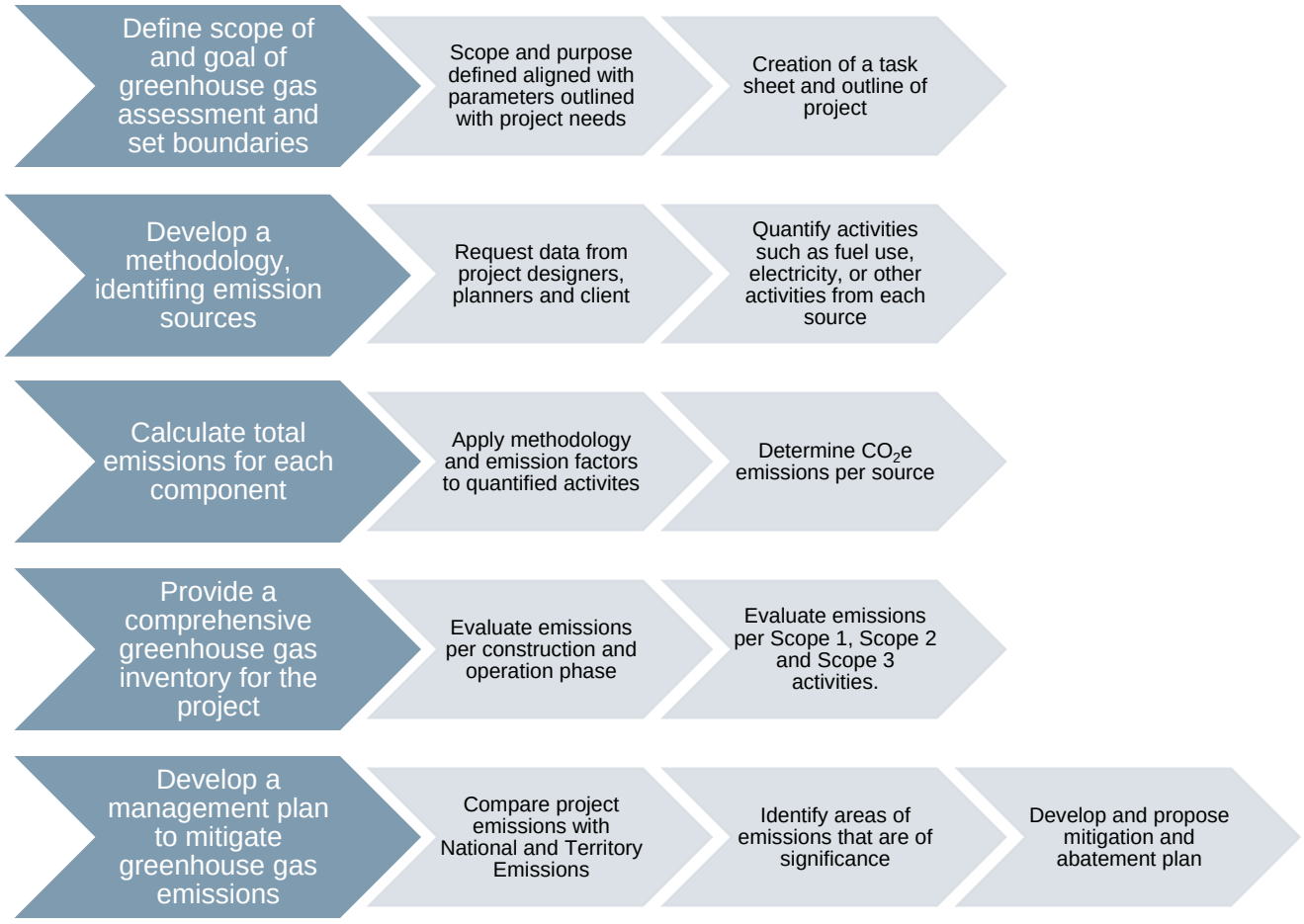



***Figure 3-1 Greenhouse gas assessment and management plan approach***

The data considered in the greenhouse gas assessment was sourced from Project documents available at the time of writing.

The Greenhouse Gas Protocol further defines greenhouse gas emissions through the concept of emission scopes. This is detailed in 2.1.1.

The Scope 1 and 2 emission factors used for this assessment were sourced primarily from the *National Greenhouse and Energy Reporting Act (Measurement) Determination 2008* as amended. Other factor sources that were deemed relevant at the time of writing include:

– National Greenhouse Accounts Factors (2024)
– ISC IS materials calculator version 2 – LCI (2017)
– EPiC Database (2019)
– Transport Authorities Greenhouse Group report: Vegetation class & maximum biomass (Maxbio) class
– EPD SHOTCRETE_ MossIA
– Australian Reinforcing Company Reinforcing Bar & Mesh (2016) (EPD858): Reinforcing bar
– Australian Reinforcing Company Reinforcing Bar & Mesh (2016) (EPD858): Reinforcing mesh
– EPD Australasia Ltd (2023): PVC pressure pipes
– MM Carbon Portal (ISCA version 2.0).

Section 3 of this report provides detailed information on the inclusions, exclusions, and assumptions made within our calculations.

The following methods were used to calculate Scope 3 emissions from purchased services and capital goods (WRI & WBCSD, 2013):

– **Average-data method**, which involves estimating emissions for goods and services by collecting data on the mass (e.g. kilograms or pounds), or other relevant units of goods or services purchased and multiplying by the relevant secondary (e.g. industry average) emission factors (e.g., average emissions per unit of good or service).
– **Spend-based method**, which involves estimating emissions for goods and services by collecting data on the economic value of goods and services purchased and multiplying it by relevant secondary (e.g. industry average) emission factors (e.g. average emissions per monetary value of goods).

### 3.1.1 Greenhouse gases and global warming potential

The greenhouse gases considered in this assessment and the corresponding global warming potential for each gas are listed in Table 3-1. Global warming potential is a metric used to quantify and communicate the relative contributions of different substances to climate change over a given time horizon.

Global warming potential accounts for the radiative efficiencies of various gases and their lifetimes in the atmosphere, allowing for the impacts of individual gases on global climate change to be compared relative to those for the reference gas carbon dioxide. In this assessment, the global warming potentials from the NGER Regulations 2008, updated from 14 October 2024, were used. These are reflective of radiative forcing over a 100-year time horizon.

***Table 3-1 Select greenhouse gases and their 100-year global warming potential***

| | |
|---|---|
| Carbon dioxide ($CO_2$) | 1 |
| Methane ($CH_4$) | 28 |
| Nitrous oxide ($N_2O$) | 265 |

# 4. Emissions calculation

## 4.1 Emissions sources

The following sources of emissions have been considered in this assessment.

### 4.1.1 Construction

– Fuel consumption from on-site equipment and plant
– Emissions associated with land clearing resulting in cleared vegetation and lost carbon sink
– Fuel associated with electricity generation
– Material inputs and transport
– Waste processing
– Potable water use and sewage
– Staff travel to and from site (local land travel)
– Staff facilities and offices

### 4.1.2 Operation and maintenance

– Fuel consumption from on-site equipment and plant
– Emissions from Compost decomposition
– Product transportation
– Processing of other waste
– Potable water use and sewage
– Staff travel to and from site (local land travel)
– Electricity use
– Ongoing maintenance activities

### 4.1.3 Decommissioning

There are additional emission sources that would be associated with the Project, such as emissions based on expenditure on supporting services such as insurances, accounting services, etc. The emissions from these sources have been estimated based on a percentage of construction emissions and where budgetary information has been made available at time of writing.

## 4.2 Exclusions

The following items were excluded from the assessment as their contribution is anticipated to be minor, not relevant or have insufficient information available to calculate, including:

– Combustion of fuels used in minor quantities such as LPG, gasoline, solvents, oils, and greases.
– Minor quantities of acetylene welding gases
– Embodied carbon of:
    - Office Amenities- structure (demountable)
    - Office Amenities- fitout (fairly basic)
    - Maintenance & Storage Shed
    - FOGO Pre Treatment Building
    - Extra over quantities within the BoQ for earthworks
    - Erosion and sediment control devices

– Capital equipment
  - heavy equipment and machinery (whether purchased or for hire)
  - furniture, fridges, computers, TVs, building fittings, demountables
– Refrigerant Use in Air Conditioners (e.g. control room)
– Software and Systems Licensing - SCADA
– Staff PPE / Clothing
– Staff business-related travel
– PI/PL insurance - required for operations
– Potable water and sewage
– Food and catering
– Revegetation carbon sequestration
– Downstream emissions avoided by use of the facilities product as opposed to traditional manufactured fertilisers or products
– Other minor GHG impacts that do not have available information to estimate

## 4.3 Assumptions

Consistent with financial and quantity estimation for projects, the calculations for greenhouse gas emissions are only as accurate as the information available. The estimations provided should not be relied upon more than the data from which it was calculated. Assumptions for the Project assessment are described in Table 4-1. These assumptions are listed in detail against the relevant emission in the greenhouse gas Inventory in Appendix A.

More broadly for the assessment the below assumptions create a basis for the assessment:

– Wherever possible, project design information was used to calculate greenhouse gas emissions, where there is limited availability of information, the assumptions below have been detailed to confirm consistency and data source.
– As the Project progresses through the reference design, detailed design, construction and operational phases, this assessment should be updated (for currency) with more relevant information as it becomes available.
– The assessment was based on emission factors available at the time of the assessment and future changes in emission factors or global warming potential were not considered.
– Scope 3 estimates are based on industry averages rather than supplier-specific information. The activity data is limited in the early stages of the Project, therefore, the numbers used are based on the best information currently available; these could be expected to change, and any updates to these numbers would fall under a separate scope of work.

Detailed assumptions relating to the greenhouse gas emissions assessment of the Project are presented in Table 4-1.

***Table 4-1 Overall assumptions for the Project***

| Category | Parameter | Assumptions |
|---|---|---|
| Whole of project | Fuel | - Assume 10,000 KL diesel - Construction fuel use for plant and machinery including generators<br>- Assume 30% used during decommissioning |
| | Vegetation removal – diesel for clearing and lost carbon sink | – 3.38 ha 'Eucalypt Tall Open Forest (Class B) - Carbon lost from removing vegetation was calculated using the factors obtained from the Transport Authorities Greenhouse Group Report specific to the facility's locality (using Biomass Class 4, which is the class that covers most of the vegetation removed). |
| | Transport of materials | – Assume transport 50 km of materials – construction and operation distance assumptions |

| Category | Parameter | Assumptions |
|---|---|---|
| | Electricity | – No grid electricity used during construction/decommissioning<br>– 12kwh/ton of feedstock – operational electricity usage |
| | Staff, local ground travel | – Assume transport 50 km of staff to and from work. |
| | Waste production (recycling and landfill) | – Assume transport 50 km of waste – construction and operation distance assumptions |
| | Feedstock (organic waste component) | – 250,000 ton annually |
| Earthworks | Gravel hardstands for storage areas and, windrows | – Assuming gravel base - @ 600mm depth |
| Roads and carparks | Pavement Surface | – Assuming asphalt pavement (200mm) |
| | Pavement Base | – Assuming subbase of rock (Fine crushed rock - 510mm) |
| | Pavement Select Fill | – Assuming thickness of 150mm |
| Concrete slabs and misc hardstands | Hardstand around building | – Assuming gravel @ 200mm depth |
| | Fogo shed slab | – Assuming concrete N32 @100mm thick slab |
| | Aerated Static Piles pad 100-150mm reinforced concrete base slab with attached thickenings | – Assuming concrete N32 @150mm thick slab |
| | Aerated Static Piles pad 300mm reinforced concrete slab with spigots | – Assuming concrete N32 @300mm thick slab |
| | Steel | – 50% of steel is recycled at decommissioning phase |
| Ponds | HDPE liner | – Assuming 1.5mm thick (Town Planning Report Figure 4.10 - see below) |
| Services | Tanks | – Assuming a 107 kl reinforced concrete tank - 100mm thick |
| | FS - Pump | – Assuming it to be a typical vertical turbine fire pump |
| | Pipe | – Assuming a 100mm pipe size - 4.5 kg/m - Assume up to a 100 m |
| | SST - Pump | – Submersible sewage ejector pump |
| MISC | Chainwire perimeter fencing | – Assuming 6.5 kg weight/meter |
| | Allowance for storage push walls and concrete blocks | – Assuming 112m3 of N32 block wall is 0.5m x 1.5m x 150m |
| | Tank hardstand with perimeter bunding | – Assuming concrete N32 @100mm thick slab |
| | Solar | – Assuming thickness of a solar panel to be about 3.5 mm |

# 5. Emissions inventory

Results of this greenhouse gas assessment are presented in the following sections.

## 5.1 Project total

Table 5-1 summarises the total emissions associated with the Project works for the construction of Bromelton Compost Manufacturing Facility, operational, and decommissioning phases.

***Table 5-1 Greenhouse gas emissions summary for the Project***

| Project phase | Duration | Emissions (t $CO_2e$) | | | | |
|---|---|---|---|---|---|---|
| | | Scope 1 | Scope 2 | Scope 3 | Total | Total per year |
| Construction phase for Bromelton Compost Manufacturing Facility | 14 months | 28,453 | 0 | 14,172 | 42,625 | 36,536 |
| Operational phase (30 years) | Annual | 11,500 | 2,130 | 1,204 | 445,021 | 14,834 |
| Decommissioning | 14 months | 8,129 | 0 | 4,277 | 12,406 | 10,634 |
| **Greenhouse gas indicators** | | | | | | |
| Total life of project | | 381,582 | 63,900 | 54,570 | 500,052 | N/A |

### 5.1.1 Construction phase emissions estimation

Emissions associated with the construction of the Project are presented below in Table 5-2. The total greenhouse gas emissions during construction are estimated at 42,200 $tCO_2e$ over one year. Emissions from diesel consumption are the largest source of emissions during the construction phase, accounting for half.

*Table 5-2 Summary of construction phase emissions*

| Activity | Activity data | Unit | Emissions (t $CO_2e$) | | | |
|---|---|---|---|---|---|---|
| | | | Scope 1 | Scope 2 | Scope 3 | Total |
| Diesel consumption of genset | 10,000 | kL | 27,097 | 0 | 0 | 27,097 |
| Diesel consumption of genset | 10,000 | kL | 0 | 0 | 6,678 | 6,678 |
| Land clearing | 3 | ha | 1,355 | 0 | 0 | 1,355 |
| Materials - concrete N32 | 11,162 | t | 0 | 0 | 4,309 | 4,309 |
| Materials - Asphalt | 7,314 | t | 0 | | 1,463 | 1,463 |
| Materials - Gravel | 45,966 | t | 0 | 0 | 261 | 261 |
| Materials - Rock | 16,256 | t | 0 | 0 | 177 | 177 |
| Materials - steel (Reo Mesh) | 11 | t | 0 | 0 | 31 | 31 |
| Materials - steel (Reo Bar) | 5 | t | 0 | 0 | 15 | 15 |
| Materials - PVC | 1 | t | 0 | 0 | 5 | 5 |
| Materials - Glass | 50 | t | 0 | 0 | 50 | 50 |
| Materials - Cast Iron | 20 | t | 0 | 0 | 32 | 32 |
| Materials - Geomembrane | 2 | t | 0 | 0 | 14 | 14 |
| Materials - Lime | 26 | t | 0 | 0 | 21 | 21 |
| Materials transport | 4,040,668 | tkm | 0 | 0 | 292 | 292 |
| Waste transport | 202,033 | tkm | 0 | 0 | 15 | 15 |
| Worker transport | 5 | kL | 0 | 0 | 3 | 3 |
| Waste (C&D) | 4,041 | t | 0 | 0 | 808 | 808 |
| **Total emissions - construction** | | | **28,453** | **0** | **14,172** | **42,625** |

### 5.1.2 Operations and maintenance phase annual emissions estimation

Table 5-3 provides an estimation of emissions occurring as a result of operations annually. The largest contributors to operational emissions are from the composting, accounting for 70% percent.

*Table 5-3 Summary of operational phase annual emissions*

| Activity | Quantity | Units | Greenhouse gas emissions (t $CO_2e$) | | | |
|---|---|---|---|---|---|---|
| | | | Scope 1 | Scope 2 | Scope 3 | Total |
| Electricity from grid (QLD) | 3,000,000 | kWh | 0 | 2,130 | 0 | 2,130 |
| Electricity from grid (QLD) | 3,000,000 | kWh | 0 | 0 | 300 | 300 |
| Worker transport | 1 | kL | 0 | 0 | 1 | 1 |
| Composting | 250,000 | t | 11,500 | 0 | 0 | 11,500 |
| Materials transport | 12,500,000 | tkm | 0 | 0 | 903 | 903 |
| **Total** | | | **11,500** | **2,130** | **1,204** | **14,834** |

### 5.1.3 Decommissioning emissions estimation

Table 5-4 provides an estimation of emissions occurring as a result of decommissioning the Project. The largest contributors to decommissioning emissions are from diesel consumption, accounting for 60 percent.

Due to no input data the decommissioning phase emission estimations were based off the construction phase estimations where relevant. Waste process was amended to include the assumed increased waste from landfill of certain items with embodied carbon.

*Table 5-4 Summary of decommissioning phase emissions*

| Activity | Activity data | Unit | Emissions (t $CO_2e$) | | | |
|---|---|---|---|---|---|---|
| | | | Scope 1 | Scope 2 | Scope 3 | Total |
| Diesel consumption of genset | 3,000 | kL | 8,129 | 0 | 0 | 8,129 |
| Diesel consumption of genset | 3,000 | kL | 0 | 0 | 2,003 | 2,003 |
| Waste (C&D) | 17,985 | t | 0 | 0 | 2,255 | 2,255 |
| Waste transport | 899,252 | tkm | 0 | 0 | 41 | 41 |
| Recycling benefit from construction - steel | 8 | t | 0 | 0 | -23 | -23 |
| Recycling transport | 790 | tkm | 0 | 0 | <1 | <1 |
| **Total** | | | **8,129** | **0** | **4,277** | **12,406** |

### 5.1.4 CMF emissions intensity comparison

Emissions intensity is the weight of carbon per unit of feedstock (gCO2eq/ton) that a facility processes. In broader waste management discussion, the NSW EPA fact sheet “Emissions impacts of composting food waste” (NSW EPA, 2024) says that “*The collection, transport, and processing of food waste into compost reduces emissions by 96% compared to landfilling it*.” Noting the facility has inherently lower GHG impacts than conventional landfill practices, this section will further discuss the emissions intensity of other compost facilities.

The study “Greenhouse Gas and Air Pollutant Emissions from Composting” (Nordahl. Et al, 2023) details that there are many types of GHG’s emitted during the composting process. This is dependent on feedstock, compost handling techniques, timing and other external factors. For the purposes of this assessment the methodology used will be from the *National Greenhouse and Energy Reporting (Measurement) Determination 2008, 5.22 Method 1—emissions of methane and nitrous oxide from biological treatment of solid waste* which states that per ton of feed stock processed 46 kgCO2eq/ton is released into the atmosphere.

The NSW EPA released a facts sheet “Emissions impacts of composting food waste” (NSW EPA, 2024). This document details several CMF types and has a measure of the carbon produced per ton of feedstock which is presented in Figure 5-1.

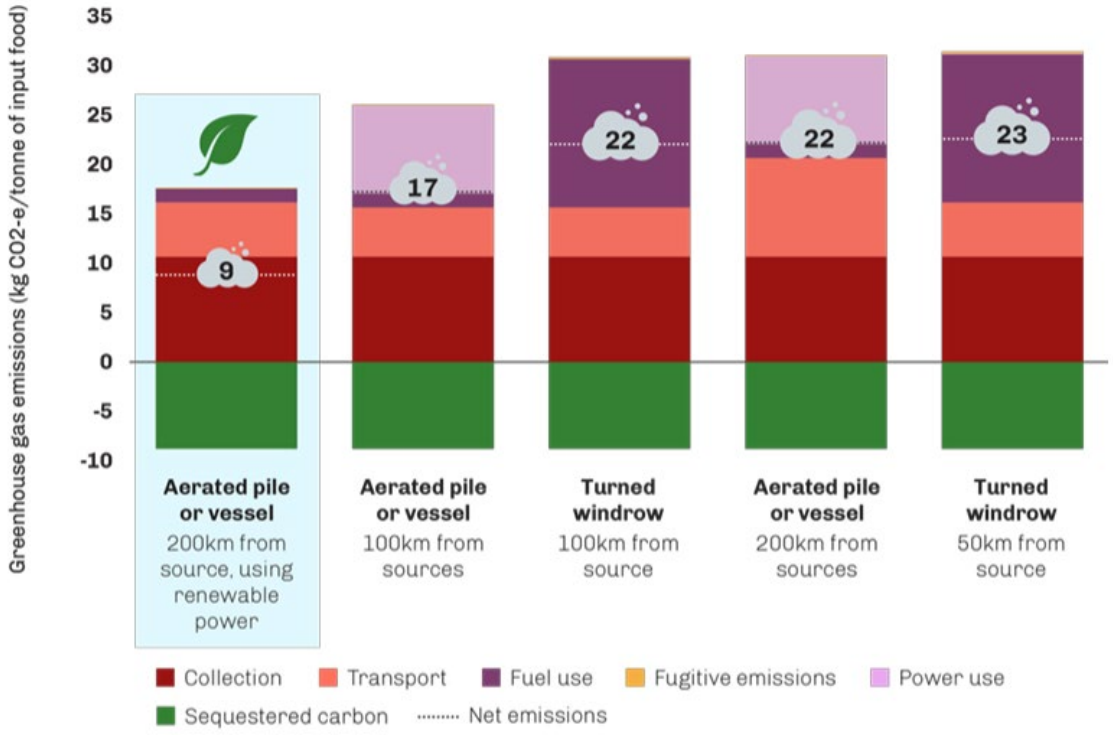



***Figure 5-1 Emissions and offsets for off-site aerobic composting scenarios (source: NSW EPA, 2023)***

The “Carbon Footprint of a University Compost Facility: Case Study of Cornell Farm Services” (M. Schwarz and J. Bonhotal, 2018) found that their facility generated 15.4 kgCO2eq/ton.

In both of the above examples (Figure 5-1and (M. Schwarz and J. Bonhotal, 2018)) there is carbon sequestering calculations that are included to bring the total carbon intensity down. Furthermore, the NSW EPA examples don’t include the 46 kgCO2eq/ton recommended by the NGER 2008. The “Carbon Footprint of a University Compost Facility: Case Study of Cornell Farm Services” (M. Schwarz and J. Bonhotal, 2018) was carried out in North America. The area of the study experiences lower temperatures than Australia. Pattey, Trzcinski, and Desjardins (2005) found a positive correlation between rising temperatures and CH4 emissions. An unsubstantiated opinion of the writer is that the lower temperatures in this climate could be key to the higher nominated baseline of 46 kgCO2eq/ton recommended by the NGER.

# 6. Mitigation and management

To reduce greenhouse gas emissions, the Project will implement a combination of the following mitigations where feasible.

## 6.1 Scope 1 emission reduction measures

– Fuel:
  - Avoid stationary fuel use through solar and battery arrangements
  - Where feasible, mobile and stationary equipment compliant with a more recent emission standard than USEPA Tier 2 will be sourced
  - Implement regular maintenance schedules to ensure optimal performance and fuel efficiency of all machinery
  - Haul distances will be minimised in Project design as far as practicable to reduce diesel consumption
  - Extraction practices will be reviewed to minimise double handling of materials and ensure that haulage is undertaken using the most efficient routes
  - Electricity bills and fuel usage will be tracked
  - Mobilise vehicles and equipment from nearby locations to minimise greenhouse gas emissions during transport
  - Plan logistics to reduce travel distances and optimise routes.
  - Utilising maximum sized vehicles to minimise movements.
– Operational practices:
  - Optimise operational schedules to reduce idle times and unnecessary fuel consumption
  - Educate operators on efficient driving and equipment handling techniques to minimise fuel use
  - Regular maintenance of equipment to ensure optimal performance and minimise emissions
  - Diesel equipment idling will be minimised wherever feasible
  - GHG emissions and energy use developed targets will be monitored and reported on a scheduled basis.
– Alternative fuels:
  - Use biofuels or other low-carbon alternatives where feasible
  - Alternative fuels (e.g. low sulphur) will be considered where economically and practically feasible
  - Explore the use of electric or hybrid vehicles for on-site transportation.
– Vegetation management:
  - Minimise the clearance of vegetated areas to preserve carbon sinks and reduce emissions from land-use changes
  - Reuse of removed vegetation will be encouraged
  - Onsite revegetation
  - Offset carbon emissions**.** SOILCO are planting an area on the site as compensation for the area cleared. There is an opportunity to calculate the carbon sink of this area if allowable under relevant standards and guidance.

## 6.2 Scope 2 emission reduction measures

– Renewable energy:
  - Source electricity from renewable energy providers where possible.
  - Install on-site renewable energy systems, such as solar panels, to power facilities
– Energy efficiency:

- Implement energy-efficient lighting, heating, and cooling systems in all buildings
- Use energy management systems to monitor and optimise electricity use
- Electricity bills and fuel usage will be tracked.

– Demand management:
  - Schedule high-energy activities such as fans on the APS system during off-peak hours to reduce strain on the grid and associated emissions
  - Implement load-shifting strategies to balance energy use throughout the day.

## 6.3 Scope 3 emission reduction measures

– Supply chain:
  - Obtain more granular source data (e.g. not based on expenditure) in order for Scope 3 emissions to be more accurately modelled. For example, shift the accounting approach from spend-based method to average data method
  - Low carbon alternatives for aggregate, cement and steel will be sourced where viable and from local sources where possible
  - Awareness raising: Engage with suppliers to ensure that they understand the impacts of their carbon footprint, and that their businesses are aligned with the Queensland Government's emissions reduction targets
  - Undertake a supply chain analysis – to assess whether suppliers are compliant with their sustainability and emissions management policies and strategies to drive Scope 3 emissions transparency and due diligence checks
  - Consider sustainable procurement, i.e. to engage suppliers who are Climate Active certified, or are able to supply products that have accompanying Environmental Product Declaration
  - For Scope 3 emissions associated with the combustion of fuels (i.e. Scope 1 emissions), should the reduction measures presented in the Scope 1 emissions reduction section above be implemented, then there will be consequential reductions in the associated Scope 3 emissions component.

# 7. Risk assessment

A risk assessment for greenhouse gas related impacts was undertaken using a high-level risk assessment framework that differentiates risks qualitatively by listing impacts as either Low, Medium or High.

Risk to the environmental values of Queensland from the Project's greenhouse gas emissions are detailed below from the Climate change in Queensland fact sheet (QLD Government, 2019). The identified risks were categorised under seven main climate variables:

– Higher temperatures
– Hotter and more frequent hot days
– Harsher fire weather
– Fewer frosts
– Reduced rainfall in the south-east
– More intense downpours.

These climate variables risk impacting the below environmental aspects:

– Climate
– Air quality
– Water quality
– Land
– Flora and fauna.

Greenhouse gas emissions from this assessment would contribute to these risks.

For this greenhouse gas assessment, the magnitude of each Project emission source (when compared to Queensland totals) and scaled against the overall Project impact was assessed to understand where the Project has the highest emission reduction opportunities. The highest risk emission sources hold the greatest opportunity for reduction.

Risks associated with the emissions for the Projects three phases are listed in Table 7-1. Risks associated with the emissions for the Projects three phases are listed in Table 7-1. Only those sources with greater than 10 percent of the Project totals have been included. The emission sources should be broadened when accuracy of estimations increase in future phases of the Project.

Table 7-1 identifies Project activities that have the highest potential to generate greenhouse gas emissions. Identified risks require mitigation and management practices to qualify residual risk. This is detailed in Table 7-2.

***Table 7-1 Emissions source in order of magnitude***

| Phase | Emission source | Magnitude (% of phase total) | Magnitude (% of Queensland total) | Overall initial risk |
|---|---|---|---|---|
| Construction | Scope 1 - Fuel usage during construction | 64% | 0.0219% | High – Transport of materials and plant and equipment usage is a larger part of the construction emissions. This is based on diesel fuel usage. |
| Construction | Scope 3 – Concrete + other materials. Embodied carbon | 10% | 0.0035% | Medium – embodied carbon is determined by the measurement of carbon input to each ton of material. |
| Operation | Scope 1 - Composting emissions | 78% | 0.0093% | High – Composting |
| Operation | Scope 2 - Energy usage during operation | 14% | 0.0017% | Medium – Energy used to operate facility is sourced from traditional fossil fuel sources, increasing the greenhouse gas intensity. |

| Phase | Emission source | Magnitude (% of phase total) | Magnitude (% of Queensland total) | Overall initial risk |
|---|---|---|---|---|
| Decommissioning | Scope 1 - Fuel usage during decommissioning | 66% | 0.0066% | Low – Decommissioning and methodology is unclear; plant may be upgraded to continue life cycle. |
| Decommissioning | Scope 3 – Infrastructure waste | 18% | 0.0018% | Low – Decommissioning and methodology is unclear; plant may be upgraded to continue life cycle. |

*Table 7-2 Emissions source mitigation and residual risk*

| Phase | Emission source | Overall initial risk | Mitigation | Management principles | Overall residual risk |
|---|---|---|---|---|---|
| Construction | Scope 1 - Fuel usage during construction | High – Transport of materials and plant and equipment usage is a larger part of the construction emissions. This is based on diesel fuel usage. | - Avoid stationary fuel use through solar and battery arrangements<br>- Haul distances will be minimised in Project design as far as practicable to reduce diesel consumption<br>- Use biofuels or other low-carbon alternatives where feasible<br>- Alternative fuels (e.g. low sulphur) will be considered where economically and practically feasible<br>- Explore the use of electric or hybrid vehicles for on-site transportation. | - Where feasible, mobile and stationary equipment compliant with a more recent emission standard than USEPA Tier 2 will be sourced<br>- Implement regular maintenance schedules to ensure optimal performance and fuel efficiency of all machinery<br>- Extraction practices will be reviewed to minimise double handling of materials and ensure that haulage is undertaken using the most efficient routes<br>- Mobilise vehicles and equipment from nearby locations to minimise greenhouse gas emissions during transport<br>- Plan logistics to reduce travel distances and optimise routes. | Medium |
| Construction | Scope 3 – Concrete + other materials. Embodied carbon | Medium – embodied carbon is determined by the measurement of carbon input to each ton of material. | - Minimise the clearance of vegetated areas to preserve carbon sinks and reduce emissions from land-use changes<br>- Reuse of removed vegetation will be encouraged | - Low carbon alternatives for aggregate, cement and steel will be sourced where viable and from local sources where possible<br>- Awareness raising: Engage with suppliers to ensure that they understand the impacts of their carbon footprint, and that their businesses | Low |

| Phase | Emission source | Overall initial risk | Mitigation | Management principles | Overall residual risk |
|---|---|---|---|---|---|
| | | | | are aligned with the Queensland Government's emissions reduction targets<br>- Undertake a supply chain analysis – to assess whether suppliers are compliant with their sustainability and emissions management policies and strategies to drive Scope 3 emissions transparency and due diligence checks | |
| Operation | Scope 2 - Energy usage during operation | Medium – Energy used to operate facility is sourced from traditional fossil fuel sources, increasing the greenhouse gas intensity. | – Source electricity from renewable energy providers<br>– Install on-site renewable energy systems, such as solar panels, to power facilities | – Implement energy-efficient lighting, heating, and cooling systems in all buildings<br>– Use energy management systems to monitor and optimise electricity use<br>– Electricity bills and fuel usage will be tracked. | Low |
| Operation | Scope 1 - Composting emissions | Medium – Composting | – Restrict number of pile turns to requirements of the relevant standards and guidelines | – Mange pile temperatures and decomposition rates<br>– Calculate the avoided carbon from industrial fertilisers being offset by the use of the facilities compost product. | Medium |
| Decommissioning | Scope 1 - Fuel usage during decommissioning | Low– Decommissioning and methodology is unclear; plant may be upgraded to continue life cycle. | – As above fuel mitigations | – As above fuel management practices | Low |
| Decommissioning | Scope 3 – Infrastructure waste | Low – Decommissioning and methodology is unclear; plant may | – Develop decommissioning plan for the project to enhance usability and circularity of components | – Highlight materials and component that can reused after operation phase, those articles that | Low |

| Phase | Emission source | Overall initial risk | Mitigation | Management principles | Overall residual risk |
|---|---|---|---|---|---|
| | | be upgraded to continue life cycle. | | could be sold on or recycled/upcycled. | |

The above qualitative assessment of risk is detailed only to the level of describing high, medium and low. Further information, quantitative data and specifics about the Project design, and operation is required to confirm actual risk levels. For the purposes of approvals, these mitigation strategies outlay the structure for measurement and reduction of the Project greenhouse gas emissions. Table 7-2 above will be utilised to populate a greenhouse gas Abatement Plan in Appendix B which will nominate time periods for quantification, implementation and review of these mitigation strategies and management principles.

# 8. Summary and conclusions

## 8.1 Total project emissions estimate

The Project will generate an estimated total 42,625 $tCO_2e$ emissions for construction plus 14,834 $tCO_2e$ per year of operation. The highest estimated annual Scope 1 emissions will be less than 50,000 $tCO_2e$ generated during the first year of construction due to fuel usage, vegetation and land use change occurs.

Based on this estimate, the Project is considered a high emitter and as such would be required to meet the obligations under the Queensland Greenhouse Gas Emissions Guidelines. If the Project reports under NGER, these estimates should be updated annually to reflect the actual emissions during both the construction and operational phases.

As described in Section 7, there are several higher risk emission sources which require mitigation as part of best practice environmental management. These are summarised in Table 8-1.

*Table 8-1 Project greenhouse gas emissions contribution to state and national emissions*

| Phase | Project greenhouse gas emissions source | Project % | Queensland % | Residual risk of emission source after mitigations |
|---|---|---|---|---|
| Construction | Scope 1 - Fuel usage during construction | 64% | 0.0219% | Medium |
| Construction | Scope 3 – Concrete + other materials. Embodied carbon | 10% | 0.0035% | Low |
| Operation | Scope 2 - Energy usage during operation | 14% | 0.0017% | Low |
| Operation | Scope 1 - Composting emissions | 78% | 0.0093% | Medium |
| Decommissioning | Scope 1 - Fuel usage during decommissioning | 66% | 0.0066% | Low |
| Decommissioning | Scope 3 – Infrastructure waste | 18% | 0.0018% | Low |

## 8.2 EP regulation compliance

The risk assessment within this report focused on higher-risk emission sources. The higher risk emission sources had a qualitative risk category assigned to understand the risk exposure. Mitigation and management practices have been applied to the identified risks to reduce greenhouse gas emissions from the Project.

All risks have been reduced to a maximum level of medium. The mitigations are part of the Project and have been considered within the scope and budget of the development. The residual risk of the GHG emissions from the Project detailed within this report meets the requirements and intent of reduction of environmental impact.

## 8.3 Contribution to meeting Queensland's environmental targets

The annual greenhouse gas emissions in Queensland were reported to be 124.1 $MtCO_2e$ in 2022. The Australian and state governments have committed to decarbonisation targets of net-zero by 2050. The Project's emissions

relative to state and national reported numbers is 16,454 t $CO_2e$ per year of operation which is 0.0133 percent. Section 6 details how the project has reduced the risk of its emissions, which is summarised in Table 8-1.

Reduction of the total Project emissions should be further investigated and confirmed as details of design, logistics, lower carbon fuels and using solar rather than diesel generators are finalised. To meet the Queensland target of net-zero by 2050, the Project must implement the below mitigations, or similar:

– Use of solar and batteries for operational energy, target of net-zero by 2050
– Calculate the avoided carbon from industrial fertilisers being offset by the use of the facilities compost product.
– Calculate the carbon sequestration of revegetated areas on site.
– Offset of Scope 3 emissions to reach target of net-zero by 2050.

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# Appendix A

## Greenhouse Gas Inventory

# Bromelton Compost Manufacturing Facility
## GHG emissions inventory

| Emission source | Activity Data | | Emissions (t $CO_2$-e) | | | Total Emissions | Emissions Percentage | |
|---|---|---|---|---|---|---|---|---|
| | Value | Units | Scope 1 | Scope 2 | Scope 3 | (t $CO_2$-e) | (t/t %) | |
| **Construction and Product inputs** | | | | | | | | |
| Diesel consumption of genset | 10,000 | kL | **27,097** | **0** | **0** | 27,097 | 64% | |
| Diesel consumption of genset | 10,000 | kL | **0** | **0** | **6,678** | 6,678 | 16% | |
| Land clearing | 3 | ha | **1,355** | **0** | **0** | 1,355 | 3% | |
| Materials - concrete N32 | 11,162 | t | **0** | **0** | **4,309** | 4,309 | 10% | |
| Materials - Asphalt | 7,314 | t | **0** | **0** | **1,463** | 1,463 | 3% | |
| Materials - Gravel | 45,966 | t | **0** | **0** | **261** | 261 | 1% | |
| Materials - Rock | 16,256 | t | **0** | **0** | **177** | 177 | 0% | |
| Materials - steel (Reo Mesh) | 11 | t | **0** | **0** | **31** | 31 | 0% | |
| Materials - steel (Reo Bar) | 5 | t | **0** | **0** | **15** | 15 | 0% | |
| Materials - PVC | 1 | t | **0** | **0** | **5** | 5 | 0% | |
| Materials - Glass | 50 | t | **0** | **0** | **50** | 50 | 0% | |
| Materials - Cast Iron | 20 | t | **0** | **0** | **32** | 32 | 0% | |
| Materials - Geomembrane | 2 | t | **0** | **0** | **14** | 14 | 0% | |
| Materials - Lime | 26 | t | **0** | **0** | **21** | 21 | 0% | |
| Materials transport | 4,040,668 | tkm | **0** | **0** | **292** | 292 | 1% | |
| Waste transport | 202,033 | tkm | **0** | **0** | **15** | 15 | 0% | |
| Worker transport | 5 | kL | **0** | **0** | **3** | 3 | 0% | |
| Waste (C&D) | 4,041 | t | **0** | **0** | **808** | 808 | 2% | |
| **Total emissions - construction** | | | **28,453** | **0** | **14,172** | **42,625** | **36,536** | Town Planning Re |
| | | | | | | | **Annual rate** | 1.17 |
| **Operation and Maintenance - annual** | | | | | | | | |
| Electricity from grid (QLD) | 3,000,000 | kWh | **0** | **2,130** | **0** | 2,130 | 14% | |
| Electricity from grid (QLD) | 3,000,000 | kWh | **0** | **0** | **300** | 300 | 2% | |
| Worker transport | 1 | kL | **0** | **0** | **1** | 1 | 0% | |
| Composting | 250,000 | t | **11,500** | **0** | **0** | 11,500 | 78% | |
| Materials transport | 12,500,000 | tkm | **0** | **0** | **903** | 903 | 6% | |
| **Total emissions - operation** | | | **11,500** | **2,130** | **1,204** | **14,834** | **445,021** | Design life of 30 y |
| | | | | | | | **Total design life** | |
| | | | | | | | | 30 |
| **End of life / decommissioning** | | | | | | | | |
| Diesel consumption of genset | 3,000 | kL | **8,129** | **0** | **0** | 8,129 | 66% | |
| Diesel consumption of genset | 3,000 | kL | **0** | **0** | **2,003** | 2,003 | 16% | |
| Waste (C&D) | 11,277 | t | **0** | **0** | **2,255** | 2,255 | 18% | |
| Waste transport | 563,862 | tkm | **0** | **0** | **41** | 41 | 0% | |
| Recycling benefit from construction - steel | 8 | t | **0** | **0** | **-23** | -23 | 0% | |
| Recycling transport | 395 | tkm | **0** | **0** | **0** | 0 | 0% | |
| | | | | | | | | |
| | | | | | | | | |
| **Total emissions - decommissioning** | | | **8,129** | **0** | **4,277** | **12,406** | **10,634** | Assume the sam |
| | | | | | | | | 1.17 |
| **Total emissions** | | | **381,582** | **63,900** | **54,570** | **500,052** | | |

# Appendix B

## Abatement Plan

# Project Abatement Plan

The below Greenhouse Gas Abatement Plan has been developed in accordance with Appendix A of the **Queensland Greenhouse Gas Guidelines**.

## Project details

The Bromelton Compost Manufacturing Facility (the Bromelton CMF Project) is a proposed 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 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 and OW technologies. A summary of the key components of the Project is outlined in Table 1-1.

***Table B.1 Summaries key Bromelton CMF Project components***

| Project Component | Details |
|---|---|
| **Lot on Plan** | Lot 4 on Plan RP85497 and Mitchell Road (Local government managed road) |
| **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<br>The site will be split into 3 different processing areas: Receival, decontamination and composting utilising Forced Aeration Pad system. |
| **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:<br>Garden, Food and Wood wastes and manure.<br><br>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:<br>– 100,000 tpa of garden organics (GO) composted by Passive Open Windrow (OW) method.<br>– 150,000 tpa of Food Organics and Garden Organics (FOGO) is to be processed on a Forced Aeration Pad system .<br>Wood wastes and manure will make up a small portion of the composting feedstocks and will be blended with the GO and FOGO based on onsite capacity.<br>VENM will be received and stored as required based on demand of finished products. |

| Project Component | Details |
|---|---|
| | Due to the seasonal nature of feedstock generation, up to 11% 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<br>– Weigh bridges<br>– Internal road network<br>– Maintenance and storage shed<br>– Final screening and manufacturing area<br>– Water tanks<br>– Aeration Pad system<br>– Office, carparking and amenities<br>– FOGO receival area<br>– 3 x leachate ponds<br>– 1 x freshwater dam<br>– Open windrows pad<br>– FOGO maturation pad<br>– Hardstand areas<br>– Retaining wall<br>– Upgrade of Mitchell Road |
| **Hours of Operation** | Monday – Friday 6am to 6pm<br>Saturday – 6am to 4pm<br>Sunday and public holidays 9am - 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<br>Late 2025 – 30th January 2026 |

# Emissions projections and commencing abatement measures

***Table B.2 Project Greenhouse gas total emissions***

| Project phase | Duration | Emissions (t $CO_2e$) | | | | |
|---|---|---|---|---|---|---|
| | | Scope 1 | Scope 2 | Scope 3 | Total | Total per year |
| Construction phase for Bromelton Compost Manufacturing Facility | 14 months | 34,336 | 0 | 14,898 | 49,234 | 42,200 |
| Operational phase (30 years) | Annual | 11,500 | 3,550 | 1,404 | 16,454 | - |
| Decommissioning | 14 months | 8,129 | 0 | 5,651 | 13,780 | 11,812 |
| **Greenhouse gas indicators** | | | | | | |
| Total life of project | | 387,465 | 106,500 | 62,670 | 556,635 | Project life |

Materials used during the construction phase will be mitigated by reduction in material or reduction/substitution of the material – design optimisation and review of material quantities of each phase of design will be required throughout the project to ensure impacts are mitigated.

Fuel consumption should be mitigated by replacing diesel generators with solar and batteries, and conversion of vehicle fleet to electric where possible.

Measures to be implemented should include:

- Select vehicles and heavy equipment with higher fuel conversion efficiency and lower greenhouse gas emissions.
- Mobilise vehicles and equipment from nearby locations to minimise greenhouse gas emissions associated with transport where possible.
- Minimise clearance of vegetated areas to reduce environmental impact.

# Greenhouse gas emissions reference point

Reference points for greenhouse gas emissions reduction include:

– Construction:
  - A industry default baseline of 100,000 $tCO_2$-e per year applies to facilities covered by the Safeguard Mechanism (it is unlikely this facility will be covered by the Safeguard Mechanism).
  - This facility is only estimated at ~40 $tCO_2$-e per year, so this will be used as the project specific baseline.
– Operation and decommissioning:
  - The projected emissions summarised in Table B.1 above will be considered as reference points for the operation and decommissioning phases of the Project.

The reference points above have been selected based on initial Project information without taking into consideration management and abatement planning. These numbers will form a baseline and assessed throughout the life of the Project. The emissions associated with the Project will be reviewed annually.

# Emission reduction targets

### Interim Scope 1 and Scope 2 greenhouse gas emission reduction targets

– 2030 Target:
  - Reduce emissions by at least 30 percent below 2005 levels
– 2035 Target:
  - Achieve a 75 percent reduction in emissions by 2035

### Long-term overall Scope 1 and Scope 2 greenhouse gas emission reduction targets

– 2050 Target:
  - Reach net-zero emissions by 2050

When annualising Scope 1 emissions, the construction phase of this Project is not captured by the Commonwealth Safeguard Mechanism for covered emissions. Emissions associated with the operations of the compost manufacturing facility are minimal – and do not negatively impact the Queensland Government's targets for emissions reduction. On the contrary, this Project will assist with meeting the Queensland Government's targets as presented above.

# Greenhouse gas emission reduction program

### Scope 1 emission reduction measures

– Fuel:
  - Avoid stationary fuel use through solar and battery arrangements
  - Select heavy equipment and vehicles with higher fuel conversion efficiency and lower greenhouse gas emissions
  - Implement regular maintenance schedules to ensure optimal performance and fuel efficiency of all machinery.
– Operational practices:
  - Optimise operational schedules to reduce idle times and unnecessary fuel consumption
  - Educate operators on efficient driving and equipment handling techniques to minimize fuel use
  - Regular maintenance of equipment to ensure optimal performance and minimize emissions.
– Alternative fuels:
  - Use biofuels or other low-carbon alternatives where feasible
  - Explore the use of electric or hybrid vehicles for on-site transportation.

– Vegetation management:
  - Reuse of removed vegetation will be encouraged
  - Offset carbon emissions.

### Scope 2 emission reduction measures

– Renewable energy:
  - Source electricity from renewable energy providers
  - Install on-site renewable energy systems, such as solar panels, to power facilities.
– Energy efficiency:
  - Implement energy-efficient lighting, heating, and cooling systems in all buildings
  - Use energy management systems to monitor and optimize electricity use.
– Demand management:
  - Schedule high-energy activities during off-peak hours to reduce strain on the grid and associated emissions
  - Implement load-shifting strategies to balance energy use throughout the day.

### Scope 3 emission reduction measures

– Supply chain:
  - Obtain more granular source data (e.g. not based on expenditure) in order for Scope 3 emissions to be more accurately modelled. For example shift the accounting approach from spend-based method to average data method.
  - Awareness raising: Engage with suppliers to ensure that they understand the impacts of their carbon footprint, and that their businesses are aligned with the Queensland Government's emissions reduction targets.
  - Undertake a supply chain analysis – to assess whether suppliers are compliant with their sustainability and emissions management policies and strategies to drive Scope 3 emissions transparency and due diligence checks.
  - Consider sustainable procurement, i.e. to engage suppliers who are Climate Active certified, or are able to supply products that have accompanying Environmental Product Declaration.
  - For Scope 3 emissions associated with the combustion of fuels (i.e. Scope 1 emissions), should the reduction measures presented in the Scope 1 emissions reduction section above be implemented, then there will be consequential reductions in the associated Scope 3 emissions component.

Regularly report on progress and adjust strategies as needed to meet reduction targets.

## Advancing technologies and opportunities

Further assessment is required in future phases to understand where future impacts can be avoided, reduced, substituted or offset. At this point in time, additional abatement measures are considered limited. The Project will continue to look for opportunities to mitigate carbon emissions throughout the Project.

# Monitoring and auditing

Monitoring of the Project is broken into the three phases.

The **construction phase** of the Project will be monitored to ensure that the estimated greenhouse gas emissions targeted will be met.

Individual companies involved in the Project must meet their NGER reporting requirements. The Project must request for all third parties (e.g. contractors) to provide a summary of their Scope 1 and 2 emissions annually, for the purposes of the Project's own assessment on whether they will need to report for contractors' emissions under the NGERS legislation.

The **operation phase** of this Project will be monitored to report on both greenhouse gas emissions from its facilities as well as energy produced and exported in line with the requirements of the *National Greenhouse and Energy Reporting Act 2007* throughout the construction phase of the Project. The Project must have an annual review of the total Scopes 1 and 2 emissions at the minimum to ascertain reporting obligations under the NGERS. Further under the greenhouse gas Protocol, year-on-year comparisons are considered good practice (WRI and WBCSD, 2004).

greenhouse gas Inventory: Maintain a comprehensive greenhouse gas inventory to track emissions against the established reference points during operation and decommissioning phases.

The **decommissioning phase** of the Project will be monitored to ensure that the Project does not negate the emissions avoidance implemented during the operation phase. Any related activities to be undertaken during decommission phase must be minimised in as far as possible, based on any engineering and technological advances current in the future. During **all phases** auditing of greenhouse gas emissions and the relevant monitoring should be undertaken annually to allow for transparency of data accuracy.

# Reporting

Contractors and involved companies will be required to undertake NGERS reporting where their greenhouse gas emissions exceed the 25,000 tCO2-e threshold or is covered by the safeguard mechanism with emissions exceeding the 100,000 tCO2-e threshold (during a financial year period). A baseline emission intensity will be generated for all phases of the Project's activities.

Regular reporting: report progress at regular intervals to stakeholders and regulatory bodies, ensuring transparency and accountability.

The Project is required to develop a reporting plan outlining which its obligations to report for contractors under the NGERS.

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The Power of Commitment

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

# Bromelton Compost Manufacturing Facility

## Groundwater Assessment

SOILCO Pty Ltd

13 August 2024

→ The Power of Commitment



| Project name | | Bromelton Compost Manufacturing Facility | | | | | |
|---|---|---|---|---|---|---|---|
| Document title | | Bromelton Compost Manufacturing Facility \| Groundwater Assessment | | | | | |
| Project number | | 12626213 | | | | | |
| File name | | 12626213-REP Groundwater Assessment.docx | | | | | |
| Status Code | Revision | Author | Reviewer | | Approved for issue | | |
| | | | Name | Signature | Name | Signature | Date |
| S4 | A | I Braithwaite<br>M Prskalo | M Prskalo | On file | E Rothwell | On file | 26/06/2024 |
| S4 | 0 | M Prskalo | M Prskalo |  | E Rothwell |  | 13/08/2024 |

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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

N

GHD

SOILCO
The Life-Giving Soil Company

**SOILCO Pty Ltd**
**Bromelton Compost Manufacturing Facility**

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

## Project area and locality

# FIGURE 1-1

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Print date: 08 Aug 2024 - 14:15

Data source: DoR: rail, watercourse (2023), cadastre (2024), road (2021); SoilCo: project area (2024); World Imagery: Earthstar Geographics public/NSW_POI: © Department of Finance, Services & Innovation 2018 nearmap.com: extracted 8/08/2024 . Created by: mvandermerwe

# 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<br>– The site will be split into 3 different processing areas: Receival, 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:<br>– Garden, Food and Wood wastes and manure.<br>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:<br>– 100,000 tpa of garden organics (GO) composted by Passive Open Windrow (OW) method.<br>– 150,000 tpa of Food Organics and Garden Organics (FOGO) is to be processed on a Forced Aeration Pad system (ASP).<br>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.<br>VENM will be received and stored as required based on demand of finished products.<br>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<br>– Weigh bridges<br>– Internal road network<br>– Maintenance and storage shed<br>– Final screening and manufacturing area<br>– Water tanks<br>– Aeration Pad system<br>– Office, carparking and amenities<br>– FOGO receival area<br>– 3 x leachate ponds<br>– 1 x freshwater dam<br>– Open windrows pad<br>– FOGO maturation pad<br>– Hardstand areas<br>– Retaining wall<br>– Upgrade of Mitchell Road |
| Hours of Operation | Monday – Friday 6 am to 6 pm<br>Saturday – 6 am to 4 pm<br>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:<br>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 $m^2$ 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 $m^2$ with an area of 9,000 $m^2$ for garden organics receival 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 $m^2$ 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 receivals 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:<br>– Groundwater is at such a significant depth that it will not be impacted by leaching or percolation of contaminants or<br>– The geotechnical composition of the composting pad surface and / or subsurface is sufficiently impermeable so that groundwater will not be impacted.<br>An adequate hard stand area is used to prevent the leaching of contaminants to groundwater.<br>Where soil permeability creates a risk of groundwater contamination, liners and leachate management systems are installed.<br>Adequate erosion and sediment control measures are implemented and maintained to minimise contact of surface water with groundwater.<br>Adequate direction of stormwater management around contamination sources is achieved.<br>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)<br>– Lot 22 SP121037 – cattle grazing<br>– Lot 21 SP121037 – cattle sale yards (Beaudesert sale yards<br>– Lot 51 SP213384 – industrial<br>– Lot 1 RP80463 and Lot 100 SP223082 – industrial use. Owned by National Hide Processors Pty Ltd, subject to EA EPPR00456613:<br>• 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<br>• 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<br>– 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:<br>• ERA 15 – Fuel burning; Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour<br>• 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<br>• 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.

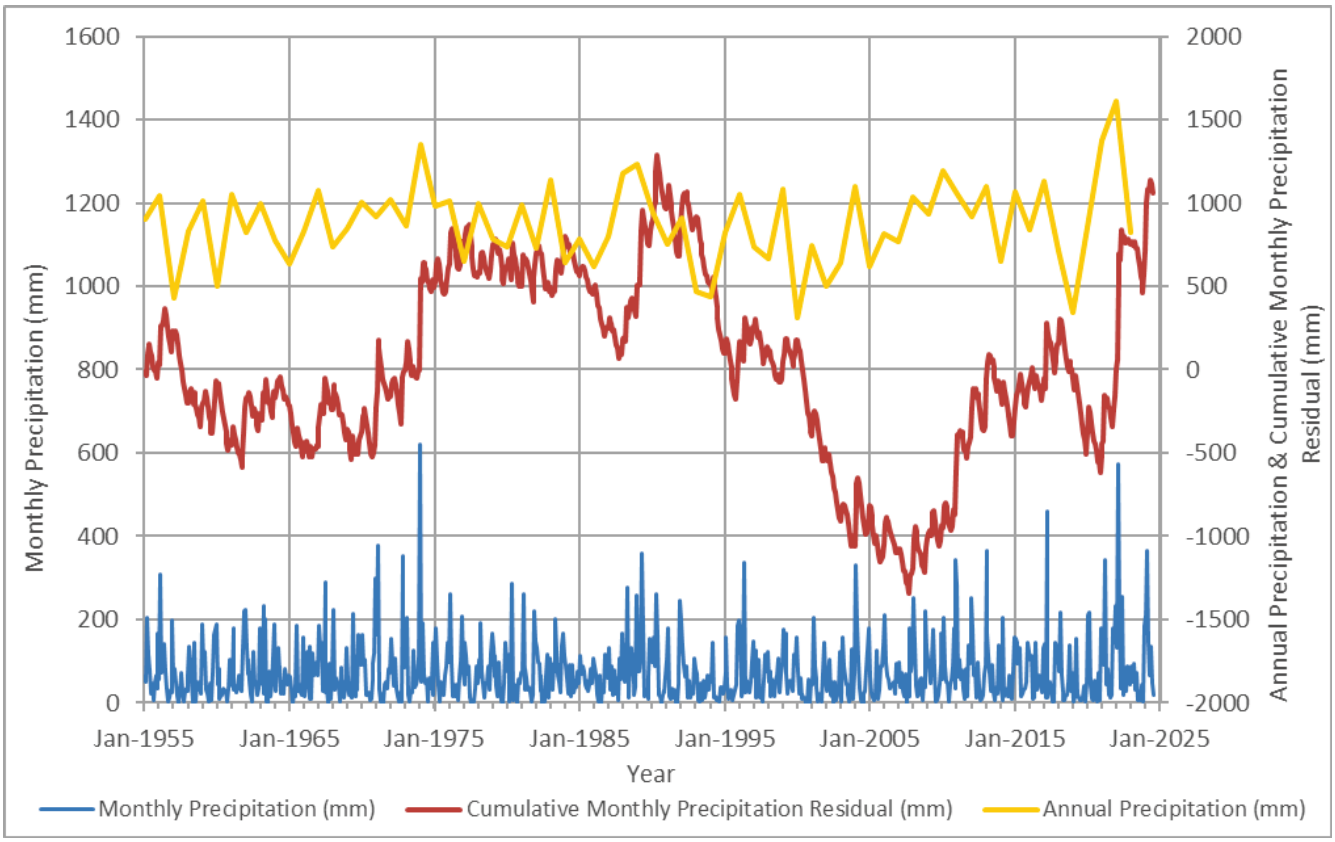



*Figure 4.1* ***Cumulative Rainfall Residual – SILO data (point -28.00, 152.90)***

## 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.

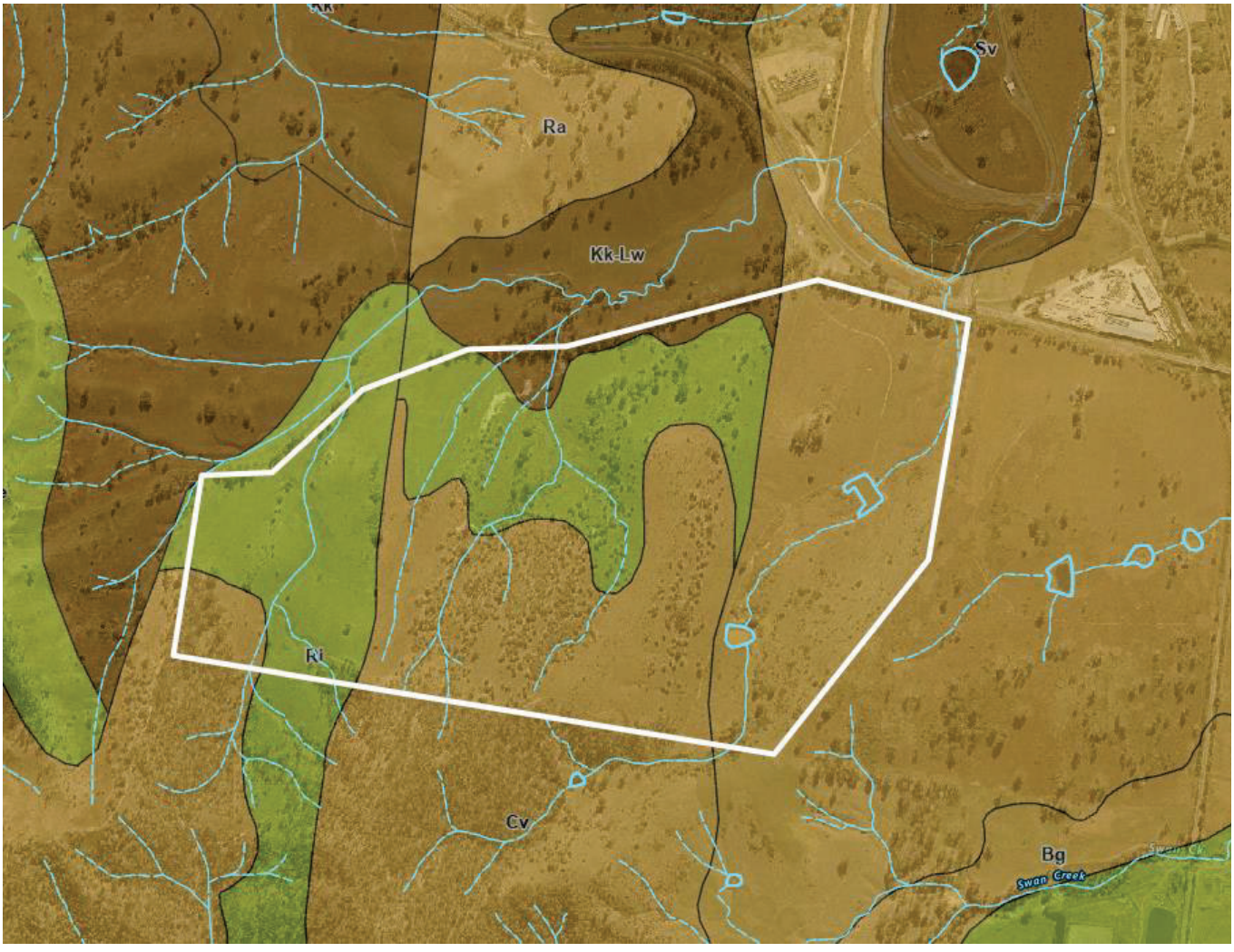



*Figure 4.3 Soils mapping (1:50,000 scale Australian Soil Classification, via QLD Globe)*

## 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.

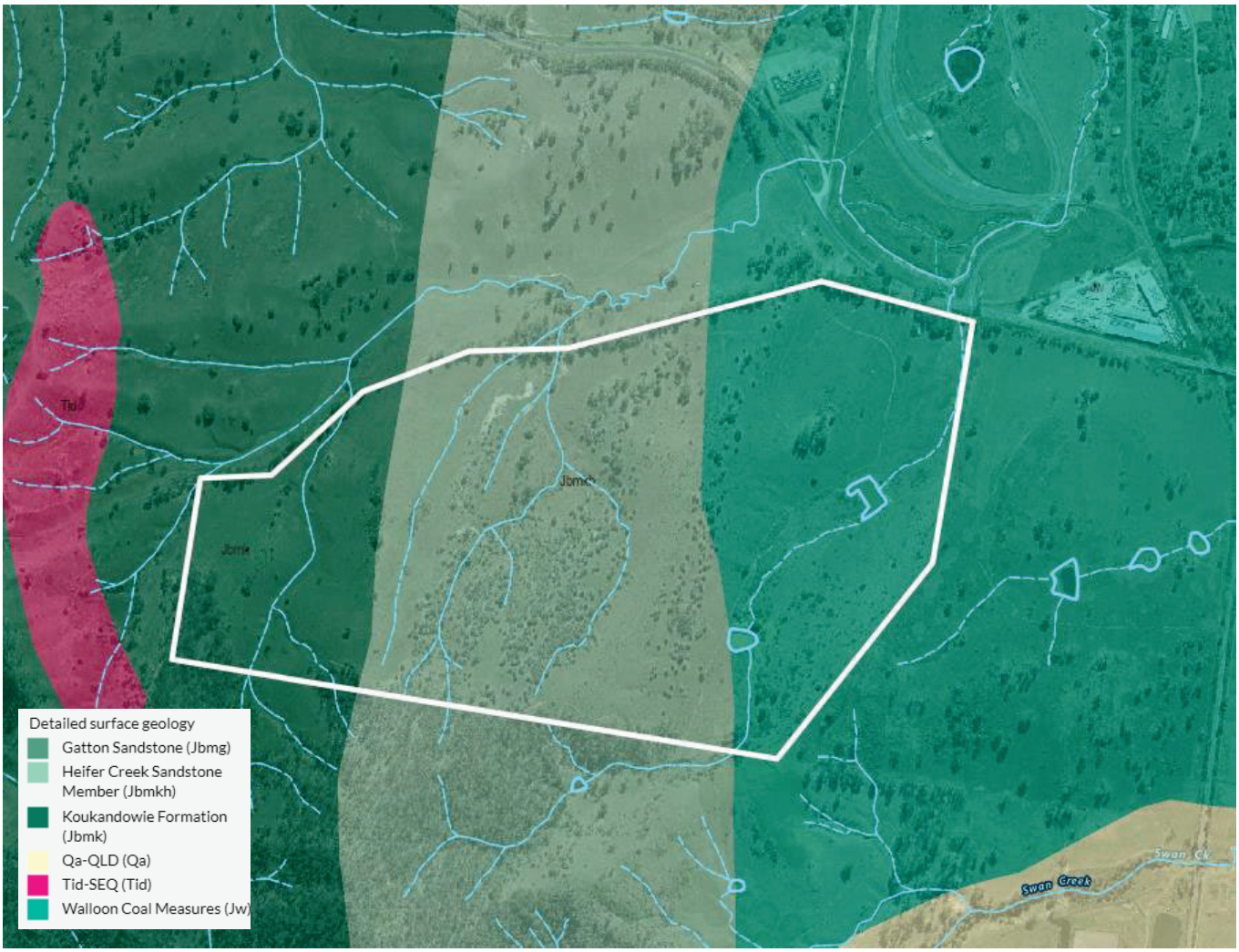



*Figure 4.4 1:100K geological mapping (QLD Globe, 2024)*

# 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):<br>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:<br>1. The finer grained components of the formation tend to contain more salt due to the some of the sedimentary depositional environment<br>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.<br>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 |

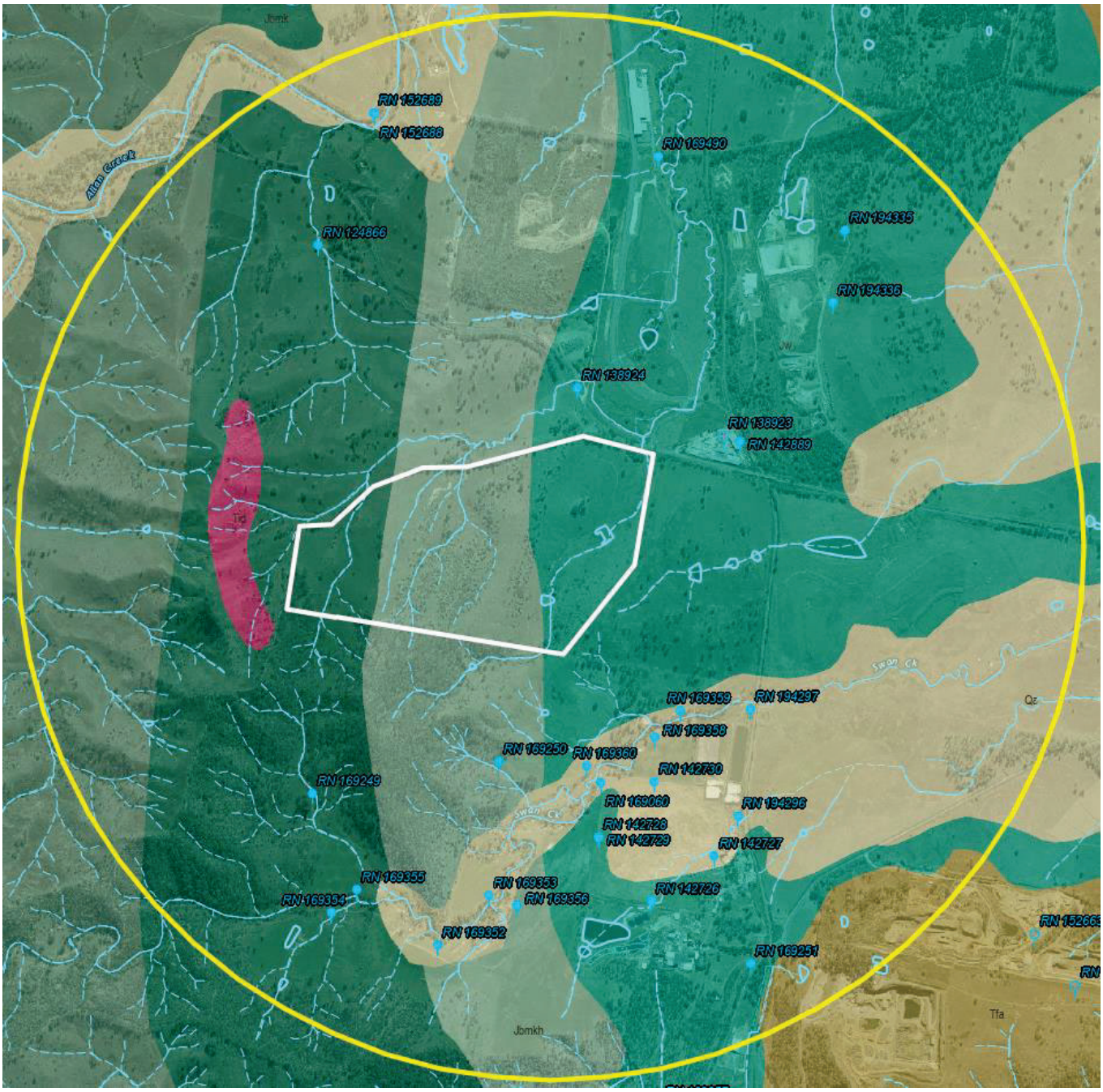



*Figure 4.5 Registered groundwater bores (Queensland Globe, 2024)*

## 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:<br>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.<br>– If groundwater is likely to be intercepted during construction, design of the facility should include management of excavation walls, and seepage controls.<br>– The contractor must prepare a Groundwater Management Plan |
| Excavations:<br>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.<br>– 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<br>– 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.<br>– 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.<br>– All imported fill must be certified as 'clean', prior to entering the site, and is to be free of debris, weeds and potential contaminants.<br>– 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.<br>– 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:<br>• 600 mm thick recompacted clay with a permeability of less than 10-9 m/s; or<br>• A high-density polyethylene geomembrane liner with a minimum thickness of 1.5 mm.<br>– The facility will have a designated leachate management system, as per the QLD ERA 53 Organic material processing guidelines.<br>– 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.<br>– 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 $1x10^{-9}$ m/s
– Leachate ponds will be lined with low permeability material (either recompacted clay or HPDE) to achieve a minimum hydraulic conductivity of $1x10^{-9}$ 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.

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# Appendix A

## Summary table – Registered groundwater bores

| 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) | SWL (mbgl) | Conductivity |
| 124866 | 3/09/2005 | 490838 | 6906601 | WS | EX | | | 0 | 1 | TOP SOIL | ALLAN CREEK ALLUVIUM | | | | 3 | Potable |
| | | | | | | | | 1 | 6 | SANDY LOAM | | | | | | |
| | | | | | | 6 | 11 | 6 | 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 | 9 | 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 | 7.8 | 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 | 3.5 | 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 | 4.6 | 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 | 4.8 | 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 | 4.6 | 12 | FINE TO MEDIUM SAND | | 9 | | | | |
| 142889 | 15/11/2011 | 492815 | 6905688 | WS | EX | | | 0 | 6 | SANDY LOAM | | | | | 8 | 2300 |
| | | | | | | 8 | 14 | 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 | 45 | 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) | SWL (mbgl) | Conductivity |
| 152688 | 11/05/2014 | 491103 | 6907213 | SM | EX | | | 0 | 0.5 | BROWN SANDY TOPSOIL | ALLAN CREEK ALLUVIUM | | | | 9 | 2400 |
| | | | | | | | | 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 | 19.5 | 15 | 16 | FINR 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 | 2400 |
| | | | | | | | | 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 | 18.5 | 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 | BROWN SANDSTONE | KOUKANDOWIE FORMATION | | | | | |
| 169060 | 3/07/2015 | 492165 | 6904098 | SM | EX | | | 0 | 2 | BLACK CLAY | QUATERNARY - UNDEFINED | | | | 4 | |
| | | | | | | | | 2 | 5 | BROWN SANDY LOAM | | | | | | |
| | | | | | | 6 | 12 | 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 | 650 |
| | | | | | | | | 5 | 11 | DARK GREY SANDSTONE | | | | | | |
| | | | | | | 11 | 14 | 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 | 3800 |
| | | | | | | 11.5 | 17.5 | 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 | 4800 |
| | | | | | | | | 2 | 4 | ORANGE BROWN SILTSTONE/SANDSTONE | WALLOON COAL MEASURES | | | | | |
| | | | | | | | | 4 | 18 | LIGHT GREY SILTSTONE/SANDSTONE | | | | | | |
| | | | | | | | | 18 | 38 | DARK GREY SILTSTONE/SANDSTONE | | | | | | |
| | | | | | | 38.5 | 41.5 | 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 | | | | | | |
| | | | | | | 8 | 11 | 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 | | | | | | |
| | | | | | | 9 | 15 | 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 | 4 | 11 | 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) | SWL (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

Log ID # 55805652

Authorisation details

Registered number ..... Development permit number ..... Works reference number .....

## SECTION A—LOCATION DETAILS

Name of landholder: Soilco Infrastructure Queensland Pty Ltd  Phone No.: 0432348332

Postal address: -  Postcode: -

Real property address: 2603 BEAUDESERT BOONAH RD,BROMELTON  Postcode: 4285

Real property description Lot: -  Plan: -  or Bore location GPS. Latitude:  Longitude:  Datum: WGS84

Easting: 4169951  Northing: 6315431  Zone: 55S

## 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) | Location (metres) From | To |
|---|---|---|
| 201 | 0 | 40 |
| | | |
| | | |
| | | |

## SECTION E—CASING DETAILS

| Type (PVC, steel etc) | Size O.D. (mm) | Wall thickness (mm) | Location (metres) From | To |
|---|---|---|---|---|
| PVC N 9 | 141 | 4.65 | 0 | 18 |
| | | | | |
| | | | | |
| | | | | |

## SECTION F—CENTRALISERS

| Type | Location (metres) From | To |
|---|---|---|
| | | |
| | | |
| | | |

## SECTION G—PERFORATIONS/ SLOTS/ SCREENS

| Type | Size O.D. (mm) | Aperture (mm) | Location (metres) From | To |
|---|---|---|---|---|
| PVC | 141 | 3 | 18 | 39 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## SECTION H—CEMENTING/GRAVEL PACK/ANNULAR FILL DETAILS

| Type & material size | Hole diameter (mm) | Casing diameter (mm O.D.) | Location (metres) From | To |
|---|---|---|---|---|
| GROUT | 201 | 141 | 0 | 6 |
| BENTONITE | 201 | 141 | 6 | 7 |
| GRAVEL | 201 | 141 | 7 | 40 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## SECTION I—BORE PURPOSE

- ☐ Domestic
- ☐ Stock
- ☐ Irrigation
- ☐ Commercial
- ☐ Urban
- ☐ Industrial
- ☑ Other (please specify): DUST SUPRESSIO

## 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) | Water rose to (metres) | Supply (litres/second) | Conductivity (µS/cm)* | pH |
|---|---|---|---|---|
| 18 | 15 | 0.093 | 1400 | - |
| 33 | 21 | 0.487 | 1400 | - |
| | | | | |
| | | | | |

Final Conductivity (µS/cm ): 1400  Final pH: -

*Fresh, brackish or salty. Laboratory testing is recommended before human consumption.

## SECTION L—SUB ARTESIAN BORE ON COMPLETION

Depth to standing water level from ground level: 9 (metres)

Depth to pump suction or bottom of drill stem: 38 (metres)

Type of test used: ☑ Air ☐ Bail ☐ Pump

| Estimated supply | Duration of test | Drawdown level from surface |
|---|---|---|
| 0.487 (litres/second) | 2 (hours) | - (metres) |

## SECTION M—ARTESIAN BORE ON COMPLETION

| Shut-in pressure | Free flow | Temperature |
|---|---|---|
| (kPa) | (litres/second) | (°C) |

## 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 BERCHIE  Driller's licence no.: 3463

Trainee Driller name: SHANE GANNON  Driller's licence no.: -

Signature of driller .....  Date: 10/05/2024

Contractor name: GD WATER SOLUTION



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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 Soilco 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<br>Bromelton Bore |
|---|---|---|
| | *Job No.* | *R4326/1* |
| **pH** | APHA 4500-H⁺-B | 7.89 |
| **Conductivity (EC) (dS/m)** | 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[note 1&2] | 309 |
| **Potassium (mg/L)** | APHA 3125 ICPMS[note 1&2] | 6.45 |
| **Calcium (mg/L)** | APHA 3125 ICPMS[note 1&2] | 71.6 |
| **Magnesium (mg/L)** | APHA 3125 ICPMS[note 1&2] | 100 |
| **Sodium Absorption Ratio (SAR)** | ** By calculation | 5.52 |
| **Chloride (mg/L)** | APHA 3125 ICPMS[note 1&2] | 374 |
| **Sulfate (mg/L $SO_4^{2-}$)** | APHA 3125 ICPMS[note 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)** | ColiBlue Membrane Filtration | <100 |
| **Aluminium (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | 0.028 |
| **Arsenic (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | 0.003 |
| **Cadmium (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | <0.001 |
| **Chromium (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | <0.001 |
| **Copper (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | <0.001 |
| **Iron (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | 0.046 |
| **Manganese (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | 0.019 |
| **Nickel (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | 0.000 |
| **Lead (mg/L)** | Total Available - APHA 3125 ICPMS[note 1&2] | 0.000 |
| **Zinc (mg/L)** | Total Available - APHA 3125 ICPMS[note 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.

NATA
ACCREDITATION
Accreditation No. 14960
Accredited for compliance with ISO/IEC 17025 - Testing

checked: .....
Graham Lancaster
Laboratory Manager



ghd.com

→ The Power of Commitment

**BUSHFIRE HAZARD ASSESSMENT AND MANAGEMENT PLAN**

# Compost Manufacturing Facility, Bromelton

PREPARED FOR
**SOILCO PTY LTD**
**C/- GHD**

AUGUST 2024

Meridian Urban

BUSHFIRE PLANNING



PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

# 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.*

Meridian Urban

# QUALITY STATEMENT

| PROJECT MANAGER | PROJECT TECHNICAL LEAD |
|---|---|
| Laura Gannon | Laura Gannon |

| PREPARED BY | |
|---|---|
| Amy Adamson | 13/08/2024 |

| REVIEWED BY | |
|---|---|
| Laura Gannon | 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

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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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 |

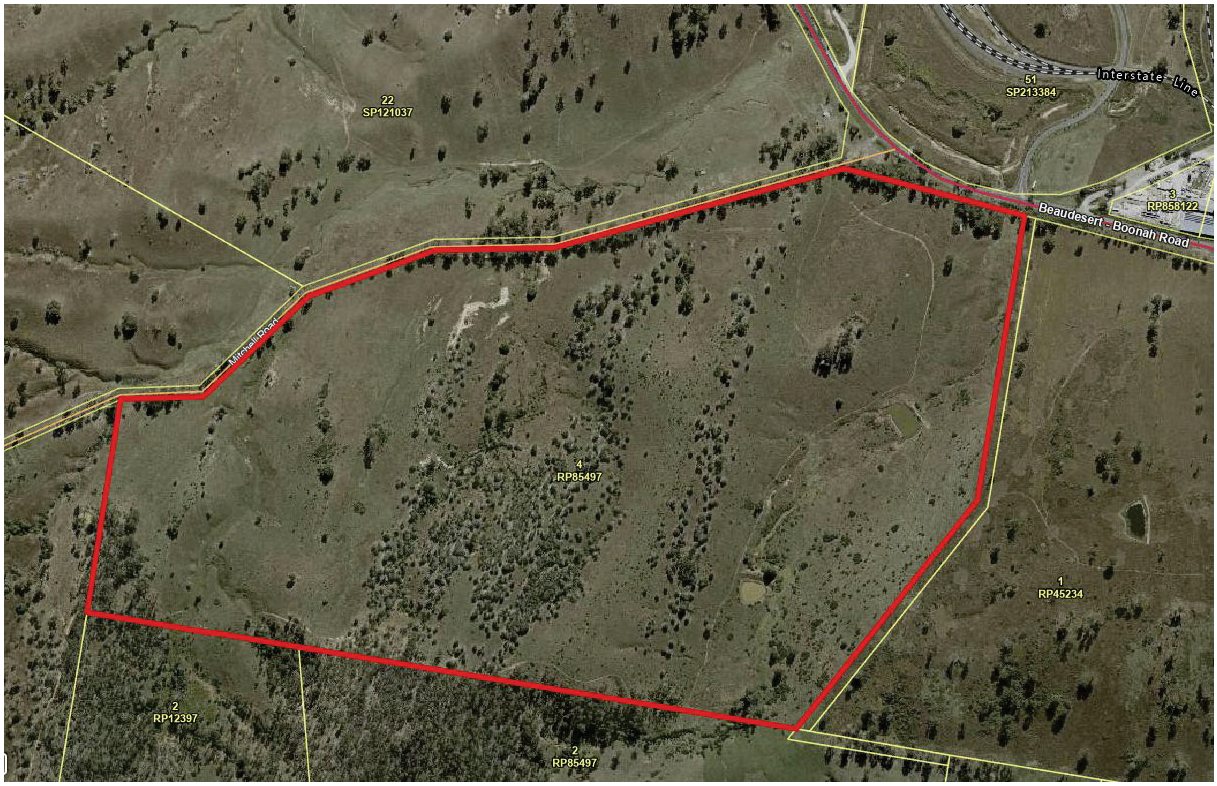



**Figure 1 - The Site**

*(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.

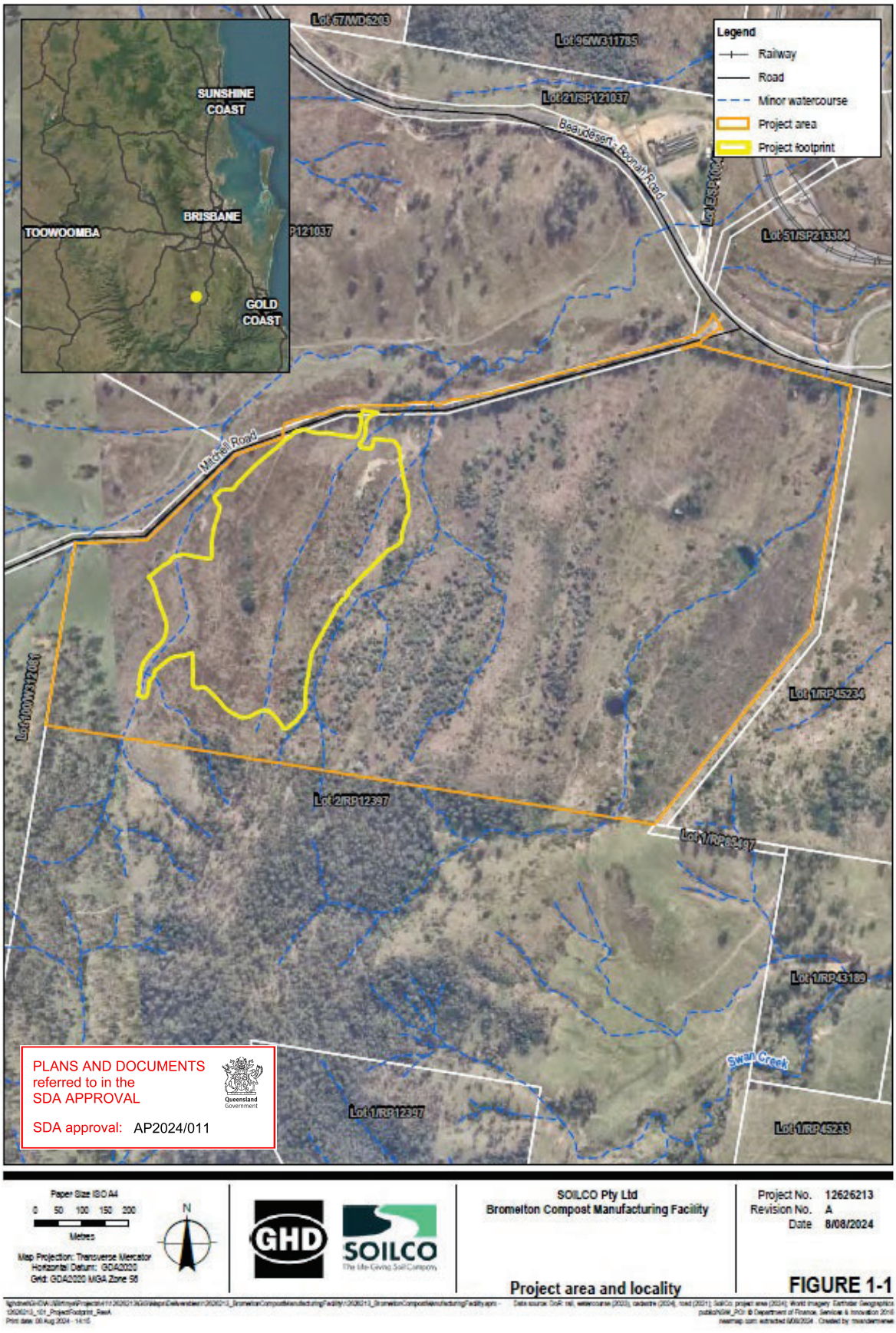



**Figure 2 - Development Footprint**

(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 receival, 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.**

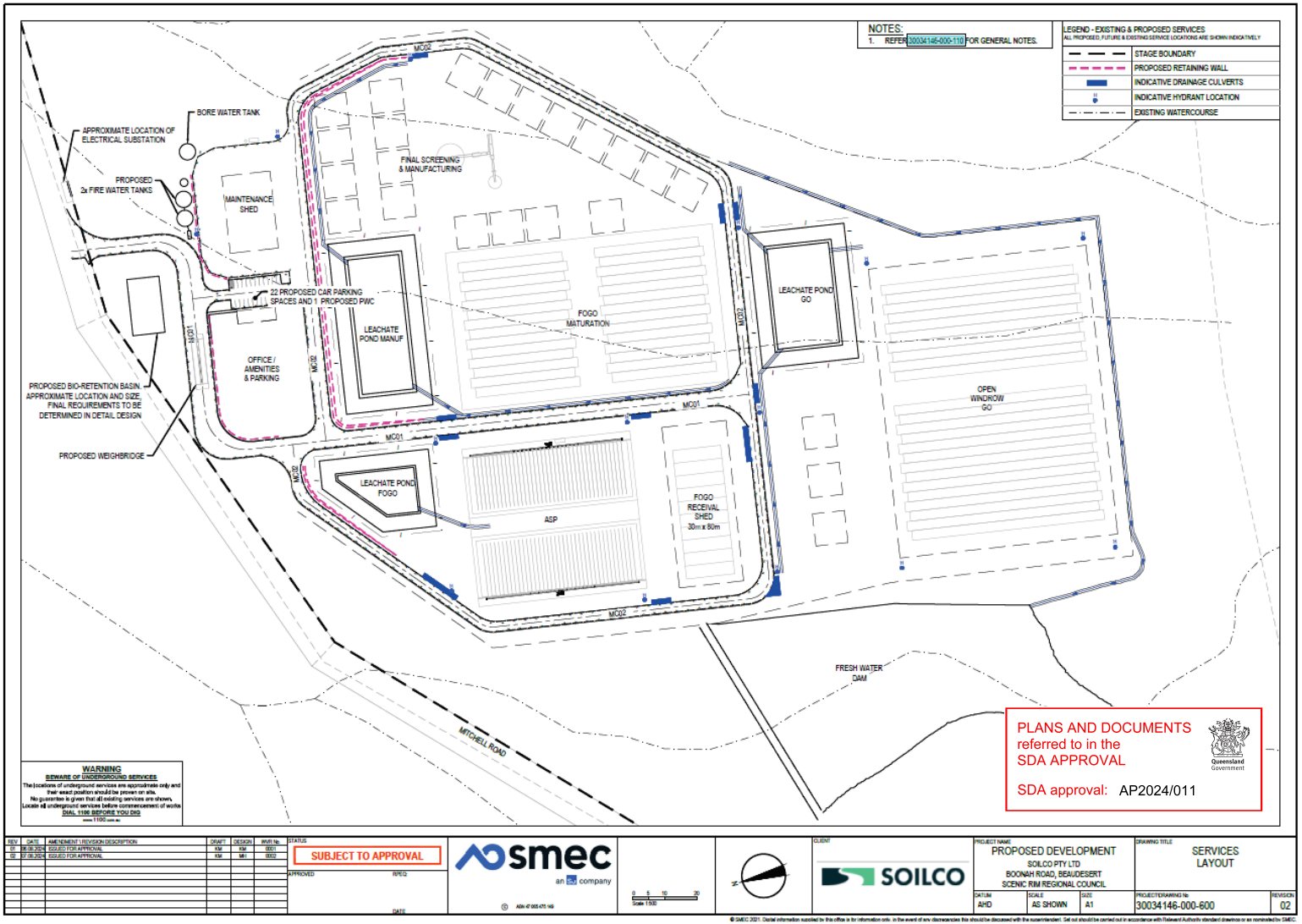



**Figure 4 - Proposed Development Plan**

*(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.

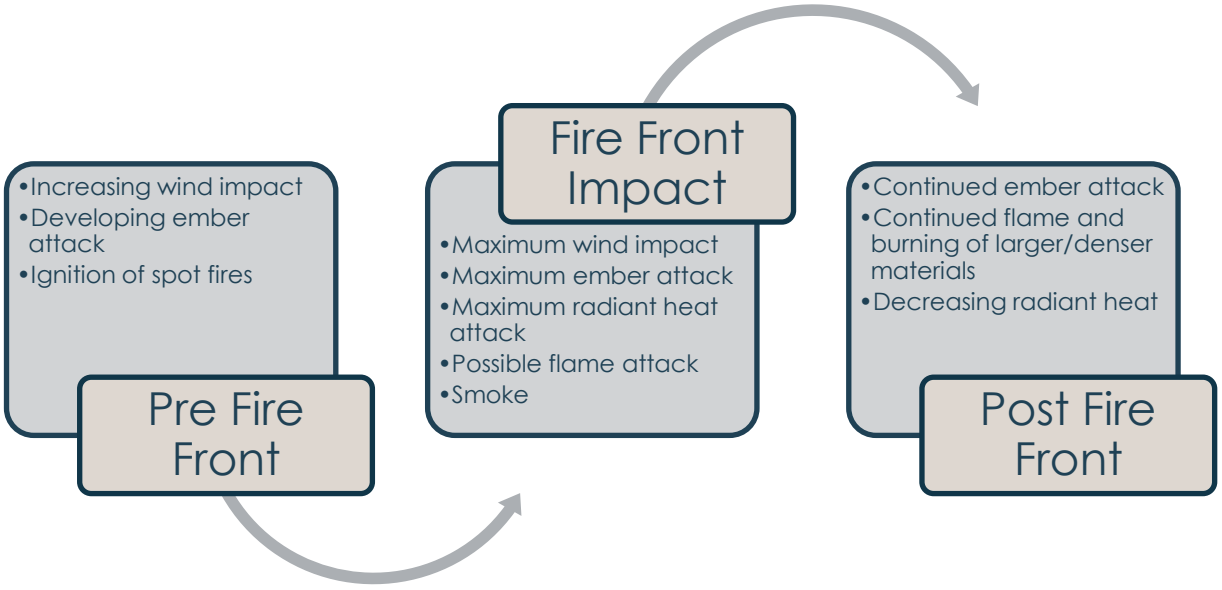



**Figure 5 – The Typical Phases of Bushfire Attack**

*(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/m²) | 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 inform[1] 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.

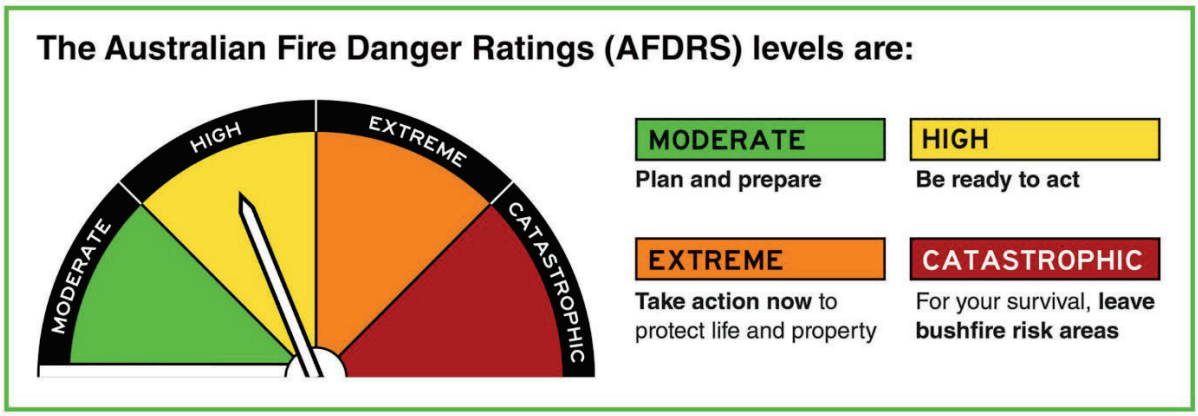



**Figure 7 – Australian fire danger rating system**

*(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:<br>…<br>(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:<br>(1) Development, in accordance with current best practice:<br>(a)identifies relevant natural hazards that may impact upon the development<br>(b)appropriately manages risk associated with the identified hazards and<br>(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).

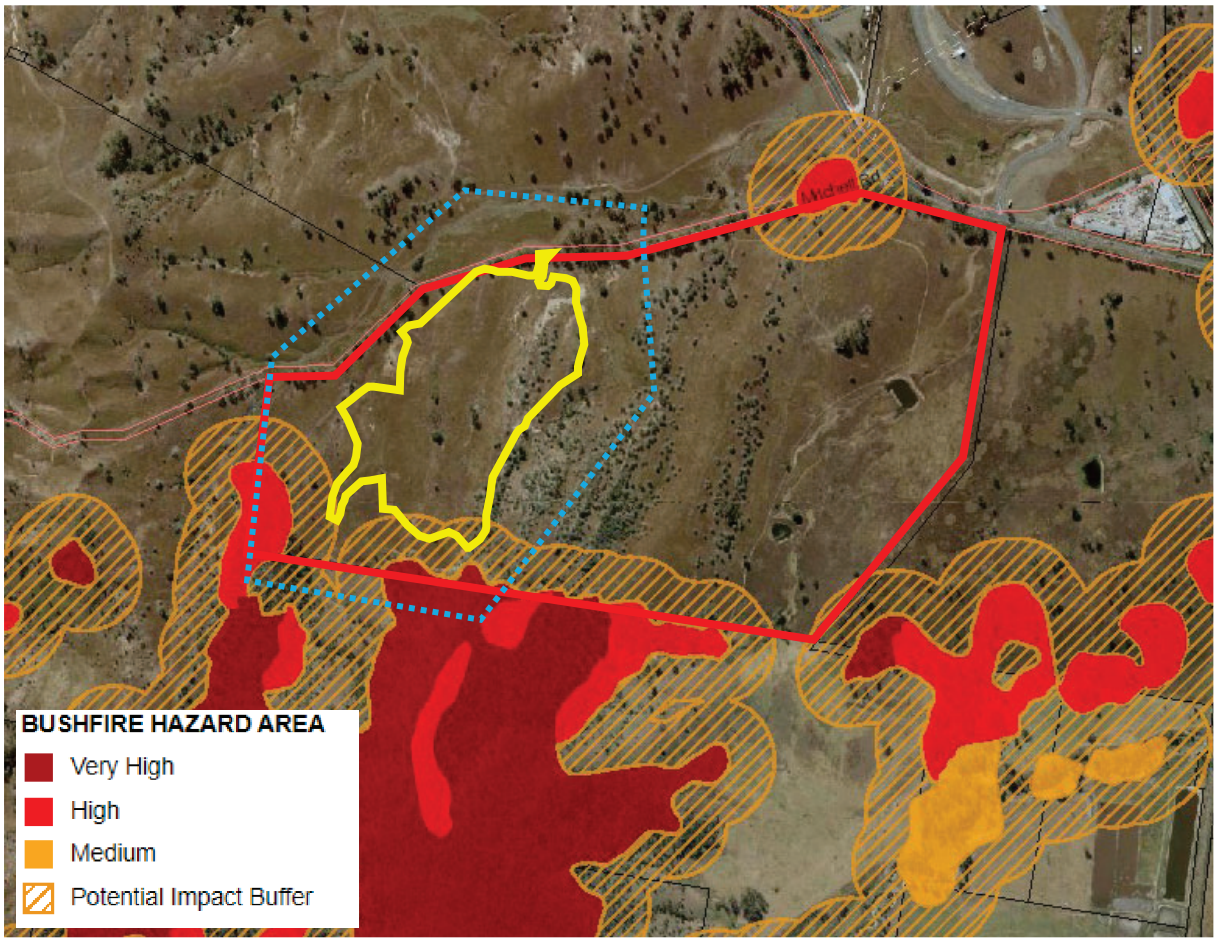



**Figure 8 - Extract from the Bushfire Hazard Overlay Map**

*(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 encroach 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.

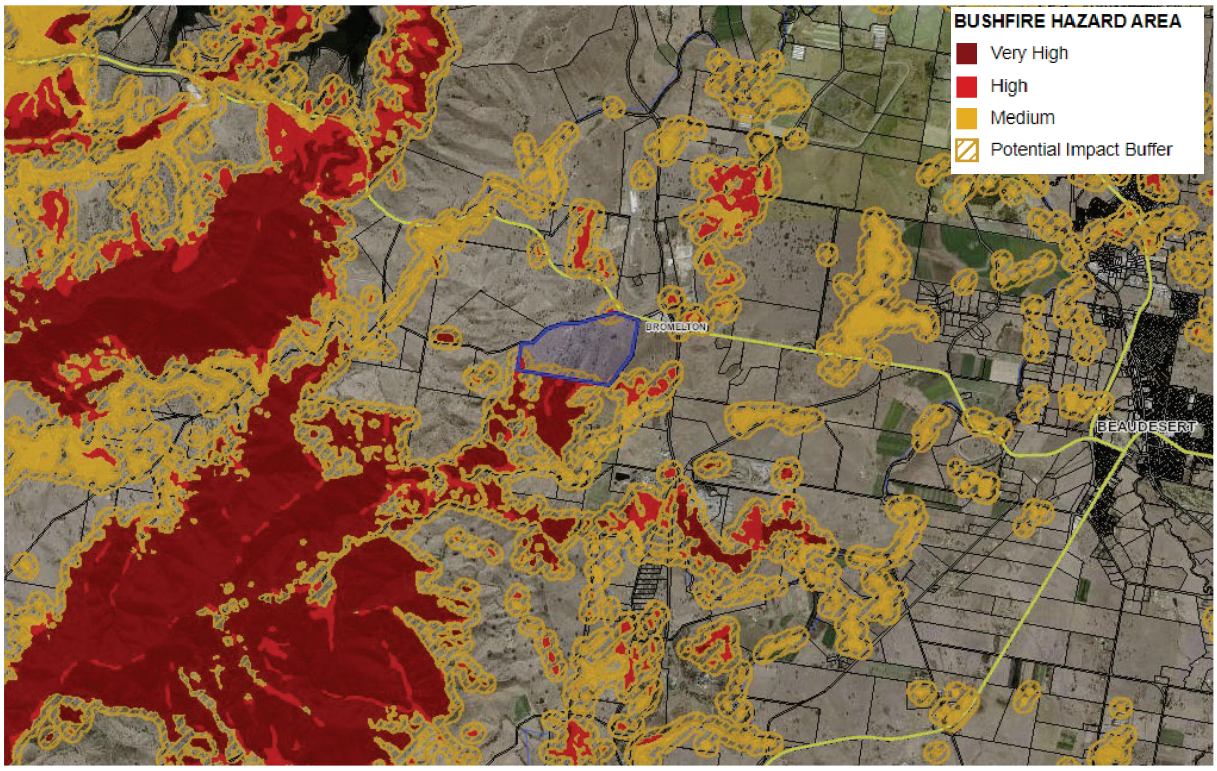



**Figure 9 - Bushfire Hazard in the Wider Locality**

*(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.

Whist 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.**

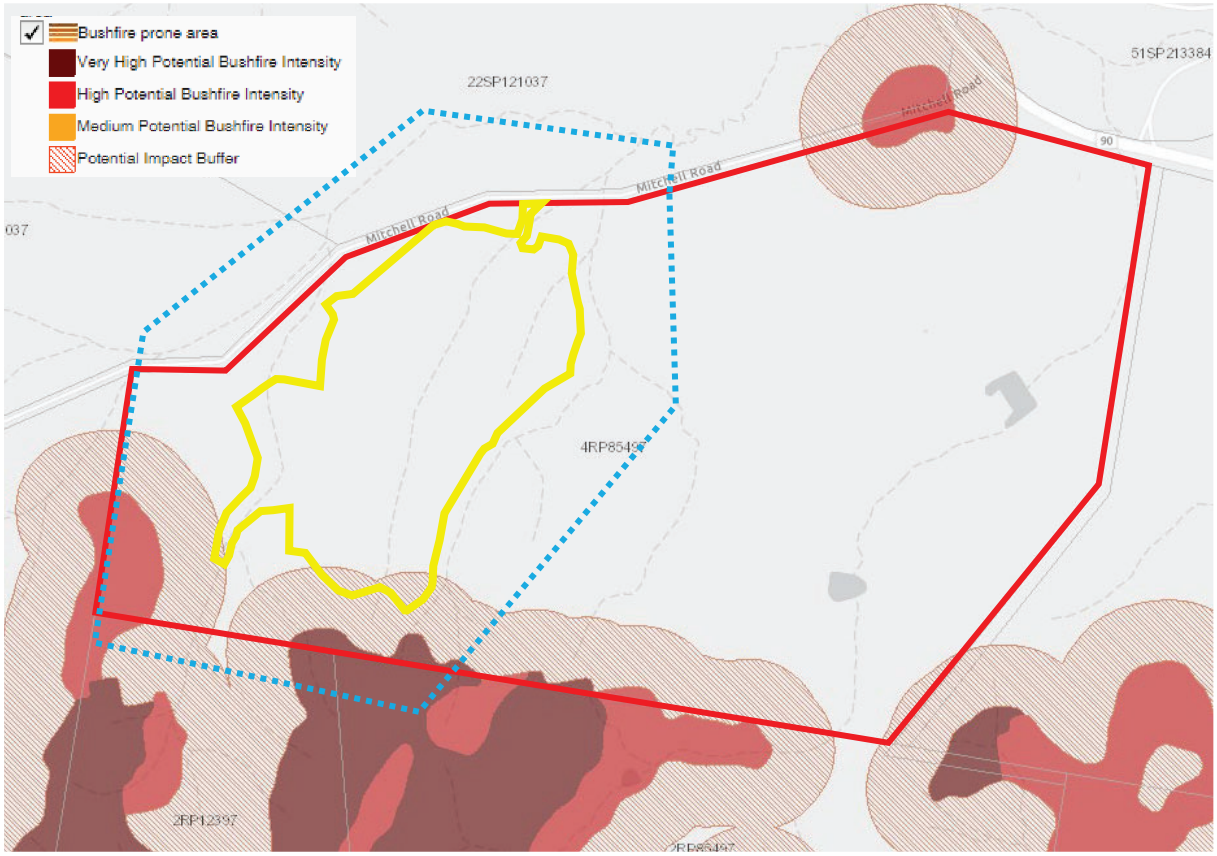



**Figure 10 - Extract of the SPP Bushfire Prone Areas Map**

*(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**<br>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:<br>• The siting of the use and provision of separation of hazardous vegetation (Asset protection zone).<br>• Use of the perimeter track around the facility.<br>• Access and egress arrangements<br>• Reticulated and static water supply<br>• 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**<br>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:<br>• Sufficient water supply is to be available.<br>• Separation between the proposed development footprint and the hazardous vegetation to provide access for emergency services.<br>• Emergency management procedures to support operations.<br>• 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**<br>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**<br>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**<br>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 mitigation 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.

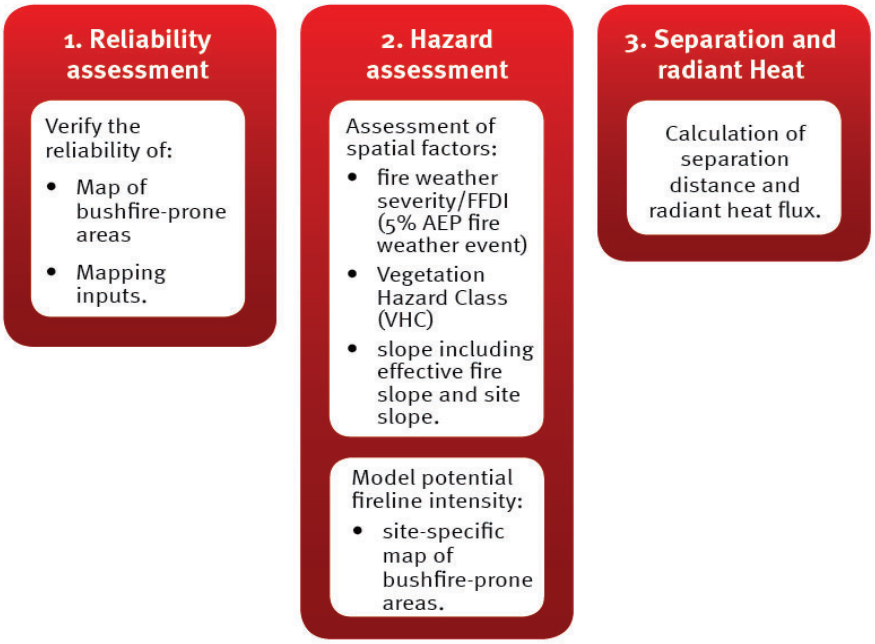



**Figure 11 – Overview of the Bushfire Hazard Assessment process as per Bushfire Resilient Communities**

*(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.

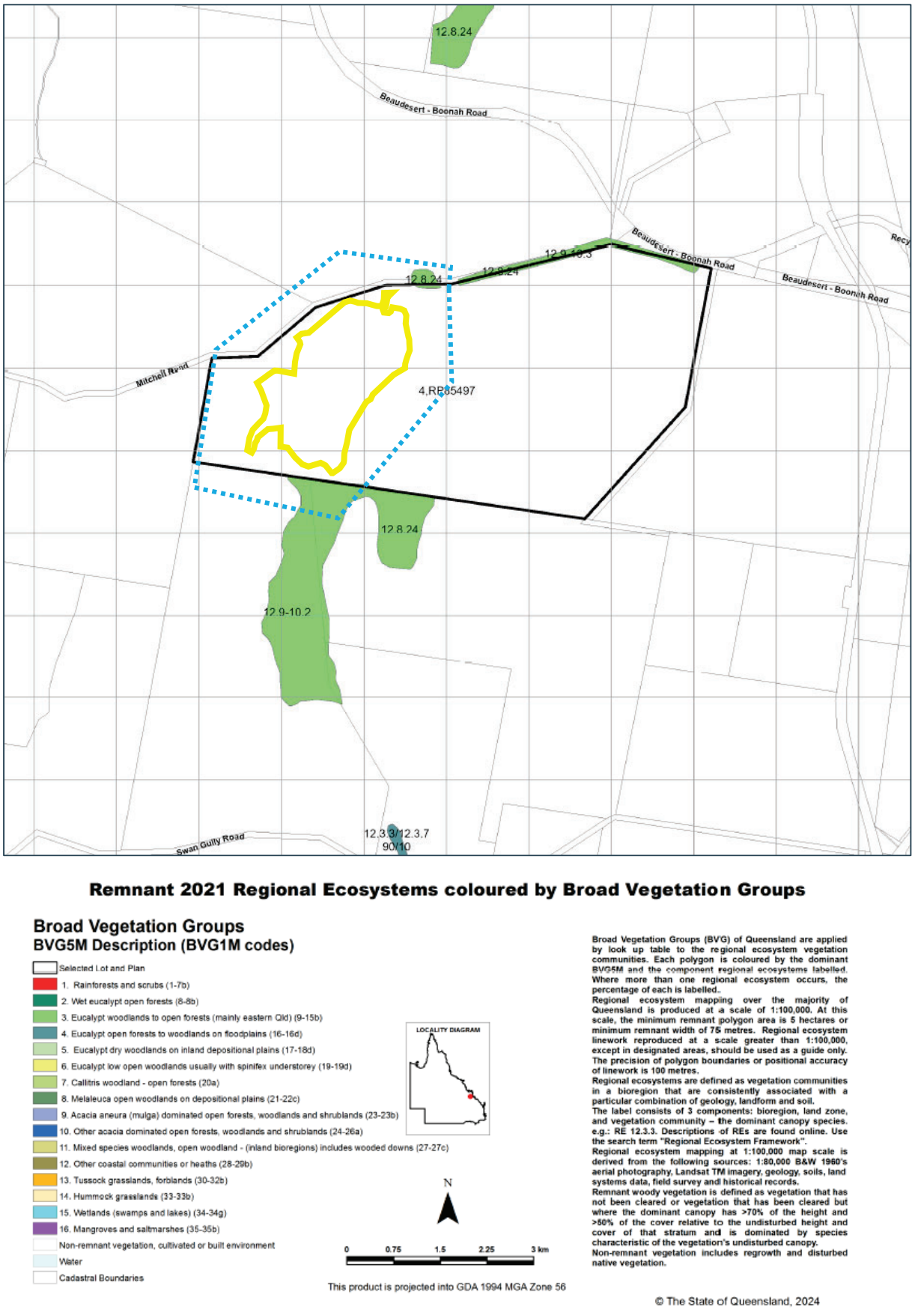



**Figure 12 - Remnant 2021 Regional Ecosystem within the Site and the 150m Vegetation Assessment Area**

*(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.

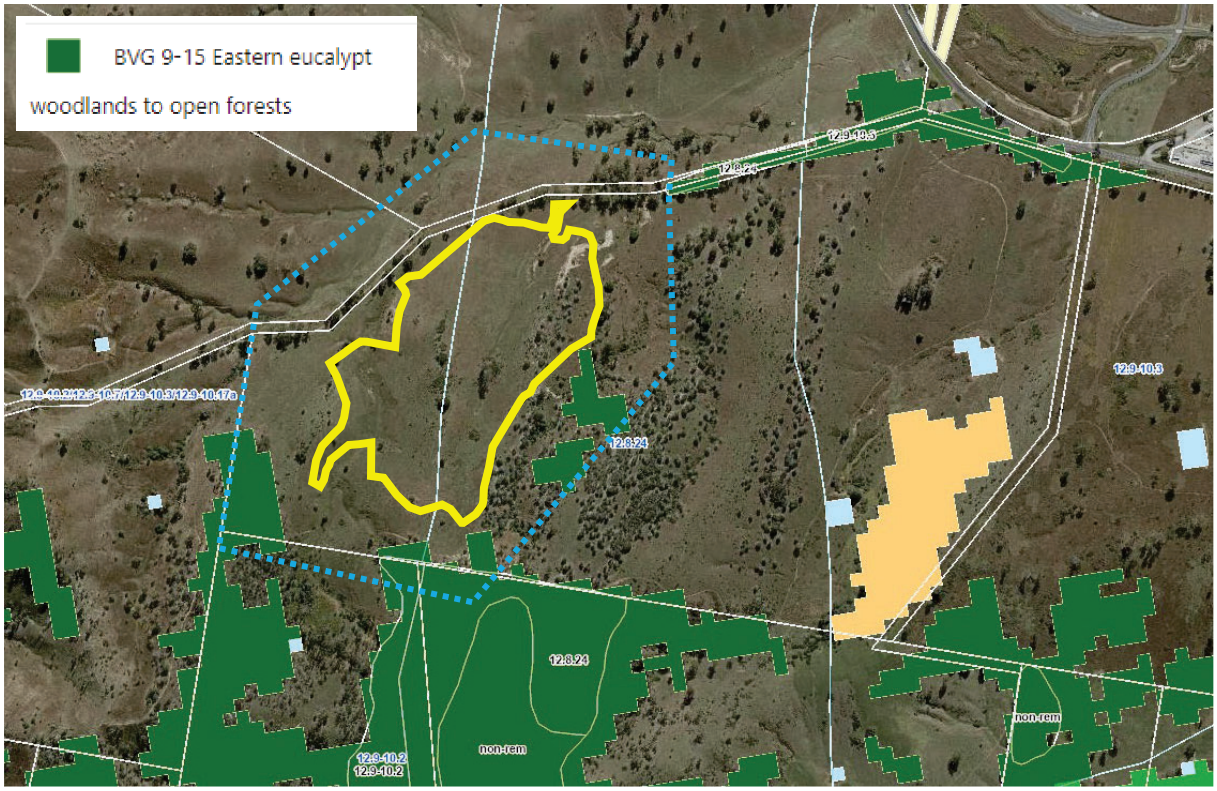



**Figure 13 - Catalyst Fire Management System Vegetation Hazard Class (VHC) Tiles**

*(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.

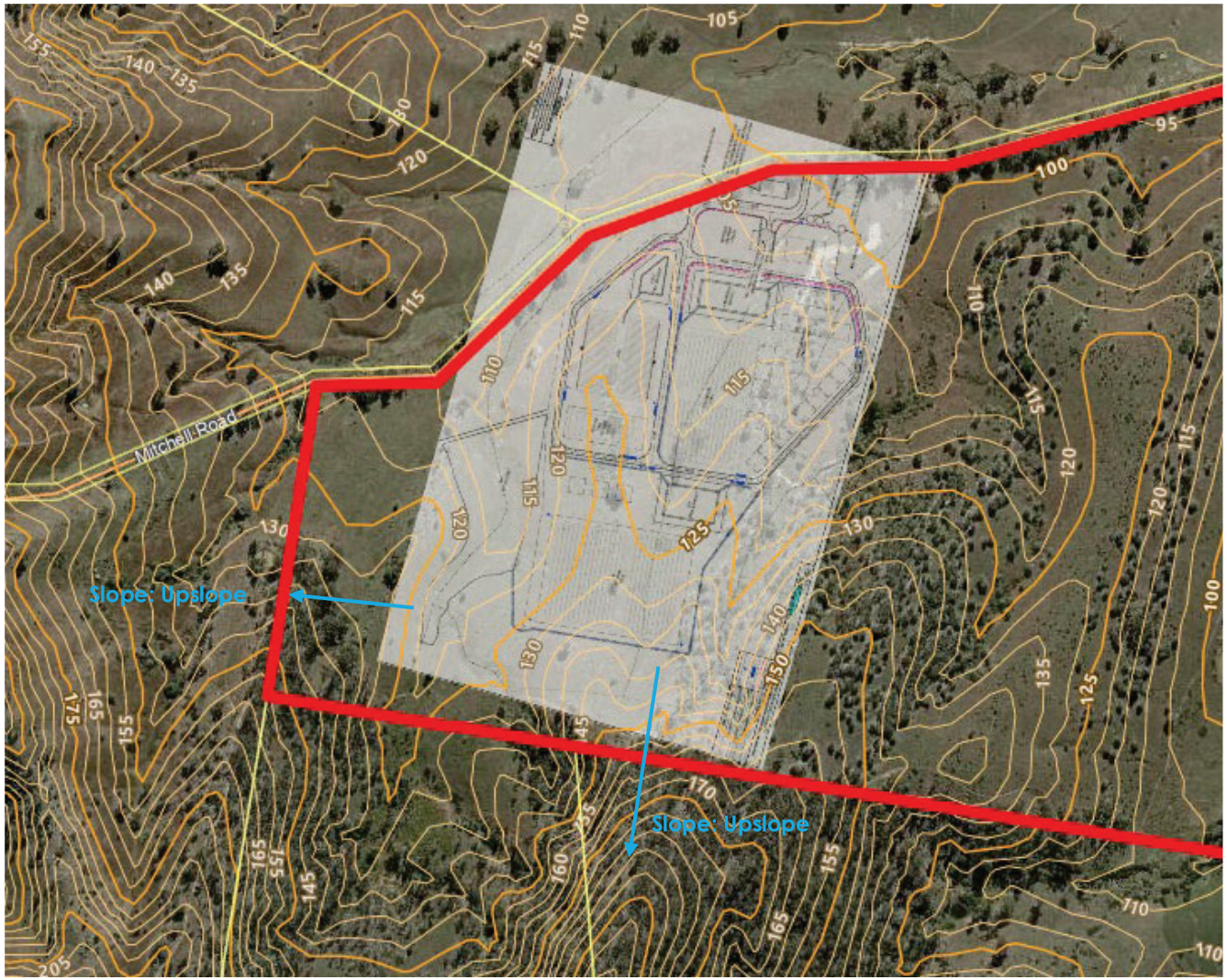



**Figure 14 - Effective slope assessment**

*(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.

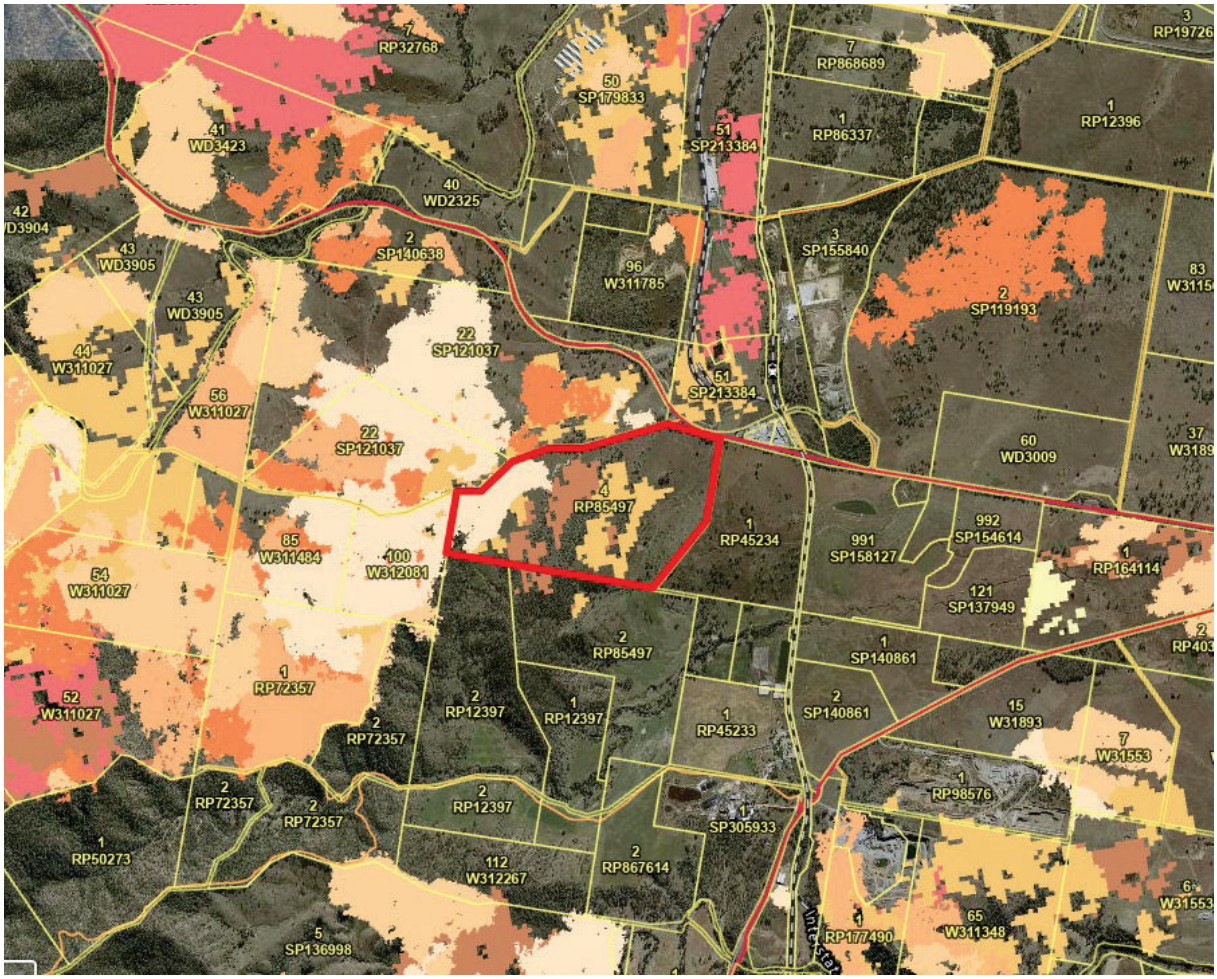



**Figure 15 - Historical Fire Scar Mapping within the Site and Locality**

*(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/m$^2$ 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/m$^2$ 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/m$^2$ 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.

FLAMESOL
FPA AUSTRALIA

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/m² | 11.3 m |
| Windspeed | n/a | Minimum distance to < 29 kW/m² | 15.4 m |
| Heat of combustion | 18,600 kJ/kg | Minimum distance to < 19 kW/m² | 22.8 m |
| Flame temperature | 1,200 K | Minimum distance to < 12.5 kW/m² | 32.3 m |
| | | Minimum distance to < 10 kW/m² | 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



Meridian Urban

# 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:<br>i. avoids areas of bushfire risk; or<br>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 | **Complies –** Disaster management response and recovery capacity and capabilities is supported by the proposed development through the provision of:<br>- Sufficient water supply is to be available.<br>- Separation between the proposed development footprint and the hazardous vegetation to provide access for emergency services.<br>- Emergency management procedures to support operations.<br>- Land and fuel management practices including hazard reduction on the balance of the land through ongoing cattle grazing. |
| i. Development is located on landforms which can limit the intensity of a bushfire and that have other protective functions or community values. | **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**<br>All premises are provided with vehicular access that enables safe evacuation for occupants and easy access by fire-fighting appliances.<br><br>*Note: A site specific assessment prepared by a suitably qualified person in accordance with Planning Scheme Policy 4 – Bushfire Management Plans, may be required to determine compliance with PO1.* | **AO1.1**<br>Development has a driveway from a constructed road with:<br>1. a minimum vertical clearance of 4.8m; and<br>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**<br>1. a driveway does not exceed a length of 60m from a constructed road; OR<br>2. where a driveway from a constructed road is longer than 60m, it is designed to accommodate turning bays for firefighting appliance vehicles in accordance with Queensland Fire and Emergency Services, 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**<br>Development is located where it is not at risk from bushfire hazard.<br><br>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**<br>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**<br>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:<br>1. that the safety of people and property in a bushfire event can be managed and risks mitigated; and<br>2. how the specific outcomes of this Code can be achieved. | **AO2**<br>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**<br>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**<br>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 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**<br>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 |
|---|---|---|
| | | considered to be in bulk and are located outside the BPA. |
| **PO4**<br>Emergency services and uses providing community support services:<br>1. are able to function effectively and safely during and immediately after a bushfire hazard event; and<br>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**<br>Emergency services and uses providing community support services;<br>1. are not located in a bushfire hazard area; and<br>2. ensures the development footprint, including internal driveways between buildings and from buildings to the roadway, does not traverse a bushfire hazard area. | **Not Applicable –** The proposal is not for emergency services or a use providing a community support service. |
| **PO5**<br>Development does not cause:<br>1. an adverse risk to people, property and the environment due to the impact of bushfire on hazardous materials; and<br>2. excess danger or difficulty for emergency services to provide an emergency response or evacuation. | **AO5**<br>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**<br>Landscaping and fuel sources within the bushfire prone area between hazardous vegetation and building envelopes does not increase the potential for bushfire hazard. | **AO6**<br>Landscaping treatments and fuel sources within a bushfire prone area, and any hazardous vegetation and building envelopes are designed and managed to achieve:<br>1. a potential available fuel load which is less than 5 tonnes/hectare in aggregate; and<br>2. a fuel structure which is discontinuous.<br><br>*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**<br>Development is designed to minimise vegetation clearing and avoid or minimise impacts on the natural environment and ecological processes. | **AO7**<br>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**<br>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**<br>A water tank is provided within 10 metres of each building (other than a class 10 building) which:<br>1. is either below ground level or of non-flammable construction;<br>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:<br>a. 10,000 litres for residential buildings;<br>b. for industrial, commercial and other buildings, a volume specified in AS 2304–2011;<br>3. includes shielding of tanks and pumps in accordance with AS2304–2011;<br>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;<br>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<br>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**<br>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**<br>Lot boundaries or building envelopes are separated from hazardous vegetation by a public road which:<br>1. has a two-lane sealed carriageway clear of hazardous vegetation;<br>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.<br><br>The access to the perimeter road is available for both fire-fighting and maintenance works for hazard reduction purposes.<br><br>*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.* | 3. is connected to public roads at both ends and at intervals of no more than 500 m;<br>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<br>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**<br>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**<br>During a bushfire event, development can be accessed from a road network suitable for use by emergency service vehicles and evacuation vehicles. | **AO10**<br>Development is accessed from either:<br>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<br>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.<br><br>*Note: When assessing singular vehicle access routes, consideration must be given to mitigation of risks for the route to:*<br>*1. become blocked to access or evacuation by fallen trees, smoke or other hazards; and*<br>*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**<br>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.<br><br>The access to the perimeter road or fire trail is available for both fire-fighting and maintenance works or hazard reduction activities.<br><br>*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**<br>Lot boundaries or building envelopes are separated from hazardous vegetation by a public road (as per AO19), or a fire trail which has:<br>1. a reserve or easement width of at least 20 metres;<br>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;<br>4. no cut or fill embankments or retaining walls adjacent to the 4 metres wide trafficable path;<br>5. the trail must be capable of accommodating a 10 tonne vehicle;<br>6. the balance 10 metre width of the easement has managed vegetation to remove major surface hazards;<br>7. turning areas and vertical clearances for firefighting appliances in accordance with Queensland Fire and Emergency Services' Fire hydrant and vehicle access guidelines;<br>8. a maximum gradient of 12.5 per cent a cross-fall of no greater than 10 degrees;<br>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;<br>11. designated fire-trail signage;<br>12. if used, has gates locked with a system authorised by Queensland Fire and Emergency Services;<br>13. if a fire trail, has an access easement that is granted in favour of council and Queensland Fire and Emergency Services; and<br>14. allows and does not impede access for firefighting and maintenance for firefighting purposes. | |
| **PO12**<br>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**<br>Development along ridgelines, saddles and crests where adjacent slopes exceed 14 degrees is avoided<br><br>**AO12.2**<br>Development is located where the effective slope is less than 5 degree downslope. | **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. |
| **PO13**<br>To ensure the protection of peoples' lives and property, an area designated for revegetation or rehabilitation will not create an additional bushfire prone area.<br><br>*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* | **AO13.1**<br>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;<br><br>OR<br><br>The landscaping treatments are designed to achieve;<br>1. potential available fuel load which is less than 5 tonnes/hectare in aggregate; and | **Response to AO13.3 - Not Applicable –**<br>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**<br>A landscape maintenance plan specifies long-term management arrangements necessary to ensure that:<br>1. potential available fuel load is maintained at less than 5 tonnes/hectare in aggregate; and<br>2. fuel structure remains discontinuous. | |
| PO14<br>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**<br>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**<br>Recreational parks or open space are designed to ensure that:<br>1. potential available fuel load is maintained at less than 5 tonnes/hectare in aggregate; and<br>2. fuel structure remains discontinuous. | |
| **PO15**<br>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**<br>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**

**Meridian Urban Pty Ltd**

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**Our ref:** 12626213

**04 April 2025**

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

**Dave Schumacher**
**Soilco Developments Pty Ltd**
**3/132 W Dapto Road**
**Kembla Grange, NSW 2526**

**Office of the Coordinator-General: Information Request – MCU for Special Industry (Reference: OUT24/5995) – Response Letter**

Dear Dave,

SOILCO Developments Pty Ltd (SOILCO) submitted a Material Change of Use (MCU) Development Application (DA) (Reference: OUT24/5995) on October 2025. An Information Request letter was issued from the Office of the Coordinator-General (OCG) dated 6 January 2025 (Reference D24/202645).

OCG has advised that additional information is required in order for an assessment of the application proposal to be completed and have provided items for clarification. Responses to OCG's information request have been provided below.

# OCG Information Request

## On-site wastewater management

### Item 3: Storage of Chemicals

***Request:***

1. *The proponent is requested to provide additional detail to demonstrate compliance with Performance Outcome PO28 of the Seqwater Development Guidelines and support the location of large quantities of Adblue and diesel such as:*
   a. *detailed drawings of storage facilities*
   b. *a plan showing the specific location of Adblue and diesel within the building (highest setback possible)*
   c. *building components (i.e. bunded edges, floor pad permeability rating etc)*
   d. *secondary containment methods with at least 110% spill recovery capacity, or industry standard, whichever is greatest*
   e. *product details for storage vessels*
   f. *procedures and notifications in the event of a spill*
   g. *spill kit contents, location and signage*
   h. *any other information / research / details the applicant can provide to justify the minimal setback.*
2. The proponent is requested to provide an updated Environmental Management Plan that includes the following information:
   a. amended risk assessment and general provisions to include further discussion of the site's location within the drinking water catchment
   b. appropriate unmitigated and mitigated risk scores for both surface and groundwater

c. clear mitigation measures, emergency actions, notifications procedures and responsibilities in the event of a large chemical/hazardous material spill

d. notification procedures to include direct notification of Seqwater's operations and water quality departments of any significant spills (i.e. quantities over 200L) which may enter surface waters.

***Response:***

In the town planning report for the SDA application, SOILCO propose to have a 5000 L AdBlue tank and 33,460 L capacity portable fuel station to support their operations. The Bromelton Compost Manufacturing Facility (CMF) will be running their own trucks and a large diesel fuel and AdBlue storage solution will be required. portable fuel station is a 20 foot container size and takes one full tanker's worth of diesel, making it a more cost effective solution. 5000 L of AdBlue is the same storage quantity currently used at SOILCO's existing Wogamia and Kembla Grange sites in NSW and have been recommended by SOILCO's operations team.

Separation distances from waterways and features have been considered during the design phase of the Project. The portable fuel station and the AdBlue tank will be set back more than 100 m from a green (low risk) waterway located to the east and more than 100 m from a red (high risk) waterway north of Mitchell Road. It is located more than 7 km from Wyaralong Dam and is located more than 4 km from the Bromelton Off-stream storage adjacent to Logan River. The CMF is required to be setback from surrounding sensitive receptors, and with its location onsite and within the SDA precinct, is appropriately setback from sensitive receptors. The CMF is located within an area that has limited environmental values.

The project is located within the Special Zone Industry Precinct within the Bromelton State Development Area and the project meets the development intent of the Precinct. The project area is also located within the Water supply buffer area and has included the following in the design phase, construction phase and operation phase to avoid compromising the drinking water supply and affecting the physical integrity of natural ecosystems that contribute to maintaining healthy functioning catchments:

- **Water Management and Risk Mitigation**: The CMF's design incorporates robust water management measures that ensure minimal risk to water supply and environmental resources. The separation of water types, in line with best practice for composting sites and Seqwater's Model Operating Conditions (MOC), will prevent contamination of water resources. The project adheres to these guidelines to manage and control any potential water-related risks effectively.
- **Exceedance of Design Standards**: The CMF has been designed with a 30 ML leachate storage capacity, exceeding the MOC-required storage based on a 10-year, 24-hour rainfall event (152 mm). This proactive approach ensures adequate leachate storage and mitigates any risks from excess runoff, enhancing the site's sustainability and resilience to extreme weather conditions. The leachate storage exceeds the 24-hour event size and can be reused during the early composting (pre-pasteurisation) stage, which further promotes resource efficiency.
- **No Active Release of Leachate**: A key environmental safeguard is the decision not to release leachate actively, ensuring there is no environmental contamination from leachate overflow. The design is robust enough to handle extreme rainfall occurrences (up to 900 mm within six months) without the need for overflow, providing strong environmental protection.
- **Stormwater Management:** The CMF will incorporate a stormwater treatment train in compliance with Seqwater (2017) guidelines. This system ensures that stormwater is effectively separated from contaminants, reducing the risk of contamination to surrounding water bodies, maintaining water quality, and complying with stringent water management protocols.
- **Sustainable Water Use**: The CMF demonstrates a commitment to sustainable water use by estimating water demands and ensuring a 30 ML harvesting storage system. This system will minimise reliance on external water sources, particularly during dry periods when water may be sourced via road tankering. This plan significantly reduces the environmental footprint by optimising the use of harvested water, contributing to water conservation efforts.
- **Flood Impact Considerations**: The operational site has been located outside the 1% Annual Exceedance Probability (AEP) flood impact zone, ensuring the facility will not be affected by the identified flow paths or potential flooding. This consideration further aligns with Seqwater's (2017)

guidelines, reducing the risk of water-related hazards and making the site more resilient to future flood events.

The CMF is designed to adhere to best practices for water management and environmental protection. By proactively addressing water-related risks, including leachate containment, stormwater management, and sustainable water use, the facility minimises its impact on the surrounding environment. These measures make the project a responsible and environmentally sound initiative, ensuring that water supply buffers and nearby water resources remain protected throughout the facility's operation. In addition, a number of specific environmental controls will be implemented to manage the storage and use of hazardous material on site, and these are discussed below.

**Description of the portable fuel station**

The portable fuel station will hold diesel and will be located to the north of the site between the office and the maintenance shed as shown in Figure 1 and Figure 2. The portable fuel station will have a capacity of 33,460 litres of diesel and be 6.1 metres (20 feet) in length.

The portable fuel station will be a proprietary self-bunded storage and dispensing unit and will include an outer tank that acts as a containment bund to catch any leaks from the inner tank, preventing environmental contamination or loss of product. The portable fuel station will have  spill recovery capacity for 110% of the storage volume.

The portable fuel station will have the following certifications:

– AS 1692-2006 Steel tanks for flammable and combustible liquids
– AS 1940-2004 Storage and handling of flammable and combustible liquids
– CAN/ULC-S601 Shop fabricated steel aboveground tanks for flammable and combustible liquids
– SANS 10131 Ed.1 (2004) Above-ground storage tanks for petroleum products
– UL 142 Aboveground flammable liquid tanks

The safety features of the portable fuel station are outlined below:

– GES innovative 3” mechanical overfill protection allowing the fuel supply company to deliver at 1,200 lpm flow rates right up to the safe fill level of the tank, saving time and money on fuel company deliveries
– Tank supplied as standard with 15 amp single phase 3 pin electrical cord connection to internal distribution board and isolation RCD’s saving on onsite installations costs
– Controlled operation prevents pump burnout when the fuel level gets too low
– Audible overfill alarms that indicate when the fuel level is too high or too low
– Fuel-level temperature monitoring
– Emergency stop switches
– Enclosed pump bay with lockable doors
– Pump bay fluorescent light, ladder platform and dip stick.




*Figure 1* *33,460 litre 20 foot portable fuel station*

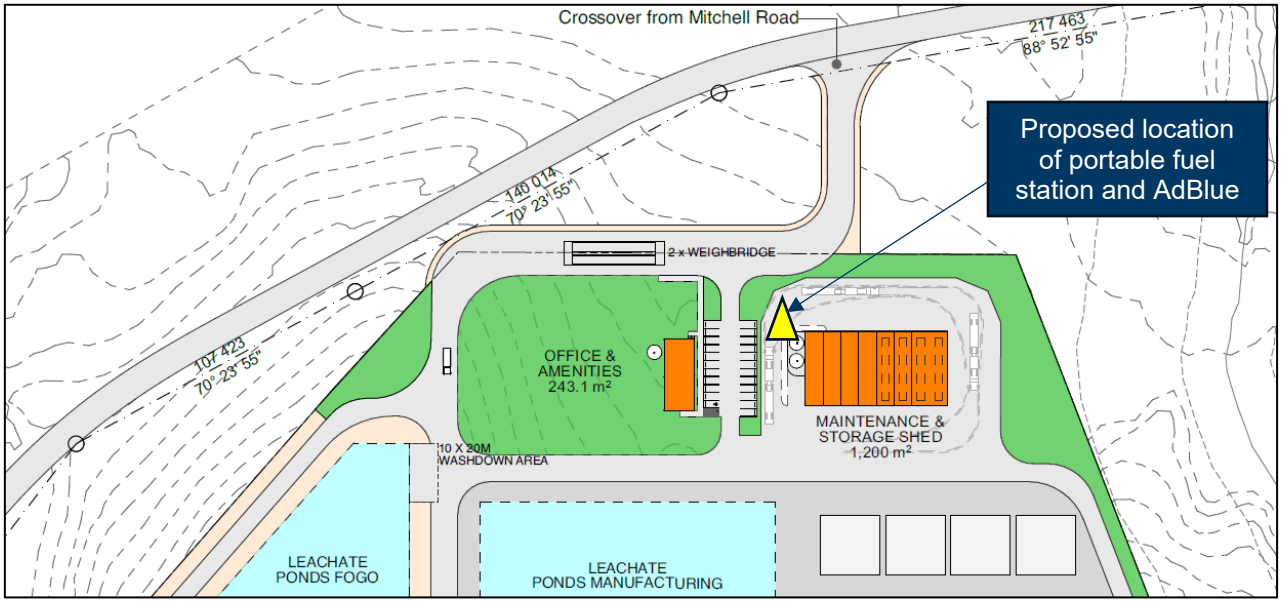



*Figure 2* *Proposed location of portable fuel station and AdBlue tank*

**Environmental controls for the portable fuel station**

The portable fuel station will be located outdoors within a bunded area on an impervious base. A summary of the key environmental controls to manage fuels and chemicals within the project area are outlined below:

- The following management plans will be developed and implemented for the operation phase to manage fuel and chemicals used within the project area:
  - An Environmental Management Plan has been developed for the project that outlines the environmental controls to be implemented during the operational phase. Refer to Attachment 1 for Rev 1 of the Environmental Management Plan.
  - A hazardous materials management plan will be developed and implemented for the operational phase that will outline measures for managing fuel and chemical handling, storage, distribution, spill response and cleanup, and managing generated waste during construction.
  - An incident and emergency management plan will be developed and implemented for the operational phase. This plan will identify the potential hazards and actions to be taken to prevent environmental harm, detailing any communication required in the event of an incident. Refer to section 9.2 in the Environmental Management Plan for more information.
- As outlined in Section 8 of the Environmental Management Plan, during the operation phase the nominated contractor will undertake inspections of the plant and equipment. The inspections will focus on:
  - Environmental controls
  - Waste storage
  - Chemical storage
  - Site environmental safety
  - Compliance with management strategies implemented.
- There will be no direct discharge of runoff to the surrounding environment. Provision of in excess of 30 ML of leachate storage sized in exceedance of the 24-hour event supported by the MOC, with reuse in the early stages of composting. No proposed active release of leachate and no overflow up to a design standard rainfall of 900 mm falling within a 6-month period.
- Separation of stormwater from contamination and management through provision of a stormwater treatment train in accordance with Seqwater (2017) guidelines.
- Hardstand areas include installing compacted material that will achieve in-situ permeability (K) of less than $1x10^{-9}$ m/s.
- Leachate ponds will be lined with low permeability material (either recompacted clay or HPDE) to achieve in-situ permeability (K) of less than $1x10^{-9}$ 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.
- SOILCO will have and maintain sufficient equipment to ensure that the response strategies outlined incident and emergency management plan can be rapidly and effectively implemented in the event of a spill. The following equipment items are to be on located within the site at all times to assist with clean-up and containment operations that may be required:
  - Oil and Fuel Spill Kit (containing absorbent material and pads, cable ties, gloves, plastic bags)
  - Personal protective equipment (PPE)
  - Shovels
  - Containers (e.g. empty IBC) for collection of soil
  - Plastic pit liners
  - In addition, identification of relevant equipment which may be required in a major containment operation, and which could be mobilised to site within 8 hours, is to be identified prior to

operations commencing: graders, bulldozers and/or scrapers; water tankers, suction tankers and/or trucks and/or portable storage tanks etc.

– Emergency equipment shall be positioned in appropriate locations at the work site to be located in a position where it is readily available to the site and maintained in a serviceable condition. Appropriate emergency equipment is to be identified commensurate with the risk of the activity being conducted and could include, but is not limited to the following:
    - Emergency response instruction folders
    - First aid equipment
    - Fire extinguishers
    - Stretcher(s)
    - Oil and chemical spill kits
    - Safety showers/eyewash stations.

    The site will be equipped with fire extinguishing equipment in accordance with the relevant fire codes and legislation.

**Description of the AdBlue**

SOILCO are proposing to install a 5000 L self-bunded AdBlue tank within the project area for the operational phase of the project (refer to Figure 3). The AdBlue storage tank will also include a 240V AdBlue pump, automatic AdBlue nozzle and digital inline flowmeter. The tank will consist of UV-resistant polypropylene with ISO22241 compliant AdBlue. The tank diameter will be 1.8 m and height 2.05 m. AdBlue is not a dangerous good, however it is considered to be a hazardous substance. The AdBlue tank will be located outdoors, and within a bunded area on an impervious base. It will be located within the northern portion of the site between the office and the maintenance shed as shown in Figure 1. Its designated location set back more than 100 m from a green (low risk) waterway located to the east.

A Safety Data Sheet for AdBlue is attached to this document (refer to Attachment 2) providing additional information about AdBlue and safety measures to be adopted when storing and handling AdBlue.

The AdBlue is certified and manufactured to exceed the ISO 22241-1 quality management standards. A specialist AdBlue supplier will service AdBlue tank. The AdBlue tank will be self-bunded (a tank within a tank) designed for safe storage of liquids like fuel, where the outer tank acts as a containment bund to catch any leaks from the inner tank, preventing environmental contamination or loss of product. The AdBlue containment tank will have 110% spill recovery capacity.

**Environmental controls for the AdBlue**

A summary of the key environmental controls to manage fuels and chemicals within project area are outlined below:

– The following management plans will be developed and implemented for the operation phase to manage fuel and chemicals used within the project area:
    - An Environmental Management Plan (refer to Attachment 1) has been prepared by SOILCO for the CMF, which will involve the construction and operation of the facility.
    - A hazardous materials management plan will be developed and implemented for the operational phase that will outline measures for managing fuel and chemical handling, storage, distribution, spill response and cleanup, and managing generated waste during construction.
    - An incident and emergency management plan will be developed and implemented for the operational phase. This plan will identify the potential hazards and actions to be taken to prevent environmental harm, detailing any communication required in the event of an incident. Refer to section 9.2 in the Environmental Management Plan for more information.
– As outlined in Section 8 of the Environmental Management Plan during the operation phase the nominated contractor will undertake inspections of the plant and equipment. The inspections will focus on:
    - Environmental controls

    - Waste storage
    - Chemical storage
    - Site environmental safety
    - Compliance with management strategies implemented.
- There will be no direct discharge of runoff to the surrounding environment. Provision of in excess of 30 ML leachate storage sized in exceedance of the 24-hour event supported by the MOC, with reuse in the early stage of composting. No proposed active release of leachate and no overflow up to a design standard rainfall of 900 mm falling within a 6 month period.
- Separation of stormwater from contamination and management through provision of a stormwater treatment train in accordance with Seqwater (2017) guidelines.
- Hardstand areas include installing compacted material that will achieve in-situ permeability (K) of less than $1x10^{-9}$ m/s.
- Leachate ponds will be lined with low permeability material (either recompacted clay or HPDE) to achieve in-situ permeability (K) of less than $1x10^{-9}$ 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.
- Emergency equipment shall be positioned in appropriate locations at the work site to be located in a position where it is readily available to the site and maintained in a serviceable condition. Appropriate emergency equipment is to be identified commensurate with the risk of the activity being conducted and could include, but is not limited to the following:
    - Emergency response instruction folders
    - First aid equipment
    - Fire extinguishers
    - Stretcher(s)
    - Oil and chemical spill kits
    - Safety showers/eyewash stations.

    The site will be equipped with fire extinguishing equipment in accordance with the relevant fire codes and legislation.




*Figure 3 Example of AdBlue tank*

**Seqwater Development Guidelines for Water Quality Management in Drinking Water Catchment (dated October 2024)**

An updated version of the Seqwater Development Guidelines for Water Quality Management in Drinking Water Catchment was released following the lodgement of the development application for Bromelton Compost Manufacturing Facility. As a result, to respond to this RFI item an assessment against Seqwater Development Guidelines for Water Quality Management in Drinking Water Catchment (dated October 2024) has been undertaken and is provided in Attachment 3.

**Bromelton Compost Manufacturing Facility Environmental Management Plan**

The Bromelton Compost Manufacturing Facility Environmental Management Plan has been updated to address this RFI and to demonstrate that environmental controls have been included in the Environmental Management Plan that address the provisions of Seqwater Development Guidelines for Water Quality Management in Drinking Water Catchment (dated October 2024). Refer to Attachment 1.

## Site Operations

### Item 4: Waste feedstock

***Request:***

*The proponent is requested to provide a comprehensive list of types of waste that may be received on site and identify where they have been accounted for in the impact assessment. This may also require amendments to any supporting application materials if additional impacts are identified.*

***Response:***

SOILCO has provided additional information about the feedstock to be received at the Bromelton Compost Manufacturing Facility and this information is outlined in Table 1 below. Table 1 also provides details of where feedstock will be stored, any specific offloading procedures, details of sorting procedures, details of leachate management, details about whether the feedstock will be mixed, and environmental controls applicable to the feedstock.

The feedstock outlined in Table 1 still meets the definition of garden, food and wood wastes and manure and meets the definition of sand and soil products. It should be noted that Virgin Excavated Natural Materials or VENM has the same meaning as 'earth' defined in the Queensland *Waste Reduction and Recycling Act 2011*, as "natural materials such as clay, gravel, sand, soil, and rock". It is also noted that there is no longer any distinction made in the *Waste Reduction and Recycling Act 2011* between "clean earth" and contaminated earth in terms of Queensland waste levy liability for materials disposed to landfill.

Potential impacts associated with the feedstock have already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report and an updated Environmental Management Plan will be provided to the OCG.

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*Table 1 Description of feedstock to be received at Bromelton Compost Facility*

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| Animal manure<br>In small amounts for blending purposes only. No more than 200 tonnes onsite at any one time. | Up to a combined total of 250,000 tonnes per annum (tpa), including the other feedstocks. | Location 8 - will be used at the final manufacturing stage.<br><br>We noted that in the planning report that Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Refer to flowchart of processes in Figure 4.<br>Inspected on arrival and stored appropriately | The material will be sourced appropriately from suppliers. | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | We noted that any feedstock with a higher odour risk rating would comprise a small fraction of the total and once mixed would have a much lower odour potential<br><br>Manure, soil and sand will be used for the manufacturing process as required. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Bark, lawn clippings, leaves, mulch, pruning waste, sawdust, shavings, woodchip and other waste from forest products. | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | Due to the nature of the materials received at the Facility and industry collection methods, any organic material received that has not been decontaminated and size reduced will first be processed through a decontamination line and shredded prior to ASP composting.<br>Material will be received in the drop off area of the | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497 m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DETSI Best Practice Environmental Management Guideline ERA 53(a) Organic | Wood waste may be sold as a mulch product on its own.<br><br>Lawn clippings and leaves will be included in the composting process. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| | | | | decontamination building. The material will be visually inspected on the floor to ensure there is no excess contamination or hazardous materials in the load. Heavily contaminated loads, or loads containing hazardous materials will be rejected and disposed of to an appropriately licensed waste facility. A concrete bunker with 1,200 $m^3$ of capacity will allow for material to be stockpiled prior to being processed. | material processing by composting, Version 1.02. | | report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Biosolids - Stabilised biosolids | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DETSI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Cardboard and paper waste - paper mulch, paper pulp effluent, paper sludge dewatered. | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase. |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| | | | | | into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | well mixed and homogenised. | A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Compostable polylactic acid (PLA) plastics - compostable plastics produced in accordance with (a) AS 4736:2006 (Biodegradable plastics) or most recent or replaced version of that standard or (b) AS 5810:2010 (Biodegradable plastics - Biodegradable plastics suitable for home composting) or the most recent or replaced version of that standard). | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Food and food processing waste (Expired/past used by date non-protein based food from supermarkets, expired beer, vegetable oil wastes and starches, vegetable waste, yeast waste, food processing effluent (wastewater) and solids (including sludges) from non protein based food) and (Food organics, expired/past used by date | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| protein based food from supermarkets, brewery and distillery effluent and waste) and (Expired soft drinks, molasses waste, grain waste (hulls/waste grains), starch water waste, sugar and sugar solutions). | | | | | Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | | Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Green waste - (leaves, grass clippings, pruning, tree branches from household maintenance). | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Inorganic additives with beneficial properties - (bentonite, crusher dust, gypsum, lime and lime slurry (inert)). | | Location 8 in Figure 4, as this feedstock will be used at the manufacturing stage. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by | Added as part of the manufacturing process | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| | | | | | composting, Version 1.02. | | updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Wood waste from untreated timber - (Untreated pallets, offcuts, boards, stumps and logs, shavings, timber offcuts, crates, wood packaging). | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | Due to the nature of the materials received at the Facility and industry collection methods, any organic material received that has not been decontaminated and size reduced will first be processed through a decontamination line and shredded prior to ASP composting. Material will be received in the drop off area of the decontamination building. The material will be visually inspected on the floor to ensure there is no excess contamination or hazardous materials in the load. Heavily contaminated loads, or loads containing hazardous materials will be rejected and disposed of to an appropriately licensed waste facility. A concrete bunker with 1200m$^3$ of capacity will allow for material to be stockpiled prior to being processed. | Three leachate ponds are proposed to handle the leachate runoff from the site, and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Wood waste may be sold as a mulch product on its own. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Soils - (clean soil, clean mud, sand). | Up to a combined 150,000 tpa of sand and soil products. | Location 8 in Figure 4, the feedstock will be used at the manufacturing stage | Refer to flowchart of processes in Figure 4. | Sourced appropriately from suppliers. | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the | Soil and sand will be used for the manufacturing process as required | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| | | | | | DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | | ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |

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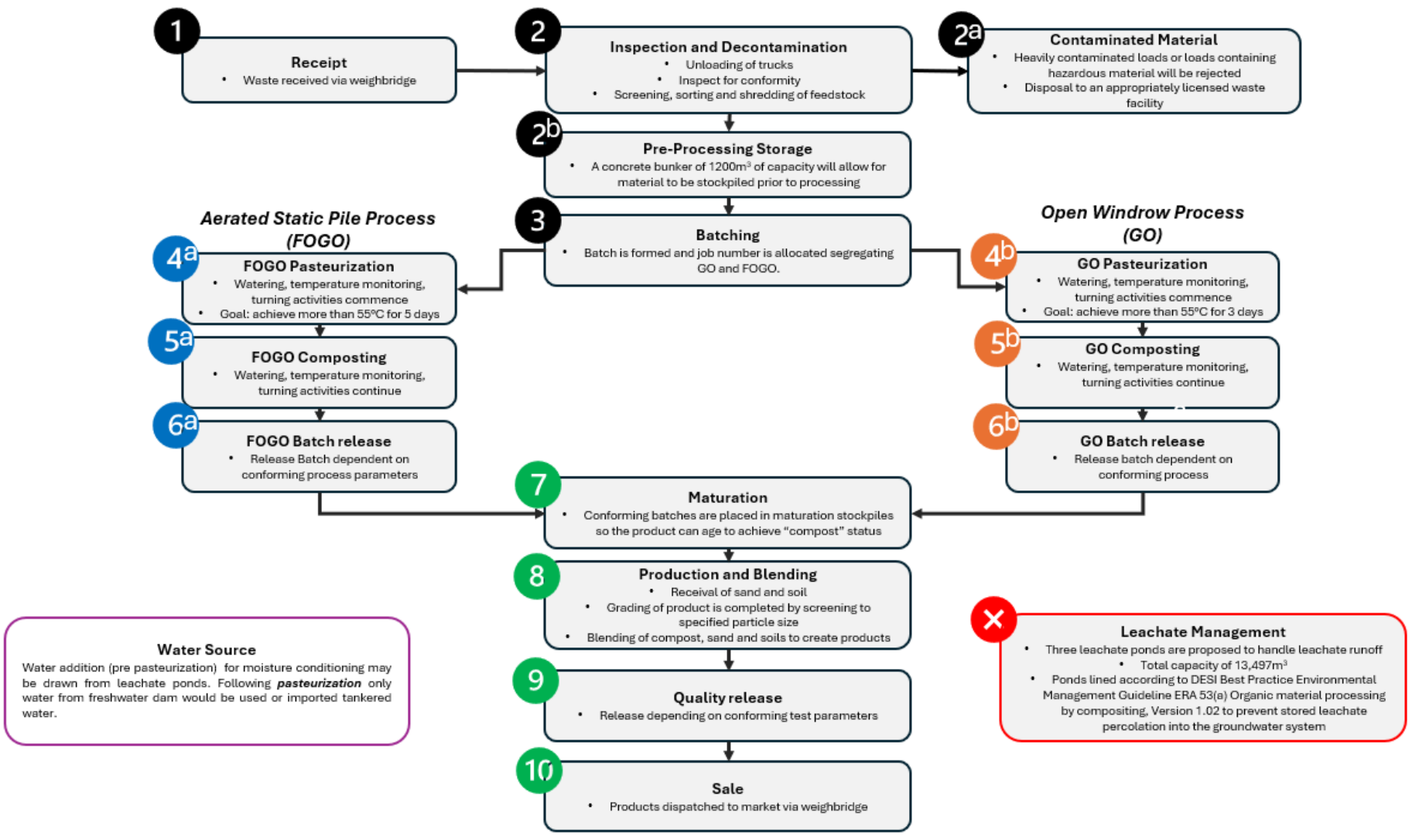




*Figure 4* *The compost manufacturing process proposed for Bromelton Compost Manufacturing Facility*

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## Noise Impact Assessment (NIA)

**Item 23: Noise monitoring data**

***Request:***

*The proponent is requested to provide a detailed analysis and summary of the noise monitoring data that has been collected during the monitoring campaign including the average, minimum and the maximum hourly figures for the parameters of LAeq, LA90 and LA10 for each of the periods (morning shoulder, daytime, evening and night).*

***Response:***

From the meeting with OCG, it is confirmed that the Bromelton Compost Manufacturing Facility Acoustic Assessment (Acoustic Assessment) included both background noise levels and uses deemed background noise levels when measured noise levels were below the deemed minimum noise levels, though did not use ambient data for the morning shoulder periods.

It was noted that the table in the Acoustic Assessment provided the ambient noise levels, however, did not include the minimum and maximum levels for each parameter, or the morning shoulder period. This information has now been included in the updated Acoustic Assessment. From an initial review of the ambient data, the use of the morning shoulder ambient noise data will likely result in a higher noise criteria than that used in the initial assessment, and will not change the results of the assessment.

GHD holds a differing opinion regarding the comment that SOILCO must compare to existing noise levels to determine impact in all cases, as in quiet areas this would mean that a noise producing activity would require unreasonable (and possibly impractical) level of noise attenuation to comply with the existing noise levels in the area.

** Use of deemed minimum background level is considered reasonable in the situation where measured ambient noise levels are below the minimum levels.*

The Acoustic Assessment has been updated and included in Attachment 4 and additional detail is included in the report for the measured ambient noise levels requested along with additional explanation on the use of minimum deemed background noise levels where appropriate. In this case it is unlikely to have any implications on the assessment conducted, but only due to the relative distance to sensitive receptors around the site and the proposed operations.

Acoustic Assessment has been updated and included in Attachment 4 to address the RFI 23 and the following sections in the Acoustic Assessment have been updated:

– Section 3.2.1.2 - Additional tables and summary of measured levels now includes the morning shoulder period).
– Section 3.2.2 – Wording is clarified.
– Section 4.2.3 – Includes the background levels measured for the morning shoulder and added additional explanation to Note 2 to say how the noise limits are derived.
– Section 5.2.4 – Added in the modified levels for the morning shoulder (still complies).

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## Closing

I trust that the above information addresses all the required information outlined in the OCG's information request, is to the OCG's satisfaction, and sufficient to allow assessment of the development application to proceed to the next phase. Should you have any queries relating to this response, please do not hesitate to contact the undersigned.

Regards,

**Sarah Wilson**
Team Leader and Technical Director - Planning

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PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

**Our ref:** 12626213

**17 July 2025**

**Dave Schumacher**
**Soilco Developments Pty Ltd**
**3/132 W Dapto Road**
**Kembla Grange, NSW 2526**

**Office of the Coordinator-General: Information Request – MCU for Special Industry (Reference: OUT24/5995) – Response Letter**

Dear Dave,

SOILCO Developments Pty Ltd (SOILCO) submitted a Material Change of Use (MCU) Development Application (DA) (Reference: OUT24/5995) in October 2024. An additional Information Request letter was issued from the Office of the Coordinator-General (OCG) in June 2025.

OCG has advised that additional information is required in order for an assessment of the application proposal to be completed and have provided items for clarification. Responses to OCG's information request have been provided below. Responses to the request for information items 3, 4, 6 ,7, 9 and 17 are presented in the sections below.

## OCG Information Request

**Item 3: Receival Building Odour Mitigation**

***Request:***

Please provide:

– best practice odour mitigation measures for the receival building; or
– update the sensitivity analysis to include the receival building to demonstrate that best practice odour mitigation (including fully enclosing the facility) is not required.

**Response**

Additional sensitivity analysis has been undertaken which includes the receival building.

This analysis has been undertaken using the conservative odour data previously referenced in the Bromelton Compost Manufacturing Facility Air Quality Assessment (GHD, 2025) and also measured Odour Emission Rate (OER) data from Wogamia Composting and Manufacturing Facility Odour and Dust Assessment (SOILCO Wogamia Composting and Manufacturing Facility (CMF) Odour and Dust Assessment (ERM, 2020)), included as Attachment 1 to demonstrate sufficient conservatism in assessment and results.

Results of the sensitivity analysis are provided in Table 1. Predicted odour concentrations at the most impacted sensitive receptor R6 (refer to the Air Quality Impact Assessment report) are still below the criteria of 2.5 OU assuming an additional 300% increase in odour emissions from the Aerated Static Pad (ASP) and emissions from the receival building (called the decontamination/material processing area in the GHD

air quality impact assessment report), including shredding and screening of organic material. The predicted odour concentration is even lower if SOILCO were to use the lower, less conservative odour data from the SOILCO Wogamia site.

Modelling odour levels from active composting up to 300% higher than the measured data is not considered to be representative of operations at any SOILCO site, as they do not experience any ongoing odour issues or offsite impacts. SOILCO encourages DETSI to undertake a site visit to the Wogamia or Stotts Creek facilities to observe SOILCO's operations and how controlled these sites are.

Results of the sensitivity analysis demonstrate the low odour risk of the proposed CMF facility and therefore no additional odour mitigation such as fully enclosing the facility is required or recommended.

*Table 1 Sensitivity analysis results*

| Receptor ID | Receptor sensitive? | Predicted odour concentration (OU) | | | | | |
|---|---|---|---|---|---|---|---|
| | y/n | Conservative reference site emission rate | | | Wogamia Emission Rate | | |
| | | Base case | 200% increase in ASP and receival building emissions | 300% increase in ASP and receival building emissions | Base case | 200% increase in ASP and receival building emissions | 300% increase in ASP and receival building emissions |
| R1 | n | 3.9 | 5.3 | 6.7 | 3.6 | 4.5 | 5.4 |
| R2 | n | 2.4 | 3.1 | 3.8 | 2.2 | 2.6 | 3.2 |
| R3 | n | 2.3 | 3.1 | 3.9 | 2.1 | 2.6 | 3.2 |
| R4 | n | 1.3 | 1.8 | 2.2 | 1.2 | 1.5 | 1.8 |
| R5 | y | 0.4 | 0.5 | 0.6 | 0.4 | 0.4 | 0.5 |
| **R6** | **y** | **1.3** | **1.8** | **2.3** | **1.2** | **1.5** | **1.9** |
| R7 | n | 0.7 | 0.9 | 1.2 | 0.6 | 0.8 | 0.9 |
| R8 | n | 0..6 | 0.9 | 1.1 | 0.6 | 0.7 | 0.9 |
| R9 | n | 1 | 1.3 | 1.6 | 0.9 | 1.1 | 1.3 |
| R10 | y | 1.2 | 1.6 | 2.1 | 1.0 | 1.3 | 1.7 |

### Item 4: Estimation of Surface Areas (windrows)

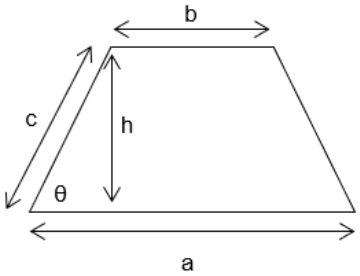
***Request:***

Please confirm the length and number of proposed windrows.

**Response**

The exact length and number of windrows will be determined by SOILCO. Rather than calculating the exact length and number in this assessment, GHD have calculated the total windrow surface area based on provided material throughput and the shape of the windrows.

Total windrow surface area was calculated by assuming trapezoidal geometry, with the assumed dimensions and formula shown below in Figure 1. Using these dimensions and provided throughput, the windrow surface area was calculated as seen in Table 2.




**Windrow parameters**

| | |
|---|---|
| **a =** | 5 m |
| **b =** | 3.1 m |
| **c =** | 4.4 m |
| **h =** | 4 m |
| **cross sectional area =** | 16.2 m2 |
| **windrow spacing =** | 2 m |

$$2 \times c \times \left(\frac{Volume\ (provided\ by\ soilco)}{0.5 \times (a+b) \times h}\right) + b \times \left(\frac{Volume\ (provided\ by\ soilco)}{0.5 \times (a+b) \times h}\right)$$

*Figure 1 Assumed windrow dimensions and surface area formula*

*Table 2 Windrow surface areas*

| Area | Calculated surface area of material |
|---|---|
| Aerated Static Pad – FOGO (Area B) | 8,374 $m^2$ |
| Composting facility – GO (Area D) | 18,181 $m^2$ |

Based on the assumptions above, the total length of windrows in each area are estimated to be:

– Aerated Static Pad – FOGO (Area B) - 704 m

– Composting facility – GO (Area D) – 1,528 m

Estimated number of windrows per area are as follows:

– Aerated Static Pad – FOGO (Area B) – 13 windrows (based on an area width of 90 m)

– Composting facility – GO (Area D) – 19 windrows (based on an area width of 135 m)

### Item 6: Odour Monitoring Period

***Request:***

Please provide:

– odour monitoring data for the summer period if available; and

– complaints logs for the facilities from which specific odour emissions rates (SOERs) were derived.

**Response**

Odour monitoring data from Wogamia (SOILCO Wogamia Composting and Manufacturing Facility (CMF) Odour and Dust Assessment (ERM, 2020)) has been reviewed as part of the odour assessment and is provided in Attachment 1. During the Wogamia study odour samples were taken of FOGO on the following dates:

– 14/02/2020 (Summer); and

– 17/04/2019 (Autumn).

GHD reviewed this data from Wogamia, and in order to be conservative GHD adopted even more conservative data in the assessment accounting for a total site OER being about 43% higher than if the Wogamia data had been used.

SOILCO have recently undertaken an odour validation audit of the Wogamia site (Soilco Wogamia Composting and Manufacturing Facility Odour Validation Audit, Zephyr Environmental (2025)) which is provided as an attachment to this letter (Attachment 2). The report was developed as part of this audit odour complaints were reviewed. The report details a total of four odour complaints over the previous two

years, with none occurring in 2024 and one in 2025 to date. As detailed above, the odour emission rates used in the Bromelton CMF assessment are higher than the measured source odour data at Wogamia, adding to the conservatism.

**Item 7: Odour Emission Rate Calculations**

***Request:***

Please review the information in Table C.3 and clarify:

– how “passive” is defined in the context of aerated static pad emissions; and
– any discrepancies in estimated OERs.

***Response:***

Passive denotes a windrow is not being actively turned. It is assumed in the assessment that these passive sources are being aerated.

Please see the following clarifications and corrections for discrepancies in reported OER’s:

– The SOER for maturation and storage was 0.572 and rounded to 0.6 in report. Area was also rounded from 16,430.3 $m^2$. to 16,430 $m^2$. 0.572 OU x 16,430.3 $m^2$ equals the reported OER of 9,398 OU.
– The SOER for Passive Aerated Static Pad (ASP) emissions was also rounded to 1.5 from 1.54615 the source area was rounded from 8374.07407 $m^2$ to 8374 $m^2$. This results in an OER of 12,948 OU/s.
– The Decontamination/Material Processing (Area C) was first modelled as an area source, but has since been updated to a volume source to reflect that these activities are being undertaken in a building and would be more appropriately modelled as a volume source. The previously reported odour emission rate of 7,137 OU/s applied to a larger area source of 4,198 $m^2$. After SOILCO provided updated project footprints during project development this area was reduced to 2,400 $m^2$ of odorous material within the decontamination/material processing building. The corrected OER is 4,080 OU/s. This value is consistent with the modelled results presented to date.

**Item 9: Odour Emissions During Windrow Turning**

***Request:***

Please provide:

– clarification of how the OER presented in tables 7.1 and C.3 was calculated for windrows turning; and
– OER during windrows turning for the maturation and storage area (Area A).

***Response:***

It was assumed that 25% of the windrows would be turned at any one time. For the 25% that is turned the SOER has been doubled to account for additional odour from this activity. Averaged out over the whole source area this accounts for an additional OER of 3,531 OU/s for the ASP (Area B) and an additional 7,272 OU/s for the open windrows (Area D) during windrow turning activities.

In the initial report, OER values for windrow turning activities were incorrectly presented however have been updated and presented in Table 3. It should be stressed that SOER values were correctly reported as rounded values in Table 7.1 of the GHD Air Quality impact assessment, and these values are what was used in in the modelling of area sources. As such, modelling results are accurate, and only the reporting of OER’s was incorrect. SOER’s presented in Table 3 are presented as unrounded and are representative of the model inputs.

Maturation and storage windrows were assumed to be mature and as such do not require turning.

*Table 3 Updated odour emission rates*

| Source | Source type | Surface area of modelled source ($m^2$) | Modelled SOER (OUV/$m^2$/s) | | OER's (OU/s) | | Hours per day source is active |
|---|---|---|---|---|---|---|---|
| Maturation and Storage - Open Windrows (Food and Garden Organics) (Area A) | Area | 16,430.30 | 0.572 | | 9,398 | | 24 |
| Aerated static pad emissions (Area B) | Area | 8,374.0744 | Passive: | 1.546154022 | Passive: | 12,948 | 18 |
| | | | Windrow turning: | 1.967820689 | Windrow turning: | 16,479 | 6 |
| Decontamination/ material processing (Area C) | Volume | N/A | N/A | | 4,080 | | 24 |
| Shredding and screening of organic material (Area C)* | Volume | N/A | N/A | | 5,740 | | 6 |
| Composting Facility - Open Windrows - Garden Organics (Area D) | Area | 18,180.556 | Passive: | 1.1903333 | Passive: | 21,641 | 18 |
| | | | Windrow turning: | 1.5903332 | Windrow turning: | 28,913 | 6 |
| Leachate pond GO | Area | 5,983.1 | Quiescent: | 0.15 | Quiescent: | 897 | 20 |
| | | | Aerated: | 1.15 | Aerated: | 6,881 | 4 |
| Leachate pond FOGO | Area | 3,430.5 | Quiescent: | 0.15 | Quiescent: | 515 | 20 |
| | | | Aerated: | 1.15 | Aerated: | 3,945 | 4 |
| Leachate pond manufacturing | Area | 6,703.600 | Quiescent: | 0.15 | Quiescent: | 1,006 | 20 |
| | | | Aerated: | 1.15 | Aerated: | 7,709 | 4 |
| Manure stockpile | Area | 203.562 | 2.109 | | 429 | | 24 |

**Item 17: Cumulative Odour Assessment**

***Request:***

Please confirm:

– survey duration at each receptor and justify why the methodology in the relevant European standard (VDI3940) was not used; and

– whether the odour survey was carried out by an experienced odour assessor with an accredited n-butanol threshold within the acceptance criteria of 20ppb to 80ppb (as per AS4323.3).

***Response:***

The odour survey was undertaken to get an understanding of the existing odour environment and odour intensity was defined following requirements as per VDI3882 Olfactometry Determination of Odour Intensity. Based on the intent of the survey an odour survey covering all requirements of VDI3940 was not considered the best approach given the large area of the site and surrounds to be covered and the location of odour sources. The odour survey was conducted at a time considered to be worst case for receptors to the Bromelton CMF site. This was light constant south-easterly winds in the late afternoon, blowing towards receptors R6 and R10. This is considered to be consistent with worst case meteorological conditions for the project. During the survey, the assessor was able to define the downwind odour plume from Bush's Proteins, confirm the presence and character of odours on and around the SOILCO proposed CMF site and also confirm conditions upwind of odour sources in the area. The assessor was at location clusters for more

than 10 minutes where odour from Bush's Proteins was confirmed and then it was decided to undertake 360-degree surveys (1 minute) to assist in assessing the potential spread of the odour plume which also included existing residential receptors, and helping to determine the extent of the odour plume downwind.

The concentration of odour surveys may be better seen in Figure 2.

Evan Smith of GHD performed the odour survey, his recent accreditation is provided in Attachment 3.

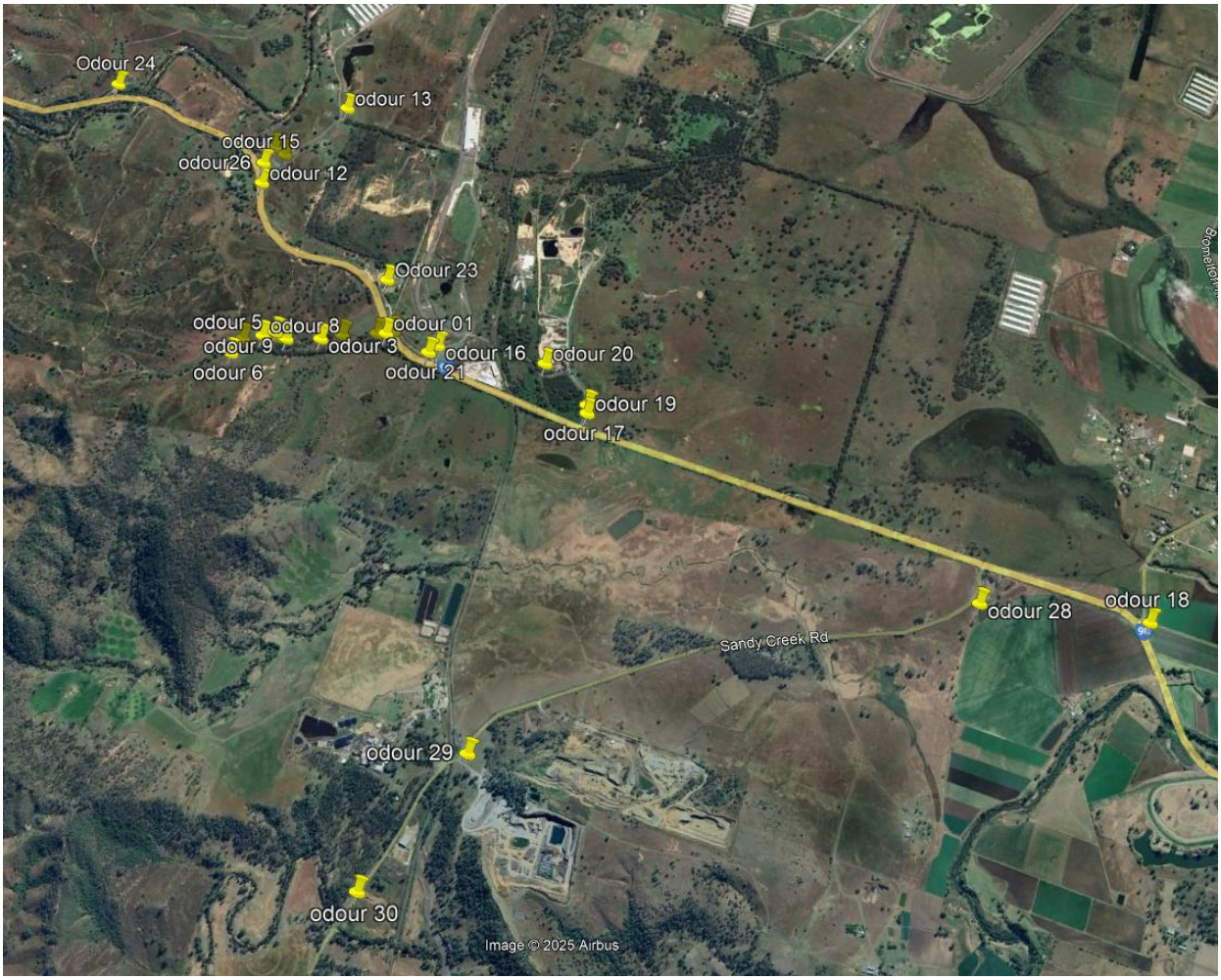



*Figure 2* *Location of odour surveys*

## Closing

The additional information provided above further demonstrates that the proposal is predicted to comply with the odour criteria.

I trust that the above information addresses all the required information outlined in the OCG's information request, is to the OCG's satisfaction, and sufficient to allow assessment of the development application to proceed to the next phase. Should you have any queries relating to this response, please do not hesitate to contact the undersigned.

Regards,

**Evan Smith**
Technical Director – Air Quality

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# Attachments

# Attachment 1

## Wogamia Composting and Manufacturing Facility (CMF) Odour and Dust Assessment



# Wogamia Composting and Manufacturing Facility (CMF)

## Odour and Dust Assessment

29 October 2020

Project No.: 0503963

*The business of sustainability*

ERM

| Document details | |
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| Document subtitle | Odour and Dust Assessment |
| Project No. | 0503963 |
| Date | 29 October 2020 |
| Version | R2 |
| Author | Angel Sanz, Russ Francis |
| Client Name | SOILCO |

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| V02 | 01 | Angel Sanz<br>Russ Francis | Russ Francis | Jane Barnett | 05.06.2020 | Second draft report |
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| V06 | R4 | Angel Sanz<br>Russ Francis | Russ Francis | Jane Barnett | 29.10.2020 | Final |

## Signature Page

29 October 2020

# Wogamia Composting and Manufacturing Facility (CMF)

## Odour and Dust Assessment



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## Acronyms and Abbreviations

| Name | Description |
|---|---|
| CMF | Composting and Manufacturing Facility |
| EIS | Environmental Impact Statement |
| EP&A Act | Environmental Planning and Assessment Act |
| FOGO | Food Organics and Garden Organics |
| NSW | New South Wales |
| NSW EPA | (NSW) Environment Protection Authority |
| OEH | (NSW) Office of Environmental Heritage |
| OU | Odour Units |
| PM | (airborne) particulate matter |
| $PM_{10}$ | Airborne particulate matter with an aerodynamic diameter of less than 10 µm |
| $PM_{2.5}$ | Airborne particulate matter with an aerodynamic diameter of less than 2.5 µm |
| Sqm | Square metres |
| TSP | Total Suspended Particulate (matter) |
| Tpa | Tonnes per annum |
| $\mu g/m^3$ | Micrograms per cubic metre |

# 1. INTRODUCTION

SOILCO commissioned ERM to conduct an odour and dust assessment, as part of an Environmental Impact Statement (EIS), for the Composting and Manufacturing Facility (CMF) in Longreach near Nowra, NSW.

The purpose of this assessment is to quantitatively assess potential odour impacts that may arise due to operations at SOILCO CMF and dust impacts from the on-site quarry. Odour modelling has been conducted for two scenarios; a normal operations scenario and a worst-case scenario. The normal operations scenario is representative of general day to day operations while the worst-case looks at potential impacts when maximum odour emissions may occur (such as during turning of windrows). Modelling of dust emissions from the on-site quarry has been conducted for a single scenario.

The assessment is based on the use of the computer-based dispersion model (CALPUFF) to predict off site odour and dust concentrations. To assess the effect that potential emissions could have on existing air quality, the dispersion model predictions are compared to relevant regulatory air quality criteria. The assessment follows a conventional approach using the procedures outlined in the NSW Environment Protection Authority's (EPA) document titled *"Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW"* (Approved Methods) (EPA, 2017).

In summary, the report comprises the following components:

- Local setting and a description of the project;
- Discussion of odour and dust issues and criteria;
- The approach to the assessment;
- Meteorological conditions in the area;
- Dust and odour emissions sources and estimates of these emissions;
- Assessment and discussion of impacts.

# 2. PROJECT DESCRIPTION

SOILCO's CMF is located at 135 Wogamia Road, Longreach, NSW and encompasses Lot 2 DP 865094. The site is currently approved to receive 35,000 tonnes per annum (tpa) of organic waste for composting consisting of 30,000 tpa garden waste (including 12,500 tpa "Pasteurised Organics") and 5,000 tpa wood waste and natural organic fibrous materials.

The Proposal seeks approval to intensify SOILCO's operations at its existing CMF. This would provide for importation of up to 98,000 tpa of material to undertake the following activities:

- Receipt, processing, composting and storage of up to 78,000 tpa of the following materials:
  - Garden, wood, food and general solid (non-putrescible) wastes;
  - Processed fibrous organics;
  - Natural organic fibrous materials;
  - Manure and biosolids (up to a maximum of 5,000 tpa combined).
- Receipt, processing, storage and blending of up to 20,000 tpa of Virgin Excavated Natural Material (VENM). The combined total of imported VENM and Drilling Muds would not exceed 20,000 tpa.
- Receipt and processing of Drilling Mud (15,000 tpa). The combined total of imported VENM and Drilling Muds would not exceed 20,000 tpa.

Proposed waste types and limits at the facility are listed in Table 2-1.

**Table 2-1: Proposed waste types and limits at the facility**

| Waste type | Description | Activity | Other limits |
|---|---|---|---|
| Food Waste | As defined in Schedule 1 of the POEO Act | Composting<br>Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 78,000 tonnes in any twelve month period. |
| Processed Fibrous Organics | As defined in Table 3 of "Environmental Guidelines: Composting and related organics processing facilities" | Composting<br>Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 78,000 tonnes in any twelve month period. |
| Natural organic fibrous materials | As defined in Schedule 1 of the POEO Act | Composting<br>Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 78,000 tonnes in any twelve month period. |
| Manure | As defined in Schedule 1 of the POEO Act | Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 5,000 tonnes in any twelve month period. |
| Wood Waste | As defined in Schedule 1 of the POEO Act | Composting<br>Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 78,000 tonnes in any twelve month period. |
| Garden Waste | As defined in Schedule 1 of the POEO Act | Composting<br>Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 78,000 tonnes in any twelve month period. |
| Biosolids | As defined in Schedule 1 of the POEO Act | Composting<br>Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 5,000 tonnes in any twelve month period. |
| General solid waste (non-putrescible) | This waste type is limited to only compostable packaging as defined in AS4736-2006. | Composting<br>Waste storage<br>Resource Recovery | The total quantity received at the premises must not exceed 78,000 tonnes in any twelve month period. |
| Virgin Excavated Natural Material (VENM) | As defined in Schedule 1 of the POEO Act | Waste processing (non-thermal treatment)<br>Waste storage<br>Resource Recovery | The total combined quantity VENM and drilling mud received at the premises must not exceed 20,000 tonnes in any twelve month period. |
| Drilling mud and/or muddy waters from drilling and pot holing operations | | Waste processing (non-thermal treatment)<br>Waste storage<br>Resource Recovery | The total combined quantity VENM and drilling mud received at the premises must not exceed 20,000 tonnes in any twelve month period. |

The two main processing areas include the aerated pads and the windrows.

- Aerated Static Pads
  - process up to 35,000 tpa of material which includes blends of:
    - Food waste
    - Garden Waste
    - Biosolids
    - General solid waste (non-putrescible)
  - Biosolids are mixed and composted with the food organics and garden organics (FOGO)
  - Oversize material is used as biocover and placed on top of the material to reduce odour
  - In any week, 2 bays will be filled, 4 bays will be turned, 2 bays will be taken to the product storage area
  - Each bay is turned, on average, every 1-2 weeks and covered again with biocover
- Windrows
  - process up to 43,000 tpa of material which includes:
    - Garden and wood waste
    - Processed fibrous organics
    - Natural organic fibrous materials
  - turned twice per week and the process takes about 4 hours to complete
  - no FOGO or biosolid material is included on the windrows

Once each of these processes is complete the composted material is moved to the manufacturing and storage area on the northern boundary of the site, to await distribution. The composted greenwaste material is blended with manure, as required, in the manufacturing and storage area.

The Proposal also seeks to continue the extraction of up to 15,000 tpa of sand and soil from the Site, consistent with that provided for by Development Consent DA95/3205 and its subsequent modifications.

The Proposal includes the construction of a new hardstand area for the manufacturing and processing of sand and soil blends for distribution from the Facility. This area would be located to the north of the existing aerated composting area, and to the west of the weighbridge and have an area of approximately 9,000 $m^2$. The development of this area would include construction of associated internal roads and new ponds designed to capture all stormwater runoff from the existing and proposed areas.

Figure 2-1 presents the proposed operational layout.

Figure 2-2 presents the location of the site and nearby sensitive receptors. It is noted that R2 is owned by Mr and Mrs Emery, Directors of SOILCO, and could therefore be considered project related.

Figure 2-3 shows a schematic of the proposed process.




**Figure 2-1: Proposed operational layout**

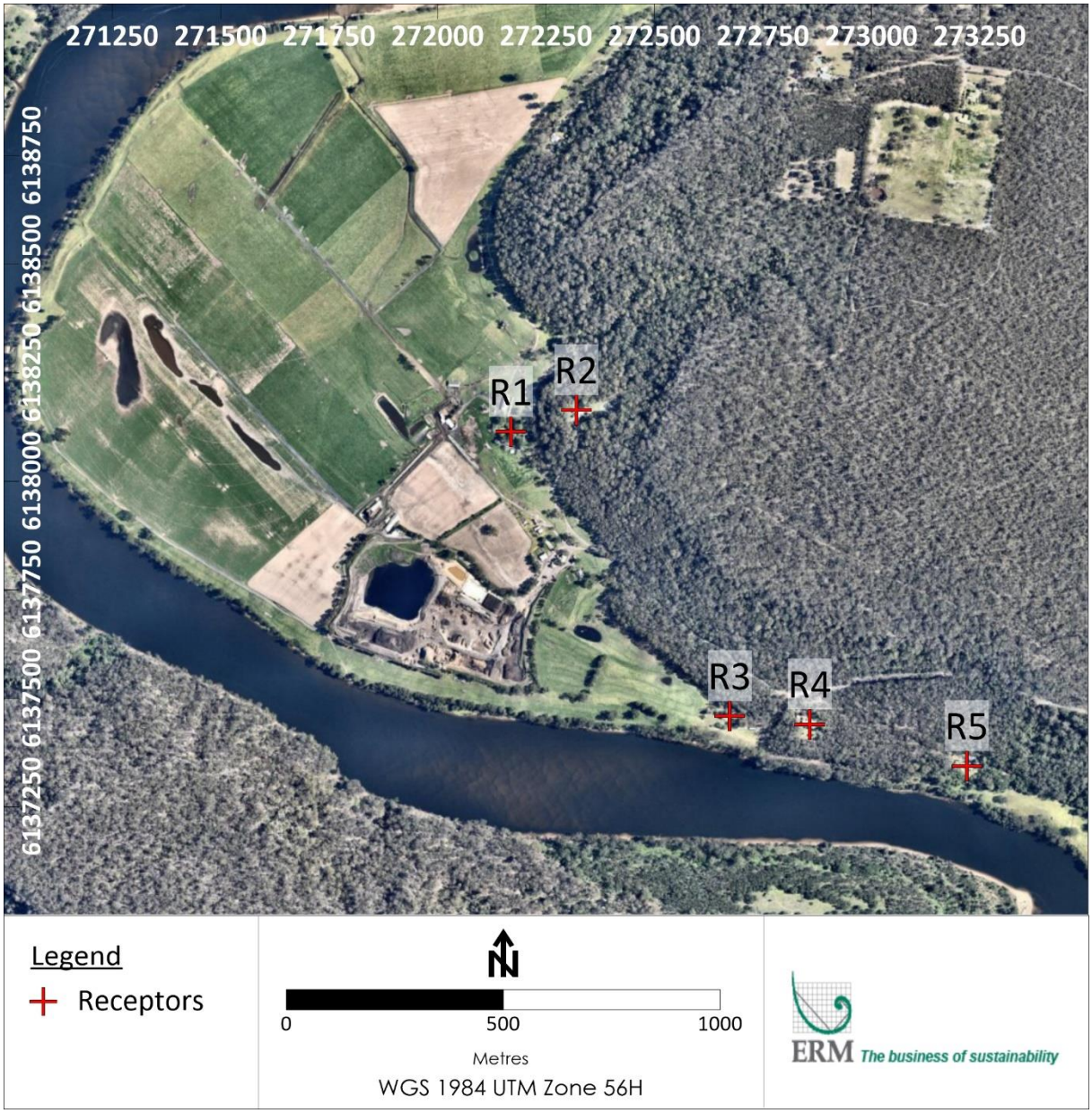



**Figure 2-2: SOILCO CMF site layout and discrete receptor locations**

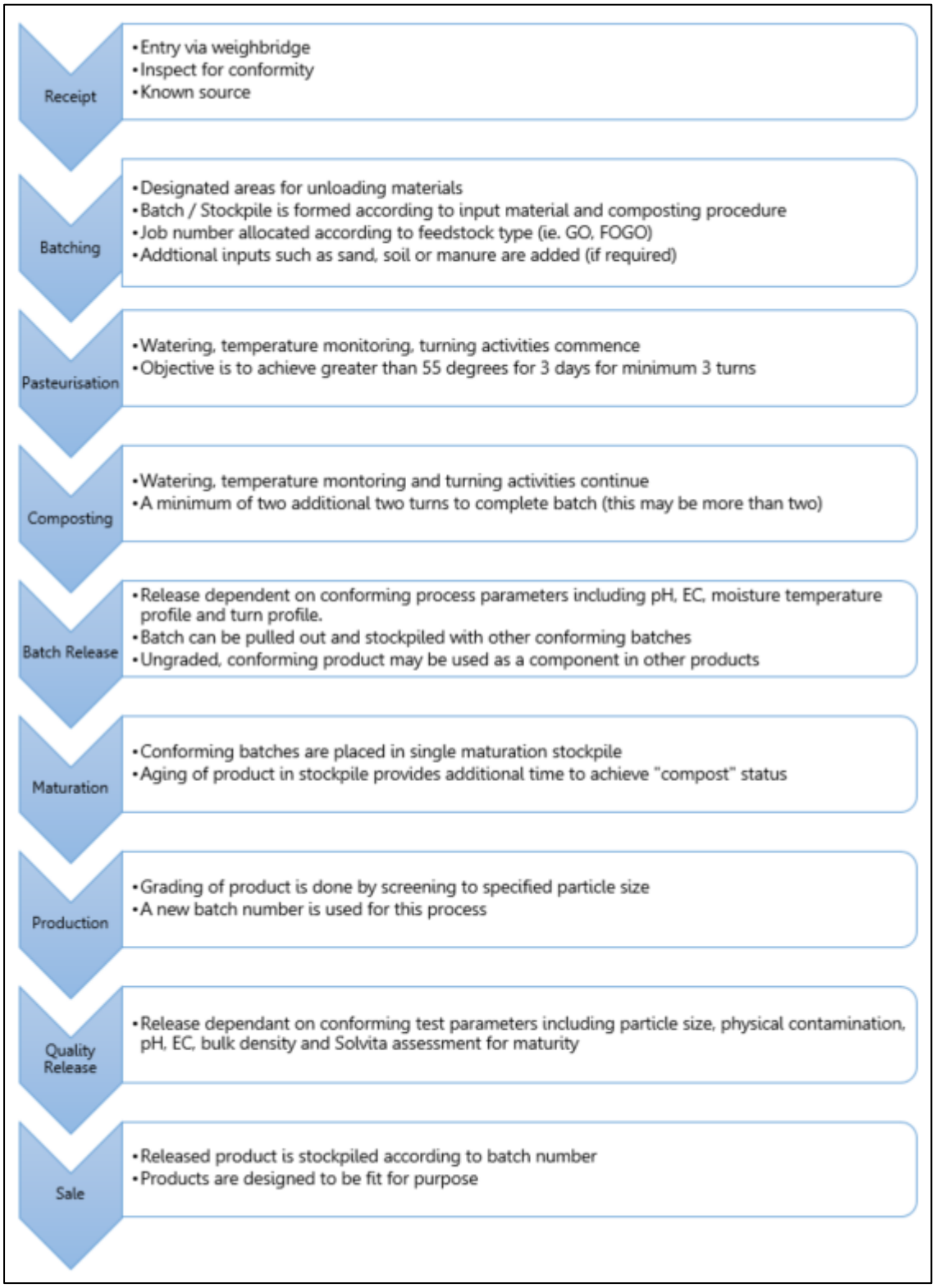



**Figure 2-3: Proposed composting process**

# 3. DISCUSSION OF DUST AND ODOUR ISSUES

## 3.1 Odour

### *3.1.1 Measuring Odour Concentration*

There are no instrument-based methods that can measure an odour response in the same way as the human nose. Therefore, “dynamic olfactometry” is typically used as the basis of odour management by regulatory authorities.

Dynamic olfactometry is the measurement of odour by presenting a sample of odorous air to a panel of people with decreasing quantities of clean odour-free air. The panellists then note when the smell becomes detectable. The correlations between the known dilution ratios and the panellists’ responses are then used to calculate the number of dilutions of the original sample required to achieve the odour detection threshold. The units for odour measurement using dynamic olfactometry are “odour units” (OU) which are dimensionless and are effectively “dilutions to threshold”.

As with all sensory methods of identification there is variability between individuals. Consequently the results of odour measurements depend on the way in which the panel is selected and the way in which the panel responses are interpreted.

### *3.1.2 Odour Performance Criteria*

The determination of air quality goals for odour and their use in the assessment of odour impacts is recognised as a difficult topic in air pollution science. The topic has received considerable attention in recent years and the procedures for assessing odour impacts using dispersion models have been refined considerably. There is still considerable debate in the scientific community about appropriate odour goals as determined by dispersion modelling.

The EPA has developed odour goals and the way in which they should be applied with dispersion models to assess the likelihood of nuisance impact arising from the emission of odour.

There are two factors that need to be considered:

1. what "level of exposure" to odour is considered acceptable to meet current community standards in NSW, and
2. how can dispersion models be used to determine if a source of odour meets the goals which are based on this acceptable level of exposure.

The term "level of exposure" has been used to reflect the fact that odour impacts are determined by several factors the most important of which are the so-called FIDOL factors:

- the Frequency of the exposure;
- the Intensity of the odour;
- the Duration of the odour episodes;
- the Offensiveness of the odour; and
- the Location of the source.

In determining the offensiveness of an odour it needs to be recognised that for most odours the context in which an odour is perceived is also relevant. Some odours, for example the smell of sewage, hydrogen sulfide, butyric acid, landfill gas etc., are likely to be judged offensive regardless of the context in which they occur. Other odours such as the smell of jet fuel may be acceptable at an airport, but not in a house, and diesel exhaust may be acceptable near a busy road, but not in a restaurant.

In summary, whether or not an individual considers an odour to be a nuisance will depend on the FIDOL factors outlined above and although it is possible to derive formulae for assessing odour annoyance in

a community, the response of any individual to an odour is still unpredictable. Odour goals need to take account of these factors.

The EPA Approved Methods include ground-level concentration criteria for complex mixtures of odorous air pollutants. They have been refined by the EPA to take account of population density in the area. Table 3-1 lists the odour thresholds, to be exceeded not more than 1% of the time, for different population densities.

**Table 3-1: Odour performance criteria for the assessment of odour**

| Population of affected community | Odour performance criteria (nose response odour units at the 99$^{th}$ percentile) |
|---|---|
| Single rural residence (≤ ~2) | 7 |
| ~10 | 6 |
| ~ 30 | 5 |
| ~ 125 | 4 |
| ~ 500 | 3 |
| Urban (~ 2000) and/or schools and hospitals | 2 |

The difference between odour goals is based on considerations of risk of odour impact and not differences in odour acceptability between urban and rural areas. For a given odour level there will be a wide range of responses in the population exposed to the odour. In a densely populated area there will therefore be a greater risk that some individuals within the community will find the odour unacceptable than in a sparsely populated area. An important point to note is that the odour assessment criteria are not intended to achieve 'no odour'. They are concerned with controlling odours to ensure offensive odour impacts will be effectively managed.

The 7 ou criterion has been adopted to assess the odour impact for this assessment.

### *3.1.3 Peak to Mean Ratios*

It is a common practice to use dispersion models to determine compliance with odour goals. This introduces a complication because dispersion models are only able to directly predict concentrations over an averaging period of 3-minutes or greater. The human nose, however, can respond to odours over periods of the order of one second. During a 3-minute period, odour levels can fluctuate significantly above and below the mean depending on the nature of the source.

To determine the ratio between the one-second peak concentrations and three minute and longer period average concentrations (referred to as the peak to mean ratio) that might be predicted by a dispersion model, the EPA commissioned studies by Katestone Scientific Pty Ltd (Katestone Scientific, 1995; Katestone Scientific, 1998). The ratio is also dependent on atmospheric stability and the distance from the source. For area sources, as applies predominantly in this case, the peak to mean ratio is 2.5 for stability classes A to D, and 2.3 for E and F class stability. For volume sources the factor is 2.3 and is not dependent on stability class.

The EPA Approved Methods take account of this peak to mean factor and the goals shown in Table 3-1 are based on nose-response time.

## 3.2 Particulate matter

### 3.2.1 Overview

Particulate matter has the capacity to affect health and to cause nuisance effects, and is categorised by size and/or by chemical composition. The potential for harmful effects depends on both. The particulate size ranges are commonly described as:

- Total Suspended Particulates (TSP) – refers to all suspended particles in the air. In practice, the upper size range is typically 30 µm.
- $PM_{10}$ – refers to all particles with equivalent aerodynamic diameters of less than 10 µm, that is, all particles that behave aerodynamically in the same way as spherical particles with diameters less than 10 µm and with a unit density. $PM_{10}$ are a sub-component of TSP.
- $PM_{2.5}$ – refers to all particles with equivalent aerodynamic diameters of less than 2.5 µm diameter (a subset of $PM_{10}$). These are often referred to as the fine particles and are a sub-component of $PM_{10}$.
- $PM_{2.5-10}$ – defined as the difference between $PM_{10}$ and $PM_{2.5}$ mass concentrations. These are often referred to as coarse particles.

Evidence suggests that health effects from exposure to airborne particulate matter are predominantly related to the respiratory and cardiovascular systems (WHO, 2011). The human respiratory system has in-built defensive systems that prevent larger particles from reaching the more sensitive parts of the respiratory system. Particles larger than 10 µm, while not able to affect health, can soil materials and generally degrade aesthetic elements of the environment. For this reason, air quality goals make reference to measures of the total mass of all particles suspended in the air, referred to as TSP. In practice particles larger than 30 to 50 µm settle out of the atmosphere too quickly to be regarded as air pollutants. The upper size range for TSP is usually taken to be 30 µm.

Both natural and anthropogenic processes contribute to the atmospheric load of particulate matter. Coarse particles ($PM_{2.5-10}$) are derived primarily from mechanical processes resulting in the suspension of dust, soil, or other crustal materials from roads, farming, mining and dust storms.

Fine particles or $PM_{2.5}$ are derived primarily from combustion processes, such as vehicle emissions, wood burning and natural processes such as bush fires. Fine particles also consist of transformation products, including sulphate and nitrate particles, and secondary organic aerosol from volatile organic compound emissions. $PM_{2.5}$ may penetrate beyond the larynx and into the thoracic respiratory tract and evidence suggests that particles in this size range are more harmful than the coarser component of $PM_{10}$.

The size of particles determine their behaviour in the respiratory system, including how far the particles are able to penetrate, where they deposit, and how effective the body's clearance mechanisms are in removing them.

### 3.2.2 Impact assessment criteria

The Approved Methods specify air quality impact assessment criteria relevant for assessing impacts from air pollution (NSW EPA, 2016). The impact assessment criteria for pollutants relevant to this assessment refer to the total pollutant load in the environment and impacts from new sources of these pollutants must be added to existing background levels for compliance assessment. In other words, consideration of background dust levels needs to be made when using the goals outlined in the Approved Methods to assess potential impacts.

These criteria are health-based (i.e. they are set at levels to protect against health effects) and for $PM_{10}$ and $PM_{2.5}$ are consistent with Amended National Environment Protection Measure for Ambient Air Quality (Ambient Air-NEPM) (NEPC, 2016). In addition, the Approved Methods include other measures

of air quality, namely dust deposition and Total Suspended Particulates (TSP), which are not stated in the Ambient Air-NEPM.

Table 3-2 summarises the air quality criteria for concentrations of particulate matter that are relevant to this study. It is important to note that these criteria are applied to the cumulative impacts due to the Project and other sources.

**Table 3-2: NSW EPA impact assessment criteria for particulate matter concentrations**

| Pollutant | Criteria | Averaging period |
|---|---|---|
| TSP | 90 µg/m$^3$ | Annual |
| $PM_{10}$ | 50 µg/m$^3$ | 24-Hour |
| | 25 µg/m$^3$ | Annual |
| $PM_{2.5}$ | 25 µg/m$^3$ | 24-Hour |
| | 8 µg/m$^3$ | Annual |

Airborne dust also has the potential to cause nuisance dust effects by depositing on surfaces, including vegetation. Larger particles do not tend to remain suspended in the atmosphere for long periods of time and will fallout relatively close to source. Dust fallout can soil materials and generally degrade aesthetic elements of the environment, and are assessed for nuisance amenity impacts.

Table 3-3 shows the maximum acceptable increase in dust deposition over the existing dust levels from an amenity perspective. These criteria for dust fallout levels are set to protect against nuisance impacts.

**Table 3-3: NSW EPA impact assessment criteria for deposited dust**

| Pollutant | Averaging period | Maximum increase (due to Project) | Maximum total level |
|---|---|---|---|
| Deposited dust (insoluble solids) | Annual average | 2 g/m$^2$/month | 4 g/m$^2$/month |

# 4. MODELLING METHODOLOGY

The local meteorology has been modelled for the year 2017 using observations from the Nowra Bureau of Meteorology (BoM) weather station in conjunction with the TAPM and CALMET models as described in Sections 4.1 and Section 4.2, respectively. Output from TAPM, plus local and regional observational weather station data were entered into CALMET, a meteorological pre-processor recommended for use in non-steady state conditions. From this, a 1-year representative meteorological dataset was compiled, suitable for use in the 3-dimensional plume dispersion model CALPUFF as described in Section 4.3. Details on the model configuration and data inputs are provided in the following sections.

## 4.1 TAPM

The Air Pollution Model (TAPM) is a three dimensional meteorological and air pollution model developed by the CSIRO Division of Atmospheric Research. Detailed description of the TAPM model and its performance is provided in *The Air Pollution Model (TAPM) Version 4. Part 1: Technical Description* (Hurley, P, 2008) and *The Air Pollution Model (TAPM) Version 4. Part 2: Summary of Some Verification Studies* (Hurley, Physick, Luhar, & Edwards, 2008).

TAPM solves the fundamental fluid dynamics and scalar transport equations to predict meteorology and pollutant concentrations. It consists of coupled prognostic meteorological and air pollution concentration components. The model predicts airflow important to local scale air pollution, such as sea breezes and terrain induced flows, against a background of larger scale meteorology provided by synoptic analyses.

For this project, TAPM was set up with 5 domains, composed of 25 grid points along both the X and the Y axes, centred on 272.000 km Easting and 6137.700 km northing (UTM Zone 56 S). Each nested domain had a grid spacing of 30 km, 10 km, 3 km, 1 km and 300 m, respectively.

CALTAPM was developed to provide users of the TAPM model the ability to create an hourly, 3 dimensional data file of gridded meteorological parameters, for direct use in the CALMET diagnostic meteorological model. When used in this way the TAPM data can be used in CALMET to determine the initial guess wind field, prior to the weighting of true observations or even to run CALMET in no-observation mode. The TAPM output file (3D.DAT) was used as an initial guess wind field.

## 4.2 CALMET

CALMET is a meteorological pre-processor that includes a wind field generator containing objective analysis and parameterised treatments of slope flows, terrain effects and terrain blocking effects. The pre-processor produces fields of wind components, air temperature, relative humidity, mixing height and other micro-meteorological variables to produce the three-dimensional meteorological fields that are utilised in the CALPUFF dispersion model (i.e. the CALPUFF dispersion model requires meteorological data in three dimensions). CALMET uses the meteorological inputs in combination with land use and geophysical information for the modelling domain to predict gridded meteorological fields for the region.

CALMET was run with a grid domain of 12 km x 18 km, with a 200 m grid resolution. Gridded wind fields generated by TAPM in the form of a three dimensional data file (the 3D.DAT file referred to above) were used as the initial guess field for CALMET. Details on the CALMET settings are provided in Table 4-1 below.

**Table 4-1: CALMET meteorological model settings**

| CALMET | |
|---|---|
| South west corner of CALMET domain | X: 266.000 km Y: 6,125.700 km |
| Meteorological grid domain | 12 km x 18 km (60 x 90 grid points) |
| Meteorological grid resolution | 0.2 km |
| TERRAD | 1 km |
| Surface stations | Nowra BoM station |
| NOOBS | 1 (Use surface and overwater stations (no upper air observations), use MM4/MM5/3D.DAT for upper air data). |

## 4.3 CALPUFF

CALPUFF is the dispersion module of the CALMET/CALPUFF suite of models. It is a multi-layer, multi species, non-steady-state puff dispersion model that can simulate the effects of time-varying and space-varying meteorological conditions on pollutant transport, transformation and removal. The model contains algorithms for near-source effects such as building downwash, partial plume penetration, sub-grid scale interactions as well as longer range effects such as pollutant removal, chemical transformation, vertical wind shear and coastal interaction effects. The model employs dispersion equations based on a Gaussian distribution of pollutants across released puffs and takes into account the complex arrangement of emissions from point, area, volume and line sources (Scire, Strimaitis, & Yamartino, 2005).

Each odour generating source was represented by a series of area and volume sources situated according to their location. Model predictions were made across the domain at gridded receptors at a spacing of 200 m x 200 m.

The local area is rural with scattered residences. Sensitive receptors locations were included in the dispersion modelling for the nearest residential receptor locations and are provided in Figure 2-2.

# 5. EXISTING ENVIRONMENT

## 5.1 Dispersion meteorology

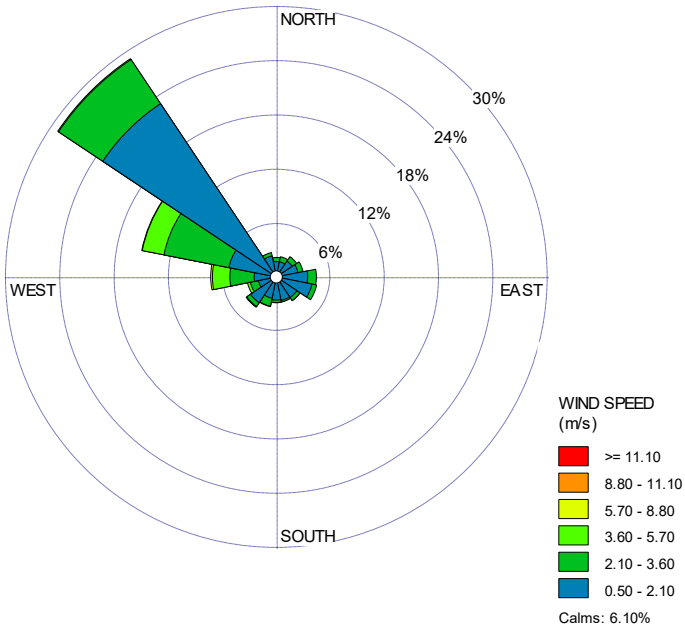
The primary meteorological parameters influencing plume dispersion modelling are wind direction, wind speed, turbulence (atmospheric stability), and mixing height (depth of turbulent layer).

The closest available meteorological station located to the site is the Bureau of Meteorology's (BoM) weather station at Nowra, approximately 8 km southeast of the site. A five year review of the meteorological data has been conducted and is shown in Appendix A. Modelling has been conducted for 2017.

### *5.1.1 Wind Speed and Direction*

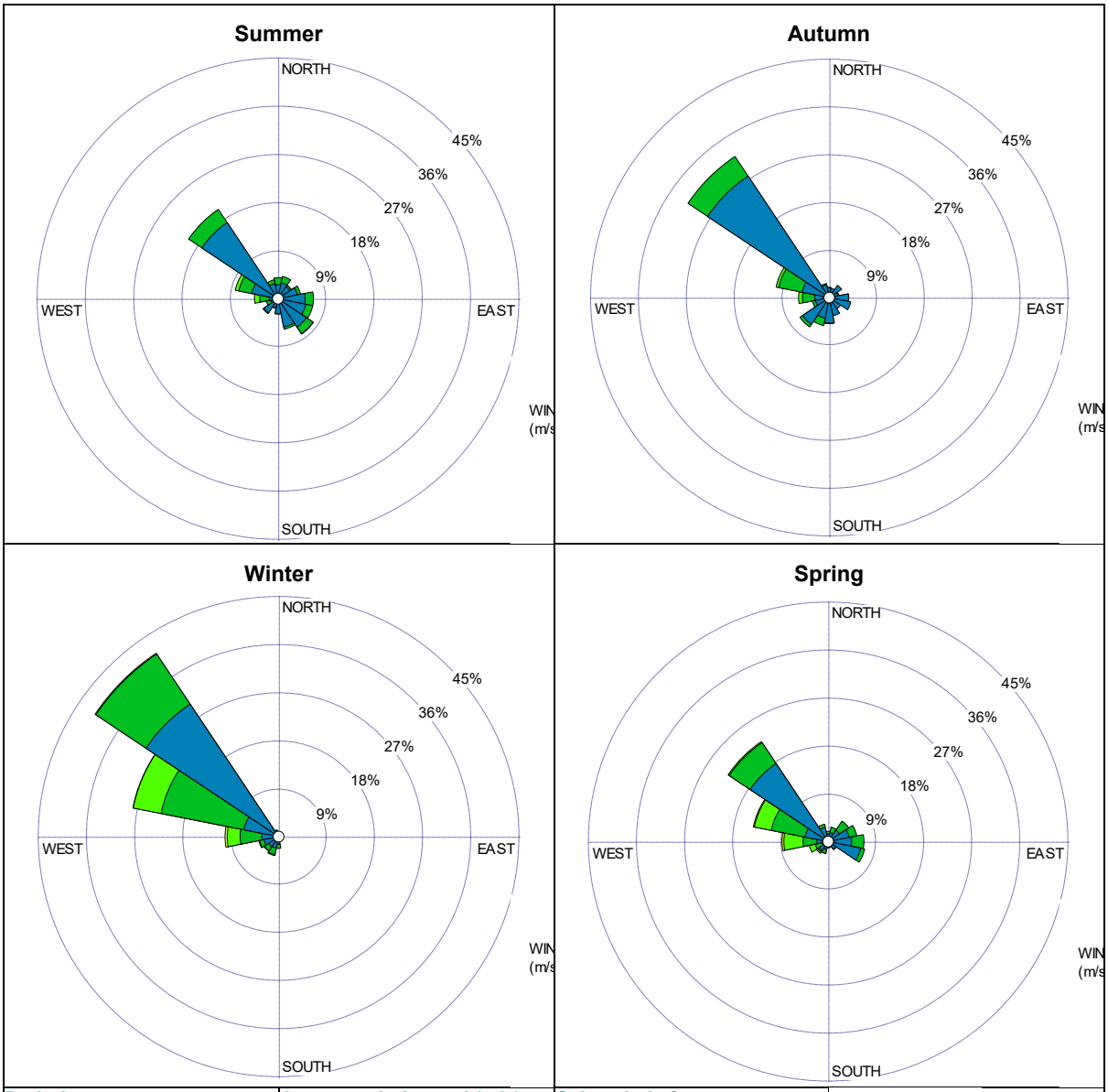
Wind roses show the frequency of occurrence of winds by direction and strength. The bars correspond to the 16 compass points – N, NNE, NE, etc. The bar at the top of each wind rose diagram represents winds blowing from the north (i.e. northerly winds), and so on. The length of the bar represents the frequency of occurrence of winds from that direction, and the bar sections correspond to wind speed categories, the nearest to the centre representing the lightest winds. Thus, it is possible to visualise how often winds of a certain direction and strength occur over any given period of time.

Annual, seasonal and time of day wind roses for the SOILCO CMF site location are presented in Figure 5-1 to Figure 5-3. The SOILCO CMF site is located in a valley along the Shoalhaven River. The site is dominated by north westerly winds throughout the year. As expected, highest wind speeds occurred in the early afternoon with weaker winds at night-time. The stronger afternoon winds are also aligned with a westerly wind direction.



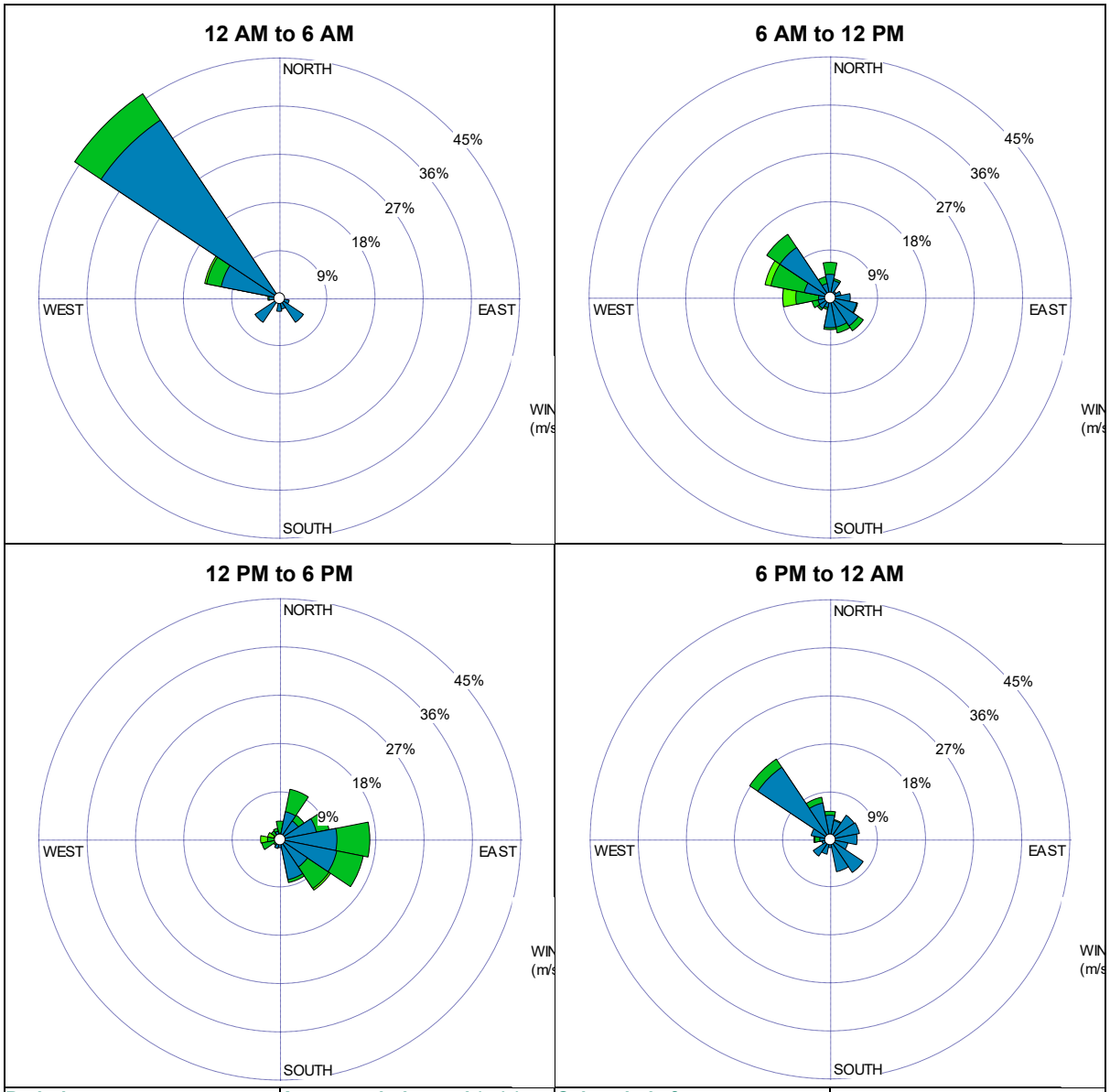

| | | |
|---|---|---|
| **Location:** SOILCO CMF | **Data Period:** 2017 | **Data Type:** CALMET Extract |
| **Calm Winds:** 6.1% | **Average Wind Speed:** 1.7 m/s | **Plot:** R McGloin |

**Figure 5-1: Annual wind rose for SOILCO CMF site for 2017**




| Period | Average wind speed (m/s) | Calm winds frequency |
|---|---|---|
| Summer | 1.4 | 9.4% |
| Autumn | 1.4 | 5.3% |
| Winter | 2.1 | 1.6% |
| Spring | 1.8 | 8.2% |
| **Location:** SOILCO CMF | **Data Period:** 2017 | **Data Type:** CALMET Extract |

**Figure 5-2: Seasonal wind rose for the SOILCO CMF site for 2017**




| Period | Average wind speed (m/s) | Calm winds frequency |
|---|---|---|
| 12 AM to 6 AM | 1.1 | 15.9% |
| 6 AM to 12 PM | 1.6 | 7.6% |
| 12 PM to 6 PM | 1.9 | 0.4% |
| 6 PM to 12 AM | 1.0 | 13.5% |
| **Location:** SOILCO CMF | **Data Period:** 2017 | **Data Type:** CALMET Extract |

**Figure 5-3: Time of day wind rose for SOILCO CMF site for 2017**

### 5.1.2 Stability

Atmospheric turbulence is an important factor in plume dispersion. Turbulence acts to increase the cross-sectional area of the plume due to random motions, thus diluting or diffusing a plume. As turbulence increases, the rate of plume dilution or diffusion increases. Weak turbulence limits plume diffusion and is a critical factor in causing high plume concentrations downwind of a source, particularly when combined with very low wind speeds.

Turbulence is related to the vertical temperature gradient, the condition of which determines what is known as stability, or thermal stability. For traditional dispersion modelling using Gaussian plume models, categories of atmospheric stability are used in conjunction with other meteorological data to describe atmospheric conditions and thus dispersion.

The most well-known stability classification is the Pasquill-Gifford scheme, which denotes stability classes from A to F. Class A is described as highly unstable and occurs in association with strong surface heating and light winds, leading to intense convective turbulence and much enhanced plume dilution. At the other extreme, class F denotes very stable conditions associated with strong temperature inversions and light winds, which commonly occur under clear skies at night and in early mornings. Under these conditions plumes can remain relatively undiluted for considerable distances downwind.

Intermediate stability classes grade from moderately unstable (B), through neutral (D) to slightly stable (E). Whilst classes A and F are strongly associated with clear skies, class D is linked to windy and/or cloudy weather, and short periods around sunset and sunrise when surface heating or cooling is small. As a general rule, unstable (or convective) conditions dominate during the daytime and stable flows are dominant at night. This diurnal pattern is most pronounced when there is relatively little cloud cover and light to moderate winds.

The frequency distributions of stability classes for the CALMET SOILCO CMF site for 2017 are presented in Figure 5-4. The data show a total of approximately 47% of hours in the F stability class and a low frequency of class D conditions, this is a result of the high frequency of very light wind speeds and low frequency of moderate to strong winds at the site. The generated meteorology is therefore conservative as odour impacts are typically expected to be higher during very stable conditions (class E or F).

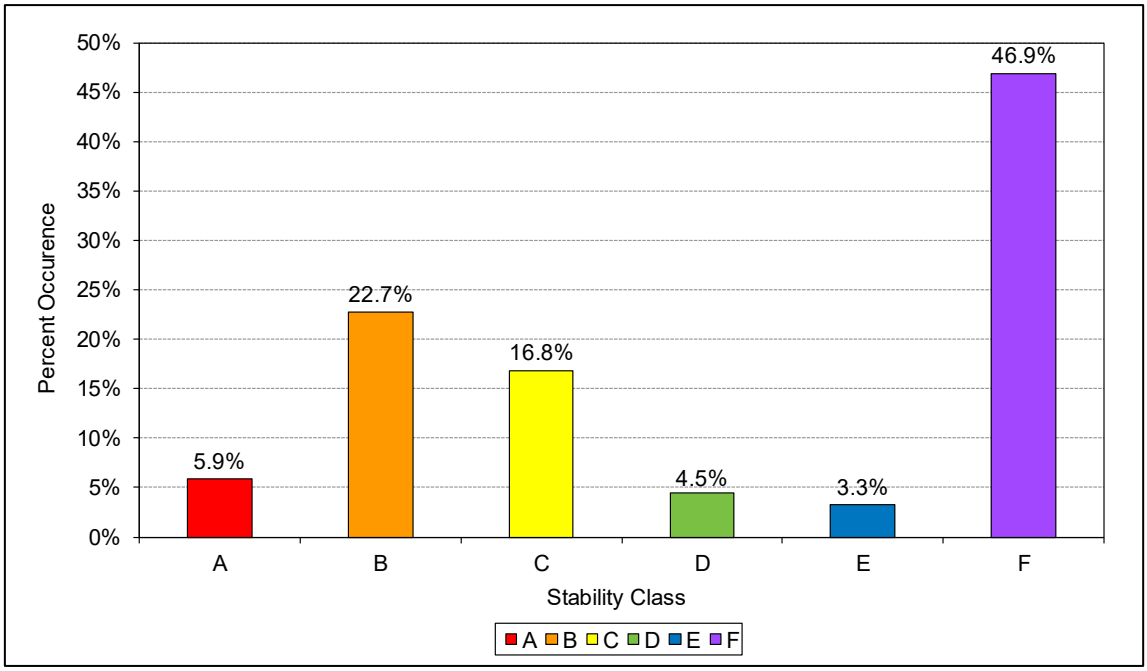



**Figure 5-4: Stability class frequency distribution for SOILCO CMF**

### 5.1.3 Mixing Height

Mixing height is the depth of the atmospheric mixing layer beneath an elevated temperature inversion. It is an important parameter in air pollution meteorology as vertical diffusion or mixing of a plume is generally considered to be limited by the mixing height. This is because the air above this layer tends to be stable, with restricted vertical motions.

The diurnal variation of mixing heights at the site location for the 2017 data set is summarised and presented in Figure 5-5. The diurnal cycles are typical with mixing height growth during daytime hours (in response to convective mixing which results from solar heating of the earth's surface) until late afternoon followed by a decline around early evening and sunset with lower mixing heights throughout the night and minimum mixing heights just before dawn.

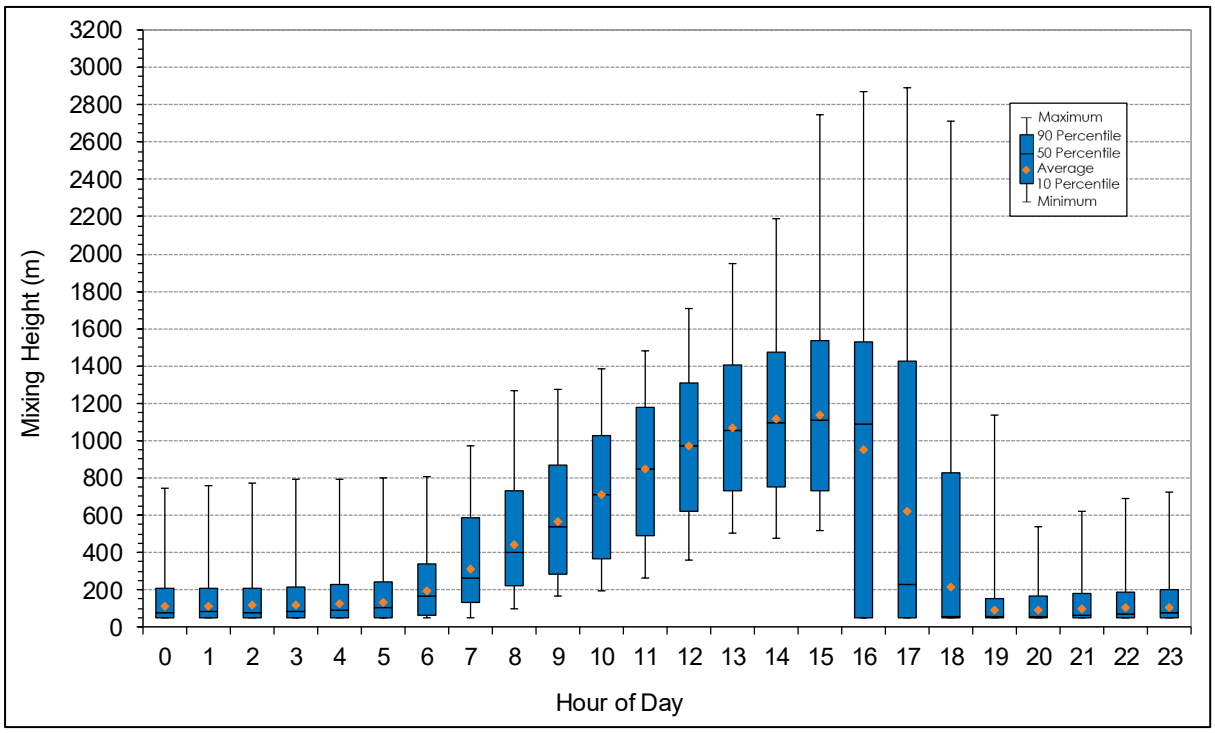



**Figure 5-5: Mixing height for SOILCO CMF**

## 5.2 Existing air quality

### 5.2.1 Particulate matter

There are no air quality monitoring stations located near to the Project, with the closest monitoring station located approximately 40 km northeast at Albion Park South. The monitoring station is located in a reserve in a semi-rural area in the south of the Illawarra. The Project is located in a rural area and the background concentrations likely to be experienced at the Project will be lower than those recorded at Albion Park South. On that basis, taking background values from this station is conservative.

Table 5-1 presents the annual average $PM_{10}$ and $PM_{2.5}$ concentrations at Albion Park South. The tables shows that $PM_{10}$ concentrations have been increasing year on year since 2015. For $PM_{2.5}$, concentrations have been increasing year on year since 2017.

**Table 5-1: Annual average $PM_{10}$ and $PM_{2.5}$ concentrations at Albion Park South**

| Year | $PM_{10}$ | Criteria | $PM_{2.5}$ | Criteria |
|---|---|---|---|---|
| 2015 | 14.0 | 25 | 6.4 | 8 |
| 2016 | 14.9 | | 7.2 | |
| 2017 | 15.3 | | 6.6 | |
| 2018 | 17.8 | | 6.8 | |
| 2019 | 19.5 | | 8.6 | |
| **Average** | **16.3** | | **7.1** | |

The chosen meteorological year for the assessment is 2017. When viewing the concentrations in Table 5-1, the annual average $PM_{10}$ and $PM_{2.5}$ concentrations for 2017 (15.3 µg/m$^3$ for $PM_{10}$ and 6.6 µg/m$^3$ for $PM_{2.5}$) are lower than the five-year averages of 16.3 µg/m$^3$ for $PM_{10}$ and 7.1 µg/m$^3$ for $PM_{2.5}$. On that basis, the five-year annual averages have been chosen for the background values. When considering the 24-hour average concentrations, the daily values from 2017 have been used to correspond with the 2017 meteorological data.

No TSP concentration data are available in the vicinity of the site. Estimates of annual average TSP concentrations can be made from the $PM_{10}$ measurements by assuming that 40% of the TSP is $PM_{10}$. This relationship was obtained from data collected by co-located TSP and $PM_{10}$ monitors operated for long periods of time in the Hunter Valley (NSW Minerals Council, 2000). Whilst it is noted that this site is not in the Hunter Valley, in the absence of other information this ratio has been applied for this assessment.

In the absence of site-specific dust deposition data it is assumed existing annual dust deposition background levels are 2 g/m$^2$/month, which is typical of arid rural areas.

### 5.2.2 Summary of background data

In summary the background values adopted for this assessment are:

- Annual average TSP = 40.8 µg/m$^3$
- Annual average $PM_{10}$ = 16.3 µg/m$^3$
- 24-hour $PM_{10}$ = daily varying
- Annual average $PM_{2.5}$ = 7.1 µg/m$^3$
- 24-hour $PM_{2.5}$ = daily varying
- Dust deposition = 2 g/m$^2$/month

### 5.2.3 Odour

ERM recently completed an odour assessment for the current operations at SOILCO's CMF (ERM, 2019). For that assessment, the CMF was approved to receive 35,000 tpa of organic waste for composting consisting of 25,000 tpa green waste and 10,000 tpa FOGO.

The assessment identified that the 6 OU criterion has been adopted to assess the odour impacts. The 6 OU contour extends into the neighbouring property (R1) which currently operates as a dairy. No other surrounding sensitive receptors fall within the 6 OU criterion. Figure 5-6 presents the contour for the existing approved operations. The risk of odour impact to sensitive receptor locations from the CMF site was predicted to be low.

It should be noted that at the aerated pads assessed at this time did not include the mitigation measure of over-size biocover. Odour measurements that were made on the aerated pad prior to this measure being implemented were significantly higher. The modelling results presented in Section 8.1 do incorporate this feature and as such the results are comparable, even with additional sources added.

The term biocover is used here to describe a layer of coarse composted material. This layer is placed on top of the pile at depth approximately 250 mm to 300 mm and provides the following benefits during the active phase of pasteurisation:

- It acts as a layer of thermal insulation to ensure that the entire stockpile maintains a temperature above 55°C;
- It acts as a form of odour control. Odour sampling undertaken by Ektimo (see Appendix B) has shown that odour is significantly reduced when a biocover layer is present on SOILCOs existing aerated pad;
- Nutrient retention;
- Reduction in bird and insect activity as the external, post-composted, layer, is not attractive to pests;
- It assists with moisture retention within the compost; and
- It is less visually obtrusive than the composting material.

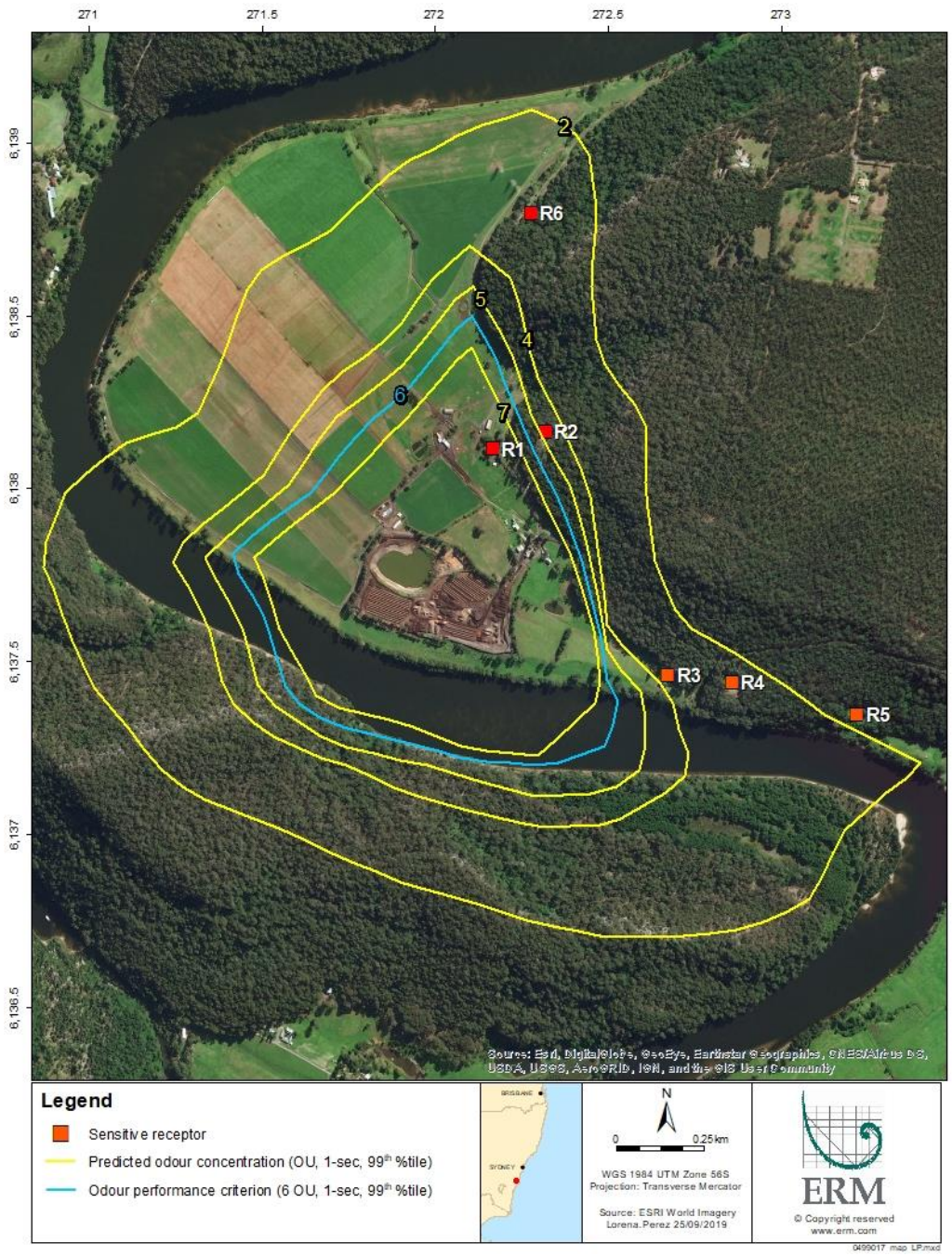



**Figure 5-6: Predicted 99th percentile ground level odour concentration (ou) for existing approved operations**

# 6. ODOUR EMISSION RATES

## 6.1 Odour Sampling

Odour sampling was carried out for at the facility by Ektimo on 3 April 2019 (report number R007301) and 2 February 2020 (report number R008735). Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Measurements were made in accordance with the relevant Australian and New Zealand standards and the results were used to determine specific odour emission rates for modelling. The odour reports provided by Ektimo for both rounds of testing have been provided in Appendix B for reference.

## 6.2 Odour Scenarios

Odour modelling has been conducted for two scenarios:

1. A normal operations scenario
    - turning of 2/7 of the windrows (to represent turning twice per week)
2. A worst-case scenario
    - turning of entire windrow area every day

In the normal operations scenario, the emissions have tried to represent a typical day. However, it is still a conservative scenario as it assumes at least some of the windrows will be turned or disturbed at any hour (between 7am and 4pm) every day of the year. This will not be the case as this would only occur twice per week.

For the worst-case scenario, it must be remembered that this is a 'theoretical' worst case modelled at the request of the EPA and would not occur in practice. Compost will only be turned, at most, twice per week.

## 6.3 Emission Rates Used for Modelling

The specific odour emission rates for area sources (OU per unit time per unit area) were determined using the analysis results from Ektimo, combined with flux hood specifications and the aeration rate through the collection hood. For the manure stockpile (source 14), the odour emissions rates were measured at a composting site in Camden which included stockpiles of manure from ducks, horses and cattle (TOU, 2012). The highest sample was from duck manure and used in this assessment.

Table 6-1 provides a summary of the odour emissions inventory adopted for this modelling exercise and how this applies to the sources modelled.

The emission rates outlined in Table 6-1 apply to the normal operations scenario. For the worst-case scenario, the emission rate for source 9 (turned garden organics) applies to source 8 (fresh garden organics) and source 10 (final stage garden organics). By changing these emissions rates, the worst-case scenario assumes that all of the garden organics are being turned, which uses the highest odour emission rate for the garden organics.

Note that emissions from drilling mud or biosolids have not been included individually as they are likely to be a relatively low compared to the material they are mixed with. Odour emission rates measured from dredged material from Sydney Harbour (ERM, 2020) have shown that these emissions are likely to be very low. The maximum value measured over a number of tests was 0.028 $ou.m^3/m^2/s$, an order of magnitude lower than the lowest measured value for all sources at the site. When blended with more odorous material prior to distribution, this would not be significant. Similarly with biosolids, conservative measurements indicate levels may be of the order of 0.8 $ou.m^3/m^2/s$ (Macquarie Franklin, 2020). When blended with more odorous raw FOGO material the FOGO odour will dominate.

**Table 6-1: Odour emission rates used for modelling**

| Odour source | Source on Figure 6-1 | Measured odour concentration (OU) | Specific odour emission rate for area sources ($ou.m^3/m^2/s$) | Odour emission rate ($ou.m^3/s$) | Comment |
|---|---|---|---|---|---|
| FOGO - Pasteurised but pre-maturation | 1 and 5 | 990 | 0.6 | - | Measured by Ektimo (14/02/2020) |
| FOGO - Aeration Pads including biocover mitigation - Airflow ON | 2 and 6 | 825 | - | 1,017 | Calculated according to the reduction due to biocover undertaken in the FOGO from round 1 (17/04/2019) to round 2 (14/02/2020) |
| FOGO - Unpasteurised (untreated) | 3, 4 5 and 7 | 1,800 | 1.1 | - | Measured by Ektimo (14/02/2020) |
| Fresh garden organics | 8 | 520 | 0.3 | - | Measured by Ektimo (17/04/2019) |
| Turned garden organics | 9 | 2,000 | 1.1 | - | Measured by Ektimo (17/04/2019) |
| Final stage garden organics | 10 | 1,100 | 0.6 | - | Measured by Ektimo (17/04/2019) |
| Main leachate pond | 11 | 5,600 | 3.2 | - | Measured by Ektimo (14/02/2020) |
| Smaller leachate ponds * | 12 and 13 | 99 | 0.11 | - | Measured from compost product leachate Spring Farm |
| Manure stockpile | 14 | - | 0.36 | - | Measured by The Odour Unit at Camden Organics |

* This is a lower value used to reflect the reality that these ponds will be run dry for the majority of the time.

Figure 6-1 presents the odour source locations. Figure 2-1 presents the detailed proposed operational layout.

The sources presented in Table 6-1 have been grouped for further analysis and to identify if any of the odour concentrations are being dominated by a single source group (SG). The source groups are as follows:

- SG 1 = Source 1, 3, 4, 5 and 7
- SG 2 = Source 2 and 6
- SG 3 = Source 8, 9 and 10
- SG 4 = Source 11, 12 and 13
- SG 5 = Source 14

The only source group that differs between the normal operations and the regulatory worst case is source group 3. Details of which are provided earlier in this section.

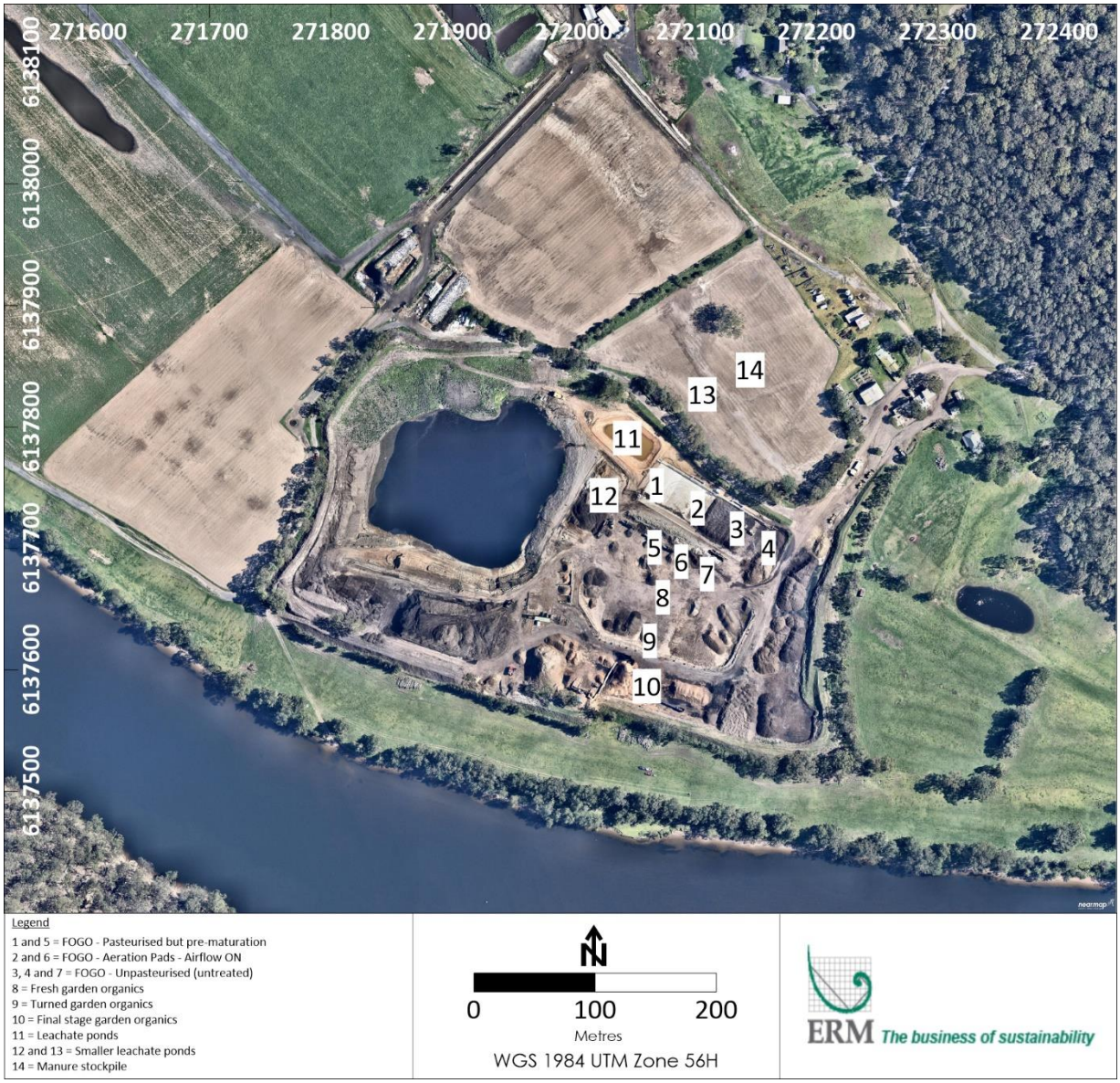



**Figure 6-1: Modelled odour source locations**

# 7. PARTICLE MATTER EMISSIONS ESTIMATION

There are potential sources of dust emissions from the proposed quarrying activities which have been analysed and estimates of dust emissions for the key dust generating activities have been made.

## 7.1 Particle size categories

Emission rates of TSP, $PM_{10}$ and $PM_{2.5}$ have been calculated using emission factors developed both within NSW and by the US EPA. Modelling of TSP, $PM_{10}$ and $PM_{2.5}$ was undertaken using the particle size specific inventories and was assumed to emit and deposit from the plume in accordance with the deposition rate appropriate for particles with an aerodynamic diameter equal to the geometric mass of the particle size range.

Modelling was completed for three particle size categories; Total Suspended Particulates (TSP), $PM_{10}$ and $PM_{2.5}$. The particle mass mean diameters were determined from particle size distribution data for various coal mining activities (presented in SPCC, 1986).

## 7.2 Emissions estimates from the Project

Estimates of emissions for each source were developed on an hourly time step taking into account the activities that would take place at that location. Thus, for each source and for each hour, an emission rate was determined which depended on the level of activity and the wind speed. Dust generating activities were represented by a series of volume sources situated according to the location of activities for the modelled scenarios. Figure 7-1 shows the locations of the volume sources used to represent the quarry activity and Table 7-1 shows the allocation of sources for each activity.

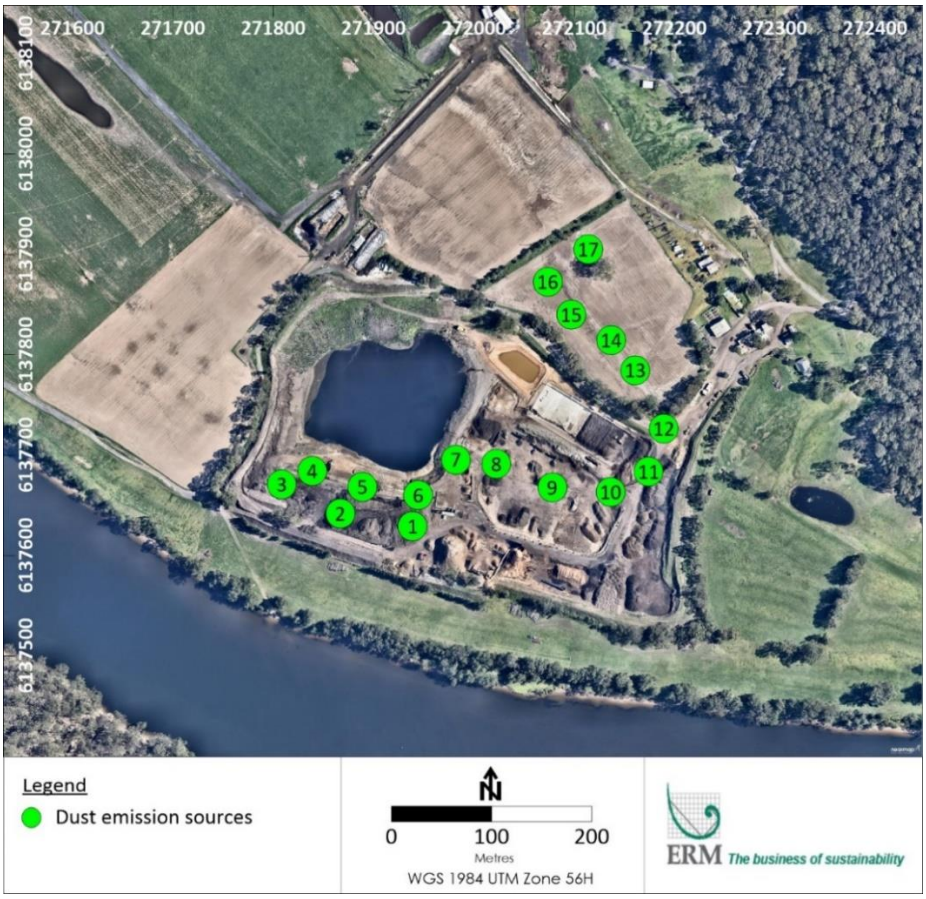



**Figure 7-1: Location of dust sources**

**Table 7-1: Inventory activity and allocated source number**

| Activity | Source number |
|---|---|
| Loading material with excavator | 1,2,3,4,5 |
| Hauling of material (unsealed roads) | 6,7,8,9,10,11,12,13,14 |
| Unloading material with excavator | 15,16,17 |
| Wind erosion - Exposed excavation and stockpile areas | 1,2,3,4,5,15,16,17 |

The information used for developing the inventories is based on the operational descriptions and plans provided by SOILCO. This information is used to determine haul road distances and routes, stockpile and pit areas, activity operating hours, truck sizes and other details that are necessary to estimate dust emissions.

Table 7-2 summarises the quantities of TSP, $PM_{10}$ and $PM_{2.5}$ estimated to be released by each activity of the Project.

**Table 7-2: Estimated TSP, $PM_{10}$ and $PM_{2.5}$**

| Activity | TSP emissions (kg/y) | $PM_{10}$ emissions (kg/y) | $PM_{2.5}$ emissions (kg/y) |
|---|---|---|---|
| Loading material with excavator | 25 | 16 | 2 |
| Hauling of material (unsealed roads) | 363 | 145 | 14 |
| Unloading material with excavator | 25 | 16 | 2 |
| Wind erosion - Exposed construction area | 425 | 213 | 32 |
| **Total estimated emissions** | **839** | **389** | **51** |

## 7.3 Overview of dust control

Dust control measures to be employed for the Project include the following:

- Use of additional water application, if required, on active haul roads (75% control applied)

# 8. ASSESSMENT OF IMPACTS

## 8.1 Odour

Modelled results have been presented for the normal operations scenario and the worst-case scenario in the following sections.

### *8.1.1 Normal operations*

The modelling results for normal operations are presented as a contour figure for the odour performance criterion of 6 OU (see Figure 8-1). The contour extends into the neighbouring property (R1) which currently operates as a dairy farm. No other surrounding discrete or sensitive receptors fall within the odour performance criterion of 6 OU criterion.




**Figure 8-1: Predicted 99th percentile ground level odour concentration (OU) for normal operations**

At the request of the EPA, results have also been analysed for the following percentiles:

- Maximum/100th percentile
- 99.9th percentile
- 99.5th percentile
- 99th percentile (used for comparison against the assessment criterion)
- 98th percentile

The modelling results for these percentiles are presented in Figure 8-2 and show that the predictions need to reach the 99.9th and 100th percentiles before impacting on receptors R3, R4 and R5.

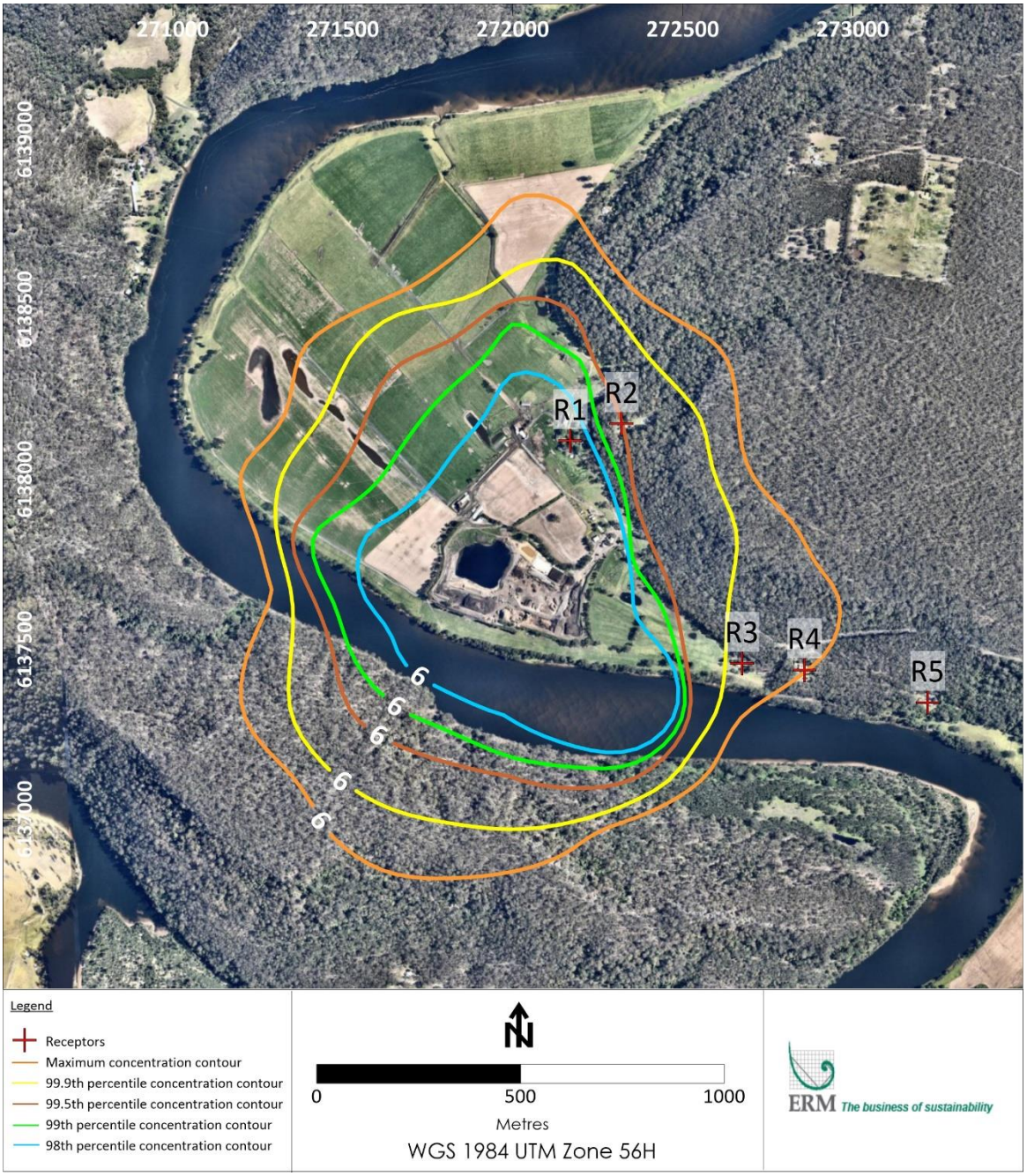



**Figure 8-2: Predicted 100th, 99.9th, 99.5th, 99th and 98th for the 6 OU contour for normal operations**

Concentration predictions for each individual hour have also been extracted for the five receptors included in this assessment. Figure 8-3 presents odour concentrations for receptors 1-5 for different hours of the day for normal operations. It can be seen that there are no predicted odour concentrations above 6 OU between 7 am and 3 pm. Activities which generate more odour, in particular turning of garden organics windrows, will be restricted to these hours to mitigate against peak odour impacts.

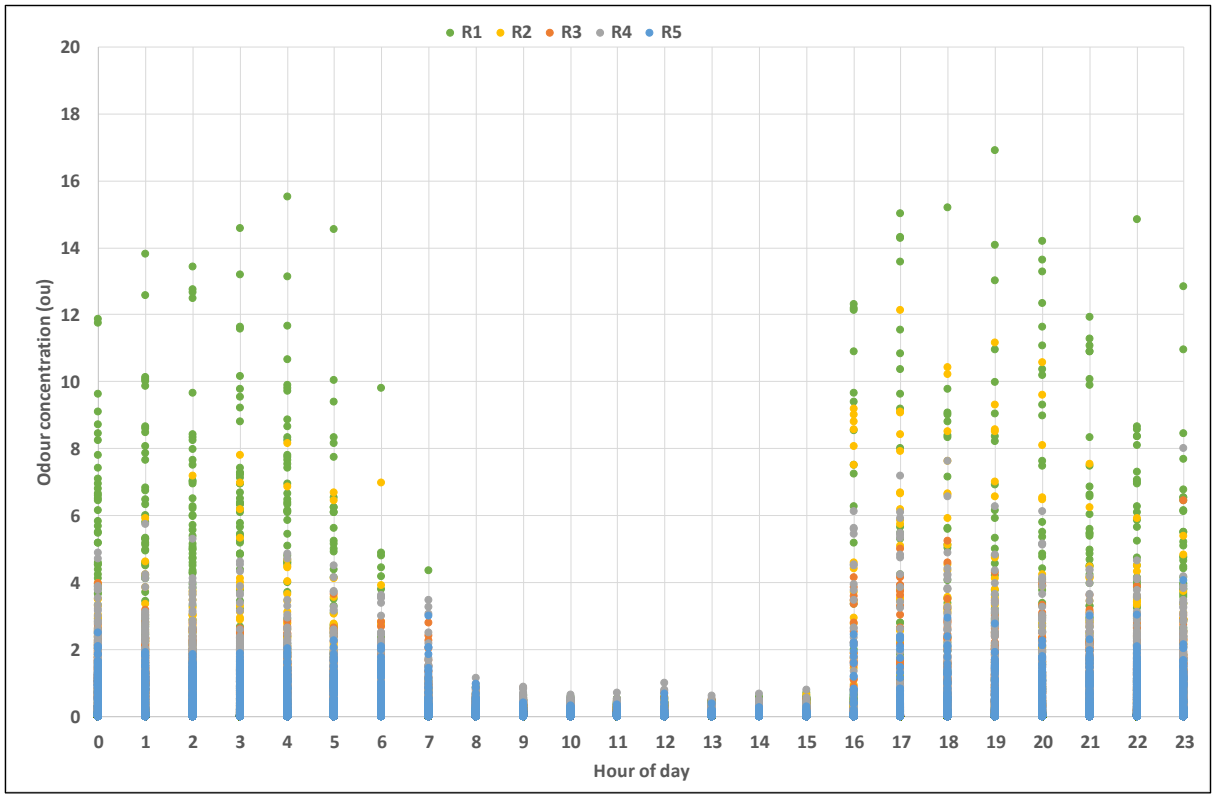



**Figure 8-3: Odour concentrations for Receptors 1-5 for every hour of the day for normal operations**

The source group with the largest impact is the windrows (SG3), which is not unexpected as this is a relatively large area and the assumptions made are conservative (that is, at least some of the windrows being turned every day). Table 8-1 shows the modelled source groups ranked from highest impact to lowest impacts on the nearest receptor (R1). This order remains relatively constant for all five receptors, but the contribution to the odour impact lessons with distance for the smaller sources such as the leachate ponds and the aerated pads.

**Table 8-1: Modelled source groups ranked**

| Rank | Source group | Sources included in group | Percentage of total impact at R1 (%) |
|---|---|---|---|
| 1 (highest impact) | SG 3 | Garden organics windrows | 39 |
| 2 | SG 1 | FOGO on pads but not aerated and raw material waiting to be loaded to pads | 22 |
| 3 | SG 4 | Leachate ponds | 20 |
| 4 | SG 2 | FOGO pads being actively aerated | 19 |
| 5 (lowest impact) | SG 5 | Manure stockpile | < 0.5 |

### 8.1.2 Worst-case

The modelling results for worst case are presented as a contour figure for the odour performance criterion of 6 OU (see Figure 8-4). The contour extends into the neighbouring property (R1) which currently operates as a dairy. No other surrounding discrete or sensitive receptors fall within the odour performance criterion of 6 OU criterion.

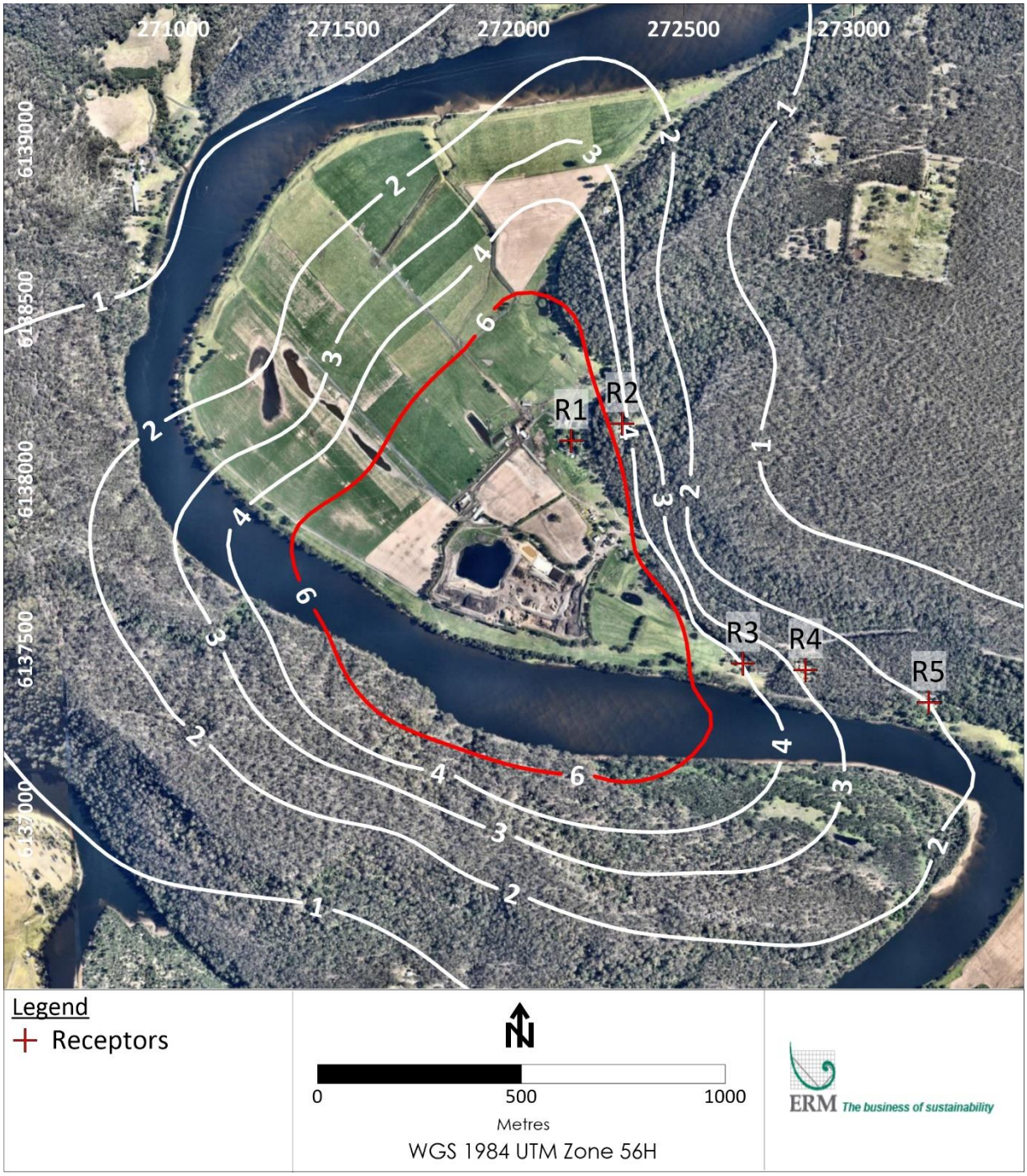



**Figure 8-4: Predicted 99th percentile ground level odour concentration (OU) for the worst-case scenario**

The modelling results for the 100th, 99.9th, 99.5th, 99th and 98th percentiles for the worst case scenario are presented in Figure 8-5. Again, these results show that the predictions need to reach the 99.9th and 100th percentiles before impacting on receptors R3, R4 and R5.

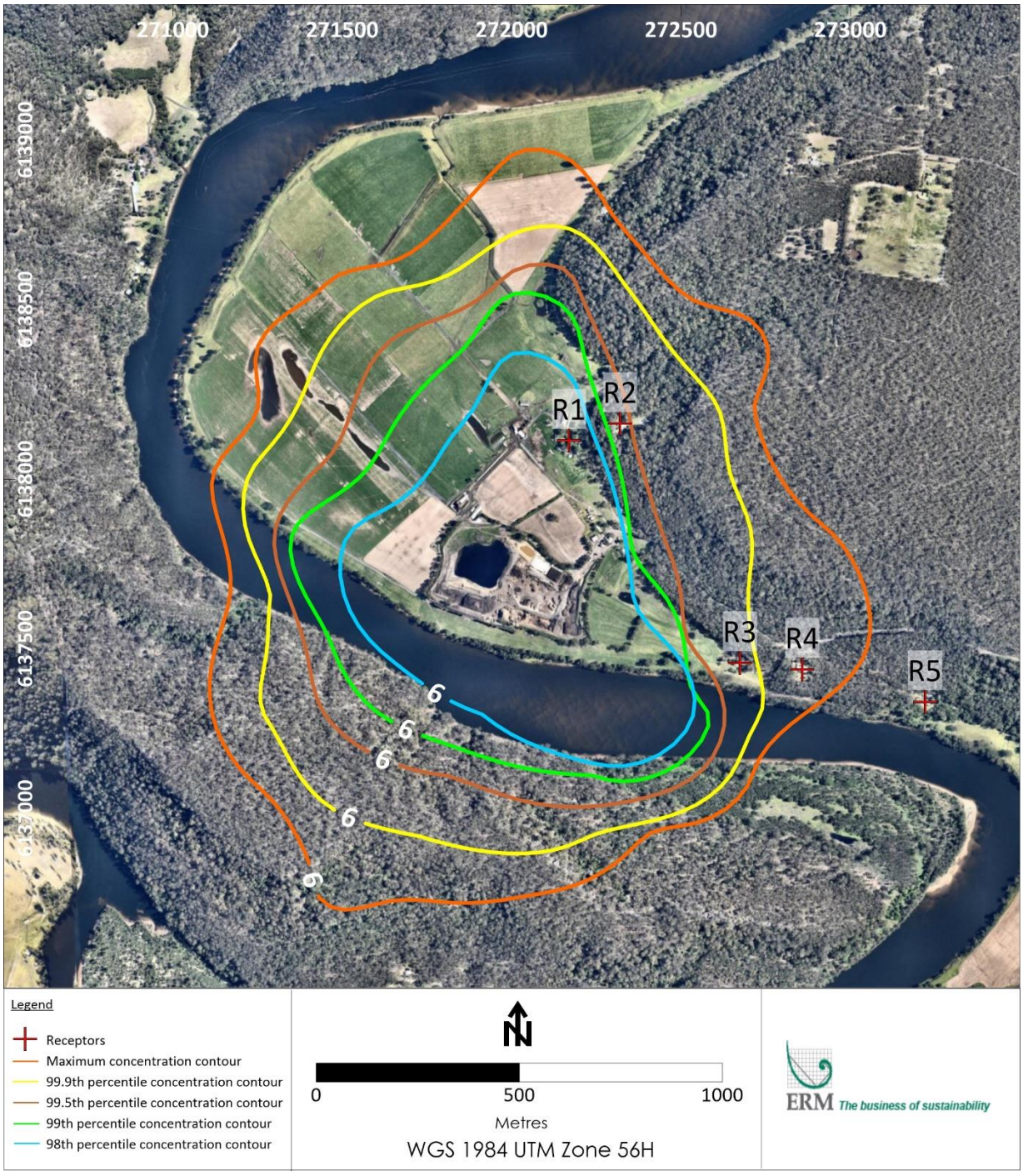



**Figure 8-5: Predicted 100th, 99.9th, 99.5th, 99th and 98th for the 6 OU contour for the worst case scenario**

Figure 8-6 presents odour concentrations for receptors 1-5 for the different hours of the day for the worst case scenario. It can be seen that there are no predicted odour concentrations above 6 OU between 8 am and 3 pm. For receptor R3 there are very few predicted concentrations above 6 OU and none for R4 or R5.

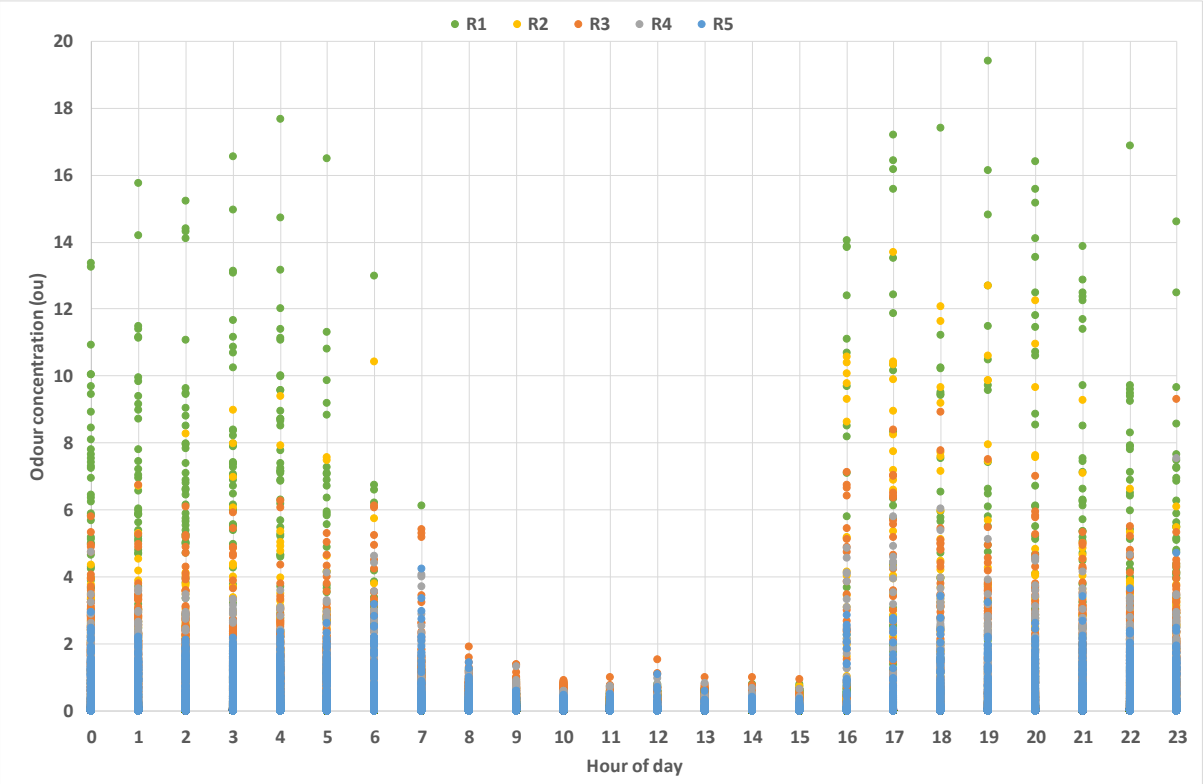



**Figure 8-6: Odour concentrations for Receptors 1-5 for every hour of the day for the worst case scenario**

## 8.2 Dust

Dust concentrations and deposition levels are presented as contours plots in this section showing the following:

- Predicted annual average TSP concentration from the Project alone
- Predicted annual average $PM_{10}$ concentration from the Project alone
- Predicted annual average $PM_{2.5}$ concentration from the Project alone
- Predicted annual average dust deposition from the Project alone
- Predicted maximum 24-hour average $PM_{10}$ concentration from the Project alone
- Predicted maximum 24-hour average $PM_{2.5}$ concentration from the Project alone
- Cumulative predicted annual average TSP concentration
- Cumulative predicted annual average $PM_{10}$ concentration
- Cumulative predicted annual average $PM_{2.5}$ concentration
- Cumulative predicted annual average dust deposition

Dispersion model predictions have been made for the quarry. Contour plots of particulate concentrations and deposition levels show the areas that are predicted to be affected by dust at different levels. It is important to note that the isopleth figures are presented to provide a visual representation of the predicted impacts. To produce the isopleths it is necessary to make interpolations, and as a result the isopleths will not always match exactly with predicted impacts at any specific location.

There are no exceedances of the NSW EPA impact assessment criteria for TSP, $PM_{10}$, $PM_{2.5}$ or dust deposition either from the project alone or cumulatively at nearby sensitive receptors.

A cumulative 24-hour assessment has been undertaken for $PM_{10}$ and $PM_{2.5}$. The results indicate that when contemporaneous assessments of maximum cumulative 24-hour average $PM_{10}$ and $PM_{2.5}$ are considered, there are no exceedances of the relevant air quality criteria. Figure 8-17 presents a time series of predicted cumulative 24-hour average $PM_{10}$ concentrations at Receptor 5.

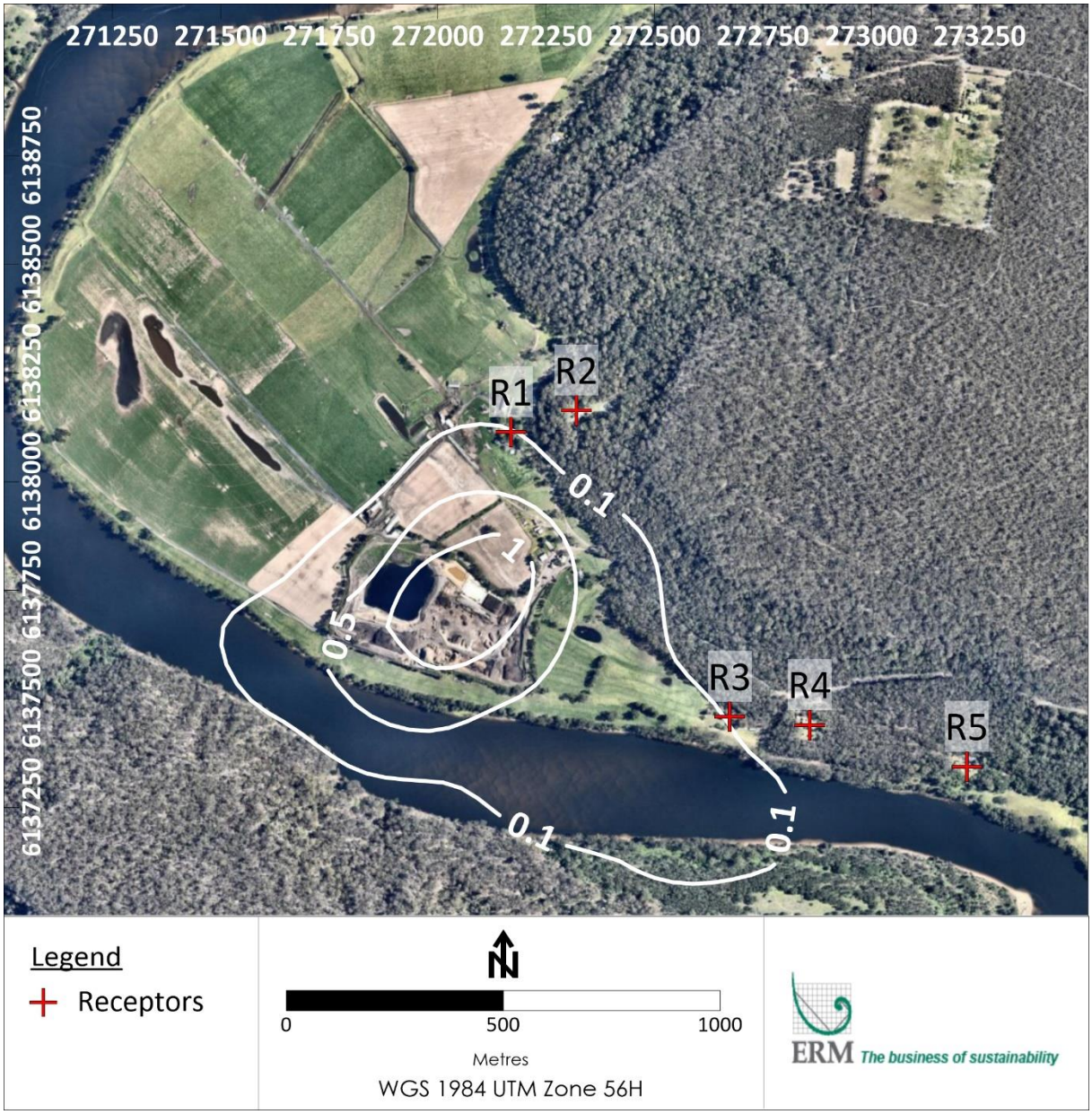



**Figure 8-7: Predicted annual average TSP concentrations (µg/m$^3$) due to emissions from the Project alone**




**Figure 8-8: Predicted annual average $PM_{10}$ concentrations (µg/m3) due to emissions from the Project alone**

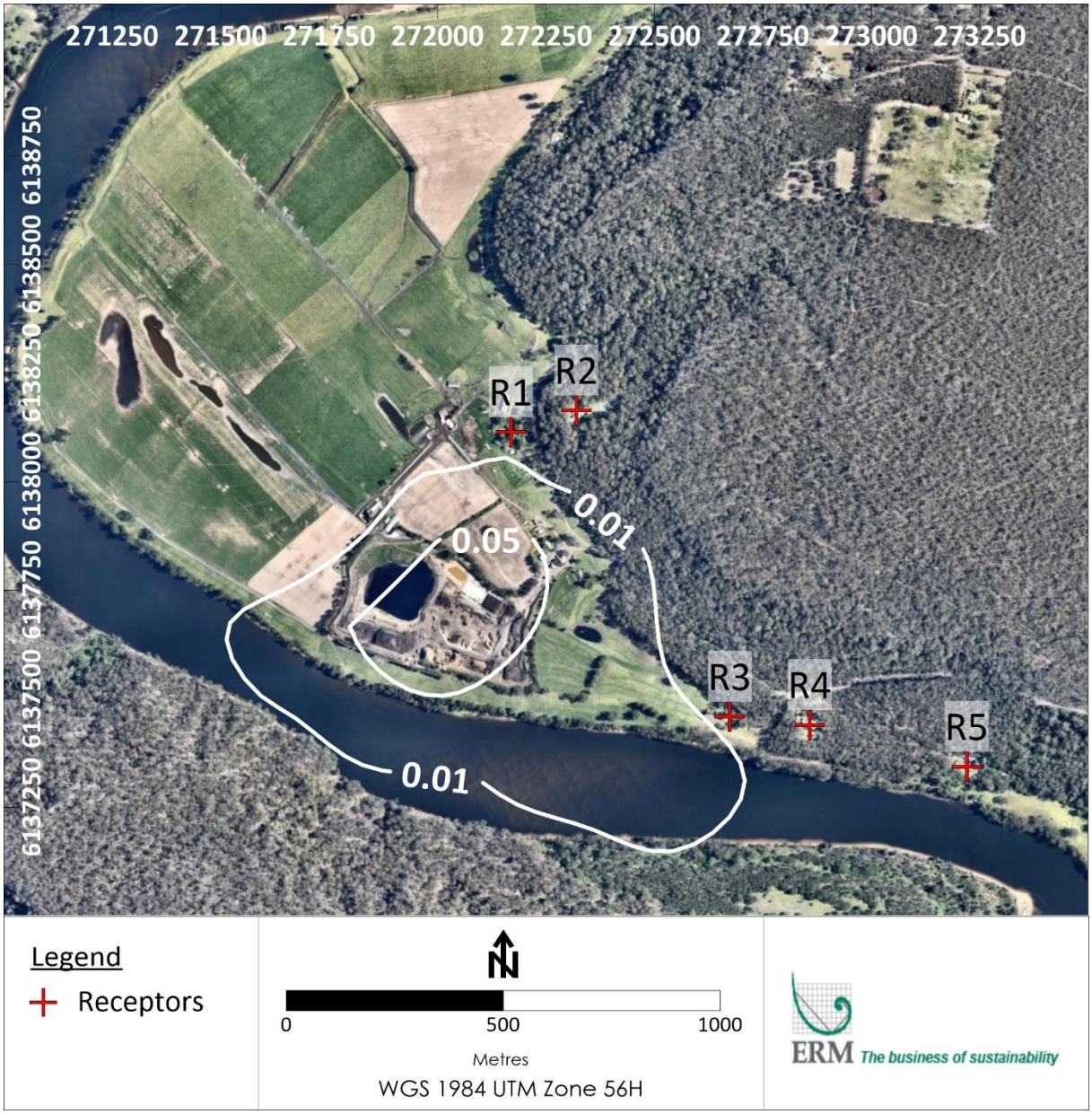



**Figure 8-9: Predicted annual average $PM_{2.5}$ concentrations (µg/m$^3$) due to emissions from the Project alone**




**Figure 8-10: Predicted monthly average dust deposition levels (g/m$^2$/month) due to emissions from the Project alone**

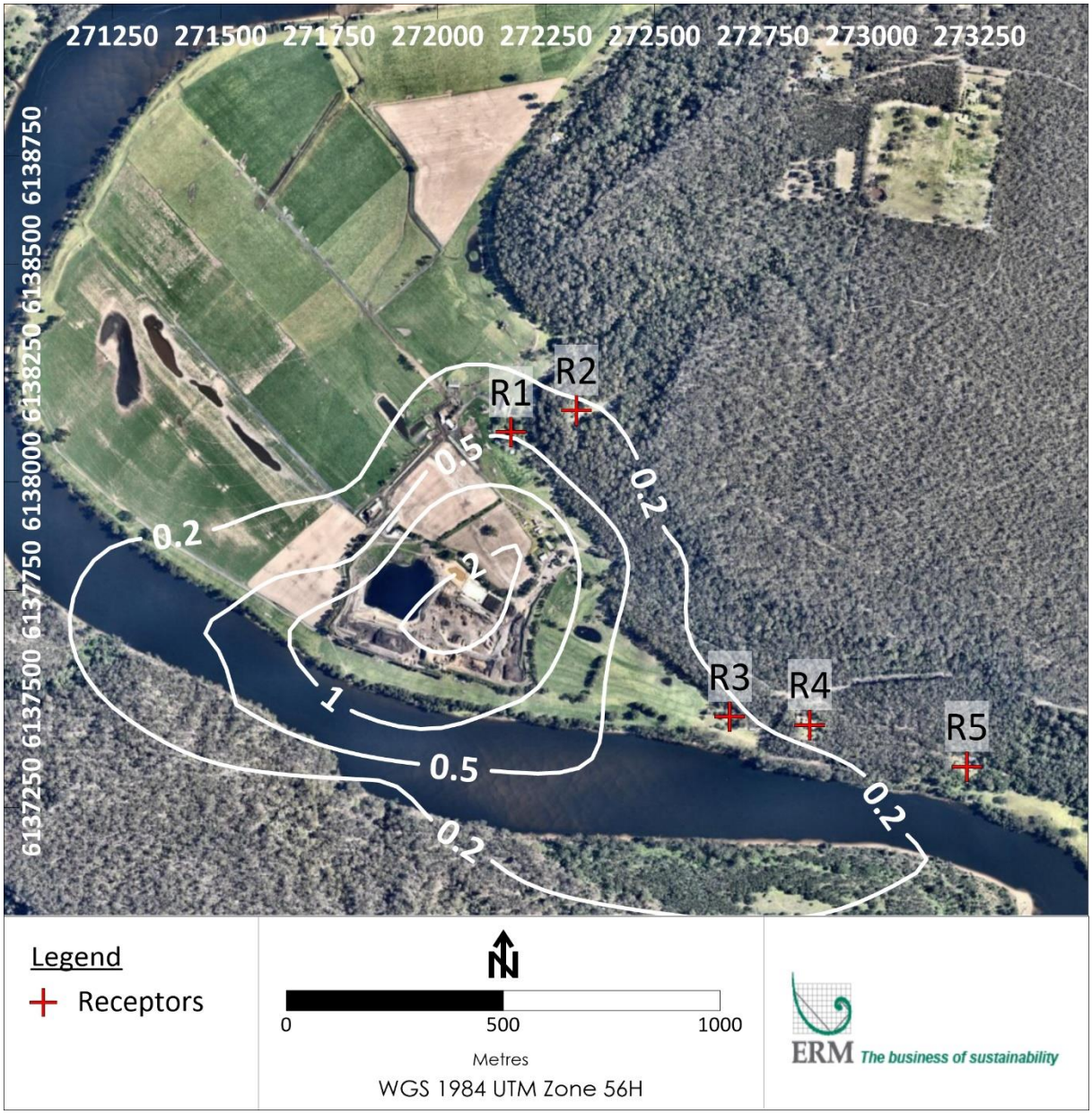



**Figure 8-11: Predicted 24-hour average $PM_{10}$ concentrations (µg/m$^3$) due to emissions from the Project alone**




**Figure 8-12: Predicted 24-hour average $PM_{2.5}$ concentrations (µg/m$^3$) due to emissions from the Project alone**




**Figure 8-13: Cumulative predicted annual average TSP concentrations (µg/m$^3$)**




**Figure 8-14: Cumulative predicted annual average $PM_{10}$ concentrations ($\mu g/m^3$)**




**Figure 8-15: Cumulative predicted annual average $PM_{2.5}$ concentrations (µg/m$^3$)**

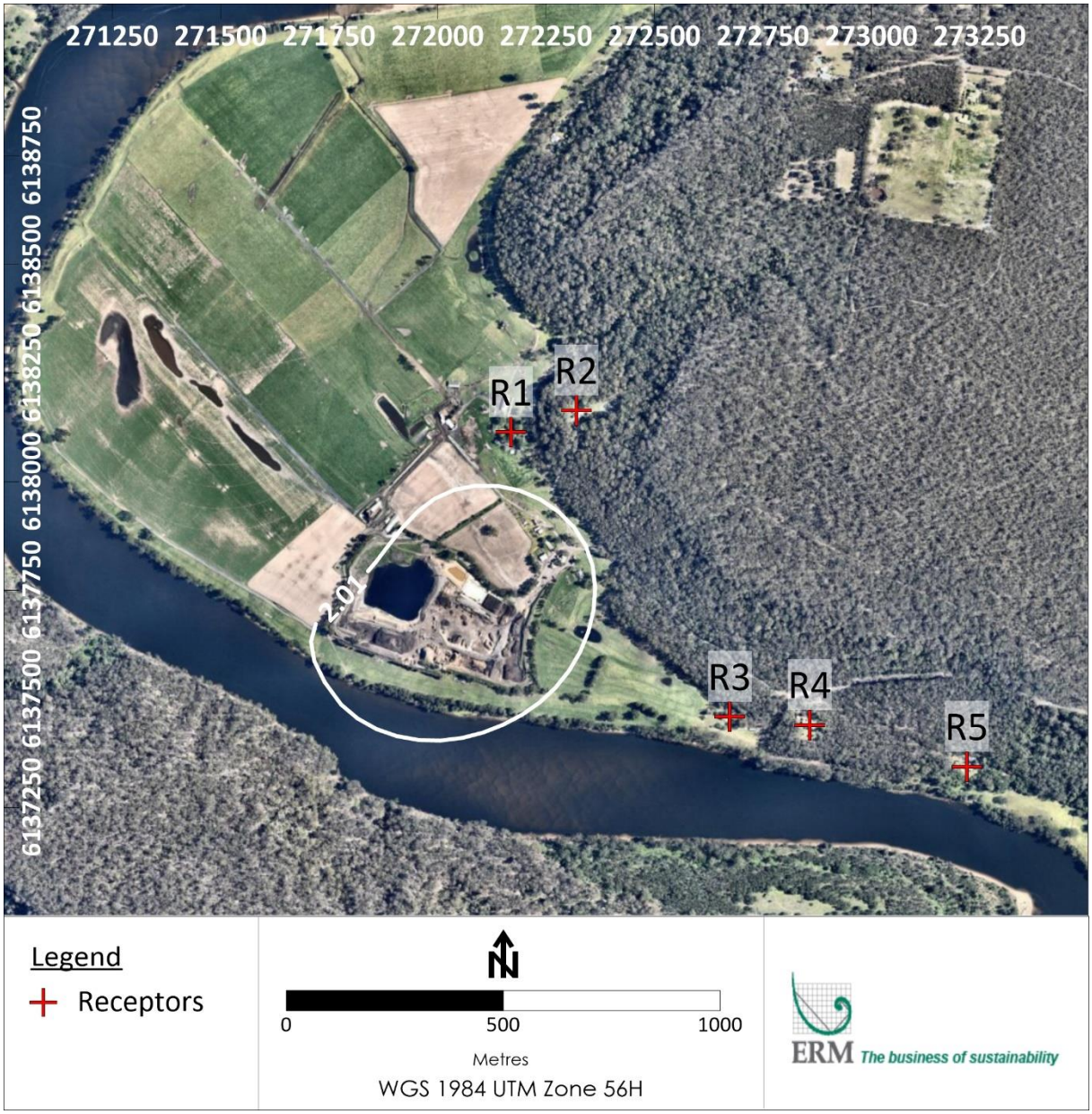



**Figure 8-16: Cumulative predicted monthly average dust deposition levels (g/m$^2$/month)**

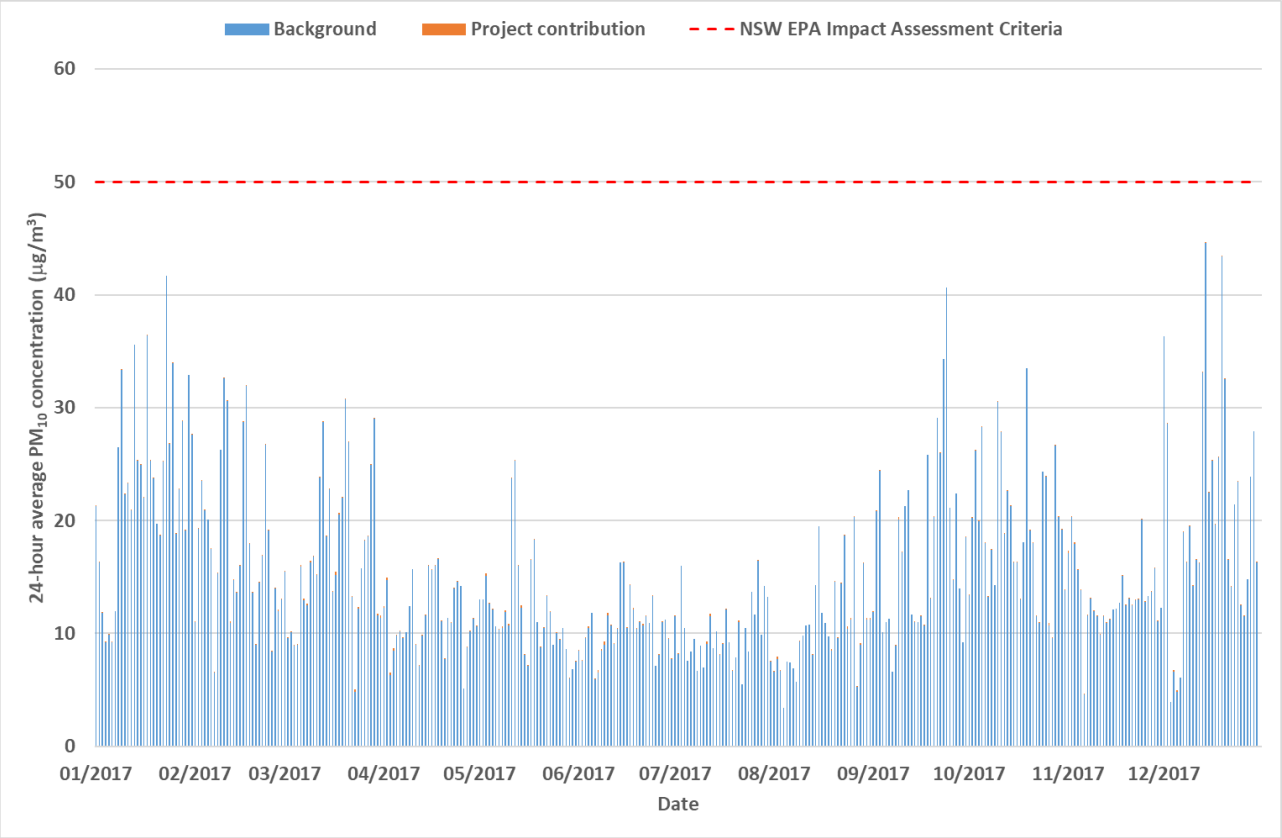



**Figure 8-17: Time series results for 24-hour average $PM_{10}$ at Receptor 5**

# 9. MITIGATION AND MANAGEMENT

There are a number of measures that Soilco can employ to mitigate the odour impacts from this site. Some of these are proactive and have already been incorporated into the design such as the use of the aerated pads. Using this technology to maintain aerated conditions in a controlled way is a key mitigation. Another is the use of biocover material on top of the aerated pads. Measurements have demonstrated that this has a significant impact in reducing emissions from this source.

Modelling has indicated the periods of the day where odour impacts are most likely to occur and also that the most significant source is the active turning of the garden organics windrows. To reduce the risk of impacts occurring, a proactive measure would be to restrict turning any windrows to between the hours of 7am and 3pm.

A number of mitigation measures are suggested by the proponent for different areas and activities on site and include such things as those described below.

## 9.1 Compost

- Material is size-reduced off-site as much as practicable. No unprocessed (non size-reduced) food waste would be received at the facility. Food waste and biosolids would be received at the site ready to be immediately placed in the composting process.
- Received material should be processed as efficiently as possible (i.e. not allowed to age for extended periods of time) and exposed pile area kept to a practical minimum.
- A layer of coarse composted material would be placed on top of the aerated static pile at depth approximately 250 mm to 300 mm. This biocover provides the following benefits during the active phase of pasteurisation:
  - It acts as a layer of thermal insulation to ensure that the entire stockpile maintains a temperature above 55°C
  - It acts as a form of odour control. Odour sampling undertaken by Ektimo (see Appendix B) has shown that odour is reduced when a biocover layer is present on SOILCOs existing aerated pad
  - Nutrient retention
  - Reduction in bird and insect activity as the external, post-composted, layer, is not attractive to pests
  - It assists with moisture retention within the compost; and
  - It is less visually obtrusive than the composting material
- All highly putrescible material (being food waste and biosolids) would be composted on the aerated static pile.
- Bi-weekly turning of windrows would ensure that all windrows maintain aerobic conditions.
- The turning (and wetting) of windrows would be closely monitored throughout the composting stage to ensure that appropriate aerobic conditions are maintained.
- Aeration of leachate ponds as deemed practicable.
- Should any stockpile be proven to be a significant source of odour, covering via a suitable tarpaulin or similar could be adopted.

## 9.2 Manufacturing

- Material stored within the new manufacturing, storage and distribution area would be restricted to mature compost, VENM, and up to 100 tonnes of manure.
- Windrow turning and manufacturing operations would not take place during times of high wind or during times of temperature inversions.

## 9.3 Water use and storage

- The surface area of stored leachate would be minimised through re-use, and draining the two proposed leachate ponds to the existing leachate ponds during normal operating and climatic conditions. That is, operating the primary holding pond with two collection/high rainfall storage ponds.
- The design of the leachate ponds promotes evaporation, which would assist in reducing the overall surface area of leachate.

## 9.4 Consultation

- On-going consultation with surrounding landowners, particularly the owner/resident of R1.

# 10. RISK ASSESSMENT

There is no specific guidance from the NSW EPA for the assessment of risk for a project such as this. An approach that has been adopted by EPA Victoria for industries working with animals is outlined in Appendix C. With regard to the assessment process itself, the following qualitative approach has been adopted.

Atmospheric dispersion models represent a simplification of the many complex processes involved in determining ground level concentrations of substances. Model uncertainty is composed of model chemistry/physics uncertainties, input data uncertainties (i.e. meteorology, emissions and release parameters), and stochastic uncertainties. In addition, there is inherent uncertainty in the behaviour of the random turbulence. The general sources of uncertainty in dispersion models and their potential effects on this assessment are summarised in Table 10-1.

**Table 10-1: Model uncertainty summary**

| Source of uncertainty | Potential effects |
|---|---|
| Oversimplification of physics in model code (varies with type of model) | A variety of effects that can lead to both under-prediction and over- prediction. Errors are greater in Gaussian plume models, which do not include the effects of non-steady-state meteorology (i.e., spatially- and temporally-varying meteorology). |
| Emissions data | Ground-level concentrations are proportional to emission rate.<br>Emission inventories are generated using either site specific measurement and/or literature based emission estimation methodologies. The literature information tends to provide a conservative estimate (i.e. higher than actual). |
| Emission release parameters | Emissions are either released as a constant over an annual period or as an hourly average, where data allows. In reality, emissions are intermittent and vary in intensity over duration less than an hour long. |
| Source types | Plumes behave differently depending on their type, such as elevated stacks, ground-level volumes or area sources. It is important to represent each source appropriately in the model to best represent reality. |
| Meteorological data | Wind speed and direction affect direction of plume travel. Wind speed affects plume rise and dilution of plume, resulting in potential errors in distance of plume impact from source, and magnitude of impact. |
| Inherent uncertainty | Models predict ‘ensemble mean’ concentrations for any specific set of input data (say on a 1-hour basis), i.e., they predict the mean concentrations that would result from a large set of observations under the specific conditions being modelled. However, for any specific hour with those exact mean hourly conditions, the predicted ground-level concentrations will never exactly match the actual pattern of ground-level concentrations, due to the effects of random turbulent motions and random fluctuations in other factors such as temperature. |
| Proximity of receptors | While not specifically part of the model itself, the location of receptors is important. Models tend to over predict for short durations and at distances close to modelled sources. The best model predictions are at distances further from the sources at longer durations. |
| Sensitivity of receptors | With regard to odour, this can be very subjective and the sensitivity of the receptor will be a factor in reality. The EPA odour criteria attempt to take this into account, as described in Section 3.1. The response of any individual to an odour is unpredictable. |

This section assesses the risk of predicting impacts, using a risk matrix similar to that presented in the previous section, although this time more qualitative. We have looked at a number of features of odour modelling and then based on the data and assumptions used, made a qualitative assessment of risk. The risk matrix is presented in Table 10-2. The assessment using this matrix is presented in Table 10-3.

**Table 10-2: Risk assessment matrix for modelling uncertainty**

| | | Impact | | |
|---|---|---|---|---|
| | | **Low (L)** | **Medium (M)** | **High (H)** |
| **Likelihood** | **High (H)** | Medium | High | Very High |
| | **Medium (M)** | Low | Medium | High |
| | **Low (L)** | Low | Low | Medium |

**Table 10-3: Risk of errors in assessment**

| Source of uncertainty | Prior to control | | | Control / action | After control | | |
|---|---|---|---|---|---|---|---|
| | Likelihood | Impact | Risk | | Likelihood | Impact | Risk |
| Oversimplification of physics in model | Low | High | Medium | Use of the complex 3 dimensional model CALPUFF. This considers the varying nature of a dispersing plume, unlike a Gaussian model such as AERMOD or AUSPLUME. | Low | Low | Low |
| Non-specific Emissions data | High | High | Very High | As many on-site measurements taken as possible, including measurements with and without biocover on the aerated pads. Limitations on the time measured and the number of samples able to be taken does still leave some residual risk. | Medium | Medium | Medium |
| Emission release parameters and source types | Low | High | Medium | Simple site layout so all sources represented realistically, including airflow through the aerated pads as volume sources. | Low | Low | Low |
| Non site specific meteorological data | High | High | Very High | Site specific data not available, but use of the CALMET model enabled good estimates of local conditions including those induced by local terrain. This can be seen by the shape of the contours which follow the terrain. | Medium | Low | Low |
| Proximity of receptors | High | High | Very High | A number of receptors are very close. While the receptors cannot be moved they mitigation such as keeping the FOGO aerated and using biocover reduces odour impact. | High | Low | Medium |
| Sensitivity of receptors / landuse | Medium | High | High | The sensitivity of the nearest residents on northern boundary is likely to be low as they are either owned by the proponent or also undertaking odorous activities such as dairying. | Low | Low | Low |

# 11. GREENHOUSE GAS ASSESSMENT

## 11.1 Methodology

Quantification of GHG emissions has been completed in accordance with the GHG Protocol (WRI & WBCSD, 2004), IPCC and Australian Government GHG accounting/classification systems.

This GHGA is also guided by the emission estimation methodologies endorsed under the National Greenhouse and Energy Reporting Regulations 2008 (the NGER Regulations) (as amended in 2019). These describe the detailed requirements for reporting under the NGER framework and also provide a basis for estimating emissions from proposed activities.

The Technical Guidelines for the Estimation of Greenhouse Gas Emissions by Facilities in Australia (the NGER Guidelines) (DoEE, 2019) support reporting under the NGER Act. They have been designed to assist corporations in understanding and applying the NGER Measurement Determination.

The NGER Guidelines are reporting year specific, and outline calculation methods and criteria for determining GHG emissions, energy production, energy consumption and potential GHG emissions embodied in combusted fuels. The latest published NGER Guidelines (at the time of writing) have been referenced.

### *11.1.1 The GHG protocol*

The GHG Protocol establishes an international standard for accounting and reporting of GHG emissions. The GHG Protocol has been adopted by the International Organization for Standardisation, endorsed by GHG initiatives (such as the Carbon Disclosure Project) and is compatible with existing GHG trading schemes.

Under this protocol, three “scopes” of emissions (Scope 1, Scope 2 and Scope 3) are defined for GHG accounting and reporting purposes. This terminology has been adopted in Australian GHG reporting and measurement methods and has been employed in this assessment. These are represented visually in Figure 11-1. Scope 3 is not relevant for this project so only Scopes 1 and 2 are addressed. The definitions for Scope 1 and Scope 2 are provided in the following sections.

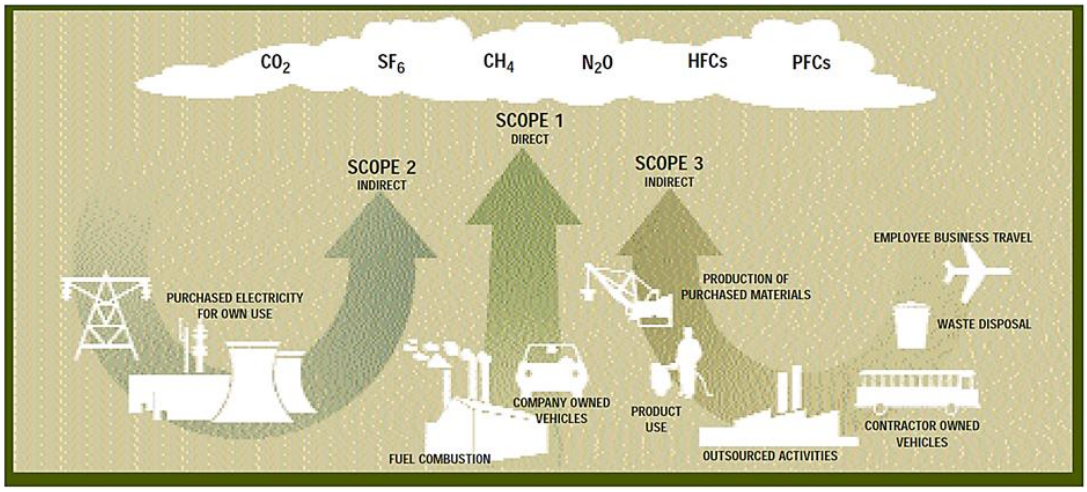



**Figure 11-1: Overview of scope and emissions across a reporting entity**

#### *11.1.1.1 Scope 1: Direct greenhouse gas emissions*

Direct GHG emissions are defined as those emissions that occur from sources that are owned or controlled by the reporting entity. Direct GHG gas emissions are those emissions that are principally the result of the following types of activities undertaken by an entity:

- Generation of electricity, heat or steam. These emissions result from combustion of fuels in stationary sources;
- Physical or chemical processing. Most of these emissions result from manufacture or processing of chemicals and materials, e.g., the manufacture of cement, aluminium, etc;
- Transportation of materials, products, waste and employees. These emissions result from the combustion of fuels in entity owned/controlled mobile combustion sources, e.g., trucks, trains, ships, aeroplanes, buses and cars; and
- Fugitive emissions. These emissions result from intentional or unintentional releases, e.g., equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; HFC emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport.

#### *11.1.1.2 Scope 2: Energy product use indirect greenhouse gas emissions*

Scope 2 emissions are a category of indirect emissions that accounts for GHG emissions from the generation of purchased energy products (principally, electricity, steam/heat and reduction materials used for smelting) by the entity.

Scope 2 covers purchased electricity defined as electricity that is purchased or otherwise brought into the organisational boundary of the entity. Scope 2 emissions physically occur at the facility where electricity is generated. Entities report the emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations as Scope 2.

### *11.1.2 Assessment approach*

GHG emissions have been estimated for the Project based upon the methods outlined in the following documents:

- The National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2008 (as amended 2019);
- Site specific information;
- The NGER Guidelines; and
- The NGA Factors.

## 11.2 Scope 1 emissions – Fuel consumption

Consumption of diesel oil has been provided by SoilCo. The total diesel accounted for within the data is equal to diesel used for transport, stationary and non-combustion purposes. Diesel consumed on-site is used in the following activities:

- Operation of heavy machinery; and
- Diesel generators.

Emissions for Scope 1 diesel consumption are calculated using the following method:

Method 1 – emissions of carbon dioxide, methane and nitrous oxide from liquid fuels other than petroleum based oils or greases (Subdivision 2.41 of the NGER Determination 2008 (as amended in 2019)).

GHG emissions from diesel consumption were estimated using the following equation:

$$E_{ij} = \frac{Q_i \times EC_i \times EF_{ijoxec}}{1000}$$

Where:

| | | | |
|---|---|---|---|
| $E_{ij}$ | = | Emissions of GHG from diesel combustion | (t $CO_2$-e) |
| $Q_i$ | = | Quantity of fuel | (GJ)[1] |
| $EC_i$ | = | Energy content of fuel | (GJ/kL) |
| $EF_{ijoxec}$ | = | Emission factor (Scope 1) for diesel combustion | (kg $CO_2$-e/GJ)[2] |

[1] GJ = giga joules

[2] kg $CO_2$-e/GJ = kilograms of carbon dioxide equivalents per gigajoule

Scope 1 fuel consumption emissions have been calculated using the energy content and emission factors from Part 3 of the NGER Measurement Determination and are presented in Table 11-1 and Table 11-2.

**Table 11-1: Diesel (for stationary purposes) GHG emission factors – Scope 1**

| Fuel type | Energy Content (GJ/kL) | Emission factor (kg $CO_2$-e/GJ) | | |
|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_20$ |
| Diesel oil | 38.6 | 69.9 | 0.1 | 0.2 |

*Source: Schedule 1, Part 3 of the NGER Determination (2008)(as amended 2019).*

The estimated annual and total GHG emissions from diesel usage are presented in Table 11-2.

**Table 11-2: Annual diesel fuel consumption and GHG emissions**

| Estimated Diesel Usage (kL/y) | Scope 1 Emissions (t $CO_2$-e) |
|---|---|
| 473 | 1,276 |

## 11.3 Scope 2 emissions – Electricity consumption

Consumption of electricity has been provided by SoilCo. Emissions for Scope 2 electricity consumption are calculated using the following method:

*Method 1 – Indirect (scope 2) emission factors from consumption of purchased electricity from a grid (Subdivision 7.2 of the NGER Technical Guidelines 2008 (as amended in 2017).*

GHG emissions from electricity consumption were estimated using the following equation:

$$Y = Q \times \frac{EF}{1000}$$

Where:

| | | | |
|---|---|---|---|
| Y | = | Scope 2 Electricity emissions | ($CO_2$-e tonnes) |
| Q | = | Quantity of electricity purchased from the electricity grid during the year | (kWh/annum)[1] |
| EF | = | Scope 2 emission factor for the State of Territory in which the consumption occurs | (kg $CO_2$-e/kWh)[2] |

[1] kWh/annum = kilowatt hours per annum

[2] kg$CO_2$-e/kWh = kilograms of carbon dioxide equivalents per kilowatt hour

Scope 2 emissions have been calculated using an emission factor of 0.83 kg $CO_2$-e/kWh for New South Wales and Australian Capital Territory as sourced from Part 7.2 of the NGER Technical Guidelines 2008 (as amended 2017).

The estimated annual and total GHG emissions from electricity usage are presented in Table 11-3.

**Table 11-3: Projected electricity consumption and Scope 2 GHG emissions**

| Electricity Consumption (kWh/y) | Scope 2 Emissions (t $CO_2$-e) |
|---|---|
| 133,677 | 111 |

# 12. CONCLUSIONS AND RECOMMENDATIONS

This report has assessed the odour and dust impacts of the SOILCO CMF located in Longreach near Nowra, NSW.

Dispersion modelling has been used to predict off-site odour and dust concentrations at nearby residential receptors. The dispersion modelling took account of local meteorological conditions and terrain information and used on-site odour measurements to determine odour emission rates.

Results from the dispersion modelling indicate that the 6 OU contour extends to one of the neighbouring residences to the north. This residence is currently operated as a dairy and the risk of odour impact to sensitive receptor locations from the CMF site is predicted to be low.

When comparing the odour results from this assessment with the odour results from the existing approved operations there are very minor changes. While the volume of material proposed to be processed at the site is increasing, the mitigation measures such as the use of biocover on the aerated pads will reduce odour emission rates. Overall, the changes between existing and proposed operations are minimal, as are the predicted impacts.

A worst case odour scenario of the entire garden organics windrows being turned every day. This will not be the case and will happen approximately twice per week. Even so, ensuring windrows are only turned between 7am and 3pm is predicted to keep peak odour concentrations below the criterion.

For dust, the dispersion modelling indicates that there are no exceedances of the NSW EPA impact assessment criteria for TSP, $PM_{10}$, $PM_{2.5}$ or dust deposition either from the project alone or cumulatively at nearby sensitive receptors.

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# Appendix A FIVE YEAR METEOROLOGICAL ANALYSIS

## Review of Available Meteorological Stations

Air quality impacts are influenced by meteorological conditions, primarily in the form of gradient wind flow regimes, and by local conditions generally driven by topographical features and interactions with coastal influences, such as the sea breeze. The local dispersion meteorology for the site, in relation to wind speed and direction, has been reviewed based on the data available at nearby meteorological stations.

The closest weather station to the Project site is run by the Bureau of Meteorology located at Nowra Ran Air Station AWS approximately 9 km south east of the Project site.

## Representative Year for Modelling

As specified in the Approved Methods, five years of meteorological data are required to be reviewed so that a representative year of meteorological conditions can be selected. Figure B-1 to Figure B-5 present the annual wind roses from BoM Nowra Ran AWS for 2015 to 2019. Data from this station was used to analyse the prevailing wind conditions on a seasonal and annual basis. The review identified 2017 as a representative year for dispersion modelling with no anomalous wind patterns compared to the other years examined and is therefore considered representative year for dispersion modelling.

The wind rose for the annual period 2017 presented in Figure B-3 indicates that winds from west-north-west were dominant and the percentage of occurrence of calm wind conditions (wind speeds less than 0.5 m/s) was 3.2%.

In terms of the seasonal behaviour, winds from the west were dominant during all seasons except summer, when winds were dominant from the south. Calm wind conditions were generally consistent across all seasons: summer (5%), autumn (3.5%), winter (1.5%), spring (3%).




**Figure B-1: Annual wind roses for Now Ran AWS for 2015**

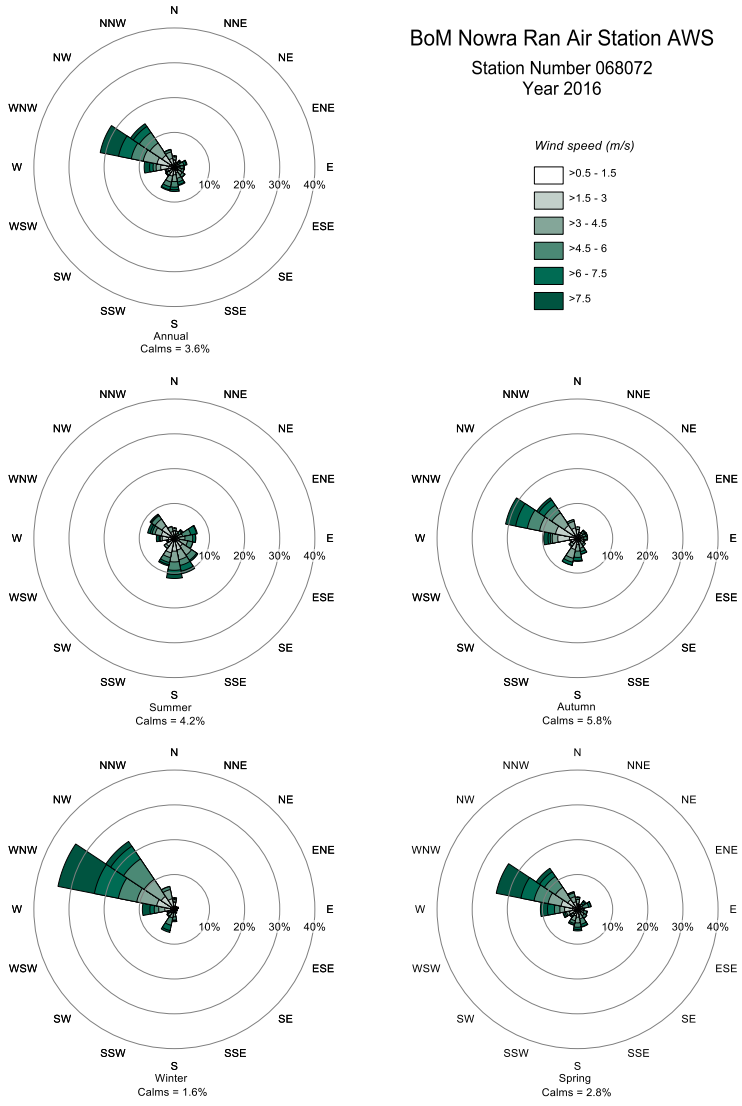



**Figure B-2: Annual wind roses for Now Ran AWS for 2016**




**Figure B-3: Annual wind roses for Now Ran AWS for 2017**

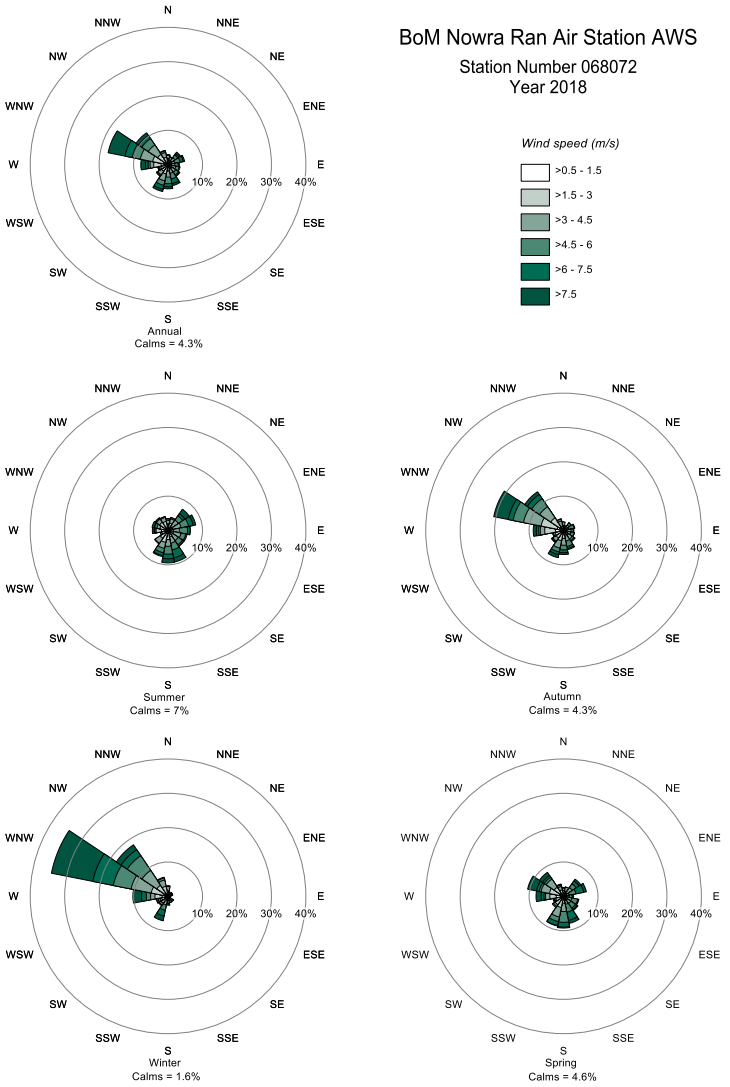



**Figure B-4: Annual wind roses for Now Ran AWS for 2018**

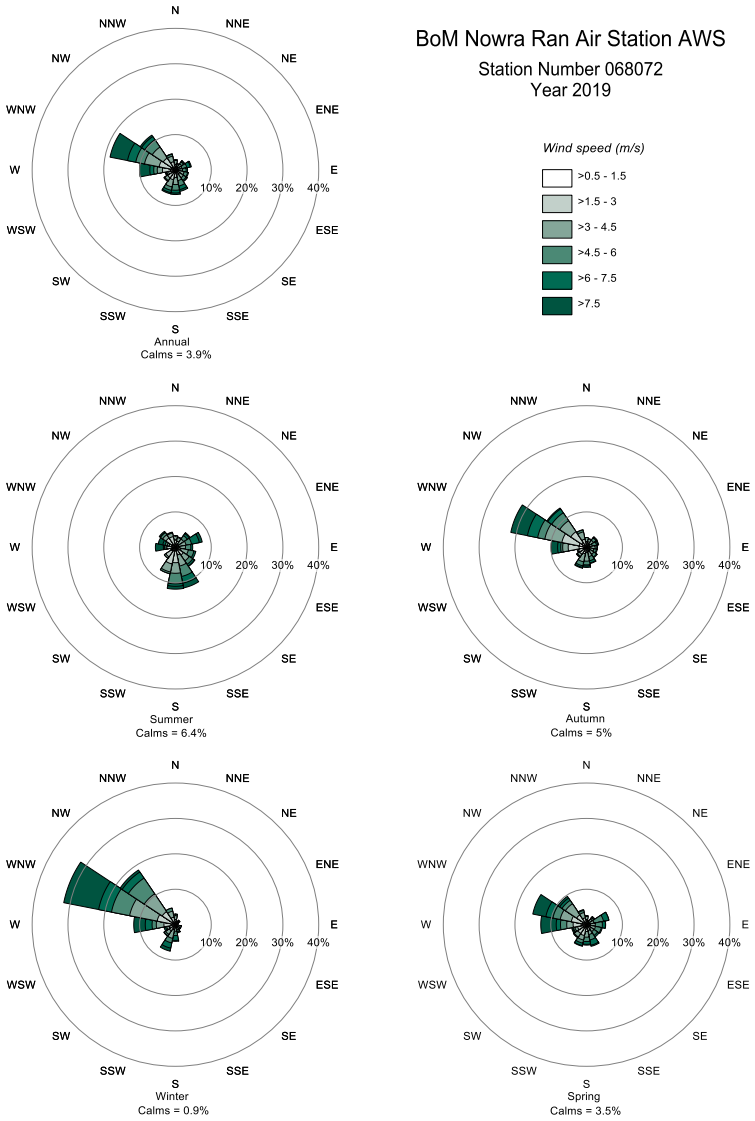



**Figure B-5: Annual wind roses for Now Ran AWS for 2019**

# Appendix B RISK ANALYSIS

There is no specific guidance from the NSW EPA for the assessment of risk for a project such as this, but the Victorian EPA Publication 1643 details a methodology for undertaking odour risk assessments for industries working with animals in Victoria. While the odour character may be different for this project, we have adopted a similar approach to investigate the potential risks.

Table B-1 contains the risk matrix used for assessing compliance for the most exposed sensitive receptors.

As outlined in the EPA discussion paper, a risk ranking of:

- Low (L) means the development is unlikely to create adverse odour amenity problems;
- Medium (M) means the development may create adverse odour amenity problems – Mitigation technologies or changes in practices required to render the risk low;
- High (H) – Project is unlikely to be able to proceed without substantial mitigation or re-siting.

The Victorian EPA matrix relies on the use of percentiles to consider the frequency of odour impact to a sensitive receptor. For each receptor, the 99.9$^{th}$, 99.5$^{th}$ and 98$^{th}$ percentiles were extracted from the model results and converted to three minute averages using Equation 1. The highest result of the year for each percentile and receptor was used and applied to the risk matrix.

**Equation 1:**

$$Conc_{3-min} = Conc_{1-hour} \times \left(\frac{60}{3}\right)^{0.2}$$

**Table B-1: Risk assessment matrix documented in Victoria EPA Publication 1643**

| Frequency | | Odour concentration | | |
|---|---|---|---|---|
| Odour events per year (hours) | Percentile | 10+ OU | 6-9 OU | 1-5 OU |
| 0 to 9 | 100$^{th}$ to 99.9$^{th}$ | See note below | | |
| 10 to 44 | 99.9$^{th}$ to 99.5$^{th}$ | High | Medium | Low |
| 45 to 175 | 99.5$^{th}$ to 98$^{th}$ | High | High | Medium |
| More than 175 | Less than 98$^{th}$ | High | High | Medium |

The highest nine events per year are deemed statistical outliers. The Victorian EPA has low confidence in these estimates and recommends that they be disregarded for the purposes of this risk assessment approach.

Table B-2 and Table B-3 show the predicted concentrations for the 99.9$^{th}$ percentile, the 99.5$^{th}$ percentile and the 98$^{th}$ percentile for all modelled sensitive receptors, along with the highest risk ranking for each receptor.

A concentration of 1 OU is defined as a level at which 50% of the population can detect the sensation of an odour in a laboratory setting. In the ambient environment, 1 OU is not typically detectable. The odour typically becomes detectable and recognisable in the ambient environment at a level of about 5 OU (Capelli, et al., 2013).

The risk assessment results for the normal operating scenario (Table B-2), indicates that there is medium risk of odour impact under normal operating conditions, with the exception of R1 where the risk is high. This is not unexpected given the results presented in Figure 8-1, which showed potential exceedances of the criterion at this location. It is likely that the remaining receptors will experience odour from time to time, however the risk is low for R3, R4 and R5 for the 99.9$^{th}$ percentile. As described in the NSW EPA *"Technical Notes – Assessment and management of odour from stationary sources in NSW"* (Technical Notes) (DEC NSW, 2006), these odour assessment criteria are concerned with controlling odours to ensure offensive odour impacts will be effectively managed but are not intended to 'no odour'.

Table B-3 shows the same presentation for the worst-case scenario. As expected, the risk increases at those residences closest to the facility, but remain low (at the 99.9th percentile) for R5. As demonstrated in Section 8.1.2 (Figure 8-6), these worst case impacts can likely be managed by ensuring the windrows are turned at certain hours of the day. It should also be noted that the modelling has assumed a worst-case of windrow turning every day. Clearly this will not be the case, as the process only occurs twice per week and takes approximately 4 hours to complete. It is useful though to see that even under these conditions the risks are only high for the closest two residences, one of which is an operating diary.

It is also helpful to put these values in context of the number of events, or hours, when these concentrations are predicted to occur. For example, for the worst case scenario at R3 (Table B-3), the model predicted:

- 9 hours in the year where the odour concentration was above 5 OU;
- 44 hours in the year above 3 OU (this is total hours and includes the 9 hours above 9 OU); and
- 175 hours in the year above 2 OU (approximately 2% of the year the odour is above 2 OU)

Noting that nearly all of these hours are before 7am or after 3pm (see Figure 8-6) then ensuring the turning times are within this period will be an important mitigation measure. Knowing that the windrows are not turned every day (as modelled) but at most twice per week, will reduce the risk rating to 'Low'.

**Table B-2: Predicted odour concentrations (OU) at the three percentiles and risk impact for each sensitive receptor for normal operating scenario**

| Receptor number | Normal operating scenario | | | |
|---|---|---|---|---|
| | 99.9th percentile | 99.5th percentile | 98th percentile | Risk rating |
| R1 | 11 | 9 | 5 | High |
| R2 | 7 | 5 | 2 | Medium |
| R3 | 5 | 3 | 2 | Medium |
| R4 | 3 | 2 | 2 | Medium |
| R5 | 2 | 1 | 1 | Medium |

**Table B-3: Predicted odour concentrations (OU) at the three percentiles and risk impact for each sensitive receptor for normal operating scenario**

| Receptor number | Worst case operating scenario (for all hours of the day) | | | |
|---|---|---|---|---|
| | 99.9th percentile | 99.5th percentile | 98th percentile | Risk rating |
| R1 | 13 | 10 | 6 | High |
| R2 | 8 | 5 | 2 | Medium |
| R3 | 5 | 4 | 2 | Medium |
| R4 | 4 | 3 | 2 | Medium |
| R5 | 2 | 2 | 1 | Medium |

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# Attachment 2

## SOILCO Wogamia Composting and Manufacturing Facility Odour Validation Audit

# Soilco Wogamia Composting and Manufacturing Facility

## Odour Validation Audit

Project number: 0369

Date: 11 June 2025

## Document details

| | |
|---|---|
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| **Reviewer** | Damon Roddis |
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| Final | 11 June 2025 | Damon Roddis, Tom Mifsud, Jarred Inzinger | Damon Roddis | Final issue |
| | | | | |

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# EXECUTIVE SUMMARY

Zephyr Environmental Pty Ltd (Zephyr) was commissioned by SOILCO Pty Ltd (SOILCO) to complete an odour validation audit of SOILCO's Wogamia Facility located in West Nowra (NSW).

The audit is required as part of the facility's NSW Environment Protection Authority (EPA) Environment Protection Licence (EPL 11542), Special Condition E1, and covers composting, recourse recovery, waste processing, and waste storage activities at the site.

Special Condition E1 states the requirement for a suitably qualified independent expert, experienced in the characterisation and treatment of odours from composting operations.

The objective of this work is to complete an odour validation audit, which is intended to be submitted to the NSW EPA in accordance with EPL 11542 Special Condition E1, namely:

- Submission of an Odour Validation Audit Report to the EPA, carried out by a suitably qualified independent expert experienced in the characterisation and treatment of odours from composting operations [This document].
- Provision of a summary of any odour complaints received, and actions taken to reduce odour emissions where complaints are verified [refer Section 2].
- Completion of a field odour survey that characterises the frequency, intensity, duration, offensiveness, location and extent of off-site odours [refer Section 3].
- Benchmarking the design and management practices at the premises against industry best practice for minimising odour emissions [refer Section 4].
- Identification of additional odour mitigation measures, if required [refer Section 5].

Upon completion of the above tasks, the conclusion of this odour validation audit is that the facility is adequately managing its odour risk, and it is not considered that additional odour mitigation is warranted.

As identified during the field odour surveys, the first hours of operation represent 'high odour risk' due to the prevalence of low wind speeds, potential temperature inversions, as well as down-river air drainage flows.

The detection of 'distinct' odour at this time at locations representative of the eastern sensitive receptors further supports that particular attention to odour management is required during this time.

Current odour management includes that windrow turning schedules are adjusted during westerly wind events to reduce potential impacts on sensitive receptors.

In the event of future odour complaints from eastern sensitive receptors, the facility should consider further restriction of windrow turning hours, e.g. from 8am onwards.

# 1. BACKGROUND INFORMATION

## 1.1. INTRODUCTION

Zephyr Environmental Pty Ltd (Zephyr) was commissioned by SOILCO Pty Ltd (SOILCO) to complete an odour validation audit of SOILCO's Wogamia Composting and Manufacturing Facility located in West Nowra, NSW.

The audit is required as part of the facility's NSW Environment Protection Authority (EPA) Environment Protection Licence (EPL 11542), Special Condition E1, and covers composting, recourse recovery, waste processing, and waste storage activities at the site.

Special Condition E1 states the requirement for a suitably qualified independent expert, experienced in the characterisation and treatment of odours from composting operations.

The objective of this work is to complete an odour validation audit, which is intended to be submitted to the EPA in accordance with EPL 11542 Special Condition E1.

## 1.2. SPECIAL CONDITION E1

EPL 11542 Special Condition E1 is reproduced, below, along with where each requirement is addressed within this document:

***E1 Odour validation audit***

*E1.1 Within 12 months of the commencement of expanded operations the licensee must submit an Odour Validation Audit Report to the EPA.* [This document].

*E1.2 The Odour Validation Audit Report must be carried out by a suitably qualified independent expert experienced in the characterisation and treatment of odours from composting operations.*

*E1.3 The Odour Validation Audit must include:*

*a) A summary of any odour complaints received, and actions taken to reduce odour emissions where complaints are verified.* [refer Section 2].

*b) A field odour survey that characterises the frequency, intensity, duration, offensiveness, location and extent of off-site odours. .* [refer Section 3].

*c) Benchmark the design and management practices at the premises against industry best practice for minimising odour emissions. .* [refer Section 4].

*E1.4 Using the results of E1.3a), E1.3b) and E1.3c), if it is identified that the facility requires additional odour mitigation measures the report must include:*

*a) Proposed mitigation works and/or management practices to ensure that odour is minimised as far as is practicable; and*

*b) A timetable for the implementation of these works.* [refer Section 5].

## 1.3. FACILITY DESCRIPTION

SOILCO's Composting and Manufacturing Facility (CMF) is located at 135 Wogamia Road, Longreach, NSW in a valley along the Shoalhaven River. The CMF holds Development Consent RA20/1001 and an Environment Protection Licence (EPL 11542) issued by the NSW EPA.

The latest Modification to the facility sought to increase processing limits to allow the receipt, processing and storage of a total of 130,000 tonnes per annum (tpa) of materials, split as:

- up to 100,000 tpa of waste material such as food waste, organics, manure and biosolids
- up to 30,000 tpa of Virgin Excavated Natural Material (VENM)
- 15,000 tpa drilling mud (noting that SOILCO are currently not receiving this material). The combined total of imported VENM and drilling muds is not to exceed 30,000 tpa

The modification also sought to construct and operate new infrastructure to support the increased operations. Following approval of the CMF's latest modification, the EPA varied EPL 11542 to include Special Condition E1, as reproduced above.

The two main processing areas at the SOILCO site include aerated pads and the windrows.

The aerated static pads process up to 45,000 tpa of material which includes blends of food waste, garden waste processing is as follows:

- Food organics and garden organics (FOGO)
- Oversize material is used as biocover and placed on top of the material to reduce odour
- In any week, two bays will be filled, four bays will be turned, two bays will be taken to the product storage area
- Each bay is turned on average, every one to two weeks and covered again with biocover.

The windrows process up to 33,000 tpa of material which includes garden and wood waste, processed fibrous organics, and natural organics fibrous materials. The processing is as follows:

- Windrows are turned twice per week and the process takes about four hours to complete
- No FOGO or biosolid material is included on the windrows.

Once each of these processes is complete the composted material is moved to the manufacturing and storage area on the northern boundary of the site, to await distribution. The composted green waste material is blended with manure, as required, in the manufacturing and storage area.

The nearby sensitive receptors are shown in Figure 1.1. It is noted that the R2 belongs to the landowners of the project site and could therefore be considered to be project related. R1 is currently operated as a dairy.

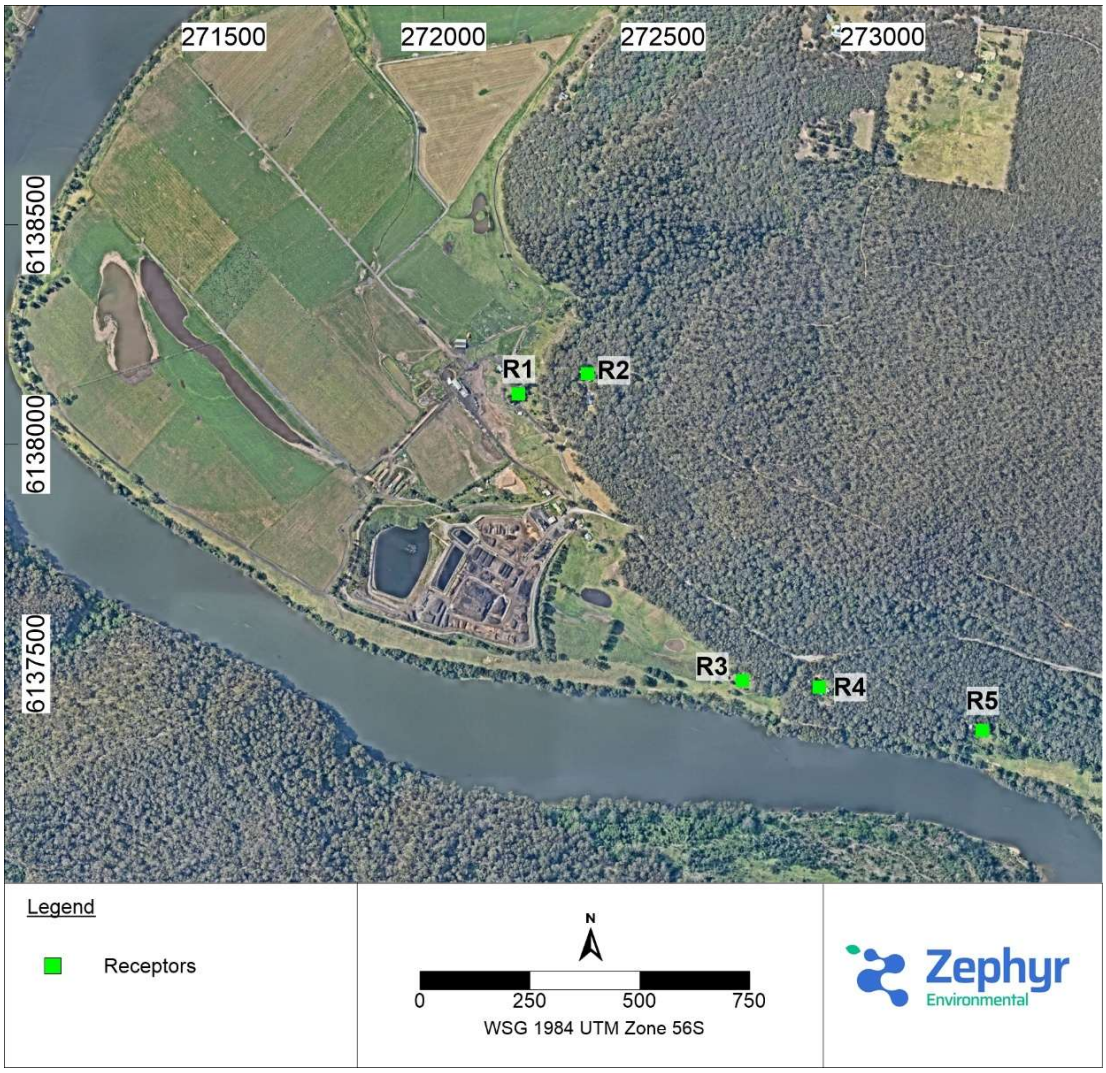



**Figure 1.1: SOILCO CMF and the sensitive receptor locations**

## 1.4. WIND DIRECTION AND SPEED

Wind roses show the frequency of occurrence of winds by direction and strength at a specific location over a defined time period. The bars correspond to the 16 compass points from a central point and the length of each bar represents the frequency of the winds from that direction.

Annual, seasonal, and time of day wind roses for the SOILCO CMF site location are presented in Figure 1-2 to Figure 1-4.

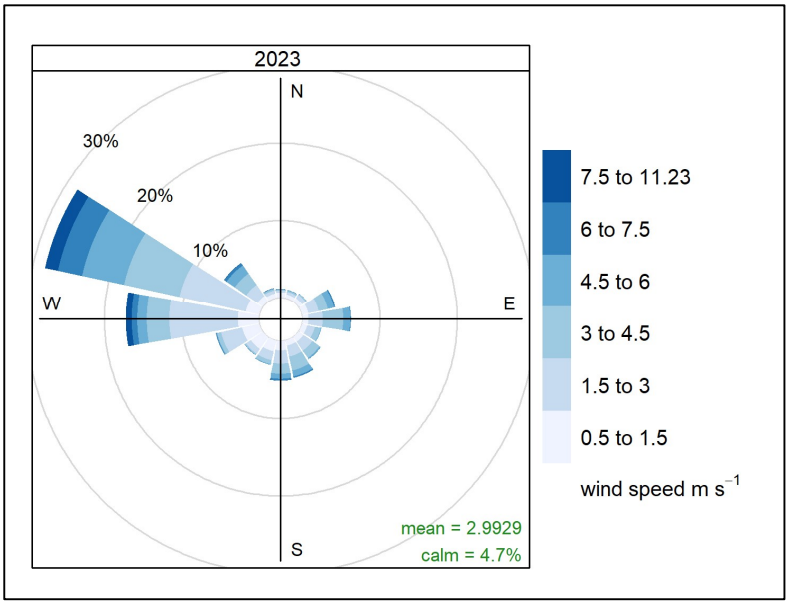



**Figure 1-2: Annual wind rose for SOILCO CMF site for 2023**

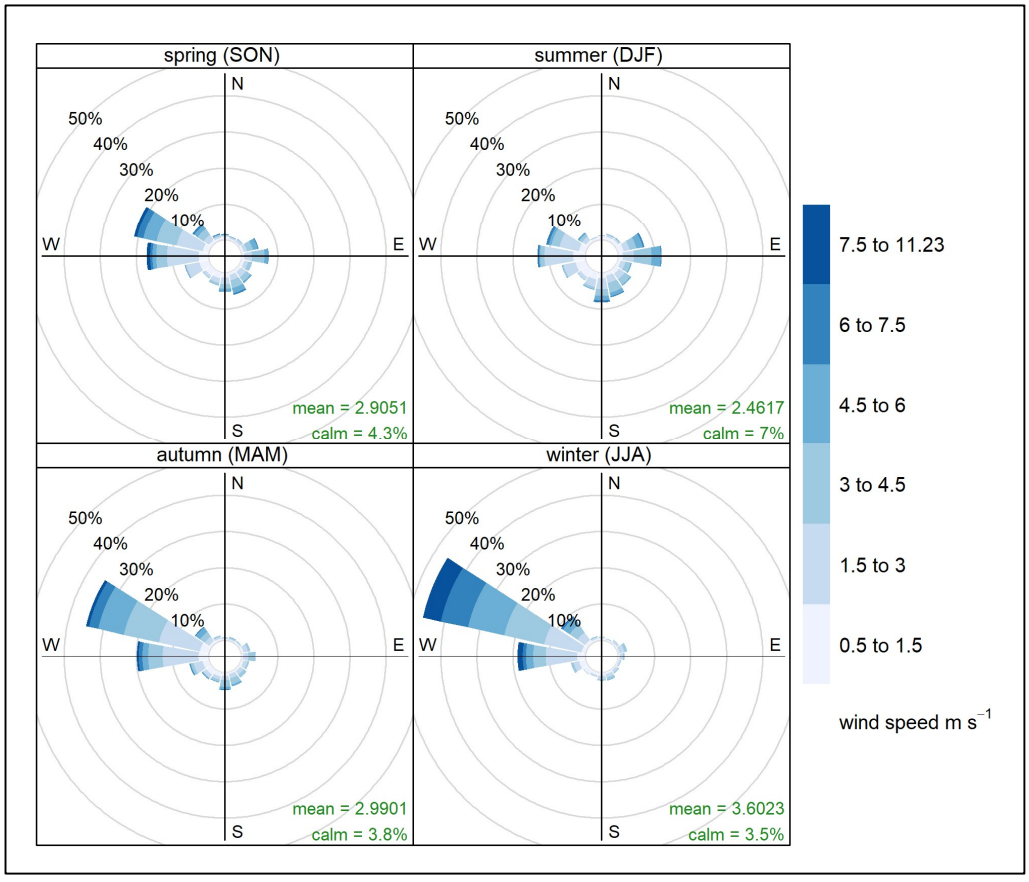



**Figure 1-3: Seasonal wind rose for SOILCO CMF site for 2023**

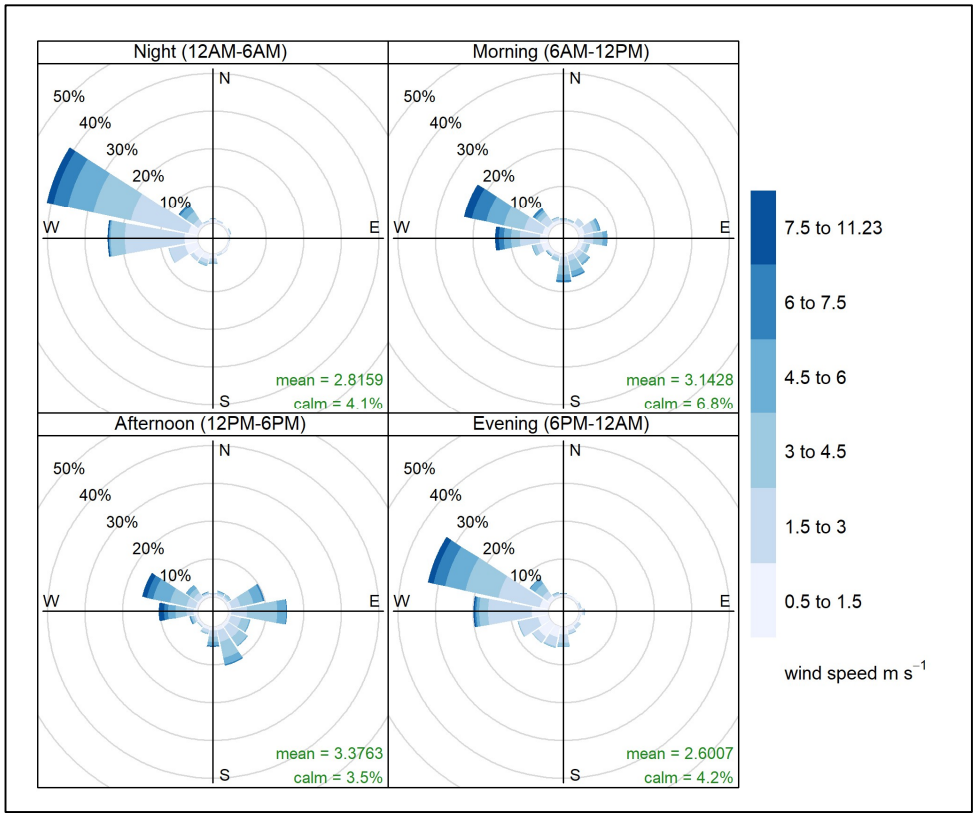



**Figure 1-4: Time of day wind rose for SOILCO CMF site for 2023**

Figure 1-2 to Figure 1-4 indicate that the locality is dominated by north westerly winds throughout the year, except in summer. Winds from this quadrant will carry potential odour emissions away from the nearest (non-project related) sensitive receptor, R1.

As expected, the highest wind speeds occur in the daytime (between 6 am and 6 pm) with weaker winds at night-time. These higher wind speeds will therefore occur during the facility's operational hours and will assist in increasing effective odour dispersion downwind (i.e. towards sensitive receptors R3, R4 and R5).

# 2. SUMMARY OF ODOUR COMPLAINTS

Odour complaint information is recorded by SOILCO and was provided to Zephyr by Patrick Gilmartin, Environmental Resources Officer, SOILCO Pty Ltd.

A summary of the odour complaints data is provided in Table 2-1.

**Table 2-1: SOILCO CMF odour complaints summary**

| Parameter | Complaint #1 | Complaint #2 | Complaint #3 | Complaint #4 |
|---|---|---|---|---|
| **Date** | 6/04/2023 | 7/04/2023 | 14/04/2023 | 12/05/2025 |
| **#Enquiries** | 1 | 1 | 1 | 1 |
| **Day** | Thursday | Friday | Friday | Monday |
| **Enquiry Time** | Not available | Not available | Not available | 9:17 am |
| **Enquiry Location** | Suppressed | Supressed | Suppressed | Longreach Road, Longreach |
| **Site Operational** | Yes | No | Not available | Yes |
| **Type of Material Being Processed** | Food and Garden Organics, Timber Waste | No material processed | Not available | Food and Garden Organics, Timber Waste |
| **Activities Conducted** | Batch soil, screening material, turning windrows, plant maintenance and yard maintenance, transporting | Not available | Food and Garden Organics, Compost, Timber Waste | Batch soil, screening material, turning windrows, plant maintenance and yard maintenance, transporting |
| **Average Wind Speed (km/hr)** | 0.6 | 3.9 | 1 | 1.33 |
| **Dominant Wind Direction** | S | W | SSW | SE |
| **Temperature (C)** | 18.1 | 18 | 15.3 | 17.22 |
| **Rainfall (mm)** | 0 | 0 | 0 | 0 |

The information in Table 2-1 indicates that odour complaint frequency is low (four events recorded in the previous two years) with a single odour complaint having been recorded since the latest modification was approved (and Special Condition E1 was imposed).

SOILCO maintained in its response to the EPA that the odour complaint on the 12/05/2025 (the only recorded complaint captured by Special Condition E1) was related to an odour from a transport vehicle bringing Food Waste to its premises and was not directly attributable to the CMF operation.

# 3. FIELD ODOUR SURVEY

## 3.1. OVERVIEW

Zephyr completed field odour surveys at the boundary of the CMF and in the vicinity of off-site sensitive receptors to characterise the frequency, intensity, duration, offensiveness, location and extent of off-site odours.

Odour surveys were completed by Zephyr personnel in varying meteorological conditions and times of day.

The odour surveys were conducted in accordance with the NSW EPA's *Guide to Conducting Field Odour Surveys* (2021). This guide provides a standardised approach for assessing odour impacts in the field, to ensure odour surveys are conducted in a reliable and repeatable manner.

The 10-minute odour assessment procedure captures upwind and downwind of a suspected source, the locations where sensitive members of the community may attend or reside, and the odour intensity and character. The odour intensity scale for the 10-minute assessments is provided in Table 3-1.

**Table 3-1: Odour intensity scale detailed in NSW EPA's Guide to Conducting Field Odour Surveys (2021)**

| Perceived odour strength | Intensity level rating | Interpretation |
|---|---|---|
| Extremely strong | 6 | Extremely strong odour detectable. For an offensive type of odour, the reaction would be to immediately mitigate until the exposure level is reduced. The odour generally cannot be tolerated. |
| Very strong | 5 | The odour character is clearly recognisable. For an offensive type of odour, exposure to this level is considered unpleasant/undesirable to the point that action to mitigate against further exposure is considered or taken. |
| Strong | 4 | The odour character is clearly recognisable. For an offensive type of odour, exposure to this level would be considered unpleasant/undesirable. |
| Distinct | 3 | The odour character is clearly recognisable. Note that this must still apply even if in a different context or situation – for example, not knowing or expecting what type of odour may be present. The odour is tolerable – even for an offensive odour. |
| Weak | 2 | The assessor is reasonably sure that odour is present but not 100% sure of the odour character. |
| Very weak | 1 | The odour character is not recognisable. There is probably some doubt whether the odour is actually present. |
| Not detectable | 0 | No odour present. |

In addition to making intensity observations, the observer also notes the character of the odour or odours observed, if that can be determined. Generally, the observations are focussed on the targeted odour. If other relevant odours or background odours are present in significant intensities this is also noted and recorded as appropriate.

The observer also notes that the general meteorological conditions at the beginning and end of the 10-minute period. These observations include descriptors of wind strength, cloud cover and precipitation.

Zephyr conducted odour surveys using two observers between 20 and 21 May 2025, as detailed in Table 3-2, to determine the presence and intensity of any odours in the surrounding area of the CMF.

Figure 3-1 shows the locations of the various survey locations in relation to the CMF. Further information related to the odour surveys can be found in the Odour Survey Report (Appendix A).

**Table 3-2: The date and time of the odour surveys conducted around the SOILCO CMF**

| Survey campaign | Date | Campaign start time | Number of 10-minute observations |
|---|---|---|---|
| 1 | 20.05.2025 | 13:00 | 12 |
| 2 | 20.05.2025 | 17:30 | 12 |
| 3 | 21.05.2025 | 07:00 | 16 |

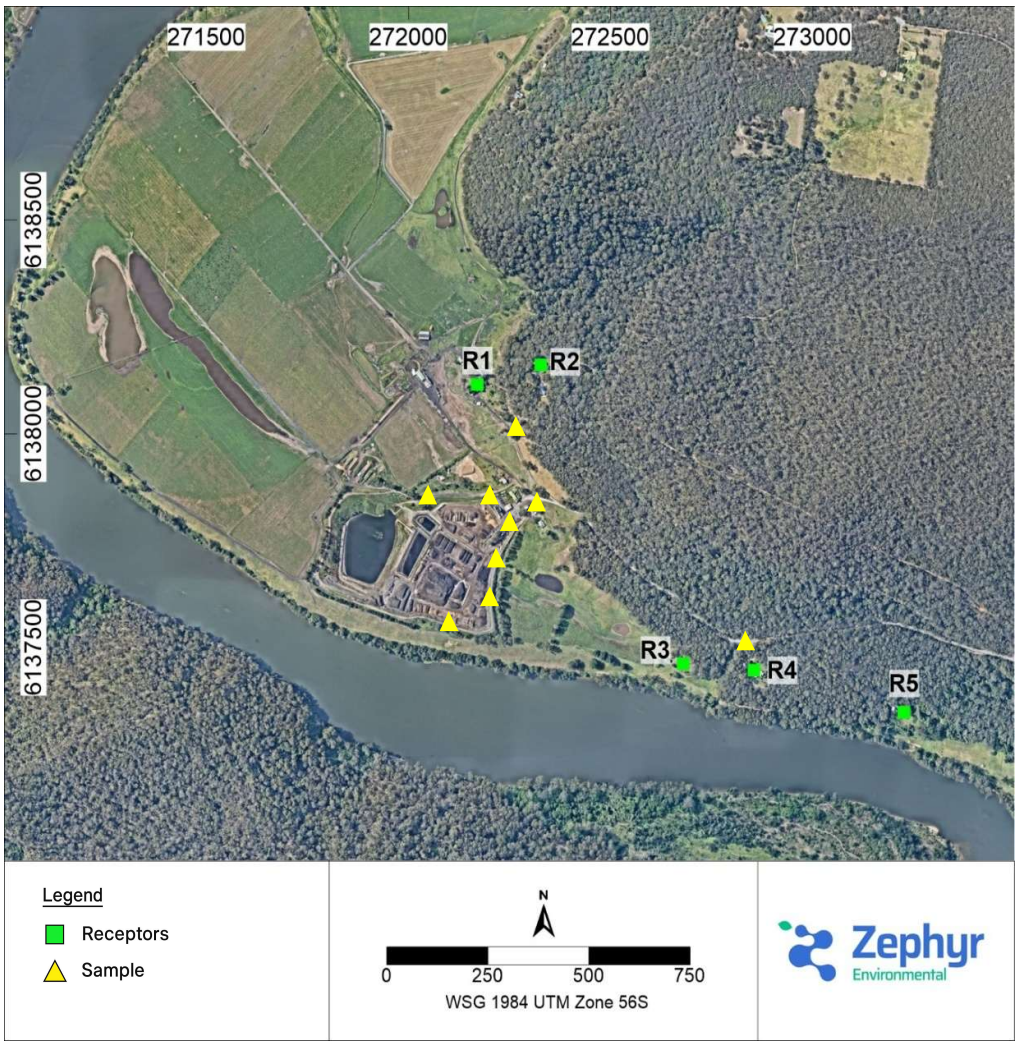



**Figure 3-1: Location of odour surveys in relation to the CMF and sensitive receptors**

## 3.2. ODOUR SURVEY RESULTS

A total of 40 x 10-minute odour surveys were completed between 20 and 21 May 2025, across nine locations within the vicinity of the CMF, including locations within the facility boundary. The winds on 20 May were predominantly from the west or west-southwest, whilst on 21 May the predominant wind direction was from the south or southwest. All wind speeds observed were light.

The character of an odours detected ranged from “cattle”, “rotting garbage”, and “garden organics” as a function of location, wind direction, and time of day. The full results for each of the odour surveys conducted in May 2025 can be found in the Odour Survey Report (Appendix A).

Figure 3-2 shows the results from odour survey campaign 3, which is highlighted as it is shows the maximum observed odour intensities at locations representative of (non-project related) off-site sensitive receptors.

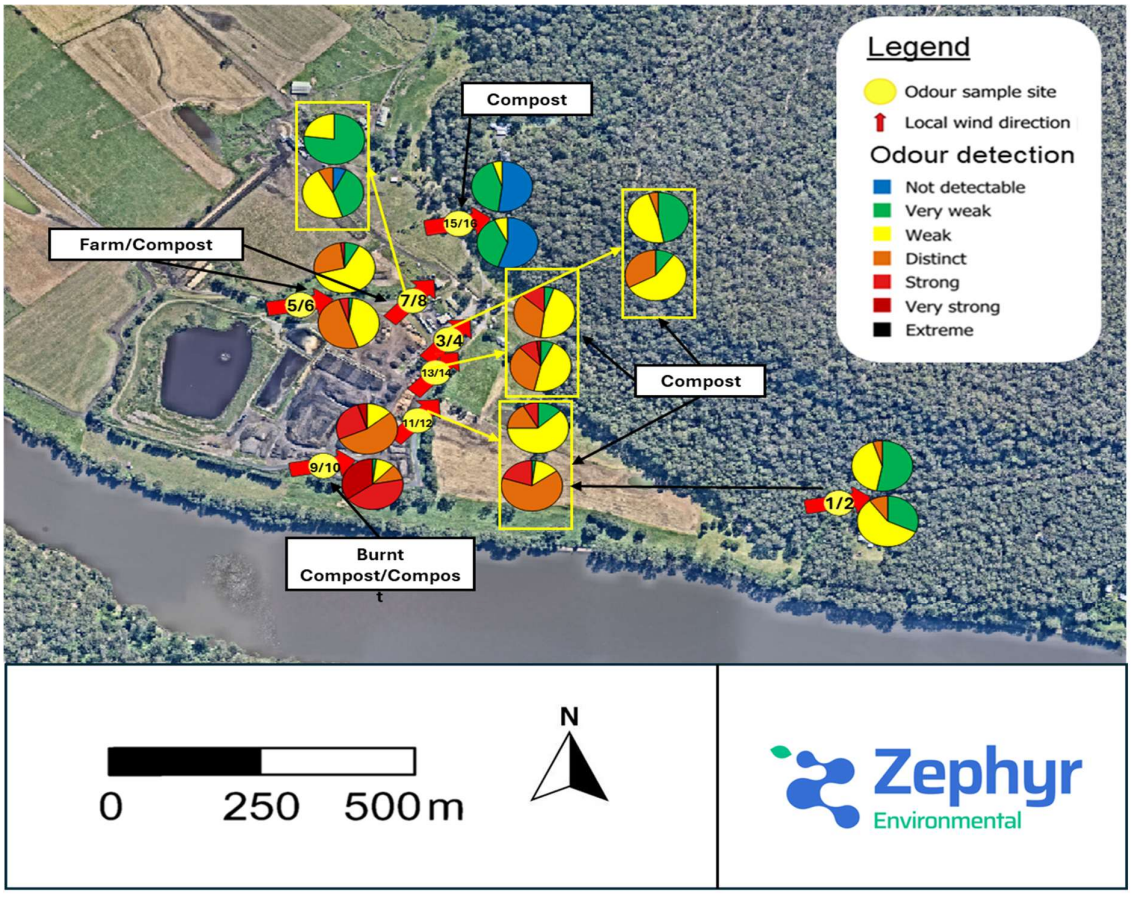



**Figure 3-2: Odour Survey Campaign 3- locations and proportions of odour detection**

Figure 3-2 shows that during Observations 1 and 2, representative of sensitive receptor R4, up to 1-minute of the 10-minute survey period, a “distinct” odour of “compost” was observed.

The odour observation start time (07.00) for Odour Survey Campaign 3 was specifically targetted as being ‘high odour risk’ due to the prevalence of low wind speeds, potential temperature inversions, and commencement of facility operations. The detection of ‘distinct’ odour is thus not a determination of offesnive odour beyond the site boundary, but rather this time of day is flagged for particular attention during the ongoing odour management at the facility.

# 4. BENCHMARKING DESIGN AND MANAGEMENT PRACTICES

A review of the design and management practices at the site was undertaken with a focus on odour control. This included on-site observation, interviews with key personnel, and evaluation of the site's odour management practices against industry best practice. A photo log of activities completed during the site inspection is provided in Appendix B.

Table 4-1 provides a summary of the facility's design and management practices at the premises against benchmarked against industry best practice for minimising odour emissions.

**Table 4-1: Industry best practice odour control benchmarking**

| Best practice measure | Conducted at the facility? | Commentary |
|---|---|---|
| Immediate processing of organic materials | Yes | Minimising the time the organic waste is stored before processing reduces the risk of off-site odour impact. |
| Aerated pads | Yes | Aerated pads maintain aerated conditions and thus reduce odour emissions |
| Aerated static piles | Yes | Aerated windrows maintain aerated conditions and thus reduce odour emissions |
| Use of biocovers | Yes | The use of a biocover actively reduces odour emissions at source. |
| Restricted hours - windrow turning | Yes | Turning of windrows is one of the most prominent odour sources. Restrict turning windrows between the hours of 7 am and 3 pm reduces the risk of off-site impacts. |
| Leachate pond monitoring | Yes | The leachate ponds are one of the most prominent odour sources. It is also important to continue to monitor the leachate ponds to ensure these are aerated to operate effectively. |
| Inspection of feedstock upon arrival | Yes | low-quality materials are flagged via site reporting procedures. |
| In-house odour survey | Yes | Odour monitoring is conducted weekly on and off site, with inspections increased in response to complaints. |
| Community engagement | Yes | Ongoing engagement with surrounding landholders is used to promot transparency and supports early issue resolution. |
| Minimising storage time | Yes | Long storage periods increase the risk of anaerobic conditions that can lead to odours. |
| Enclosure of potentially odorous activities | No | Current odour mitigation is deemed to be adequate in mitigating off-site odour risks. Enclosure of a pre-existing facility is generally prohibitively expensive. |
| Use of biofilter | No | A biofilter is only effective where potentially odorous activities are contained (i.e. within an enclosure – refer comments above). |

# 5. ODOUR MITIGATION

## 5.1. CURRENT ODOUR MITIGATION

The benchmarking exercise completed in Section 4 provides commentary on some of the odour mitigation activities currently completed at the facility. A summary of the current odour management context and mitigation is additionally provided below.

## 5.2. POTENTIAL IMPACTS

The generation of nuisance odours and vapours during the operation of the SoilCo Wogamia facility has the potential to impact nearby sensitive receptors, including residential properties and commercial establishments. Such impacts may arise from various stages of the composting process, including feedstock receival, material processing, windrow turning, and leachate pond management.

## 5.3. PERFORMANCE CRITERIA

Odour management performance is governed by the EPL, relevant development approvals, and the Site-Specific Management Plan (SSMP). These documents establish measurable expectations for odour control, including the requirement that no offensive odours are to be detected beyond the premises. In the event that offensive odours are reported, the facility is required to investigate and submit a written report to the NSW EPA.

## 5.4. MANAGEMENT STRATEGIES

The facility operates under a SSMP which outlines odour control strategies, with a clear operational objective to minimise odour emissions and prevent the generation of offensive odours beyond the site boundary.

- **Key operational and infrastructure-based odour controls**
  - Receival Area Controls
    - All incoming feedstock loads are inspected by a site operator to verify compliance with site requirements.
    - Unprocessed or non-size-reduced food waste is not accepted at the facility.
    - High-risk feedstocks such as food waste and biosolids are placed directly into the composting process.
    - The receival area is cleaned regularly, and litter patrols are routinely undertaken.
  - Aerated Pads
    - The Aerated Pads system is a central odour mitigation strategy at the site, allowing controlled aerobic composting conditions.
    - Regular inspection and maintenance of aeration ductwork to ensure airflow is efficient and clear of any obstruction.
    - All highly putrescible material (food waste and biosolids) is to be composted on the aerated pads.
    - This is considered industry best practice, and on-site measurements have demonstrated the significant odour reductions that are achieved using this method.
  - Windrow Management
    - Windrow turning is restricted to between 7am and 3pm.
    - Windrows are turned bi-weekly, and moisture levels are managed to maintain aerobic conditions.

  - Turning schedules are adjusted during westerly wind events to reduce potential impacts on sensitive receptors.

- Compost Stockpiles
  - Finished compost is stored in discrete piles with wind management controls such as water sprays and tarpaulin covering to further ensure material is not blown from stockpiles.
  - All transport vehicles carrying compost product are required to remain covered.

- Leachate Management
  - Leachate ponds are aerated as deemed practicable.
  - The surface area of stored leachate is minimised through re-use, and draining the leachate ponds to the existing leachate ponds during normal operating and climatic conditions

- General Controls and Monitoring
  - Anaerobic conditions are avoided through proper site grading and water management infrastructure (carbon amendment may be added).
  - Weekly inspections are conducted to monitor odour sources on and off-site.
  - Pond levels are managed to prevent anaerobic conditions and off-site odour risk.
  - Voluntary Environmental Audits are conducted by site staff regularly to monitor for odour. These are then recorded in SOILCO's QSE register (*REG015*

## 5.5. ADDITIONAL ODOUR MITIGATION

In view of the field odour surveys documented in Section 3, the industry benchmarking completed in Section 4, and commentary on current odour mitigation, it is not considered that additional odour mitigation is warranted.

# 6. CONCLUSIONS

Zephyr Environmental Pty Ltd (Zephyr) was commissioned by SOILCO Pty Ltd (SOILCO) to complete an odour validation audit of SOILCO's Wogamia Facility located in West Nowra, NSW.

The audit is required as part of the facility's NSW Environment Protection Authority (EPA) Environment Protection Licence (EPL 11542), Special Condition E1, and covers composting, recourse recovery, waste processing, and waste storage activities at the site.

Special Condition E1 states the requirement for a suitably qualified independent expert, experienced in the characterisation and treatment of odours from composting operations.

The objective of this work is to complete an odour validation audit, which is intended to be submitted to the EPA in accordance with EPL 11542 Special Condition E1, namely:

- Submission of an Odour Validation Audit Report to the EPA, carried out by a suitably qualified independent expert experienced in the characterisation and treatment of odours from composting operations [This document].
- Provision of a summary of any odour complaints received, and actions taken to reduce odour emissions where complaints are verified [refer Section 2].
- Completion of a field odour survey that characterises the frequency, intensity, duration, offensiveness, location and extent of off-site odours [refer Section 3].
- Benchmarking the design and management practices at the premises against industry best practice for minimising odour emissions [refer Section 4].
- Identification of additional odour mitigation measures, if required [refer Section 5].

Upon completion of the above tasks, the conclusion of this odour validation audit is that the facility is adequately managing its odour risk and it is not considered that additional odour mitigation is warranted.

As identified during the field odour surveys, the first hours of operation represent 'high odour risk' due to the prevalence of low wind speeds, potential temperature inversions, as well as down-river air drainage flows.

The detection of 'distinct' odour at this time at locations representative of the eastern sensitive receptors further supports that particular attention to odour management is required during this time.

Current odour management includes that windrow turning schedules are adjusted during westerly wind events to reduce potential impacts on sensitive receptors.

In the event of future odour complaints from eastern sensitive receptors, the facility should consider further restriction of windrow turning hours, e.g. from 8 am onwards.

# 7. REFERENCES

NSW EPA (New South Wales Environmental Protection Authority) (2021), Guide to conducting field odour surveys.

# APPENDIX A – ODOUR SURVEY REPORT

| | |
|---|---|
| **To:** | Dave Schumacher / Michelle Villegas |
| **Client** | SOILCO Odour Validation Audit |
| **From:** | Zephyr Environmental |
| **Date:** | 28 May 2025 |
| **Subject:** | Odour survey report |
| **Purpose:** | Wogamia Odour Validation Audit |

## Background and context

Zephyr Environmental (Zephyr) was commissioned by SOILCO to conduct odour surveys for the odour assessment of SOILCO's Wogamia Facility located in West Nowra (NSW). The audit is required as part of the facility's Environmental Protection Agency (EPA) licence (11542), Special Condition E1, and covers composting, recourse recovery, waste processing, and waste storage activities at the site. The Condition states the requirement for a suitably qualified independent expert, experienced in the characterisation and treatment of odours from composting operations. The objective of this work is to complete an odour validation audit, which is intended to be submitted to the EPA in accordance with Special Condition E1, of SOILCO's EPA EPL.

The SoilCo Wogamia facility is located in a semi-rural area and operates as an organics processing and composting facility. At the time of the site assessment, key activities observed at the premises included:

- Delivery of organic feedstock by commercial transport vehicles
- Acceptance of food organics and garden organics (FOGO) for immediate processing
- Operation of aerated static piles and open windrows for composting
- Screening and handling of mature compost for reuse as a soil amendment
- Management and aeration of leachate ponds
- Routine inspection, monitoring, and maintenance activities carried out by on-site staff

These activities are consistent with the facility's approved operations and odour management plan.

## Odour survey methodology

The odour surveys were conducted in accordance with the NSW EPA's *Guide to Conducting Field Odour Surveys* (2021). The guide provides a standardised approach for assessing odour impacts in the field, to ensure odour surveys are conducted in a reliable and repeatable manner.

The three survey campaigns were completed between 20 and 21 May 2025. Two surveys were carried out on the 20 May, and one on the 21 May, as detailed in Table A-1.

**Table A-1: Date and time of the odour surveys campaigns conducted around the CMF**

| Campaign No. | Date | Time of day | Number of samples |
|---|---|---|---|
| 1 | 20.05.2025 | 13:00 | 12 |
| 2 | 20.05.2025 | 17:30 | 12 |
| 3 | 21.05.2025 | 07:00 | 16 |

## Results of field surveys

The results of the odour survey campaigns completed between 20 – 21 May 2025 are presented in Figure A-1 to A-3 below. The arrows depict the direction the wind is flowing towards. For example, a westerly wind flows from west to east, and therefore the arrows would point to the east in this scenario. Surveys were taken downwind and upwind of the GWMC.

Survey Campaign 1 consisted of 12 surveys taken between 1:01 pm and 2:22 pm, under low wind speeds (1.0 – 3.0 m/s) predominantly from the west or west-southwest direction, as shown in Figure A-1. Survey Campaign 1 was also conducted with moderate cloud cover or light precipitation.

There were weak to strong odours detected immediately West of the CMF (surveys 3, 4). The odours were associated with Farm from the adjacent cattle farm. Surveys 1, 2, 3 and 4 pertained to predominantly very weak to weak detections along with instances of distinct animal related odour. No Soilco related odour was detected for these samples. Samples 5, 6, 7, and 8 remained relatively odorless – very weak with minimal weak detections of compost. Samples 9 and 10 both recorded distinct odour early within the survey and became non-detectable by the later stages. Samples 11 and 12 both pertained to predominantly non detectable to very weak odours, with weak and distinct detections also recorded. A strong detection associated with compost was detected near the end of the survey, however it was noted this was due to a composted loaded truck driving past. Samples 5-12 all contained only compost related odour characters.

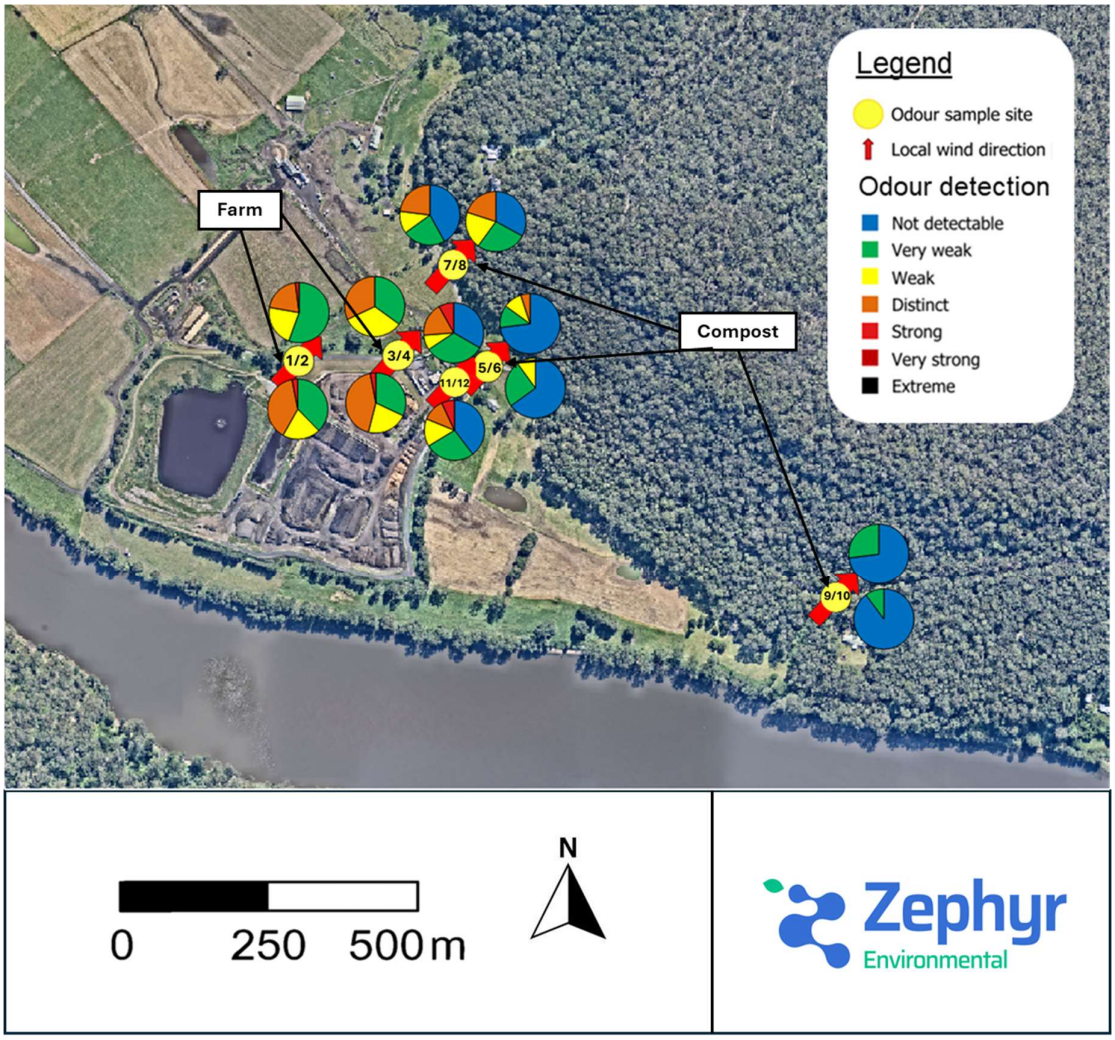



**Figure A-1: Field odour survey locations (survey 1), odours detected and wind direction**

Survey Campaign 2 consisted of 12 surveys taken between 05:25 pm and 06:36 pm, under calm to low wind conditions (0.7 – 1.5 m/s) predominantly from the Northwest, as shown in Figure A-2. Survey Campaign 2 was also conducted with moderate to heavy cloud cover and occasional light precipitation.

Surveys 5, 7, 8, 9 and 10 contained non-detectable to very weak odour, with sample 6 containing similar results with 1 minute of a weak compost associated odor being detected. Samples 1, 2, 3, and 4 contained mostly weak to distinct odour, with some strong odour detections present in samples 3 and 4. All noted odors were related to farm processes, it was noted that numerous cows were grazing within 5-10m of these samples. Samples 11 and 12 (near both receptors 3 and 4) contained mostly very weak to weak odors, with 20 seconds of a distinct odor being detected in sample 12. All odor in samples 11 and 12 were related to compost.

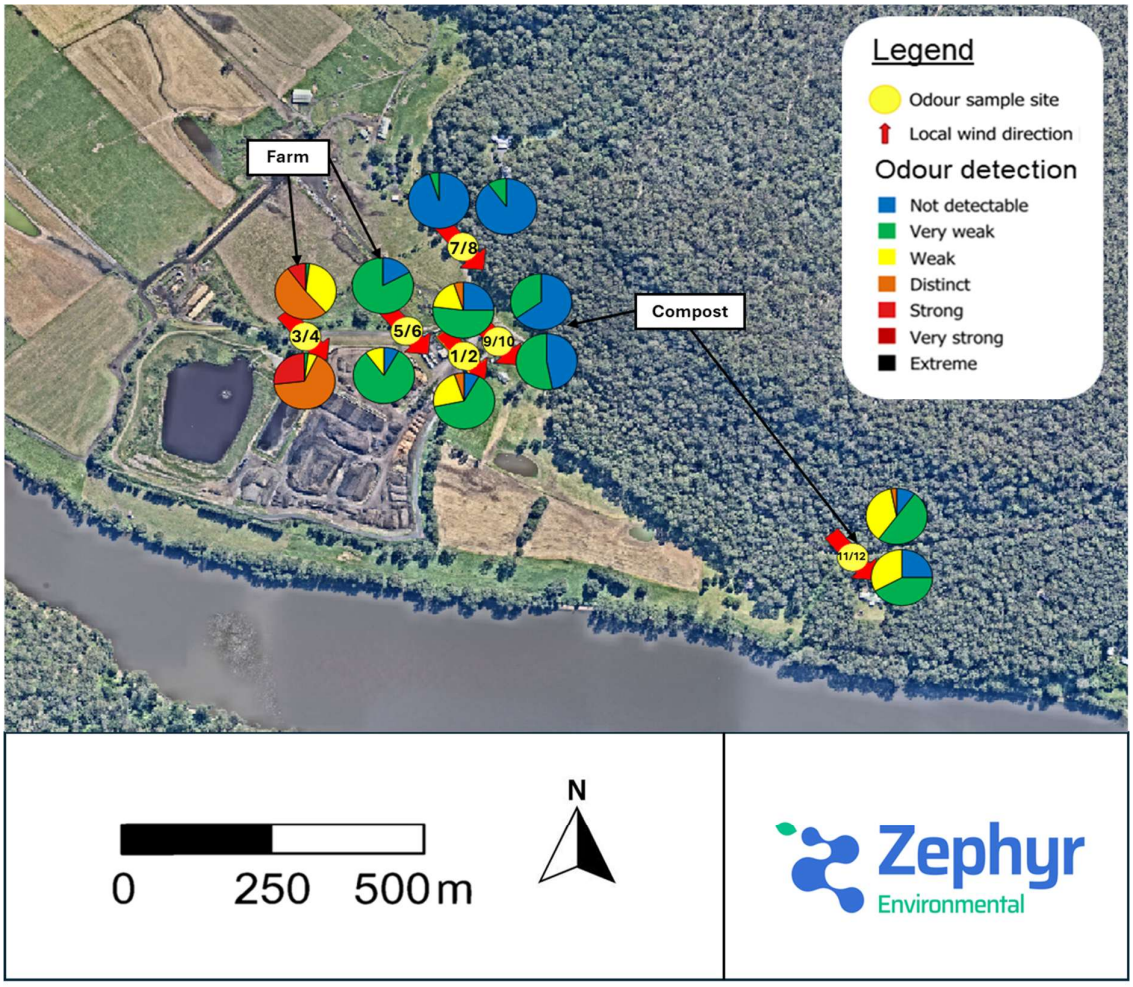



**Figure A-2: Field odour survey locations (survey 2), odours detected and wind direction**

Survey Campaign 3 consisted of 16 surveys taken between 07:07 am and 08:52 am, under calm wind to light wind conditions (0.3 to 2.4 m/s) predominantly from the west - southwest, as shown in Figure A-3.

Very weak to distinct compost-related odours were detected in samples 1 and 2 located west of the facility close to receptors 3 and 4. Samples 3 and 4 contained weak to distinct odor related to compost, with samples 7 and 8 containing similar results related to animal odours. Samples 5, and 6 contained similar results with small period of a strong odor identified as a mix of animal and compost. Samples 9 10, 11, 12, 13, and 14 conducted within the site boundary contained a range of compost related odour with prolonged periods of strong detections. In this time it was noted a “hot spot” was blowing towards the sample area. Samples 9 and 10 on the south side of the facility recorded periods of a very strong odours associated with burning compost. Samples 15 and 16 remained within very weak to weak detection relating to compost, with small periods of weak odour.

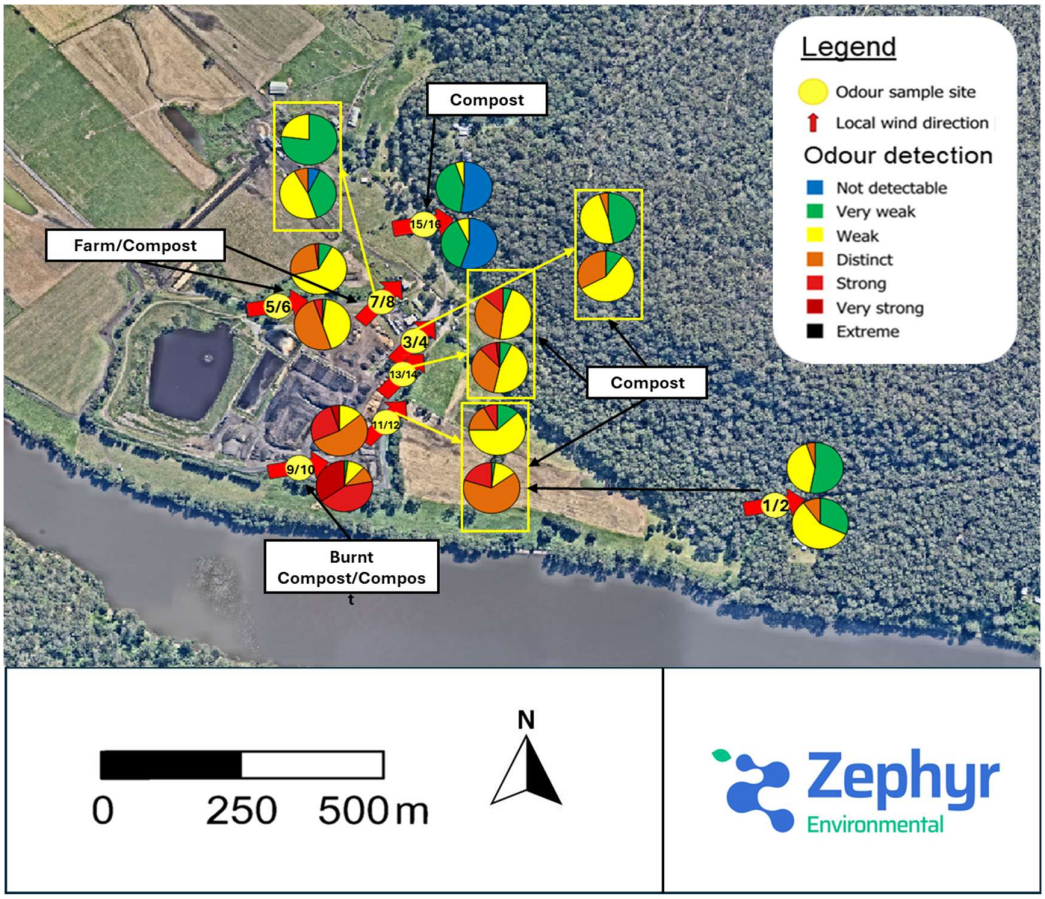



**Figure A-3: Field odour survey locations (survey 3), odours detected and wind direction**

# APPENDIX B – SITE VISIT PHOTO LOG



**Figure B-1: Leachate ponds at SOILCO Wogamia**



Figure B-2: Windrow at SOILCO Wogamia



Figure B-3: Truck unloading at SOILCO Wogamia

# Attachment 3

## Evan Smith - odour accreditation

THE ODOUR UNIT

# CERTIFICATE OF QUALIFICATION
# ODOUR ASSESSOR

*This certificate is awarded to*

## Evan Smith

has successfully qualified as an odour assessor under the Australian Standard AS/NZS 4323.3 criteria.

n-butanol threshold criteria (ppb): **$20 \leq \chi \leq 80$**
Assessor mean threshold (ppb): **44.9**

Standard deviation criteria: **$10^{sr} < 2.3$**
Assessor standard deviation: **1.61**

**The Odour Unit (Qld) Pty Ltd**

Melissa Gilbert
Laboratory Co-ordinator

17 July 2025

Date

ACS Engineers
CIVIL | ENVIRONMENTAL | PROJECT MANAGEMENT

PLANS AND DOCUMENTS referred to in the SDA APPROVAL
SDA approval: AP2024/011

# Information Request Response

17/04/2025

Your Ref: **OUT24/5995**

Our Ref: 240040

The Coordinator General
Office of the Coordinator General
PO Box 15517
Brisbane City East, QLD, 4002

Attention: Marcus Peck

**RE: OUT24/5995 – SDA application for a material change of use (MCU) for special industry (compost manufacturing facility) in the Bromelton State Development Area (SDA)**

**260 Mitchell Road, Bromelton, QLD 4285**
**Lot 4 RP85497**

Dear Marcus,

On behalf of our client, SOILCO Developments Pty Ltd, we acknowledge receipt of your Information Request dated the 6th of January 2025. Please find the following responses to the information requested.

This RFI response is accompanied by the following supporting documentation:

| Document Item Number | Document Name | RFI Issue |
|---|---|---|
| 1 | Pavement Impact Contribution Schedule (Dykman Consulting, 2025) | 1 |
| 2 | Site and Soil Report (Stav's Hydraulics, 2024) and LURT Assessment | 2 |
| 3 | Geotechnical Investigation Report (East Coast Geotechnical, 2025) | 2 |
| 4 | Site Layout (SMEC, 2025) | 2, 3, 15, 26 |
| 5 | Architectural Layout A-DA-01.02 and A-DA-03.02 (Elevation Architecture, 2025) | 3 |
| 6 | GHD RFI Response Letter Issues 3, 4 and 23. | 3, 4, 23 |
| 7 | Environmental Management Plan (GHD, 2025) | 3, 4 |
| 8 | Adblue Safety Data Sheet | 3 |
| 9 | Seqwater Development Guidelines Code Response (GHD 2025) | 3 |
| 10 | Feedstock Summary | 4, 15 |
| 11 | Air Quality Impact Assessment (GHD, 2025) | 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 |
| 12 | Receptor Sensitivity Analysis | 8 |
| 13 | Acoustic Report (GHD, 2025) | 23 |
| 14 | Ecological Assessment Report (Redleaf, Dec 2021), and | 24, 25 |
| 15 | Significant Impact Assessment -EPBC Act (Envirosphere, Aug 2024) | 24, 25 |
| 16 | Drawings ACS-220089-ROAD, ACS-220089-INT-02 (ACS Engineers, 2025) | 24, 25 |

| Document Item Number | Document Name | RFI Issue |
|---|---|---|
| 17 | Voluntary Offset Area Sketch (SOILCO) | 24, 25 |
| 18 | GHD RFI Response Letter Issues 6 to 21. | 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 |

Please do not hesitate to contact me if you require any further information.

Kind regards,



Susan Shay
Director/Principal Civil and Environmental Engineer
BEng RPEQ 13697

| No. | Issue | Information Requested | Proponent Response |
|---|---|---|---|
| **Pavement Impact Assessment – State Transport Interests** | | | |
| **1** | **Contribution Schedule** | The Pavement Impact Assessment Report carries out the assessment over a 20 year period with different productivity rates based on a total production rate of 400,000tpa. This has determined a total contribution value of $2,018,427 over the 20 years of operation. However, a Contribution Schedule has not been proposed as part of the assessment.<br><br>A Contribution Schedule is required to clarify how the pavement impact assessment will be addressed over the 20 year period, noting the assessment identified that the first 5 years of operation may not have any significant impacts to trigger any contributions.<br><br>1) **The proponent is requested** to provide a proposed Contribution Schedule that details how the contributions will be paid (e.g. payment per tonne, payment amount over a particular time period, payment over a specific threshold of vehicles / material haulage etc.) for review and endorsement by the Department of Transport and Main Roads. | Please refer to supporting document Item 1- Pavement Impact Contribution Schedule. |
| **On-site Wastewater Management** | | | |
| **2** | **Risk Rating** | The effluent disposal area will be located approximately 52 metres from a stream order 1 watercourse, therefore the treatment standard is required to be upgrade to achieve compliance. To achieve the required medium risk rating and enable full assessment of the design under Seqwater's Land use risk tool (LURT), an amended Site and Soil Evaluation is required.<br><br>1) **The proponent is requested to** provide an updated Site and Soil Evaluation report that includes the following:<br>a) upgrade of the treatment standard of the wastewater treatment system to 'advanced secondary with nutrient reduction'<br>b) provide borehole log results over the proposed effluent disposal area showing a minimum depth of one (1) metre to bedrock and groundwater. | Refer to supporting documents Item 2 – Site and Soil Report & LURT and Item 3 – McPhee Geotechnical Investigation.<br><br>a) As detailed on the Stav's Hydraulic Services Site Plan H104 the land application area is located 204m from the nearest watercourse (east of operational area pad) and 52m from the nearest building. The existing stream order 1 located near to the proposed office building and identified as being the closest |

| No. | Issue | Information Requested | Proponent Response |
|---|---|---|---|
| | | *Note: This item was requested as part of Seqwater's response to the draft documentation.* | watercourse is to be diverted upstream of the operational area pad to the watercourse east of the pad. No change to the LURT assessment is required. *Please note that this detail was incorporated in an updated Site and Soil Report which unfortunately was not provided by the planning consultant in the official application material.*<br>b) Groundwater was not encountered on site including to depths greater than 1m. Please find attached McPhee Geotechnical Investigation Report, specifically Section 9.1 and Borehole Log 21. |
| 3 | **Storage of Chemicals** | Seqwater Development Guidelines for Water Quality Management in Drinking Water Catchment (dated October 2024) AO28.2 requires that dangerous/hazardous substances stored in quantities above 200kg/200L maintain a minimum 100m setback to all watercourses. The planning report (page 35) states that the maintenance and storage shed are within 40-50m of a watercourse and will involve the following goods stored in quantities over 200kg/200L:<br>• bunded storage of waste oil 1000L<br>• above-ground self-bunded diesel storage and dispensing tank 34000L<br>• above-ground Adblue storage and dispensing tank 5000L.<br><br>Given the large quantities of the material stored, further justification of the reduced setback is required.<br><br>Further, it is noted that the Environmental Management Plan:<br>• does not provide an assessment of unmitigated and mitigated risk to surface waters associated with spills for each stage of development (construction - section 6.3.1.4 Table 12, operation - section 6.3.2.3 Table 13), discussing only risk to groundwater from this type of incident<br>• rates unmitigated risk to groundwater from hazardous material spills as 'moderate' for both the construction and operational phases, which is | Dangerous/hazardous substances stored in quantities above 200kg/200L will be located to maintain a minimum 100m setback to all watercourses.<br><br>Please refer to the following supporting documents for specific additional details:<br><br>• Item 4 – Updated Site Layout (SMEC)<br>• Item 5 - Updated development layout plans A-DA-01.02 and A-DA-03.02 (Elevation Architecture);<br>• Item 6 - GHD RFI Response Letter (dated 14/04/2025) Item 3 Response;<br>• Item 7 - Updated Environmental Management Plan GHD (dated |

| No. | Issue | Information Requested | Proponent Response |
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| | | not considerate of the site's location within a drinking water catchment or the large quantity of diesel and Adblue stored on the site<br>• does not discuss the risks to surface or groundwater in relation to the site's location within a drinking water catchment<br>• does not clearly articulate mitigation measures, procedures or responsibilities in the event of a large chemical/hazardous materials spill.<br><br>1) **The proponent is requested to** provide additional detail to demonstrate compliance with Performance Outcome PO28 of the Seqwater Development Guidelines and support the location of large quantities of Adblue and diesel such as:<br>a) detailed drawings of storage facilities<br>b) a plan showing the specific location of Adblue and diesel within the building (highest setback possible)<br>c) building components (i.e. bunded edges, floor pad permeability rating etc)<br>d) secondary containment methods with at least 110% spill recovery capacity, or industry standard, whichever is greatest<br>e) product details for storage vessels<br>f) procedures and notifications in the event of a spill<br>g) spill kit contents, location and signage<br>h) any other information / research / details the applicant can provide to justify the minimal setback.<br><br>2) **The proponent is requested to** provide an updated Environmental Management Plan that includes the following information:<br>a) amended risk assessment and general provisions to include further discussion of the site's location within the drinking water catchment<br>b) appropriate unmitigated and mitigated risk scores for both surface and groundwater<br>c) clear mitigation measures, emergency actions, notifications procedures and responsibilities in the event of a large chemical/hazardous material spill<br>d) notification procedures to include direct notification of seqwater's operations and water quality departments of any significant spills (i.e. quantities over 200L) which may enter surface waters. | 11/04/2025) Section 6.3.1.4, 6.3.2.4, 6.4.4.1 and 6.4.4.2, 6.5.1.4, 6.5.2.4, 9.1 and 9.2.<br>• Item 8 - Adblue material safety data sheet<br>• Item 9 - Updated Seqwater Development Guidelines 2024 Code Response GHD |

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| | | *Note: Seqwater Development Guidelines (October 2024) can be found at: https://www.seqwater.com.au/planning-and-development* | |
| **Site Operations** | | | |
| **4** | **Waste Feedstock** | Table 2.1 in the planning report identifies the following wastes to be accepted onsite:<br>• Food Organics and Garden Organics (FOGO)<br>• wood waste<br>• manure.<br><br>Section 4.5.2 of the planning report contains a review of potential waste feedstocks, which has additional wastes, including:<br>• stabilised biosolids<br>• paper pulp effluent and paper sludge dewatered<br>• compostable polylactic acid (PLA) plastics<br>• food processing waste (non-protein based).<br><br>1) **The proponent is requested to** provide a comprehensive list of types of waste that may be received on site and identify where they have been accounted for in the impact assessment. This may also require amendments to any supporting application materials if additional impacts are identified. | Please refer to the following supporting documents for specific details of the feedstocks to be accepted and how their impacts have been assessed and accounted for:<br><br>• Item 6 - GHD RFI Response Letter date 14/04/2025 Item 4 Response<br>• Item 10 - Detailed feedstock list and locational plan;<br>• Item 7 - Updated Environmental Management Plan GHD (dated 11/04/2025);<br>• Item 11 - Updated AQIA GHD (dated 14/04/2025) |
| **5** | **Aeration System** | It is noted that there are two types of Aerated Static Piles (ASP) used in the composting industry, namely positive aeration systems (outward air flow) and negative aeration systems (inward air flow). It is unclear in the application material which type of ASP is proposed as part of this facility.<br><br>1) **The proponent is requested to** confirm if the facility will use a positive or negative aeration system. | A positive aeration system ASP will be used at the Bromelton facility. |
| **6** | **Windrow Surface Area** | The Air Quality Impact Assessment (AQIA) report indicates that the odour emissions from area sources such as windrows were estimated by multiplying the specific odour emission rate (SOER) and the corresponding surface area (m2). Section 4.2.3 of the AQIA report indicates that windrows have been assumed to be trapezoidal in shape and the surface area has been based on the | Please refer to the following supporting documents for specific details on how windrow surfaces were estimated for individual odour |

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| | | volume of material at any one time. Detailed information about the estimation of surface areas, such as the number of windrows, their dimensions (e.g. height, width and slopes), what throughput scenario has been assumed (peak, low, average or varied depending on time of year) has not been provided and is required to assess how the surface areas of the windrows were estimated.<br><br>1) **The proponent is requested to** provide detailed information on how the surface areas were estimated for individual odour sources used in the development of the emission inventory. | sources used in the development of the emission inventory:<br><br>• Item 11 - Updated AQIA (Section 4.2.3 and Appendix C).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 6) |
| **Odour Mitigation** | | | |
| **7** | **Receival Building** | The receival building and decontamination area (Area C) is proposed to be covered with two sides enclosed to contain windblown litter. It is noted food waste and manure have a 'high odour rating' as prescribed in the ERA 53(a) guideline which requires consideration of a fully enclosed building with industry best practice odour mitigation. Potential odour control measures have not been identified to demonstrate that odour emissions from this source will be mitigated.<br><br>1) **The proponent is requested to** provide<br>a) the proposed best practice odour controls required to mitigate potential odour impacts as a result of receiving, mechanically reprocessing and mixing feedstocks.<br>b) the proposed maintenance of these measures to manage the risk of odour impacts from the activity. | Please refer to the following supporting documents for specific details on controls to mitigate potential odour impacts as a result of receiving, mechanically reprocessing and mixing feedstocks and the maintenance of those controls:<br><br>• Refer to Item 11 - Updated AQIA (Section 7.5, Table 7.3).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 7) |
| **8** | **Odour Data** | Section 7.2.1 of the AQIA report indicates that a review of similar FOGO and GO composting facilities was undertaken to identify representative odour emission rates for assessing the proposed facility. It indicates that a conservative approach has been taken in the selection of odour emission rates. However, the measured data of the similar composting facilities have not been provided to demonstrate that the adopted emission rates are conservative.<br><br>In addition, the AQIA report notes that odour emission rates can vary based on many factors including odour sampling methodology, the composition of waste, age of waste, time of day and the season that the sampling is undertaken. An assessment of these factors has not been provided for the odour emission rates that have been reviewed. | Please refer to the following supporting documents for additional details on measured odour data and emissions inventory:<br>• Item 11 - Updated AQIA (Appendix C).<br>• Item 12 – Receptor Sensitivity Analysis<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 8) |

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| | | The use of Australian Standard AS/NZS 4323.4:2009 Stationary source emissions –Method 4: Area source sampling – Flux chamber technique (AS/NZS 4323.4) is not considered appropriate for the sampling of any active surface such as ASPs. The 'Critical Evaluation of Composting Operations and Feedstock Suitability Report' prepared by Arcadis Australia Pty Ltd in 2019 is a 'recognised entity report' under section 215(2)(l) of the Environmental Protection Act (EP Act). The literature review conducted in Phase 1 of this report indicated that the flux chamber should not be used to measure odour emissions from active phase compost windrows and that the facilities that have done so in the past are likely to have underestimated their odour emissions and impacts. The flux chamber has a very low sweeping air flow rate as compared to the active surface of ASPs that have an outward air flow. The uncertainty in this measurement can have a direct impact on the estimation of odour emission rates and the prediction of ground level concentrations (GLC).<br><br>Although the AQIA report does not specify how the SOER for the aerated static pad (Area B) sources were measured, section 4.2.2 of the AQIA report indicates that odour sampling was undertaken at Soilco's Wogamia facility by Ektimo in 2019 using an isolation flux chamber. This data was then used to demonstrate the impact of best practice processes and odour controls at the Wogamia facility and indicate the conservatism of the emission inventory that has been developed for the proposed facility.<br><br>1) **The proponent is requested to** provide a detailed analysis of the measured odour data from similar composting facilities to demonstrate that an appropriate emission inventory has been developed. This must include:<br>a) an assessment of the odour sampling methodology<br>b) the composition of waste<br>c) age of waste<br>d) time of day and the season that the sampling was undertaken. | |
| **9** | **Odour Monitoring Period** | The AQIA report does not indicate if the SOER values adopted in Table B-2 were based on sampling conducted during winter or summer. During summer the high temperatures accelerate the oxygen-uptake activities within the windrows and leachate ponds that can quickly turn these sources into anaerobic conditions. Anaerobic conditions are responsible for the generation of odorous gases such as hydrogen sulphide and methyl mercaptan. The rate at which | Please refer to the following supporting documents for additional details on the odour monitoring period utilised in the AQIA: |

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| | | hydrogen sulphide is generated depends on the concentration of sulphate, the level of oxygen, organic loading, pH and temperature inside the windrows and leachate ponds. In addition, it is predicted that more compost will be produced in the summer months. The worst-case odour emissions during summer were not discussed in the report and the estimated odour emissions may not represent the seasonal variation of potential odour impacts<br><br>1) **The proponent is requested to:**<br>a) confirm what time of year monitoring was undertaken to determine the odour emission rates used in the AQIA and<br>b) if monitoring was undertaken in winter, provide an updated AQIA that assess worst-case impact for the facility during summer. | • Refer to Item 11 - Updated AQIA (Appendix C).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 9) |
| **10** | **Odour Emission Rate Calculations** | There are discrepancies in the estimation of the odour emission rates (OERs) provided in Table B-2 of the AQIA report. For example, the OER for the maturation and storage – open windrows (Area A) source is reported as 9,398 ou/s. However, the calculated OER value for this source is 16,430 x 0.6 = 9,858 ou/s.<br><br>1) **The proponent is requested to:**<br>a) review the OERs that have been calculated and confirm their accuracy<br>b) where required, provide an updated emission inventory and dispersion modelling results that accurately represent the proposed activities and potential extent of impact. | Please refer to the following supporting documents for additional details on the OER calculations:<br><br>• Refer to Item 11 - Updated AQIA (Section 7.2 and Appendix C).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 10) |
| **11** | **Emission Scaling Factor** | Table B-2 of the AQIA report includes a footnote to explain that the emission scaling factor adjusts the emission factors based on the expected area of the odourous material in the windrows divided by the area of the source. A scaling factor of one (1) has been applied to all sources except for the following:<br>• turning of aerated static pad windrows (Area B) – 0.3<br>• open windrows – GO (Area D) – 0.7<br>• turning of open windrows – GO (Area D) – 0.3<br><br>How these values have been calculated is not clear from the notes that have been provided in Table B-2 of the AQIA. | Please refer to the following supporting documents for additional details on emission scaling factors:<br><br>• Refer to Item 11 - Updated AQIA (Appendix C).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 11) |

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| | | 1) **The proponent is requested to** provide detailed information of how the emission scaling factors have been developed for each of the odour emission sources. | |
| **12** | **Emissions During Windrow Turning** | The highest odour emissions are expected during the windrows turning process. The aerated static pad (Area B) windrows are proposed to be turned once during a three-week cycle (assuming the odour emission during a turning period is applicable to 25% of the total windrow area). Section 7.2.2 of the AQIA report also indicates that the turning of windrows is assumed to increase odour by 100%. However, the modelled SOERs presented in Table B-2 of the AQIA report show that the Area B windrows is reduced from 1.5 ou/m2/s to 0.4 ou/m2/s during the turning process. The SOER is expected to increase during the windrow turning process. The SOER for the turning of the Area B windrows is also not included in Table 7-1 where the odour emission inventory is summarised. In addition, the odour emissions from turning the maturation and storage – open windrows (Area A) are not included in either Table 7-1 or Table B-2, so appear to not have been modelled.<br><br>1) **The proponent is requested to:**<br>a) review the SOER calculations for the turning of windrows to confirm their accuracy and update where required<br>b) provide an updated emission inventory and dispersion modelling results that includes all potential odour emission sources. | Please refer to the following supporting documents for additional details on SOER calculations during windrow turning:<br><br>• Refer to Item 11 - Updated AQIA (Appendix C).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 12) |
| **13** | **Shredding and Screening Emissions Source** | The shredding and screening of organic material is not assigned an OER in Table 7-1 but is included in Table B-2 where it is noted that it has been modelled as a volume source. No source parameter details have been provided except that it has an area of 22 m2 and is 21.5 m3, but how this relates to the modelling of this source is unclear. The notes provided in Table B-2 indicate that the OER has been taken from a measurement of decomposing GO, but the specific source of the OER has not been provided. As the activity will include the shredding of FOGO, not just GO, this emission source should be assigned a higher OER to accurately reflect the proposed operations.<br><br>1) **The proponent is requested to** provide:<br>a) a detailed summary of the emission source parameters to demonstrate how this odour source has been represented in the dispersion model | Please refer to the following supporting documents for additional details on shredding and screening emission source parameters:<br><br>• Refer to Item 11 - Updated AQIA (Appendix C).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 13) |

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| | | b) an updated emission inventory and dispersion modelling results that accurately represent the proposed activities and potential extent of impact. | |
| **14** | **Decontamination and Material Processing Emission Source** | Decontamination and material processing is proposed to be located in a shed (30 x 80m or 2400m2) with two enclosed walls. The decontamination/material processing (Area C) source that is listed in Table B-2 of the AQIA report appears to have been modelled as an area source with a surface area of 4,198 m2. It is unclear what this source represents as a volume source is more appropriate to model emission sources within buildings and the proposed site layout provided in Figure 2.1 of the AQIA report does not show an external waste receival and storage area.<br><br>1) **The proponent is requested to** provide:<br>a) a detailed summary of the emission source parameters to demonstrate how this odour source has been represented in the dispersion model<br>b) an updated emission inventory and dispersion modelling results that includes all potential odour emission sources. | Please refer to the following supporting documents for additional details on decontamination and material processing emission source parameters:<br><br>• Refer to Item 11 - Updated AQIA (Appendix C).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 14) |
| **15** | **Animal Manure Odour Emissions** | The AQIA report indicates that up to 200 tonnes of animal manure will be stored at the site at any one time and that it will be blended with the composted material. Where the animal manure will be stored on the site has not been identified or included in the site plans provided (Appendix A). Animal manure is listed in the ERA 53(a) guideline with an odour rating of 'high', but this odour source has not been considered in the AQIA.<br><br>1) **The proponent is requested to** provide:<br>a) an updated AQIA that includes the receival and storage of animal manure as an odour emission source<br>b) an updated site plan that identifies the location for the receipt and storage of manure<br>c) the proposed storage method (covered, within a three walled bunker etc.) and approximately how long manure will be stored prior to being blended with the compost<br>d) the proposed mitigation measures to ensure odours are minimised from the receipt, storage and blending of manure with compost. | Please refer to the following supporting documents for additional details on the inclusion of animal manure as an emission source:<br>• Item 11 - Updated AQIA (Section 7 and Appendix C)<br>• Item 4 – Site Layout<br>• Item 10 – Feedstock Summary.<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 15) |

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| 16 | **CALMET Grid Origin and Domain** | Section A-3 of the AQIA provides a summary of the CALMET model parameters. The domain origin is reported in both the text and within Table A.2 with a northing of 6879 km. It is understood that the northing should be 6897 km. Similarly, the text in Section A-3 indicates the CALMET domain is 20 km x 20 km but Table A.2 reports a domain size of 16 km x 16 km. Figures A.1 and A.2 appear to show that the modelling was done in the correct area over a 16 km x 16 km domain and that these are just transcription errors that have been made in the AQIA report.<br><br>1) **The proponent is requested to** review the modelling files and confirm the CALMET grid origin and domain size that has been included in the modelling. | Please refer to the following supporting documents for additional details on CALMET grid origin and domain size:<br>• Item 11 - Updated AQIA (Appendix A).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 16) |
| 17 | **Modelling Grid Resolution** | Table A.2 of the AQIA report indicates that a grid resolution of 200m has been used for the meteorological and dispersion modelling exercise. This resolution is not fine enough with the complex terrain of the area.<br><br>It is noted that the meteorological model (CALMET) was run in the 'hybrid' mode with upper air taken from a TAPM generated *.m3d file and surface observations from the Beaudesert Drumley Street Bureau of Meteorology (BoM) station. A large modelling domain of 16km x 16km with a 200m resolution has been selected and it appears this choice has been made to include the Beaudesert BoM station as a surface station right on the edge of the domain. To allow for a finer grid resolution without significantly increased model run times, surface observational data can be assimilated into TAPM and CALMET can be run in the 'No-Obs' mode. This is a standard methodology that is referenced in the Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'.<br><br>1) **The proponent is requested to:**<br>a) update the meteorological and dispersion modelling grid to be a finer resolution (e.g. 100m)<br>b) provide an amended AQIA report with the revised results. | Please refer to the following supporting documents for additional details on modelling grid resolution:<br>• Item 11 - Updated AQIA (Appendix A).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 17) |
| 18 | **Model Generated Methodology** | Section A-3-1 of the AQIA provides a review of the CALMET generated annual wind pattern. No further analysis of the CALMET generated meteorology is provided or an assessment against the Beaudesert BoM station data undertaken to confirm the representativeness of the dataset for the region. | Please refer to the following supporting documents for additional details on model generation methodology: |

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| | | 1) **The proponent is requested to** provide a detailed analysis of the CALMET generated meteorological dataset (e.g. time of day and seasonal windroses, stability class, mixing height etc.) and an assessment against the Beaudesert BoM station data. | • Item 11 - Updated AQIA (Appendix A).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 18) |
| **19** | **Dispersion Modelling Parameters** | The AQIA report does not provide a summary of the CALPUFF dispersion model parameters. The appropriateness of the model settings that have been selected cannot be assessed.<br>In addition, no information has been provided to describe how each of the emission sources were represented in the dispersion model (e.g. source type, sigma z, sigma z, effective height etc.) and no coordinates or figures have been provided to show the locations or sizes of the CALPUFF emission sources. How each of the emission sources have been represented in the dispersion modelling cannot be assessed without this information.<br><br>1) **The proponent is requested to** provide:<br>a) a summary of the CALPUFF dispersion model parameters that have been selected<br>b) details of how each of the emission sources are represented in the dispersion model<br>c) coordinates and figures that show the locations of the CALPUFF emission sources. | Please refer to the following supporting documents for additional details on dispersion modelling methodology:<br>• Item 11 - Updated AQIA (Appendix B).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 19) |
| **20** | **Cumulative Odour Assessment** | There are a number of significant odour sources in the area, including Bush's Proteins, Beaudesert Saleyards, the Scenic Rim Regional Council Waste Facility/Transfer Station, poultry farms and other agricultural odour sources. Some of these may contribute to cumulative odour impacts. Section 7.3.1 of the AQIA report indicates that as the odour characteristics of the background sources will be different and they are not located in close proximity of the proposed facility, the cumulative odour impacts have not been assessed.<br><br>It is noted from Section 5.4 of the AQIA report that during a site visit, odour was observed whilst driving along Beaudesert Boonah Road including the entry of the proposed site and the source of the odour was likely Bush's Proteins. It is noted it may be difficult to model the background odour concentration in the area with limited information on emission sources. However in the absence of background modelling, more detailed odour surveys of the area should be conducted to | Please refer to the following supporting documents for additional details on cumulative odour considerations:<br>• Refer to Item 11 - Updated AQIA (Section 5.5, 7.3.1 and Appendix D).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 20) |

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| | | determine the background odour concentrations and extent of existing odour impacts so the cumulative odour impacts at sensitive receptors can be assessed.<br><br>1) **The proponent is requested to** provide an assessment of cumulative odour impacts either through a dispersion modelling exercise or field odour surveys. | |
| **Particulate Matter** | | | |
| **21** | **Particulate Matter Risk** | Particulate matter emissions from the proposed facility have not been estimated or modelled. Section 7.4 of the AQIA identifies site activities that will generate particulate matter emissions. The AQIA report proposes mitigation measures in Table 7-3 and item number AQ3 provides mitigation measures specifically for dust during construction and operation. No mitigation measures have been proposed for windrow turning activities.<br><br>1) **The proponent is requested to** provide potential mitigation measures to control particulate matter emissions associated with windrow turning activities. | Please refer to the following supporting documents for additional details on mitigation of particulate matter emissions:<br><br>• Refer to Item 11 - Updated AQIA (Section 6, 7.4 and 7.5).<br>• Item 18 – GHD RFI Response letter Issues 6 to 21 (Issue 20) |
| **Greenhouse Gases** | | | |
| **22** | **Greenhouse Gas (GHG) Assessment** | Figure 4.11 of the Planning Report identifies the potential sources of GHG emissions as a result of the ASP composting process. Section 5.3.2 of the planning report indicates that a GHG assessment will be completed during the detailed design phase of the project. A GHG assessment is required to be conducted and provided as part of an application for an environmental authority. The Department of Environment, Tourism, Science and Innovation (DETSI) has developed a GHG emission guideline (ESR/2024/6819) to clarify existing application requirements under the EP Act and provides information about how to meet these requirements in relation to GHG emissions. This information is also required to assess how the project will comply with section 2.5.10 of the Bromelton SDA Development Scheme (December 2017).<br><br>1) **The proponent is requested to** provide an assessment of GHG emissions from the proposal in accordance with DETSI's GHG guideline, including: | A Greenhouse Gas Emissions Assessment is currently being undertaken. The Greenhouse Gas Emissions Report will be forwarded to the Office of the Coordinator General as soon as possible. |

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| | | a) an emissions inventory identifying the GHGs to be emitted from the proposed activity,<br>b) an estimate of the projected annual Scope 1 and Scope 2 CO2-e emissions over the life of the project including both unabated emissions and emissions after all avoidance and abatement measures (as outlined in section 3.3 of the guideline) have been accounted,<br>c) a risk assessment that outlines the scale of expected GHG emissions from the activity and how they are expected to contribute to climate change impacts on Queensland's environmental values<br>d) if the total Scope 1 and Scope 2 emissions from the project are estimated to be more than 25,000 tonnes of CO2-e per annum:<br>i. estimate scope 3 emissions from the project<br>ii. provide a GHG abatement plan. | |
| **Noise Impact Assessment (NIA)** | | | |
| **23** | **Noise Monitoring Data** | The purpose of conducting a NIA is to assess if the impact from the proposed activity is acceptable to the surrounding environment. The NIA report indicates that noise levels at two locations were measured, but only limited data has been provided in Table 3.2 and no detailed analysis has been conducted. The NIA report purely refers to the deemed background level and does not adequately provide the contextual details of the environmental values of the site and the surrounding environment. Without comparing the existing noise levels against the predicted impact, it is not possible to assess the actual impact of the proposed activity.<br><br>1) **The proponent is requested to** provide a detailed analysis and summary of the noise monitoring data that has been collected during the monitoring campaign including the average, minimum and the maximum hourly figures for the parameters of LAeq, LA90 and LA10 for each of the periods (morning shoulder, daytime, evening and night). | Please refer to the following supporting documents for specific additional details:<br>• Item 6 - GHD RFI Response Letter dated 14/04/2025 Item 23 Response;<br>• Item 13 - Updated Acoustic Assessment GHD (dated 04/04/2025); |
| **Matters of State Environmental Significance (MSES) – Regulated Vegetation** | | | |

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| 24 | **MSES Clearing** | MSES regulated vegetation is proposed to be cleared for which impacts should be assessed in accordance with either the:<br>• Significant Residual Impact Guideline, Department of Environment and Heritage Protection 2014 (EHP (now DETSI) SRI guideline); or<br>• Significant Residual Impact Guideline, Department of State Development, Infrastructure and Planning December 2014 (DSDIP SRI Guideline).<br><br>Further information is required to demonstrate how any proposed clearing of MSES regulated vegetation will not exceed the limits within the SRI guidelines.<br><br>1) **The proponent is requested to** provide an assessment in accordance with either the DETSI or DSDIP SRI guidelines that demonstrates how any proposed clearing of MSES regulated vegetation will not exceed the limits within the SRI guidelines. Please include a figure specifically identifying the MSES regulated vegetation proposed to be cleared.<br><br>*Note: DETSI SRI Guideline: https://environment.des.qld.gov.au/__data/assets/pdf_file/0017/90404/significant-residual-impact-guide.pdf*<br><br>*DSDIP SRI Guideline: https://dsdmipprd.blob.core.windows.net/general/dsdip-significant-residual-impact-guideline.pdf* | The proposed development is within a State Development Area (SDA) and clearing of regulated vegetation in an SDA is considered exempt and therefore no further assessment is required.<br><br>It should be noted however that the development has been designed to avoid where possible the clearing of regulated vegetation. Avoidance of clearing of regulated vegetation within the Mitchell Road road reserve is not possible.<br><br>As part of SOILCO's environmental commitment it is proposed to establish a minimum 6ha voluntary vegetation offset as shown on sketch Voluntary Offset Area. Species to be planted will consist of Koala feed and habitat trees as well as species significant to the Danggan Balun (Five Rivers) People.<br><br>Refer to supporting documentation:<br>• Item 14 - Ecological Assessment Report (Redleaf, Dec 2021),<br>• Item 15 - Significant Impact Assessment -EPBC Act (Envirosphere Aug 2024)<br>• Item 16 – Road Drawings<br>• Item 17 – Sketch Voluntary Offset Area (SOILCO) |
| 25 | **SEQ Koala Habitat** | It is not appropriate to use the Federal Significant Impact Guideline to assess the impact to an MSES. As impacts to SEQ Koala Habitat are proposed, an assessment of the project's impact and subsequent offset requirements under the Queensland Environmental Offsets Framework is required. Impacts to SEQ Koala Habitat are specifically addressed within the DETSI SRI guideline. It identifies that the removal of one non-juvenile koala habitat tree (NJKHT) in SEQ | The Planning Regulation 2017 describes any exempted development in koala habitat areas. Works that are exempted development in koala habitat areas on all land tenures are: |

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| | | is a significant residual impact and is required to be offset (Section 6). The number of NJKHTs that are proposed to be impacted by the activity must be quantified as it is not acceptable that impacts to SEQ Koala Habitat are based on area calculations.<br><br>1) **The proponent is requested to** provide an assessment in accordance with the DETSI SRI guideline to determine the project's impact and subsequent offset requirements. The assessment must identify:<br>a) the number of NJKHT that are proposed to be cleared, their locations and demonstrate that if there is an SRI<br>b) all reasonable on-site avoidance and mitigation measures have been or will be undertaken to address the impacts<br>c) if an offset is still required for the impacts after this has been considered, information on offset requirements in accordance with the Queensland Environmental Offsets Policy (EPP/2015/1658) must be provided. | • Exempted development in koala habitat areas - land dedicated as a road under the Land Act 1994.<br>• State Development Areas (SDA) State Development Areas (SDA) are defined areas of land established by the Coordinator General under the State Development and Public Works Organisation Act 1971 to promote economic development in Queensland. The Coordinator-General is responsible for the planning, establishment and ongoing management of SDAs including:<br>○ controlling land-use, infrastructure, economic and environmental planning;<br>○ implementing a development scheme for each SDA; and<br>○ assessing and deciding all SDA applications and requirements that can be made under the development scheme.<br><br>As environmental impacts are considered for development within an SDA under the State Development and Public Works Organisation Act 1971, development within an SDA is exempted development.<br>The works area falls under the Bromelton State Development Area (SDA). Works within a SDA are exempted development. Therefore, no further actions are required by the State under the Nature Conservation (Koala) Conservation Plan 2017. |

| No. | Issue | Information Requested | Proponent Response |
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| | | | As part of SOILCO's environmental commitment it is proposed to establish a minimum 6ha voluntary vegetation offset as shown on sketch Voluntary Offset Area sketch. Species to be planted will consist of Koala feed and habitat trees as well as species significant to the Danggan Balun (Five Rivers) People.<br><br>Refer to supporting documentation:<br>• Item 14 - Ecological Assessment Report (Redleaf, Dec 2021),<br>• Item 15 - Significant Impact Assessment -EPBC Act (Envirosphere Aug 2024)<br>• Item 16 - Road Drawings<br>• Item 17 – Sketch Voluntary Offset Area (SOILCO) |
| **Composting Activities** | | | |
| **26** | **Impervious Barrier** | The ERA 53(a) model operating conditions (MOCs) (ESR/2015/1665) require composting activities to occur on an impervious barrier which is defined as a barrier with a thickness of at least 600 mm with an in-situ permeability (K) of less than 10–9 ms–1. Table 5.11 of the Planning Report only indicates that hardstand areas are to be constructed with a low-permeability base. Drawing number 30034146-000-114 in Appendix A indicates that the ASP and FOGO receival shed are proposed to be concrete. The 'open windrow GO', 'FOGO maturation' and 'final screening & manufacturing' areas are only proposed to be a gravel surface.<br><br>1) **The proponent is requested to** confirm that an impervious barrier with a thickness of at least 600 mm with an in-situ permeability (K) of less than 10–9 ms–1 is proposed for all composting activity areas. | Refer to supporting documents Item 4 – Site Layout (SMEC) that details areas where an impervious barrier will be installed, including all areas where composting activities will occur. Impervious barriers will consist of either concrete or compacted impervious material at least 600mm thick with an in-situ permeability (k) of less than 1 x $10^{-9}$m/s (confirmed by testing during construction). |

# Supporting Documentation

| Document Item Number | Document Name | RFI Issue |
|---|---|---|
| 1 | Pavement Impact Contribution Schedule (Dykman Consulting, 2025) | 1 |
| 2 | Site and Soil Report (Stav's Hydraulics, 2024) and LURT Assessment | 2 |
| 3 | Geotechnical Investigation Report (East Coast Geotechnical, 2025) | 2 |
| 4 | Site Layout (SMEC, 2025) | 2, 3, 15, 26 |
| 5 | Architectural Layout A-DA-01.02 and A-DA-03.02 (Elevation Architecture, 2025) | 3 |
| 6 | GHD RFI Response Letter | 3, 4, 23 |
| 7 | Environmental Management Plan (GHD, 2025) | 3, 4 |
| 8 | Adblue Safety Data Sheet | 3 |
| 9 | Seqwater Development Guidelines Code Response (GHD 2025) | 3 |
| 10 | Feedstock Summary | 4, 15 |
| 11 | Air Quality Impact Assessment (GHD, 2025) | 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 |
| 12 | Receptor Sensitivity Analysis | 8 |
| 13 | Acoustic Report (GHD, 2025) | 23 |
| 14 | Ecological Assessment Report (Redleaf, Dec 2021), and | 24, 25 |
| 15 | Significant Impact Assessment -EPBC Act (Envirosphere, Aug 2024) | 24, 25 |
| 16 | Road Drawings (Mitchell Road and Intersection with Beaudesert Boonah Road) (ACS Engineers, 2025) | 24, 25 |
| 17 | Voluntary Offset Area Sketch (SOILCO) | 24, 25 |
| 18 | GHD RFI Response Letter Issues 6 to 21. | 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 |

# 1. PAVEMENT IMPACT CONTRIBUTION SCHEDULE

# 2. SITE AND SOIL REPORT & LURT ASSESSMENT

# 3. GEOTECHNICAL INVESTIGATION REPORT

# 4. SMEC SITE LAYOUT

# 5. ARCHITECTURAL LAYOUT

# 6. GHD RFI RESPONSE LETTER

# 7. ENVIRONMENTAL MANAGEMENT PLAN

# 8. ADBLUE SAFETY DATA SHEET

# 9. SEQWATER DEVELOPMENT GUIDELINES CODE RESPONSE

# 10. FEEDSTOCK SUMMARY

# 11. AIR QUALITY IMPACT ASSESSMENT

# 12. RECEPTOR SENSITIVITY ANALYSIS

## RECEPTOR SENSITIVITY ANALYSIS RESULTS (GHD 2025)

| RECEPTOR ID | RECEPTOR SENSITIVE? Y/N | PREDICTED ODOUR CONCENTRATION (OU) | | | | | |
|---|---|---|---|---|---|---|---|
| | | CONSERVATIVE REFERENCE SITE EMISSION RATE | | | WOGAMIA EMISSION RATE | | |
| | | BASE CASE | 200% INCREASE IN ASP EMISSIONS | 300% INCREASE IN ASP EMISSIONS | BASE CASE | 200% INCREASE IN ASP EMISSIONS | 300% INCREASE IN ASP EMISSIONS |
| **R1** | N | 3.9 | 5.0 | 6.0 | 3.7 | 4.4 | 5.1 |
| **R2** | N | 2.4 | 2.9 | 3.4 | 2.2 | 2.6 | 2.9 |
| **R3** | N | 2.3 | 2.9 | 3.5 | 2.2 | 2.6 | 3.0 |
| **R4** | N | 1.3 | 1.6 | 1.9 | 1.2 | 1.5 | 1.7 |
| **R5** | Y | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 |
| **R6** | **Y** | **1.3** | **1.7** | **2.1** | **1.2** | **1.5** | **1.7** |
| **R7** | N | 0.7 | 0.8 | 1.0 | 0.7 | 0.7 | 0.9 |
| **R8** | N | 0.6 | 0.8 | 1.0 | 0.6 | 0.7 | 0.9 |
| **R9** | N | 1.0 | 1.2 | 1.4 | 0.9 | 1.1 | 1.3 |
| **R10** | Y | 1.2 | 1.5 | 1.9 | 1.0 | 1.3 | 1.6 |

# 13. ACOUSTIC REPORT

# 14. ECOLOGICAL ASSESSMENT REPORT

# 15. SIGNIFICANT IMPACT ASSESSMENT

# 16. ROAD DRAWINGS

# 17. VOLUNTARY OFFSET AREA SKETCH

# 18. GHD RFI RESPONSE LETTER (ISSUES 6 TO 21)

STAV'S HYDRAULIC SERVICES
ABN: 64 467 212 730
QBCC: 15061807
stephen@stavs.com.au
www.stavs.com.au
0402 303 599

# SITE & SOIL EVALUATION REPORT
# BROMELTON COMPOST MANUFACTURING FACILITY LOT 4 MITCHELL ROAD BROMELTON 4285

| | |
|---|---|
| Prepared for: | SOILCO C/o ACS Engineers |
| Prepared by: | Stav's Hydraulic Services |
| Purpose: | Site & Soil Evaluation Report |
| Issue No: | A |
| Date Issued: | 03-Oct-24 |
| Author: | Stephen Stavrinou |

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

# 1. Contents

2. Intro ..... 3
3. Executive summary ..... 3
4. Site Investigation ..... 4
5. Effluent Quality and Control Parameters ..... 4
6. Design Calculations ..... 5
7. Operation and Maintenance ..... 6
8. Appendix A - Land application area Vegetation ..... 7
9. Appendix B - Land application area plan ..... 8

# 2. Intro

Stav's Hydraulic Services have carried out a Site and Soil Evaluation for the On-Site waste water treatment and the effluent disposal for the proposed Bromelton Compost Manufacturing Facility at Lot 4 Mitchell Road Bromelton 4285.

The following report has been prepared in accordance with AS/NZS1547:2012, On-Site Domestic Waste Water Management and the Queensland Plumbing and Waste Water Code.

# 3. Executive summary

The recommendation and comments:

1. Use an Advanced Secondary all-waste sewage system such as the Envirocycle 10EP advanced Secondary Wastewater treatment system.

2. The peak daily design volume for the entire site is 4.4 Equivalent persons – 600l/day – loads from staff.

3. Soil is a densely structured category 5 – Clayey Sand, Low Plasticity, Fine Grained, yellow - Design Irrigation Rate (DIR) = 21 mm / week

4. Total land application to be comprised of a land application area of 220m2 via drippers.

5. Have warning signs, complying with AS1319 at the boundaries of the designated area in two places and clearly visible to property users with wording such as "Recycled Water – Avoid Contact – DO NOT DRINK"

6. On-site sewage systems are not designed to cope with the flow from garbage grinders, fats, oils or chemicals and household cleaning products are to be used in accordance with their labels.

7. The land application area is an important area and has to be maintained e.g. regularly mowed, do not drive vehicles over the area or allow livestock to access the land application area Follow the maintenance requirements specified by the manufacturer and authorised service agent.

## 4. Site Investigation

| Site Investigation | |
|---|---|
| Date of Investigation | 8.7.2024 |
| Address | Lot 4 Mitchell Road Bromelton 4285 |
| Area of Site | 1,192,790m2 |
| Property Description | Lot 4 on RP85497 |
| Local Council | Scenic Rim Regional Council |
| Weather | Fine |
| Ground Cover | Grass |
| Well/Bores | 0 |
| Waterways | Existing Dams and waterways |
| Water Table | Nill |
| Embankments | Nill |
| Buildings | Nill |
| Site Exposure | Full Sunlight |
| Boundaries | Sufficient |
| Landscape Description | Waxing Divergent |
| Diversion / Retention Mound | Nill |
| Ground Water Cut off drains | Nill |
| Intended Water Supply | Rain Water |

| Soil Characteristics | |
|---|---|
| Depth | 0-600mm |
| Texture - structure - Colour | Silty Sand Loam in the top layers that increase in sand content with depth |
| Soil Category | 5 |
| Indicative permeability (Ksat) m/day | 0.71 |
| Design Loading Rate (DLR) mm/week | 21 |

## 5. Effluent Quality and Control **Parameters**

| Effluent Quality Parameters | | | |
|---|---|---|---|
| Parameter | Primary | Secondary | Advanced Secondary |
| $Bod_5$ | 120-240 | 20 | 10 |
| Total Suspended Solids (mg/L) | 65-180 | 30 | 10 |
| Thermotolerant Coliforms (org/100mL) | N/A | 200 | 10 |

# 6. Design Calculations

| Design Loadings | | | | | |
|---|---|---|---|---|---|
| No. of Staff | 22 | | | | |
| Desing Flow L/day | 30 | | Tank Water Supply | | |
| Daily flow / Weekly Flow | 660 | / | 4620 | | |
| Design Loading Rate (DLR) mm/week | 21 | | | | |
| Land Application Area (m²) | 220 | m² | Adopt | 220 | m² |

| Bod5 Applied | | |
|---|---|---|
| $Bod_5$ Applied 10mg / litre/ day | 2.409 | kg/year |
| Soil Absorption Only | 0.05kg / m² / year | |
| Minimum land Application Area | 48.18 | m² |

The proposed wastewater system utilises an Advanced Secondary all-waste sewage treatment plant – Envirocycle 10EP advanced Secondary Wastewater treatment system.

The Proposed system will discharge to drippers as per below calculations.

| Compensating Dripper Calculations | | | |
|---|---|---|---|
| Compensation Dripper | 220 | 30 | m lateral length |
| No. of Laterals and Spacing's | 7 | 1 | m centres |
| Dripper Hole spacing | 0.5 | m dripper hole spacing | |
| Compensating dripper flow rate | | 2.5 | l/hour dripper rate |
| Effluent Flow Rate | | 440 | l/hour |

AS1547 states that:

a. The effluent is required to be evenly distributed within the designated area.

b. Have warning, complying with AS1319 at the boundaries of the designated area in two places and clearly visible to property users with wording such as "Recycled Water – Avoid Contact – DO NOT DRINK"

c. Ensure that the effluent does not come into contact with people, domestic animals, fruit or vegetables for human consumption

# 7. Operation and Maintenance

Maintenance requirements specified by the manufacturer and authorized service agent are to be implemented. These include:

- Use low sodium biodegradable soaps and detergents
- No paints, solvents, chemicals, food scraps, fats, oils or any other solids are not to be disposed of ”down the drain”
- On-site sewage systems are not designed to cope with the flow from garbage grinders
- The land application area is an important area and has to be maintained e.g. regularly mowed or pruned also ensuring that there is no ponding of effluent in the disposal area
- Vehicles, livestock or general access is to be generally restricted with warning signs erected

# 8. Appendix A - Land application area Vegetation

| Vegetation for Land Application Area | | |
|---|---|---|
| Recommended Species: Callistemon, Melaleuca, Lomandra and Casuarina | | |
| Vegetation Form | Botanical Name | Common Name |
| Ground cover / grasses / clumping | Belechnum SPP | Water ferns |
| | Lomandra Longiflora | Matt rush |
| | Theme Triandra | Kangaroo grass |
| | Viola Hederacea | Native violet |
| | Dianella Caurulea | Paroo lily |
| | Gahnia SPP | Sword grass |
| Vines | Cissus Antarctica | Kangaroo vine |
| | Cissus Hypoglauca | Water vine |
| | Hibberta Scandens | Guinea flower |
| Shrubs | Callistemon Pachyphylius | Swamp callistemon |
| | Callistemon Salignus | Pink tips |
| | Leptospernum Speciosum | Coastal tea tree |
| | Leptospernum Flavescens | Weeping tea tree |
| | Melastoma Affine | Native lasiandra |
| Small Trees | Melicope Elleryana | Corkwood |
| | Melaleuca Thymafolia | Pink or white lace |
| | Melaleuca Sheberi | Paperbark |
| | Melaleuca Nodosa | Paperbark |
| | Melaleuca Dealbata | White bolly gum |
| | Archontophoenix Cunninghamiana | Picabeen or Bangalow plam |
| | Eucalyptus Congiomerata | Swamp stringy bark |
| | Eucalyptus Intermedia | Pink bloodwood |
| | Glochidion Sumatranum | Umbrella cheese tree |
| | Hymenosporum Flavum | Native frangipani |
| | Livistonia Australis | Cabbage palm |
| | Lophostermon Suaveolens | Swamp turpentine |
| | Melaleuca Quinquenervia | Broadleaf paperbark |
| | Syzygium SPP | Lillypillies |

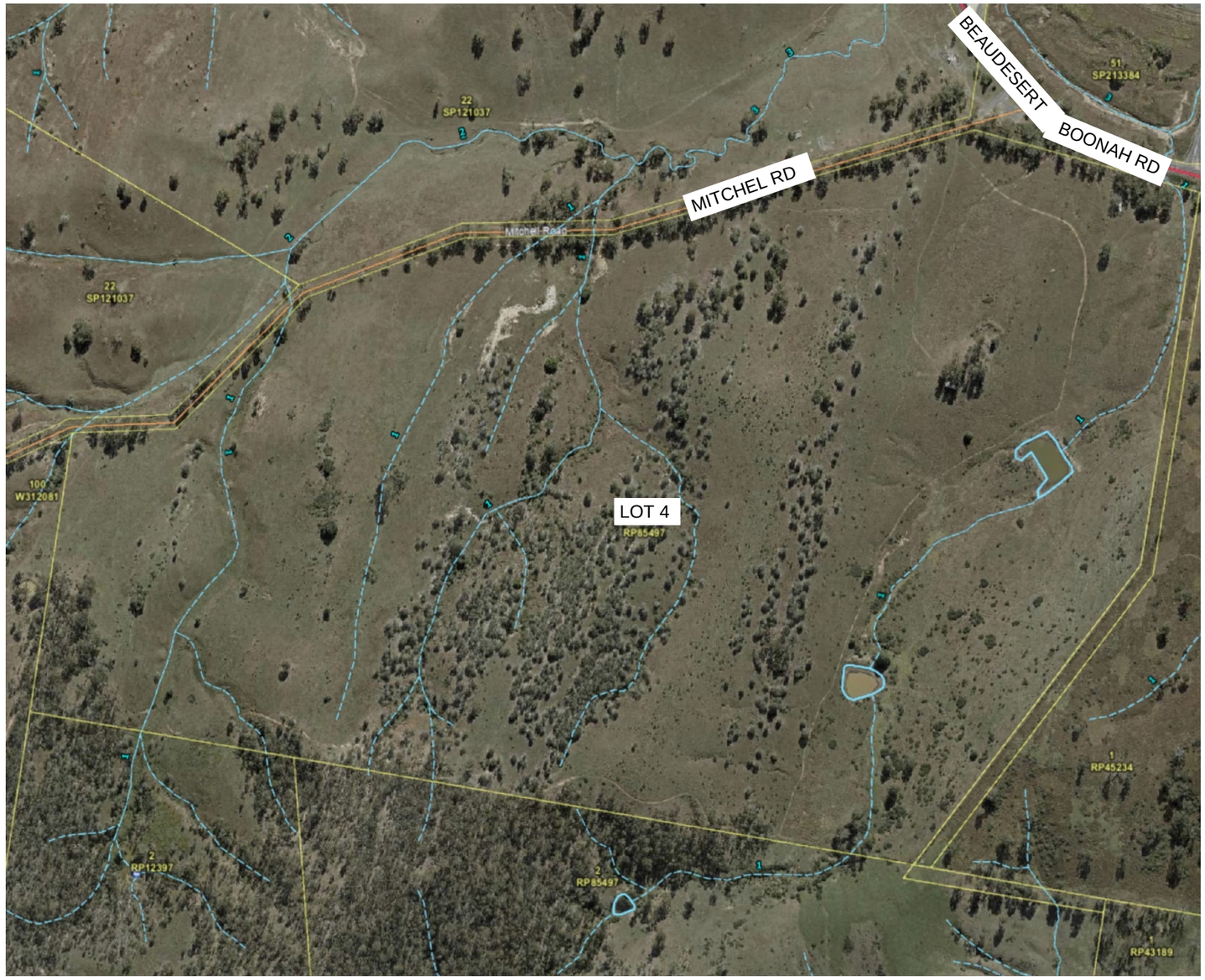
# 9. Appendix B - Land application area plan

# EFFLUENT DISPOSAL

LOT 4 ON RP85497
MITCHELL ROAD
BROMELTON QLD 4285

## DRAWING LIST

H101 - COVER SHEET & LOCATION PLAN
H102 - LEGEND, NOTES & DETAILS
H103 - SITE PLAN
H104 - PART SITE PLAN EFFLUENT DISPOSAL LAYOUT




LOCATION PLAN

NOT TO SCALE

2m 0 2m 4m 6m 8m 10m

PLANS AND DOCUMENTS referred to in the SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

| ISSUE | AMENDMENT | DATE |
|---|---|---|
| P1 | PRELIMINARY ISSUE | 18.07.2024 |
| A | APPROVAL ISSUE | 03.10.2024 |
| | | |
| | | |
| | | |

DESIGNER: STEPHEN STAVRINOU QBCC 15061807

CLIENT:

SOILCO
C/o ACS ENGINEEERS

CONSULTANT:

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PROJECT:

SITE & SOIL EVALUATION REPORT
LOT 4 ON RP85497
MITCHELL ROAD
BROMELTON 4285

TITLE:

HYDRAULIC SERVICES
COVER SHEET & LOCATION PLAN

| PROJECT No. | ACS31 | DRAWING No. | ISSUE No. |
|---|---|---|---|
| SCALE / SIZE: | N.T.S @ A3 | H101 | A |

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

GENERAL

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF AS3500, THE BUILDING CODE OF AUSTRALIA, RELEVANT AUSTRALIAN STANDARDS AND THE LOCAL AUTHORITY REQUIREMENTS.

2. THESE PLANS SHALL BE READ IN CONJUNCTION WITH THE APPROVED ARCHITECTURAL AND RELEVANT SERVICES PLANS AND SPECIFICATIONS

3. LOCATION OF EXISTING SERVICES HAS BEEN DETERMINED FROM SITE VISITS AND EXISTING RECORD PLANS. NO PROVING OF SERVICES HAS BEEN UNDERTAKEN. THE CONTRACTOR SHALL PROVE ALL SERVICES PRIOR TO COMMENCING CONSTRUCTION AND ADVISE THE SUPERINTENDENT OF ANY DISCREPANCIES BEFORE PROCEEDING. THIS CONTRACTOR MUST CO-ORDINATE WITH ALL OTHER SERVICES. PIPEWORK SHOWN ON THIS DRAWING IS DIAGRAMMATIC ONLY. FINAL LOCATION OF SERVICES SHALL BE DETERMINED ON SITE.

4. ARRANGE & APPLY TO THE LOCAL AUTHORITY FOR ALL NECESSARY PERMITS. PAY ALL PLUMBING INSPECTION FEES AND CHARGES, OBTAIN COMPLETION CERTIFICATE AND SUBMIT TO SUPERVISOR.

5. THE ENTIRE HYDRAULIC SERVICES INSTALLATION AND EQUIPMENT SHALL BE MAINTAINED UNDER WARRANTY FOR A PERIOD OF TWELVE (12) MONTHS AFTER PRACTICAL COMPLETION HAS BEEN ACHIEVED.

6. PROVIDE INSTRUCTIONS MANUALS AT PRACTICAL COMPLETION. CONTAINING THE FOLLOWING:

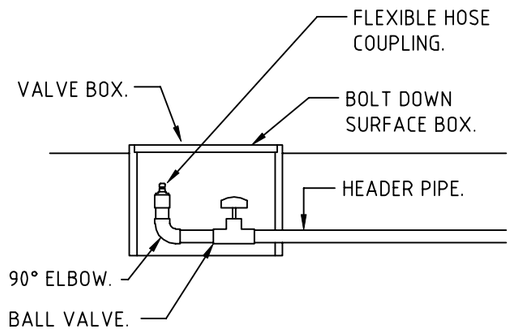
- GENERAL DESCRIPTION OF PROJECT

- LISTING OF EQUIPMENT, MANUFACTURERS NAMES, AGENTS ETC.

- OPERATING AND MAINTENANCE INSTRUCTIONS AND WARRANTY INFORMATION FOR EACH ITEM OF EQUIPMENT.

- "AS CONSTRUCTED" DRAWINGS.

- COUNCIL INSPECTION REPORTS AND FINAL COMPLETION CERTIFICATES FROM RELEVANT AUTHORITIES.




## FLUSHING VALVE DETAIL

SCALE: NTS

WATER

1. ALL EXPOSED HW & CW PIPEWORK SHALL BE COPPER TUBE TYPE "B" TO AS1432. CONNECT COPPER PIPE WITH BRAZED JOINTS IN AS1645 OR COMPRESSION JOINTS AS1585. USE PRE-INSULATED PIPEWORK FOR HOT WATER SERVICES OR INSULATE WITH 'ARMAFLEX' INSULATION OR SIMILAR. DENSO WRAP ALL CW PIPEWORK IN-GROUND. PROVIDE INSULATION TO ALL HOT WATER PIPEWORK. PROVIDE ALL NECESSARY ALLOWANCES FOR THERMAL MOVEMENT OF PIPES.

2. WATER SUPPLY PIPEWORK CONCEALED IN WALLS AND EXTERNAL TO BUILDING IN-GROUND MAY BE POLYETHYLENE PIPE OF MIN. CLASS 12, AND SHALL COMPLY WITH AS 1159. INSTALLATION OF POLYETHYLENE PIPES SHALL BE IN ACCORDANCE WITH AS 2033 AND THE MANUFACTURERS SPECIFICATIONS.

3. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT WATER HAMMER AND RECTIFY SHOULD IT OCCUR.

4. EXTERNAL AND INTERNAL HOSE COCKS SHALL BE FITTED WITH HOSE TYPE VACUUM BREAKERS.

5. PROVIDE HW & CW STOPCOCKS TO ALL HW & CW FIXTURES.

6. ALL PIPEWORK TO BE IDENTIFIED IN ACCORDANCE WITH AS1345.

7. ALL PIPE DIAMETERS NOMINATED ARE NOMINAL BORE DIAMETERS UNLESS NOTED OTHERWISE.

ON SITE DISPOSAL NOTES

1. IRRIGATION SYSTEM TO COMPLY WITH AS1547, QLD PLUMBING WASTE WATER CODE, ASSOCIATED DOCUMENTATION AND MANUFACTURERS SPECIFICATIONS.

2. MINIMUM COVER OVER RISING MAIN 450mm. RISING MAINS TO BE 32ϕ PIPES TO AS/NZS 1477. PIPE TO BE LILAC COLORED AND/OR INSTALLED WITH TAPE IDENTIFYING THE PIPES CONTENTS AS SEWAGE EFFLUENT.

3. IRRIGATION SYSTEMS DISTRIBUTE EFFLUENT INTO THE TOPSOIL LAYERS TO PROVIDE IN-SOIL TREATMENT OF THE REMAINING EFFLUENT RESIDUALS AS WELL AS PROVIDE NUTRIENT UPTAKE AND EVAPOTRANSPIRATION BY GRASS, SHRUBS OR PLANTINGS. THE CHOSEN GRASS, SHRUBS OR PLANTINGS SHALL BE PLANTED/SEEDED PRIOR TO THE COMMISSIONING OF THE SYSTEM TO ALLOW FOR PROPER EFFLUENT DISPOSAL.

DRAINAGE

1. SANITARY DRAINAGE & VENT PIPEWORK IN UPVC IN ACCORDANCE WITH AS1260 AND THE MANUFACTURERS SPECIFICATIONS.

2. ALL PIPEWORK TO BE IDENTIFIED IN ACCORDANCE WITH AS1345.

3. ALL PIPE DIAMETERS NOMINATED ARE NOMINAL BORE DIAMETERS UNLESS NOTED OTHERWISE.

## LEGEND

| | |
|---|---|
| ——R——R—— | PUMPED EFFLUENT |
| ——————— | SANITARY DRAINAGE PIPEWORK |
| – – – – – – | VENT PIPEWORK |
| — — — — | STORMWATER PIPEWORK |
| —·—·—·— | COLD WATER PIPEWORK |
| —··—··—··— | HOT WATER PIPEWORK |
| ⋈ | VALVE |

| | |
|---|---|
| AFFL | ABOVE FINISHED FLOOR LEVEL |
| AHD | AUSTRALIAN HEIGHT DATUM |
| B | BASIN |
| CD | CONDENSATE DRAIN |
| COS | CLEAR OUT TO SURFACE |
| Cu | COPPER PIPE |
| CW | COLD WATER |
| CV | CONTROL VALVE |
| DP | DOWN PIPE |
| DW | DISHWASHER |
| e | EXISTING TO REMAIN |
| FFL | FINISHED FLOOR LEVEL |
| FW | FLOOR WASTE GULLY (c/w REMOVABLE CHROME GRATE) |
| H/L | HIGH LEVEL |
| HC | HOSE COCK c/w KEY OPERATED HAND |
| HW | HOT WATER |
| HWH | HOT WATER HEATER |
| IC | INSPECTION CHAMBER |
| IO | INSPECTION OPENING |
| L/L | LOW LEVEL |
| ORG | OVERFLOW RELIEF GULLY |
| SHR | SHOWER |
| SK | SINK |
| WC | WATER CLOSET |
| VB | VACUUM BREAKER |

2m 0 2m 4m 6m 8m 10m

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DESIGNER: STEPHEN STAVRINOU QBCC 15061807

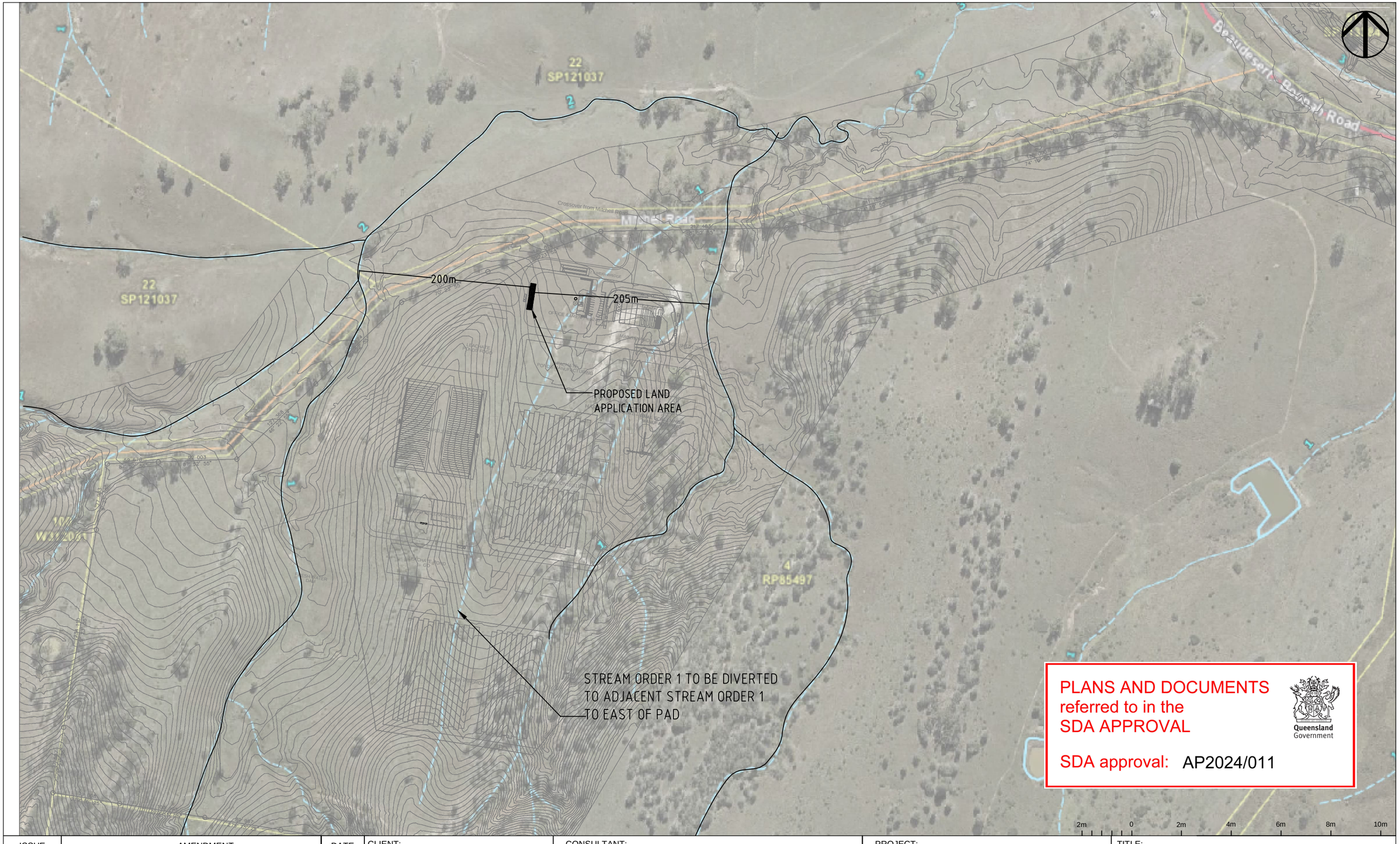
CLIENT:
SOILCO
C/o ACS ENGINEEERS

CONSULTANT:
SHS
STAV'S HYDRAULIC SERVICES
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PO Box 529,
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PROJECT:
SITE & SOIL EVALUATION REPORT
LOT 4 ON RP85497
MITCHELL ROAD
BROMELTON 4285

TITLE:
HYDRAULIC SERVICES
LEGEND, NOTES & DETAILS

| PROJECT No. | ACS31 | DRAWING No. | ISSUE No. |
|---|---|---|---|
| SCALE / SIZE: | NTS @ A3 | H102 | A |




PLANS AND DOCUMENTS
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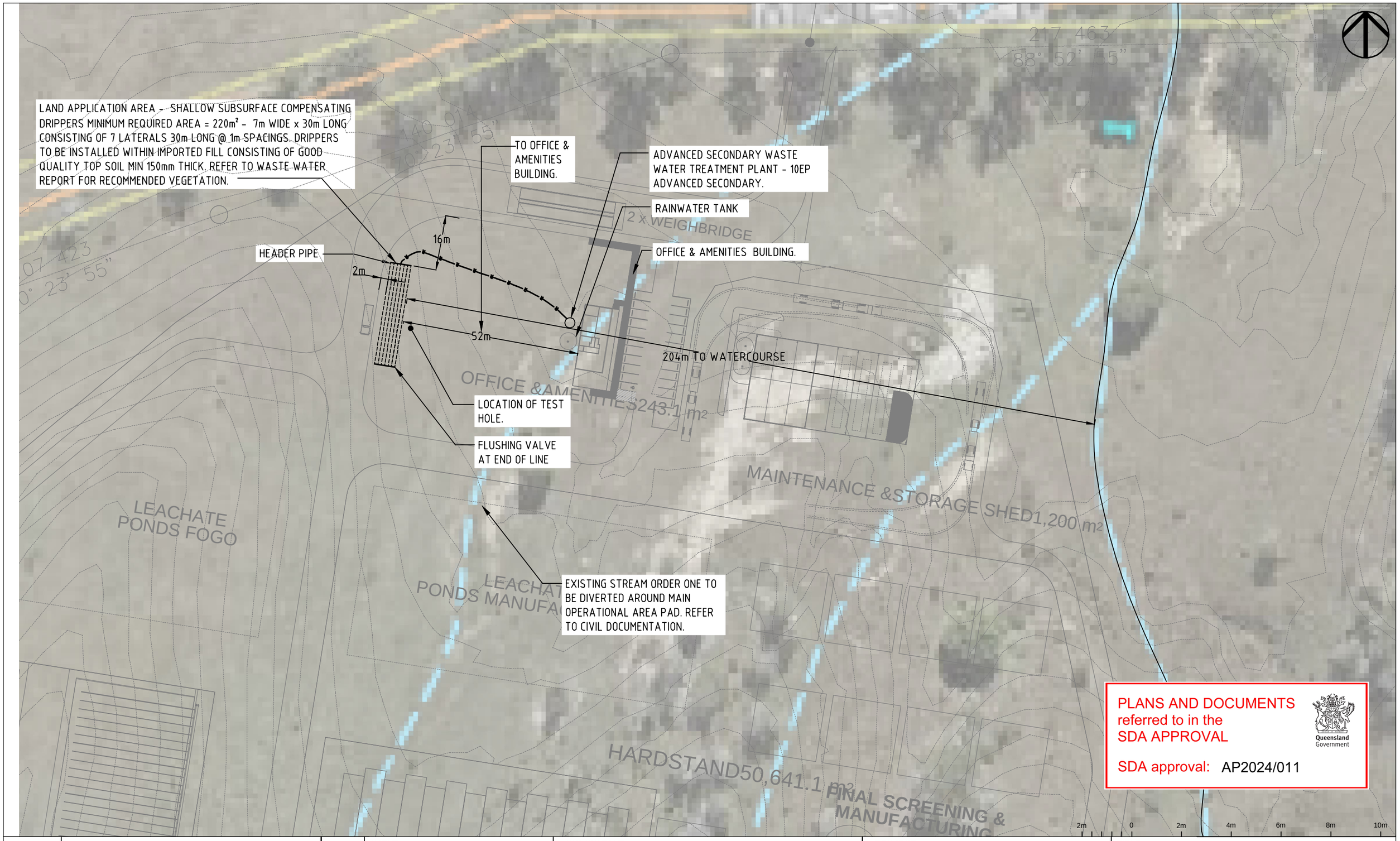
PROJECT:

SITE & SOIL EVALUATION REPORT
LOT 4 ON RP85497
MITCHELL ROAD
BROMELTON 4285

TITLE:

HYDRAULIC SERVICES
SITE PLAN

| PROJECT No. | ACS31 | DRAWING No. | ISSUE No. |
|---|---|---|---|
| SCALE / SIZE: | 1:4000 @ A3 | H103 | A |




PLANS AND DOCUMENTS referred to in the SDA APPROVAL

Queensland Government

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| | | |
| | | |
| | | |

DESIGNER: STEPHEN STAVRINOU QBCC 15061807

CLIENT:

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C/o ACS ENGINEEERS

CONSULTANT:

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PROJECT:

SITE & SOIL EVALUATION REPORT
LOT 4 ON RP85497
MITCHELL ROAD
BROMELTON 4285

TITLE:

HYDRAULIC SERVICES
PART SITE PLAN
EFFLUENT DISPOSAL LAYOUT

| PROJECT No. | ACS31 | DRAWING No. | ISSUE No. |
|---|---|---|---|
| SCALE / SIZE: | 1:1000 @ A3 | H104 | A |

# Rating Details

## Property Owner Details

| | | | | |
|---|---|---|---|---|
| **Property Owner:** | "SOILCO c/o ACS Engineers (Aust) Pty Ltd" | | | |
| **Postal Address:** | "PO Box 554" | "Beaudesert" | "QLD" | "4285" |
| **Phone Number:** | "0755413500" | **Mobile Number:** | "0417782907" | |
| **Email:** | "susan@acsengineers.com.au" | | | |

## Property Details

| | | | | |
|---|---|---|---|---|
| **Street Address:** | "Mitchell Road" | "Bromelton" | "QLD" | "4285" |
| **Latitude:** | "" | **Longitude:** | "" | |
| **Lot Number:** | "" | **Plan Number:** | "" | |
| **Area (m2):** | "1192790" | **Local Government:** | "Scenic Rim Regional Council" | |

# Rating Risk Rating Questionnaire

| | | |
|---|---|---|
| Unimitigated Score 4 | No further mitigation required | Mitigated Score 0 |
| | **VERY LOW** | |

## Calculating Unmitigated Risk

| | | |
|---|---|---|
| 1 | Does the disposal area and wastewater treatment system maintain the following separation distances (AND):<br>• At least 100m to the nearest watercourse (permanent and non-permanent)?<br>• At least 400m from the full supply level of a potable water supply?<br><br>Please note: Potable water supply includes any dam, bore, reservoir or conduit used for direct extraction of water for drinking water purposes. | Yes |
| 2 | Is the disposal area or the wastewater treatment system (OR):<br>• Less than 50m to the nearest watercourse (permanent and non-permanent)?<br>• Less than 200m from the nearest full supply level of a potable water supply?<br><br>Please note: Potable water supply includes any dam, bore, reservoir or conduit used for direct extraction of water for drinking water purposes. | N/A |
| 3 | Is the disposal area of wastewater treatment system located inside of a defined flood event (Council or State mapping), at a minimum being 1% Annual Exceedance Probability (AEP)? | No |
| 4 | What is the maximum slope of the disposal area or wastewater treatment system location? | <5% |
| 5 | How many bedrooms are serviced by the proposed wastewater treatment system? | 3 or more bedrooms |
| 6 | Is the indicative permeability range higher than 1m/day? | No |
| 7 | Is the separation distance to the water table/bedrock as specific for the type of system and at a minimum 1m below the disposal depth? | Yes |
| 8 | Is the dwelling a permanent or holiday residence? | Permanent Residence |
| 9 | Is the indicative drainage class either poorly drained (Soil Category 5) or very poorly drained (Soil Category 6), as defined in Australian Standard AS1547? | Yes |
| 10 | Does the proposal involve composting? | No composting |
| 11 | Please select an irrigation method. | Subsurface |
| 12 | Please select the proposed treatment method. | Aerated |
| 13 | Does the system propose the diversion or re-use of greywater? | No |
| | **Mitigation Reduction:** | **6** |

# Model Conditions

## Here are your draft conditions!

| | |
|---|---|
| 1 | The poor drainage of the soil necessitates an appropriate depth of topsoil over the proposed effluent disposal area. Either soil remediation (gypsum / scarification) or clean imported topsoil must be provided to a depth of 150mm – 250mm over the disposal area and scarified into soils over the entire disposal area to ensure adequate drainage and reduction of nutrients. |
| 2 | The wastewater treatment system must be an advanced secondary wastewater treatment system with Chief Executive approval from the Department of Energy and Public Works and incorporate chlorination. The wastewater treatment system and disposal area must be designed operated and maintained in accordance with manufacturers specifications and the submitted Wastewater Design Report. |
| 3 | The disposal area must be planted with kikuyu grass or other native vegetation which provides a high uptake of nitrogen and phosphorus and prevents erosion. |
| 4 | The disposal area must incorporate appropriate diversion drainage above the disposal area (to prevent stormwater inundation) and bunds below the disposal area to reduce the risk of waterway contamination. |
| 5 | To minimise the risk of failure or inefficiency, the wastewater treatment system and disposal area must be inspected and serviced by an appropriately qualified professional in accordance with the manufacturer’s recommendations and at least annually. |
| 6 | Ensure that larger deep-rooting plants and trees which may block sunlight are not planted near the disposal area to reduce the chance of root intrusion and clogging and maximise sun exposure. |
| 7 | A 100% reserve area is reserved and maintained on-site to allow for an alternative disposal location in case of land application area failure, malfunction or loss of soil uptake capacity. The reserve area must be kept clear of buildings, structures, vehicular movement paths or other activities which may otherwise affect its use for effluent disposal in the future. |
| 8 | No vehicular, machinery or domestic animal traffic movement is to occur over the disposal area, to maintain the integrity and function of sub-surface pipelines. Barriers such as fencing or shrubs are to be used when necessary. |
| 9 | The design must incorporate a warning system to notify of pump failure and/or high water level comprising of a highly visible strobe warning light at the tank and an internal alarm mounted in the house comprising of an audible and visual. A licenced plumber/service provider must be contacted as soon as practical after an alarm activates to rectify the issue. |
| 10 | The treatment system must incorporate contingency components including a backup pump stored appropriately on the site. |

# EAST COAST GEOTECHNICAL PTY LTD

**CONSULTING ENGINEERS**

ABN 66-382-660-160

## REPORT ON GEOTECHNICAL INVESTIGATION

**260 Mitchell Road**
**Bromelton QLD 4285**

**Bromelton Pty Ltd**
**C/o McPhee Distribution Services**

**Ref No G21/109**
**Issue1**
**27th July 2021**

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

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| Report prepared for | Bromelton Pty Ltd C/o McPhee Distribution Services | |

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## *1.0 INTRODUCTION*

The following geotechnical investigation was prepared by East Coast Geotechnical Pty Ltd for the proposed design of a future development at 260 Mitchell Rd, Bromelton.

This report was undertaken at the request of Bromelton Pty Ltd C/o McPhee Distribution Services

The scope of our services was outlined in our Quotation Ref JL1296 dated 15/06/2021 which would address the following in a geotechnical report.

- Safe bearing pressure and skin friction of strata encountered in accordance with AS2870 and AS1726.
- Classification of soils according to AS2870.
- Excavatability.
- Trafficability.

## *2.0 COMMISSION*

Conduct preliminary geotechnical testing aimed at providing parameters for the design of a future development.

## *3.0 SITE CLASSIFICATION*

After considering the results of our limited site investigation (recorded elsewhere in the report) at the time of our testing we have classified this site as:

Class " P " due to trees.

In accordance with Section 2 of AS 2870.

The design engineer must consider the effects of any proposed earthworks, tree growth or removal on the site classification.

## *4.0 SITE DESCRIPTION*

The construction area is on the south side of the street.
The construction area is gently sloping to steeply sloping.
Vegetation on the construction area (and nearby surrounds) is mainly grasses, trees and scrub.
Site drainage is poor to fair.

## *5.0 SITE PHOTOGRAPHS*







Job #40777
Lot 4 #260 Mitchell Rd Bromelton
7th July 2021
The Soiltesters
East Coast Geotechnical Pty Ltd


Job #40777
Lot 4 #260 Mitchell Rd Bromelton
7th July 2021
The Soiltesters
East Coast Geotechnical Pty Ltd

## *6.0 UNDERGROUND SERVICES*

At the time of writing this report we had not been informed of any underground services on or adjacent to this allotment which may affect the proposed structure.

## *7.0 TESTING PROGRAM*

22 test sites were established with a nominal 100 mm diameter power auger. The locations are shown on accompanying sketch and excavated to the depths indicated on the log section. Numerous samples were collected and hand classified.

## *8.0 FIELD & LABORATORY TESTING*

The following testing was conducted in the geotechnical investigation:

- Pocket penetrometer tests in accordance with AS1289
- Dynamic Cone penetrometer tests in accordance with AS1289
- Shrink—swell index testing of soil to determine predicted surface movements ($Y_s + Y_{t\,max}$ value) in accordance with AS1289
- Atterberg Limits in accordance with AS1289

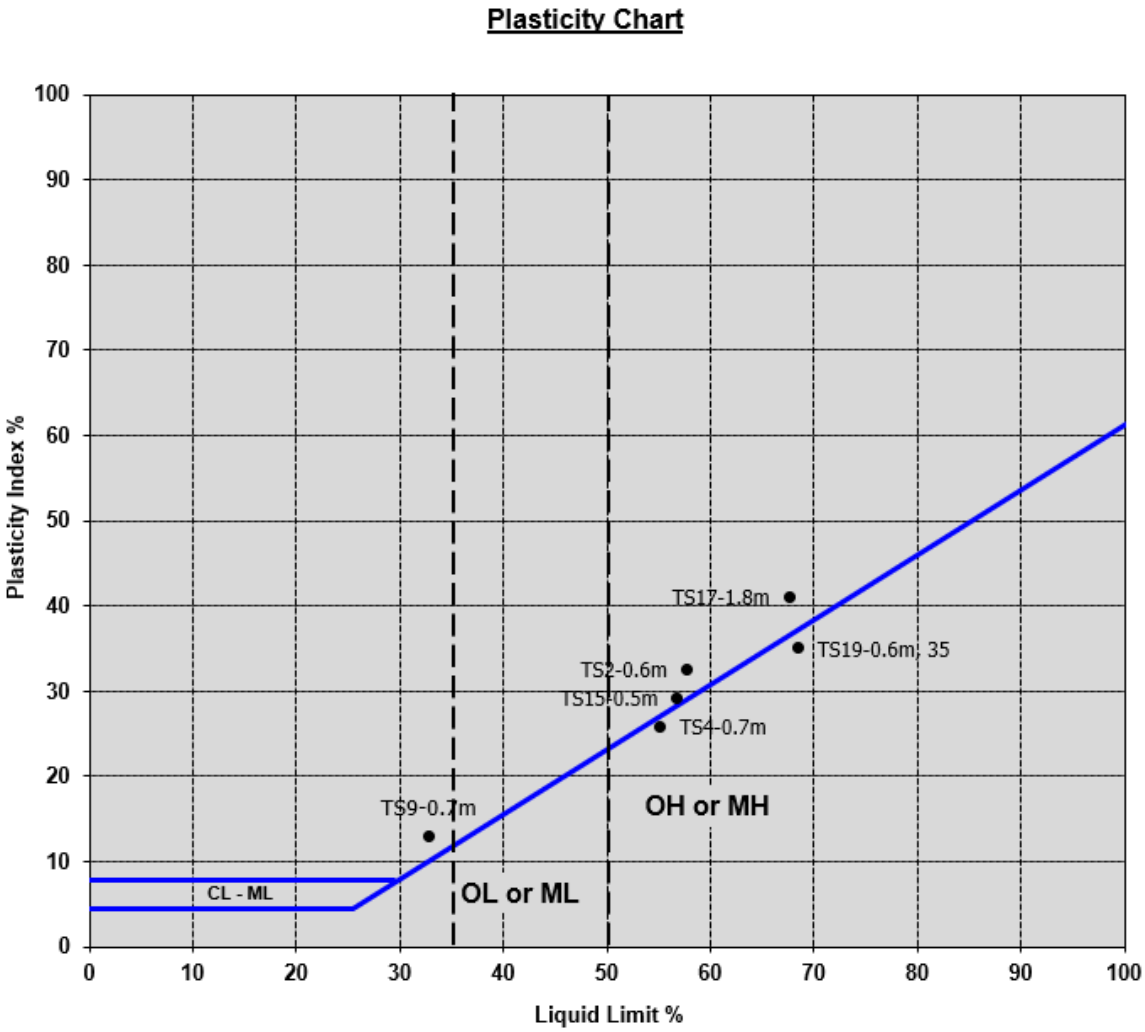
From the sample(s) collected the following laboratory testing was carried out:

| Test Site | Depth (mm) | LS (%) | $I_{ss}$ %/pF | Moisture Content % | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) |
|---|---|---|---|---|---|---|---|
| 1 | 600 – 800 | - | 2.2 | 21.1 | - | - | - |
| 2 | 500 – 700 | 17.7 | - | 26.7 | 57.7 | 25.2 | 32.5 |
| 4 | 600 – 800 | 15.1 | - | 15.2 | 55.2 | 29.4 | 25.8 |
| 7 | 500 – 700 | - | 5.1 | 22.0 | - | - | - |
| 9 | 600 – 800 | 12.7 | - | 22.8 | 32.8 | 19.9 | 12.9 |
| 15 | 400 - 600 | 15.8 | - | 23.7 | 56.8 | 27.6 | 29.2 |
| 17 | 500 – 700 | - | 2.7 | 18.9 | - | - | - |
| 17 | 1800 - 1900 | 17.7 | - | 22.5 | 67.6 | 26.6 | 41.0 |
| 19 | 500 – 700 | 18.9 | - | 27.4 | 68.5 | 33.5 | 35.0 |
| 20 | 500 – 700 | - | 6.5 | 34.2 | - | - | - |

LS – Linear Shrinkage
$I_{ss}$ – Shrink Swell Index

The resistance of the soils encountered was tested with an approved pocket penetrometer (PP) and the results recorded at the appropriate levels on the attached log section.

The materials encountered consists of low to high plasticity clays and silts.




## *9.0 FINDINGS*

### *9.1 GROUND WATER*

The soil profiles encountered are shown on the attached log section. The water table was not encountered during our testing program.

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.

### *9.2 SOIL REACTIVITY*

The samples were assessed as having high to extreme plasticity.

Using the method outlined in AS2870, we have calculated the characteristic surface movement ($Y_s$) and the maximum potential surface moment due to the tree induced suction change in addition to the normal design suction change ($Y_{t\,max}$) for the appropriate soil profiles.

| Test Site No | Predicted Surface Movement – $Y_s$+ $Y_{t\,max}$ (mm) | |
|---|---|---|
| 1 | $Y_s$ | 30 – 40 mm |
| | $Y_{t\,max}$ | 20 – 30 mm |
| 7 | $Y_s$ | 80 – 90 mm |
| | $Y_{t\,max}$ | 50 – 60 mm |
| 17 | $Y_s$ | 40 – 50 mm |
| | $Y_{t\,max}$ | 30 – 40 mm |
| 20 | $Y_s$ | 100 – 110 mm |
| | $Y_{t\,max}$ | 70 – 80 mm |

The predicted surface movement ($Y_s$ + $Y_{t\,max}$) value has been calculated on the site as tested. The influence of any proposed earthworks has not been considered when calculating this $Y_s$ + $Y_{t\,max}$, therefore the site classification and predicted surface movement may vary when proposed earthworks (if any) are considered.

### *9.3 ROCK DEPTHS*

Rock was encountered at the following depths below our test surface level:

| Test Site No | Extremely Weathered Rock Depth (mm) | Unexcavatable Rock Depth (mm) |
|---|---|---|
| 3 | 2800 | 3300 |
| 4 | 800 | 900 |
| 5 | 1000 | 1200 |
| 6 | 1400 | 1500 |
| 8 | 2000 | 2200 |
| 10 | 1500 | 1700 |
| 11 | 900 | 1300 |
| 12 | 800 | 900 |
| 13 | 900 | 1000 |
| 14 | 5500 | 5600 |
| 15 | 5400 | 5500 |
| 16 | 1300 | 1400 |
| 18 | 1000 | 1400 |
| 19 | 3500 | 3700 |
| 22 | 5500 | 5700 |

### *9.4 REFUSAL DEPTHS*

Our onsite testing refused at the following depths:

| Test Site No | Depth (mm) |
|---|---|
| 3 | 3300 |
| 4 | 900 |
| 5 | 1200 |
| 6 | 1500 |
| 8 | 2200 |
| 10 | 1700 |
| 11 | 1300 |
| 12 | 900 |
| 13 | 1000 |
| 14 | 5600 |
| 15 | 5500 |
| 16 | 1400 |
| 18 | 1400 |
| 19 | 3700 |
| 22 | 5700 |

### *9.5 ALLOWABLE DESIGN PARAMETERS*

| Soil Type | Allowable Bearing Capacity (kPa) | | | Allowable Skin Friction (kPa) |
|---|---|---|---|---|
| | Square or Circular Footings | | Strip Footings | |
| | d/b < 4 | d/b > 4 | | |
| 1) Natural Silty/Sandy Clay - Firm | NR | NR | NR | 10 |
| 2) Natural Silty/Sandy Clay – Stiff to Very Stiff | 200 | 300 | 100 | 20 |
| 3) Natural Silty/Sandy Clay – Very Stiff to Hard | 400 | 600 | 200 | 30 |
| 4) Natural Extremely Weathered Rock - VLS | 600 | 800 | 300 | 40 |
| 5) Natural Clayey Sand – Dense (min 1000 below E.G.L) | 400 | 600 | 100 | 30 |

Notes: Where weaker strata is within 1 metre beneath the proposed founding depth, the design parameters for the weaker strata must be adopted.

- Ignore top 1.5 metres of soil profile for skin friction calculations
- Values are unsaturated conditions
- d = Depth of footing

- b = Breadth of footing
- E.G.L = Existing Ground Level
- Factor of safety for Skin Friction = 2 has been applied
- Factor of safety for Bearing Capacity = 3 has been applied
- NA – Not Applicable
- NR – Not Recommended

### *9.6 EXCAVATABILITY*

In reference to the Geological Survey of Queensland Map Ipswich 1:100 000 Series, materials in the area consist of Heiffer Creek Sandstone (consisting of sublabile to quartzose sandstone, siltstone & shale); Walloon Coal Measures (consisting of shale, siltstone, sandstone and coal seams) and Koukandowie Formation (consisting of lithofeldspathic labile and sublabile to quartzose sandstone, siltstone, shale, minor coal and ferruginous oolite material).




Excavatability of these materials may depend on layer orientation and medium to large excavators with rock breaking equipment may be required.

### *9.7 SUITABILITY OF MATERIAL FOR FILL AND COMPACTION CRITERIA*

The soil material encountered during our testing may be used as structural fill provided that it is free of organic material and silt, and approximates the optimum moisture content for compaction as per AS 3798 (-1% to +2% of Optimum Moisture Content – OMC). All earthworks to be undertaken in accordance with Level 1 Inspection and Testing as defined in AS3798.

Special compaction consideration must be given to the rock encountered on site as it may not break down upon compaction which may leave voids.

**Table 16. Minimum relative compaction values as per AS 3798**

| Location | Minimum Dry Density Ratio (%) |
|---|---|
| Building area | 98 |

Note: The minimum relative compaction may need to be increased to limit deformations associated with the proposed filling (subject to a detailed analysis by an experienced engineer)

Further details on earthworks including suitability of material for fill and compaction requirements are highlighted in AS 3798.

### *9.8 TRAFFICABILITY*

To ensure suitable site trafficability adequate drainage must be maintained to reduce any ponding of water on site which may soften underlying soils. Repetitive vehicle loading may also reduce the strength of founding material and such may promote the formation of depressions which can hinder adequate site drainage. Furthermore, proof rolling the site after clearing and grubbing can support positive conditions for suitable trafficability.

### *9.9 SITE FACTOR FOR SEISMIC DESIGN*

In reference to AS1170.4-2007 Section 4 the Sub-Soil Class varies from Class $B_e$ (Rock) to Class $C_e$ (Shallow Soil).

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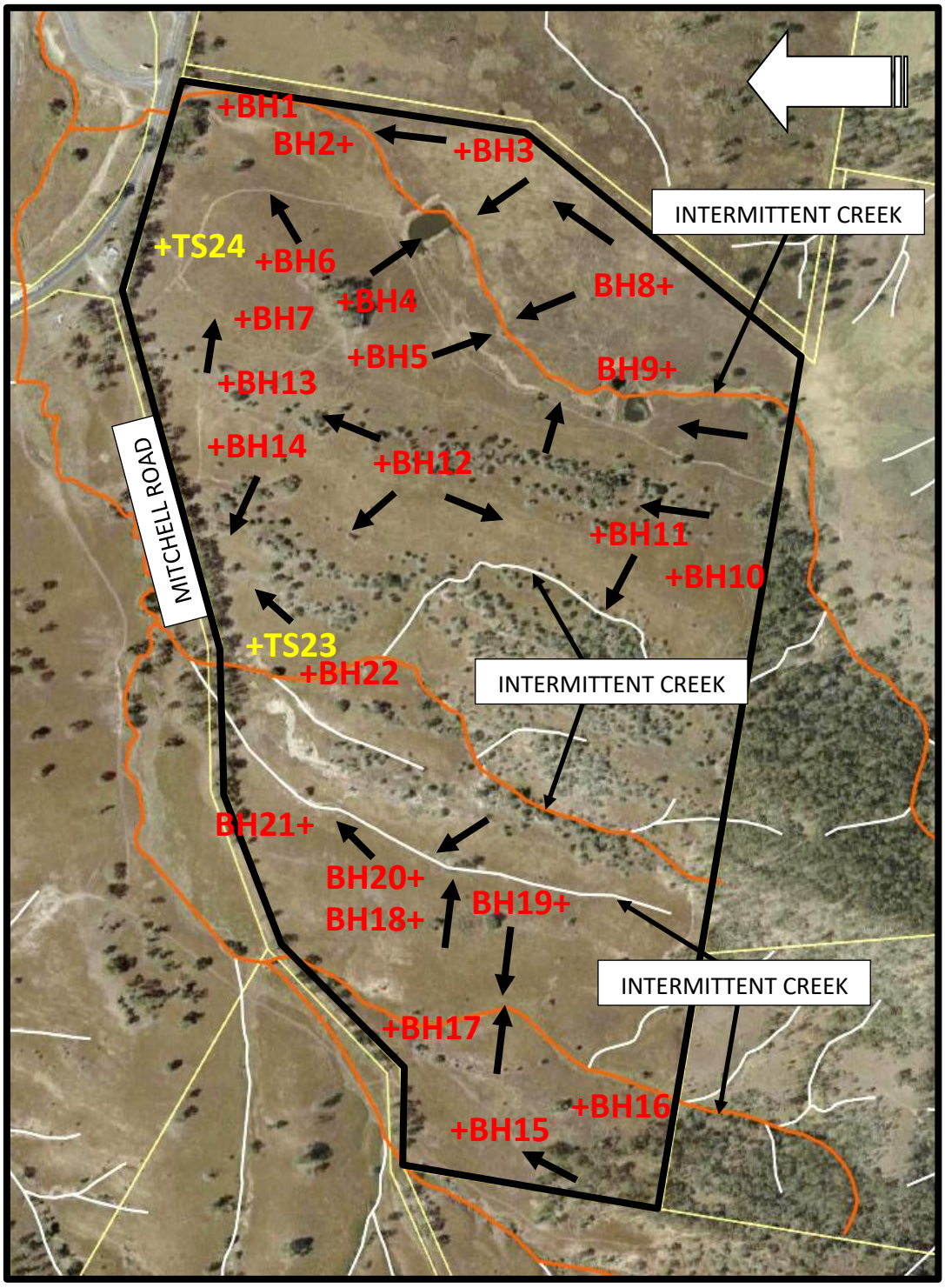


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***APPENDIX***

# APPENDIX A - SITE SKETCH & BORE LOGS

**SITE SKETCH**




| | |
|---|---|
| **Site Address:** | Lot 4 #260 Mitchell Road, Bromelton |
| **Date:** | 06/07/2021 & 07/07/2021 |
| **Job Number:** | G21/109 |

*Notes:*

1. *This site sketch is schematic only and is not to scale.*
2. *Approximate measurements and locations have been used.*
3. *Site features in aerial photos may have changed from the time the photo was taken.*

**BORELOGS**

| Bore Log 1 | | | |
|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | **Date Drilled:** 6th July 2021 | **Job Number:** G21/109 | |

| Depth (m) | Soil Description # 1 | FILL | PP | DCP |
|---|---|---|---|---|
| 0.0 | NATURAL – CLAYEY SILT (ML) | | | |
| 0.1 | Loose, Br, Medium Plasticity, Moist | | | |
| 0.2 | SILTY CLAY (CH) | | | |
| 0.3 | Very Stiff, Br, Yell-Br, Gr, Becoming Dk Gr, High Plasticity, Moist | | | |
| 0.4 | | | 450 | |
| 0.5 | | | | |
| 0.6 | | | | |
| 0.7 | | | 300 | |
| 0.8 | | | | |
| 0.9 | | | | |
| 1.0 | | | | |
| 1.1 | | | | |
| 1.2 | SILTY CLAY (CH) | | 350 | |
| 1.3 | Very Stiff, Lt Br, Lt Gr, Becoming Grey & Yell, High Plasticity, Moist | | | |
| 1.4 | | | | |
| 1.5 | | | | |
| 1.6 | | | | |
| 1.7 | As above, but Stiff | | 200 | |
| 1.8 | | | | |
| 1.9 | | | | |
| 2.0 | | | 150 | |
| 2.1 | | | | |
| 2.2 | | | | |
| 2.3 | | | | |
| 2.4 | | | | |
| 2.5 | | | 150 | |
| 2.6 | | | | |
| 2.7 | | | | |
| 2.8 | | | | |
| 2.9 | | | | |
| 3.0 | | | | |
| 3.1 | | | | |
| 3.2 | | | | |
| 3.3 | | | 100 | |
| 3.4 | | | | |
| 3.5 | As above, but Traces of Coal (from 3.5m – 4.0m) | | | |
| 3.6 | | | | |
| 3.7 | | | | |
| 3.8 | | | 150 | |
| 3.9 | | | | |
| 4.0 | | | | |

~BORELOGS CONTINUED ON NEXT PAGE~

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 6th July 2021 | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 1 | | | | | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | | | | | |
| 4.1 | | | | | | | | | |
| 4.2 | | | | | | | | | |
| 4.3 | | | | | | | | | |
| 4.4 | | | | | | | | 200 | |
| 4.5 | | | | | | | | | |
| 4.6 | | | | | | | | | |
| 4.7 | | | | | | | | | |
| 4.8 | | | | | | | | | |
| 4.9 | | | | | | | | | |
| 5.0 | | | | | | | | | |
| 5.1 | | | | | | | | | |
| 5.2 | | | | | | | | 270 | |
| 5.3 | | | | | | | | | |
| 5.4 | | | | | | | | | |
| 5.5 | | | | | | | | | |
| 5.6 | | | | | | | | | |
| 5.7 | | | | | | | | | |
| 5.8 | | | | | | | | 400 | |
| 5.9 | | | | | | | | | |
| 6.0 | END BOREHOLE 1 | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 2 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 6th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 2 | | FILL | PP | DCP |
| 0.0 | TOPSOIL | | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | | |
| 0.2 | Stiff, Yell-Br, High Plasticity, Moist | | | | |
| 0.3 | | | | | |
| 0.4 | | | | | |
| 0.5 | | | | 180 | |
| 0.6 | | | | | |
| 0.7 | | | | | |
| 0.8 | | | | | |
| 0.9 | SILTY SANDY CLAY (CI) | | | 200 | |
| 1.0 | Very Stiff, Yell-Br, Gr, Mottled Red-Br, Medium Plasticity, Moist | | | | |
| 1.1 | | | | | |
| 1.2 | SILTY CLAY (CH) | | | 450 | |
| 1.3 | Very Stiff, Yell-Br, Gr, Becoming Pale Yell-Br, Traces of Sand, High Plasticity, Moist | | | | |
| 1.4 | | | | | |
| 1.5 | | | | 450 | |
| 1.6 | | | | | |
| 1.7 | | | | | |
| 1.8 | | | | | |
| 1.9 | | | | | |
| 2.0 | | | | 400 | |
| 2.1 | | | | | |
| 2.2 | | | | | |
| 2.3 | | | | | |
| 2.4 | | | | 450 | |
| 2.5 | | | | | |
| 2.6 | | | | | |
| 2.7 | | | | | |
| 2.8 | | | | | |
| 2.9 | As above, but Stiff | | | 200 | |
| 3.0 | | | | | |
| 3.1 | | | | | |
| 3.2 | | | | | |
| 3.3 | | | | | |
| 3.4 | As above, but Very Stiff | | | 300 | |
| 3.5 | | | | | |
| 3.6 | | | | | |
| 3.7 | | | | | |
| 3.8 | | | | | |
| 3.9 | | | | 300 | |
| 4.0 | | | | | |

~BORELOGS CONTINUED ON NEXT PAGE~

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 2 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 6th July 2021 | | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 2 | | | | | | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | | | | | | |
| 4.1 | | | | | | | | | | |
| 4.2 | | | | | | | | | | |
| 4.3 | | | | | | | | | | |
| 4.4 | | | | | | | | | 300 | |
| 4.5 | | | | | | | | | | |
| 4.6 | | | | | | | | | | |
| 4.7 | | | | | | | | | | |
| 4.8 | | | | | | | | | | |
| 4.9 | | | | | | | | | | |
| 5.0 | | | | | | | | | | |
| 5.1 | | | | | | | | | | |
| 5.2 | | | | | | | | | | |
| 5.3 | | | | | | | | | | |
| 5.4 | | | | | | | | | | |
| 5.5 | | | | | | | | | 300 | |
| 5.6 | | | | | | | | | | |
| 5.7 | | | | | | | | | | |
| 5.8 | | | | | | | | | | |
| 5.9 | | | | | | | | | | |
| 6.0 | END BOREHOLE 2 | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 3 | | | |
|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | **Date Drilled:** 6th July 2021 | | **Job Number:** G21/109 |

| Depth (m) | Soil Description # 3 | FILL | PP | DCP |
|---|---|---|---|---|
| 0.0 | TOPSOIL | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | |
| 0.2 | Stiff, Pale Yell-Br, High Plasticity, Moist | | | |
| 0.3 | | | | |
| 0.4 | | | | |
| 0.5 | | | 100 | |
| 0.6 | | | | |
| 0.7 | | | | |
| 0.8 | As above, but Very Stiff | | 300 | |
| 0.9 | | | | |
| 1.0 | | | | |
| 1.1 | | | | |
| 1.2 | | | 350 | |
| 1.3 | | | | |
| 1.4 | | | | |
| 1.5 | | | 400 | |
| 1.6 | | | | |
| 1.7 | | | | |
| 1.8 | | | 450 | |
| 1.9 | | | | |
| 2.0 | | | | |
| 2.1 | SILTY CLAY (CH) | | 450 | |
| 2.2 | Hard, Lt Br, High Plasticity, Dry, Non-Cohesive Insitu | | | |
| 2.3 | | | | |
| 2.4 | | | | |
| 2.5 | | | 450 | |
| 2.6 | | | | |
| 2.7 | | | | |
| 2.8 | EXTREMELY WEATHERED ROCK (XW) | | | |
| 2.9 | | | | |
| 3.0 | | | | |
| 3.1 | | | | |
| 3.2 | | | | |
| 3.3 | | | | |
| 3.4 | UTP – END BOREHOLE 3 | | | |
| 3.5 | | | | |
| 3.6 | | | | |
| 3.7 | | | | |
| 3.8 | | | | |
| 3.9 | | | | |
| 4.0 | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 4 | | | |
|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | **Date Drilled:** 6th July 2021 | **Job Number:** G21/109 | |

| Depth (m) | Soil Description # 4 | FILL | PP | DCP |
|---|---|---|---|---|
| 0.0 | TOPSOIL | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | |
| 0.2 | Hard, Pale Yell-Br, High Plasticity, Sl Moist, Non-Cohesive Insitu | | | |
| 0.3 | | | | |
| 0.4 | | | 450 | |
| 0.5 | | | | |
| 0.6 | | | | |
| 0.7 | | | 450 | |
| 0.8 | EXTREMELY WEATHERED ROCK (XW) | | | |
| 0.9 | UTP – END BOREHOLE 4 | | | |
| 1.0 | | | | |
| 1.1 | | | | |
| 1.2 | | | | |
| 1.3 | | | | |
| 1.4 | | | | |
| 1.5 | | | | |
| 1.6 | | | | |
| 1.7 | | | | |
| 1.8 | | | | |
| 1.9 | | | | |
| 2.0 | | | | |
| 2.1 | | | | |
| 2.2 | | | | |
| 2.3 | | | | |
| 2.4 | | | | |
| 2.5 | | | | |
| 2.6 | | | | |
| 2.7 | | | | |
| 2.8 | | | | |
| 2.9 | | | | |
| 3.0 | | | | |
| 3.1 | | | | |
| 3.2 | | | | |
| 3.3 | | | | |
| 3.4 | | | | |
| 3.5 | | | | |
| 3.6 | | | | |
| 3.7 | | | | |
| 3.8 | | | | |
| 3.9 | | | | |
| 4.0 | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 5 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | | **Date Drilled:** 6th July 2021 | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 5 | | | | | | | FILL | PP | DCP |
| 0.0 | TOPSOIL | | | | | | | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.2 | Very Stiff, Pale Yell-Br, High Plasticity, Moist | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.4 | | | | | | | | | 450 | |
| 0.5 | | | | | | | | | | |
| 0.6 | | | | | | | | | | |
| 0.7 | | | | | | | | | | |
| 0.8 | | | | | | | | | 450 | |
| 0.9 | | | | | | | | | | |
| 1.0 | EXTREMELY WEATHERED ROCK (XW) | | | | | | | | | |
| 1.1 | | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | UTP – END BOREHOLE 5 | | | | | | | | | |
| 1.4 | | | | | | | | | | |
| 1.5 | | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | | | | | | | | | | |
| 2.1 | | | | | | | | | | |
| 2.2 | | | | | | | | | | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | | |
| 2.5 | | | | | | | | | | |
| 2.6 | | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 6 | | | |
|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | **Date Drilled:** 6th July 2021 | | **Job Number:** G21/109 |

| Depth (m) | Soil Description # 6 | FILL | PP | DCP |
|---|---|---|---|---|
| 0.0 | TOPSOIL | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | |
| 0.2 | Very Stiff, Or-Br, Becoming Pale Yell-Br, High Plasticity, Moist | | | |
| 0.3 | | | 400 | |
| 0.4 | | | | |
| 0.5 | | | | |
| 0.6 | | | 300 | |
| 0.7 | | | | |
| 0.8 | SILTY SANDY CLAY (CH) | | | |
| 0.9 | Very Stiff, Pale Yell-Br, Pale Gr, High Plasticity, Sl Moist | | | |
| 1.0 | | | | |
| 1.1 | | | 450 | |
| 1.2 | | | | |
| 1.3 | | | | |
| 1.4 | EXTREMELY WEATHERED ROCK (XW) | | | |
| 1.5 | | | | |
| 1.6 | UTP – END BOREHOLE 6 | | | |
| 1.7 | | | | |
| 1.8 | | | | |
| 1.9 | | | | |
| 2.0 | | | | |
| 2.1 | | | | |
| 2.2 | | | | |
| 2.3 | | | | |
| 2.4 | | | | |
| 2.5 | | | | |
| 2.6 | | | | |
| 2.7 | | | | |
| 2.8 | | | | |
| 2.9 | | | | |
| 3.0 | | | | |
| 3.1 | | | | |
| 3.2 | | | | |
| 3.3 | | | | |
| 3.4 | | | | |
| 3.5 | | | | |
| 3.6 | | | | |
| 3.7 | | | | |
| 3.8 | | | | |
| 3.9 | | | | |
| 4.0 | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 7 | | | |
|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | **Date Drilled:** 6th July 2021 | **Job Number:** G21/109 | |

| Depth (m) | Soil Description # 7 | FILL | PP | DCP |
|---|---|---|---|---|
| 0.0 | TOPSOIL | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | |
| 0.2 | Very Stiff, Yell-Br, Becoming Lt Gr & Yell-Br, High Plasticity, Moist | | | |
| 0.3 | | | | |
| 0.4 | | | 300 | |
| 0.5 | | | | |
| 0.6 | | | | |
| 0.7 | | | | |
| 0.8 | | | | |
| 0.9 | | | 350 | |
| 1.0 | | | | |
| 1.1 | | | | |
| 1.2 | | | | |
| 1.3 | | | | |
| 1.4 | | | 450 | |
| 1.5 | | | | |
| 1.6 | | | | |
| 1.7 | | | | |
| 1.8 | | | 400 | |
| 1.9 | | | | |
| 2.0 | | | | |
| 2.1 | | | 400 | |
| 2.2 | | | | |
| 2.3 | | | | |
| 2.4 | | | | |
| 2.5 | | | 350 | |
| 2.6 | | | | |
| 2.7 | | | | |
| 2.8 | | | | |
| 2.9 | | | 400 | |
| 3.0 | | | | |
| 3.1 | | | | |
| 3.2 | | | | |
| 3.3 | | | | |
| 3.4 | | | | |
| 3.5 | | | 400 | |
| 3.6 | | | | |
| 3.7 | | | | |
| 3.8 | | | | |
| 3.9 | | | | |
| 4.0 | | | 400 | |

~BORELOGS CONTINUED ON NEXT PAGE~

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 7 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | | **Date Drilled:** 6th July 2021 | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 7 | | | | | | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | | | | | | |
| 4.1 | | | | | | | | | | |
| 4.2 | | | | | | | | | | |
| 4.3 | | | | | | | | | | |
| 4.4 | | | | | | | | | | |
| 4.5 | | | | | | | | | 400 | |
| 4.6 | | | | | | | | | | |
| 4.7 | | | | | | | | | | |
| 4.8 | | | | | | | | | | |
| 4.9 | | | | | | | | | | |
| 5.0 | | | | | | | | | 450 | |
| 5.1 | | | | | | | | | | |
| 5.2 | | | | | | | | | | |
| 5.3 | | | | | | | | | | |
| 5.4 | | | | | | | | | | |
| 5.5 | | | | | | | | | | |
| 5.6 | | | | | | | | | | |
| 5.7 | | | | | | | | | 450 | |
| 5.8 | | | | | | | | | | |
| 5.9 | | | | | | | | | | |
| 6.0 | END BOREHOLE 7 | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 8 | | | | |
|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 6th July 2021 | | **Job Number:** G21/109 |
| Depth (m) | Soil Description # 8 | FILL | PP | DCP |
| 0.0 | TOPSOIL | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | |
| 0.2 | Very Stiff, Or-Br, Becoming Pale Yell-Br, High Plasticity, Moist | | | |
| 0.3 | | | | |
| 0.4 | | | 450 | |
| 0.5 | | | | |
| 0.6 | | | | |
| 0.7 | SANDY CLAY (CL) | | | |
| 0.8 | Hard, Lt Br, Low Plasticity, Sl Moist | | 450 | |
| 0.9 | CEMENTED SAND (SP) | | | |
| 1.0 | Dense, Lt Br, Dry | | | |
| 1.1 | | | | |
| 1.2 | | | | |
| 1.3 | | | | |
| 1.4 | | | | |
| 1.5 | | | | |
| 1.6 | | | | |
| 1.7 | | | | |
| 1.8 | | | | |
| 1.9 | | | | |
| 2.0 | EXTREMELY WEATHERED ROCK (XW) | | | |
| 2.1 | | | | |
| 2.2 | | | | |
| 2.3 | UTP – END BOREHOLE 8 | | | |
| 2.4 | | | | |
| 2.5 | | | | |
| 2.6 | | | | |
| 2.7 | | | | |
| 2.8 | | | | |
| 2.9 | | | | |
| 3.0 | | | | |
| 3.1 | | | | |
| 3.2 | | | | |
| 3.3 | | | | |
| 3.4 | | | | |
| 3.5 | | | | |
| 3.6 | | | | |
| 3.7 | | | | |
| 3.8 | | | | |
| 3.9 | | | | |
| 4.0 | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 9 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 6th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 9 | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY SANDY CLAY (CH) | | | | |
| 0.1 | Firm, Br, Becoming Br & Gr, High Plasticity, Moist | | | | |
| 0.2 | | | | | |
| 0.3 | | | | | |
| 0.4 | | | | | |
| 0.5 | | | | 100 | |
| 0.6 | | | | | |
| 0.7 | | | | | |
| 0.8 | | | | | |
| 0.9 | | | | 50 | |
| 1.0 | | | | | |
| 1.1 | | | | | |
| 1.2 | | | | | |
| 1.3 | | | | 80 | |
| 1.4 | | | | | |
| 1.5 | | | | | |
| 1.6 | | | | | |
| 1.7 | | | | | |
| 1.8 | | | | 70 | |
| 1.9 | | | | | |
| 2.0 | | | | | |
| 2.1 | | | | | |
| 2.2 | SILTY SANDY CLAY (CH) | | | | |
| 2.3 | Stiff, Lt Gr, Br, Yell-Br, High Plasticity, Moist | | | | |
| 2.4 | | | | 150 | |
| 2.5 | | | | | |
| 2.6 | | | | | |
| 2.7 | SANDY GRAVELLY CLAY (CI) | | | | |
| 2.8 | Stiff, Br, Yell-Br, Red-Br, Gr, Medium Plasticity, Moist | | | | |
| 2.9 | | | | 200 | |
| 3.0 | | | | | |
| 3.1 | | | | | |
| 3.2 | | | | | |
| 3.3 | | | | | |
| 3.4 | | | | | |
| 3.5 | | | | 100 | |
| 3.6 | | | | | |
| 3.7 | | | | | |
| 3.8 | | | | | |
| 3.9 | | | | | |
| 4.0 | SANDY GRAVELLY CLAY (CI), Firm, Br, Yell-Br, Red-Br, Gr, Medium Plasticity, ***Wet*** | | | 50 | |
| ~BORELOGS CONTINUED ON NEXT PAGE~ | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 9 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 6th July 2021 | | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 9 | | | | | | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | | | | | | |
| 4.1 | | | | | | | | | | |
| 4.2 | | | | | | | | | | |
| 4.3 | | | | | | | | | | |
| 4.4 | | | | | | | | | | |
| 4.5 | | | | | | | | | 80 | |
| 4.6 | | | | | | | | | | |
| 4.7 | | | | | | | | | | |
| 4.8 | | | | | | | | | | |
| 4.9 | SILTY GRAVELLY CLAY (CH) | | | | | | | | | |
| 5.0 | Very Stiff, Lt Gr, Yell-Br, High Plasticity, Moist | | | | | | | | | |
| 5.1 | | | | | | | | | | |
| 5.2 | | | | | | | | | 350 | |
| 5.3 | | | | | | | | | | |
| 5.4 | | | | | | | | | | |
| 5.5 | | | | | | | | | | |
| 5.6 | | | | | | | | | | |
| 5.7 | | | | | | | | | | |
| 5.8 | | | | | | | | | 400 | |
| 5.9 | | | | | | | | | | |
| 6.0 | END BOREHOLE 9 | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 10 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 6th July 2021 | | | | **Job Number:** G21/109 | | | |
| Depth (m) | Soil Description # 10 | | | | | | FILL | PP | DCP | |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.1 | Stiff, Yell-Br, High Plasticity, Moist | | | | | | | | | |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.4 | | | | | | | | 200 | | |
| 0.5 | | | | | | | | | | |
| 0.6 | | | | | | | | | | |
| 0.7 | | | | | | | | | | |
| 0.8 | As above, but Very Stiff | | | | | | | 350 | | |
| 0.9 | | | | | | | | | | |
| 1.0 | SILTY CLAY (CI) | | | | | | | | | |
| 1.1 | Very Stiff, Pale Yell-Br, Lt Gr, Medium Plasticity, Sl Moist, Fine Sandstone Lenses Encountered | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | | | | | | | | 450 | | |
| 1.4 | | | | | | | | | | |
| 1.5 | EXTREMELY WEATHERED ROCK (XW) | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | UTP – END BOREHOLE 10 | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | | | | | | | | | | |
| 2.1 | | | | | | | | | | |
| 2.2 | | | | | | | | | | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | | |
| 2.5 | | | | | | | | | | |
| 2.6 | | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 6th July 2021 | | | | **Job Number:** G21/109 | | | |
| Depth (m) | Soil Description # 11 | | | | | | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.1 | Very Stiff, Yell-Br, High Plasticity, Moist | | | | | | | | | |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.4 | GRAVELLY SAND (SP) | | | | | | | | | |
| 0.5 | Dense, Lt Br, Dry | | | | | | | | | |
| 0.6 | | | | | | | | | | |
| 0.7 | | | | | | | | | | |
| 0.8 | | | | | | | | | | |
| 0.9 | EXTREMELY WEATHERED ROCK (XW) | | | | | | | | | |
| 1.0 | | | | | | | | | | |
| 1.1 | | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | | | | | | | | | | |
| 1.4 | UTP – END BOREHOLE 11 | | | | | | | | | |
| 1.5 | | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | | | | | | | | | | |
| 2.1 | | | | | | | | | | |
| 2.2 | | | | | | | | | | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | | |
| 2.5 | | | | | | | | | | |
| 2.6 | | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 12 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | | **Date Drilled:** 6th July 2021 | | | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 12 | | | | | | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.1 | Stiff, Or-Br, High Plasticity, Moist | | | | | | | | | |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | 300 | |
| 0.4 | | | | | | | | | | |
| 0.5 | SILTY CLAY (CH) | | | | | | | | | |
| 0.6 | Very Stiff, Lt Br, Some Sand, Medium Plasticity, Sl Moist, With Rock Fragments | | | | | | | | | |
| 0.7 | | | | | | | | | | |
| 0.8 | EXTREMELY WEATHERED ROCK (XW) | | | | | | | | | |
| 0.9 | UTP – END BOREHOLE 12 | | | | | | | | | |
| 1.0 | | | | | | | | | | |
| 1.1 | | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | | | | | | | | | | |
| 1.4 | | | | | | | | | | |
| 1.5 | | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | | | | | | | | | | |
| 2.1 | | | | | | | | | | |
| 2.2 | | | | | | | | | | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | | |
| 2.5 | | | | | | | | | | |
| 2.6 | | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 13 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | | **Date Drilled:** 6th July 2021 | | | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 13 | | | | | | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.1 | Very Stiff, Or-Br, Becoming Pale Yell-Br, High Plasticity, Moist | | | | | | | | | |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.4 | | | | | | | | | 450 | |
| 0.5 | | | | | | | | | | |
| 0.6 | | | | | | | | | | |
| 0.7 | CEMENTED SAND (SP) | | | | | | | | 450 | |
| 0.8 | Dense, Lt Br, Br, Dry | | | | | | | | | |
| 0.9 | EXTREMELY WEATHERED ROCK (XW) | | | | | | | | | |
| 1.0 | UTP – END BOREHOLE 13 | | | | | | | | | |
| 1.1 | | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | | | | | | | | | | |
| 1.4 | | | | | | | | | | |
| 1.5 | | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | | | | | | | | | | |
| 2.1 | | | | | | | | | | |
| 2.2 | | | | | | | | | | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | | |
| 2.5 | | | | | | | | | | |
| 2.6 | | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 14 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 6th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 14 | | FILL | PP | DCP |
| 0.0 | TOPSOIL | | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | | |
| 0.2 | Stiff, Or-Br, Becoming Yell-Br, High Plasticity, Moist | | | | |
| 0.3 | | | | 200 | |
| 0.4 | | | | | |
| 0.5 | | | | | |
| 0.6 | As above, but Very Stiff | | | 300 | |
| 0.7 | | | | | |
| 0.8 | | | | | |
| 0.9 | | | | | |
| 1.0 | | | | 200 | |
| 1.1 | | | | | |
| 1.2 | SILTY CLAY (CH) | | | | |
| 1.3 | Hard, Br, Yell-Br, Traces of Sand and Gravel, High Plasticity, Sl Moist | | | | |
| 1.4 | | | | 450 | |
| 1.5 | | | | | |
| 1.6 | | | | | |
| 1.7 | | | | | |
| 1.8 | | | | | |
| 1.9 | | | | 450 | |
| 2.0 | | | | | |
| 2.1 | | | | | |
| 2.2 | | | | | |
| 2.3 | | | | | |
| 2.4 | | | | 450 | |
| 2.5 | | | | | |
| 2.6 | | | | | |
| 2.7 | | | | | |
| 2.8 | SILTY CLAY (CH) | | | | |
| 2.9 | Very Stiff, Yell-Br, Gr, Some Sand, High Plasticity, Moist | | | | |
| 3.0 | | | | 420 | |
| 3.1 | | | | | |
| 3.2 | | | | | |
| 3.3 | | | | | |
| 3.4 | | | | | |
| 3.5 | | | | | |
| 3.6 | | | | | |
| 3.7 | | | | | |
| 3.8 | | | | | |
| 3.9 | | | | | |
| 4.0 | | | | 450 | |

~BORELOGS CONTINUED ON NEXT PAGE~

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 14 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 6th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 14 | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | |
| 4.1 | | | | | |
| 4.2 | SILTY CLAY (CI) | | | | |
| 4.3 | Hard, Yell-Br, Gr, With Sand, Medium Plasticity, Sl Moist, With Rock Fragments | | | | |
| 4.4 | | | | | |
| 4.5 | | | | 500 | |
| 4.6 | | | | | |
| 4.7 | | | | | |
| 4.8 | | | | | |
| 4.9 | | | | | |
| 5.0 | | | | 500 | |
| 5.1 | | | | | |
| 5.2 | | | | | |
| 5.3 | | | | | |
| 5.4 | | | | | |
| 5.5 | EXTREMELY WEATHERED ROCK (XW) | | | | |
| 5.6 | | | | | |
| 5.7 | UTP – END BOREHOLE 14 | | | | |
| 5.8 | | | | | |
| 5.9 | | | | | |
| 6.0 | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 15 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 7th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 15 | | FILL | PP | DCP |
| 0.0 | TOPSOIL | | TOPSOIL | | |
| 0.1 | NATURAL – SILTY CLAY (CH) | | | | |
| 0.2 | Very Stiff, Lt Br, Becoming Gr, High Plasticity, Moist | | | | |
| 0.3 | | | | 300 | |
| 0.4 | | | | | |
| 0.5 | | | | | |
| 0.6 | | | | 300 | |
| 0.7 | | | | | |
| 0.8 | | | | | |
| 0.9 | | | | | |
| 1.0 | | | | 450 | |
| 1.1 | | | | | |
| 1.2 | SANDY CLAY (CI) | | | | |
| 1.3 | Very Stiff, Pale Br, Some Gravel, Medium Plasticity, Moist | | | | |
| 1.4 | | | | 400 | |
| 1.5 | | | | | |
| 1.6 | | | | | |
| 1.7 | | | | 450 | |
| 1.8 | | | | | |
| 1.9 | | | | | |
| 2.0 | | | | | |
| 2.1 | | | | | |
| 2.2 | | | | | |
| 2.3 | | | | | |
| 2.4 | | | | | |
| 2.5 | CLAYEY SAND (SC) | | | | |
| 2.6 | Dense, Pale Br, Sl Moist, Fine to Coarse Sand | | | | |
| 2.7 | | | | | |
| 2.8 | | | | | |
| 2.9 | | | | | |
| 3.0 | | | | | |
| 3.1 | | | | | |
| 3.2 | | | | | |
| 3.3 | | | | | |
| 3.4 | | | | | |
| 3.5 | | | | | |
| 3.6 | | | | | |
| 3.7 | SILTY SANDY CLAY (CI) | | | | |
| 3.8 | Pale Br, Medium Plasticity, Moist | | | | |
| 3.9 | | | | | |
| 4.0 | | | | 350 | |
| ~BORELOGS CONTINUED ON NEXT PAGE~ | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 15 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 7th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 15 | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | |
| 4.1 | | | | | |
| 4.2 | SILTY CLAY (CH) | | | | |
| 4.3 | Very Stiff, Gr, Becoming Lt Br, Very High Plasticity, Moist | | | | |
| 4.4 | | | | | |
| 4.5 | | | | 450 | |
| 4.6 | | | | | |
| 4.7 | | | | | |
| 4.8 | | | | | |
| 4.9 | | | | | |
| 5.0 | | | | | |
| 5.1 | | | | | |
| 5.2 | | | | | |
| 5.3 | | | | | |
| 5.4 | EXTREMELY WEATHERED ROCK (XW) | | | | |
| 5.5 | | | | | |
| 5.6 | UTP – END BOREHOLE 15 | | | | |
| 5.7 | | | | | |
| 5.8 | | | | | |
| 5.9 | | | | | |
| 6.0 | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 16 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | | **Date Drilled:** 7th July 2021 | | | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 16 | | | | | | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.1 | Very Stiff, Or-Br, High Plasticity, Moist | | | | | | | | | |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | 450 | |
| 0.4 | SILTY SANDY CLAY (CI) | | | | | | | | | |
| 0.5 | Very Stiff, Lt Yell-Br, Medium Plasticity, Moist | | | | | | | | | |
| 0.6 | | | | | | | | | | |
| 0.7 | | | | | | | | | 350 | |
| 0.8 | CLAYEY SAND (SC) | | | | | | | | | |
| 0.9 | Dense, Lt Yell-Br, Sl Moist | | | | | | | | | |
| 1.0 | | | | | | | | | | |
| 1.1 | | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | EXTREMELY WEATHERED ROCK (XW) | | | | | | | | | |
| 1.4 | | | | | | | | | | |
| 1.5 | UTP – END BOREHOLE 16 | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | | | | | | | | | | |
| 2.1 | | | | | | | | | | |
| 2.2 | | | | | | | | | | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | | |
| 2.5 | | | | | | | | | | |
| 2.6 | | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 17 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 7th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 17 | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY SANDY CLAY (CH) | | | | |
| 0.1 | Stiff, Br, High Plasticity, Moist | | | | |
| 0.2 | | | | | |
| 0.3 | | | | | |
| 0.4 | | | | 250 | |
| 0.5 | | | | | |
| 0.6 | | | | | |
| 0.7 | | | | | |
| 0.8 | SILTY SANDY CLAY (CH) | | | | |
| 0.9 | Very Stiff, Br, Yell-Br, Gr, High Plasticity, Sl Moist | | | | |
| 1.0 | | | | 450 | |
| 1.1 | | | | | |
| 1.2 | | | | | |
| 1.3 | | | | 450 | |
| 1.4 | | | | | |
| 1.5 | | | | | |
| 1.6 | | | | | |
| 1.7 | SILTY CLAY (CH) | | | | |
| 1.8 | Very Stiff, Dk Gr, Traces of Sand, Very High Plasticity, Moist | | | | |
| 1.9 | | | | 420 | |
| 2.0 | | | | | |
| 2.1 | | | | | |
| 2.2 | | | | 450 | |
| 2.3 | | | | | |
| 2.4 | | | | | |
| 2.5 | | | | | |
| 2.6 | | | | | |
| 2.7 | SILTY SANDY CLAY (CI) | | | | |
| 2.8 | Very Stiff, Br, Medium Plasticity, Moist | | | 450 | |
| 2.9 | | | | | |
| 3.0 | | | | | |
| 3.1 | | | | | |
| 3.2 | | | | | |
| 3.3 | | | | | |
| 3.4 | | | | | |
| 3.5 | | | | | |
| 3.6 | | | | | |
| 3.7 | | | | | |
| 3.8 | CLAYEY SAND (SC) | | | | |
| 3.9 | Dense, Yell-Br, Sl Moist | | | | |
| 4.0 | | | | | |

~BORELOGS CONTINUED ON NEXT PAGE~

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 17 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 7th July 2021 | | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 17 | | | | | | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | | | | | | |
| 4.1 | | | | | | | | | | |
| 4.2 | | | | | | | | | | |
| 4.3 | | | | | | | | | | |
| 4.4 | | | | | | | | | | |
| 4.5 | | | | | | | | | | |
| 4.6 | | | | | | | | | | |
| 4.7 | | | | | | | | | | |
| 4.8 | | | | | | | | | | |
| 4.9 | | | | | | | | | | |
| 5.0 | | | | | | | | | | |
| 5.1 | | | | | | | | | | |
| 5.2 | | | | | | | | | | |
| 5.3 | | | | | | | | | | |
| 5.4 | | | | | | | | | | |
| 5.5 | | | | | | | | | | |
| 5.6 | | | | | | | | | | |
| 5.7 | | | | | | | | | | |
| 5.8 | | | | | | | | | | |
| 5.9 | | | | | | | | | | |
| 6.0 | END BOREHOLE 17 | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 18 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 7th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 18 | | FILL | PP | DCP |
| 0.0 | NATURAL – CLAYEY SAND (SC) | | | - | |
| 0.1 | Dense, Yell-Br, Sl Moist | | | 3 | |
| 0.2 | | | | 8 | |
| 0.3 | | | | 13 | |
| 0.4 | | | | 17 | |
| 0.5 | | | | >20 | |
| 0.6 | | | | | |
| 0.7 | | | | | |
| 0.8 | | | | | |
| 0.9 | | | | | |
| 1.0 | EXTREMELY WEATHERED ROCK (XW) | | | | |
| 1.1 | | | | >30 | |
| 1.2 | | | | | |
| 1.3 | | | | | |
| 1.4 | | | | | |
| 1.5 | UTP – END BOREHOLE 18 | | | | |
| 1.6 | | | | | |
| 1.7 | | | | | |
| 1.8 | | | | | |
| 1.9 | | | | | |
| 2.0 | | | | | |
| 2.1 | | | | | |
| 2.2 | | | | | |
| 2.3 | | | | | |
| 2.4 | | | | | |
| 2.5 | | | | | |
| 2.6 | | | | | |
| 2.7 | | | | | |
| 2.8 | | | | | |
| 2.9 | | | | | |
| 3.0 | | | | | |
| 3.1 | | | | | |
| 3.2 | | | | | |
| 3.3 | | | | | |
| 3.4 | | | | | |
| 3.5 | | | | | |
| 3.6 | | | | | |
| 3.7 | | | | | |
| 3.8 | | | | | |
| 3.9 | | | | | |
| 4.0 | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 19 | | | |
|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | **Date Drilled:** 7th July 2021 | **Job Number:** G21/109 | |

| Depth (m) | Soil Description # 19 | FILL | PP | DCP |
|---|---|---|---|---|
| 0.0 | NATURAL – SILTY CLAY (CH) | | | |
| 0.1 | Hard, Pale Br, Becoming Mottled Dk Br, High Plasticity, Moist | | | |
| 0.2 | | | | |
| 0.3 | | | | |
| 0.4 | | | 300 | |
| 0.5 | | | | |
| 0.6 | | | | |
| 0.7 | | | 450 | |
| 0.8 | | | | |
| 0.9 | | | | |
| 1.0 | | | | |
| 1.1 | | | | |
| 1.2 | | | 450 | |
| 1.3 | | | | |
| 1.4 | | | | |
| 1.5 | | | | |
| 1.6 | | | | |
| 1.7 | | | | |
| 1.8 | | | 450 | |
| 1.9 | | | | |
| 2.0 | | | | |
| 2.1 | | | | |
| 2.2 | | | 500 | |
| 2.3 | | | | |
| 2.4 | | | | |
| 2.5 | | | | |
| 2.6 | | | | |
| 2.7 | | | | |
| 2.8 | | | 500 | |
| 2.9 | | | | |
| 3.0 | | | | |
| 3.1 | | | | |
| 3.2 | | | | |
| 3.3 | | | | |
| 3.4 | | | | |
| 3.5 | | | 500 | |
| 3.6 | EXTREMELY WEATHERED ROCK (XW) | | | |
| 3.7 | | | | |
| 3.8 | UTP – END BOREHOLE 19 | | | |
| 3.9 | | | | |
| 4.0 | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 20 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | | **Date Drilled:** 7th July 2021 | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 20 | | | | | | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.1 | Stiff, Dk Gr-Br, Becoming Black, Very High Plasticity, Moist | | | | | | | | | |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.4 | | | | | | | | | 200 | |
| 0.5 | | | | | | | | | | |
| 0.6 | | | | | | | | | | |
| 0.7 | | | | | | | | | | |
| 0.8 | As above, but Very Stiff | | | | | | | | 450 | |
| 0.9 | | | | | | | | | | |
| 1.0 | | | | | | | | | | |
| 1.1 | | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | | | | | | | | | 450 | |
| 1.4 | | | | | | | | | | |
| 1.5 | | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | 450 | |
| 1.9 | | | | | | | | | | |
| 2.0 | SILTY CLAY (CH) | | | | | | | | | |
| 2.1 | Hard, Br, Dk Br, Some Sand, High Plasticity, Moist | | | | | | | | | |
| 2.2 | | | | | | | | | | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | 450 | |
| 2.5 | | | | | | | | | | |
| 2.6 | | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | 500 | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | | | | | | | | | | |

~BORELOGS CONTINUED ON NEXT PAGE~

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 20 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 7th July 2021 | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 20 | | | | | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | | | | | |
| 4.1 | | | | | | | | | |
| 4.2 | | | | | | | | | |
| 4.3 | | | | | | | | | |
| 4.4 | | | | | | | | | |
| 4.5 | | | | | | | | | |
| 4.6 | | | | | | | | | |
| 4.7 | | | | | | | | | |
| 4.8 | | | | | | | | | |
| 4.9 | | | | | | | | | |
| 5.0 | END BOREHOLE 20 | | | | | | | | |
| 5.1 | | | | | | | | | |
| 5.2 | | | | | | | | | |
| 5.3 | | | | | | | | | |
| 5.4 | | | | | | | | | |
| 5.5 | | | | | | | | | |
| 5.6 | | | | | | | | | |
| 5.7 | | | | | | | | | |
| 5.8 | | | | | | | | | |
| 5.9 | | | | | | | | | |
| 6.0 | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 21 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 7th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 21 | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | |
| 0.1 | Very Stiff, Pale Br, High Plasticity, Moist | | | | |
| 0.2 | | | | | |
| 0.3 | | | | | |
| 0.4 | | | | 300 | |
| 0.5 | | | | | |
| 0.6 | | | | | |
| 0.7 | | | | 450 | |
| 0.8 | | | | | |
| 0.9 | SILTY SANDY CLAY (CI) | | | | |
| 1.0 | Hard, Pale Br, Medium Plasticity, Sl Moist | | | 450 | |
| 1.1 | | | | | |
| 1.2 | | | | | |
| 1.3 | | | | | |
| 1.4 | | | | 500 | |
| 1.5 | | | | | |
| 1.6 | | | | | |
| 1.7 | SILTY CLAY (CH) | | | | |
| 1.8 | Hard, Dk Gr-Br, Very High Plasticity, Moist | | | 500 | |
| 1.9 | | | | | |
| 2.0 | | | | | |
| 2.1 | | | | | |
| 2.2 | | | | 500 | |
| 2.3 | | | | | |
| 2.4 | | | | | |
| 2.5 | | | | | |
| 2.6 | SILTY CLAY (CI) | | | | |
| 2.7 | Very Stiff, Br, With Sand, Medium Plasticity, Moist | | | | |
| 2.8 | | | | 450 | |
| 2.9 | | | | | |
| 3.0 | | | | | |
| 3.1 | | | | | |
| 3.2 | | | | | |
| 3.3 | | | | | |
| 3.4 | | | | | |
| 3.5 | | | | | |
| 3.6 | | | | | |
| 3.7 | | | | 450 | |
| 3.8 | | | | | |
| 3.9 | SILTY CLAY (CH) | | | | |
| 4.0 | Very Stiff, Br, Gr, Becoming Br, High Plasticity, Moist | | | | |
| ~BORELOGS CONTINUED ON NEXT PAGE~ | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 21 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 7th July 2021 | | | | **Job Number:** G21/109 | | |
| Depth (m) | Soil Description # 21 | | | | | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | | | | | |
| 4.1 | | | | | | | | | |
| 4.2 | | | | | | | | | |
| 4.3 | | | | | | | | | |
| 4.4 | | | | | | | | | |
| 4.5 | | | | | | | | 450 | |
| 4.6 | | | | | | | | | |
| 4.7 | | | | | | | | | |
| 4.8 | | | | | | | | | |
| 4.9 | | | | | | | | | |
| 5.0 | | | | | | | | | |
| 5.1 | | | | | | | | | |
| 5.2 | | | | | | | | 450 | |
| 5.3 | | | | | | | | | |
| 5.4 | | | | | | | | | |
| 5.5 | | | | | | | | | |
| 5.6 | | | | | | | | | |
| 5.7 | | | | | | | | | |
| 5.8 | | | | | | | | | |
| 5.9 | | | | | | | | | |
| 6.0 | END BOREHOLE 21 | | | | | | | 450 | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 22 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | | **Date Drilled:** 7th July 2021 | | | | **Job Number:** G21/109 | | | |
| Depth (m) | Soil Description # 22 | | | | | | | FILL | PP | DCP |
| 0.0 | NATURAL – SILTY CLAY (CH) | | | | | | | | | |
| 0.1 | Very Stiff, Dk Br, High Plasticity, Moist | | | | | | | | | |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.4 | | | | | | | | | 400 | |
| 0.5 | | | | | | | | | | |
| 0.6 | | | | | | | | | | |
| 0.7 | | | | | | | | | 450 | |
| 0.8 | | | | | | | | | | |
| 0.9 | | | | | | | | | | |
| 1.0 | | | | | | | | | 450 | |
| 1.1 | | | | | | | | | | |
| 1.2 | SANDY CLAY (CL) | | | | | | | | | |
| 1.3 | Hard, Br, Mottled Gr, Low Plasticity, Sl Moist | | | | | | | | | |
| 1.4 | | | | | | | | | 450 | |
| 1.5 | | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | SILTY SANDY CLAY (CI) | | | | | | | | | |
| 2.1 | Stiff, Br, Gr, Medium Plasticity, ***Very Moist*** | | | | | | | | | |
| 2.2 | | | | | | | | | 100 | |
| 2.3 | | | | | | | | | | |
| 2.4 | | | | | | | | | | |
| 2.5 | CLAYEY SAND (SC) | | | | | | | | | |
| 2.6 | Dense, Pale Br, Mottled Gr, Sl Moist | | | | | | | | | |
| 2.7 | | | | | | | | | | |
| 2.8 | | | | | | | | | | |
| 2.9 | | | | | | | | | | |
| 3.0 | | | | | | | | | | |
| 3.1 | | | | | | | | | | |
| 3.2 | | | | | | | | | | |
| 3.3 | | | | | | | | | | |
| 3.4 | | | | | | | | | | |
| 3.5 | | | | | | | | | | |
| 3.6 | | | | | | | | | | |
| 3.7 | | | | | | | | | | |
| 3.8 | | | | | | | | | | |
| 3.9 | | | | | | | | | | |
| 4.0 | SILTY CLAY (CH) – Hard, Br, Gr, Becoming Yell-Br, High Plasticity, Moist | | | | | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

**BORELOGS CONTINUED**

| Bore Log 22 | | | | | |
|---|---|---|---|---|---|
| **Site Address:** Lot 4 #260 Mitchell Road, Bromelton | | **Date Drilled:** 7th July 2021 | | **Job Number:** G21/109 | |
| Depth (m) | Soil Description # 22 | | FILL | PP | DCP |
| ~BORELOGS CONTINUED FROM PREVIOUS PAGE~ | | | | | |
| 4.1 | | | | | |
| 4.2 | | | | | |
| 4.3 | | | | | |
| 4.4 | | | | | |
| 4.5 | | | | 450 | |
| 4.6 | | | | | |
| 4.7 | | | | | |
| 4.8 | | | | | |
| 4.9 | | | | | |
| 5.0 | | | | 500 | |
| 5.1 | | | | | |
| 5.2 | | | | | |
| 5.3 | | | | | |
| 5.4 | | | | | |
| 5.5 | EXTREMELY WEATHERED ROCK (XW) | | | | |
| 5.6 | | | | | |
| 5.7 | UTP - END BOREHOLE 21 | | | | |
| 5.8 | | | | | |
| 5.9 | | | | | |
| 6.0 | | | | | |

**DRILLING TERMINOLOGY:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UTP | Unable to penetrate | R | Refusal | | | | | | |
| DCP | Dynamic Cone Penetrometer | PP | Pocket Penetrometer | SPT | Standard Penetrometer Test | VS | Vane Shear | | |
| DS | Disturbed Sample | UD | Undisturbed Sample | BS | Bulk Sample | | | | |
| Br | Brown | Gr | Grey | Yell | Yellow | Or | Orange | Wt | White |
| Dk | Dark | Lt | Light | Pl | Pale | | | | |

# APPENDIX B – LAB RESULTS

www.biotrack.com.au
781 Mt Glorious Rd Highvale 4520

# Certificate of Analysis

**Signatory:**

Phone: +617 3289 7179 Bio-Track Pty Ltd ABN 91 056 237 275

| **Test Code/Name** | **[32] Electrical Conductivity Soil (1:5)** | | |
|---|---|---|---|
| **Lab Reference (LR)** | **080721.615** | Client Name | East Coast Geotechnical |
| **SampleID** | **All Samples** | Client Contact | Julian Lockwood |
| | | Project Name | Aggressive Testing |
| Report Date | 14/07/2021 | Job Number | 621/109 |
| Sample Received Date | 8/07/2021 | Order Number | 6687 |
| Sample Disposal Date | 6/09/2021 | Chain of Custody | |
| Sample Packaging | Plastic Bag | Client Email | manager@eastcoast-geotech.com.au |
| Temperature | Ambient | Client Address | P.O Box 31 Acacia Ridge Brisbane Queensland 4110 |

**Analytical Method:** 1:5 in deionised water. 30 minute rolling shake. Measurement by pH probe.

| S# | SampleID | Electrical Conductivity dS/m | pH | Chloride mg/L |
|---|---|---|---|---|
| 1 | TS_1 CLAY 600-800 | **0.41** | ***NM** | ***NM** |
| 2 | TS_2 CLAY 500-700 | **0.48** | ***NM** | ***NM** |
| 3 | TS_4 SAND 600-800 | **0.49** | ***NM** | ***NM** |
| 4 | TS_7 CLAY 500-700 | **1.08** | ***NM** | ***NM** |
| 5 | TS_8 SAND 1000 | **0.59** | ***NM** | ***NM** |
| 6 | TS_9 CLAY 600-700 | **0.11** | ***NM** | ***NM** |
| 7 | TS_15 CLAY 400-600 | **0.43** | ***NM** | ***NM** |
| 8 | TS_15 SAND 1500-1600 | **0.36** | ***NM** | ***NM** |
| 9 | TS_15 SAND 2800 | **0.12** | ***NM** | ***NM** |
| 10 | TS_17 CLAY 1800-1900 | **0.63** | ***NM** | ***NM** |
| 11 | TS_18 SAND 600 | **0.05** | ***NM** | ***NM** |
| 12 | TS_20 CLAY 500-700 | **0.11** | ***NM** | ***NM** |
| 13 | TS_23 SAND 200-500 | **0.04** | ***NM** | ***NM** |
| 14 | TS_24 SAND 200-500 | **0.09** | ***NM** | ***NM** |

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# Certificate of Analysis

**Signatory:**

Phone: +617 3289 7179 Bio-Track Pty Ltd ABN 91 056 237 275

| **Test Code/Name** | **[34] Emerson Class** | | |
|---|---|---|---|
| **Lab Reference (LR)** | **150721.430** | Client Name | East Coast Geotechnical |
| **SampleID** | **All Samples** | Client Contact | Julian Lockwood |
| | | Project Name | Aggressive Testing |
| Report Date | 16/07/2021 | Job Number | 621/109 |
| Sample Received Date | 8/07/2021 | Order Number | 6687 |
| Sample Disposal Date | 13/09/2021 | Chain of Custody | |
| Sample Packaging | Plastic Bag | Client Email | manager@eastcoast-geotech.com.au |
| Temperature | Ambient | Client Address | P.O Box 31 Acacia Ridge Brisbane Queensland 4110 |

**Analytical Method:** As per Emerson, WW 1967, A classification of soil aggregates based on their coherence in water. *Australian Journal of Soil Research*, 5: 47-57.

| S# | SampleID | Emerson Class |
|---|---|---|
| 1 | TS_1 CLAY 600-800 | **1** |
| 2 | TS_7 CLAY 500-700 | **1** |
| 3 | TS_9 CLAY 600-700 | **2** |
| 4 | TS_15 CLAY 400-600 | **4** |
| 5 | TS_20 CLAY 500-700 | **4** |

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# Certificate of Analysis

**Signatory:**

Phone: +617 3289 7179 Bio-Track Pty Ltd ABN 91 056 237 275

| **Test Code/Name** | **[15] Aggressive Soil Suite #1 for AS2159 Piling Code** | | |
|---|---|---|---|
| **Lab Reference (LR)** | **150721.431** | Client Name | East Coast Geotechnical |
| **SampleID** | **All Samples** | Client Contact | Julian Lockwood |
| | | Project Name | Aggressive Testing |
| Report Date | 15/07/2021 | Job Number | 621/109 |
| Sample Received Date | 8/07/2021 | Order Number | 6687 |
| Sample Disposal Date | 13/09/2021 | Chain of Custody | |
| Sample Packaging | Plastic Bag | Client Email | manager@eastcoast-geotech.com.au |
| Temperature | Ambient | Client Address | P.O Box 31 Acacia Ridge Brisbane Queensland 4110 |

**Analytical Method:** As per ASTM G187 - 12 a. Resistivity **R**15.5 standardised to a resistance at 15.5'C (per ASTM G187 - 12 a) Resistivity will be ***lower*** at temperatures above 15.5 'C which may apply to field conditions.

# Resistivity at reported temperature

* NM = Not Measured

| S# | SampleID | Resistivity (Ohms.cm) # | Temp # 'C | Resistivity (Ohms.cm) R15.5 | pH |
|---|---|---|---|---|---|
| 1 | TS_2 CLAY 500-700 | 380 | 22 | 440 | 5.8 |
| 2 | TS_7 CLAY 500-700 | 450 | 22 | 520 | 7.0 |
| 3 | TS_8 SAND 1000 | 470 | 22 | 550 | 8.7 |
| 4 | TS_17 CLAY 1800-1900 | 290 | 22 | 340 | 7.8 |

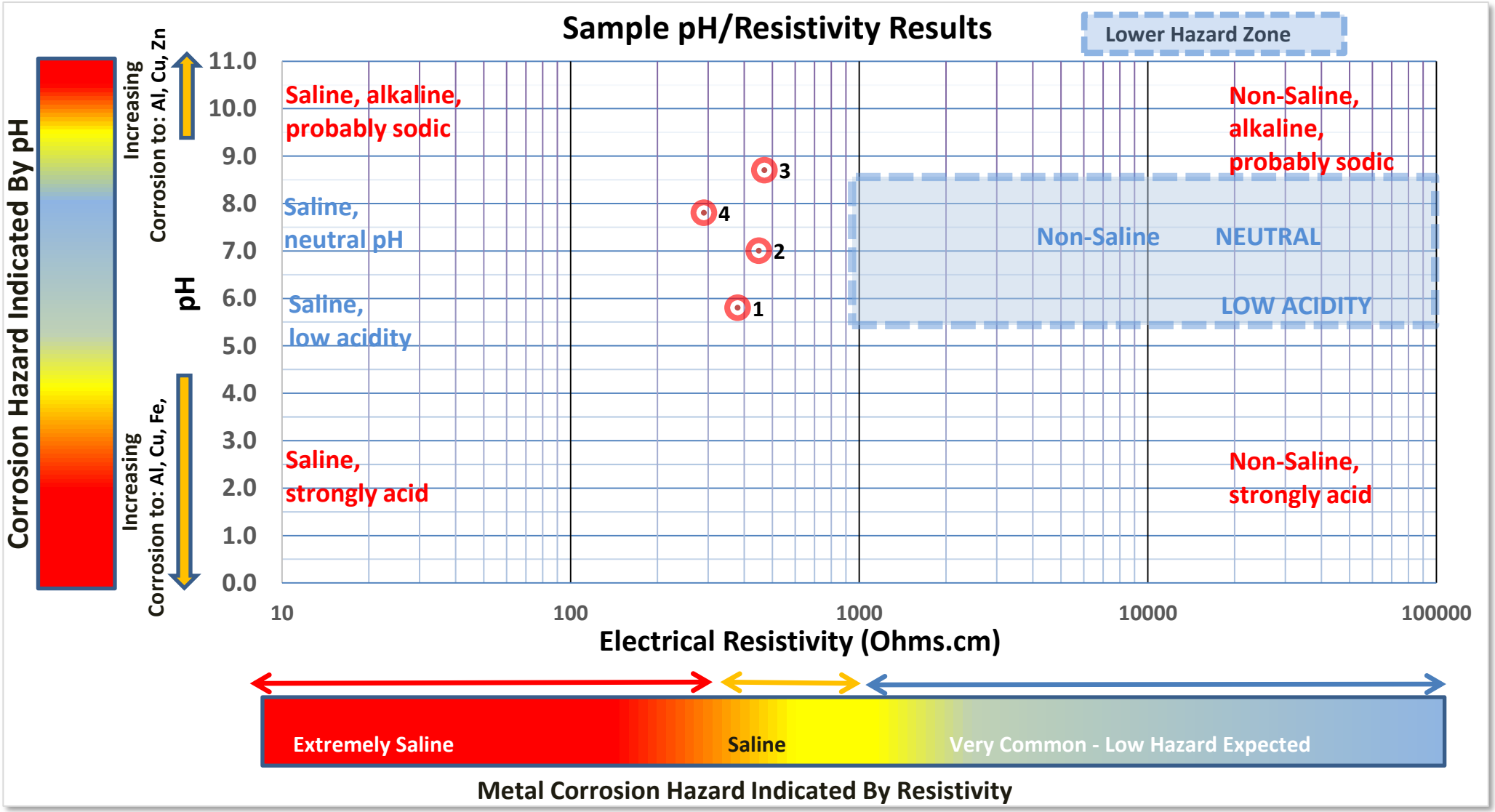
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# Certificate of Analysis

**Signatory:**

Phone: +617 3289 7179 Bio-Track Pty Ltd ABN 91 056 237 275

| Test Code/Name | [15] Aggressive Soil Suite #1 for AS2159 Piling Code | | |
|---|---|---|---|
| Lab Reference (LR) | 150721.431 | Client Name | East Coast Geotechnical |
| SampleID | All Samples | Client Contact | Julian Lockwood |
| | | Project Name | Aggressive Testing |



# CERTIFICATE OF ANALYSIS

Analysis By: Bio-Track Pty Ltd
ABN 91 056 237 275
Mt. Glorious Road
Highvale, Brisbane, Australia, 4520
Ph. 07 3289 7179 Fx. 07 3289 7155

DATE OF REPORT 16 JULY 2021 Page 1 of 1 Report Pages.
CLIENT NAME Julian Lockwood c/o East Coast Geotechnical
CLIENT ADDRESS P.O Box 31 Acacia Ridge Brisbane 4110
PROJECT NAME Aggressive Testing YOUR PROJECT/JOB REFERENCE 621/109
SAMPLING DATE NUMBER OF SAMPLES 4 SAMPLE TYPE:Soil/Solid
PACKAGING Plastic Bag ** SAMPLES DISPOSED ON 13/09/2021
DATE RECEIVED 15/07/2021 10:18:32 AM LAB REF. LR150721.431

METHODOLOGY: EC Cl as 1:5, pH 1:2.5; air dried soil in water, 30 minute rolling shake, Cl by ion selective electrode. S as 1:40 IN KCl extract measured by ICP OES. RESIS:soil resistivity per AS1289.4.4.1 SO4 calculated as S x 3 SO3 calculated as S x 2.5

| SAMPLE ID | EC | pH | Cl | S | SO4 | SO3 | RESIS |
|---|---|---|---|---|---|---|---|
| mm depth | dS/m | | mg/kg | mg/kg | % | % | ohm-cm |
| TS_2CLAY 500-700 | 0.48 | 5.8 | 650 | 56 | <0.1 | <0.1 | 380 |
| TS_7CLAY 500-700 | 1.08 | 7.0 | 1500 | 19 | <0.1 | <0.1 | 450 |
| TS_8SAND 1000- | 0.59 | 8.7 | 550 | 44 | <0.1 | <0.1 | 470 |
| TS_17CLAY 1800-1900 | 0.63 | 7.8 | 750 | 12 | <0.1 | <0.1 | 290 |

Signatory

For and behalf of Bio-Track Pty Ltd

***REPORT LIMITATIONS***

Our commission from our client was to establish test sites as shown and then undertake geotechnical testing aimed at providing parameters for proposed design. Under normal circumstances the attached log sections should be representative of the soil conditions over this site, however in some cases, soil conditions can change dramatically over short distances and even careful exploration programmes may not locate all the variations. If footing excavations reveal soil conditions differing from those shown on the log sheet in this report, we recommend that we be immediately notified so that further exploration can be carried out and the designer of the footings then notified to consider the influence of the changes to the design.

In this report we have attempted to convey to the designer of the footings as much information about the site and conditions so that an economical and practical footing can be designed.

In writing this report, we have also considered all the information supplied to us by our client. Should the client or his agent have omitted to supply us with relevant information, our report may be irrelevant and/or inappropriate. We do not take responsibility for the consequences in such cases and we will make an additional charge if as a result, more testing or rewriting of this report is necessary.

This report has been signed in blue ink. If the signature on this report is in black ink, you are reading a photocopy.

This report has not taken into consideration the long-term effects of any previous, current or potential sub-surface work by mining companies, developers or local authority or potential slope instability problems. At the time of writing this report, neither our client (nor his agent) nor the local authority had made us aware that these problems may be affecting this allotment. If a mining subsidence or slope stability assessment is required for this allotment to obtain building approval, we can arrange for this to be done, but that type of report is beyond the scope of our commission and fees in this report.

***SITE CLASSIFICATIONS***

Australian Standard AS 2870-2011 establishes performance requirements and specific designs for common foundation conditions as well as providing guidance on the design of footing systems using engineering principles. Site classes for AS 2870 are presented IN the Table below.

| Site Class | Foundation | Characteristic Surface Movement |
|---|---|---|
| A | Most sand and rock sites with little or no ground movement from moisture changes. | |
| S | Slightly reactive clay site, which may experience only slight ground movement from moisture changes | 0 – 20 mm |
| M | Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes | 20 – 40 mm |
| H1 | Highly reactive clay sites, which experience high ground movement from moisture changes | 40 – 60 mm |
| H2 | Highly reactive clay sites, which may experience very high ground movement from moisture changes | 60 – 75 mm |
| E | Extremely reactive site, which may experience extreme ground movement from moisture changes | >75 mm |
| P | Sites which include filled site (refer to AS 2870 2, 4, 6), soft soils, such as soft clay or silt or loose sands; landslip: mine substance: collapsing soils: soils subject to erosion: reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise. | |

Reactive sites are sites consisting of clay soils that swell on wetting and shrink on drying, resulting in ground movements that can damage lightly loaded structures. The amount of ground movement is related to the physical properties of the clay and environmental factors such as climate, vegetation and watering. Higher probability of damage can occur on reactive sites WITH abnormal moisture conditions, as defined in AS 2870, due to factorS such as:

- Presence of trees on the building site or adjacent site, removal of trees prior to or after construction, and the growth of trees too close to a footing. The proximity of trees and their effect on foundation should be considered when determining building areas within each allotment (refer to AS 2870)
- Failure to provide adequate site drainage or lack of maintenance of site drainage, failure to repair plumbing leaks and excessive or irregular watering of gardens:
- Unusual moisture conditions caused by removal of structures, ground covers ( such as pavements), drains, dams, swimming pools, tanks, etc.

## *DEFINITIONS*

In our log section we describe filled ground as stated below. It must be remembered that when sampling boreholes, particularly in alluvial soils, some top soils and other natural soils are indistinguishable from fill, therefore can be logged as fill and vice versa.
All sites with fill deeper than the limits prescribed in AS 2870 have been classified as Class "P". A predicted surface movement ($Y_s$) has also been supplied. The design engineer must make allowances for both possible limited bearing and reactivity affecting the footings.

**CONTROLLED FILL**
Fill which has been placed under supervision and at the time of writing this report we have received written certification from a Geotechnical Testing Authority that this fill complies with either Level 1 or 2 as defined in A.S. 3798. Certification of fill as controlled does not equate with STABLE conditions for design purposes.

**UNCONTROLLED FILL**
Fill other than controlled fill consists of many forms. In all cases consideration should be given to design by engineering principles.

**VIRTUALLY FLAT**
Visually assessed as minor levelling only required to form a level construction pad.

**GENTLY SLOPING**
Visually assessed as having gradient of less than 1:25.

**MODERATELY SLOPING**
Visually assessed as having gradients in the order of 1:12 to 1:25.

**STEEPLY SLOPING**
Visually assessed as having gradients in the order of 1:5 to 1:12.

**VERY STEEPLY SLOPING**
Visually assessed as having gradients steeper that 1:5.

**UNEXCAVATABLE ROCK**
Any material which is similar to that described in Clause 1.8.47 of A.S. 2870-1996. Strong material including shaley material and strongly cemented sand or gravel that does not soften in water. Material that cannot **readily** be excavated by a conventional backhoe with a normal bucket* may be taken to be rock.

**EXCAVATABLE ROCK**
A rock-like material which does not shrink or swell with changes in soil moisture, but is readily excavatable with a conventional backhoe with a normal bucket.*

**GRAVEL**
Coarse soil particles, larger than sand size, but less than 60mm in diameter. Generally 2mm to 60mm in size.

**ROCK FLOATERS**
Pieces of rock in a soil profile larger than 60mm, but can range up to well over a metre in diameter. Where these rock floaters form a layer or mat within the soil profile and difficulty is encountered in excavating them, subject to the geotechnical consultant, they may be taken to be the same as unexcavatable rock. For the purpose of this report cobbles and boulders are the same as rock floaters.

**A rubber tyred machine similar in power to a Case 580 series using a 300mm wide bucket.*

**Services Offered by East Coast Group of Companies**

Bore Hole Drilling

Bracing, Framing and Tie Down

CBR Test

Contamination Testing

Cut and Fill Design

Density Testing

Footing Design

Inspections and Certifications

Investigation of Structural Failures

Percolation Testing

Retaining Wall / Fences

Site Contours

Site Investigations

Site Management on Small Developments

Site Visits

Slope Stability

Steel Screw Piling

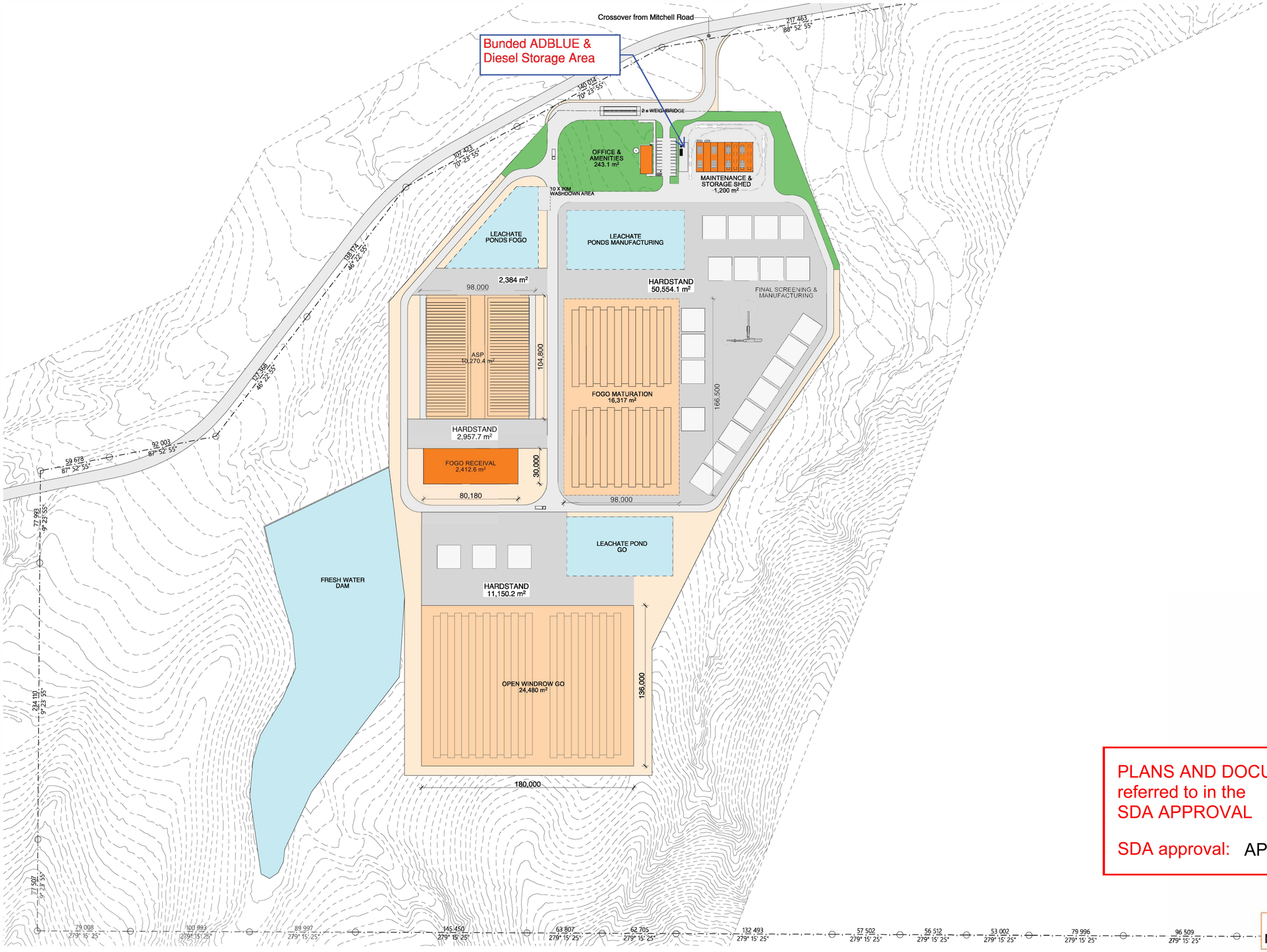
Sheet Piling

Structural Design

Subdivisional Area Investigation and Certification of Earthworks

Timber Piling

Wind Ratings




PLANS AND DOCUMENTS referred to in the SDA APPROVAL

SDA approval: AP2024/011

Queensland Government

DA
NOT FOR CONSTRUCTION

elevation architecture

**Contact**
(07) 3251 6900
20 Prospect St, Fortitude Valley QLD 4006
info@elevationarchitecture.com.au

**Revision**

| | | |
|---|---|---|
| A | Preliminary DA Set | 19/07/2024 |
| B | DA Information Request | 21/03/2025 |

**Project**
Bromelton Compost Manufacturing Facility
Lot 4 Mitchell Road Bromelton 4285

**Client**
SOILCO

**Stage**
DA

**Status**
Peliminary
NOT FOR CONSTRUCTION

**Architect**
GA

**Drawn**
ZB

**Project No.**
1384-02

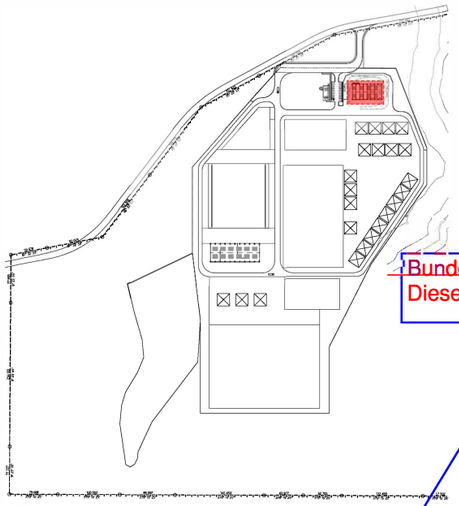
**Scale**
1:1500 at A1

Proposed Site Plan

**A-DA-01.02** **B**

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P:\Data 1\1384-02 Bromelton Compost Manufacturing Facility\5.2 Development Application\5.2.1 Arch\CAD\1384-02_Site Master DA.R 27.pln

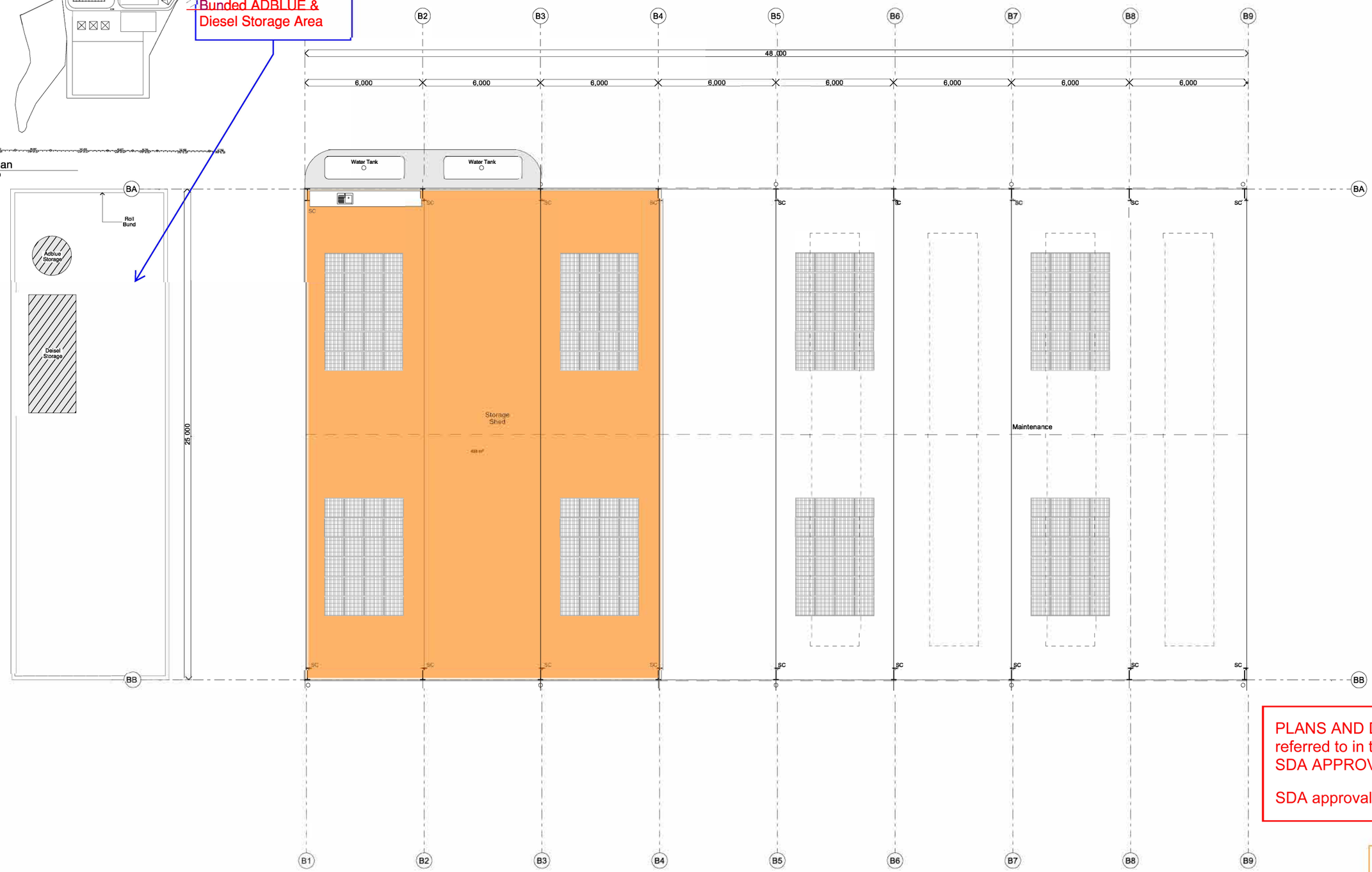


2 Key Plan
Scale 1:5000

Bunded ADBLUE &
Diesel Storage Area

LEGEND

DP Downpipe
SC Structural Column




PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

DA
NOT FOR CONSTRUCTION

elevation architecture


**Contact**
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20 Prospect St, Fortitude Valley QLD 4006
info@elevationarchitecture.com.au


**Revision**

| | | |
|---|---|---|
| A | Preliminary DA Set | 19/07/2024 |
| B | DA Information Request | 21/03/2025 |

**Project**
Bromelton Compost Manufacturing Facility
Lot 4 Mitchell Road Bromelton 4285

**Client**
SOILCO

**Stage**
DA

**Status**
Peliminary
NOT FOR CONSTRUCTION

**Architect**
GA

**Drawn**
ZB

**Project No.**
1384-02

**Scale**
1:100, 1:5000
at A1

Floor Plan - Ground - Maintenance & Storage Shed

**A-DA-03.02** **B**


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P:\Data 1\1384-02 Bromelton Compost Manufacturing Facility\5.2 Development Application\5.2.1 ArchiCAD\1384-02_Site Master DA!R 27.pln

SOILCO
The Life-Giving Soil Company

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

# PR1118- Bromelton CMF

Environmental Management Plan

**11 April 2025**

SOILCO Pty Ltd
1300 254 443 | info@soilco.com.au | soilco.com.au
PO Box 199 Unanderra NSW 2526
ABN 85 055 303 243

# Bromelton CMF- Document Description

**Revision Schedule**

| Date | Revision | Issue | Prepared By | Approved By |
|---|---|---|---|---|
| 14/08/2024 | Draft A | Draft A (GHD) | L Hughes<br>S Wilson | E Rothwell |
| 22/08/2024 | Rev 00 | Rev 00 (GHD) | G Robertson<br>S Wilson | S Wilson |
| 11/10/2024 | Rev 01 | Rev 01 (GHD) | G Robertson | S Wilson |
| 11/04/2025 | Rev 05 | Rev 02 (GHD) | S Wilson | E Rothwell |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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# 1. Background

SOILCO commenced composting operations in 1985 in Australia and has a strong distribution network in 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 our contribution to clean energy and sustainable communities.

SOILCO Pty Ltd (SOILCO) is a producer of organic soil improvers, manufacturing a range of soil, compost, and mulch products and specialising in the processing of organic waste through composting facilities and organics processing facilities. SOILCO currently has four approved and licensed facilities in New South Wales and is proposing to develop and operate a Compost Manufacturing Facility (CMF) in Southeast Queensland, approximately 80 km south-west of Brisbane and 62 km west of the Gold Coast (the Project).

## 1.1 Purpose of this document

The following Environmental Management Plan (EMP) has been prepared by SOILCO for the Compost Manufacturing Facility (CMF) located at 260 Mitchell Rd, Bromelton. 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 will design, construct and operate the Bromelton CMF Project. This EMP details the processes that occur on-site and how any potential impacts identified during the planning, approval, construction and operational phases will be controlled, monitored and reported.

### 1.1.1 Integrated management system

SOILCO operates an Integrated Management System (IMS) that combines all related components of a business into one system for easier management and operations. Quality (QMS), Safety (SMS) and Environmental (EMS) management systems are combined and managed as part of this IMS. The IMS ensures SOILCO focuses on delivering best practice service to its customers, staff and the community. SOILCO is committed to third-party certification and has designed and implemented its management system accordingly. The IMS is structured upon the requirements of:

- AS/NZS 9001:2016 – Quality Management Systems
- AS/NZS 45001:2018 – Occupational Health and Safety Management Systems
- AS/NZS 14001:2016 – Environmental Management Systems
- AS 4454:2012 – Composts, Soil Conditioners and Mulches
- AS 4419:2018 – Soils for Landscaping & Garden Use
- NHVR Regulations for Mass, Maintenance & Fatigue Modules
- NSW DPI Phylloxera
- NSW EPA Environment Protection Licences
- *Mines and Petroleum Regulation 2022*
- *Protection of the Environment Operations Act 1997*.

IMS certification will be conducted by a third-party certification body, providing confidence in the commitment, application, and continual improvement of SOILCO's management systems to our staff, customers and other interested parties.

The requirements specified are aimed primarily at achieving objectives, goals and commitments stated in SOILCO's Quality, Environmental and Safety Policies. External certification ensures and confirms that the technical, administrative, and human factors are identified and controlled, and that they satisfy the internal managerial needs of SOILCO. The systems also demonstrate SOILCO's capability to meet the required standards of quality to customers, regulatory bodies and interested parties as well as meeting the organisations own objectives within business capabilities.

The management system follows the "process approach" which incorporates the "Plan-Do-Check-Act (PDCA) Cycle" and "risk-based thinking" defined and promoted by ISO 9001, whereby desired results are achieved more efficiently through planning and management as well as review and addressing of risks and opportunities that threaten or may enhance objectives. The processes herein are considered in terms of adding value to SOILCO's overall product and service provision and will be continually improved based on objective measurements over the years.

The management system has also been structured following the "system approach to management", whereby a system of interrelated processes for a given objective have been identified, which in some cases satisfy the requirements of more than one standard i.e., management review. The management system also aims at facilitating the training and induction of new staff to allow them to rapidly achieve a high level of performance, thereby allowing SOILCO to continue to operate at its peak performance always.

Continual improvement principles and the prevention of non-conformities will be objectives of SOILCO to constantly improve the effectiveness of the management systems with the aim of enhancing customer satisfaction through meeting their requirements. Improvement initiatives will be reported upon and reviewed during regular Monthly Management Meetings.

The management of SOILCO understand that our customers' opinion of us is influenced by the behaviour of our staff, our ability to meet service and product requirements, enhance customer satisfaction and maintain long term relationships. Our customers are the centre of our business so meeting and exceeding customer needs forms a core focus of our business and, therefore, forms the basis of our quality system.

SOILCO ensures customer requirements are determined in the form of a specification for all sites (Environmental Management Plan) and projects (Contract Management Plan). For each site and project, SOILCO implements a straightforward structure utilising several key staff to ensure customer service and product requirements are met.

A copy of SOILCO's Environmental Policy is included in Appendix A.

### 1.1.2 Administration and control

This EMP and its associated Flowcharts, Roles and Responsibilities, Registers and Standard Forms are regularly reviewed by SOILCO management for continued compliance and relevance to the SOILCO business operation, as well as relevant standards. The EMP will be used as a reference tool to guide all staff through their day-to-day duties in a safe and efficient manner.

All SOILCO staff will have access to the relevant parts of the EMP and associated documents, procedures, and forms either electronically via the centralised SOILCO computer system or with up-to-date controlled copies on-site.

The location of all documents and records associated with the EMP are documented in the Forms Register (SOILCO001), which also serves as an archive and records register.

Revisions are scheduled and noted in the Forms Register. Minor changes are proposed and changed by the relevant divisional Manager and are approved by the Executive General Manager (EGM Finance & Operations). Changes to documentation shall be noted in the 'amendment records' tab of the Forms Register. Superseded copies of the EMP and related documents listed in the Forms Register, shall be placed in the 'Archive' electronic folder for reference. References in this EMP to accompanying documents are in italics.

# 2. Project overview

The Bromelton CMF Project aligns with objectives in the Queensland Government's Queensland Organics Strategy 2022–2032 by reducing the amount of organic waste going to landfill, and will offer economic and social benefits through employment and local business opportunities in South East Queensland. Table 1 below summarises the key components of the Bromelton CMF Project.

*Table 1* *Key Project components*

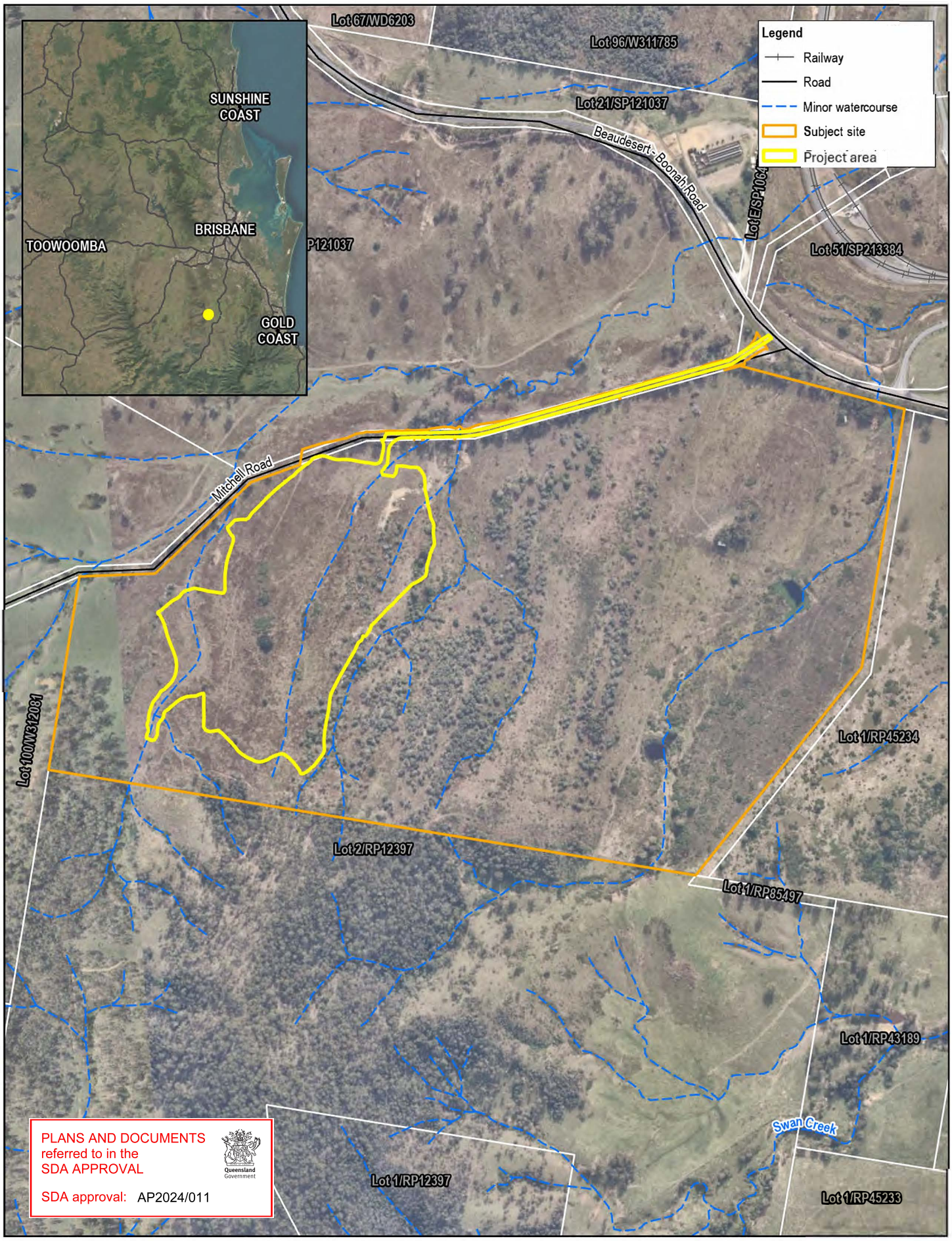
| Project Component | Details |
|---|---|
| Lot on Plan | Lot 4 on Plan RP85497 and Mitchell Road (local government road parcel) |
| Description of works | Operation of the Compost Manufacturing Facility (CMF) at 260 Mitchell Road, Bromelton for the sale and distribution of finished compost, mulch and soil products<br>The site will be split into 3 different processing areas: Receival, decontamination and composting utilizing Forced Aeration Pad system (ASP). |
| Construction disturbance area within Lot 4 on RP85497 | 21 ha |
| Operational footprint within Lot 4 on RP85497 | 18.5 ha |
| The output of the CMF 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.<br>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:<br>– 100,000 tpa of garden organics (GO) composted by Passive Open Windrow (OW) method.<br>– 150,000 tpa of Food Organics and Garden Organics (FOGO) is to be processed on a Forced Aeration Pad system (ASP).<br>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.<br>VENM will be received and stored as required based on demand of finished products.<br>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<br>– Weigh bridges<br>– Internal road network<br>– Maintenance and storage shed<br>– Final screening and manufacturing area<br>– Water tanks<br>– Aeration Pad system<br>– Office, carparking and amenities<br>– FOGO receival area<br>– 3x leachate ponds<br>– 1x freshwater dam<br>– Open windrows pad<br>– FOGO maturation pad<br>– Hardstand areas<br>– Lined leachate ponds<br>– Retaining wall<br>– Upgrade of Mitchell Road. |
| Hours of operation | Monday – Friday: 6am to 6pm<br>Saturday: 6am to 4pm<br>Sunday and public holidays: 9am to 4pm |
| Operational staff required | 22 employees |
| Access arrangements | Mitchell Road will connect the Bromelton CMF to the road network. Mitchell Road will be upgraded to accommodate the traffic from the Bromelton CMF. |
| Timeframe | Construction and Commissioning: 7 April 2025 – 30 January 2026 |

## 2.1 Project location

Table 2 and Figure 1 provides a summary of the key features of the CMF location.

***Table 2 Facility location – key features***

| Category | Description |
|---|---|
| Street Address | 260 Mitchell Road, Bromelton |
| Lot on Plan | Lot 4 on Plan RP85497 and Mitchell Road (road parcel) |
| Lot size | 160 ha |
| Longitude and latitude (approximate central lot coordinate) | -27.97834, 152.91454 |
| Local Government Area (LGA) | Scenic Rim Regional Council (SRRC) |
| Suburb | Bromelton |
| Tenure | Freehold |
| Categorising instrument | Bromelton SDA |
| Existing environmental conditions | **Lot 4 on RP85497**<br>Topography is a series of undulating hills and valleys, predominately cleared, previously used for grazing native vegetation.<br>**Mitchell Road**<br>Unformed road with trees. |




Paper Size ISO A4

0 50 100 150 200

Metres

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

N

GHD

SOILCO
The Life-Giving Soil Company

**SOILCO Pty Ltd**
**Bromelton Compost Manufacturing Facility**
**Terrestrial Ecology Assessment**

**Proposed subject site**

Project No. **12626213**
Revision No. **A**
Date **14/08/2024**

# FIGURE 1

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Print date: 14 Aug 2024 - 17:08

Data source: DoR: rail, watercourse (2023), cadastre (2024), road (2021); SoilCo: project area (2024); World Imagery: Earthstar Geographics public/NSW_POI: © Department of Finance, Services & Innovation 2018 nearmap.com: extracted 14/08/2024 . Created by: mvandermerwe

## 2.2 Feedstocks to be received at CMF

***Table 3 Feedstocks to be received at the site***

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| Animal manure<br>In small amounts for blending purposes only. No more than 200 tonnes onsite at any one time. | Up to a combined total of 250,000 tonnes per annum (tpa), including the other feedstocks. | Location 8 - will be used at the final manufacturing stage.<br><br>We noted that in the planning report that Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Manufacturing | Refer to flowchart of processes in Figure 2 and 3.<br>Inspected on arrival and stored appropriately | The material will be sourced appropriately from suppliers. | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | We noted that any feedstock with a higher odour risk rating would comprise a small fraction of the total and once mixed would have a much lower odour potential<br><br>Manure, soil and sand will be used for the manufacturing process as required. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| Bark, lawn clippings, leaves, mulch, pruning waste, sawdust, shavings, woodchip and other waste from forest products. | | Location 2 in Figure 2 and 3. | Aerated Static Pile (ASP) or Open Windrow (OW) | Refer to flowchart of processes in Figure 2 and 3. | Due to the nature of the materials received at the Facility and industry collection methods, any organic material received that has not been decontaminated and size reduced will first be processed through a decontamination line and shredded prior to ASP composting.<br>Material will be received in the drop off area of the decontamination building. The material will be visually inspected on the floor to ensure there is no excess contamination or hazardous materials in the load. Heavily contaminated loads, or loads containing hazardous materials will be rejected and disposed of to an appropriately licensed waste facility. A concrete bunker with 1,200 $m^3$ of capacity will allow for material to be stockpiled prior to being processed. | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DETSI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Wood waste may be sold as a mulch product on its own.<br>Lawn clippings and leaves will be included in the composting process. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Biosolids - Stabilised biosolids | | Location 4a, 5a, 6a in Figure 2 and 3. | ASP | Refer to flowchart of processes in F Figure 2 and 3. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 | Feedstocks would be received and processed within the material processing building | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| | | | | | | ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DETSI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | and that after this stage, all material will be well mixed and homogenised. | Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Cardboard and paper waste - paper mulch, paper pulp effluent, paper sludge dewatered. | | Location 2 in Figure 2 and 3. | ASP or OW | Refer to flowchart of processes in Figure 2 and 3. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| | | | | | | to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | | be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Compostable polylactic acid (PLA) plastics - compostable plastics produced in accordance with (a) AS 4736:2006 (Biodegradable plastics) or most recent or replaced version of that standard or (b) AS 5810:2010 (Biodegradable plastics - Biodegradable plastics suitable for home composting) or the most recent or replaced version of that standard). | | Location 2 in Figure 2 and 3. | ASP | Refer to flowchart of processes in Figure 2 and 3. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| | | | | | | material processing by composting, Version 1.02. | | management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Food and food processing waste (Expired/past used by date non-protein based food from supermarkets, expired beer, vegetable oil wastes and starches, vegetable waste, yeast waste, food processing effluent (wastewater) and solids (including sludges) from non protein based food) and (Food organics, expired/past used by date protein based food from supermarkets, brewery and distillery effluent and waste) and (Expired soft drinks, molasses waste, grain waste (hulls/waste grains), starch water waste, sugar and sugar solutions). | | Location 2 in Figure 2 and 3. | ASP | Refer to flowchart of processes in Figure 2 and 3. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Green waste - (leaves, grass clippings, pruning, tree branches from household maintenance). | | Location 2 in Figure 2 and 3. | ASP or OW | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Inorganic additives with beneficial properties - (bentonite, crusher dust, gypsum, lime and lime slurry (inert)). | | Location 8 in Figure 2 and 3, as this feedstock will be used at the manufacturing stage. | Manufacturing | Refer to flowchart of processes in Figure 2 and 3. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Added as part of the manufacturing process | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Wood waste from untreated timber - (Untreated pallets, offcuts, boards, stumps and logs, shavings, timber offcuts, crates, wood packaging). | | Location 2 in Figure 2 and 3. | OW or shredded<br><br>Note: Shredded wood waste may be sold as a mulch product on its own. | Refer to flowchart of processes in Figure 2 and 3. | Due to the nature of the materials received at the CMF and industry collection methods, any organic material received that has not been decontaminated and size reduced will first be processed through a decontamination line and shredded prior to ASP composting. Material will be received in the drop off area of the decontamination building. The material will be visually inspected on the floor to ensure there is no excess contamination or hazardous materials in the load. Heavily contaminated loads, or loads containing hazardous materials will be rejected and disposed of to an appropriately licensed waste facility. A concrete bunker with 1200 $m^3$ of capacity will allow for material to be stockpiled prior to being processed. | Three leachate ponds are proposed to handle the leachate runoff from the site, and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Wood waste may be sold as a mulch product on its own. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br><br>The EMP covers environmental controls to be implemented during the operational phase.<br><br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br><br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of feedstock processing type | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Assessment Report will be provided to the OCG. |
| Soils - (clean soil, clean mud, sand). | Up to a combined 150,000 tpa of sand and soil products. | Location 8 in Figure 2 and 3, the feedstock will be used at the manufacturing stage | Manufacturing | Refer to flowchart of processes in Figure 2 and 3. | Sourced appropriately from suppliers. | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of in excess of 30 ML. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Soil and sand will be used for the manufacturing process as required | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>The Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. Additionally, SOILCOs process flow diagram in Figure 2 and 3 provides detail about the feedstock management processes.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |




*Figure 2 The compost manufacturing process proposed for Bromelton Compost Manufacturing Facility plan*

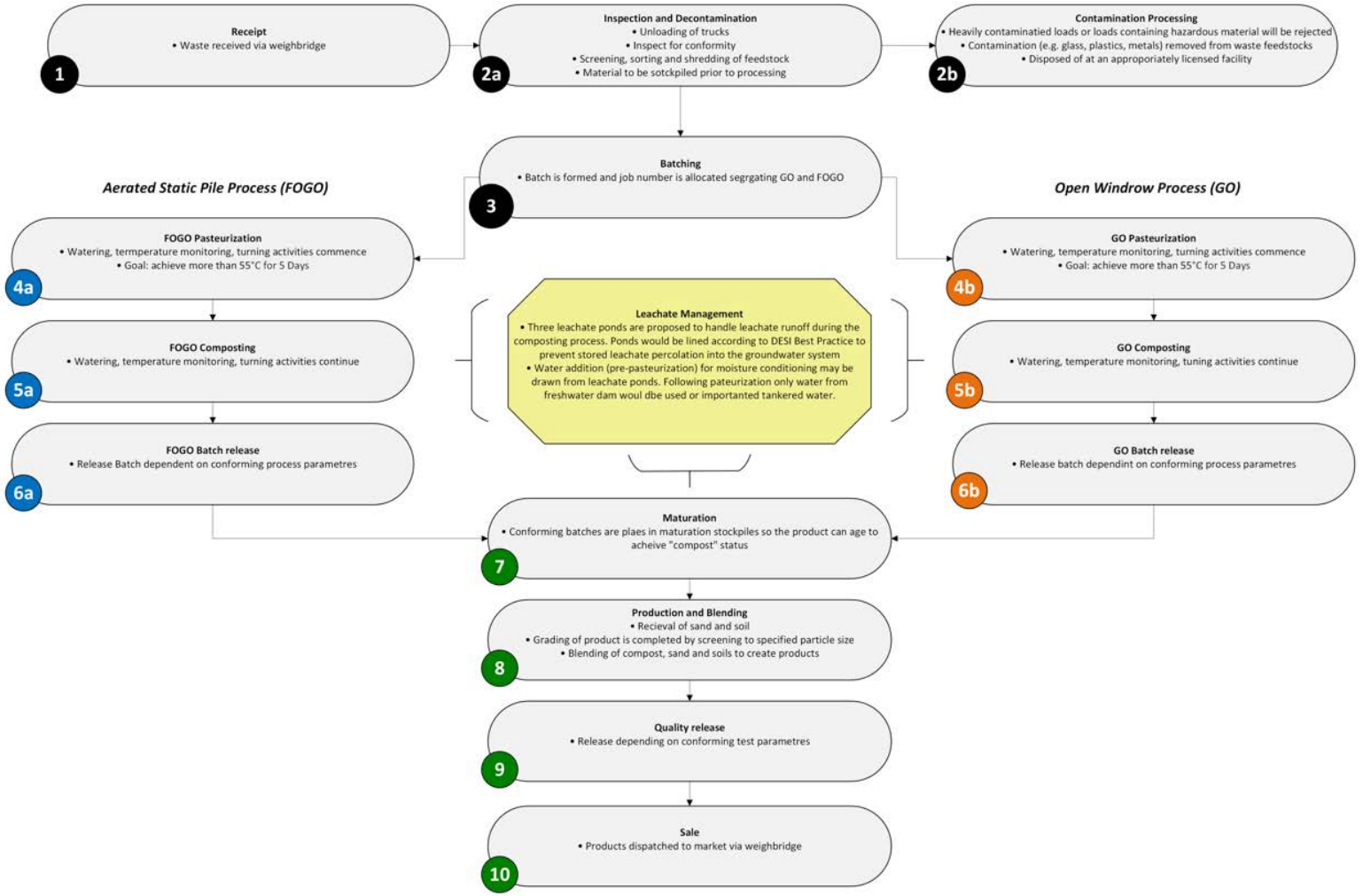



*Figure 3* *The compost manufacturing process proposed for Bromelton Compost Manufacturing Facility*

## 2.3 Project location

Table 2 and Figure 1 provides a summary of the key features of the CMF location.

***Table 4 Facility location – key features***

| Category | Description |
|---|---|
| Street Address | 260 Mitchell Road, Bromelton |
| Lot on Plan | Lot 4 on Plan RP85497 and Mitchell Road (road parcel) |
| Lot size | 160 ha |
| Longitude and latitude (approximate central lot coordinate) | -27.97834, 152.91454 |
| Local Government Area (LGA) | Scenic Rim Regional Council (SRRC) |
| Suburb | Bromelton |
| Tenure | Freehold |
| Categorising instrument | Bromelton SDA |
| Existing environmental conditions | **Lot 4 on RP85497**<br>Topography is a series of undulating hills and valleys, predominately cleared, previously used for grazing native vegetation.<br>**Mitchell Road**<br>Unformed road with trees. |

# 3. Overview of statutory framework

*Table 5 Overview of statutory framework for the Bromelton CMF Project*

| Legislation | Regulatory bodies | Description | Relevance to Project |
|---|---|---|---|
| **Commonwealth** | | | |
| *Environment Protection and Biodiversity Act 1999* | Department of Climate Change, Energy, the Environment and Water (DCCEEW) | The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. The EPBC Act provides the legal framework to protect and manage Matters of National Environmental Significance (MNES). There are currently nine MNES protected under the EPBC Act:<br>– World heritage properties<br>– National heritage properties<br>– Wetlands of international importance (Ramsar wetlands)<br>– Nationally listed threatened species and ecological communities<br>– Listed migratory species<br>– Commonwealth marine parks<br>– Great Barrier Reef Marine Park<br>– Nuclear actions (including uranium mining)<br>– A water resource, in relation to coal seam gas development and large coal mining development. | MNES that have potential or are likely to occur in the Project area being:<br>– White-throated needletail (*Hirundapus caudacutus*)<br>– Koala (*Phascolarctos cinereus*)<br>– Grey-headed flying fox (*Pteropus poliocephalus*)<br>– Yellow bellied glider (*Petaurus australis australis*)<br>– Greater glider *(Petauroides volans*).<br>Habitat for the five MNES species primarily occurs in the surrounding areas and not directly impacted by the Project area.<br>The exception is the presence of dispersal habitat for the koala and very limited foraging tree species for the grey-headed flying fox within the south section of Lot 4 on Plan RP85497 and koala habitat along Mitchell Road.<br>Provisions under the EPBC Act will be addressed for the Project. |
| **State** | | | |
| *State Development Public Works Organisation Act 1971*<br>Bromelton State Development Area Development Scheme | Department of State Development, Infrastructure and Planning (DSDIP) | The *State Development and Public Works Organisation Act 1971* (SDPWO Act) authorises the declaration of State Development Areas (SDAs) – clearly defined areas of land established by the Coordinator-General to promote economic development in Queensland. | The Project area is located within the Bromelton SDA and is subject to the Bromelton SDA Development Scheme under the SDPWO Act.<br>It meets the preferred development intent of the Area outlined within the Bromelton SDA Development Scheme and is defined as 'medium to large scale industrial activities of regional, state and national significance'.<br>An assessment against the provisions in the Bromelton SDA in outlined in **Section 6** of the **Town Planning Report**.<br>A SDA Material Change of Use (MCU) approval for works within the Bromelton SDA is being sought for the Project. Conditions of the SDA MCU approval will need to be considered in this document. |
| *Environmental Protection Act 1994* | Department of Environment, Tourism, Science and Innovation (DETSI) | The *Environmental Protection Act 1994* (EP Act) prescribes conditions through an Environmental Authority (EA), that operators must comply with to undertake environmentally relevant activities (ERAs). | An environmental authority (EA) under the EP Act is required for the CMF.<br>The operation of the CMF will require the following ERAs:<br>– ERA 33 Crushing, milling, grinding or screening<br>– ERA 53(a) Organic material processing |

| Legislation | Regulatory bodies | Description | Relevance to Project |
|---|---|---|---|
| | | ERAs are activities with the potential to release contaminants into the environment that will or may cause environmental harm. | • Processing more than 200 t of organic material in a year by composting.<br>– ERA 54 Mechanical waste processing<br>• 2(c) – operating a facility for receiving and mechanically reprocessing more than 10,000 t a year of general waste.<br>An EA for the ERAs is being sought for the Project. Conditions of the EA will need to be considered in this document |
| *Planning Act 2016* | Department of Housing and Public Work (DHPW) | The *Planning Act 2016* is the primary legislation governing planning and development in Queensland. It outlines the framework for creating and implementing planning instruments, policies and designations. The Act aims to achieve ecological sustainability and provides a system for plan-making and development assessment. | Part of the Project area within mapped core koala habitat area. The clearing of core koala habitat is exempted development under Schedule 10, Part 10 of the *Planning Act 201*, and does not trigger assessable development.<br>The Project area is located within the water supply buffer area which is managed by Seqwater. Therefore, the CMF will be required to be assessed against Chapter 4 of the *Seqwater Development Guidelines: Water Quality Management in Drinking Water Catchments* (Seqwater 2024).<br>This has been addressed in the SDA MCU approval for works within the Bromelton SDA. |
| *Aboriginal Cultural Heritage Act 2003* | Department of Women, Aboriginal and Torres Strait Islander Partnerships and Multiculturalism (DWATSIPM) | The *Aboriginal Cultural Heritage Act 2003* is legislation enacted by the Queensland Parliament to recognise, protect, and conserve Aboriginal cultural heritage in Queensland. It provides protection over areas and objects of traditional, customary and archaeological significance. | The Project area has been assessed as a Category 5 risk in accordance with the Cultural Heritage Duty of Care Guidelines under the *Aboriginal Cultural Heritage Act 2003*. Therefore, a cultural heritage management plan or cultural heritage agreement will be required to be developed with traditional owners under the *Aboriginal Cultural Heritage Act 2003*. |
| *Environmental Offsets Act 2014* | Department of Environment, Tourism, Science and Innovation (DETSI) | The *Environmental Offsets Act 2014* is legislation in Queensland designed to manage the environmental impacts of development. It aims to counterbalance significant residual impacts of development on environmental values by requiring offsets when unavoidable impacts occur. | Offsets under this Act may be required to counterbalance any significant residual impacts of the Bromelton CMF Project.<br>This has been addressed in the SDA MCU approval for works within the Bromelton SDA. |
| *Land Act 1994* | Department of Environment, Tourism, Science and Innovation (DETSI)<br>Department of Resources (DoR) | The *Land Act 1994* is a key piece of legislation in Queensland that regulates the ownership, use and management of land. It ensures the sustainable use and management of State land by providing guidelines for the allocation of land, including leasing and reservations. | The Project will involve works with Mitchell Road Reserve.<br>Mitchell Road will be upgraded to facilitate the access to the subject site. Scenic Rim Regional Council have determined that the road is to be upgraded to a class 4B – rural collector road and this entails an 8m formation and 7m carriageway. The upgraded will accommodate B-Double traffic. SOILCO has secured a separate development approval for operational works from Scenic Rim Regional Council for the upgrade of Mitchell Road. |

| Legislation | Regulatory bodies | Description | Relevance to Project |
|---|---|---|---|
| *Vegetation Management Act 1999* | Department of Resources (DoR) | The *Vegetation Management Act 1999* regulates the clearing of vegetation in Queensland in a way that:<br>– conserves remnant vegetation;<br>– ensures clearing does not cause land degradation; and<br>– prevents loss of biodiversity.<br>The Act provides for five 'Accepted development vegetation clearing codes'. Each code outlines the requirements for clearing vegetation for particular purposes and to achieve the desired environmental outcomes., offsets and voluntary declarations.<br>– Category A — vegetation that is subject to compliance notices, offsets and voluntary declarations<br>– Category B — remnant vegetation shown on a regional ecosystem or remnant map as an endangered regional ecosystem, an of concern regional ecosystem or a least concern regional ecosystem<br>– Category C— high-value regrowth vegetation<br>– Category R— regrowth watercourse area<br>– Category X— vegetation that is generally exempt from requirements under vegetation management laws. | The project footprint within Lot 4 RP85497 for the CMF will require the clearing of 21 ha of Category X vegetation.<br>The clearing of within the CMF Project area does not trigger approvals as the clearing of Category X area on freehold land is exempt development as outlined under Part 2, Schedule 21 of the Planning Regulation 2017.<br>The project footprint within Mitchell Road will require the clearing of:<br>- 0.5 ha of Category B Endangered and Of Concern regional ecosystems.<br>- 0.2 ha of Category X (non-remnant) vegetation.<br>The clearing within the Mitchell Road Reserve will be limited to 10 m wide and meets the clearing limits in Section 4.3 in Accepted Development Vegetation Clearing Code – Clearing for Infrastructure. |
| *Fisheries Act 1994* | Department of Primary Industries (DPI) | The *Fisheries Act 1994* provides Queensland's principal legislative framework for the regulation of commercial fishing, recreational fishing, indigenous fishing, coastal areas that are important as fisheries habitat and marine plants.<br>To protect and manage fish passage and fish habitat in Queensland waterways, waterway barrier works (when barriers to fish movement, including partial barriers, are installed across waterways) are regulated under the *Fisheries Act 1994* and the *Planning Act 2016*. | Two green low risk waterway barrier works waterways traverse the Project area (referred to as ACT1 and ACT2). The waterways details include:<br>– ACT1 – traverses outside of the CMF<br>– ACT2 – traverses through the centre of the CMF.<br>The two waterways (ACT1 and ACT2) are not considered to be suitable for fish passage or provide fish habitat for the following reasons:<br>– The waterways provide no connectivity and fish passage to upstream areas.<br>– The waterways do not provide suitable fish habitat features and there were evidence of fauna species within ACT1 and/or ACT2.<br>– There is no evidence of aquatic species recorded in waterways ACT1 and ACT2.<br>– ACT1 and ACT2 have reasonably poor water quality.<br>– No fish passage occurs due to absence of defined bed and banks, minimal flow and depth, no habitat features present and no upstream habitat. |

| Legislation | Regulatory bodies | Description | Relevance to Project |
|---|---|---|---|
| | | | – ACT 1 and ACT 2 are considered to be drainage depressions that carry overland flow water during and immediately after rainfall events; and flows for only a short duration after a rainfall event, regardless of the frequency of flow events; and does not have enough continuing flow to create a riverine environment.<br>DAF noted that ACT1 has a shallower gradient that allows for fish movement, defined bed and banks and shows evidence of fish habitats. DAF considered ACT1 to constitute a waterway as defined under the *Fisheries Act 1994* and any waterway barrier works within this waterway require authorisation. The works in this waterway include a dam could be undertaken under the Accepted Development Requirements, provided a spillway in accordance with the design requirements of work type 3.1 is included. SOILCO is seeking further clarification from DAF regarding waterway ACT1 based on the findings of the aquatic assessment. |
| *Water Act 2000*<br>*Water Plan (Logan Basin) 2007* | Department of Local Government, Water and Volunteers (DLGWV) | The *Water Act 2000* provides a framework for the planning, allocation and use of surface water and groundwater in Queensland, including regulating major water impoundments (e.g. dams and weirs) and extraction through pumping for irrigation and other uses.<br>Water plans are developed under the Water Act to sustainably manage and allocate water resources in Queensland. | One minor watercourse intersects the centre of the Project area (ACT2) and is classified as 'Unmapped' under the *Water Act 2000*. Pre-lodgement advice from DRDMW, confirmed that no approvals are triggered for the water feature.<br>DRDMW also confirmed that no approvals under *Water Plan (Logan Basin) 2007* are required for the freshwater dam, and no authorisations are required to take/use water from the dam under this Water Plan. |

# 4. Existing environment

A summary of the existing condition of key environmental aspects that have the potential to be impacted by the works associated with the construction and operational phases of the CMF is provided in Table 6 below. Potential approval triggers and additional investigations recommended for consideration in the next phase of the Project are also covered.

The existing condition of each environmental aspect and notable legislative requirements have been recorded in relation to the modifications proposed as part of the Project.

***Table 6*** ***Existing condition of key environmental aspects and notable legislative requirements***

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| **Land** | | | | |
| Bushfire hazard | *State Development and Public Works Organisation Act 1971* | Fire weather<br>Vegetation (fuel load)<br>Slope and aspect<br>Ignition sources | The majority of the development footprint is outside the Bushfire Prone Area (BPA) and consequently avoids areas of bushfire risk. Additionally, the Project can be adequately separated from nearby hazardous vegetation and does not include significant changes to the vegetation hazard class adjacent to the development footprint, therefore it is not expected to increase the severity of bushfire hazard. The development footprint is on land that is largely cleared of vegetation and is not steeply sloping.<br>A Bushfire Hazard Assessment and Management Plan (Appendix B) has been developed for the CMF to address the requirements in the Bromelton SDA Development Scheme. The Bushfire Hazard Assessment and Management Plan 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 Queensland Fire and Emergency Services. The bushfire risk is expected to be low to moderate. There are several mitigation measures to manage bushfire risk such as asset protection zones, fencing, water supply, fire-fighting infrastructure, revegetation, and fuel load management.<br>The Queensland Fire and Emergency Services (renamed Queensland Fire Department in July 2024) Catalyst Fire Management System includes Forest Fire Danger Index (FFDI) mapping which is climate-adjusted for a five percent annual exceedance probability (AEP) fire weather event in 2050.<br>Vegetation can impact fire intensity Vegetation classification is an indicator of fire intensity and fire behaviour, associated with specific types of vegetation. Vegetation communities within 150 m of the Project footprint form the basis of the assessment required as part of the Bushfire Resilient Communities Guidelines. | Section 6.4.1.1 |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | | | The broad vegetation group present within 150 m of the Project footprint is Eucalypt woodlands to open forests; with a surface potential fuel load of 16.3 t/ha, and a total potential fuel load of 20.8 t/ha.<br>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.<br>The development footprint generally maintains a northerly and north-westerly aspect.<br>Ignition sources in the area surrounding the Project area may include:<br>– Accidental ignition from agricultural and extractive industry uses and other machinery and equipment<br>– Sparking<br>– Roadside ignition (potentially caused by cigarette butts thrown from vehicles)<br>– Arcing powerlines<br>– Other rural and industrial activities<br>– Ignitions may also occur from activities on nearby rural residential properties such as lawnmowing and use of power tools.<br>The ignition potential of the CMF, may occur from various activities on-site, including use of machinery and fuel storage. Ignition from the composting process itself may also occur. | |
| Landscape | *State Development and Public Works Organisation Act 1971* | Visual amenity | A Visual Impact Assessment (VIA) was completed to outline the potential visual amenity impacts of the CMF and to address the requirements in the Bromelton SDA Development Scheme.<br>The landscape within the Project area contains the Bromelton SDA, heavy and high-impact industries, undulating farmland, recreational areas, and elevated upland and ridges.<br>The topography of the Project area is a landscape characterised by gently undulating and rolling hills, ridges and valleys. It encompasses various major and minor creeks such as Swan Creek, Sandy Creek and Allan Creek. The Project area has a diverse array of vegetation, featuring native woodlands and forests, grasslands and revegetation native trees.<br>The VIA was undertaken with seven representative viewpoints selected for assessment. The outcome of this process indicates that the visual impacts of | Section 6.4.1.2 |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | | | the Project are anticipated to be moderate-low to negligible as overall the site is well-screened by intervening landform and vegetation. | |
| | *State Development and Public Works Organisation Act 1971*<br>*Environmental Protection Act 1994* | Potential and actual acid sulfate soils (ASS) (elevation ≤5 m AHD) | Acid sulfate soils generally occur in coastal areas lower than 5 m AHD and can be found at elevations below 20 m AHD. Mapping on Queensland Globe, combined with the site being located at over 100 m AHD indicates that the site is not likely to contain acid sulfate soils. Acid sulphate soils are not considered to be present within the Project area due to the Project area being located above 20m AHD. An assessment of ASS was undertaken to address the requirements in the Bromelton SDA Development Scheme. | Section 6.4.1.3<br>Section 6.4.1.8 |
| | *State Development and Public Works Organisation Act 1971*<br>*Environmental Protection Act 1994* | Dispersive soils | A review of the Australian Soil Classification mapping (Queensland Globe 2024) shows the six unique soil classifications with the Project area. The main soil types within the site are classified as chromosols, kurosols, dermosols, ferrosols, and sodosols. | |
| | *State Development and Public Works Organisation Act 1971*<br>*Environmental Protection Act 1994* | Geology and topography | The Queensland Government 1:100,000 Detailed Surface Geology spatial layer (GeoRes Globe 2024) shows that, within the Project area, the surface geology is made up of three rock units; however, the Project footprint is comprised of only the Koukandowie Formation and the Heifer Creek Sandstone Member.<br>The Project area is described as undulating terrain. The general contour of the Project area has an increasing 15 m slope from the western to the eastern extent. Within the Project area, the terrain is relatively even, with the southern extent having the highest elevation of 145 m AHD and the northern extent (Mitchell Road) having the lowest height of 100 m AHD. | |
| Terrestrial biodiversity | *Environment Protection and Biodiversity Conservation Act 1999* | Matters of National Environmental Significance (MNES) | **Threatened ecological communities**<br>A desktop assessment indicated that six threatened ecological communities (TECs) have the potential to occur within the Project area. A field survey, undertaken on 10 and 12 April 2024, assessed the vegetation communities within the Project area to determine the presence of any TECs.<br>The survey identified no vegetation communities within the Project area confirmed to align with any TECs. Only one type of vegetation community that could potentially align with a TEC was recorded; regrowth patches of RE 12.9-10.3, dominated by Eucalyptus moluccana.<br>RE 12.9-10.3 may align with the 'Grey box-grey gum wet forest of subtropical eastern Australia' TEC (DCCEEW, 2022). This vegetation community occurs within the Project footprint along Mitchell Road. | Section 6.4.1.4 |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | | | Multiple patches were assessed against the relevant TEC criteria, including the key diagnostic characteristics and condition thresholds. One of the key diagnostic characteristics of this TEC is to have a canopy containing grey box (*Eucalyptus moluccana*) and grey gums (*E. propinqua*, *E. punctata*); however only grey box individuals were recorded.<br>Due to the lack of grey gums (*E. propinqua*, *E. punctata*) and the poor quality of the habitat; the TEC criteria were not met, and this TEC was evaluated as being 'unlikely to occur' as part of the likelihood of occurrence assessment.<br>**Threatened fauna species**<br>There were no conservation significant fauna species identified during field surveys; however, a likelihood of occurrence assessment was completed based on habitat assessments undertaken during the field survey.<br>Five MNES were assessed as 'likely to occur' or having the 'potential to occur' within the Project area. Specifically, five listed fauna species were identified, one of which is also listed as migratory:<br>– <u>Likely to occur:</u><br>• White-throated needletail (*Hirundapus caudacutus*)<br>• Koala (*Phascolarctos cinereus*)<br>• Grey-headed flying fox (*Pteropus poliocephalus*).<br>– <u>Potential to occur:</u><br>• Yellow bellied glider (*Petaurus australis australis*)<br>• Greater glider (*Petauroides volans*). | |
| | *Environmental Protection Act 1994*<br>*Nature Conservation Act 1992*<br>*Vegetation Management Act 1999*<br>*State Development and Public Works Organisation Act 1971* | Matters of State Environmental Significance (MSES) | – MSES conservation areas – none mapped within the Project area.<br>– MSES wetland values– none mapped within the Project area.<br>– MSES wildlife habitat – none mapped within Lot 4 RP85497, however a small area of MSES wildlife habitat [SEQ koala habitat - core] is mapped along Mitchell Road.<br>– MSES vegetation and habitat - MSES regulated vegetation (essential habitat) is partly mapped within the Project area.<br>– MSES regulated vegetation (category C- endangered or of concern) is s partly mapped within the Project area. MSES regulated vegetation (category B - endangered or of concern) is mapped along Mitchell Road. | |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | *Vegetation Management Act 1999*<br>*Planning Regulation 2017*<br>*State Development and Public Works Organisation Act 1971*<br>*Environmental Protection Act 1994* | Vegetation communities | The project footprint within Lot 4 RP85497 for the CMF will require the clearing of 21 ha of Category X vegetation.<br>The project footprint within Mitchell Road will require the clearing of:<br>- 0.5 ha of Category B Endangered and Of Concern regional ecosystems.<br>- 0.2 ha of Category X (non-remnant) vegetation. | |
| | *Nature Conservation Act 1999* | Conservation significant flora species and conservation significant fauna. | There were no protected plant trigger areas located within the Project footprint or wider Project area.<br>No conservation significant flora species were identified during field surveys and therefore, the likelihood of occurrence assessment determined all flora species as either 'unlikely to occur' or 'highly unlikely to occur'. No flora species required a significant impact assessment.<br>The short-beaked echidna (*Tachyglossus aculeatus*), has the 'potential to occur' within the Project area. | |
| | *Vegetation Management Act 1999* | Essential habitat (fauna) | Essential habitat is mapped at the southern western corner of Lot 4 on RP85497 and along Mitchell Road.<br>During field surveys, open woodlands were observed only in the south-west of the Project area and Lot 4 on RP85497 i, as well as along Mitchell Road reserve. These vegetated areas support essential habitat for koalas (*Phascolarctos cinereus*).<br>Microhabitats were present adjacent to the Project area; primarily hollows (generally small) present in eucalypt trees (predominantly *E. tereticornis*). These could provide breeding habitat for gliders as well as avifauna.<br>However, all but one area containing these hollows was deemed unsuitable habitat for gliders due to the lack of connectivity. | |
| | *South East Queensland Koala Conservation Strategy 2020–2025*<br>*Planning Act 2016* | Core koala habitat | Core koala habitat is mapped along Mitchell Road to the north and at the southern western corner of Lot 4 on RP85497. Field surveys have confirmed koala habitat within the Project area. | |
| | *Nature Conservation Act 1992* | Native animal breeding places | During field assessments conducted in April 2024, fauna breeding places were observed to be present amongst remnant vegetation patches within the | |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | | | Project area; providing a range of microhabitat features for breeding, shelter and roosting habitat.<br>Fauna breeding places were generally uncommon within the Project area owing to a lack of remnant vegetation and historical clearing. The highest value fauna habitat was found in the south-west margin of the Project area, as well as along Mitchell Road to the north outside of the Project area. | |
| | *Biosecurity Act 2014* | Introduced/pest flora and fauna species | Several species of fauna/flora relevant to the *Biosecurity Act 2014* were present in the field surveys.<br>During field surveys the following introduced fauna species were observed:<br>– Cane toad (*Rhinella marina*) was observed three times.<br>– European fox (*Vulpes vulpes*) was captured twice on remote camera imagery.<br>Weed species considered to be of greatest threat to natural and economic values on a national basis have been ranked as Weeds of National Significance (WONS) (Thorp & Lynch 2000).<br>Ten restricted flora species were recorded during the site visit, five of which are listed as WONS:<br>– Groundsel bush (*Baccharis halimifolia*)<br>– Mother-of-millions (*Bryophyllum delagoense*)<br>– Chinese celtis (*Celtis sinensis*)<br>– Lantana (*Lantana camara*) – WONS<br>– Creeping lantana (*Lantana montevidensis*)<br>– Prickly pear (*Opuntia stricta*) – WONS<br>– Velvety tree pear (*Opuntia tomentosa*) – WONS<br>– Parthenium (*Parthenium hysterophorus*) – WONS<br>– Fireweed (*Senecio madagascariensis*) – WONS<br>– Giant rat's tail grass (*Sporobolus pyramidalis*) | |
| Aquatic biodiversity | *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*<br>Logan River Environmental Values | Aquatic MSES values | An aquatic ecology assessment has been completed for the Project. | Section 6.4.1.5 |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | and Water Quality Objectives | | | |
| | *Environment Protection and Biodiversity Conservation Act 1999*<br>*Nature Conservation Act 1999* | Conservation significant flora and fauna species | A desktop assessment identified no species of conservation significance within 1 km of the Project area.<br>No aquatic flora or fauna species listed under the EPBC Act or NC Act were observed during field surveys.<br>Eight different species of aquatic plants (macrophytes) were recorded across five testing points within the survey area; and no fish or turtle species were observed. | |
| Heritage | *Aboriginal Cultural Heritage Act 2003* | Aboriginal cultural heritage values | A Cultural Heritage and Native Title Duty of Care Assessment has been completed for the Project and found the following:<br>– revealed two known cultural heritage values within 1 km of the Project area.<br>– identified 18 stone artefacts inside or adjacent to the Project area.<br>The fie Cultural Heritage and Native Title Duty of Care Assessment determined that the Project area is mapped as a Category 5 risk, under the Aboriginal Cultural Heritage Act – Duty of Care Guidelines. A Category 5 risk indicates that there is a generally high risk that an activity can harm Aboriginal cultural heritage. Particular care must be taken where it is proposed to undertake activities causing additional surface disturbance to the features likely to have cultural heritage significance. | Section 6.4.1.6 |
| | *Queensland Heritage Act 1992* | European cultural heritage values | No National, State or local heritage values were recorded within or adjacent to the Project area. | |
| | *Native Title Act 1993* | Native Title | Lot 4 on RP85497 is mapped as freehold land. A search of the Native Title Register indicated that no Native Title determinations currently exist over the Lot 4.<br>One Native Title application exists over the works area:<br>– Ted Williams & Ors on behalf of the Danggan Balum (Five Rivers) People v State of Queensland (QC2017/007)(QUD331/2017). | |
| Waste | *Environmental Protection Act 1994* | Asbestos containing materials (ACMs) | No known ACM present. | Section 6.4.1.7 |
| | *Environmental Protection Act 1994* | Known waste/regulated waste | No existing known or regulated waste present. | |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | *Environmental Protection Regulation 2019* | | | |
| **Air** | | | | |
| Pollutant dispersal factors | *State Development and Public Works Organisation Act 1971*<br>*Environmental Protection Act 1994* | Climate | The greater Southeast Queensland region (encompassing the SRRC LGA) is classified as a sub-tropical climate influenced by tropical systems in the north, and fluctuations in the high pressure ridge to the south (DES 2019).<br>Climate data was sourced from the Bureau of Meteorology (BoM) Beaudesert–Drumley Street Weather Station (ID: 040983), approximately 6.6 km east of the CMF (BoM 2024).<br>The data, on average, indicates that January is the warmest month and July is the coolest month. January has the highest average rainfall in comparison to August, which has the lowest rainfall. August also has the lowest average of days ≥1 mm of rain. | Section 6.4.2.1 |
| | *State Development and Public Works Organisation Act 1971*<br>*Environmental Protection Act 1994* | Wind direction and speed | Key observations for the annual wind rose are as follows:<br>– Overall, winds are predominantly from the south-west<br>– The average wind speed is a moderate 1.3 m/s<br>– Calms, which are defined as wind speeds less than 0.5 m/s and are associated with poor dispersion outcomes, occur 33.8 percent of the time.<br>Seasonal wind roses show the following trends:<br>– Relatively high prevalence of calm conditions can be observed all year round as with the highest percentage of calms being observed in winter (40.1 percent of the time)<br>– Wind speeds are generally moderate year-round, with marginally higher wind speeds observed in spring and summer<br>– Winds blow primarily from the south south-west in autumn and winter. Winter wind data shows weak directionality in wind directions. Summer wind directions occur primarily from the east north-east and south south-west.<br>Diurnal wind roses show that:<br>– Calm conditions are significantly more frequent in the nighttime period relative to the daytime period, with calm conditions occurring between 58.2 percent to 61.4 percent of the time | |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | | | – Wind generally occurs from a southerly direction in the nighttime periods<br>– Wind occurs primarily from the southwest and northwest between 6:00 am and 12:00 pm, and primarily from the northeast between 12:00 pm and 6:00 pm. | |
| Ambient air quality | *State Development and Public Works Organisation Act 1971*<br>*Environmental Protection Act 1994* | Pollutants | The nearest station to the CMF site is located in North Maclean, approximately 24.5 km north of the site, which commenced operating in February 2021.<br>The monitoring station has recorded the following general trends for Particulate Matter (PM) pollutants between 2021 and 2023:<br>– A reduction in the maximum 24-hour average of $PM_{10}$ and $PM_{2.5}$<br>– An increase in the 70$^{th}$ percentile, 24-hour average of $PM_{10}$ and $PM_{2.5}$<br>– An increase in the annual average of $PM_{10}$ and $PM_{2.5}$. | Section 6.4.2.2 |
| **Noise and vibration** | | | | |
| Noise | *Environmental Protection (Noise) Policy 2019* | Sensitive receptors | Twelve sensitive receptors were identified to be within 2.5 km of the Project area. Refer to the Noise Impact Assessment Report completed for the Project.<br>The sensitive receptors 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. | Section 6.4.3.1 |
| | *Environmental Protection Act 1994*<br>*Environmental Protection Regulation 2019* | Background noise | In the Noise Impact Assessment Report completed for the Project, two noise loggers were deployed near the Project area to capture ambient and representative background levels near the area.<br>The noise levels measured around the Project area were very low; below the minimum background noise levels for isolated rural areas. | |
| **Water** | | | | |
| Water features | *Fisheries Act 1994* | Waterways for waterway barrier works | An aquatic ecology assessment has been competed for the Project. There are several green (low risk) waterways for waterway barrier works within the Lot boundary. These waterways flow north-west into two separate 'amber' (moderate risk) waterways, and then converge to a 'red' (major risk) waterway approximately 200 m from the Project area. This 'red' waterway then continues to flow north-west as a tributary to Allan Creek. | Section 6.4.4.1 |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | | | Allan Creek is mapped as a 'purple' (major risk) waterway, which has a confluence to the Logan River approximately 6.5 km downstream of the Project area.<br>Two green low risk waterway barrier works waterways traverse the Project area (referred to as ACT1 and ACT2). The waterways details include:<br>– ACT1 – traverses outside of the CMF location<br>– ACT2 – traverses through the centre of the CMF.<br>The two waterways (ACT1 and ACT2) are not considered to be suitable for fish passage or provide fish habitat for the following reasons:<br>– The waterways provide no connectivity and fish passage to upstream areas.<br>– The waterways do not provide suitable fish habitat features and there was no evidence of fauna species within ACT1 and/or ACT2.<br>– There is no evidence of aquatic species recorded in waterways ACT1 and ACT2.<br>– ACT1 and ACT2 have reasonably poor water quality.<br>– No fish passage occurs due to absence of defined bed and banks, minimal flow and depth, no habitat features present and no upstream habitat.<br>– DAF noted that ACT1 has a shallower gradient that allows for fish movement, defined bed and banks and shows evidence of fish habitats. DAF considered ACT1 to constitute a waterway as defined under the Fisheries Act 1994 and any waterway barrier works within this waterway require authorisation. The works in this waterway include a dam could be undertaken under the Accepted Development Requirements, provided a spillway in accordance with the design requirements of work type 3.1 is included. SOILCO is seeking further clarification from DAF regarding waterway ACT1 based on the findings of the aquatic assessment. | |
| | *Water Act 2000* | Drainage features | Within the Project area there are various drainage lines and unmapped watercourses. To gain clarity on these unmapped features, DRDMW was contacted (via email on 12/06/2024) to determine if these features will be mapped. DRDMW replied to the confirmation email and stated that all other unmapped features are classified as drainage features under the Water Act. | |
| Wetlands | *Environment Protection and Biodiversity Conservation Act 1999* | RAMSAR wetland/wetland Protection Area in a Great Barrier Reef catchment | A search of the EPBC Act Protected Matters Search Tool (PMST) indicated that the Project area is not located within the vicinity of any wetlands of international importance (Ramsar wetlands). The Moreton Bay Ramsar Wetland is located approximately 30-40 km downstream of the Project area. | |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | *Environmental Protection Act 1994*<br>*State Development and Public Works Organisation Act 1971* | Matters of State and Local Environmental Significance (MSES and MLES) | The DESI referable wetlands mapping indicates the Project area is not located in a wetland protection trigger area.<br>However, there are natural wetlands of High Ecological Significance occurring within 5 km of the Project area. These wetlands comprise less than one percent of the desktop search extent, with the closest wetland area situated more than 3 km from the Project area boundary. | |
| Flood hazard | *State Development and Public Works Organisation Act 1971* | Flood hazard areas | Model simulations were undertaken for seven AEP storm events. Ten storm rainfall patterns were simulated for a range of durations, with the median flood peak identified from the ten storm patterns.<br>The operational site is located outside the 1% AEP flood extent for the identified flow paths adjacent to the site. | |
| Water resource catchment | *Planning Act 2016* | Catchment area and drainage basins | Based on the Scenic Rim Regional Council Overlay mapping for water resource catchments, the Project area is located within the Logan River Catchment Area, and the Logan-Albert Drainage Sub-Basin.<br>Major regional hydrological features include Wyaralong Dam located 4.6 km to the north-west, which impounds Teviot Brook, a direct tributary of the Logan River downstream of the Project area. Bromelton Off Stream Storage, an off-stream storage located adjacent the Logan River, is also located 4.2 km northeast of the Project area; however, it is currently out of commission.<br>The Project area is located within a Water Supply Buffer Area which is managed by Seqwater. Therefore, the CMF will be required to be assessed against Chapter 4 of the *Seqwater Development Guidelines: Water Quality Management in Drinking Water Catchments* (Seqwater 2024). | |
| Groundwater | *Water Act 2000* | Groundwater values | A groundwater assessment report has been developed for the Project. It was based on desktop assessment and described the existing groundwater environment and identified potential groundwater sensitive receptors.<br>A search of the Queensland Groundwater Database lists 28 registered groundwater bores within a 2 km radius of Lot 4 RP85497 (Queensland Globe 2024). Of the registered bores, five of them are registered as existing water supply bores, which identified as one of the sensitive receptors.<br>There are no groundwater receptors (GDEs) or users within the Project area.<br>The geological units underlying the 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. | Section 6.4.4.2 |

| Element | Legislative trigger | Environmental aspect | Comments | Reference to mitigation measures |
|---|---|---|---|---|
| | | | 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. | |
| Surface water | *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*<br>Logan River Environmental Values and Water Quality Objectives | Water quality | An aquatic ecology assessment has been competed for the Project. In-situ water quality was taken at the water features intersecting and surrounding the Project area during field surveys conducted in April 2024. The parameters were compared to the Western Logan River Freshwaters - upland moderately disturbed water quality guidelines (DES 2022).<br>Exceedances were recorded at all five sites for dissolved oxygen and turbidity. Dissolved oxygen ranged from 50.6% to 84.1%, whilst turbidity ranged from 42.11 NTU to 78.15 NTU. Exceedances for electrical conductivity were also recorded at all sites, except for one (346 µS/cm). The pH was within the water quality guideline range at each site.<br>These results indicate the overall water quality across site was reasonably poor to support a diverse range of aquatic species. | Section 6.4.1.5 |

# 5. Environmental management

## 5.1 Roles and responsibilities

All SOILCO employees and contractors associated with the Project are required to abide by the legislation outlined in

Table 6 and comply with all procedures outlined in this Plan. Persons involved with the Project must not carry out any activities that may cause, or are likely to cause, environmental harm unless the person(s) involved take all reasonable and practical measures to prevent or minimise harm. Parties who have active roles in the Plan for construction and operational phases are outlined in Table 7 below and shown in Figure 4.

***Table 7 Roles and responsibilities for construction and operational phases***

| Role | Responsibilities |
|---|---|
| **Construction phase** | |
| Project Manager | – Overall Project compliance with this plan.<br>– Provision of onsite supervision via the Contractor for approved staff.<br>– For ensuring that the Project environmental performance meets requirements and in particular is responsible for the integrity of the work and commercial performance of the Project.<br>– Ensure all environmental requirements are implemented in accordance with the Project approvals, SOILCO requirements, the specification, the contract requirements, and legislative obligations.<br>– Reviewing and implementing this EMP.<br>– Communicating the requirements of this EMP to the Project team and ensuring compliance.<br>– Ensuring Project environmental documentation records are maintained and provided to SOILCO and their representatives as necessary.<br>– Ensuring Environmental Incidents are reported as per the Incident reporting outlined in Section 8.<br>– For issuing controlled electronic and hard copies (where required) of the EMP.<br>– Obtaining all the required approvals to undertake the proposed works for further information.<br>– Engage qualified and experienced staff and provide management support to ensure all activities relating to environmental performance are undertaken by trained and competent personnel and in accordance with the contract.<br>– Select subcontractors and suppliers based on an evaluation of their ability to meet the specified requirements including those for environmental aspects and ensure compliance. |
| Project Director | – Manage the construction process as the Project Proponent.<br>– Provide readily available expertise for the construction of the Project, as required.<br>– Receive progress reports on performance by the Principal Contractor for the purpose of acknowledging compliance with contract conditions.<br>– Review the EMP submitted by the Principal Contractor.<br>– Ensure that the requirements of the Conditions of Contract (environmental management) and approved EMP included in the contract documentation are implemented.<br>– Review any revisions to the EMP as required.<br>– Maintain a current copy of the Contract and the EMP, a record of the completion of planned actions, and monitoring records and reports, supplied by the Principal Contractor.<br>– Initiate audits of environmental performance. |
| Principal Contractor | – Develop Construction Contractor's EMP in accordance with the approved EMP.<br>– Maintain a master copy of the EMP, a record of the completion of planned actions, and monitoring records and reports, which are made available during audits.<br>– Obtain all necessary statutory approvals and licences, and ensure that conditions of licences/approvals/permits are met.<br>– Provide copies of the EMP to the relevant Project staff, with responsibilities clearly defined in the EMP.<br>– Maintain a record of all training undertaken by all Project staff, detailing the type and purpose of the training.<br>– Ensure that environmental protection measures are implemented in accordance with EMP.<br>– Coordinate regular monitoring in relation to environmental management issues and ensure that monitoring results are made available to the Proponent. |

| Role | Responsibilities |
|---|---|
| | – Ensure corrective actions arising from self-assessments and external audits are completed, and in accordance with the EMP.<br>– Notify the Proponent and any relevant agency of all environmental incidents and maintain a record of events relating to the environmental incidents, including any remedial action taken.<br>– Ensure there is adequate and accurate identification and reporting of all non-conformances, complaints and any other environmental issues that may arise during construction.<br>– Provide relevant and timely information about construction activities that may impact on the relevant stakeholders and as required, consult with individuals that may be directly impacted by construction activities to ensure direct Project impacts are being managed.<br>– Undertake regular management reviews of the EMP, at scheduled intervals and on the identification of a system failure. |
| Principal Contractor (Construction Manager) | – Ensure all staff are trained/inducted to site (including environmental management responsibilities) and that all training/inductions are recorded in a Training and Induction Register.<br>– Ensure appropriate waste facilities are provided on-site and that maintenance and waste disposal is conducted by a licenced contractor, where required.<br>– All vehicles accessing the site use the designated access routes, entries/exits, and parking locations.<br>– All equipment is maintained and 'fit for purpose' before arriving at the site.<br>– All environmental incidents and complaints are reported to the Project Manager. |
| Construction Superintendent | – Ensure this CEMP, all approved plans and conditions are referred to during construction works on-site and available to all relevant personnel.<br>– Appoint a suitably experienced, licensed fauna spotter-catcher and arborist to oversee the implementation of this Plan during site works.<br>– Undertake works in accordance with the Plan.<br>– Undertake compliance, incidence and/or exceedance reporting during construction.<br>– Monitor weather conditions and water quality, as required.<br>– Report environmental incidents to DESI, where required.<br>– Report and monitor any non-compliance and review management procedures, where required. |
| Construction Contractor (Employees) | – All personnel involved in construction activities are to be fully briefed on what is permissible under law and animal welfare implications as well as emergency procedures and reporting of incidents.<br>– Complete required inductions and training.<br>– Comply with SOILCO and site rules, practices, management plans, procedures and protocols.<br>– Have appropriate qualifications and licenses to undertake the activities.<br>– Prevent and minimise environmental impacts, where possible.<br>– Report environmental and safety incidents, non-compliances, near misses or complaints to the Supervisor or Construction Manager without delay. |
| Principal Contractor (Environmental Representative) | – Responsible for ensuring all contractors and operational personnel are aware of their responsibilities under the EMP and any approval/permit conditions.<br>– Prepare relevant plans, procedures and policies to assist in compliance with relevant environmental obligations.<br>– Develop and run awareness training sessions and visitor inductions.<br>– Conduct regular audits.<br>– Oversee monitoring programs.<br>– Prepare internal and external compliance reports. |
| Fauna Spotter-catcher | – A person authorised under a current rehabilitation permit to take and/or keep a protected animal whose habitat is about to be destroyed by human activity in accordance with the *Nature Conservation (Administration) Regulation 2017*.<br>– Undertake pre-clearance and post-clearance surveys.<br>– Oversee all vegetation clearing on-site.<br>– Manage and handle all fauna tasks onsite.<br>– Implement fauna contingency measures, where required.<br>– Prepare a pre-clearance and post-clearance fauna spotter-catcher report following the completion of vegetation clearing and the requirements for low risk SMP's under Section 335 of the *Nature Conservation (Animals) Regulation 2020*. |

| Role | Responsibilities |
|---|---|
| Wildlife Carer | – A person qualified to take and keep protected wildlife under a current rehabilitation permit in accordance with the *Nature Conservation (Administration) Regulation 2017*. |
| All personnel (including sub-contractors) | **General Environmental Duty**<br>Under Section 319 of the *Environmental Protection Act 1994* (EP Act), everyone has a general environmental duty to not undertake an activity that causes or is likely to cause environmental harm unless all reasonable and practicable measures are taken to avoid that harm. All staff and sub-contractors will attend a site specific environmental induction and awareness training to ensure that all personnel are aware of their responsibilities in this regard.<br>**Duty to Notify**<br>The EP Act also imposes a 'duty to notify' (Section 320A – 320G) upon any person who becomes aware that their activities, or the activities of somebody working with them, has caused or threatens to cause material or serious environmental harm that is unlawful under the EP Act. |
| **Operational phase** | |
| Facility Manager | – Develop Operational Contractor's EMP in accordance with the approved EMP.<br>– Maintain a master copy of the EMP, a record of the completion of planned actions, and monitoring records and reports, which are made available during audits.<br>– Obtain all necessary statutory approvals and licences, and ensure that conditions of licences/approvals/permits are met.<br>– Provide copies of the EMP to the relevant Project staff, with responsibilities clearly defined in the EMP.<br>– Maintain a record of all training undertaken by all Project staff, detailing the type and purpose of the training.<br>– Ensure that environmental protection measures are implemented in accordance with EMP.<br>– Coordinate regular monitoring in relation to environmental management issues and ensure that monitoring results are made available to the Proponent.<br>– Ensure corrective actions arising from self-assessments and external audits are completed, and in accordance with the EMP.<br>– Notify the Proponent and any relevant agency of all environmental incidents and maintain a record of events relating to the environmental incidents, including any remedial action taken.<br>– Ensure there is adequate and accurate identification and reporting of all non-conformances, complaints and any other environmental issues that may arise during construction.<br>– Provide relevant and timely information about construction activities that may impact on the relevant stakeholders and as required, consult with individuals that may be directly impacted by construction activities to ensure direct Project impacts are being managed.<br>– Undertake regular management reviews of the EMP, at scheduled intervals and on the identification of a system failure.<br>– Ensuring Contractor's commitment to Safety, Health, Environment and Quality (SHEQ) are clearly understood and followed:<br>• Providing adequate resources to achieve the objectives and targets of the Business Plan.<br>• Effectively managing the plant as a business.<br>• Delivering contractual, legal, technical and other performance commitments to clients.<br>• Promoting awareness of customer and other stakeholder requirements throughout the organisation.<br>• Managing risk within operations.<br>• Developing a positive relationship with stakeholder groups to minimise any potential risks to the Project and provide advice as necessary.<br>– Managing regulatory requirements and communication with government agencies. |
| Safety Advisor | – Ensure this EMP, all approved plans and conditions are referred to during operational works on-site and available to all relevant personnel.<br>– Ensuring the WHS Management System is established, implemented and maintained in accordance with ISO 45001 and relevant legislation. |
| Asset and Projects Supervisor | – Ensuring the Asset Management System is established, implemented and maintained in accordance with Asset Management Plan and relevant legislation. |

| Role | Responsibilities |
|---|---|
| Principal Contractor (Environmental Representative) | – Responsible for ensuring all contractors and operational personnel are aware of their responsibilities under the EMP and any approval/permit conditions.<br>– Prepare relevant plans, procedures and policies to assist in compliance with relevant environmental obligations.<br>– Develop and run awareness training sessions and visitor inductions.<br>– Conduct regular audits.<br>– Oversee monitoring programs.<br>– Prepare internal and external compliance reports. |
| All personnel (including sub-contractors) | **General Environmental Duty**<br>Under Section 319 of the *Environmental Protection Act 1994* (EP Act), everyone has a general environmental duty to not undertake an activity that causes or is likely to cause environmental harm unless all reasonable and practicable measures are taken to avoid that harm. All staff and sub-contractors will attend a site specific environmental induction and awareness training to ensure that all personnel are aware of their responsibilities in this regard.<br>**Duty to Notify**<br>The EP Act also imposes a 'duty to notify' (Section 320A – 320G) upon any person who becomes aware that their activities, or the activities of somebody working with them, has caused or threatens to cause material or serious environmental harm that is unlawful under the EP Act. |

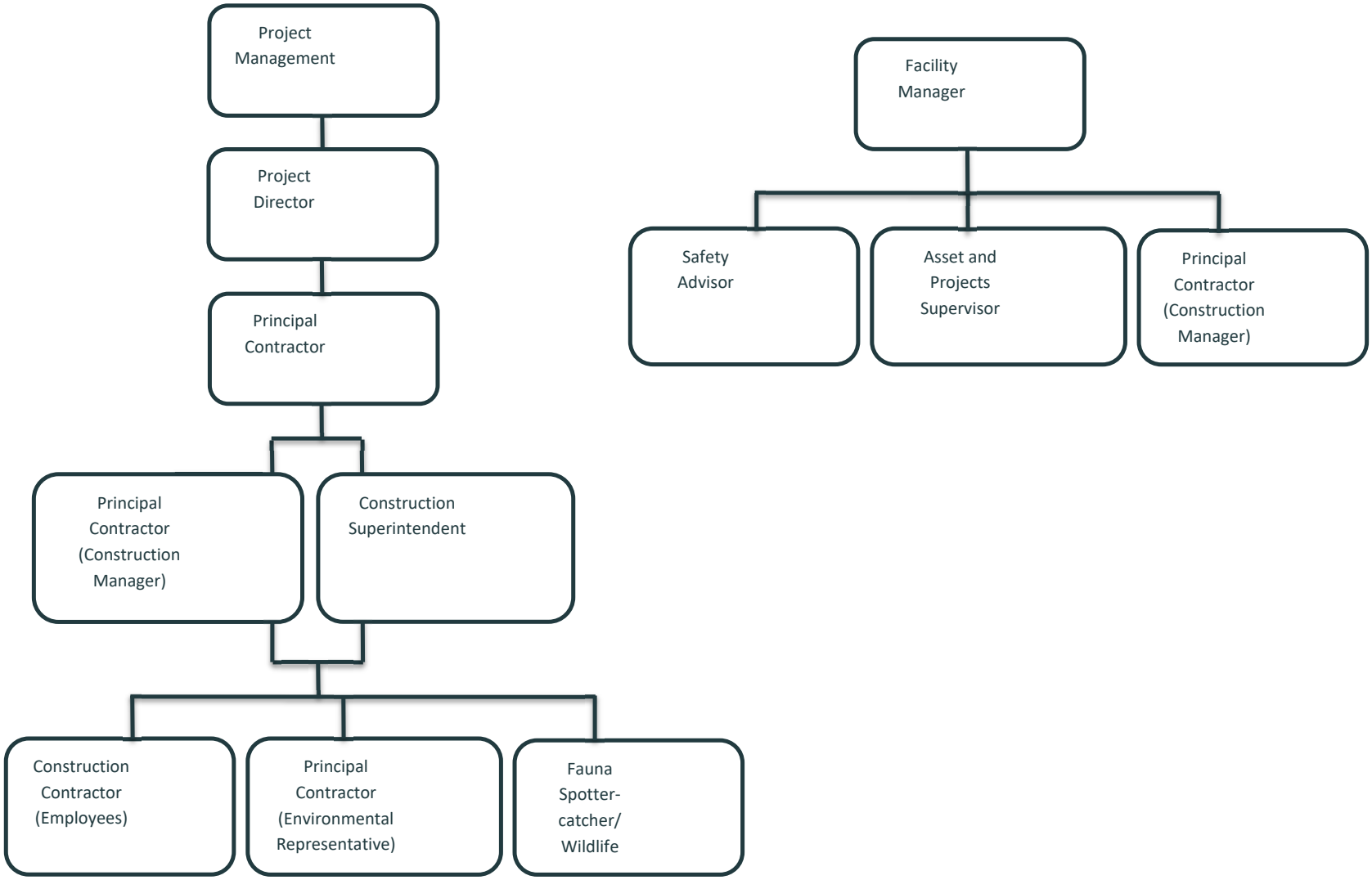



*Figure 4 Construction (left) and operational (right) roles and responsibilities organisation chart*

# 6. Impacts and mitigation measures

## 6.1 Environmental factors

This EMP provides a discussion of potential impacts and management measures for each of the following environmental factors that relate to the construction and operation of the CMF:

- Bushfire hazard
- Visual amenity
- Erosion and sediment control
- Terrestrial biodiversity
- Aquatic biodiversity
- Heritage
- Waste
- Public health and safety
- Climate
- Air quality
- Noise
- Surface and stormwater
- Groundwater.

To reduce the risks that the Project may have on the above-mentioned values, potential impacts have been identified, with corresponding mitigation measures to be implemented during construction and operation detailed in Section 6.4.

## 6.2 Risk assessment

The purpose of this section is to qualitatively determine the risk of potential impacts to environmental factors occurring during construction and/or operational activities associated with the CMF – without having any environmental controls in place. Mitigation measures for each potential impact are described with a residual risk rating then applied.

### 6.2.1 Risk assessment criteria

The risk rating applied to each potential impact and residual impact has been identified using the risk matrix shown in Table 8. The risk matrix applies consequence ratings (Table 9) and likelihood ratings (Table 10) to the identified environmental impacts to give an overall risk rating for each impact. The most suitable descriptor is assigned based on the information available, rather than the worst possible outcome. Consequence is assessed first, with the likelihood based on the consequence descriptor selected.

***Table 8 Risk ratings matrix***

| Likelihood | Consequence | | | | |
|---|---|---|---|---|---|
| | Insignificant | Minor | Moderate | Major | Catastrophic |
| Very unlikely | Negligible | Negligible | Low | Moderate | Moderate |
| Unlikely | Negligible | Negligible | Low | Moderate | Significant |
| Possible | Negligible | Low | Moderate | Significant | Extreme |
| Likely | Low | Low | Moderate | Significant | Extreme |
| Almost certain | Low | Moderate | Significant | Extreme | Extreme |

***Table 9 Consequence descriptors***

| Descriptor | Definition |
|---|---|
| Insignificant | Negligible on-site/off-site environmental impact and of low significance |
| Minor | On-site/off-site environmental localised impact, immediately contained |
| Moderate | On-site/off-site environmental short term impact, immediately recoverable |
| Major | On-site/off-site environmental medium term impact or repeated non-compliance with potential in some jurisdictions for prosecution |

| | |
|---|---|
| Catastrophic | On-site/off-site environmental long-term impact or repeated non-compliance with potential in some jurisdictions for prosecution |

***Table 10 Likelihood descriptors***

| Descriptor | Definition |
|---|---|
| Very unlikely | Highly doubtful but could occur in exceptional circumstances |
| Unlikely | It is improbable that it may occur |
| Possible | It is conceivable that it may occur |
| Likely | Will probably occur in most circumstances |
| Almost certain | Will likely occur in most circumstances |

## 6.3 Initial risk assessment

### 6.3.1 Construction phase

#### 6.3.1.1 Land

*Table 11 Initial risk assessment for construction – land*

| Impact | Initial risk rating |
|---|---|
| **Bushfire hazard** | |
| Bushfire impacts during the construction phase; including damage to equipment, buildings and staff. | Low |
| **Visual amenity** | |
| Impacts to the design materiality due to the construction works | Moderate |
| Visual modification of the area due to landscaping works | Significant |
| Visual modification of the area due to signage required for construction works | Low |
| Visual modification of the area due to construction works | Low |
| **Erosion and sediment control** | |
| Disturbance of in-situ soils during construction, resulting in erosion and sedimentation | Low |
| **Terrestrial biodiversity** | |
| Disturbance/clearing of vegetation and fauna habitat during construction; reducing native fauna in the area | Significant |
| Injury and mortality of wildlife, due to wildlife movement through the Project area during construction | Significant |
| Vegetation clearing during construction reduces habitat connectivity within and adjacent to the Project area | Moderate |
| Disturbance of wildlife due to increased light, noise and vibration during construction activities; resulting in injury or mortality of wildlife | Significant |
| Habitat degradation due to dust, run-off and sedimentation generated by construction activities reducing the abundance and diversity of habitats by:<br>– Physically smothering vegetation<br>– Changing nutrient levels<br>– Decreasing water quality<br>– Encouraging weed incursions<br>– Altering the movement of wildlife. | Moderate |
| Introduction and spread of invasive species due to increased movement of vehicles and machinery during construction | Significant |
| Impacts to MNES from the construction of the CMF | Moderate |
| **Aquatic biodiversity** | |
| Loss of aquatic habitat due to construction activities | Low |
| Degradation of aquatic habitat and water; due to excessive sediment and release of contaminant, increase of weed and pest species and overall reduction in suitability of habitat conditions as a result of construction activities | Moderate |
| Disturbance of aquatic fauna due to increased light, noise and vibration during construction activities; resulting in injury or mortality of wildlife | Significant |
| Alteration of flow and aquatic fauna movement, as a result of construction activities | Moderate |
| Fauna injury or mortality, due to construction works undertaken within waterways, including the excavation and dewatering of modified dams | Moderate |
| Introduction and spread of invasive species due to increased movement of vehicles and machinery during construction | Moderate |
| **Heritage** | |
| Indigenous heritage values uncovered during construction works | Significant |
| Non-Indigenous heritage values uncovered during construction works | Low |
| Native Title claim existing over the Project area | Low |

| Waste | |
|---|---|
| Inappropriate/inefficient material and resource selection and consumption during construction | Low |
| Failure to carry out general waste management activities during construction | Moderate |
| Inappropriate handling of waste/reuse materials during construction | Low |
| Inappropriate disposal of waste during construction | Low |

#### 6.3.1.2 Air

*Table 12 Initial risk assessment for construction – air*

| Impact | Initial risk rating |
|---|---|
| **Climate** | |
| Extreme temperatures and heatwave events during construction impacting the efficiency of electrical infrastructure, and construction activities (both personnel and rate of infrastructure renewal) | Low |
| **Air quality** | |
| Dust emissions produced during construction, due to the movement of trucks and other vehicles on unpaved roads, and from other sources associated with material handling on-site; wind erosion from unsealed surfaces and stockpiles; unloading and turning compost stockpiles and product screening | Low |
| Particulates generated during site establishment works; including delivery of site amenities, and surveying/pegging of the site | Moderate |
| Particulates generated during earth works, including:<br>– Establishment of access road to work area<br>– Grading, excavation and general movement of earth materials. | Significant |
| Particulates generated during road works and intersection works, including:<br>– Removal of trees/stripping of topsoil<br>– Box out to required levels<br>– Subgrade and base course<br>– Asphalting<br>– Line marking<br>– Signage installation<br>– Defect inspection and cleaning. | Moderate |
| Particulates generated during civil works, including:<br>– Demolition and earthworks<br>– Civil works<br>– Ponds and other civil structures. | Significant |
| Particulates generated during mechanical installation of the following:<br>– Shredder<br>– Drum screen<br>– Platforms<br>– Storage tanks/platforms<br>– Blowers<br>– Leachate system<br>– Water system<br>– Picking system<br>– Control system and instrument mech<br>– Odour control system<br>– Interconnecting pipework. | Moderate |
| Particulates generated during electrical installation of the following:<br>– Blowers<br>– Pumps | Moderate |

| | |
|---|---|
| – Screens<br>– Motor control centre works<br>– Interconnecting cabling. | |
| Greenhouse gas emissions produced by machinery and equipment used during construction | TBD |

#### 6.3.1.3 Noise and vibration

***Table 13 Initial risk assessment for construction – noise and vibration***

| Impact | Initial risk rating |
|---|---|
| **Noise** | |
| Excess generation of noise during construction activities, which may include:<br>– Earthworks<br>– Slab construction<br>– Building construction<br>– Embankment/pavement works<br>– Sealing works. | Moderate |

#### 6.3.1.4 Water

***Table 14 Initial risk assessment for construction – water***

| Impact | Initial risk rating |
|---|---|
| **Surface and stormwater** | |
| Excess sediment generated by ground disturbance activities being discharged into the downstream environment | Moderate |
| Risk of contamination to surface water from accidental hazardous material spills during construction of the CMF, given the site's location within a drinking water catchment area. | Significant |
| **Groundwater** | |
| Groundwater seepage into excavated areas leading to structural instability of excavation walls | Significant |
| Excavation activities intercepting groundwater table and/or underground springs | Low |
| Contamination of groundwater from unintentional leaks/spills of hazardous substances, from plant/machinery, vehicle washdowns or chemical storage during construction. | Significant |
| Changes to groundwater levels and recharge dynamics resulting from excavation and filling works | Moderate |
| Cut and fill works during construction using sulfidic rock excavated at the site, resulting in acid rock drainage (ARD) | Moderate |
| Contamination of imported fill material for construction leaches contaminants into the groundwater | Moderate |

### 6.3.2 Operational phase

#### 6.3.2.1 Land

***Table 15 Initial risk assessment for operations – land***

| Impact | Initial risk rating |
|---|---|
| **Bushfire hazard** | |
| Increased bushfire impacts during the operational phase due to CMF materials; resulting in significant bushfire risks for adjacent properties, fire runs and disruptions to operation of the CMF | Moderate |
| **Visual amenity** | |
| Impacts to the design materiality during operations, as a result of the construction of the CMF | Moderate |
| The CMF being visible from residential areas and the state controlled road reserve. | Moderate |
| Visual modifications due to signage required for operational works | Low |
| **Erosion and sediment control** | |
| Increased erosion and sediment mobilisation due to the movement of vehicles on-site during operations | Moderate |

| | |
|---|---|
| Increased erosion and sediment mobilisation, due to wind, from materials stockpiled on-site during operations | Moderate |
| **Terrestrial biodiversity** | |
| Disturbance/clearing of vegetation and fauna habitat to accommodate CMF operations leading to a reduction of native fauna in the area | Moderate |
| Injury and mortality of wildlife, due to wildlife movement through the Project area during operations | Moderate |
| Vegetation clearing to accommodate CMF operations reduces habitat connectivity within and adjacent to the Project area | Low |
| Disturbance of wildlife due to increased light, noise and vibration during operational activities; resulting in injury or mortality of wildlife | Low |
| Impact surrounding native flora and fauna due to the operation of the CMF; resulting in a reduction of surrounding native populations | Moderate |
| Impacts to MNES from the operation of the CMF | Moderate |
| **Aquatic biodiversity** | |
| Degradation of aquatic habitat and water; due to storage pond runoff during high rainfall events, and rubbish entering downstream waterways via stormwater drains on-site during operational activities | Low |
| **Heritage** | |
| Heritage items uncovered during earthworks | Low |
| **Waste** | |
| Failure to carry out general waste management activities during operations | Moderate |
| Inappropriate handling of waste/reuse materials during operations | Low |
| Inappropriate waste disposal during operations | Low |
| Increased fire risk due to stockpiles present on-site during operations | Low |
| **Public health and safety** | |
| Increased risk of pathogens such as Legionella and dispersion of bioaerosols, due to operation of the CMF | Low |
| Inappropriate management of contaminants such as heavy metals and PFAS during operations | Low |

#### 6.3.2.2 Air

***Table 16 Initial risk assessment for operations – air***

| Impact | Initial risk rating |
|---|---|
| **Climate** | |
| Extreme temperatures and heatwave events during operational activities impacting the efficiency of electrical infrastructure, and operational and maintenance activities (both personnel and rate of infrastructure renewal) | Low |
| **Air quality** | |
| Potential for odour to exceed the highest predicted 99.5$^{th}$ percentile odour impact of 2.1 OU at the industrial receptor R7 | Low |
| Potential for odour to exceed the highest predicted 99.5$^{th}$ percentile odour impact of 0.6 OU at the residential receptor R6 | Low |
| Cumulative odour impacts during operations due to the distinct odour characteristics associated with Bush's Proteins | Low |
| Dust emissions produced during operations, due to the movement of trucks and other vehicles on unpaved roads, and other sources associated with material handling onsite; wind erosion from unsealed surfaces and stockpiles; unloading and turning of compost stockpiles and product screening | Low |
| Greenhouse gas emissions produced by machinery and equipment used during operations | Moderate |

### 6.3.2.3 Noise and Vibration

*Table 17 Initial risk assessment for operations – noise and vibration*

| Impact | Initial risk rating |
|---|---|
| **Noise** | |
| Increased noise levels, above those of the pre-existing environment, due to operational activities | Low |
| Excess generation of noise, due to additional traffic during operations, impacting on sensitive receptors in the surrounding area. | Moderate |

### 6.3.2.4 Water

*Table 18 Initial risk assessment for operations – water*

| Impact | Initial risk rating |
|---|---|
| **Surface and stormwater** | |
| Generation of differing types of water during operations, distinguished by their respective water quality, impacting downstream environments | Moderate |
| Discharge of untreated runoff that has come into significant contact with organic material | Moderate |
| Runoff from impervious site areas, not impacted by organic material | Low |
| Increased site water supply required for the composting process | Moderate |
| Impacts of external floodwaters on operations, and the resulting water quality risks associated with site inundation | Moderate |
| The increase in impervious areas for the CMF, leading to an increase in the peak rate of runoff and changes flood conditions downstream | Moderate |
| Non-compliance with government authorities during operations | Low |
| Risk of contamination to surface water from accidental hazardous material spills during operation of the CMF, given the site's location within a drinking water catchment area. | Significant |
| **Groundwater** | |
| Changes to groundwater levels and recharge dynamics as a result of landform changes | Low |
| Risk of contamination to groundwater from accidental hazardous material spills during construction and/or operation of the CMF, given the site's location within a drinking water catchment area. | Significant |
| Contamination of groundwater from unintentional leaks/spills of hazardous substances, from plant/machinery, vehicle washdowns or chemical storage during operations. | Significant |
| Water from harvest water dam seeping into groundwater during operations | Low |
| Contaminated water from leachate dams seeping into groundwater during operations | Moderate |
| Contaminated leachate, seeping through the hardstand underlying the aeration pad/windrow pad/maturation, into soils and groundwater during operations | Moderate |

## 6.4 Mitigation measures

### 6.4.1 Land

#### 6.4.1.1 Bushfire hazard

***Table 19 Mitigation measures for bushfire hazards***

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Bushfire impacts during the construction phase; including damage to equipment, buildings and staff.<br>Ignition sources in the area surrounding the Project area may include:<br>– Accidental ignition from agricultural and extractive industry uses and other machinery and equipment<br>– Sparking<br>– Roadside ignition (potentially caused by cigarette butts thrown from vehicles)<br>– Arcing powerlines<br>– Other rural and industrial activities<br>– Ignition may also occur from activities on nearby rural residential properties such as lawnmowing and use of power tools<br>– The ignition potential of the CMF, may occur from various activities on-site, including use of machinery and fuel storage; ignition from the composting process itself may also occur. | – Construction will not include any Class 1, 2, 3 or selected 9 and 10 buildings. Therefore, further assessment of building provisions has not been carried out.<br>– Recommended that materials used on-site are largely non-flammable/fire resistant in nature e.g. concrete or steel to minimise the risk of fire spreading onsite and beyond the facility.<br>– Use of timber for construction shall be minimised.<br>– Any fences or barriers must not be constructed from timber.<br>– Retaining walls should be constructed of fire resistant or fire-retardant material e.g. concrete, stone, masonry.<br>– Adequate standard to accommodate emergency access to and from site, via the upgrade of Mitchell Road.<br>– Ignition management of the will be the subject of broader facility management plans and strategies. | ✓ | | – Principal Contractor<br>– Construction Manager<br>– Construction Superintendent |
| Increased bushfire impacts during the operational phase due to CMF materials; resulting in significant bushfire risks for adjacent properties, fire runs and disruptions to operation of the CMF | Due to the surrounding landscape and slope, there is opportunity for fire to advance towards the facility at any angle. However, fire runs are more likely to occur from the south and south-west direction.<br>**Asset Protection Zones (APZ)**<br>– An APZ is an area that surrounds a building and/or structure and is to be maintained continuously in a no/low fuel condition to aid in the protection of buildings.<br>– An APZ offers a defensible space for firefighters to work safely from radiant heat exposure.<br>– APZ distances are calculated based on fire weather, fuel load and topography. An APZ of 10 kW/m2 is proposed for the CMF as the use of industrial machinery and fuel storage may be hazardous in the context of a bushfire. | | ✓ | – Principal Contractor<br>– Facility Manager<br>– Safety Advisor |

| | | | | |
|---|---|---|---|---|
| | – An APZ along the south-western boundary is not required due to the separation from the nearest hazardous vegetation by the freshwater dam.<br>**Site layout**<br>– The CMF has safe and convenient access to the road network (via upgrade of Mitchell Road) for evacuation purposes and access for emergency services.<br>– Vulnerable components of the facility (e.g. fuel storage areas and buildings are at the northern extent of the development footprint, located outside the bushfire prone area and as far as practical from hazardous vegetation.<br>– A one-way road for heavy vehicles is provided at the perimeter of the site, effectively separating the activities of the CMF from adjacent grass hazard.<br>**Water supply and fire-fighting infrastructure**<br>– Static water supply in form of water tanks and booster pump<br>– Additional 45,000 L static water tank<br>• Non-flammable construction<br>• Medium rigid vehicle clear access within 6 m of the tank<br>• A 50 mm male camlock fitting for emergency fire service use if required.<br>**Rehabilitation/re-vegetation and landscaping**<br>– Further assessment to be completed to ensure that rehabilitation/ revegetation areas do not affect the vegetation hazard class or increase the severity of the hazard.<br>– Adopt landscaping principles and species in accordance with Section 8 of the *Bushfire Resilient Communities: Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'* (QFES, 2019). Including:<br>• Low threat (flammability) species adopted<br>• Tree specimens are smooth-barked species only and are not within 20 km of the CMF<br>• The use of organic mulches in garden beds should be avoided.<br>**Land and Field Load Management**<br>– Ongoing land and diel load management practices; both within and beyond the APZ.<br>– Land outside the development footprint.<br>**Operational procedures**<br>– Evacuation procedures and site emergency plans:<br>• Where advised, watch and act or emergency warning is issued for a location within 5kms of the CMF, advice is sort from emergency services and / or the site operations are immediately ceased, and the facility evacuated. | | | |

| | | | | |
|---|---|---|---|---|
| | • For warnings (advice, watch and act or emergency) issued for locations within 10km of the site, 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 prepared to evacuate the site.<br>• Fire that is ignited on the site or in immediate proximity – cease operation and evacuate the site if safe to do so. Call 000.<br>• 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. | | | |
| **Performance criteria** | | | | |
| – No staff injured or stuck during an emergency situation, without access to safe exit routes.<br>– No damage to the assets at the Bromelton CMF. | | | | |
| **Monitoring** | | | | |
| Undertake routine inspections to ensure the site is managed according to design specifications, and that sufficient controls are in place and remain fit-for-purpose. | | | | – Principal Contractor<br>– Construction Manager<br>– Construction Superintendent<br>– Facility Manager<br>– Safety Advisor |
| Regularly monitor site conditions against emergency procedures and management plans to keep documentation up to date; and ensure provision of optimal exit routes for all staff, operators and machinery. | | | | – Construction Manager<br>– Construction Superintendent<br>– Facility Manager<br>– Safety Advisor |
| **Reporting** | | | | |
| Any potential emergency situations identified are to be reported to the Construction Manager/Facility Manager as soon as practicable. | | | | – All staff |
| Any reported emergency situations are to be relayed to the Principal Contractor as soon as practicable. | | | | – Construction Manager<br>– Construction Superintendent<br>– Facility Manager |
| **Corrective actions** | | | | |
| Immediately cease all site activities and proceed calmly to emergency evacuation points upon notification of an emergency evacuation. | | | | – All staff |
| Follow all directions given by emergency wardens and site management during an emergency evacuation. | | | | – All staff |
| Ensure that the site is inspected following the emergency evacuation procedures, to determine whether the site is safe for return to work. | | | | – Construction Manager<br>– Facility Manager<br>– Safety Advisor<br>– Assigned persons responsible |

### 6.4.1.2 Visual amenity

*Table 20 Mitigation measures for visual amenity risks*

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Visual modification of the area due to construction works | – Take all practical measures to ensure construction equipment, storage areas, and other visible elements are located away from key views to or from the sensitive visual receptors identified in this assessment<br>– Ensure general tidiness of the site is maintained during construction<br>– Avoid conducting work in evenings and nights where possible, to minimise impacts from lighting<br>– Where construction activity cannot be located away from trees, provide tree protection to ensure they are not damaged<br>– All areas disturbed by construction and ancillary works are to be rehabilitated to their previous condition<br>– During construction, employ screening measures to assist the site in blending into the surrounding area. Choice of screening is to be sympathetic to the existing rural setting. | ✓ | | – Construction Manager<br>– Construction Superintendent |
| Impacts to the design materiality due to the construction of the CMF | – Ensure the Project's form, material and finishes are of high quality and are in keeping with the surrounding setting to positively contribute to existing rural landscape character values<br>– Avoid or minimise the use of shiny or reflective materials to reduce associated visual impacts on surrounding sensitive receptors<br>– Consider specifying neutral colours such as brown and green for the cladding of external walls and roof that complements the rural landscape setting<br>– If required, specify boundary fencing that is sensitive to the rural aesthetic of the site and avoid large areas of opaque, metal fencing. | ✓ | ✓ | – Construction Manager<br>– Construction Superintendent<br>– Facility Manager |
| Visual modification of the area due to landscaping | – Additional screen planting using shrubs and trees along Mitchell Road will assist to preserve the landscape character of surrounding farmlands whilst minimising views from Beaudesert Boonah Road<br>– Increasing the density of planting along the site boundaries will minimise visual impacts of the additional infrastructure and taller buildings within the CMF<br>– Plant screening vegetation within the site boundary to minimise visual impacts experienced from Beaudesert Boonah Road, Sandy Creek Road and the railway corridor<br>– Avoid vegetation clearing, especially mature and regulated trees, where possible, to retain existing character values<br>– Consider planting vegetation throughout the Project area to break up the concrete expanses and hard stand areas and to aid successful blending of the Project into the surrounding rural landscape. | ✓ | ✓ | – Construction Manager<br>– Construction Superintendent<br>– Facility Manager |
| Visual modification to the area due to signage required for construction and operational activities | – Where possible, minimise visual impacts of signage by:<br>• Minimising signage dimensions<br>• Avoiding brightly illuminated signage<br>• Employing high-quality signage design<br>• Locating signage on buildings rather than freestanding. | ✓ | ✓ | – Construction Manager<br>– Construction Superintendent<br>– Facility Manager<br>– Safety Advisor |
| **Performance criteria** | | | | |
| – No significant long-term impacts to the visual amenity of the area resulting from construction or operational activities. | | | | |
| **Monitoring** | | | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | | | | – |
| **Reporting** | | | | |
| Maintain a complaints register, recording all complaints regarding visual amenity issues received from the surrounding community. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| **Corrective actions** | | | | |
| Investigate complaints received regarding impacts to the visual amenity of the surrounding area.<br>Identify corrective actions if required and allocate a responsible person and timeframe for completion. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Validate any complaints/reports received; and review any relevant controls currently in place, including their effectiveness. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Any additional control measures identified are to be implemented in a timely manner where excessive visual amenity impacts are identified. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| All complaints/reports are to be investigated in a timely manner, using appropriate dispute resolution methods and abatement or attenuation measures. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |

### 6.4.1.3 Erosion and sediment control

*Table 21 Mitigation measures for erosion and sediment control risks*

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Disturbance of in-situ soils during construction, resulting in erosion and sedimentation.<br>Potential activities that could result in erosion and sedimentation include earthworks and excavations which could pose a risk to flora and fauna and impact on waterways. | – Routine inspection/observation of cleared land to determine flow paths of stormwater and install appropriate controls.<br>– Install bunds and stormwater controls to divert flow to appropriate areas and discharge points.<br>– Routine inspection/observation and cleaning of drains and stormwater control infrastructure.<br>– Temporary stormwater ponds should be desilted and maintained to ensure operation allows for the maximum storage volume and minimal unlicensed discharges.<br>– Stormwater quality should be inspected and tested to confirm if it meets levels appropriate for discharge. Only stormwater that meets specified license or site water quality criteria (i.e. State and local government) should be discharged from the site.<br>– Sediment collected in stormwater infrastructure will be appropriately disposed of in a manner that will not create an erosion or pollutant hazard, or allow it to re-enter a waterway. | ✓ | | – Construction Manager<br>– Construction Superintendent<br>– Environmental Representative |

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|---|---|---|---|---|
| Increased erosion and sediment mobilisation due to the movement of vehicles on-site during operations | – Implementation of an Erosion and Sediment Control Plan (ESCP).<br>– Vehicles should be washed down off-site to prevent introducing contaminated runoff<br>– Minimise traffic and construction of additional roads<br>– Dust suppression systems.<br>– The internal roads will be pavemented with different surface materials. Refer to Project drawing No 30034146-000-114 for more details regarding roads surface material.<br>– Water from the onsite storage dam will be used for dust suppression. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Increased erosion and sediment mobilisation, due to wind, from materials stockpiled on-site during operations | | | ✓ | – Facility Manager<br>– Environmental Representative |
| **Performance criteria** | | | | |
| – No environmental harm occurs as a result of disturbance of soils during construction activities<br>– No unlawful discharges of sediment. | | | | |
| **Monitoring** | | | | |
| Undertake routine inspections to ensure the site is managed according to design specifications, and that sufficient controls are in place and remain fit-for-purpose. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Additional water quality monitoring and laboratory analysis to be carried out in response to a complaint or incident. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| **Reporting** | | | | |
| Maintain a complaints register, recording all complaints regarding erosion and sediment control issues received from the surrounding community and/or regulatory authorities. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| **Corrective actions** | | | | |
| Increase the frequency of dust suppression and/or erosion protection measures where appropriate and practical. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Investigate complaints received regarding impacts of erosion and sedimentation on the surrounding environment.<br>Identify corrective actions if required and allocate a responsible person and timeframe for completion. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Validate any complaints/reports received against the performance criteria associated with the activity being undertaken at the time; and review any relevant controls currently in place, including their effectiveness. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Any additional control measures identified are to be implemented as relevant, in a timely manner where erosion and sediment control impacts are identified. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |

| | |
|---|---|
| All complaints/reports are to be investigated in a timely manner, using appropriate dispute resolution methods and abatement or attenuation measures. | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |

### 6.4.1.4 Terrestrial biodiversity

***Table 22 Mitigation measures for erosion and terrestrial biodiversity risks***

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Disturbance/clearing of vegetation and fauna habitat leading to a reduction of native fauna in the area | **Design:**<br>– Vegetation clearing limits around sensitive habitat (core koala habitat) to be defined within the contract documentation for Mitchell Road. | ✓ | ✓ | – Construction Manager<br>– Construction Superintendent<br>– Fauna Spotter-catcher<br>– Wildlife Carer<br>– Facility Manager<br>– Environmental Representative |
| Injury and mortality of wildlife, due to wildlife movement through the Project area during construction and operations | – Nominate no-go zones on the design drawings and within contract documentation to protect significant vegetation within Mitchell Road. Including areas mapped as core koala habitat. | ✓ | ✓ | |
| Vegetation clearing for the Project reduces habitat connectivity within and adjacent to the Project area | – Require the Contractor to develop a clear staged approach to vegetation clearing to minimise the amount of clearing undertaken at one time and include an initial stage for vegetation clearing to support pioneering works such as for fence installation and establishment of erosion and sediment control devices. | ✓ | ✓ | |
| Disturbance of wildlife due to increased light, noise and vibration; resulting in injury or mortality of wildlife | – Design drawings to delineate the extent of the Project area and any specific nominated no-go zones where vegetation is to be retained within the Project area. | ✓ | ✓ | |
| Introduction and spread of invasive species due to increased movement of vehicles and machinery during construction and operations | – Minimise the extent of clearing required for the Project, where possible.<br>– Pre-clearance surveys to mark the locations of all potential breeding places for wildlife, disturbance of which is to be avoided as possible. These will target areas with potential to support breeding habitat for conservation significant species and breeding places identified within this report. | ✓ | ✓ | |
| Habitat degradation due to dust, run-off and sedimentation generated by construction activities reducing the abundance and diversity of habitats by:<br>– Physically smothering vegetation<br>– Changing nutrient levels<br>– Decreasing water quality<br>– Encouraging weed incursions<br>– Altering the movement of wildlife. | – Design adverse incident response procedures to detail actions to be taken in the event of wildlife injury or mortality during clearing.<br>– Develop a Construction ESCP (ESCP(C)) in accordance with the *Best Practice Erosion and Sediment Control Guidelines* (IECA 2008).<br>– Prepare a low-risk Species Management Program (SMP) in accordance with the requirements of Section 335 of the *Nature Conservation (Animals) Regulation 2020*. This will outline a process to identify and minimise impact on breeding places for least concern species listed under the NC Act. | ✓ | | |
| Impact surrounding native flora and fauna due to the operation of the CMF; resulting in a reduction of surrounding native populations | – If a landscape plan is to be developed, it is recommended that this incorporates the use of endemic native species wherever possible.<br>– Incorporate design measures that prevent or reduce the attraction of introduced fauna such as foxes, rats, cats and dogs to the Project area, such as ensuring waste areas are enclosed and secure.<br>**Construction:** | | ✓ | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Prepare and adhere to a Construction EMP (EMP(C)). The EMP(C) should include protocols to limit injury and mortality to fauna including management of risks associated with open excavations and increased traffic, and responses and reporting for roadkill and adverse incident protocols.<br>– Restrict vegetation clearing to the minimal area required to enable safe construction, operation and maintenance of the Project.<br>– Ensure that vegetation clearing boundaries are established with appropriate signage at regular intervals using visible and physical markings. High visibility tape, barricade webbing or similar should be utilised. Ensure that all contractors are aware of these boundaries.<br>– Engage a suitably qualified and experienced Fauna Spotter-catcher to undertake pre-clearance surveys immediately prior to clearing and supervise all clearing activities associated with construction. This will involve searching and clearing tree hollows, habitat trees and fallen logs prior to clearing and relocating resident fauna to the nearest suitable, safe habitat outside the clearing footprint.<br>– If a koala is encountered within the Project area, the individual must not be relocated and should be left to self-disperse on their own accord (wherever possible).<br>– Fauna within the Project area will be encouraged to self-disperse when the works take place. Disturbances associated with construction of the facility (i.e. increased noise and human presence) are anticipated to encourage species occurring within the Project area to self-disperse.<br>– If injuries occur, the Fauna Spotter-catcher will capture and transport the injured animal to a qualified veterinarian for treatment or euthanasia (unless suitably qualified to undertake treatment/euthanasia themself). Prior to clearing for construction, formalise arrangements with local veterinary services to treat and care for injured animals.<br>– Rehabilitate and revegetate temporary construction areas as soon as possible after the completion of construction.<br>– Include weed management measures in the EMP(C) to prevent the spread or introduction invasive plants and environmental weeds.<br>– Reduce sources of artificial light by reducing night works and limiting site lighting to the minimum needed for safety.<br>– Prioritise construction activities to daylight hours to reduce the need for lighting and resultant light spill into adjacent habitat and to reduce noise and vibration impacts on nocturnal fauna species.<br>– Install erosion and sediment control devices where disturbance must be undertaken within or adjacent to wetted waterways. | | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Implement responsible waste management practices (e.g. not leaving out food waste and not feeding wildlife) during construction. All waste will be stored in secure temporary holding containers and transported off-site.<br>– Clearly demarcate areas of native vegetation to be removed so that equipment operators and supervisors are aware of clearing extents.<br>**Operations:**<br>– Utilise existing cleared areas for laydown of materials.<br>– Reduce light spill, associated with permanent infrastructure, into retained adjacent vegetation by limiting artificial light associated with operations to the minimum needed for safety.<br>– Limit operation and maintenance work to day light hours, as is feasible, to decrease the impacts of light and noise pollution on nocturnal organisms within adjacent retained vegetation.<br>– Speed limits will be established and enforced on all access roads and/or internal roads to reduce the potential for vehicle fauna interactions.<br>– If fauna injuries occur within the Project area, a fauna spotter/catcher will capture and transport the injured animal to a qualified veterinarian for treatment or euthanasia (unless suitably qualified to undertake treatment/euthanasia themself).<br>– Develop an ESCP(C) in accordance with the *Best Practice Erosion and Sediment Control Guidelines* (IECA 2008) to minimise impacts to water quality and adjacent habitats.<br>– Mapping of major weed infestations identified during a pre-clearing survey and appropriate management actions to be undertaken. As a minimum, the management actions should include:<br>• An explanation of the general biosecurity obligation under the *Biosecurity Act 2014*<br>• Procedures for vehicle wash-downs and inspections<br>• Procedures for reporting sightings of prohibited and restricted pest species within the works area<br>• A requirement that weed infested vegetation is not mulched for re-use on-site, and off-site disposal for weed infested mulch at an appropriate facility.<br>– Prohibiting the movement of restricted invasive plants, including aquatic plants, such as salvinia (*Salvinia molesta*), into areas which do not contain the restricted invasive plants. | | | |
| Impacts to MNES from the construction of the CMF | **Construction:**<br>– Prepare and adhere to an EMP(C). The EMP(C) should include protocols to limit injury and mortality to fauna including management of risks associated with open excavations and increased traffic, and responses and reporting for roadkill and adverse incident protocols. | ✓ | | – Construction Manager<br>– Construction Superintendent<br>– Fauna Spotter-catcher<br>– Wildlife Carer |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Restrict vegetation clearing to the minimal area required to enable safe construction, operation and maintenance of the Project.<br>– Ensure that vegetation clearing boundaries are established with appropriate signage at regular intervals using visible and physical markings. High visibility tape, barricade webbing or similar should be utilised. Ensure that all contractors are aware of these boundaries.<br>– Engage suitably qualified and experienced fauna spotter/catchers to undertake pre-clearance surveys immediately prior to clearing and supervise all clearing activities associated with construction. This will involve searching and clearing tree hollows, habitat trees and fallen logs prior to clearing and relocating resident fauna to the nearest suitable, safe habitat outside the clearing footprint.<br>– Pre-clearance surveys to mark the locations of all potential breeding places for wildlife (i.e. hollows, nests, burrows etc), disturbance of which is to be avoided as possible. These will target areas with potential to support breeding habitat for conservation significant species and breeding places identified within this report.<br>– Prepare an SMP in accordance with the requirements of Section 335 of the *Nature Conservation (Animals) Regulation 2020*. This will outline a process to identify and minimise impact on breeding places for least concern species listed under the NC Act.<br>– If a koala is encountered within the Project area, the individual must not be relocated and should be left to self-disperse on their own accord (wherever possible).<br>– Fauna within the Project footprint will be encouraged to self-disperse when the works take place. Disturbances associated with construction of the facility (i.e. increased noise and human presence) are anticipated to encourage species occurring within the Project footprint to self-disperse.<br>– If injuries occur, the fauna spotter/catcher will capture and transport the injured animal to a qualified veterinarian for treatment or euthanasia (unless suitably qualified to undertake treatment/euthanasia themself). Prior to clearing for construction, formalise arrangements with local veterinary services to treat and care for injured animals.<br>– Inspect trenches, excavations and machinery daily for the presence of trapped fauna.<br>– Develop adverse incident response procedures to detail actions to be taken in the event of wildlife injury or mortality during clearing. This will include procedures for capture and transport of injured wildlife to qualified veterinarian or humane on-site euthanasia and formalisation of arrangements with a local veterinarian to treat and care for wildlife injured during for the construction period. | | | – Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Rehabilitate and revegetate temporary construction areas as soon as possible after the completion of construction.<br>– Include weed management measures in the EMP(C) to prevent the spread or introduction invasive plants and environmental weeds.<br>– Reduce sources of artificial light by reducing night works and limiting site lighting to the minimum needed for safety.<br>– Prioritise construction activities to daylight hours to reduce the need for lighting and resultant light spill into adjacent habitat and to reduce noise and vibration impacts on nocturnal fauna species.<br>– Where nightworks are required, minimise lighting impacts into retained adjacent vegetation and wetland areas by reducing light spill outside of the Project site.<br>– All waterway crossing structures are to consider the suite of fish present in the waterway and the fish species' passage requirements. Thirty-four native freshwater fish have been recorded in the catchment, which may migrate upstream when flows occur. Fish most likely to migrate into the Project footprint are small-bodied fish that are adapted to the ephemeral conditions of the local waterways, such as gudgeon, rainbowfish, etc.<br>– Where de-watering of waterways and/or modified dams is required, develop a Dewatering Management Plan to identify appropriate management strategies for aquatic fauna to minimise injury and death during construction, which include (as a minimum) the following:<br>• Aquatic fauna salvage prior to and during de-watering by a suitably qualified aquatic ecologist<br>• Translocating species to nearby waterways or wetlands of similar quality<br>• Temporary storage and monitoring to demonstrate the water meets the reuse or discharge water quality objectives<br>• On-site re-use of suitable water (e.g. for dust suppression) where practicable.<br>– Contingency for on-site treatment and discharge for water that does not meet the objectives or approvals conditions<br>– Install erosion and sediment control devices where disturbance must be undertaken within or adjacent to wetted waterways.<br>– Implement responsible waste management practices (e.g. not leaving out food waste and not feeding wildlife) during construction. All waste will be stored in secure temporary holding containers and transported off-site.<br>– Clearly demarcate areas of native vegetation to be removed so that equipment operators and supervisors are aware of clearing extents.<br>– Utilise existing cleared areas for laydown of materials.<br>– Design storage facilities and laydown areas a minimum of 50 m from any waterway, where possible. If areas cannot be located 50 m away, then bunds | | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | would need to be erected around the perimeter of the laydown area and checked daily for failures. Any failures in the bund wall will need to be rectified prior to any additional material being stored.<br>**Design:**<br>– Vegetation clearing will be restricted to the minimum amount necessary for the construction within the Project footprint, including in riparian zones.<br>– The extent of vegetation clearing (and no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing. Clearing extent will be communicated to construction supervisors.<br>– Require the Contractor to develop a clear staged approach to vegetation clearing to minimise the amount of clearing undertaken at one time and include an initial stage for vegetation clearing to support pioneering works such as for fence installation and establishment of erosion and sediment control devices.<br>– Design drawings to delineate the extent of the Project area and any specific nominated no-go zones where vegetation is to be retained within the Project area.<br>– Design adverse incident response procedures to detail actions to be taken in the event of wildlife injury or mortality during clearing.<br>– Where reasonable and practicable, incorporate water sensitive urban design measures to minimise runoff that enters waterways. This should take into consideration the water quality objectives, level of risk, maintenance requirements and physical space within the site to accommodate treatment devices. It should also include consideration of any locations where additional scour protection may be required to minimise erosion risk and maintain watercourse stability. Measures may include wide grassed swales, rock dissipaters, gross pollutant traps, and sediment basins. Within waterways and riparian areas, erosion and sediment control measures should prioritise soft engineering measures to achieve stabilisation where possible (i.e. geofab, jute matting or planting).<br>– Where possible, design culverts in accordance with the *Accepted development requirements for operational work that is constructing or raising waterway barrier works* (DAF 2018).<br>– Develop a Construction Erosion and Sediment Control Plan (ESCP(C)) in accordance with the *Best Practice Erosion and Sediment Control Guidelines* (IECA 2008).<br>– If a landscape plan is to be developed, it is recommended that this incorporates the use of endemic native species wherever possible.<br>– Incorporate design measures that prevent or reduce the attraction of introduced fauna such as European foxes, black rats, feral cats and wild dogs to the Project area, such as ensuring waste areas are enclosed and secure. | | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Limit permanent exclusion fencing at site.<br>– All fencing used on the Project will use fencing without barbed wire, particularly on the top strand, to minimise incidence of flying-fox entanglement. | | | |
| Impacts to MNES from the operation of the CMF | – Inspect and maintain all vehicles, machinery and plant regularly to minimise operational noise.<br>– Restrict vehicle movements as far as practicable and minimise night driving.<br>– Reduce light spill, associated with permanent infrastructure, into retained adjacent vegetation by limiting artificial light associated with operations to the minimum needed for safety.<br>– Limit operation and maintenance work to day light hours, as is feasible, to decrease the impacts of light and noise pollution on nocturnal organisms within adjacent retained vegetation.<br>– Speed limits will be established and enforced on all access roads and/or internal roads to reduce the potential for vehicle fauna interactions.<br>– If fauna injuries occur within the Project footprint, a Fauna Spotter-catcher will capture and transport the injured animal to a qualified veterinarian for treatment or euthanasia (unless suitably qualified to undertake treatment/euthanasia themself).<br>– Develop an Erosion and Sediment Control Plan (ESCP) in accordance with the *Best Practice Erosion and Sediment Control Guidelines* (IECA 2008) to minimise impacts to water quality and adjacent habitats.<br>– Mapping of major weed infestations identified during a pre-clearing survey and appropriate management actions to be undertaken. As a minimum, the management actions should include:<br>• An explanation of the general biosecurity obligation under the *Biosecurity Act 2014*<br>• Procedures for vehicle wash-downs and inspections<br>• Procedures for reporting sightings of prohibited and restricted pest species within the works area<br>• A requirement that weed infested vegetation is not mulched for re-use on-site, and off-site disposal for weed infested mulch at an appropriate facility.<br>– Prohibiting the movement of restricted invasive plants, including aquatic plants, such as salvinia (*Salvinia molesta*), into areas which do not contain the restricted invasive plants. | | ✓ | – Facility Manager<br>– Environmental Representative |
| **Performance criteria** | | | | |
| – No injury or death to native flora or fauna species<br>– No existing or new pest species spread by heavy vehicles/machinery entering or exiting the site<br>– All necessary reporting and pre-start checks are completed, and controls implemented to protect fauna during clearing and other construction activities<br>– No vegetation cleared outside of the approved footprints. | | | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| **Monitoring** | | | | |
| Undertake weekly inspections to assess the implementation of the above measures, with records kept in an environmental checklist. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Ensure all personnel on-site during construction have undertaken weed, pest and pathogen induction training. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Routine inspections for weeds and pest species during and after construction activities, to ensure no establishment of new/existing species within the Project area. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| **Reporting** | | | | |
| Any non-conformance regarding implemented mitigation measures is to be noted and reported to the Construction Manager. | | | | – All staff |
| Maintain a record of all plant/machinery washdown checks undertaken. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Maintain records demonstrating that personnel associated with the construction and operational phases have undertaken weed, pest and pathogen induction training. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Maintain a register of weeds, pests and pathogens observed within the Project area. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Any observed weed/pest infestations are to be documented and reported to the Construction Manager. | | | | – All staff |
| **Corrective actions** | | | | |
| Any works identified outside of the approved area are to be stopped immediately, and flagging/fencing checked and replaced, to avoid any accidental clearing outside the approved footprint. | | | | – Construction Manager<br>– Construction Superintendent |
| If any fauna are identified to be at risk of injury or death, the activity responsible should be stopped immediately, and appropriate authorities or suitably qualified persons engaged to determine steps for relocation. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative<br>– Fauna Spotter-catcher |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Any reported weed/pest infestations are to be documented and reported to the appropriate regulatory authority, so they can be rectified in a timely manner. | | | | – Project Manager<br>– Principal Contractor |

### 6.4.1.5 Aquatic biodiversity

***Table 23*** ***Mitigation measures for aquatic biodiversity risks***

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Loss of aquatic habitat due to construction activities | – Minimise the extent of all vegetation clearing wherever possible, particularly within riparian zones of waterways. | ✓ | | – Construction Manager<br>– Construction Superintendent<br>– Fauna Spotter-catcher<br>– Wildlife Carer<br>– Environmental Representative |
| Degradation of aquatic habitat and water; due to excessive sediment and release of contaminant, increase of weed and pest species and overall reduction in suitability of habitat conditions as a result of construction activities | – Where reasonable and practicable, incorporate water sensitive urban design measures to minimise runoff that enters waterways. This should take into consideration the water quality objectives, level of risk, maintenance requirements and physical space within the site to accommodate treatment devices. It should also include consideration of any locations where additional scour protection may be required to minimise erosion risk and maintain watercourse stability. Measures may include wide grassed swales, rock dissipaters, gross pollutant traps, and sediment basins. Within waterways and riparian areas, erosion and sediment control measures should prioritise soft engineering measures to achieve stabilisation where possible (i.e. geofab, jute matting or planting).<br>– Minimise lighting impacts into retained adjacent vegetation and wetland areas by reducing light spill outside of the Project area. | ✓ | | |
| Disturbance of aquatic fauna due to increased light, noise and vibration during construction activities; resulting in injury or mortality of wildlife | – All waterway crossing structures are to consider the suite of fish present in the waterway and the fish species' passage requirements. Thirty-four native freshwater fish have been recorded in the catchment, which may migrate upstream when flows occur. Fish most likely to migrate into the Project area are small-bodied fish that are adapted to the ephemeral conditions of the local waterways, such as gudgeons, rainbowfish, etc. | ✓ | | |
| Alteration of flow and aquatic fauna movement, as a result of construction activities | – Where possible, design culverts in accordance with the 'Accepted development requirements for operational work that is constructing or raising waterway barrier works' (DAF, 2018).<br>– Develop an Erosion and Sediment Control Plan (ESCP) in accordance with the *Best Practice Erosion and Sediment Control Guidelines* (IECA 2008) to minimise impacts to water quality and aquatic habitat. | ✓ | | |
| Fauna injury or mortality, due to construction works undertaken within waterways; including the excavation and dewatering of modified dams | – Where de-watering of waterways and/or modified dams is required, develop a Dewatering Management Plan to identify appropriate management strategies for aquatic fauna to minimise injury and death during construction, which include (as a minimum) the following:<br>• Aquatic fauna salvage prior to and during de-watering by a suitably qualified aquatic ecologist<br>• Translocating species to nearby waterways or wetlands of similar quality<br>• Temporary storage and monitoring to demonstrate the water meets the reuse or discharge water quality objectives<br>• On-site re-use of suitable water (e.g. for dust suppression) where practicable<br>• Contingency for on-site treatment and discharge for water that does not meet the objectives or approvals conditions. | ✓ | | |
| Introduction and spread of invasive species due to increased movement of vehicles and machinery during construction | | ✓ | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Mapping of major weed infestations identified during a pre-clearing survey and appropriate management actions to be undertaken. As a minimum, the management actions should include:<br>• An explanation of the general biosecurity obligation under the *Biosecurity Act 2014*<br>• Procedures for vehicle wash-downs and inspections<br>• A requirement for 'weed free' certification and checks prior to vehicles entering the construction site during site establishment<br>• Procedures for reporting sightings of prohibited and restricted pest species within the works area<br>• A requirement for the appropriate treatment of all restricted invasive plants in the construction area before construction begins<br>• A requirement that weed infested vegetation is not mulched for re-use on-site, and off-site disposal for weed infested mulch at an appropriate facility<br>• The identification of no-go zones and protection areas in the construction area<br>• Prohibiting the movement of restricted invasive plants, including aquatic plants, such as salvinia (*Salvinia molesta*), into areas which do not contain the restricted invasive plants.<br>– Design storage facilities and laydown areas a minimum of 50 m from any waterway, where possible. If areas cannot be located 50 m away, then bunds would need to be erected around the perimeter of the laydown area and checked daily for failures. Any failures in the bund wall will need to be rectified prior to any additional material being stored. | | | |
| Degradation of aquatic habitat and water; due to storage pond runoff during high rainfall events, and rubbish entering downstream waterways via stormwater drains on-site during operational activities | – Minimise lighting impacts into retained adjacent vegetation and wetland areas by reducing light spill outside of the Project area.<br>– Design storage facilities and laydown areas a minimum of 50 m from any waterway, where possible. If areas cannot be located 50 m away, then bunds would need to be erected around the perimeter of the laydown area and checked daily for failures. Any failures in the bund wall will need to be rectified prior to any additional material being stored. | | ✓ | – Facility Manager<br>– Environmental Representative |
| **Performance criteria** | | | | |
| – No injury or death to native flora or fauna species<br>– No existing or new pest species spread by heavy vehicles/machinery entering or exiting the site<br>– All necessary reporting and pre-start checks are completed, and controls implemented to protect fauna during clearing and other construction activities<br>– No vegetation cleared outside of the approved footprints. | | | | |
| **Monitoring** | | | | |
| Undertake weekly inspections to assess the implementation of the above measures, with records kept in an environmental checklist. | | | | – Construction Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Ensure all personnel on-site during construction have undertaken weed, pest and pathogen induction training. | | | | – Construction Manager<br>– Facility Manager |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | | | | – Environmental Representative |
| Routine inspections for weeds and pest species during and after construction activities, to ensure no establishment of new/existing species within the Project area. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| **Reporting** | | | | |
| Any non-conformance regarding implemented mitigation measures is to be noted and reported to the Construction Manager. | | | | – All staff |
| Maintain a record of all plant/machinery washdown checks undertaken. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Maintain records demonstrating that personnel associated with the construction and operational phases have undertaken weed, pest and pathogen induction training. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Maintain a register of weeds, pests and pathogens observed within the Project area. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Any observed weed/pest infestations are to be documented and reported to the Construction Manager. | | | | – All staff |
| **Corrective actions** | | | | |
| Any works identified outside of the approved area are to be stopped immediately, and flagging/fencing checked and replaced, to avoid any accidental clearing outside the approved footprint. | | | | – Construction Manager<br>– Construction Superintendent |
| If any fauna are identified to be at risk of injury or death, the activity responsible should be stopped immediately, and appropriate authorities or suitably qualified persons engaged to determine steps for relocation. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative<br>– Fauna Spotter-catcher |
| Any reported weed/pest infestations are to be documented and reported to the appropriate regulatory authority, so they can be rectified in a timely manner. | | | | – Project Manager<br>– Principal Contractor |

### 6.4.1.6 Heritage

*Table 24* *Mitigation measures for heritage risks*

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Indigenous heritage values uncovered during construction works | The entirely of the site is mapped as a Category 5 risk under the ACH Act – Duty of Care Guidelines. The likelihood of other values being uncovered during construction are significantly high.<br>– Traditional Owner consultation will be required to avoid harm to Indigenous cultural heritage under the *Aboriginal Cultural Heritage Act 2003*. Consultation may result in:<br>• A cultural heritage management plan<br>• A cultural heritage management agreement<br>• A cultural heritage field agreement.<br>**Site protocols**<br>Site protocols are to be followed at all times during construction and operation.<br>Site inductions:<br>– Provide machinery and road/traffic personnel with relevant cultural heritage training to ensure they:<br>• Understand the Duty of Care requirements under the *Aboriginal Cultural Heritage Act 2003*<br>• Understand where machinery, stockpiles etc. should be located.<br>– The site induction can be delivered by the responsible cultural heritage officer (Tim Menkins: 0497 259 960).<br>**During works**<br>These guidelines are developed from the Department of Environment and Science's *Procedural guide: Managing Indigenous Cultural Heritage* (DES 2015).<br>– **FIND:** An item of potential Cultural Heritage is found.<br>– **STOP:** All work at the FIND location shall cease. The item shall not be removed or disturbed and an exclusion zone must be installed around the area.<br>– **NOTIFY:** The Contractor shall immediately notify a 'responsible person'.<br>– **MANAGE:** This may include precluding access to that area and liaison with relevant Aboriginal party/parties. The Contractor shall notify all site personnel of the object and/or area and proposed treatment of the object and/or area as soon as possible, but prior to commencing work on the next working day. Please immediately notify the responsible cultural heritage officer should further historical or Indigenous heritage values be identified (Tim Menkins: 0448 119 104).<br>Archaeological Discoveries:<br>– Under Section 89 of the *Queensland Heritage Act 1992* (QHA), if values are, or could be, of State significance, a notification of discovery must be made to the Department of Environment, Science and Innovation (DESI).<br>– Under Section 90 of the QHA, unless the chief executive gives consent, or if a person has a reasonable excuse, the archaeological artefact must not be interfered with until at least 20 business days after the giving of notice. When an archaeological discovery is reported, DESI | ✓ | | – Construction Manager<br>– Construction Superintendent |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | assesses the finds to determine if it is an important source of information about Queensland's history. Discoveries may be assessed as:<br>• Not important<br>• Important and requiring management strategies<br>• Important and eligible for entry in the Queensland Heritage Register.<br>– Archaeological discoveries can occur regardless of land tenure. | | | |
| Non-Indigenous heritage values uncovered during construction works | **Site protocols**<br>Site protocols are to be followed at all times during construction and operation.<br><u>Site inductions:</u><br>– Provide machinery and road/traffic personnel with relevant cultural heritage training to ensure they:<br>• Understand the Duty of Care requirements under the *Aboriginal Cultural Heritage Act 2003*<br>• Understand where machinery, stockpiles etc. should be located.<br>– The site induction can be delivered by the responsible cultural heritage officer (Tim Menkins: 0497 259 960).<br>**During works**<br>These guidelines are developed from the Department of Environment and Science's *Procedural guide: Managing Indigenous Cultural Heritage* (DES 2015).<br>– **FIND:** An item of potential Cultural Heritage is found.<br>– **STOP:** All work at the FIND location shall cease. The item shall not be removed or disturbed and an exclusion zone must be installed around the area.<br>– **NOTIFY:** The Contractor shall immediately notify a 'responsible person'.<br>– **MANAGE:** This may include precluding access to that area and liaison with relevant Aboriginal party/parties. The Contractor shall notify all site personnel of the object and/or area and proposed treatment of the object and/or area as soon as possible, but prior to commencing work on the next working day. Please immediately notify the responsible cultural heritage officer should further historical or Indigenous heritage values be identified (Tim Menkins: 0448 119 104).<br><u>Archaeological Discoveries:</u><br>– Under section 89 of the *Queensland Heritage Act 1992* (QHA), if values are, or could be, of State significance, a notification of discovery must be made to the Department of Environment, Science and Innovation (DESI)<br>– Under section 90 of the QHA, unless the chief executive gives consent, or if a person has a reasonable excuse, the archaeological artefact must not be interfered with until at least 20 business days after the giving of notice. When an archaeological discovery is reported, DES assesses the finds to determine if it is an important source of information about Queensland's history. Discoveries may be assessed as:<br>• Not important<br>• Important and requiring management strategies<br>• Important and eligible for entry in the Queensland Heritage Register.<br>– Archaeological discoveries can occur regardless of land tenure. | ✓ | | – Construction Manager<br>– Construction Superintendent |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Native Title claim existing over the Project area | – If it can be proven that freehold tenure was validly declared prior to 13 December 1996, then Native Title is extinguished in this area. If Native tile has been validly extinguished for this reason, then it need not be considered further for the Project. | ✓ | | – Project Manager |
| Heritage items uncovered during operational works | – Follow the Find, Stop Notify and Manage steps in the Department of Environment and Science's *Procedural guide: Managing Indigenous Cultural Heritage* (DES 2015).<br>• **FIND:** A potential Cultural Heritage item or object is found.<br>• **STOP:** STOP WORK IMMEDIATELY and install an exclusion zone around the area.<br>• **NOTIFY:** notify a responsible person (e.g. Project Manager).<br>• **MANAGE:** This may include precluding access to that area and liaison with relevant Aboriginal party/parties. The Contractor shall notify all site personnel of the object and/or area and proposed treatment of the object and/or area as soon as possible, but prior to commencing work on the next working day. Please immediately notify the responsible cultural heritage officer should further historical or Indigenous heritage values be identified (Tim Menkins: 0448 119 104).<br>– Adhere to the requirements set out in the ACH Act for the development of an appropriate Environmental Management Plan (EMP). | | ✓ | – Facility Manager |
| **Performance criteria** | | | | |
| – All activities are to be managed in accordance with the *Aboriginal Cultural Heritage Act 2003*<br>– No sites of cultural significance are to be disturbed, damaged, or altered in any way, shape, or form. | | | | |
| **Monitoring** | | | | |
| Undertake inspections prior to construction for sites of cultural significance. | | | | – Construction Manager<br>– Construction Superintendent |
| Any unexpected finds should be confirmed not to be sites of cultural significance before further activity occurs. | | | | – Construction Manager<br>– Construction Superintendent |
| **Reporting** | | | | |
| Any unexpected finds that could potentially be of cultural significance must be reported to the Construction Manager as soon as reasonably practicable. | | | | – All staff |
| The identification of a potential site of cultural significance must be reported to the relevant authority for confirmation on next steps. | | | | – Principal Contractor<br>– Construction Manager |
| **Corrective actions** | | | | |
| Immediately cease all activity within the area of a potential site of cultural significance. | | | | – Construction Manager<br>– Construction Superintendent |
| The site of cultural significance is to be reported to the relevant authority for investigation and confirmation. | | | | – Project Manager<br>– Principal Contractor |
| If confirmed as a site of cultural significance, actions are to be undertaken in accordance with the *Aboriginal Cultural Heritage Act 2003* and instructions given by the relevant authority. | | | | – Construction Manager |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | | | | – Construction Superintendent |
| If deemed to not be a site of cultural significance, actions are to be undertaken in accordance with the Project's Unexpected Finds Procedure and relevant construction specification. | | | | – Construction Manager<br>– Construction Superintendent |

### 6.4.1.7 Waste

*Table 25 Mitigation measures for waste management risks*

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Inappropriate/inefficient material and resource selection and consumption during construction | – Educated planning shall be implemented to efficiently manage the delivery and storage of materials, reducing spoilage of materials.<br>– Agreements with suppliers to where possible use reusable or recyclable packaging in preference of single use packaging.<br>– Minimise procurement of material to reduce spoilage. | ✓ | | – Principal Contractor<br>– Construction Manager<br>– Environmental Representative |
| Failure to carry out general waste management activities | – The Waste Management Hierarchy of "avoidance, reuse, recycling, disposal" will be followed to manage waste throughout site operations.<br>– The relevant persons responsible (the Contractor during construction; SOILCO during operations), will identify and maximise opportunities for supporting a circular economy that benefits waste avoidance and recycling of key priority waste streams.<br>– A site induction shall be implemented for all site personnel detailing their responsibilities under the relevant waste management legislation and guidelines in regard to the minimisation, classification, management and reporting of waste on-site.<br>– Signs within the site will be erected to encourage employees to reduce, reuse or recycle where possible.<br>– Footpaths and road reserves on the site are to be maintained clear of rubbish, building materials and all other waste materials. | ✓ | ✓ | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Inappropriate handling of waste/reuse materials/feedstock | **General:**<br>– If encountered or identified, hazardous waste shall be managed by appropriately qualified and licensed contractors in accordance with State legislation.<br>– Waste receptacles, both general and recycling, shall be made available throughout the site to allow for waste segregation and replaced or emptied regularly to prevent overflow.<br>– Liquid wastes are to be stored in appropriate containers in areas that are bunded.<br>– Recyclables and non-recyclable wastes are to be stored in appropriate containers on-site until removed to an approved disposal or recycling facility.<br>– All waste receptacles shall be covered and bunded where possible.<br>**Operations:**<br>– All waste inputs and outputs are entered into SOILCO's database and recorded in SOILCO's Waste Monthly Contribution Report on the Queensland Waste and Resource Reporting Portal. | ✓ | ✓ | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Organic wastes to be processed to ensure effective pasteurisation and segregation of pasteurised material from unpasteurised materials and/or leachate, in accordance with SOILCO's composting procedures and operating protocols.<br>– A Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. | | | |
| Inappropriate disposal of waste | **General:**<br>– Procedures shall be implemented and maintained to verify licenses and permits for the handling, transportation and disposal of waste. All relevant information is to be recorded in a Waste Management Register.<br>– Disposal of septage from site amenities shall be directed to holding tanks for licenced disposal, if a sewer connection is unavailable.<br>**Construction:**<br>– Materials should be transported to C and D recycling facilities for recovery. | ✓ | ✓ | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Increased fire risk due to stockpiles present on-site during operations | Measures outlined in the *Guideline Prevention of fires in waste stockpiles* (DESI 2024) are implemented across the site. | | ✓ | – Facility Manager<br>– Safety Advisor |
| **Performance criteria** | | | | |
| – No complaints are received in relation to waste generated on-site<br>– Litter is contained in appropriate facilities on-site.<br>– No complaints are received in relation to the feedstock received at the site. | | | | |
| **Monitoring** | | | | |
| Routine inspections to ensure waste is appropriately stored, handled, transported and disposed of. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Routine inspections to ensure all practicable environmental management measures are being followed to minimise excess waste and energy consumption. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Routine inspection of incoming feedstocks, litter pick-up and cleaning of tipping floors, conveyor transfer points and of wheels of all vehicles leaving the site. | | | | – Facility Manager<br>– Environmental Representative |
| **Reporting** | | | | |
| Maintain a register, recording all monitoring/inspections undertaken for the entirety of site operations. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Introduce and maintain a Waste Management Register, which includes all waste inputs and outputs generated up until the actual completion date of site operations. | | | | – Principal Contractor |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Introduce and maintain a record of induction training completed by site personnel, for the entirety of site operations. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| **Corrective actions** | | | | |
| If failure to contain waste generated on-site is a recurring issue, review disposal facility locations and types. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |
| Consider shelters and prevailing winds. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager |

### 6.4.1.8 Public health and safety

***Table 26*** ***Mitigation measures for public health and safety risks***

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Increased risk of pathogens such as Legionella and dispersion of bioaerosols, due to operation of the CMF | – The risk of pathogen transmission is as low possible.<br>– Control and minimisation of dust to reduce the migration of certain pathogens.<br>– Table 2.3 and Appendix A of the Environmental Assessment Report, outline the processing and timing for pasteurisation. For the Bromelton CMF, the feedstock is to remain on the ASP between 18 and 21 days, depending on conditions and seasonal variation. | | ✓ | – Facility Manager<br>– Safety Advisor |
| Inappropriate management of contaminants such as heavy metals and PFAS during operations | – A Hazardous Material and Waste Management Plan will be developed and implemented by the operator to describe how generated wastes are handled, stored, recycled and disposed of in accordance with applicable legislative and contractual requirements during operation of the facility.<br>– Waste Hierarchy Principles will be adopted during the operational phase, and this involves the adoption of environmentally sensitive work practices and implementation of environmental safeguards to minimise waste and promote Ecologically Sustainable Development. | | ✓ | – Construction Manager<br>– Facility Manager<br>– Safety Advisor<br>– Environmental Representative |
| Inappropriate management of feedstock during the operation of the CMF resulting in vermin infestation. | – A Site-Specific Management Plan will include a feedstock management plan for the operational phase, which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>– Frequent removal of waste contaminants, regular cleaning and maintenance of tipping areas, conveyor transfer points, stormwater and leachate ponds and sumps.<br>– Prevention of water pool and stagnating.<br>– Ensuring appropriate feedstock management including frequent turning and mixing, and minimised storage times. | | ✓ | – Facility Manager<br>– Safety Advisor |

| | |
|---|---|
| **Performance criteria** | |
| – No adverse impacts to human health or safety as a result of construction or operational activities. | |
| **Monitoring** | |
| Undertake inspections/observations of the storage, use and impacts of hazardous substances on-site. | – Construction Manager<br>– Facility Manager<br>– Safety Advisor<br>– Environmental Representative |
| Undertake regular check-ins with staff, and health monitoring of staff members as required. | – Construction Manager<br>– Facility Manager<br>– Safety Advisor<br>– Assigned persons responsible |
| **Reporting** | |
| Any observations or evidence of incorrect use of PPE, or adverse impacts to persons by hazardous chemicals, are to be reported to the Construction Manager. | – All staff |
| **Corrective actions** | |
| Any reported observations or evidence of potentially hazardous substances affecting the surrounding environment, will require an investigation into the source. | – Construction Manager<br>– Facility Manager<br>– Safety Advisor<br>– Environmental Representative |
| The source of contamination should be immediately remediated in accordance with safe practices outlined in the SDS. | – Construction Manager<br>– Facility Manager<br>– Safety Advisor<br>– Environmental Representative |
| Any contamination discovered is to be isolated as soon as practicable and assessed to determine suitable remediation strategies. | – Construction Manager<br>– Facility Manager<br>– Safety Advisor<br>– Environmental Representative |
| Any reported observations or evidence of incorrect use of PPE or handling of a hazardous substance, will require the activity responsible to be stopped while an investigation occurs. | – All staff |
| Following an investigation, training will be carried out on the correct use and handling of hazardous substances in the workplace to ensure worker safety is maintained. | – Construction Manager<br>– Facility Manager<br>– Safety Advisor |

## 6.4.2 Air

### 6.4.2.1 Climate

*Table 27 Mitigation measures for climate risks*

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Extreme temperatures and heatwave events during operational activities impacting the efficiency of electrical infrastructure; and construction, operational and maintenance activities (both personnel and rate of infrastructure renewal) | – Develop emergency response plans with emergency muster and access points clearly established and maintain open communications with stakeholders. | ✓ | ✓ | – Construction Manager<br>– Facility Manager<br>– Safety Advisor |
| **Performance criteria** | | | | |
| – No adverse impacts to on-site worker health and safety due to extreme temperature events<br>– Minimal unplanned downtime due to overheating of electrical infrastructure. | | | | |
| **Monitoring** | | | | |
| Undertake routine inspections to ensure the site is managed according to design specifications, and that sufficient controls are in place and remain fit-for-purpose. | | | | – Construction Manager<br>– Facility Manager<br>– Safety Advisor |
| Regularly monitor site weather conditions and forecasts to plan for extreme temperatures/heatwave events. | | | | – Construction Superintendent |
| **Reporting** | | | | |
| Any emergency situations regarding the failure of electrical infrastructure or personnel health and safety, during an extreme temperature event, are to be reported to the Construction Manager or Facility Manager as soon as practicable. | | | | – All staff |
| Any reported emergency situations are to be relayed to the Principal Contractor as soon as practicable. | | | | – Construction Manager<br>– Facility Manager<br>– Safety Advisor |
| **Corrective actions** | | | | |
| Investigate any reductions in efficiency or failure of electrical infrastructure during extreme temperature events.<br>Identify corrective actions if required, and allocate a responsible person and timeframe for completion. | | | | – Construction Manager<br>– Facility Manager |
| Any additional control measures or maintenance activities identified are to be implemented in a timely manner. | | | | – Construction Manager<br>– Facility Manager |

## 6.4.2.2 Air quality

*Table 28 Mitigation measures for air quality risks*

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Dust emissions produced by the movement of trucks and other vehicles on unpaved roads, and other sources associated with material handling onsite; wind erosion from unsealed surfaces and stockpiles; unloading and turning of compost stockpiles and product screening | **Construction:**<br>– A construction dust control protocol will be prepared detailing management measures including a method for recording dust complaints and monitoring requirements.<br>– On days with forecasted and actual high winds (i.e., over 10 m/s), reduce work effort accordingly if wind-blown dust is observed to be leaving the site boundary.<br>– Undertake dust suppression, as required, using water sprays, water extension agents, soil stabilising polymers or other media on:<br>• Unpaved work areas subject to traffic or wind<br>• Spoil and aggregate stockpiles<br>• During the loading and unloading of dust generating materials<br>• Unpaved access tracks.<br>– Water from the onsite storage dam will be used for dust suppression for the internal roads used by heavy vehicles.<br>– If the works are creating levels of dust which may significantly impact on public amenity, modify or stop the works until the dust hazard is reduced to an acceptable level.<br>– Stockpile turning will be suspended during periods of high wind<br>– Maintain plant and equipment in good condition to minimise air emissions.<br>**Operations:**<br>Dust emissions from unpaved access and site roads, as well as all composting operations are readily managed with application of watering and proactive dust controls. Water from the onsite storage dam will be used for dust suppression for the internal roads used by heavy vehicles.<br>Covering all loads include the transport of feedstocks and final products to and from the CMF. | ✓ | ✓ | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Particulates generated during site establishment works; including delivery of site amenities, and surveying/pegging of the site | | ✓ | | – Construction Manager<br>– Construction Superintendent |
| Particulates generated during earth works, including:<br>– Establishment of access road to work area<br>– Grading, excavation and general movement of earth materials. | | ✓ | | – Construction Manager<br>– Construction Superintendent |
| Particulates generated during road works and intersection works, including:<br>– Removal of trees/stripping of topsoil<br>– Box out to required levels<br>– Subgrade and base course<br>– Asphalting<br>– Line marking<br>– Signage installation<br>– Defect inspection and cleaning. | | ✓ | | – Construction Manager<br>– Construction Superintendent |
| Particulates generated during civil works, including:<br>– Demolition and earthworks<br>– Civil works<br>– Ponds and other civil structures. | | ✓ | | – Construction Manager<br>– Construction Superintendent |
| Particulates generated during mechanical installation of the following:<br>– Shredder<br>– Drum screen | | ✓ | | – Construction Manager<br>– Construction Superintendent |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| – Platforms<br>– Storage tanks/platforms<br>– Blowers<br>– Leachate system<br>– Water system<br>– Picking system<br>– Control system and instruments<br>– Odour control system<br>– Interconnecting pipework. | The pavement types of the internal roads are not expected to produce significant dust emission. The pavement types are:<br>• unbound granular pavements<br>• stabilised pavements<br>• asphalt pavements and surfacing stabilised pavements<br>• sprayed bituminous surfacing<br>• asphalt pavements and surfacing | | | |
| Particulates generated during electrical installation of the following:<br>– Blowers<br>– Pumps<br>– Screens<br>– Motor control centre works<br>– Interconnecting cabling. | | ✓ | | – Construction Manager<br>– Construction Superintendent |
| Greenhouse gas emissions produced by machinery and equipment used during construction and operations | Greenhouse gas emissions assessment will be completed during the detailed design phase. | ✓ | ✓ | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Potential for odour to exceed the highest predicted 99.5$^{th}$ percentile odour impact of 2.1 OU at the industrial receptor R7 | – Maintain plant and equipment in good condition to minimise ignition risk of fuel or chemicals, spills, and air emissions that may cause nuisance.<br>– Mixing putrescible feedstock materials immediately into the compost process, if not pre-treated or dried. No feedstock with a 'very high' odour rating will be accepted onsite. The only feedstock with a 'high' rating accepted at the site are food organics for composting and small amounts of animal manure (up to 200 tonnes) for blending purposes only.<br>– Implementing a management strategy for turning open windrows to prevent anaerobic conditions which is determined by an experienced operator through site trials and measurements. | | ✓ | – Facility Manager<br>– Environmental Representative<br>– Assigned persons responsible |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Potential for odour to exceed the highest predicted 99.5$^{th}$ percentile odour impact of 0.6 OU at the residential receptor R6 | – Minimising turning events for open windrows, especially during the first 7-10 days of composting, with only the minimum turning required to support pasteurisation and moisture redistribution.<br>– Train staff (internal and contractors) on odour management strategy and all relevant procedures. Requirements to be included in the Odour Management Plan.<br>– Install and operate as needed an aerator in the leachate pond to reduce the odour potential from the stored leachate.<br>– Scheduling activities for times when they will have least impact (e.g. avoid undertaking odour-generating activities such as turning windrows of compost at times when it is windy, and the odour might carry to a sensitive or commercial place.<br>– If the site activities are emitting odour concentrations which may significantly impact the nearby receptors, the works should be modified or stopped until the hazard is reduced to an acceptable level. This can include shredding of raw feedstock or turning of windrows.<br>– An Odour Management Plan to be developed prior to the activity commencing which includes:<br>• Identification of all odour sources, and potential odour sources at the site, including odours and potential odours generated from the activity<br>• A requirement that odour investigations be completed by an appropriately qualified person<br>• An analysis of routine and non-routine processes and operating conditions that could potentially result in odour emissions<br>• Measures to avoid the generation and minimise the impacts of odours<br>• At a minimum, annual reviews of the effectiveness of the measures.<br>– Upon receipt of a valid odour complaint, engage a suitable experienced odour professional to conduct odour surveillance (odour surveys) to determine the extent of | | ✓ | – Facility Manager<br>– Environmental Representative<br>– Assigned persons responsible |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | odour from the site and investigate what site activities led to elevated odour. | | | |
| Cumulative odour impacts during operations due to the distinct odour characteristics associated with Bush's Proteins | Not expected to occur as the odour from Bush's Proteins is not similar to that of the odour character experienced from composting, therefore cumulative impacts are not expected. | | ✓ | – Facility Manager<br>– Environmental Representative<br>– Assigned persons responsible |
| **Performance criteria** | | | | |
| – All construction and operational activities are managed in accordance with the *Environmental Protection Act 1994* and the *Environmental Protection Policy (Air) 2019*<br>– No complaints are received from regulatory authorities or the surrounding community in relation to air quality issues. | | | | |
| **Monitoring** | | | | |
| Undertake air quality monitoring prior to construction commencing and during the construction phase. | | | | – Air quality specialist |
| Undertake inspections/observations of air quality for fugitive dust, odour at the facility.<br>Undertake air quality testing for point source emissions. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| **Reporting** | | | | |
| Any observations or evidence of air pollution likely to cause nuisance is to be reported to the Construction Manager or Facility Manager for action. | | | | – All staff |
| Any observations or evidence of fugitive air emissions travelling offsite that may impact surrounding receivers to be reported to the Facility Manager. | | | | – All staff |
| Any emission non-compliance are to be recorded and appropriately investigated. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Maintain a complaints register, recording all complaints regarding air quality issues received from the surrounding community and/or regulatory authorities. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Prepare an environmental monitoring report documenting the results of the monitoring programs during the operational phase and any actions taken to address exceedances. | | | | – Principal Contractor |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | | | | – Environmental Representative |
| **Corrective actions** | | | | |
| Investigate any non-compliance or complaint including review of operational activity that may be source and weather conditions.<br>Identify corrective actions if required and allocate a responsible person and timeframe for completion. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Validate any complaints/reports received against the performance criteria associated with the activity being undertaken at the time; and review any relevant controls currently in place, including their effectiveness. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Officer |
| Any additional control measures identified are to be implemented in a timely manner where excessive emissions or nuisance dust and other air quality issues are identified. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| All complaints/reports are to be investigated in a timely manner, using appropriate dispute resolution methods and abatement or attenuation measures. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |

## 6.4.3 Noise and vibration

### 6.4.3.1 Noise

***Table 29 Mitigation measures for noise risks***

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Excess generation of noise during construction activities, which may include:<br>– Earthworks<br>– Slab construction | Construction noise levels will be dynamic and vary based on the construction activities being undertaken.<br><br>**Site inductions**<br>– All employees, contractors and sub-contractors are to receive an environmental induction. The induction should include: | ✓ | | – Principal Contractor<br>– Construction Manager<br>– Construction Superintendent |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| – Building construction<br>– Embankment/ pavement works<br>– Sealing works. | • All relevant project-specific and standard noise and vibration mitigation measures<br>• Relevant licence and approval conditions<br>• Permissible hours of work<br>• Location of nearest sensitive receivers<br>• Construction employee parking areas<br>• Designated loading/unloading areas and procedures<br>• Site opening/closing times (including deliveries)<br>• Environmental incident procedures.<br>**Behavioural practices**<br>– No swearing or unnecessary shouting or loud stereos/radios on-site<br>– No dropping of materials from height, throwing of metal items and slamming of doors.<br>**Community consultation measures**<br>– 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.<br>– This may include a local community update letters for specific construction activities and a Project information line.<br>**Complaints management**<br>Complaints will be managed in accordance with the procedure outlined below. Signage at each site will clearly and visibly provide a contact number and name to receive complaints and enquiries about construction.<br>– Potential complaints specific to these works could include:<br>• A cluster of noise complaints<br>– In this instance, the response would be to:<br>• Verbally respond to complainant<br>• Provide a written response within seven calendar days, if the complaint cannot be resolved verbally<br>• Log the complaint, and any actions taken with regards to the complaint within a complaints register<br>• Undertake monitoring at the complainant's residence(s), where appropriate.<br>• Investigate the nature and reasons of the impact<br>– Investigate and implement further mitigation measures to minimise the impact.<br>**Construction hours and scheduling** | | | – Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Comply with the recommended standard construction hours outlined in **Section 4.1.1 of Appendix I** in the **Environmental Assessment Report**, unless out of hours work has been approved.<br>– For any work that would take place outside of normal construction hours:<br>• Undertake an assessment of the potential noise and vibration impacts associated with the proposed activities and outline specific mitigation measures.<br>• Residents potentially affected by such activities will be notified at least five days before hand, where required.<br>• Minimise consecutive night activities in the same locality and provide periods of quiet if activities occur for extended periods during the night.<br>• Conduct activities in a manner that eliminates or minimises the need for audible warning alarms.<br>**Equipment selection**<br>– Use quieter and less vibration emitting construction methods where reasonable and feasible.<br>**Use and siting of plant**<br>– Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided.<br>– The offset distance between noisy plant and adjacent sensitive receivers is to be in accordance with this report.<br>– Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers where possible.<br>**Plan worksites and activities to minimise noise and vibration**<br>– Plan traffic flow, parking and loading unloading areas to minimise reversing movements within the site.<br>**Minimise disturbance arising from delivery of goods to construction sites**<br>– Loading and unloading of materials/deliveries is to occur during standard construction hours.<br>– Contractors are to avoid dropping materials from height where practicable, during loading and unloading.<br>– Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. | | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Increased noise levels, above those of the pre-existing environment, due to operational activities | – 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 to the surrounding amenity.<br>– Dump trucks, loaders (L90 and L150) and shredder operations should be limited to day time operations or only operated near the centre of the Project area during the start of the day (6am to 7am) to reduce noise impacts during the morning shoulder period.<br>A Noise Management Plan (NMP) be prepared for the CMF. It should contain (but not limited to):<br>– 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:<br>• 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<br>• 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.<br>• SOILCO will endeavour to attend to these complaints within 48 hours of receipt.<br>• 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.<br>• The complaints log will be made available to relevant regulatory authorities on request.<br>– A record of the noise mitigation measures implemented on-site.<br>**Best practice environmental management practices**<br>– All work to be within nominated hours of operation<br>– Switch off equipment when not in use.<br>– Select the quietest machinery and equipment available and find quieter processes or ways of performing tasks where possible (e.g. investigate whether there are suitable alternatives to reversing alarms on vehicles and select vehicles with low noise emissions).<br>– Ensure that roads have a suitable and well-maintained surface and limit the amount, type, times and speed of vehicle movements.<br>– Start plant and vehicles sequentially rather than all at the same time.<br>– Use existing screens or site features to their advantage to reduce noise.<br>– If the noise is directional, point the source away from noise-sensitive locations where possible.<br>– Ensure that equipment, vehicles and acoustic screens or other noise mitigation devices are properly maintained. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Excess generation of noise, due to additional traffic during operations, impacting on sensitive receptors located along the road network near the site | | | ✓ | – Facility Manager<br>– Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – Ensure that each staff member is aware of their responsibilities to reduce noise emissions, and how this can be achieved.<br>– Noise at the sensitive and commercial places is periodically monitored to ensure that noise mitigation strategies are effective.<br>– Monitoring is undertaken at a sufficient frequency 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.<br>– An environmental management system is implemented per *AS/NZS ISO 14001:2016 – Environmental management systems – Requirements with guidance for use* (Standards Australia 2016). | | | |
| **Performance criteria** | | | | |
| – No complaints or adverse impacts on staff or the community relating to noise. | | | | |
| **Monitoring** | | | | |
| Routine inspection of operations to identify any points of excessive noise generation outside of that which is approved under operational works approvals. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Background noise criteria to be developed from baseline noise monitoring prior to the construction phase. | | | | – Noise specialist |
| Environmental monitoring program to be developed for the operational phase. | | | | – Principal Contractor<br>– Environmental Representative |
| **Reporting** | | | | |
| Any complaints made by staff or the community relating to noise should be recorded in a complaints register. | | | | – Principal Contractor<br>– Construction Manager<br>– Construction Superintendent<br>– Facility Manager<br>– Environmental Representative |
| Environmental monitoring report documenting the results of the monitoring programs during the operational phase and any actions taken to address exceedances. | | | | – Principal Contractor<br>– Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| **Corrective actions** | | | | |
| Review the activity being undertaken at the time of the complaint/report and confirm the validity of the complaint/report received. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Validate any complaints/reports received against the performance criteria associated with the activity being undertaken at the time; and review any relevant controls currently in place, including their effectiveness. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Any additional control measures identified are to be implemented in a timely manner where excessive noise issues are identified. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| All complaints/reports are to be investigated in a timely manner, using appropriate dispute resolution methods and abatement or attenuation measures. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |

## 6.4.4 Water

### 6.4.4.1 Surface and stormwater

***Table 30*** ***Mitigation measures for surface and stormwater risks***

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Excess sediment generated by ground disturbance activities being discharged into the downstream environment | – During detailed design, temporary sediment basins, would be sized in accordance with management of at least 80% of the annual average runoff to 50 mg/L of TSS.<br>– Staging of the works is also to be considered during detailed design, and in particular the provision of early-stage temporary sediment basin(s) before final pad levels are reached and leachate basins cannot be used as temporary sediment basins.<br>– Development of a Stormwater Management Plan to address surface water quality risks. A Surface Water Impact Assessment including Conceptual Surface Water Management Plan has been developed and include in Appendix C. | ✓ | | – Principal Contractor<br>– Construction Manager<br>– Construction Superintendent<br>– Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – To minimise potential erosion and sedimentation impacts during construction of the composting manufacturing facility, a detailed Construction Erosion and Sediment Control Plan (ESCP(C)) would be developed based on relevant regulatory requirements.<br>• This ESCP(C) would be prepared by a suitably qualified professional, as certified by the International Erosion Control Association (IECA).<br>• The ESCP(C) would be developed as an addendum to an EMP(C) that would address risks to the environment from a multitude of sources, including water and soil resources. | | | |
| Generation of differing types of water during operations, distinguished by their respective water quality, impacting downstream environments | – Diversion of upstream run-on around the facility.<br>– Designation of respective leachate and stormwater catchments within the operational site, with separate stormwater conveyance systems.<br>– Preparation and regular update of a Operational Management Plan. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Discharge of untreated runoff that has come into significant contact with organic material | Provision of 30 ML of contact water storage with disposal via reuse in the pasteurisation phase of the process. No proposed activities release of leachate and no overflow up to a design standard rainfall of 900 mm falling within a 6-month period. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Runoff from impervious site areas, not impacted by organic material | – Runoff from impervious site areas not impacted by organic material includes a water quality risk consistent with typical urban stormwater, requiring consideration accordingly.<br>– Provision of a typical urban stormwater treatment train including 500 $m^2$ of bio-retention filter area and a gross pollutant trap. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Increased site water supply required for the composting process | Water is required for the composting process, including in the pasteurisation and maturation processes, with leachate only able to be used in the pasteurisation process<br>– Provision of a 30 ML harvesting storage to the west of the operational area<br>– Water delivery from appropriately licensed external water sources during dry periods to meet water supply needs. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Impacts of external floodwaters on operations, and the resulting water quality risks associated with site inundation | – The operational site is located outside the 1% AEP flood impact for the identified flow paths adjacent to the site, other than for two minor locations where through detailed design extents would be altered as required to locate outside the flood extent. This would also be undertaken in consideration of waterway separation distance requirements.<br>– The upgrade of Mitchell Road includes provision of appropriate flood protection and flow conveyance.<br>– A Water Quality (groundwater, surface water and ponds) Monitoring Plan will be developed and implemented for the construction and operational phase. | | ✓ | – Facility Manager<br>– Environmental Representative |
| The increase in impervious areas for the CMF, leading to an increase in the peak rate of runoff and changes flood conditions downstream | – 3 Leachate storage ponds will be included for the CMF as shown in Drawing 30034146-000-300<br>– Adjustment of leachate catchment area when full processing rate is not occurring<br>– Preparation of a detailed water balance model based on actual site operational data and provide emergency containment bunding if required. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Non-compliance with government authorities during operations | – 25 m setback from flow paths, other than the harvesting storage<br>– Location of site operational activities above the 1% AEP. | | ✓ | – Principal Contractor<br>– Facility Manager |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | | | | – Environmental Representative |
| Adverse impact on fish passage / loss of fish habitats | – The CMF will setback 25 metres from the waterways<br>– The waterways ACT1 and ACT2 do not meet Fisheries Act 1994 definition of a waterway and are not considered to provide fish passage. Pre-lodgement advice received from DAF (refer to Section 7) and DAF confirmed that ACT2 appears to be a mapping anomaly. ACT2 feature does not constitute a waterway as it does not have defined bed and banks, fish habitat and it is too steep to provide adequate flow to sustain ecological processes.<br>– A Water Quality (groundwater, surface water and ponds) Monitoring Plan will be developed and implemented for the construction and operational phase.<br>– DAF noted that ACT1 has a shallower gradient that allows for fish movement, defined bed and banks and shows evidence of fish habitats. DAF considered ACT1 to constitute a waterway as defined under the Fisheries Act 1994 and any waterway barrier works within this waterway require authorisation. The proposed works in this waterway include a dam could be undertaken under the Accepted Development Requirements, provided a spillway in accordance with the design requirements of work type 3.1 is included. | | | – Principal Contractor<br>– Facility Manager<br>– Environmental Representative |
| Risk of contamination to surface waters from accidental hazardous material spills during construction and/or operation of the CMF, given the site's location within a drinking water catchment area. | – A hazardous materials management plan will be developed and implemented for the operational phase that will outline measures for managing fuel and chemical handling, storage, distribution, spill response and cleanup, and managing generated waste during construction phase.<br>– An incident and emergency plan will be developed and implemented for the operational phase. This plan will identify hazards and action to be taken to prevent environmental harm, detail the steps to follow and communication protocols required in the event of an emergency.<br>– Separation of stormwater from contamination and management through provision of a stormwater treatment train in accordance with Seqwater (2024) guidelines.<br>– A leachate management system will be implemented to capture leachate from compost handling areas.<br>– A stormwater management system will be implemented to capture and retain rainfall in non-compost handling areas.<br>– The following equipment items are to always be on location to assist with clean-up and containment operations that may be required: Oil and Fuel Spill Kit (containing absorbent material and pads, cable ties, gloves, plastic bags), AdBlue Spill Kit, Protection Personal Equipment (PPE), shovels, containers (e.g. empty IBC) for collection of soil and plastic pit liners.<br>• In addition, identification of relevant equipment which may be required in a major containment operation, and which could be mobilised to site within 8 hours is to be | ✓ | ✓ | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | identified prior to operations commencing: graders, bulldozers and/or scrapers; water tankers, suction tankers and/or trucks and/or portable storage tanks etc.<br>– Emergency equipment shall be positioned in appropriate locations at the work site to be located in a position where it is readily available to the site and maintained in a serviceable condition. Appropriate emergency equipment is to be identified commensurate with the risk of the activity being conducted and could include, but is not limited to the following: emergency response instruction folders, first aid equipment, fire extinguishers, stretcher(s) and safety showers/eyewash stations.<br>– The portable fuel station and AdBlue tank will be contained within a self-bunded container. A specialist supplier will be responsible for servicing the portable fuel station and AdBlue tank. The portable fuel station and AdBlue tank will be located on an impervious area with bunding around it. They will be located more than 100 m from existing water features.<br>– Hazardous substance to be used during the construction phase to be stored in bunded area, in accordance with the specific storage recommendations outlined in the Safety Data Sheet for each substance, ensuring proper ventilation, secure storage practices and to be located more than 100 m from existing water features.<br>– Store and handle flammable and combustible liquids during the operational phase in strict accordance with Australian Standard AS 1940:2017. | | | |
| **Performance criteria** | | | | |
| – No unlawful discharges of contaminated or unlicensed surface water. | | | | |
| **Monitoring** | | | | |
| Routine inspection/observation of stormwater infrastructure to confirm it is clear from obstructions and maintained.<br>Preparation of an environmental monitoring program will be required for the operational phase. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Routine inspection/observation of flows to confirm to unlawful discharges and any controlled releases should be monitored against discharge criteria determined in a Surface Water Management Plan. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Implement a Receiving Environmental Monitoring Program (REMP). | | | | – Principal Contractor<br>– Environmental Representative |
| A Water Quality (groundwater, surface water and ponds) Monitoring Plan will be developed and implemented for the construction and operational phase. | | | | – Principal Contractor<br>– Environmental Representative<br>– Facility Manager |
| **Reporting** | | | | |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Any unscheduled discharges or flows outside of stormwater infrastructure should be reported to the Construction Manager/Facility Manager and relevant Environmental Representative. | | | | – All staff |
| Any controlled releases should be recorded in a register with the accompanying test results to demonstrate compliance with licensed discharge criteria. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Environmental monitoring report documenting the results of the monitoring programs during the operational phase and any actions taken to address exceedances. | | | | – Principal Contractor<br>– Environmental Representative |
| **Corrective actions** | | | | |
| Any stormwater identified to impact on construction or operational activities, should be assessed to determine whether additional infrastructure is required to manage stormwater through appropriate controls. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Stormwater not suitable for discharge should be retained on-site and treated to meet discharge quality characteristics or taken to a suitably licensed disposal facility. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Following any scheduled or unscheduled discharges, an accompanying downstream inspection should be undertaken to confirm that the discharge has not created adverse impacts to the receiving environment. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |

### 6.4.4.2 Groundwater

***Table 31 Mitigation measures for groundwater risks***

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| Groundwater seepage into excavated areas leading to structural instability of excavation walls | – If groundwater is likely to be intercepted during construction, design of the facility should include management of excavation walls and seepage controls<br>– The Contractor must prepare a Groundwater Management Plan. | ✓ | | – Principal Contractor<br>– Construction Manager<br>– Environmental Representative |
| Excavation activities intercepting groundwater table and/or underground springs | – The Construction Contractor must prepare a Groundwater Management Plan that details the capture, testing, treatment (if required), and disposal/discharge of seepage. | ✓ | | – Principal Contractor<br>– Construction Manager<br>– Environmental Representative |
| Cut and fill works during construction using sulfidic rock excavated at the site, resulting in acid rock drainage (ARD) | – Conduct additional geotechnical investigations to target depth of below the proposed level of excavation to determine presence of potential acid rock drainage (ARD) materials. | ✓ | | – Principal Contractor<br>– Construction Manager |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | – 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.<br>– If the stockpile material is confirmed to produce acid, the rock must be managed in accordance with the Hazardous Material Management Plan and Waste Management Plan (Appendix D), to be prepared by the Construction Contractor. | | | – Environmental Representative |
| Contamination of imported fill material for construction leaches contaminants into the groundwater | – The Construction Contractor is required to source fill from a reputable supplier that has a quality assurance system.<br>– All imported fill must be certified as 'clean', prior to entering the site, and is to be free of debris, weeds and potential contaminants.<br>– A register will be kept of all fill materials imported to the site (source and destination). | ✓ | | – Principal Contractor<br>– Construction Manager<br>– Environmental Representative |
| Changes to groundwater levels and recharge dynamics resulting from excavation and filling works | – 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.<br>– On-going groundwater monitoring of the proposed groundwater monitoring bores during and after construction will allow for early detection of any changes. | ✓ | | – Construction Manager<br>– Environmental Representative |
| Risk of contamination to groundwater from accidental hazardous material spills during construction and/or operation of the CMF, given the site's location within a drinking water catchment area. | – A hazardous materials management plan will be developed and implemented for the operational phase that will outline measures for managing fuel and chemical handling, storage, distribution, spill response and cleanup, and managing generated waste during construction phase.<br>– An incident and emergency plan will be developed and implemented for the operational phase. This plan will identify hazards and action to be taken to prevent environmental harm, detail the steps to follow and communication protocols required in the event of an emergency.<br>– Designation of respective leachate and stormwater catchments within the operational site, with separate stormwater conveyance systems.<br>– Separation of stormwater from contamination and management through provision of a stormwater treatment train in accordance with Seqwater (2024) guidelines.<br>– A leachate management system will be implemented to capture leachate from compost handling areas.<br>– A stormwater management system will be implemented to capture and retain rainfall in non-compost handling areas.<br>– The following equipment items are to always be on location to assist with clean-up and containment operations that may be required: Oil and Fuel Spill Kit (containing absorbent material and pads, cable ties, gloves, plastic bags), AdBlue Spill Kit, Protection Personal Equipment (PPE), shovels, containers (e.g. empty IBC) for collection of soil and plastic pit liners. | ✓ | ✓ | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | • In addition, identification of relevant equipment which may be required in a major containment operation, and which could be mobilised to site within 8 hours is to be identified prior to operations commencing: graders, bulldozers and/or scrapers; water tankers, suction tankers and/or trucks and/or portable storage tanks etc.<br>– Emergency equipment shall be positioned in appropriate locations at the work site to be located in a position where it is readily available to the site and maintained in a serviceable condition. Appropriate emergency equipment is to be identified commensurate with the risk of the activity being conducted and could include, but is not limited to the following: emergency response instruction folders, first aid equipment, fire extinguishers, stretcher(s) and safety showers/eyewash stations.<br>– The portable fuel station and AdBlue tank will be contained within self-bunded container. A specialist supplier will be responsible for servicing the portable fuel station and AdBlue tank. The portable fuel station and AdBlue tank will be located on an impervious area with bunding around it. They will be located more than 100 m from existing water features.<br>– Hazardous substance to be used during the construction phase to be stored in bunded area, in accordance with the specific storage recommendations outlined in the Safety Data Sheet for each substance, ensuring proper ventilation, secure storage practices and to be located more than 100 m from existing water features.<br>– Store and handle flammable and combustible liquids during the operational phase in strict accordance with Australian Standard AS 1940:2017. | | | |
| Changes to the surrounding landform causing changes to 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.<br>– Maintain environmental flows in downstream watercourses, so that recharge of alluvium in Allan Creek is not altered. | | ✓ | – Facility Manager<br>– Environmental Representative |
| Water from harvest water dam seeping into groundwater during operations | Design of the freshwater storage dam indicates that the dam will be lined to limit seepage. | | ✓ | – Principal Contractor<br>– Facility Manager<br>– Environmental Representative |
| Contaminated water from leachate dams seeping into groundwater during operations | – Design of the leachate dam indicates that the dam will be fully lined with either:<br>• 600 mm thick recompacted clay with a permeability of less than 10-9 m/s; or<br>• A high-density polyethylene geomembrane liner with a minimum thickness of 1.5 mm.<br>– The facility will have a designated leachate management system, as per the Queensland Government guidelines for *Model operating conditions: ERA 53(a) – Organic material processing by composting* (Queensland Government 2024).<br>– Seepage may be detected through installation of spears around the dam. | | ✓ | – Principal Contractor<br>– Facility Manager<br>– Environmental Representative |
| Contaminated leachate, seeping through the hardstand underlying the aeration | – Hardstand areas are to be constructed with a low-permeability base that prevents leachate from seeping into underlying soils and groundwater. | | ✓ | – Principal Contractor<br>– Facility Manager |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| pad/windrow pad/maturation, into soils and groundwater during operations | – The facility will have a designated leachate management system, as per the Queensland Government guidelines for *Model operating conditions: ERA 53(a) – Organic material processing by composting* (Queensland Government 2024).<br>– The generation of leachate in operational areas will be minimised using drive-over culverts to separate clean and dirty water.<br>– The leachate pond system and pipework will be regularly inspected, maintained, and repaired when necessary. | | | – Environmental Representative |
| **Performance criteria** | | | | |
| – No unlawful discharges of contaminated or unlicensed surface water/leachate<br>– No seepage of contaminated water/leachate into groundwater. | | | | |
| **Monitoring** | | | | |
| Preparation of an environmental monitoring program will be required for the operational phase. | | | | – Principal Contractor<br>– Environmental Representative |
| Routine inspection/observation of flows to confirm to unlawful discharges and any controlled releases should be monitored against discharge criteria determined in a Groundwater Management Plan. | | | | – Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| A Water Quality (groundwater, surface water and ponds) Monitoring Plan will be developed and implemented for the construction and operational phase. | | | | – Principal Contractor<br>– Environmental Representative<br>– Facility Manager |
| Maintain a register of all fill materials imported to the site. | | | | – Principal Contractor<br>– Construction Manager |
| **Reporting** | | | | |
| Any unscheduled discharges or flows outside of stormwater infrastructure should be reported to the Construction Manager/Facility Manager and relevant Environmental Representative. | | | | – All staff |
| Any unintentional spills or leaks of hazardous substances, leaks/spills from plant/machinery, vehicle washdowns or chemical storage should be reported to the Construction Manager/Facility Manager and relevant Environmental Representative. | | | | – All staff |
| Any controlled releases should be recorded in a register with the accompanying test results to demonstrate compliance with licensed discharge criteria. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |
| Preparation of an environmental monitoring report documenting the results of the monitoring programs during the operational phase and any actions taken to address exceedances. | | | | – Environmental Representative |
| **Corrective actions** | | | | |
| Water not suitable for discharge should be retained on-site and treated to meet discharge quality characteristics or taken to a suitably licensed disposal facility. | | | | – Construction Manager<br>– Facility Manager |

| Risk | Mitigation measures | Construction phase | Operational phase | Responsibility |
|---|---|---|---|---|
| | | | | – Environmental Representative |
| Investigate any non-compliance or incidents reported, including review of any operational activities that may have been the source.<br>Identify corrective actions if required and allocate a responsible person and timeframe for completion. | | | | – Principal Contractor<br>– Construction Manager<br>– Facility Manager<br>– Environmental Representative |

## 6.5 Residual risk assessment

### 6.5.1 Construction phase

#### 6.5.1.1 Land

*Table 32 Residual risk assessment for construction – land*

| Impact | Residual risk rating |
|---|---|
| **Bushfire hazard** | |
| Bushfire impacts during the construction phase; including damage to equipment, buildings and staff. | Low |
| **Visual amenity** | |
| Impacts to the design materiality due to the construction works | Low |
| Visual modification of the area due to landscaping works | Moderate |
| Visual modification of the area due to signage required for construction works | Negligible |
| Visual modification of the area due to construction works | Negligible |
| **Erosion and sediment control** | |
| Disturbance of in-situ soils during construction, resulting in erosion and sedimentation | Negligible |
| **Terrestrial biodiversity** | |
| Disturbance/clearing of vegetation and fauna habitat during construction; reducing native fauna in the area | Moderate |
| Injury and mortality of wildlife, due to wildlife movement through the Project area during construction | Moderate |
| Vegetation clearing during construction reduces habitat connectivity within and adjacent to the Project area | Low |
| Disturbance of wildlife due to increased light, noise and vibration during construction activities; resulting in injury or mortality of wildlife | Low |
| Habitat degradation due to dust, run-off and sedimentation generated by construction activities reducing the abundance and diversity of habitats by:<br>– Physically smothering vegetation<br>– Changing nutrient levels<br>– Decreasing water quality<br>– Encouraging weed incursions<br>– Altering the movement of wildlife. | Low |
| Introduction and spread of invasive species due to increased movement of vehicles and machinery during construction | Low |
| Impacts to MNES from the construction of the CMF | Low |
| **Aquatic biodiversity** | |
| Loss of aquatic habitat due to construction activities | Negligible |
| Degradation of aquatic habitat and water; due to excessive sediment and release of contaminant, increase of weed and pest species and overall reduction in suitability of habitat conditions as a result of construction activities | Low |
| Disturbance of aquatic fauna due to increased light, noise and vibration during construction activities; resulting in injury or mortality of wildlife | Low |
| Alteration of flow and aquatic fauna movement, as a result of construction activities | Low |
| Fauna injury or mortality, due to construction works undertaken within waterways; including the excavation and dewatering of modified dams | Low |
| Introduction and spread of invasive species due to increased movement of vehicles and machinery during construction | Low |
| **Heritage** | |
| Indigenous heritage values uncovered during construction works | Moderate |

| | |
|---|---|
| Non-Indigenous heritage values uncovered during construction works | Negligible |
| Native Title claim existing over the Project area | Low |
| **Waste** | |
| Inappropriate/inefficient material and resource selection and consumption during construction | Negligible |
| Failure to carry out general waste management activities during construction | Low |
| Inappropriate handling of waste/reuse materials during construction | Low |
| Inappropriate disposal of waste during construction | Low |

#### 6.5.1.2 Air

***Table 33 Residual risk assessment for construction – air***

| Impact | Residual risk rating |
|---|---|
| **Climate** | |
| Extreme temperatures and heatwave events during construction impacting the efficiency of electrical infrastructure, and construction activities (both personnel and rate of infrastructure renewal) | Negligible |
| **Air quality** | |
| Dust emissions produced during construction, due to the movement of trucks and other vehicles on unpaved roads, and from other sources associated with material handling on-site; wind erosion from unsealed surfaces and stockpiles; unloading and turning compost stockpiles and product screening | Negligible |
| Particulates generated during site establishment works; including delivery of site amenities, and surveying/pegging of the site | Negligible |
| Particulates generated during earth works, including:<br>– Establishment of access road to work area<br>– Grading, excavation and general movement of earth materials. | Low |
| Particulates generated during road works and intersection works, including:<br>– Removal of trees/stripping of topsoil<br>– Box out to required levels<br>– Subgrade and base course<br>– Asphalting<br>– Line marking<br>– Signage installation<br>– Defect inspection and cleaning. | Low |
| Particulates generated during civil works, including:<br>– Demolition and earthworks<br>– Civil works<br>– Ponds and other civil structures. | Low |
| Particulates generated during mechanical installation of the following:<br>– Shredder<br>– Drum screen<br>– Platforms<br>– Storage tanks/platforms<br>– Blowers<br>– Leachate system<br>– Water system<br>– Picking system<br>– Control system and instrument mech<br>– Odour control system<br>– Interconnecting pipework. | Negligible |
| Particulates generated during electrical installation of the following: | Negligible |

| | |
|---|---|
| – Blowers<br>– Pumps<br>– Screens<br>– Motor control centre works<br>– Interconnecting cabling. | |
| Greenhouse gas emissions produced by machinery and equipment used during construction | To be determined. |

#### 6.5.1.3 Noise and vibration

***Table 34 Residual risk assessment for construction – noise and vibration***

| Impact | Residual risk rating |
|---|---|
| **Noise** | |
| Excess generation of noise during construction activities, which may include:<br>– Earthworks<br>– Slab construction<br>– Building construction<br>– Embankment/pavement works<br>– Sealing works. | Moderate |

#### 6.5.1.4 Water

***Table 35 Residual risk assessment for construction – water***

| Impact | Residual risk rating |
|---|---|
| **Surface and stormwater** | |
| Excess sediment generated by ground disturbance activities being discharged into the downstream environment | Low |
| Risk to surface waters from hazardous material spills during construction, considering the location is within a drinking water catchment area. | Low |
| Risk of contamination to surface water from accidental hazardous material spills during construction of the CMF, given the site's location within a drinking water catchment area. | Moderate |
| **Groundwater** | |
| Groundwater seepage into excavated areas leading to structural instability of excavation walls | Low |
| Excavation activities intercepting groundwater table and/or underground springs | Negligible |
| Risk of contamination to groundwater from accidental hazardous material spills during construction of the CMF, given the site's location within a drinking water catchment area. | Moderate |
| Contamination of groundwater from unintentional leaks/spills of hazardous substances, from plant/machinery, vehicle washdowns or chemical storage during construction, particularly in a drinking water catchment area. | Low |
| Changes to groundwater levels and recharge dynamics resulting from excavation and filling works | Negligible |
| Cut and fill works during construction using sulfidic rock excavated at the site, resulting in acid rock drainage (ARD) | Low |
| Contamination of imported fill material for construction leaches contaminants into the groundwater | Negligible |

### 6.5.2 Operational phase

#### 6.5.2.1 Land

***Table 36 Residual risk assessment for operations – land***

| Impact | Residual risk rating |
|---|---|
| **Bushfire hazard** | |
| Increased bushfire impacts during the operational phase due to CMF materials; resulting in significant bushfire risks for adjacent properties, fire runs and disruptions to operation of the CMF | Low |
| **Visual amenity** | |

| | |
|---|---|
| Impacts to the design materiality during operations, as a result of the construction of the CMF | Low |
| Visual modifications due to landscaping | Moderate |
| Visual modifications due to signage required for operational works | Negligible |
| **Erosion and sediment control** | |
| Increased erosion and sediment mobilisation due to the movement of vehicles on-site during operations | Low |
| Increased erosion and sediment mobilisation, due to wind, from materials stockpiled on-site during operations | Low |
| **Terrestrial biodiversity** | |
| Disturbance/clearing of vegetation and fauna habitat to accommodate CMF operations leading to a reduction of native fauna in the area | Low |
| Injury and mortality of wildlife, due to wildlife movement through the Project area during operations | Low |
| Vegetation clearing to accommodate CMF operations reduces habitat connectivity within and adjacent to the Project area | Negligible |
| Disturbance of wildlife due to increased light, noise and vibration during operational activities; resulting in injury or mortality of wildlife | Negligible |
| Impact surrounding native flora and fauna due to the operation of the CMF; resulting in a reduction of surrounding native populations | Low |
| Impacts to MNES from the operation of the CMF | Low |
| **Aquatic biodiversity** | |
| Degradation of aquatic habitat and water; due to storage pond runoff during high rainfall events, and rubbish entering downstream waterways via stormwater drains on-site during operational activities | Negligible |
| **Heritage** | |
| Heritage items uncovered during operational works | Low |
| **Waste** | |
| Failure to carry out general waste management activities during operations | Low |
| Inappropriate handling of waste/reuse materials during operations | Negligible |
| Inappropriate waste disposal during operations | Negligible |
| Increased fire risk due to stockpiles present on-site during operations | Low |
| **Public health and safety** | |
| Increased risk of pathogens such as Legionella and dispersion of bioaerosols, due to operation of the CMF | Negligible |
| Inappropriate management of contaminants such as heavy metals and PFAS during operations | Negligible |

#### 6.5.2.2 Air

***Table 37 Residual risk assessment for operations – air***

| Impact | Residual risk rating |
|---|---|
| **Climate** | |
| Extreme temperatures and heatwave events during operational activities impacting the efficiency of electrical infrastructure, and operational and maintenance activities (both personnel and rate of infrastructure renewal) | Negligible |
| **Air quality** | |
| Potential for odour to exceed highest predicted 99.5$^{th}$ percentile odour impact (2.1 OU) at industrial receptor R7 | Low |
| Potential for odour to exceed highest predicted 99.5$^{th}$ percentile odour impact (0.6 OU) at residential receptor R6 | Low |
| Cumulative odour impacts during operations due to the distinct odour characteristics associated with Bush's Proteins | Negligible |
| Dust emissions produced during operations, due to the movement of trucks and other vehicles on unpaved roads, and other sources associated with material handling onsite; wind erosion from unsealed surfaces and stockpiles; unloading and turning of compost stockpiles and product screening | Low |

| | |
|---|---|
| Greenhouse gas emissions produced by machinery and equipment used during operations | TBD |

### 6.5.2.3 Noise and Vibration

*Table 38 Residual risk assessment for operations – noise and vibration*

| Impact | Residual risk rating |
|---|---|
| **Noise** | |
| Increased noise levels, above those of the pre-existing environment, due to operational activities | Negligible |
| Excess generation of noise, due to additional traffic during operations, impacting on sensitive receptors located along the road network near the site | Low |

### 6.5.2.4 Water

*Table 39 Residual risk assessment for operations – water*

| Impact | Residual risk rating |
|---|---|
| **Surface and stormwater** | |
| Generation of differing types of water during operations, distinguished by their respective water quality, impacting downstream environments | Low |
| Discharge of untreated runoff that has come into significant contact with organic material | Low |
| Runoff from impervious site areas, not impacted by organic material | Negligible |
| Increased site water supply required for the composting process | Low |
| Impacts of external floodwaters on operations, and the resulting water quality risks associated with site inundation | Low |
| The increase in impervious areas for the CMF, leading to an increase in the peak rate of runoff and changes flood conditions downstream | Low |
| Non-compliance with government authorities during operations | Low |
| Risk to surface waters from hazardous material spills during operation, considering the location is within a drinking water catchment area. | Low |
| Risk of contamination to surface water from accidental hazardous material spills during operation of the CMF, given the site's location within a drinking water catchment area. | Moderate |
| **Groundwater** | |
| Changes to groundwater levels and recharge dynamics as a result of landform changes | Negligible |
| Contamination of groundwater from unintentional leaks/spills of hazardous substances, from plant/machinery, vehicle washdowns or chemical storage during operation. | Moderate |
| Water from harvest water dam seeping into groundwater during operations | Negligible |
| Contaminated water from leachate dams seeping into groundwater during operations | Low |
| Contaminated leachate, seeping through the hardstand underlying the aeration pad/windrow pad/maturation, into soils and groundwater during operations | Low |

## 6.6 Management plans

The following management plans will be developed for the construction and operational phases of the Project:

- Bushfire Hazard Assessment and Management Plan (included in Appendix B)
- Surface Water Impact Assessment including Conceptual Surface Water Management Plan (included in Appendix C)
- Odour Management Plan
- Surface and Groundwater Management Plan
- Traffic Management Plan
- Hazardous Materials Management Plan
- Waste Management Plan (included in Appendix D)
- Noise Environmental Management Plan
- Flora and Fauna Management Plan

- A Site-Specific Management Plan
- Incident and Emergency Management Plan.

# 7. Communication, monitoring and reporting

## 7.1 Communication

### 7.1.1 Construction phase

All personnel involved in the construction phase shall be required to attend a compulsory induction before commencing any work on-site. The environmental component of the induction shall include (but not be limited to) the following items:

- Guidance on the significance and sensitivity of environmental features within the Project area.
- Environmental obligations under relevant environmental legislation.
- The potential environmental impacts of construction (where relevant).
- Controls and procedures to prevent impacts.
- All staff shall be made aware of their General Environmental Duty and Duty to Notify responsibilities as per the *Environmental Protection Act 1994*, and the implications of failing to fulfil these duties.
- All staff shall be made aware of their environmental responsibilities under the EMP in relation to implementing mitigation measures, reporting environmental incidents and complaints and implementing corrective actions.
- All staff shall be given instructions on environmental emergency response procedures.

The environmental induction training should be developed prior to construction commencing.

### 7.1.2 Operational phase

For the operational phase, the nominated Contractor should promote the effective communication of information for both internal and external purposes. The nominated Contractor and the employees should aim to:

- Build morale, trust and encourage engagement amongst the team.
- Ensure effective discussion on health, safety and environment matters between the Contractor and the employees, and extended to sub-contractors, labour hire personnel, and any other people who work for the Contractor and are directly affected by the work health and safety matters.
- Provide open and honest external communication to key stakeholder groups and other relevant parties including surrounding community groups as applicable.
- Implement an effective complaint management procedure for all community complaints, enquiries and concerns.

#### 7.1.2.1 Site inductions and toolbox talks

All Contractor personnel including sub-contractors will either be briefed on environmental requirements for specific construction activities or on a site-specific basis, concentrating on reinforcing practical measures. It is typical for these briefings to become a part of the Toolbox agenda. Typical topics for toolbox talks include:

- Permit conditions
- Vegetation clearing demarcations
- Refuelling plant and machinery
- Precautions to prevent sediment-laden run-off entering watercourses
- Waste management (including re-use, recycling, segregation, storage and disposal)
- Noise management measures
- Precautions for protected flora and fauna
- Wildlife care.

## 7.2 Monitoring

During construction and operational phases, compliance monitoring will be conducted in accordance with the requirements of EMP, as well as construction procedures, relevant legislation, licence and permit conditions and industry standards. Requirements for monitoring during the construction and operational phases of the Project are outlined in Section 6.4, and may need to be updated follow the receipt of approvals for the Project.

## 7.3 Reporting

### 7.3.1 Construction phase

Records of all environmental inspections and other relevant environmental records will be kept demonstrating environmental due diligence and compliance with this EMP. As well as conditions of approval. To demonstrate compliance the following records will be kept and provided upon request:

- Site inspections
- Non-conformance and contingency plans
- Complaints
- Environmental incidents and response actions
- Safety data sheets and chemical registers
- Waste tracking documentation
- Fauna record register
- Fauna Spotter-catcher pre-clearance and post-clearance report.

### 7.3.2 Operational phase

During the operational phase of the Project, records of environmental monitoring and other relevant, audits, and incidents will be kept ensuring compliance with the framework of this EMP and regulatory requirements and conditions of approval. To demonstrate compliance, the following records will be kept and provided upon request:

- All monitoring data from the site including laboratory analysis results
- Environmental incidents and response actions
- Workplace incidents and near misses and response actions
- Waste tracking documentation
- Safety data sheets and chemical registers
- Feedback and complaints received and responses
- Audits and inspections outcomes
- Operational data (quality, quantity, availability and treatment process optimisation).

## 7.4 Review

### 7.4.1 Construction phase

During the construction phase the Construction Contractor nominated by SOILCO will regularly review and (if necessary) update the EMP. The review will consider the following:

- Changes in legislative requirements (including conditions of approvals)
- Environmental performance, findings of environmental audits and inspections
- Outcomes of agency consultation
- Outcomes of consultation with communities and resolution of complaints
- Changes in external and internal policies, standards and guidelines.

### 7.4.2 Operational phase

Throughout the operational phase of the Project, the nominated Contractor will regularly review and (if necessary) update the EMP. The review will consider the following:

- Changes in legislative requirements (including conditions of approvals)
- Environmental performance, findings of environmental audits and inspections
- Changes in external and internal policies, standards and guidelines
- Recorded incidents and near misses
- The effectiveness of current management procedures.

# 8. Compliance auditing and monitoring

## 8.1 EMP provisions

For the environmental matters identified in Section 4, the performance and corrective actions have been outlined in Section 8.1.1 and Section 8.1.2 below. The Project Manager will be responsible for the implementation to reduce any impact to the environment. This section is broken into the construction phase and operational phase.

### 8.1.1 Construction phase

#### 8.1.1.1 Inspections

The Contractor will carry out site inspections to ensure compliance with environmental obligations, task and actions outlined in this EMP. The site inspections shall be carried out by any personnel, leading hand or higher, to visually assess the compliance of the work with this EMP. The inspection shall check for each environmental element the mitigation measures which should be in place and if they are working effectively as intended. Broadly the checks should include:

- Site layout and access.
- Condition of skip bins (i.e., sufficiently covered, not over-flowing etc.).
- All materials being handled within laydown areas.
- Spill kits stocked and available.
- Management of surface water and debris within the bunded areas.

#### 8.1.1.2 Audits

The Contractor's Environmental Representative or SOILCO Representative may conduct internal audits. The audit will focus on:

- Review of all environmental incidents and corrective actions.
- Review of inspection records.
- Implementation of this management plan.

Audit reports will be submitted to the Principal Contractor and will include the date of the audit and the timeframe that the Contractor and sub-contractors must complete any required action.

#### 8.1.1.3 Compliance with planning and environmental approvals

During the construction phase, SOILCO will be required to comply with the relevant conditions in the planning and environmental approvals that have been secured for the Project and discussed in Section 3.

During the construction phase, SOILCO will need to consider environmental sensitive and no-go areas within the Project area. If changes are made to the footprint of the CMF, post receipt of the planning and environmental approvals then an environmental and planning review will need to be undertaken to determine if any additional approvals and/or amendments to existing approvals are required.

### 8.1.2 Operational phase

#### 8.1.2.1 Inspections

The nominated Contractor for the operational phase of the Project may undertake inspections of the plant and equipment. The inspections will focus on:

- Environmental controls
- Waste storage
- Chemical storage
- Site environmental safety
- Compliance with management strategies implemented.

#### 8.1.2.2 Audits

The nominated Contractor for the operational phase of the Project may conduct internal audits. The audits will focus on:

- Review of all environmental incidents and corrective actions
- Review of workplace incidents and corrective actions
- Implementation of this management plan
- Review of compliance with company policies and procedures, legislation and industry standards
- Review of compliance with contractual and client requirements.

#### 8.1.2.3 Compliance with planning and environmental approvals

During the operational phase of the Project, SOILCO will be required to comply with the relevant conditions in the planning and environmental approvals that have been secured for the Project and discussed in Section 3.

During the operational phase, SOILCO will need to consider environmental sensitive areas within the Project area as shown in the figures in following technical reports:

- Terrestrial Ecology Assessment
- Aquatic Ecology Assessment
- Cultural Heritage and Native Title Duty of Care Assessment
- Stormwater Impact Assessment

If changes are made to the footprint of the CMF, post receipt of the planning and environmental approvals then an environmental and planning review will need to be undertaken to determine if any additional approvals and/or amendments to existing approvals are required.

# 9. Emergency planning and response

## 9.1 Construction phase

Emergency and incident responses will vary and be proportional to the nature of the incident. An Incident and Emergency Management Plan will be developed and implemented. The key steps involved in the managing an emergency/incident is show in SOILCO's Emergency and Incident Reporting Flow Chart in Figure 5.

The Principal Contractor will be verbally notified by the Construction Manager of an incident on the day it occurs and as soon as practicable of the responsible person becoming aware of the incident, and in writing within 24 hours.

All notifications to authorities including but not limited to the Department of the Environment, Tourism, Science and Innovation, State emergency services (police/fire/ambulance) and Department of Transport and Main Roads will be undertaken by the Principal Contractor.

In the event of an accidental hazardous material spills during construction phase for hazardous substances quantities over 200 L, the Principal Contractor will be required to undertake direct notification of Seqwater's on 1300 737 928 and email communications@seqwater.com.auoperations.

The Principal Contractor will be required to provide an Emergency Response Plan and for this plan to be thoroughly communicated to all staff members in the Construction Induction. The Emergency Response Plan should identify evacuation routes, mustering points, communication protocols and provide key contact details for local authorities and services.

When reporting environmental incidents, the following information is to be provided:

- The name and contact details of the reporting person
- The date and time the environmental incident occurred
- The activity that was being undertaken when the incident occurred
- How the incident occurred
- Any containment measures put in place to reduce or contain environmental harm
- An assessment of the amount of environmental harm that occurred
- If any other stakeholders are aware of the incident.

Environmental incidents and emergencies have been identified within Section 8. However, pro-active environmental risk management measures should be undertaken wherever possible.

Some examples of environmental risk responses are provided below in Table 40.

***Table 40 Example environmental incidents and mitigation and reporting requirements***

| Incident | Mitigation measures | Reporting authority |
|---|---|---|
| Failure of erosion and sediment control devices following rainfall event or flooding | Re-instatement of erosion and sediment control devices. | SOILCO |
| Injury to fauna during site works | Following notification procedure as detailed in the Flora and Fauna Management Plan. | DETSI |
| Accidental spill of fuel or hazardous chemicals | Spills are to be isolated, stopped and contained and will be cleaned up utilising onsite spill kits | DETSI and Seqwater |

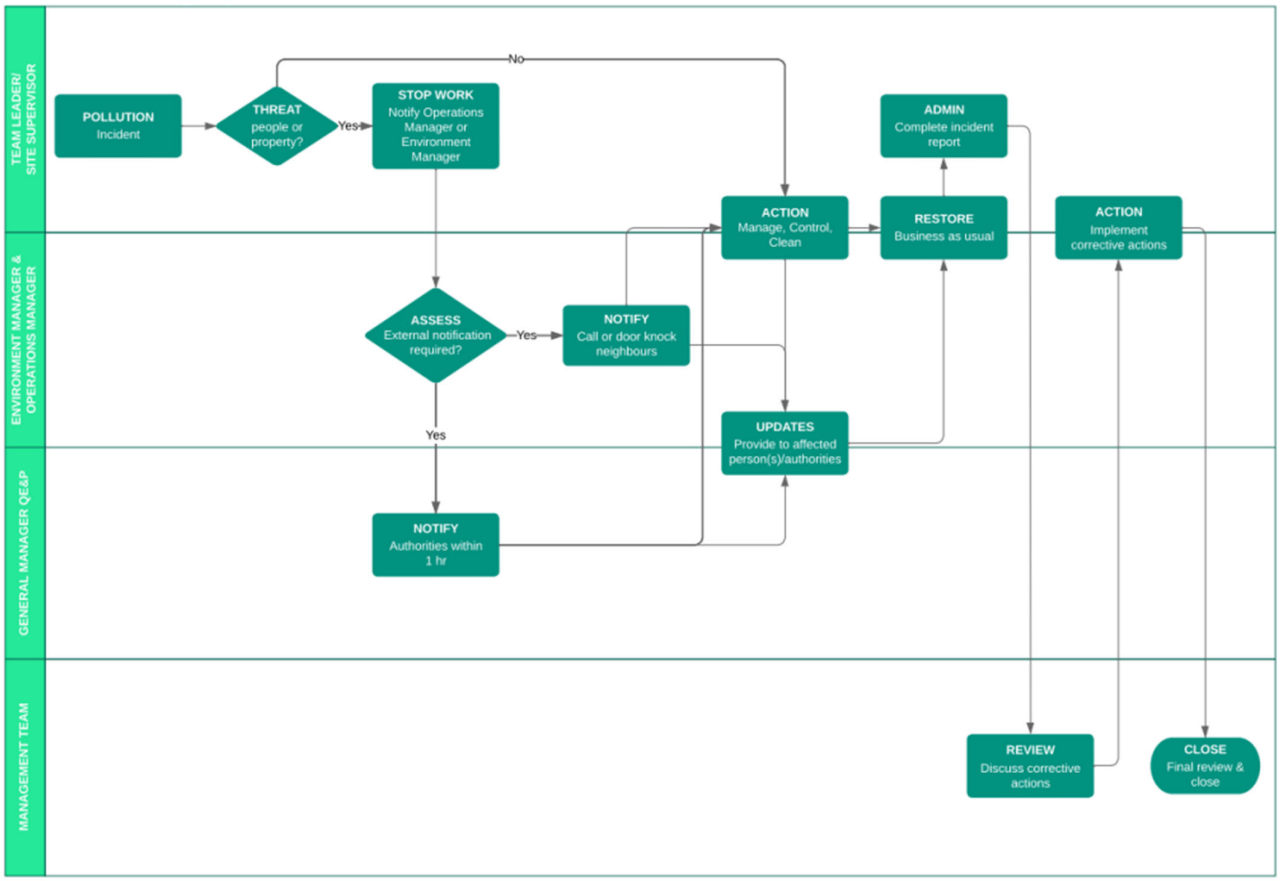



*Figure 5 Example of the SOILCO's Emergency and Incident Reporting Flow Chart*

### 9.1.1 Induction and training requirements

All personnel involved in the process shall be required to attend a compulsory site induction before commencing any work at the site. The environmental component of the induction shall include (but not be limited to) the following items:

- All staff shall be made aware of the environmental obligations and requirements, including any weeds, pests, and contamination risks
- All staff shall be made aware of waste management practices including segregation, storage, waste management and duty to report issues
- All staff shall be made aware of their environmental responsibilities under the EMP in relation to implementing mitigation measures, reporting environmental incidents and complaints, and implementing corrective actions.
- All staff to be made aware of obligations under any SOILCO procedures.
- All staff shall be given instructions on environmental emergency response procedures (i.e., spill kit locations and usage).

Task-specific training sessions covering specific topics will be undertaken on an 'as needed basis'. A training register and sign off sheets are to be maintained at the Project's office and be able to be provided to SOILCO Representatives on request.

### 9.1.2 Environmental incidents

An environmental incident refers to an event that has either caused or has the potential to cause damage or harm to the environment. These incidents serve as opportunities for improving or enhancing the Project's environmental performance.

For the Project, the Construction Contractor is responsible for establishing their own incident reporting and response procedure, which must be both ISO certified and compliant. The key steps involved in managing an emergency/incident is shown in SOILCO's Emergency and Incident Reporting Flow Chart in Figure 5. When an environmental incident occurs, the following general steps should be taken:

- Notification: The Principal Contractor should be promptly notified.
- Reporting: The Contractor and all sub-contractors must complete an Environmental Reporting/Incident Form.
- Immediate Action: If environmental harm becomes evident, the Principal Contractor must immediately contact the SOILCO Representative.

This process ensures effective management of environmental incidents while adhering to established standards and protocols.

### 9.1.3 Non-conformance

Non-conformances managed by the EMP shall include the following:

- An incident or near-miss with potential or actual environmental impact
- Complaints regarding Project activities
- Not meeting an objective or target
- Management review not being undertaken.

The Principal Contractor shall be responsible for identifying, reporting/record and implementing any preventative and/or corrective actions in response to any non-conformance. Preventative and corrective actions shall be incorporated into the EMP as required.

## 9.2 Operational phase

For the operational phase, an incident and emergency management plan will be developed by the SOILCO. The plan is intended to provide guidance to the operations team on:

- The correct response to incidents that occur on, or near to the Project area
- The reporting requirements to support external but relevant plans
- The various aspects of incident management before, during and after any incident that may occur on or around the Project area
- Help reduce the impact of incidents on personnel, clients and customers, the community, the environment, sites, assets and systems.

The plan in anticipated to include the following contents:

- Incident Definition, Classification and Notification
- Incident and Emergency Management Response
- Incident Management Team
- Incident Management Actions
- Incident Communication Protocol
- Incident De-escalation and Recovery
- Incident Investigation

- Incident Prevention and Preparedness.

The key steps involved in managing an emergency/incident is shown in SOILCO's Emergency and Incident Reporting Flow Chart in Figure 5. The operator will be verbally notified by the Environmental Manager of an incident on the day it occurs and as soon as practicable of the responsible person becoming aware of the incident, and in writing within 24 hours.

All notifications to authorities including but not limited to the Department of the Environment, Tourism, Science and Innovation, State emergency services (police/fire/ambulance) and Department of Transport and Main Roads will be undertaken by the Principal Contractor.

In the event of an accidental hazardous material spills during construction phase for hazardous substances quantities over 200 L, the operator will be required to undertake direct notification to Seqwater on 1300 737 928 and email communications@seqwater.com.auoperations.

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# 11. Appendices

**Appendix A SOILCO's Environmental Policy**

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Brisbane, Queensland 4000
Australia
ghd.com http://www.ghd.com/http://www.ghd.com/

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

*Table 1 Description of feedstock to be received at Bromelton Compost Facility*

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| Animal manure<br>In small amounts for blending purposes only. No more than 200 tonnes onsite at any one time. | Up to a combined total of 250,000 tonnes per annum (tpa), including the other feedstocks. | Location 8 - will be used at the final manufacturing stage.<br><br>We noted that in the planning report that Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Refer to flowchart of processes in Figure 4.<br>Inspected on arrival and stored appropriately | The material will be sourced appropriately from suppliers. | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | We noted that any feedstock with a higher odour risk rating would comprise a small fraction of the total and once mixed would have a much lower odour potential<br><br>Manure, soil and sand will be used for the manufacturing process as required. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Bark, lawn clippings, leaves, mulch, pruning waste, sawdust, shavings, woodchip and other waste from forest products. | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | Due to the nature of the materials received at the Facility and industry collection methods, any organic material received that has not been decontaminated and size reduced will first be processed through a decontamination line and shredded prior to ASP composting.<br>Material will be received in the drop off area of the | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497 m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DETSI Best Practice Environmental Management Guideline ERA 53(a) Organic | Wood waste may be sold as a mulch product on its own.<br><br>Lawn clippings and leaves will be included in the composting process. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning |

| Detail of feedstock to be received at Bromelton Compost Manufacturing Facility | Annual quantity | Details of where feedstock will be stored and any details if any vessels are required to hold feedstock | Details of any specific offloading procedures for the feedstock | Details of sorting procedures | Details of leachate management | Will it be mixed | Environmental controls applicable to the feedstock |
|---|---|---|---|---|---|---|---|
| | | | | decontamination building. The material will be visually inspected on the floor to ensure there is no excess contamination or hazardous materials in the load. Heavily contaminated loads, or loads containing hazardous materials will be rejected and disposed of to an appropriately licensed waste facility. A concrete bunker with 1,200 $m^3$ of capacity will allow for material to be stockpiled prior to being processed. | material processing by composting, Version 1.02. | | report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Biosolids - Stabilised biosolids | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DETSI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Cardboard and paper waste - paper mulch, paper pulp effluent, paper sludge dewatered. | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase. |

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|---|---|---|---|---|---|---|---|
| | | | | | into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | well mixed and homogenised. | A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Compostable polylactic acid (PLA) plastics - compostable plastics produced in accordance with (a) AS 4736:2006 (Biodegradable plastics) or most recent or replaced version of that standard or (b) AS 5810:2010 (Biodegradable plastics - Biodegradable plastics suitable for home composting) or the most recent or replaced version of that standard). | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Food and food processing waste (Expired/past used by date non-protein based food from supermarkets, expired beer, vegetable oil wastes and starches, vegetable waste, yeast waste, food processing effluent (wastewater) and solids (including sludges) from non protein based food) and (Food organics, expired/past used by date | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance. |

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|---|---|---|---|---|---|---|---|
| protein based food from supermarkets, brewery and distillery effluent and waste) and (Expired soft drinks, molasses waste, grain waste (hulls/waste grains), starch water waste, sugar and sugar solutions). | | | | | Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | | Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Green waste - (leaves, grass clippings, pruning, tree branches from household maintenance). | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Inorganic additives with beneficial properties - (bentonite, crusher dust, gypsum, lime and lime slurry (inert)). | | Location 8 in Figure 4, as this feedstock will be used at the manufacturing stage. | Refer to flowchart of processes in Figure 4. | As Above | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497$m^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by | Added as part of the manufacturing process | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An |

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|---|---|---|---|---|---|---|---|
| | | | | | composting, Version 1.02. | | updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Wood waste from untreated timber - (Untreated pallets, offcuts, boards, stumps and logs, shavings, timber offcuts, crates, wood packaging). | | Location 2 in Figure 4. | Refer to flowchart of processes in Figure 4. | Due to the nature of the materials received at the Facility and industry collection methods, any organic material received that has not been decontaminated and size reduced will first be processed through a decontamination line and shredded prior to ASP composting. Material will be received in the drop off area of the decontamination building. The material will be visually inspected on the floor to ensure there is no excess contamination or hazardous materials in the load. Heavily contaminated loads, or loads containing hazardous materials will be rejected and disposed of to an appropriately licensed waste facility. A concrete bunker with 1200m$^3$ of capacity will allow for material to be stockpiled prior to being processed. | Three leachate ponds are proposed to handle the leachate runoff from the site, and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | Wood waste may be sold as a mulch product on its own. | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |
| Soils - (clean soil, clean mud, sand). | Up to a combined 150,000 tpa of sand and soil products. | Location 8 in Figure 4, the feedstock will be used at the manufacturing stage | Refer to flowchart of processes in Figure 4. | Sourced appropriately from suppliers. | Three leachate ponds are proposed to handle the leachate runoff from the site and they will have a total capacity of 13,497m$^3$. To prevent leachate stored in the ponds from percolating into the groundwater system, the ponds will be lined according to the | Soil and sand will be used for the manufacturing process as required | Environmental controls for the feedstock have been captured in the Bromelton Compost Manufacturing Facility Environmental Management Plan (EMP) Rev 2.<br>The EMP covers environmental controls to be implemented during the operational phase.<br>A feedstock management plan will be developed and implemented for the operational phase which will outline how feedstocks are sourced, stored, handled, and processed to |

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|---|---|---|---|---|---|---|---|
| | | | | | DESI Best Practice Environmental Management Guideline ERA 53(a) Organic material processing by composting, Version 1.02. | | ensure efficiency, quality, and environmental compliance.<br>Potential impacts associated with the feedstock has already been included in the planning report and in the technical assessments. An updated Air Quality Impact Assessment Report will be provided to the OCG. |

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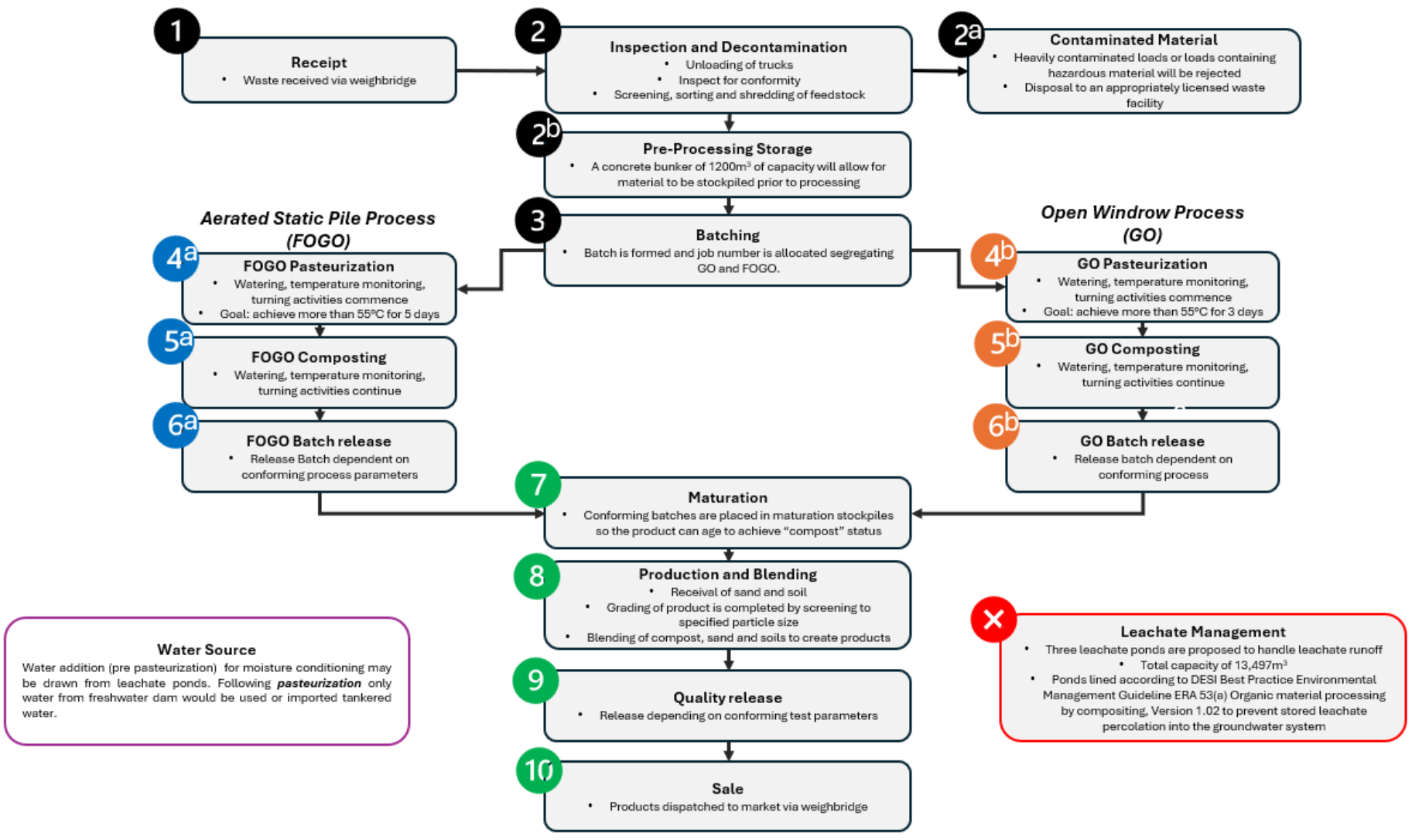




*Figure 4* *The compost manufacturing process proposed for Bromelton Compost Manufacturing Facility*

# Bromelton Compost Manufacturing Facilty

## Air quality impact assessment

SOILCO Pty Ltd

17 April 2025

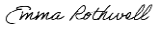
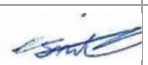
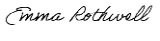
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PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

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# 1. Introduction

## 1.1 Background

SOILCO Developments Pty Ltd (SOILCO) are preparing a Development Application (DA) for a Compost Manufacturing Facility (The Project), licensed for the production of 400,000 tonnes per annum (tpa) of compost. 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 approximately 250,000 tonnes per annum (tpa) of 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 air quality assessment (AQA) of the construction and operational phases of the Project to support the DA.

An air quality assessment is required for construction and operation of the Project to determine any potential impacts on the nearby sensitive receptors and identify the need for any specific mitigation measures. Odour is identified as the key issue for air quality from the Project.

## 1.3 Scope of works

The following scope of works has been undertaken as part of this assessment:

- Review of Project information, including the design and the proposed operational sequence.
- Review of nearby sensitive land uses, review of baseline air quality, discussion of existing sources of air pollutants including odour and review of other factors influencing air quality, including climate and meteorology.
- Qualitative construction dust assessment in accordance with the Institute of Air Quality Management (IAQM) guidance on the assessment of dust from demolition and construction.
- A literature review of similar existing or proposed FOGO facilities was undertaken, including odour assessments and predicted odour contours. The review was limited to publicly available sources.
- Preparation of an odour inventory of proposed operations based on provided source/process odour emission rate data.
- Preparation of an odour dispersion model of the Project, using assumed odour emission rates, discharge parameters (e.g. flow rates) and local meteorology.
- Predict the 99.5$^{th}$ percentile odour concentrations at nearby sensitive receptors and area surrounding the proposal site (contours).
- Determine whether predicted odour impacts comply with the Queensland odour criterion.
- Discussion of potential dust impacts from operation of compost production facility.
- Mitigation strategies have been recommended in order to minimise odour and dust emissions from the composting facility.

## 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 1.2 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 (refer Section(s) 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 the air quality assessment:

- Sensitive receptors were identified using aerial photography and land use planning and may not include all existing or future receptors in the area surrounding the Project but are considered representative of receptors. The predicted modelling results were presented as a dispersion contour so that results can be interpolated to any location.
- Ambient air quality and meteorological data is considered representative however may vary year to year and be influenced by external factors including climate trends and bushfires.
- Odour emission rates have been determined from previous measurements undertaken for GHD at composting facilities in Australia. Odour emission rates were assumed to be a conservative representation of odour for the Project. Emission rates for the Project may vary depending on waste variability, inclement weather events and activities undertaken onsite. A detailed outline of odour emission rate determination is provided in Section 7.2 of this report.
- This assessment has not considered impacts of from transportation of odorous materials to site on public roads.
- There are a number of significant odour sources in the area, including Bush's Proteins, Beaudesert Saleyards, the Scenic Rim Regional Council Waste Facility/Transfer Station, poultry farms and other agricultural odour sources. Some of these may contribute to cumulative odour impacts, however most would have different odour types and odour character than composting. Regardless, discussion of potential for odour impacts is presented in Section 7.3.1.
- For the purposes of this assessment odours are assumed to be comprised of a complex mix of pollutants, including volatile organic compounds (VOCs). The odour guidance in QLD provides a methodology for dispersion modelling to predict ground level odour concentrations to be compared with the odour criteria. It is assumed there is no one individual compound from the Project activities that is a source of significant odour for the assessment.

Any additional assumptions used in the assessment are documented in the relevant sections.

# 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 197*1.
– An Environmental Authority (EA) Approval for Environmentally Relevant Activities (ERAs) ERA :
    - ERA 53(a) Organic material processing: Processing more than 200 t of organic material in a year by composting.
    - ERA 54 Mechanical waste processing: 2 (c) – operating a facility for receiving and mechanically reprocessing more than 10,000 t a year of general waste.
    - ERA 33(1): Crushing, milling, grinding or screening more than 5,000 t of material in a year.

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 Southeast 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. A summary of the key components of the Project is outlined in Table 2.1

***Table 2.1 Summaries key Bromelton CMF Project components***

| 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<br>The site will be split into 3 different processing areas: Receival, decontamination and composting utilising 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:<br>Garden, Food and Wood wastes and manure.<br><br>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:<br>– 100,000 tpa of garden organics (GO) composted by Passive Open Windrow (OW) method.<br>– 150,000 tpa of Food Organics and Garden Organics (FOGO) is to be processed on a Forced Aeration Pad system (ASP).<br>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.<br>VENM will be received and stored as required based on demand of finished products.<br>Due to the seasonal nature of feedstock generation, up to 11% 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<br>– Weigh bridges<br>– Internal road network<br>– Maintenance and storage shed<br>– Final screening and manufacturing area<br>– Water tanks<br>– Aeration Pad system<br>– Office, carparking and amenities<br>– FOGO receival area<br>– 3 x leachate ponds<br>– 1 x freshwater dam<br>– Open windrows pad<br>– FOGO maturation pad<br>– Hardstand areas<br>– Retaining wall<br>– Upgrade of Mitchell Road |
| **Hours of Operation** | Monday – Friday 6am to 6pm<br>Saturday – 6am to 4pm<br>Sunday and public holidays 9am - 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<br>7th April 2025 – 30th January 2026 |

## 2.1 Construction

The majority of the construction works will involve grading/excavation of the existing site, construction of semi-open composting facilities, establishment of hardstand areas and installation of plant to be used in general operation of the site.

Construction of the facility will involve:

- Bulk earthworks (Cut and fill in order to level terrain for the facility)
- Establishment of open-air compost manufacturing areas
- Establishment of the Aerated Static Pile areas
- Construction of weighbridges
- Concrete pads for loading bays
- Construction of leachate ponds.

Construction activities with potential to lead to dust generation are outlined in Table 2.2.

***Table 2.2 Dust generating construction activities***

| Construction phase | Expected activities |
|---|---|
| Site establishment | – Delivery of site amenities and surveying and pegging of site. |
| Earthworks | – Establishment of access road to work area.<br>– Grading, excavation and general movement of earth materials. |
| Roadworks and intersection works | – Removal of trees/ stripping of topsoil<br>– Box out to required levels<br>– Subgrade and base course<br>– Asphalting<br>– Line Marking<br>– Signage installation<br>– Defect inspection and cleaning |
| Civil works | – Demolition and earthworks<br>– Civil works.<br>– Ponds and other civil structures |
| Mechanical installation | Installation of the following items:<br>– Shredder<br>– Drum screen<br>– Platforms<br>– Storage tanks/platforms<br>– Blowers<br>– Leachate system<br>– Water system<br>– Picking station<br>– Control system & instrument mech<br>– Odour control system<br>– Interconnecting pipework. |
| Electrical installation | Installation of the following items:<br>– Blowers<br>– Pumps<br>– Screens<br>– Motor control centre works<br>– Interconnecting cabling<br>– Electrical installation complete. |

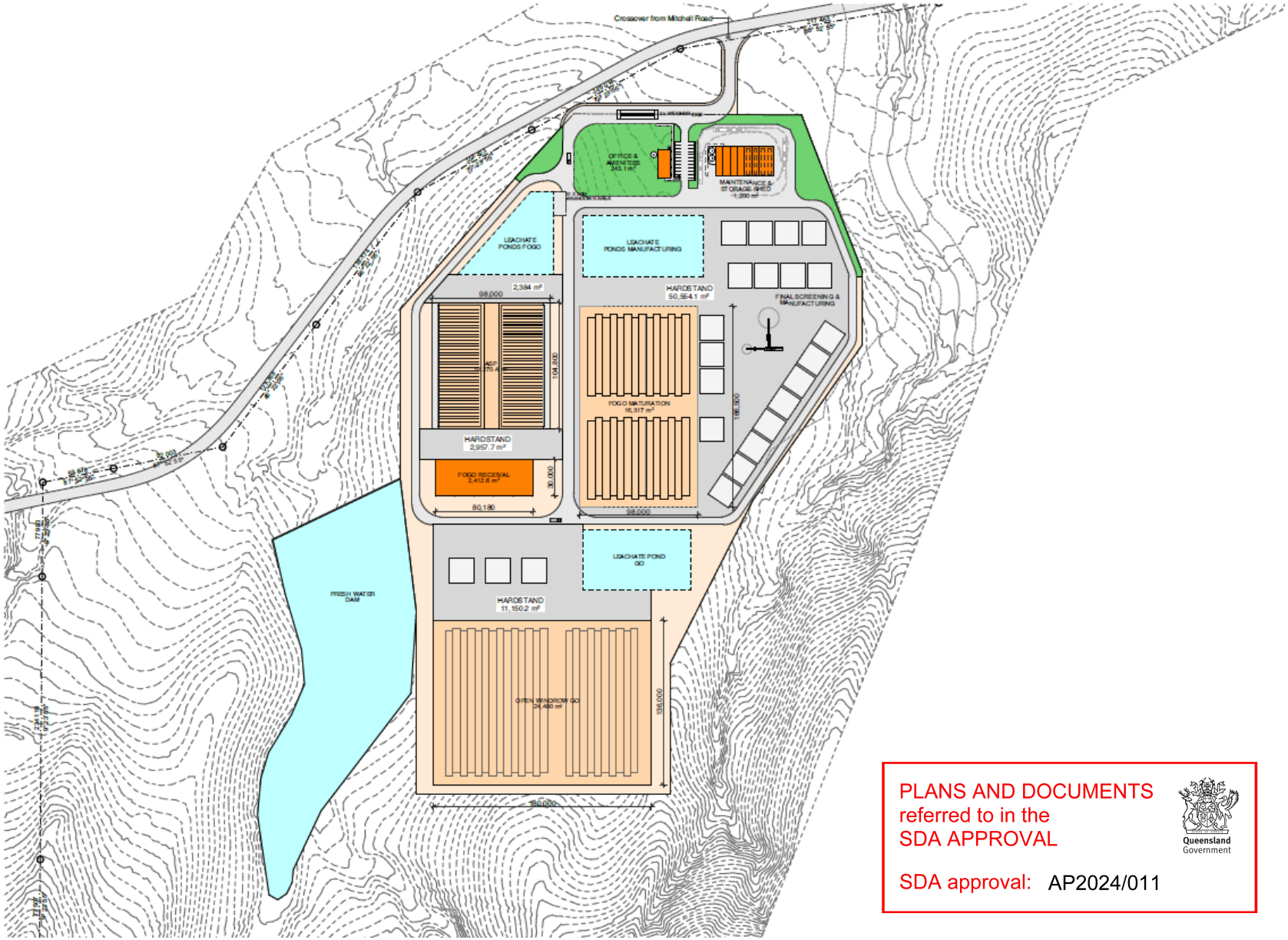
## 2.2 Operation

### 2.2.1 Site layout

The proposed composting facility is shown in Figure 2.1. The following sections of the facility are expected to contribute to odour generation:

– FOGO receival building
– Aerated Static Pad (ASP)
– Fogo maturation area
– Open Windrows GO
– Final Screening and Manufacturing (Manure)
– Leachate Ponds (GO, FOGO and Manufacturing)

Matured compost is not expected to significantly contribute to odour emissions from the operation of the facility.




PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

***Figure 2.1 Proposed site layout***

### 2.2.2 Composting Process

The facility will operate in accordance with the process flow outlined in Figure 2.2 and Figure 2.3. The process flow can be divided into two branches and includes the following steps:

- Material will enter site, be weighed on a weigh bridge and inspected for conformity to process requirements.
- FOGO will be delivered to the decontamination line, which will then be screened, sorted, decontaminated and shredded depending on the size of material (>60 mm in diameter material will be shredded).
  - Shredded and decontaminated FOGO will then be placed into windrows on ASP pads for 21 days.
    - ASP pads will aerate FOGO with 18,000 $m^3$/hour of air.
    - Windrows will be turned completely one time during the three week period.
  - Once 21 days have passed, FOGO will be transferred to the manufacturing, maturation & storage area, and will be aged for a further eight weeks.
    - Virgin Excavated Natural Material (VENM) will also be stored in this area and will be blended into completed compost as required.
- Garden Organics (GO) will be sorted and then directly deposited onto open windrows for composting and maturation, which will sit for 8 weeks.
  - Windrows will be turned two times completely during the eight week period.
  - Maturation windrows will undergo water humidification periodically.
  - VENM and manure will also be mixed into finished GO compost as required.
    - Manure will be stored in the final screening and manufacturing area.
- Once material has been composted sufficiently, it will be directly transported off site or stored in “bunker” areas until it is ready to be transported off site.

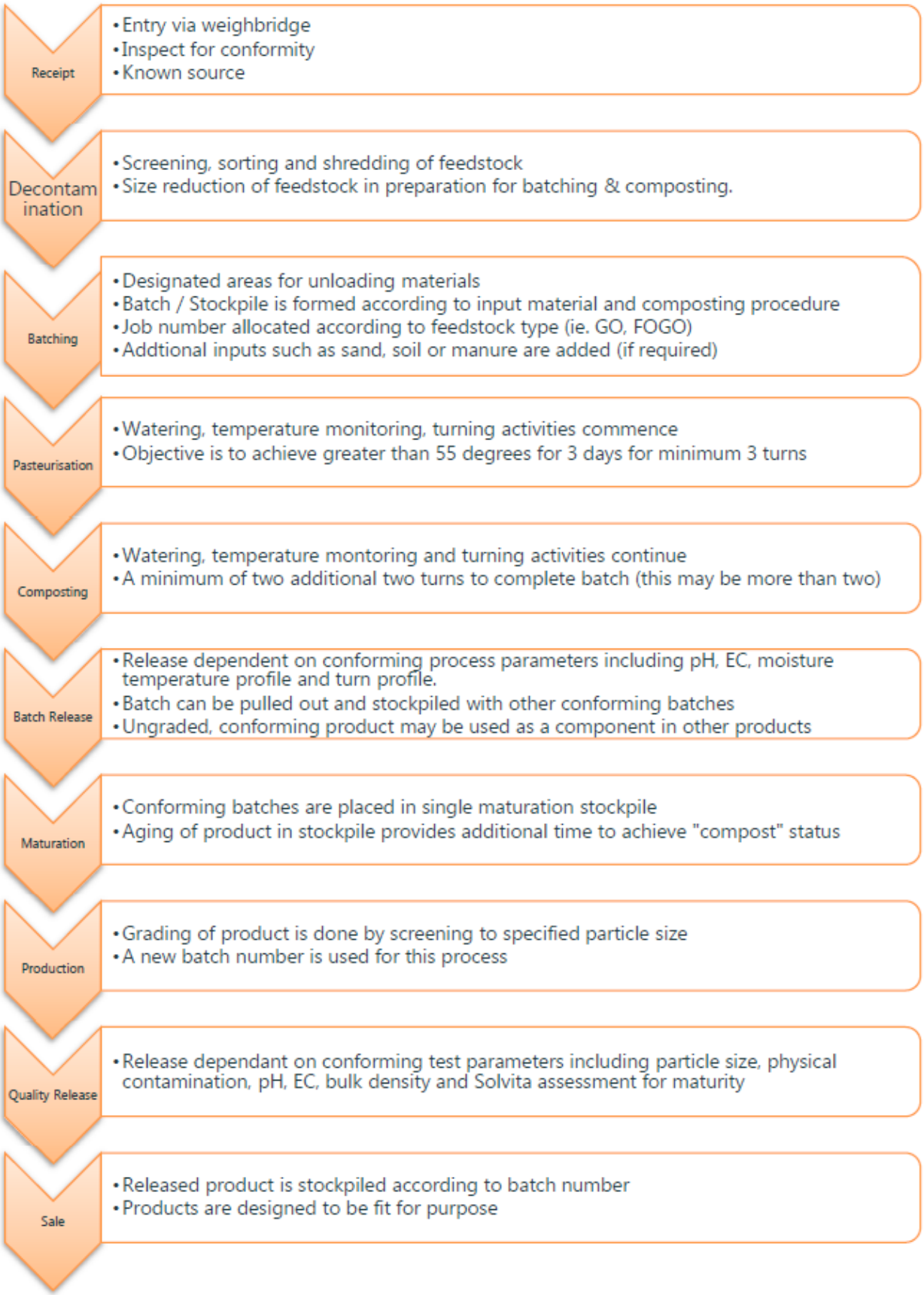



***Figure 2.2 Bromelton compost manufacturing facility process flow***

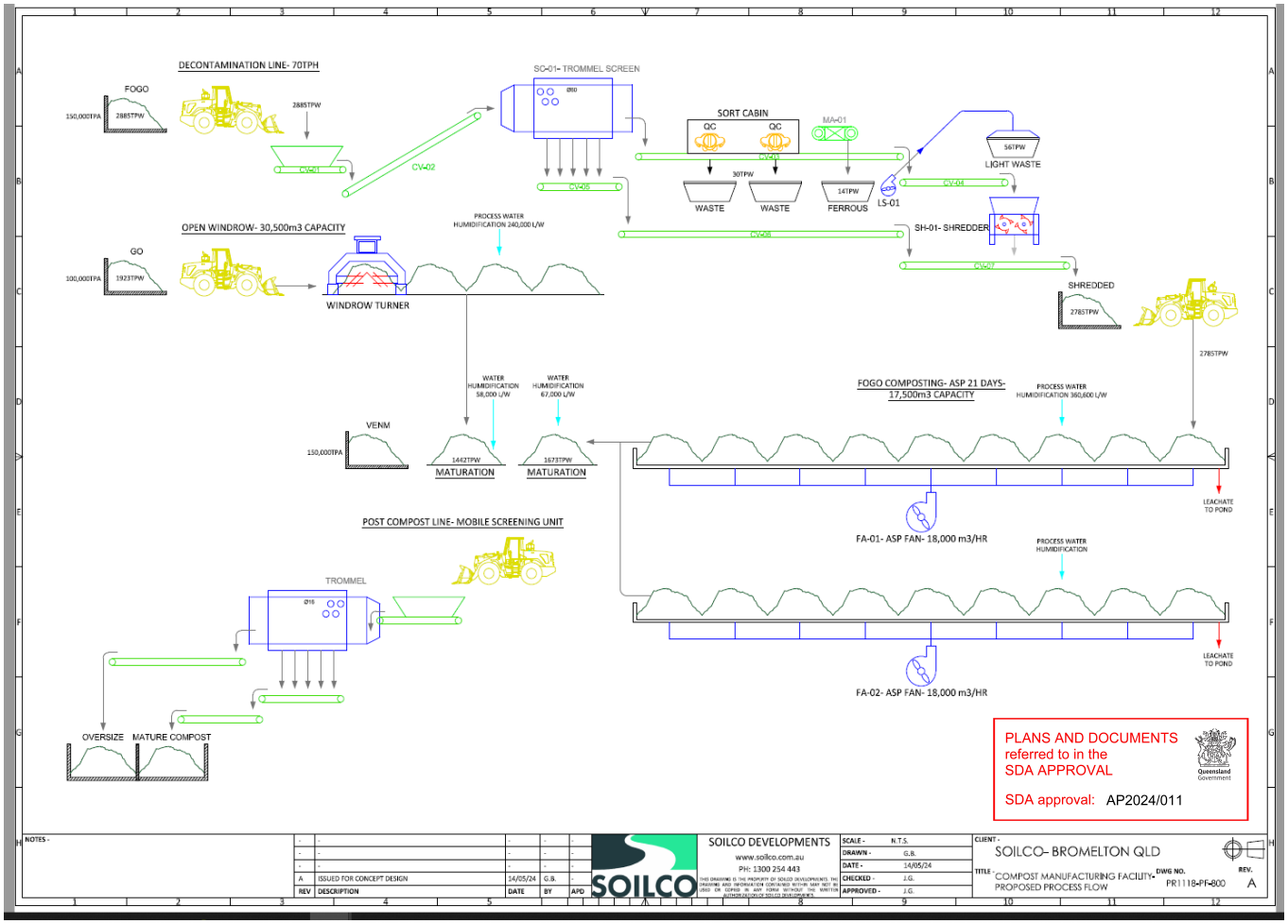



*Figure 2.3 Bromelton compost manufacturing facility process flow diagram*

## 2.2.3 Material throughput

Material receival is expected to vary significantly across the year, with more compost being processed in the summer months than the winter months. The peak compost material throughput occurs in January and March, and the lowest material throughput occurring in June and July. The amount of compost at the facility would likely correlate to odour potential. An annual breakdown of organic materials processed at the facility is provided in Table 2.3.

***Table 2.3 Annual breakdown of GO and FOGO processed across a year***

| Month | Estimated receival of material (tonnes per period) | | Total material received Tonnes per annum |
|---|---|---|---|
| | GO | FOGO | |
| Jan | 9,437 | 14,155 | 23,592 |
| Feb | 8,692 | 13,038 | 21,730 |
| Mar | 9,557 | 14,335 | 23,892 |
| Apr | 8,278 | 12,416 | 20,694 |
| May | 7,900 | 11,850 | 19,750 |
| Jun | 6,256 | 9,384 | 15,640 |
| Jul | 5,955 | 8,932 | 14,887 |
| Aug | 7,613 | 11,420 | 19,033 |
| Sep | 7,985 | 11,977 | 19,962 |
| Oct | 8,707 | 13,060 | 21,767 |
| Nov | 10,825 | 16,237 | 27,062 |
| Dec | 8,797 | 13,195 | 21,992 |
| **Total per year** | **100,000** | **150,000** | **250,000** |

## 2.2.4 Material types

GHD has undertaken a review of potential feedstock types to be accepted at the facility with particular reference to *Best Practice Environmental Management Guideline ERA 53(a) - Organic material processing by composting* (DESI, 2024). It is important to note that feedstocks would be received and processed within the material processing building and that after this stage, all material will be well mixed and homogenised. Any feedstock with a higher odour risk rating would comprise a small fraction of the total and once mixed would have a much lower odour potential. The majority of all feedstocks accepted at the site will be green waste which has a low odour potential. The wastes to potentially be accepted and their corresponding odour rating are provided in Table 2.4.

No feedstock with a ‘very high’ odour rating will be accepted onsite. The only feedstocks with a ‘high’ rating accepted at the site are food organics for composting and small amounts of animal manure (up to 200 tonnes) for blending purposes only.

***Table 2.4 Odour rating of composting feedstock (ERA 53(a)) – Organic material processing by composting***

| Feedstock | Examples | Odour rating | To be used at Bromelton CMF (y/n) |
|---|---|---|---|
| Abattoir waste | Meat processing leftovers, bone material, blood, tallow waste, abattoir waste including animal effluent and residues from meat processing, including abattoir effluent, liquid animal wastes (blood) and sludge | Very high | No |
| | Paunch material | High | No |

| Feedstock | Examples | Odour rating | To be used at Bromelton CMF (y/n) |
|---|---|---|---|
| Animal manure | Horse manure, chicken manure, cow manure, livestock manure, or any manure produced by animals, wastewater from holding yards | High | In small amounts for blending purposes only. No more than 200 tonnes onsite at any one time |
| Animal waste and animal processing waste | Any dead animals or part/s of dead animals, remains of animals or part/s of remains of animals (e.g. chickens from poultry farms), egg waste, milk waste, mixtures of animal manure and animal bedding organics | Very high | No |
| Bark, lawn clippings, leaves, mulch, pruning waste, sawdust, shavings, woodchip and other waste from forest products | Cane and sorghum residues including bagasse, forest mulches, cypress chip, green waste, mill mud71, pine bark, sawmill residues non-treated (including sawdust, bark, wood chip, shavings etc.), tub ground mulch (from land clearing and forestry waste), peat, seed hulls/husks, straw, and other natural fibrous organics, wood chips (forestry waste and land clearing, household maintenance), wood waste (including untreated pallets, offcuts, boards, stumps and logs); worm castings suitable for unrestricted use | Low | Yes |
| Biosolids | Biosolids that are not stabilised biosolids | Very high | No |
| | Stabilised biosolids | Medium | Yes |
| Cardboard and paper waste | Paper mulch | Low | Yes |
| | Paper pulp effluent, paper sludge dewatered | Medium | Yes |
| Compostable polylactic acid (PLA) plastics | Compostable plastics produced in accordance with:<br>(a)<br>AS 4736:2006 (Biodegradable plastics) or the most recent or replaced version of that standard or<br>(b)<br>AS 5810:2010 (Biodegradable plastics - Biodegradable plastics suitable for home composting) or the most recent or replaced version of that standard. | Low | Yes |
| Ammonium Nitrate, dewatered fertiliser sludge | | High | No |
| A substance used for manufacturing fertiliser for agricultural, horticultural or garden use | Fertiliser water and fertiliser washings, stormwater from fertiliser manufacturing plants containing fertiliser washwater | Medium | No |
| Fish processing waste | Fish bones and other fish remains/leftovers, wastewater from fish processing | Very high | No |
| Food and food processing waste | Expired/past used by date non-protein based food from supermarkets, expired beer, vegetable oil wastes and starches, vegetable waste, yeast waste, food processing effluent (wastewater) and solids (including sludges) from non-protein based food | Medium | Yes |
| | Food processing effluent (wastewater) and solids (including sludges) from protein based food | Very high | No |
| | Food organics, expired/past used by date protein based food from supermarkets, brewery and distillery effluent and waste | High | Yes |

| Feedstock | Examples | Odour rating | To be used at Bromelton CMF (y/n) |
|---|---|---|---|
| | Expired soft drinks, molasses waste, grain waste (hulls / waste grains), starch water waste, sugar and sugar solutions | Low | Yes |
| Grease trap waste | Oil and grease waste recovered from grease traps | Very high | No |
| Green waste | Leaves, grass clippings, prunings, tree branches from household maintenance | Low | Yes |
| Inorganic additives with beneficial properties | Bentonite | None | Yes |
| | Crusher dust | None | Yes |
| | Drilling muds (non-CSG and no additives) | None | No |
| | Gypsum | Medium | Yes |
| | Lime and lime slurry (inert) | None | Yes |
| Poultry processing waste | Feathers, meal and bone leftovers, egg waste including poultry processing poultry abattoir effluent and sludges | Very high | No |
| Soils | Acid sulfate soils and sludge | High | No |
| | Clean soil, clean mud, sand | None | Yes |
| Stormwater | Low level organically contaminated stormwaters or groundwaters (tested) | Low | No |
| Wood waste from untreated timber | Untreated pallets, offcuts, boards, stumps and logs, sawdust, shavings, timber offcuts, crates, wood packaging | Low | Yes |
| Mushroom compost and mushroom growing substrate | | Medium | No |

# 3. Legislation and policy context

The relevant legislation and government guidance for the air quality assessment of the Project are:

– QLD *Environmental Protection Act 1994* (EP Act)
– QLD *Environmental Protection (Air) Policy 2019* (EPP (Air))
– QLD *Best Practice Environmental Management Environmentally relevant activity 53(a) - Organic material processing by composting* (2024)
– QLD *Odour Impact Assessment from Developments Guideline* (Department of Environment and Heritage Protection, 2014)
– *Application requirements for activities with impacts to air* (Department of Environment and Science, 2017)
– *National Environment Protection Council (NEPC) National Environment Protection* (Ambient Air Quality) *Measure 2021* (the Air NEPM)
– *Guidance on the assessment of dust from demolition and construction* (Institute of Air Quality Management, 2024) (IAQM guidance).

Under the *Environmental Protection Act 1994* (EP Act), proposals are assessed to ensure they will not adversely affect environmental values including air quality, public amenity and safety. This means ensuring the Project is not likely to cause environmental nuisance or environmental harm.

The *Environmental Protection (Air) Policy 2019* (EPP (Air)) under the EP Act establishes air environment values to be protected or enhanced. The environmental values considered relevant to this assessment are:

– The qualities of the air environment that are conducive to human health and wellbeing.
– The qualities of the air environment that are conducive to protecting the aesthetics of the environment, including the appearance of buildings, structures and other property.

The EPP (Air) provides air quality objectives for sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, particles, lead and a number of air toxics. Odour impacts are required to comply with protection of the aesthetics of the environment. Application requirements for activities with impacts to air (Department of Environment and Science, 2017) under the EP Act provide guidance on impact assessment criteria for dusts (suspended and deposited) and odour.

The QLD *Odour Impact Assessment from Developments Guideline* (Department of Environment and Heritage Protection, 2014) provides a procedure for assessing the likelihood of odour nuisance from development proposals for new facilities, modifications of existing facilities and land developments.

This air quality assessment is completed in consideration of the guidance outlined in Air—EIS information guideline (Department of Environment and Science, 2020).

The National Environment Protection Council of Environmental Ministers, now the National Environment Protection Council (NEPC), updated the Air NEPM in May 2022. The Air NEPM sets uniform national standards for ambient air quality and outlines the framework for state and territory jurisdictions to monitor and report against these standards.

The IAQM guidance provides guidance on the assessment of dust from demolition and construction activities. It provides a qualitative step by step process to assess the risk of dust impacts. This is an industry-accepted contemporary guidance which has been used for a number of large projects across Australia (SLR Consulting Pty Ltd, 2018; Aecom, 2018). Additionally, an Australia and New Zealand-specific *Good Practice Guide for the Assessment and Management of Air Pollution from Road Transport Projects* references and closely follows the IAQM approach (Clean Air Society of Australia and New Zealand, 2023).

## 3.1.1 Dust assessment criteria

### Deposited dust

The Queensland Government guideline 'Application requirements for activities with impacts to air' states, '*A dust deposition limit of **120 milligrams per square metre per day, averaged over one month**, when monitored in accordance with 'AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of Particulates – Deposited Matter – Gravimetric method of 1991', is frequently used in Queensland.*'

Deposited dust criteria are most relevant for dust on surfaces and for amenity.

### Particulates

The QLD *Environmental Protection (Air) Policy 2019* provide the following relevant air quality criteria for health and wellbeing shown in Table 3.1. These are relevant to human health and not directly relevant for amenity impacts.

***Table 3.1 Air quality impact assessment criteria***

| Pollutant | Averaging period | Impact location | Impact type | Criteria (µg/m³) |
|---|---|---|---|---|
| TSP | Annual | Sensitive receptor | Cumulative | 90 |
| $PM_{10}$ | 24 hour | Sensitive receptor | Cumulative | 50 |
| | Annual | Sensitive receptor | Cumulative | 25 |
| $PM_{2.5}$ | 24 hour | Sensitive receptor | Cumulative | 25 |
| | Annual | Sensitive receptor | Cumulative | 8 |

## 3.1.2 Odour assessment criteria

The odour assessment criteria for the Project were taken from the *Odour impact assessment from developments guideline* (Department of Environment and Heritage Protection, 2014). Comparison of the site's predicted odour performance against the impact assessment criteria outlined in this guideline is a valuable tool in understanding the potential for off-site odour impacts, assessing the expected level of risk of odour impacts occurring as well as providing a baseline for future plant modifications or future developments surrounding the source of odour.

Odour impacts are predicted and assessed using Odour Units (OU). OU's are determined by dividing the concentration of a sample by the number of dilutions required to reach the odour threshold. The odour threshold is determined through a testing panel and is the concentration at which 50% of the testing panel participants can correctly detect an odour. In essence, the use of OU's allows for a numeric representation of a subjective sensory experience.

The modelled odour concentrations at the 'most exposed existing or likely future off-site sensitive receptors' should be compared with the following guideline values:

– **0.5 OU**, 1-hour average, 99$^{th}$ percentile for wake-free stacks
– **2.5 OU**, 1-hour average, 99.5$^{th}$ percentile for ground-level sources and wake-affected stacks, and
– For facilities that do not operate continuously, the 99.5$^{th}$ percentile must be applied to the actual hours of operation.

#### 3.1.2.1 Separation distances

The Environment Protection Authority (EPA) in several states (including Department of the Environment, Tourism, Science and Innovation (DETSI) in Queensland) have specified separation distances between industrial land uses that emit odour or dust and sensitive land uses. These guidelines are published as one method of considering potential conflicts between incompatible land uses. These are recommendations only, and there is always opportunity for a proponent to demonstrate compliance with relevant legislative requirements through other methods. It is noted that separation distances are developed to minimise impacts that may occur when there are accidents, power failure, equipment failure (i.e., odour controls) or unusual meteorological conditions that may occur, as well as normal operation. The State of Queensland's recommended separation distances are outlined in

the *Queensland State Planning Policy 5/10: Air, Noise and Hazardous Material 2010.* The nearest residential receptor is approximately 1.1 km north of the Project which is greater than the recommended distance for all guidance documents (excluding Victoria which recommends >1400 m). A summary of the separation distances in each state is presented in Table 3.2.

***Table 3.2 Required separation distances for this site per guidelines in each state or territory***

| State guideline | Facility type | | Recommended separation distance |
|---|---|---|---|
| Australian Capital Territory (ACT Government, 2018) | Composting works – compost is produced at a rate of > 200 tonnes/year | | 1,000 m |
| South Australia (EPA South Australia, 2016) | Composting works (>200 tonnes/year) | | 1,000 m |
| Victoria (EPA Victoria, 2013) (EPA Victoria, 2017) | Types of feedstock: green waste, vegetable organics, grease inceptor trap waste<br>Technology: open air receival, enclosed aerobic composting with secondary odour capture and treatment equipment, open air maturation<br>90,000 tonnes/year | | >1,400 m |
| Western Australia (WA EPA, 2005) | Composting facility – outdoor uncovered, regularly turned windrows | Manures, mixed food/putrescible and vegetative food waste | 1,000 m |
| | | Biosolids | 500 m |
| | | Green waste | 150 m |
| Queensland (DETSI) 2010 - *State Planning Policy 5/10 Air, Noise and Hazardous Materials.* | Level 1 Industry Zones[1] | Medium impact industry | 250 m |
| | | High impact industry | 500 m |
| | | Noxious and hazardous industry | 1,500 m |

## 3.1.3 Pre-lodgement advice from DETSI

DETSI provided information relevant to air quality and odour in an email to GHD dated 20 June 2024. The pre-lodgement advice is summarised in Table 3.3.

***Table 3.3 Pre-lodgement advice relevant to odour***

| Relevance to assessment | Advice |
|---|---|
| Air | Emissions to air:<br>– odour including volatile organic compounds (VOCs) (from receiving raw material, mechanically reprocessing feedstock, mixing or turning compost and leachate); and<br>– particulate matter (from turning compost, screening final compost and blending compost with clean earth). |
| Odour | As part of the application, the department will require a list of specific feedstocks that the site will propose to accept and the associated odour rating of each feedstock (see Schedule 1- Odour rating of composting feedstock of the ERA 53(a) MOCs). If the type of waste you intend to process is not listed, you can follow the procedure outlined in this guideline **https://environment.desi.qld.gov.au/__data/assets/pdf_file/0023/340727/organicfeedstockodourrating.pdf** to assign an odour rating to a particular feedstock.<br>If feedstock proposed to be accepted onsite has a high or very high odour rating, the department will require that the operations onsite that have the highest risk of causing odours are to be fully enclosed and incorporate appropriate air filtration systems.<br>Operations that have the potential to cause odours include the initial receival, sorting, decontaminating, shredding and mixing of feedstocks that are of a high and very high odour rating. Composting, before pasteurisation is achieved, with feedstocks of a high or very high odour rating also has the potential to cause nuisance odours. It is recommended that in-vessel or enclosed systems are used for composting these feedstocks until pasteurisation is achieved. Enclosed systems could also include GORE® covers or similar mitigation measures over composting windrows, etc. If a different method of composting is proposed |

| Relevance to assessment | Advice |
|---|---|
| | (which is not fully enclosed) sufficient evidence must be provided to determine the potential impacts of odours on sensitive receptors and appropriate alternative mitigation measures must be proposed to manage and mitigate odour. |

GHD reviewed the proposed feedstocks to be accepted at the Project in Section 2.2.4 of this report, which identified that some wastes with high and very high odour rating will potentially be accepted at the site. Advice from DETSI is that where high or very high odour rated feedstocks are accepted, the operations are to be fully enclosed and incorporate air filtration systems. DETSI also noted that where a different method of composting is proposed (which is not fully enclosed), sufficient evidence must be provided to determine the potential impacts of odours on sensitive receptors and appropriate alternative mitigation measures must be proposed to manage and mitigate odour.

A detailed assessment of odour from the Project has been undertaken (this assessment) which includes a review of odour from similar operating facilities in order to adopt a conservative odour emission dataset, meteorological and dispersion modelling which considers local terrain, land use and weather data to predict the pattern of odour dispersion in the areas surround the Project. This assessment has incorporated conservative odour emission rates for the proposed activities at the site (refer Section 7) and demonstrates full compliance with the QLD odour criteria at all sensitive receptors. Mitigation measures are provided in Section 7.5 to minimise odour as far as practicable, including additional measures that can be implemented should odour need to be further reduced.

# 4. Assessment Methodology

## 4.1 General

This air quality assessment was completed with accordance to the *QLD Odour Impact Assessment from developments guideline* and the IAQM guidance. A qualitative assessment has been completed to assess the dust impact during construction of the Project.

Air quality may be impacted by a number of pollutants, each of which has different emission sources and effects on human health, amenity and the environment.

Based on a review of the construction methodology and operational activities, dust and particulate matter was identified as the pollutant most likely to impact nearby sensitive receptors during construction of the Project.

During operation of the Project, odour was identified as the pollutant most likely to impact nearby sensitive receptors. Dispersion of odour has been modelled and assessed for operation of the Project. The potential for dust impacts from operations are considered low given the significant distance to sensitive receptors, high moisture content of feedstocks and dust mitigation controls that will be used at the facility, including watering of unpaved surfaces such as the access road and stockpiles. Following guidance outlined in page 12 of the QLD guidance document *Application requirements for activities with impacts to air*, dispersion modelling of dust and particulate matter has therefore not been undertaken as the proposed activities are not likely to have a high impact to air.

Combustion emissions from traffic and equipment would occur during both construction and operation of the Project. However, these emissions are expected to be negligible in comparison with those from the existing traffic volume already present on the Beaudesert-Boonah Road, adjacent to the proposed site. Therefore, combustion emissions have not been further assessed in this report.

## 4.2 Modelling methodology

### 4.2.1 Dispersion model selection

CALPUFF was found to be the most appropriate dispersion modelling software to use for this Project due to the distance and topography between the meteorological observations and sensitive receptors, and the proposed site. The Project is located on elevated terrain with some gullies either side, and some nearby sensitive receptors are also located on the far side of terrain features. As well as this, the high frequency of calm conditions (wind speeds less than 0.5 metres per second) cannot be accurately accounted for using AERMOD and therefore CALPUFF is recommended.

CALPUFF is an advanced non-steady-state, Gaussian puff dispersion model that uses a three dimensional spatially varying wind field that is capable of accounting for complex terrain features and varying wind fields.

### 4.2.2 Emission inventory development

GHD has reviewed the odour emission rates supplied by SOILCO, who provided an odour assessment prepared by ERM (Wogamia Composting and Manufacturing Facility (CMF) Odour and Dust Assessment (29 October 2020)). The assessment references odour sampling that was undertaken by Ektimo at the site in 2019 of various stages of composting using an Isolation Flux Chamber (IFC). Derived odour emission rates were observed to be lower than odour measurements previously undertaken or reviewed by GHD on other GO and FOGO composting sites in Australia. This may be due to the sampling IFC method on permeable substrates such as composted material and is discussed in more detail in Section 7.2, or other variabilities associated with FOGO composition and age, windrow age.

In order to be conservative, GHD has conducted review of numerous other green waste and FOGO composting facilities and conservative odour emission rates have been used for this assessment. These are discussed in Section 7.2.

The odour emission inventory reflects the proposed feedstocks accepted at the facility described in Section 2.2.4, where no high risk odour feedstock types are to be accepted at the site.

### 4.2.3 Assumed geometry of windrows

Organic material will be processed and stored in windrows. For the purpose of this assessment, windrow size and surface area has been estimated using material volumes provided by SOILCO. Windrows are expected to be trapezoidal in shape and GHD has calculated the surface area of composting windrows based on the volume of material at any one time.

Material volumes and the total area needed to house compost, as well as the expected surface area of windrows per composting area are presented in Table 4.1 and assumed windrow geometry is presented in Appendix C-1. Modelled windrow parameters are based on the maximum expected volumes across an entire year. In reality volumes would be lower in winter months, and as such these assumptions are conservative.

***Table 4.1 Material volumes, areas and surface areas***

| Area | Scenario | Total volume of material processed per period | Total area in which material is to be stored | Expected surface area of material |
|---|---|---|---|---|
| Maturation and storage – FOGO (Area A) | Peak period material throughput | 37,336 $m^3$ per eight weeks[1] | 16,430 $m^2$ | 16,430 $m^2$ |
| | Low period material throughput | 23,4467 $m^3$ per eight weeks[1] | | |
| | Average Material Throughput | 13,5902 $m^3$ per eight weeks[1] | | |
| Aerated Static Pad – FOGO (Area B) | Peak period material throughput | 14,000$m^3$ per three weeks | 9,135 $m^2$ | 8,374 $m^2$ |
| | Low period material throughput | 8,800 $m^3$ per three weeks | | |
| | Average Material Throughput | 11,400 $m^3$ per three weeks | | |
| Composting facility – GO (Area D) | Peak period material throughput | 30,500 $m^3$ per eight weeks | 24,438 $m^2$ | 18,181 $m^2$ |
| | Low period material throughput | 19,000 $m^3$ per eight weeks | | |
| | Average Material Throughput | 24,750 $m^3$ per eight weeks | | |
| Final screening and manufacturing | Peak period manure stored on site for blending | 200 tonnes at any time | 386 $m^2$ | 204 $m^2$ |

Note: 1. Calculated from ASP output adjusted to an eight-week cycle

### 4.2.4 Representative year

A representative year was chosen from the last five years based on the average annual wind speed, wind direction, temperature and relative humidity recorded at the Bureau of Meteorology, Beaudesert Drumley St Automatic Weather Station (AWS). This review is shown in Appendix A-2-2. The review resulted in the selection of the 2021 calendar year (01/01/2021 – 31/12/2021) as the representative year for modelling purposes.

### 4.2.5 Meteorological modelling

Local meteorology including long term wind speed and direction, as well as atmospheric stability, influence how air pollutants are dispersed into the local environment.

Site specific meteorological data used to drive the dispersion model was generated by use of TAPM and CALMET meteorological models to produce a three-dimensional wind field which also accounts for local variations in the terrain. Surface observations from the Beaudesert Drumley Street AWS (040983) were assimilated into TAPM, and the prognostic data generated by TAPM were used as an 'initial guess field' for the CALMET meteorological model.

Details of the procedure undertaken to produce the site-specific meteorology are provided in Appendix A-2-3.

### 4.2.6 Dispersion modelling configuration

Beaudesert falls within the Scenic Rim Regional Council local government area, which has no specific dispersion modelling guidance. Consequently, predicted air quality impacts were modelled in accordance with the Brisbane City Council City (BCC) Plan 2014 using an approved computer software model CALPUFF. CALPUFF model settings were selected with consideration to the recommendations provided in the BCC Air quality planning scheme policy (Brisbane City Council, 2016) and the Queensland Department of Environment and Heritage Protection Guideline, *Odour Impact Assessment from Developments* 2018. The *Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia* (Barclay and Scire; Atmospheric Studies Group, 2011) was also to help determine appropriate model configuration settings. CALPUFF settings are outlined in section B-1.

For this assessment, the CALPUFF dispersion model was used to predict ground-level odour concentrations from the Project. The CALPUFF dispersion model utilised a meteorological dataset of one year in duration. The grid size used in the CALPUFF model was equivalent to the CALMET domain (use of CALMET further discussed in Section A-3). The same grid resolution of 100 metres used for the CALMET model was used in CALPUFF.

The source properties and emission rates utilised in the dispersion modelling are detailed in Section 7.2 and Appendix C.

Building effects on dispersion were not considered in the model as all model sources are area or volume sources.

The dispersion model was configured to predict odour concentration at identified sensitive receptor locations and for a sampling grid centred on the proposed site.

# 5. Existing environment

## 5.1 Sensitive receptors

Air quality sensitive receptors are defined in the DESI, Queensland's guideline "*Application requirements for activities with impacts to air quality*" (Department of Environment and Science, 2017) as follows:

- A dwelling, mobile home or caravan park, residential marina or other residential premises
- A motel, hotel or hostel
- A kindergarten, school, university or other educational institution
- A medical centre or hospital
- A protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area
- A public park or gardens
- a place used as a workplace including an office for business or commercial purposes.

The nearest receptors in each direction, two km from the Project site boundary have been identified and described in Table 5.1 and shown in Figure 5.1. The nearest receptors are predominantly industrial facilities, located to the north of the site. Three residential receptors (R05, R06 and R11) were identified within two kilometres of the Project boundary. Other receptors outlined in Table 5.1 below are industrial receptors and would not be considered sensitive under the DETSI guidelines.

***Table 5.1 Nearby receptors***

| ID | Receptor type | Address | Easting (m) | Northing (m) | Distance and direction from Project | Receptor considered sensitive y/n |
|---|---|---|---|---|---|---|
| R01 | Industrial | Beaudesert Saleyards, State Route 90 | 492,043 | 6,906,126 | 863 m Northeast | n |
| R02 | Industrial | Quickcell Technology Products Pty Ltd, LOT 3 Beaudesert Boonah Rd | 492,614 | 6,905,652 | 1,150 m East-northeast | n |
| R03 | Industrial | SCT Logistics, 2603 Beaudesert Boonah Rd | 492,323 | 6,906,010 | 1,000 m Northeast | n |
| R04 | Industrial | Scenic Rim Regional Council Waste Facility, Waste Facility Rd | 493,114 | 6,905,850 | 1,700 m Northeast | n |
| R05 | Residential | 388 Swan Gully Road Bromelton | 489,519 | 6,903,432 | 2,000 m Southwest | y |
| R06 | Residential | 2572 Beaudesert - Boonah Road | 490,940 | 6,906,632 | 1,100 m Northwest | y |
| R07 | Industrial | 28 Swan Gully Road | 492,703 | 6,904,019 | 1,700 m Southeast | n |
| R08 | Industrial | Bush's Proteins QLD (A J Bush & Sons (Manufactures) | 492,401 | 6,903,487 | 1,800 m Southeast | n |

| ID | Receptor type | Address | Easting (m) | Northing (m) | Distance and direction from Project | Receptor considered sensitive y/n |
|---|---|---|---|---|---|---|
| | | Pty Ltd), 358 Sandy Creek Rd | | | | |
| R09 | Industrial | 194 Swan Gully Road | 491262 | 6903415 | 1,400 m South | n |
| R10 | Residential | 15 Tilley Rd | 491045 | 6906961 | 1,466 m North | y |
| 1. GHD understands that the industrial facility located at 2,572 Beaudesert – Boonah Road is currently not in operation | | | | | | |

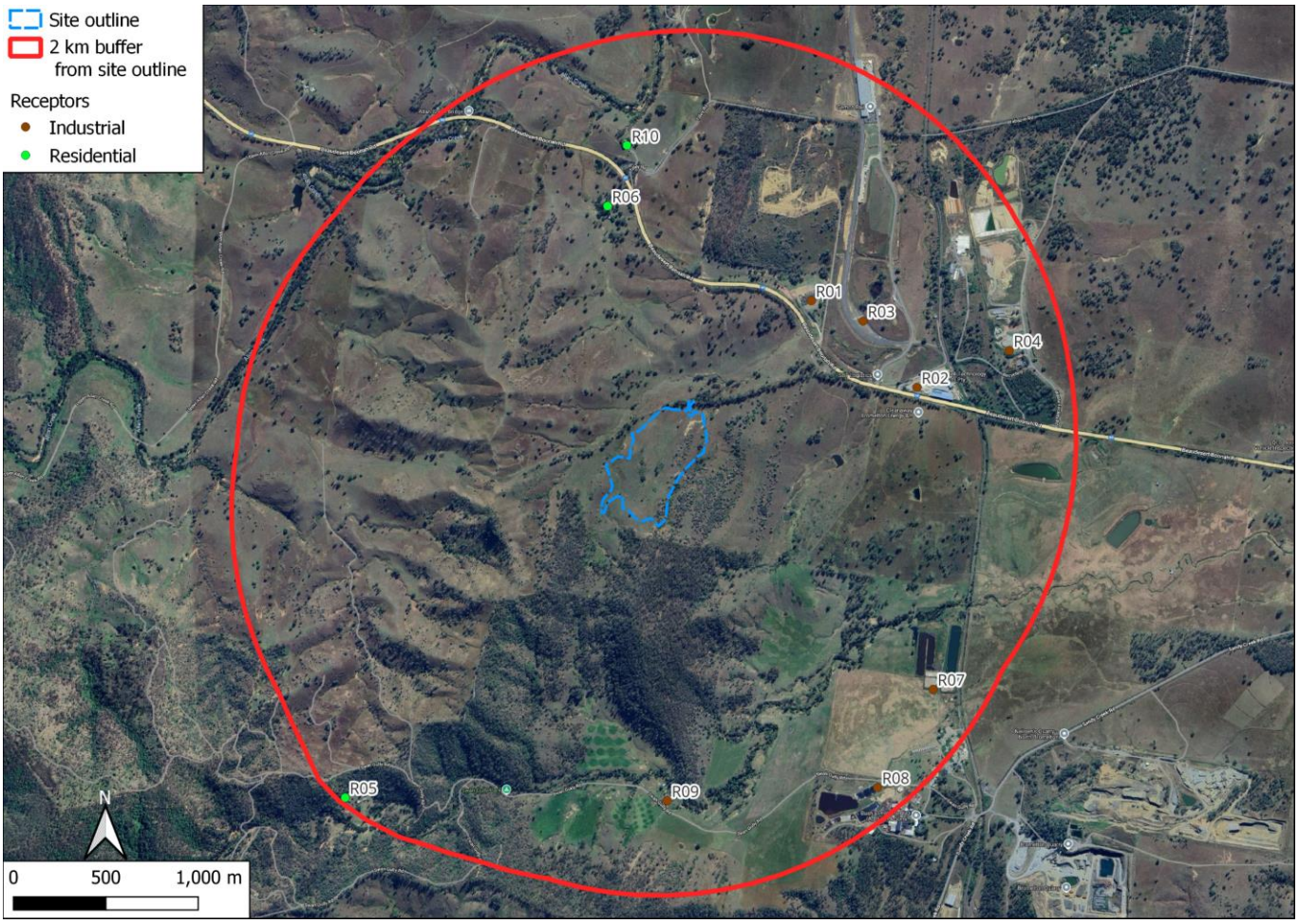



*Figure 5.1 Receptors within 2km of the site boundary*

### 5.1.1 Ecological Receptors

As part of the DA, separate terrestrial ecology assessments have been undertaken by GHD (Bromelton Compost Manufacturing Facility Terrestrial Ecology Assessment Report, dated 13 June 2024) and Redleaf Environmental (Ecological Assessment Report Mitchell Road, Bromelton, Queensland, dated December 2021). These reports have been reviewed to determine ecological sensitivity of the surrounding habitat. The ecological assessment undertaken by GHD determined that the Project site and its surroundings have been heavily impacted by human activity and is of poor quality for sensitive flora and fauna. Despite this, the survey undertaken by Redleaf Environmental determined that areas deemed essential habitat for koalas lies directly adjacent to, and within the site footprint as seen in Figure 5.2 (<20 metres from the proposed works). Furthermore, evidence of koala activity was detected on site.

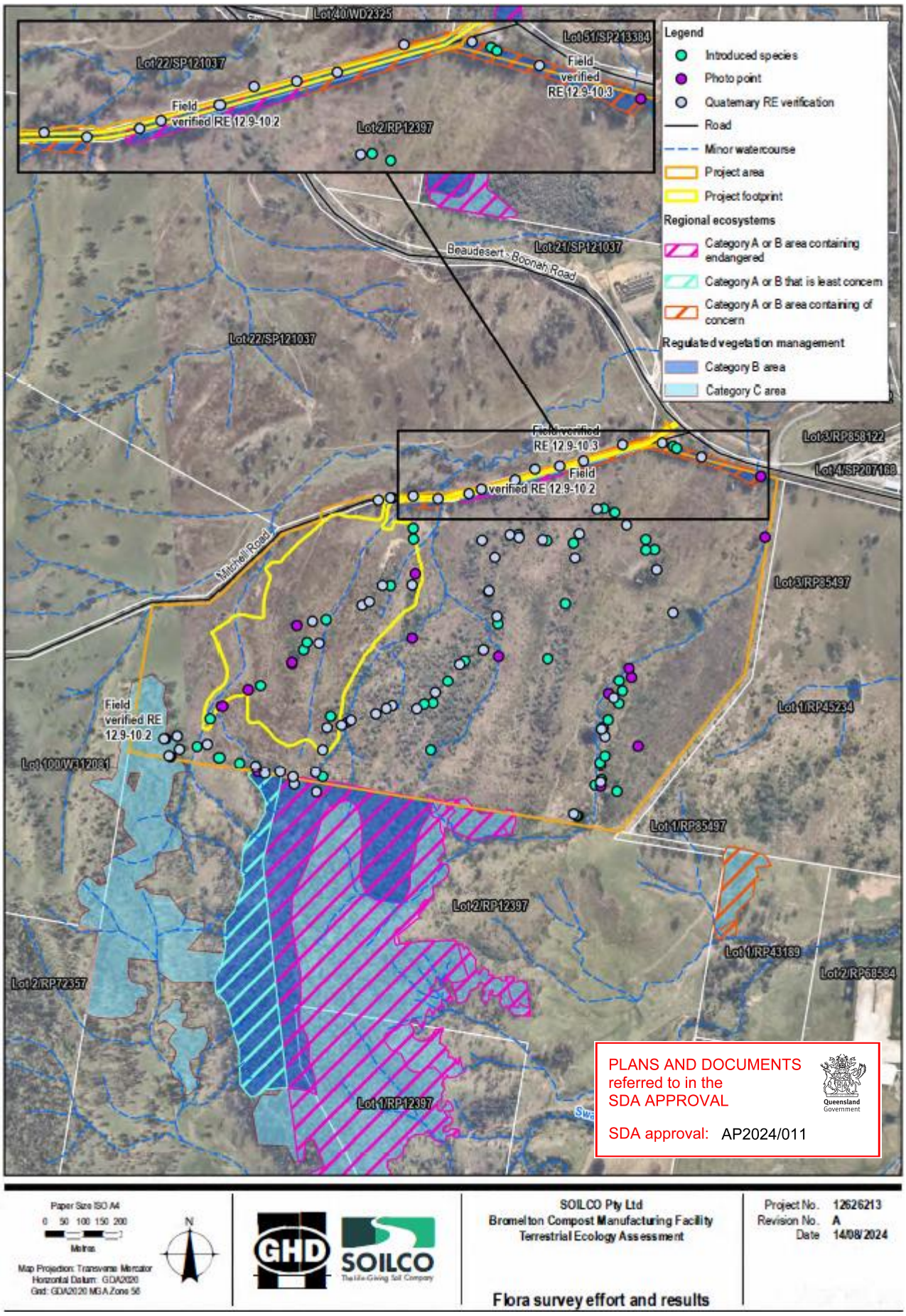



*Figure 5.2 Ecological receptors adjacent to site (Source: GHD Terrestrial Ecology Report, 2024)*

## 5.2 Climate and meteorology

The local climate and meteorology (weather) within the areas surrounding the Project site is of critical importance when assessing the potential for air quality impacts at sensitive receptors.

The Bureau of meteorology (BoM) operates a network of Automatic Weather Stations (AWS) across Australia. A BoM AWS typically measures critical meteorological parameters including wind speed, wind directions, temperature, relative humidity and pressure, with some stations also measuring cloud cover.

The nearest meteorological station to the Project is the Bureau AWS located at Beaudesert Drumley St (ID: 040983), approximately 7.9 kilometres east of the Project site. Data from 2019 through to the end of 2023 from this station have been reviewed for wind direction and speed, and temperature and rainfall data from 2007 through to the end of 2023 has been reviewed, in order to gain a better understanding of longer term climatic characteristics of the site.

### 5.2.1 Wind

Wind patterns at a site are one of the most important factors influencing pollutant dispersion. The annual, seasonal, and diurnal winds from the Beaudesert Drumley Street station are presented in Figure 5.3, Figure 5.4, and Figure 5.5, respectively.

Key observations for the annual wind rose (Figure 5.3) is as follows:

– Overall, winds are predominantly from the southwest.
– The average wind speed is a moderate 1.3 m/s.
– Calms, which are defined as wind speeds less than 0.5 m/s and are associated with poor dispersion outcomes, occur 33.8% of the time.

Seasonal wind roses (Figure 5.4) show the following trends:

– Relatively high prevalence of calm conditions can be observed all year round as with the highest percentage of calms being observed in winter (40.1% of the time).
– Wind speeds are generally moderate year-round, with marginally higher wind speeds observed in spring and summer.
– Winds blow primarily from the south-southwest in autumn and winter. Winter wind data shows weak directionality in wind directions. Summer wind directions occur primarily from the east-northeast and south-southwest.

Diurnal wind roses (Figure 5.5) show that:

– Calm conditions are significantly more frequent in the nighttime period relative to the daytime period, with calm conditions occurring between 58.2% to 61.4% of the time.
– Wind generally occurs from a southerly direction in the nighttime periods.
– Wind occurs primarily occurs from the southwest and northwest between 6:00 and 12:00, and primarily from the northeast between 12:00 and 18:00.

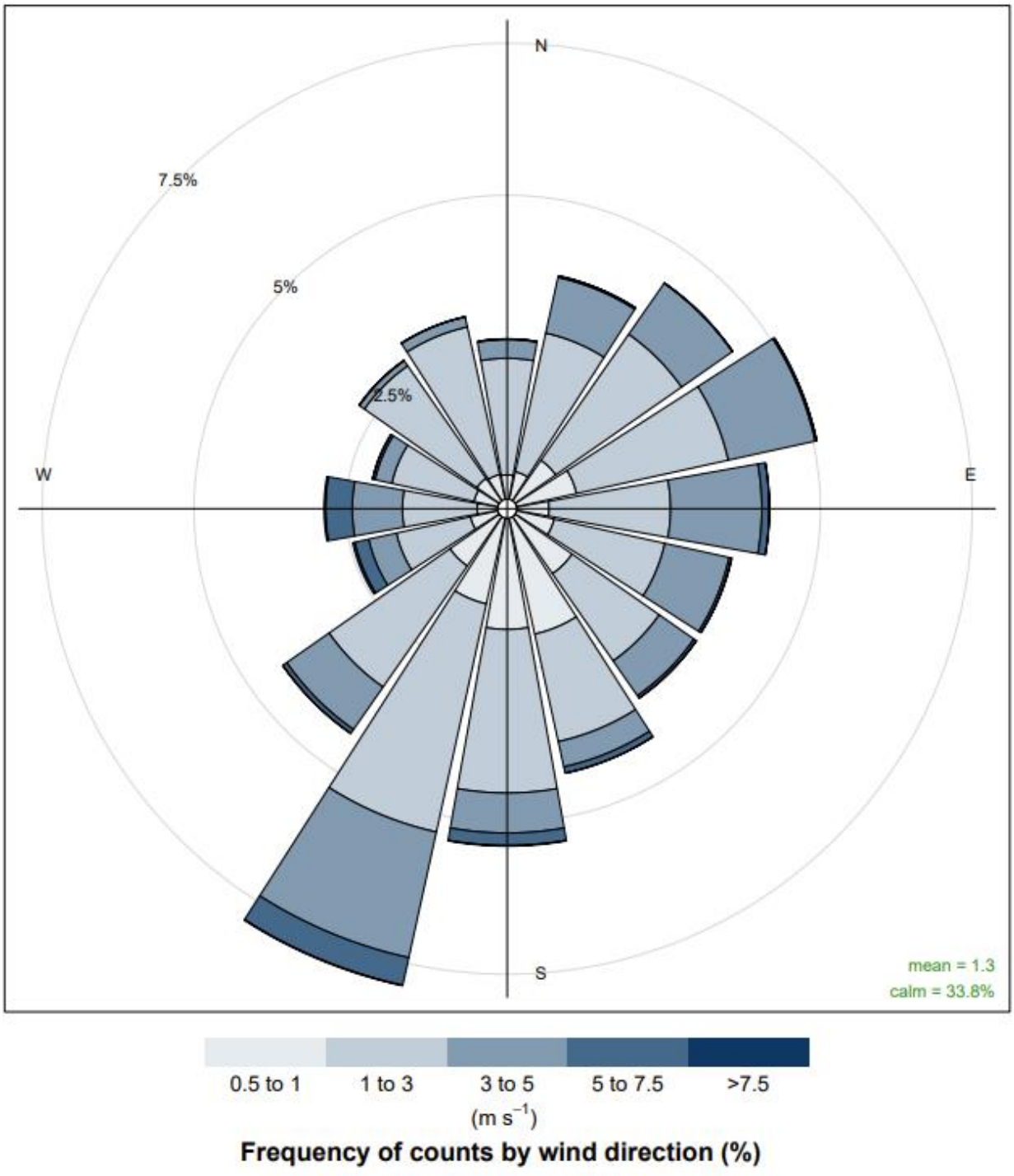



*Figure 5.3 Average winds at Beaudesert Drumley Street BoM AWS (2019-2023)*

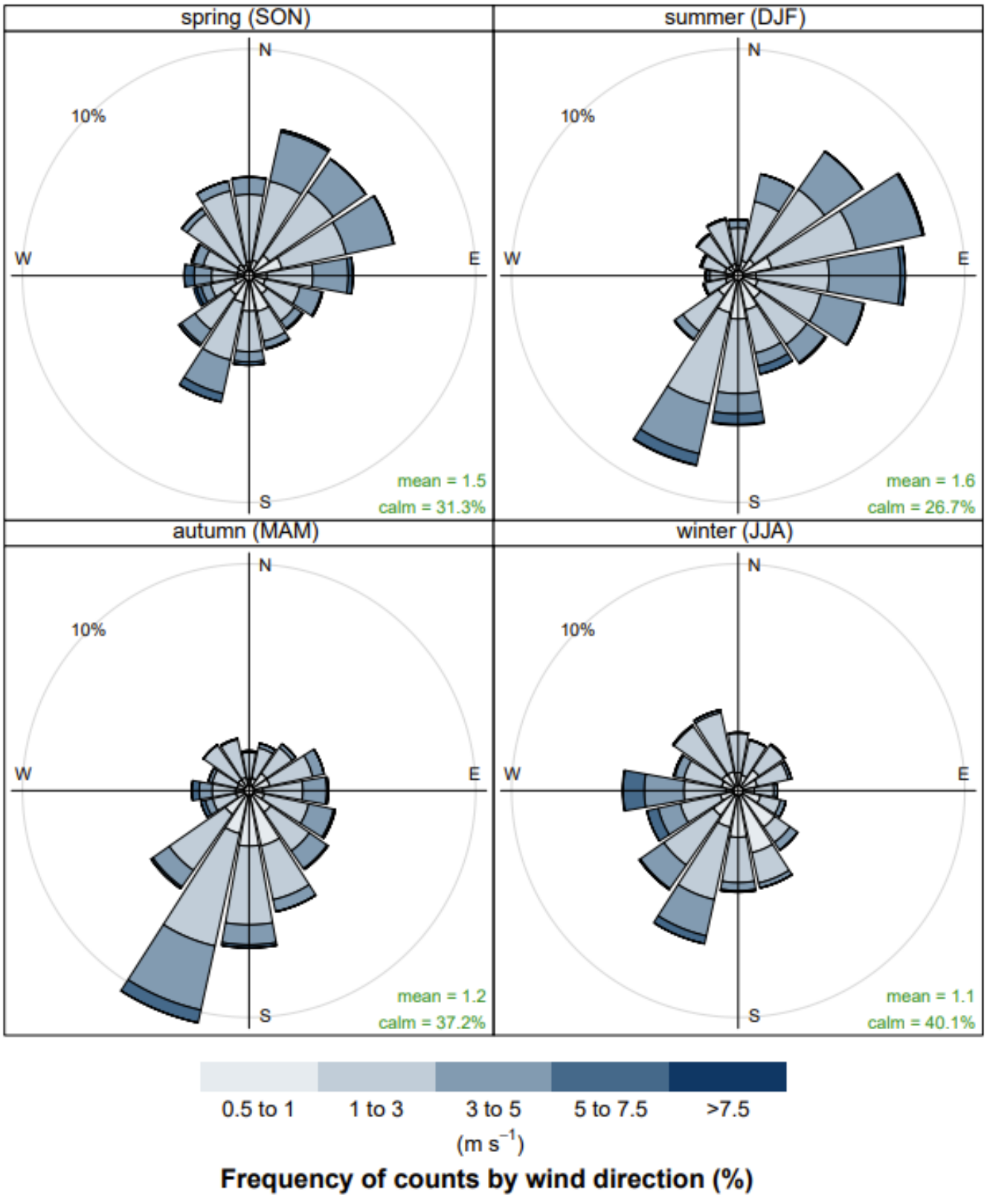



*Figure 5.4* *Seasonal winds at Beaudesert Drumley Street BoM AWS (2019-2023)*

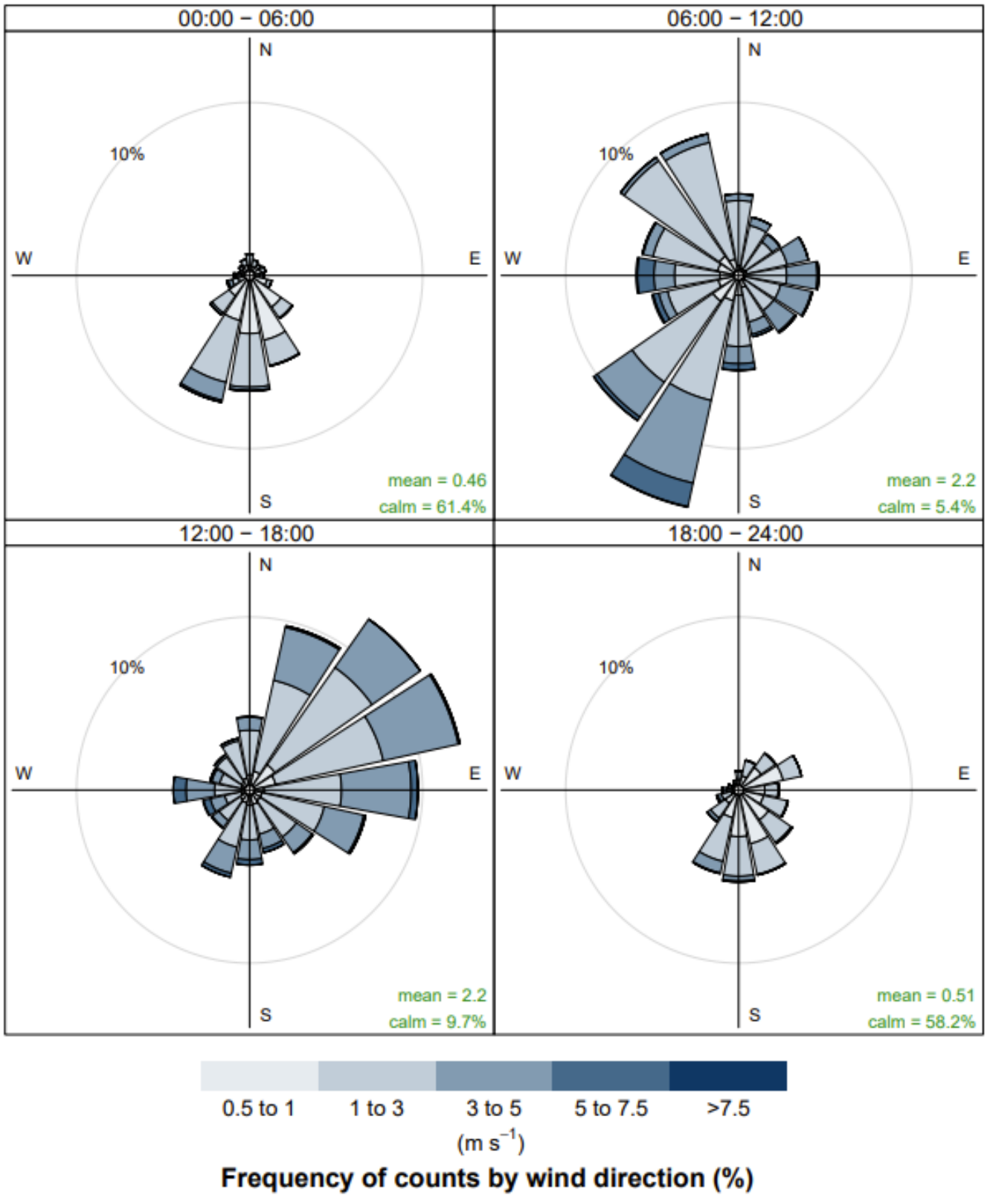



*Figure 5.5 Diurnal winds at Beaudesert Drumley Street BoM AWS (2019-2023)*

## 5.2.2 Temperature

The mean monthly temperature statistics measured at the Beaudesert Drumley Street BoM AWS from 2007-2023 are presented in Figure 5.6. The 50th percentile monthly maximum and minimum temperatures are used to show the typical temperature range for each month of the year, as well as the average monthly maximum and minimum temperatures. The average monthly maximum temperature was highest in in January, with recorded temperatures averaging 31.4 °C. The minimum monthly average temperature, 6.2 °C, occurs in July. The mean temperature is 25.3 °C in January and 13.9 °C in July.

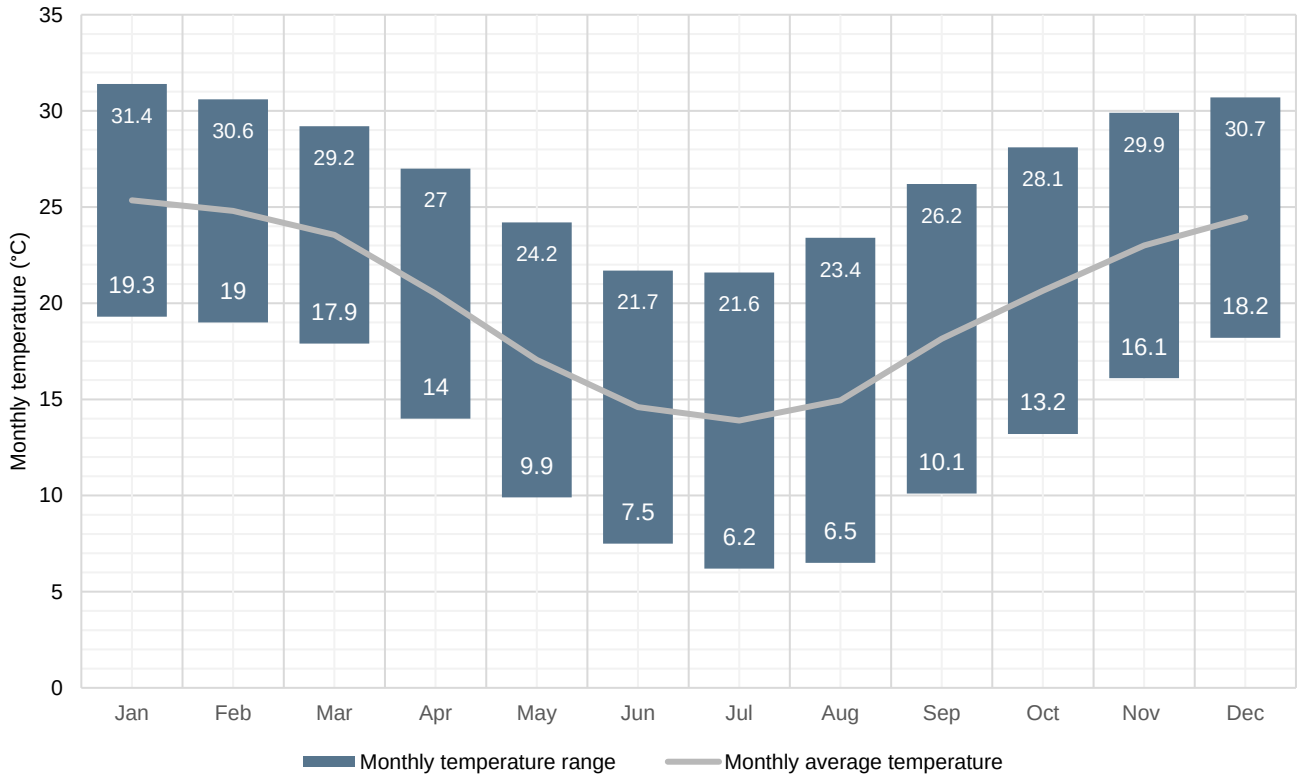



***Figure 5.6 Monthly average temperatures from Beaudesert Drumley Street BoM AWS (2007-2023)***

## 5.2.3 Rainfall

The monthly average rainfall and days of rain measured at the Beaudesert Drumley Street BoM AWS from 2007-2023 are presented in Figure 5.7. The Bars indicate the average rainfall (in mm) for a given month, and the line plot shows the average days in the month where rainfall >0.25 mm occurred. The rainfall pattern from the station shows higher rainfall occurring in summer months. The highest number of days with rain also occur during this time. Minima occur in winter (July and August), which also represent the lowest number of days with rain.

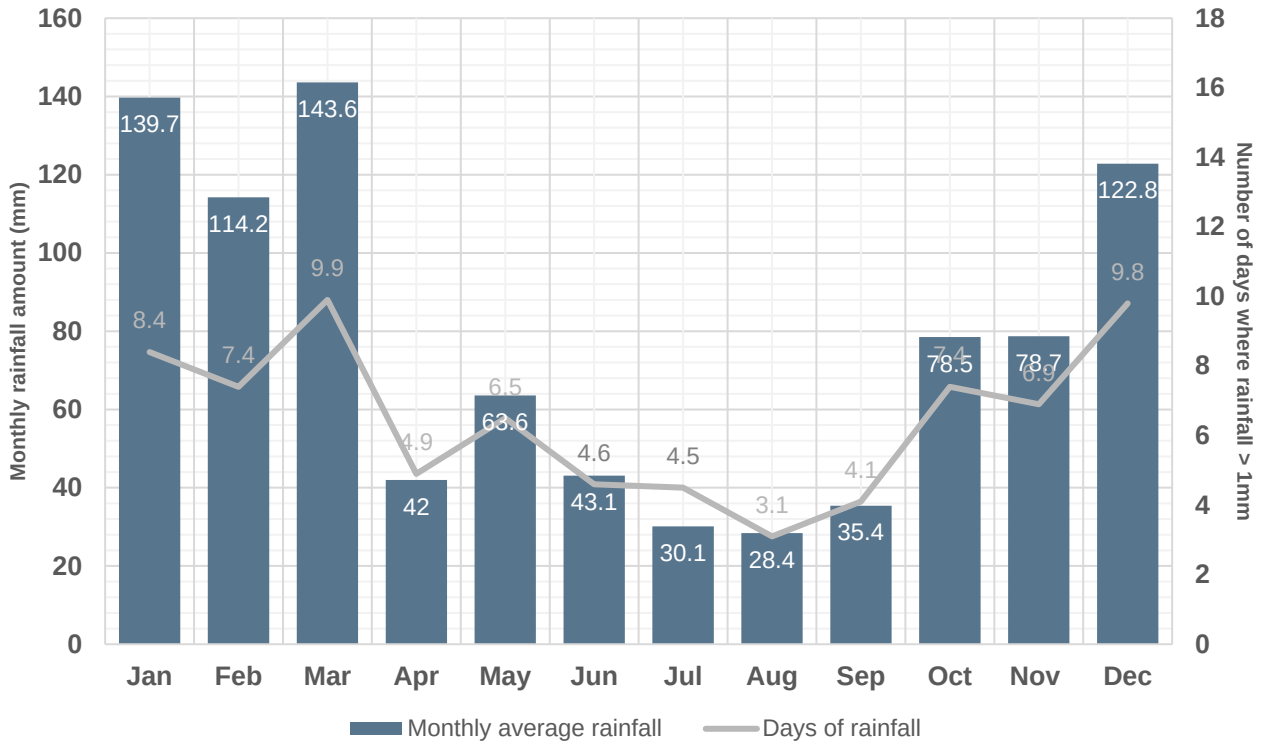



*Figure 5.7* *Monthly average rainfall (amount and days of rainfall) from Beaudesert Drumley Street BoM AWS (2007-2023)*

# 5.3 Background air quality

## 5.3.1 Background air quality data

DESI operates a network of air quality monitoring stations (AQMS) across QLD. The objectives of the network are to check compliance with ambient air quality guidelines and criteria, identify long-term trends in air quality, investigate local issues, and assess the effectiveness of air quality management strategies. The nearest station to the Project site is located in North Maclean, approximately 24.5 km north of the site and this commenced operating in February 2021.

In order to gain an understanding of the existing air quality conditions in the region. This assessment has only considered particulate matter for background air quality data, as particulate matter is the primary compound of concern in regard to non-odorous air quality impacts for the construction and operation of a composting facility. $PM_{10}$ and $PM_{2.5}$ have been used as an indicator of air quality, as they are typically the limiting pollutants when assessing dust impacts. The particulate matter observations from this station were obtained and reviewed, as summarised in Table 5.2.

*Table 5.2* *Summary of available background air quality recorded by the North Maclean DESI AQMS*

| Pollutant | Averaging period | Recorded background concentration by year (µg/m$^3$) | | |
|---|---|---|---|---|
| | | 2021 | 2022 | 2023 |
| $PM_{10}$ | Maximum 24-hour average | 49.4 | 29.7 | 25.4 |
| | 70$^{th}$ percentile, 24-hour | 16.6 | 15.1 | 20.7 |
| | Annual average | 14.7 | 13.3 | 19.7 |
| | Data capture | 90.7% | 99.6% | 82.2% |
| $PM_{2.5}$ | Maximum 24-hour average | 25.7 | 17.1 | 12.9 |

| Pollutant | Averaging period | Recorded background concentration by year (µg/m$^3$) | | |
|---|---|---|---|---|
| | | 2021 | 2022 | 2023 |
| | 70$^{th}$ percentile, 24-hour | 6.6 | 6.2 | 7.9 |
| | Annual average | 5.9 | 5.4 | 7.9 |
| | Data capture | 90.7% | 99.6% | 82.2% |

Average 24-hour particulate monitoring data for the period is presented in Figure 5.8. During the monitoring period, exceedance of $PM_{10}$ 24-hour criteria (the blue line) was observed once on 26/09/2023. Exceedances of $PM_{2.5}$ criteria are observed more frequently, occurring in March 2021, August 2023, March 2023 and December 2023.

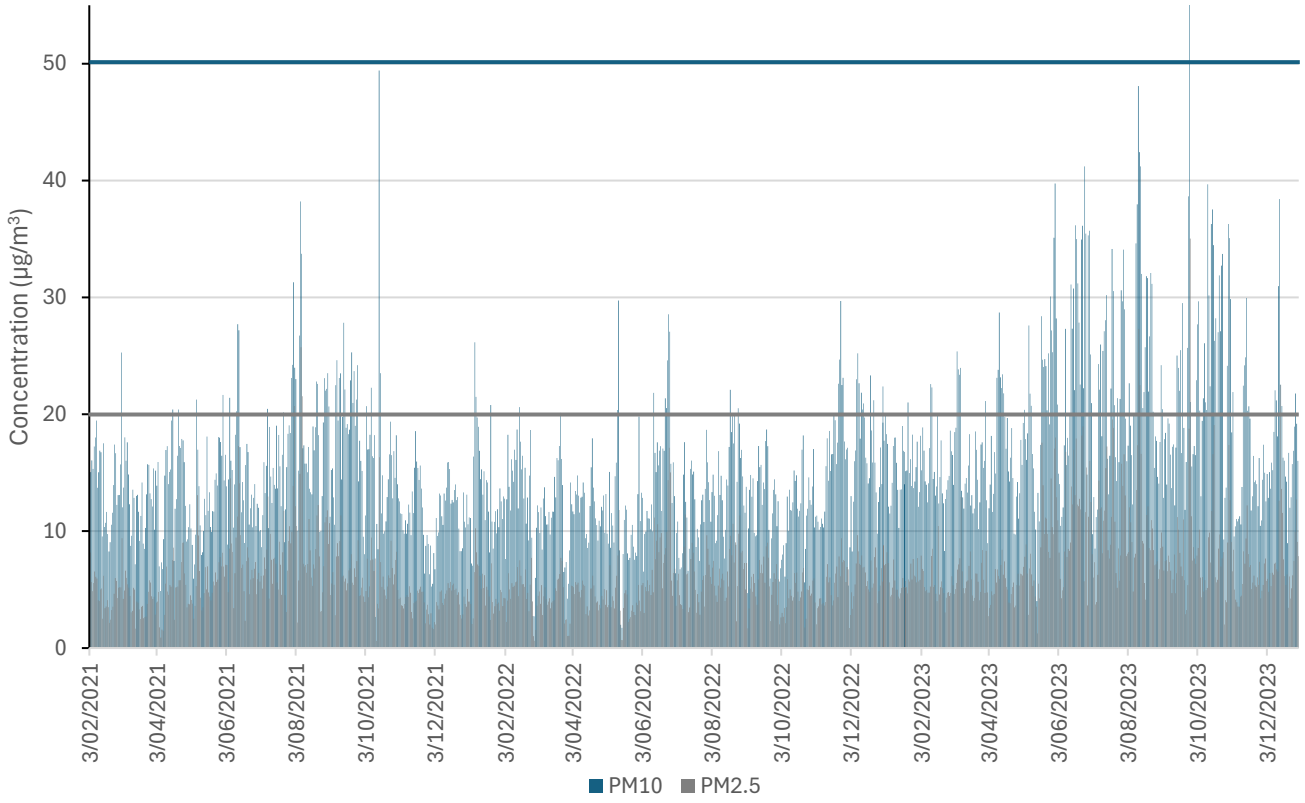



***Figure 5.8 Background air quality monitoring data collected from North Maclean DESI AQMS***

## 5.3.2 Facilities reporting to the NPI

The National Pollutant Inventory (NPI), operated under the *National Environment Protection (National Pollutant Inventory) Measure 1998*, provides publicly available information about emissions of 93 pollutants throughout Australia. Facilities that exceed prescribed threshold values are required to report their emissions to the NPI on a yearly basis.

A review of facilities reporting to the NPI in the area surrounding the Project sites revealed six facilities near the Project site (within approximately a 5 km radius). Facilities which reported emissions of particulate matter are described in Table 5.3 as these have potential to cause cumulative effects with emissions during construction and operation of the Project. Facilities which are considered likely to be a source of odour have also been included in the table.

*Table 5.3 Summary of facilities within 5 km of the site which reported emissions during the 2022-2023 NPI reporting period*

| Facility | Address | Approximate distance and direction from Project | Activity | Emitted pollutants |
|---|---|---|---|---|
| GELITA Australia | Sunny Hills, Flood Rd, Josephville, Beaudesert | 5 km south | Gelatine manufacture | PM and odour |
| Arranmore | 121 Amiens Road, Beaudesert | 4.5 km north | Meat chicken Facility | Odour |
| Bromelton Quarry Pty Ltd | 325 Sandy Creek Road, Bromelton | 2.4 km southeast | Alabaster mining | PM |
| Allans Creek Poultry Farm | 75 Tilley Road, Bromelton | 2.6 km northwest | Meat chicken farm | Odour |
| Scenic Rim Regional Council Waste Facility/Transfer Station | 43 Waste Facility Road, Bromelton | 0.9 km northeast | Biogas flaring | PM and odour |

### 5.3.3 Potential cumulative odour sources

The facilities which report to the NPI, as outlined in Section 5.3.3 which have the potential to contribute to cumulative odour impacts from the operation of the Bromelton Composting Facility, are the Arranmore and Allans Creek Poultry farms, Scenic Rim Regional Council Waste Facility/Transfer Station and GELITA Australia.

Bush's Proteins (A J Bush & Sons (Manufacturers) Pty Ltd) is located approximately 1.8 km southeast of site at 358 Sandy Creek Rd, Bromelton QLD 4285 Australia. Bush's Proteins does not report to the NPI. Bush's Proteins renders meat waste products in order to produce high protein tallows and oils. This process is likely to generate an odour impact, and as such there is potential for cumulative odour impacts, however it should be noted that it is likely the odour emissions from Bush Proteins will have a different odour character to those emitted from the Bromelton Composting Facility.

GHD and SOILCO met with staff from DETSI for a Teams meeting about the Project including the Information Request. DETSI advised additional odour survey should be undertaken to get a better appreciation of odour in the locality however did not advise of any history of odour complaints or ongoing odour issues in the area. Odour surveys were conducted onsite as described in Section 5.5.

Potential for cumulative impacts surrounding industry is discussed further in Section 7.3.1.

## 5.4 Site visit

GHD visited the proposed SOILCO site on 11 June 2024. The proposed site is located on elevated terrain with gullies each side and slopes down to the north towards Beaudesert Boonah Road, as shown in Figure 5.9. The site is currently vegetated with grass.

During the site visit GHD drove around the local area and observed the following in regard to odour:

– GHD observed the presence of odour whilst driving along Beaudesert Boonah Road including the entry of the SOILCO site. The source of the odour was likely Bush's Proteins. The odour had a character of cooked meat similar to odours observed from abattoir sites. Winds were blowing from the south at the time.
– GHD did not detect any odours from the poultry operations located off Tilley Road, Scenic Rim Regional Council Waste Facility/Transfer Station or near to GELITA Australia; however, GHD was unable to get downwind of those premises.
– Dust was observed from trucks leaving the Bromelton Quarry, as well as some track out onto Sandy Creek Road.
– The nearest receptors to the site were verified to be residential (R05, R06 and R11 as per Section 5.1).



*Figure 5.9 View looking north from the proposal site*

## 5.5 Odour survey

GHD attended site on 10 April 2025 to undertake a number of day and evening time odour surveys in the locality. This date was chosen due to the favourable conditions to capture worst-case odour impacts from existing industry in the area towards the nearest sensitive receptors to the Project.

Conditions on the day were clear, sunny with some cloud cover and constant light south and southeasterly winds. The survey detected odours from Bush's Proteins on the SOILCO site as well as at receptors R6 and R10. Odour when detected had a character generally defined as beef and cattle, cooking meat and dog food and the intensity ranged from not perceptible up to strong. More details of the odour survey are provided in Appendix D.

Importantly the odour characteristics detected during the survey were not like any odours that are often attributed to composting facilities which have a more earthy character and can often smell like bark, vegetation, cut grass, dirt and pine.

A key observation of the odour survey was that odours tended to increase when winds increased, and that is likely due to buoyant or elevated sources of odour at Bush's Proteins rather than ground-based sources.

# 6. Construction impact assessment

## 6.1 Construction dust risk assessment

Expected construction activities are defined in Section 1.1.

The generation of dust and particulate matter are the primary pollutants during the construction phase of the Project. A risk-based assessment in accordance with the IAQM guidance was undertaken to assess potential particulate impacts during the construction of the Project. The steps and thresholds used in the assessment are described below.

**Screening assessment**

The guidance states that assessment is only required where there is:

– A 'human receptor' within 250 m of the boundary of the site, or 50 m of the route(s) used by construction vehicles on the public highway up to 250 m from the site entrance.
– An 'ecological receptor' within 50 m of the boundary of the site, or 50 m of the route(s) used by construction vehicles on the public highway up to 250 m from the site entrance.

As there are no human or identified ecological receptors within these distances a detailed assessment is not required for this Project and a risk-based assessment has been undertaken. The activities expected to produce the largest dust emissions have been identified and mitigation measures provided to manage these emissions.

**Receptor sensitivity**

Receptor risk is generally identified for dust soiling impacts, human health impacts and ecological impacts. Dust soiling is defined in the IAQM as "the effect of deposited dust on surfaces, which can lead to annoyance."

Where all receptors are greater than 250m from the Project site then this would be a sensitivity of 'low'.

**Ecological receptor sensitivity**

Areas within and around the site are classified as core koala habitat and essential habitat for koalas. Signs of koala presence (scratches and scat) were observed near site (<20 metres from the site boundary) during the ecological survey undertaken by Redleaf Environmental (2021). It should be noted that the koala is not traditionally considered a dust sensitive species, and that the ecological assessment undertaken by GHD determined that impacts to koalas as a result of the proposed construction were unlikely. As such the ecological receptor sensitivity was considered as low.

**Dust emission magnitude**

The IAQM guidance provides example definitions for small, medium and large dust emissions magnitude for each stage of construction which have been adopted for this assessment. These are as follows:

– Earthworks: Total site area (small, medium and large thresholds of <18,000 $m^2$, 18,000-110,000 $m^2$, and >110,000 $m^2$ respectively), soil type, number of heavy earth moving vehicles, formation of bunds.
– Construction: Total building volume (small, medium and large thresholds of <12,000 $m^3$, 12,000-75,000 $m^3$ and >75,000 $m^3$ respectively), construction materials, presence of onsite concrete batching.
– Trackout: number of heavy duty vehicle (HDV) movements (small, medium and large thresholds of <20 HDV outward movements, 20-50 HDV outward movements, >50 HDV outward movements respectively), surface material, and length of unpaved road (small, medium and large thresholds of <50 m, 50-100 m, and >100 m respectively).

**Risk assessment**

The IAQM risk matrix uses the sensitivity and scale to determine the risk of dust impacts on the surrounding receptors.

A summary table of the assessment findings are presented in Table 6.1. Activities which generally are a significant source of dust are trucks travelling on unpaved roads, excavations associated with bulk earthworks, importing and spreading fill, and stockpiles.

*Table 6.1 Dust risk assessment of the construction stage*

| **Step 1: Screen the need for a detailed assessment** | | | |
|---|---|---|---|
| There are no residences within 250 metres of the proposed construction works. Under the IAQM methodology this means a low receptor sensitivity and a detailed assessment is not needed. Nonetheless, one has been undertaken | | | |
| **Step 2A: Define the potential dust emission magnitude** | | | |
| **Activity** | **IQAM works classification** | **Description of works** | **Dust emission magnitude** |
| Site establishment | Track out | Delivery of site amenities and surveying and pegging of site. | Medium |
| Earthworks | Earthworks | – Establishment of access road to work area<br>– Grading, excavation and general movement of earth materials. | Large |
| Roadworks and intersection works | Earthworks | – Removal of trees/ stripping of topsoil<br>– Box out to required levels<br>– Subgrade and base course<br>– Asphalting<br>– Line Marking<br>– Signage installation<br>Defect inspection and cleaning | Large |
| Civil works | Earthworks | – Demolition and earthworks<br>– Civil Works<br>Ponds and Other Civil Structures | Large |
| Mechanical installation | Construction | Installation of the following items:<br>– Shredder<br>– Drum screen<br>– Platforms<br>– Storage tanks/platforms<br>– Blowers<br>– Leachate system<br>– Water system<br>– Picking station<br>– Control system & instrument mech<br>– Odour control system<br>Interconnecting pipework | Medium |
| Electrical installation | Construction | Installation of the following items:<br>– Blowers<br>– Pumps<br>– Screens<br>– Motor control centre works<br>– Interconnecting cabling<br>Electrical Installation Complete | Medium |
| **Step 2B: Define the sensitivity of the area** | | | |
| There are no residences within 250 metres of the site. Thus, the sensitivity to impacts is low. | | | |
| **Step 2C Define the risk of impacts - Sensitive receptors** | | | |
| **Activity** | **IQAM works classification** | **Risk of dust impacts** | |
| Site establishment | Track out | Low risk | |
| Earthworks | Earthworks | Low risk | |

| | | |
|---|---|---|
| Roadworks and intersection works | Earthworks | Low risk |
| Civil works | Earthworks | Low risk |
| Mechanical installation | Construction | Low risk |
| Electrical installation | Construction | Low risk |
| **Step 2C Define the risk of impacts to sensitive receptors – Ecological receptors** | | |
| **Activity** | **IQAM works classification** | **Risk of dust impacts** |
| Site establishment | Track out | Low risk |
| Earthworks | Earthworks | Low risk |
| Roadworks and intersection works | Earthworks | Low risk |
| Civil works | Earthworks | Low risk |
| Mechanical installation | Construction | Low risk |
| Electrical installation | Construction | Low risk |

## 6.2 Additional analysis

Most high-speed winds (greater than 5 m/s) which contribute to dust lift off, occur from the south-southwest, meaning that most dust impacts would occur to the north-northeast (downwind). There are no identified sensitive receptors within direct proximity of the Project site and the nearest industrial receptors to the east-northeast is approximately 800 metres away, and the nearest residential receptor is approximately 1.1 km north of the site.

As such, no dust impacts are expected at surrounding receivers during construction works.

## 6.3 Mitigation measures

Although no impacts are expected due to construction, mitigation measures have still been proposed to avoid or minimise potential air quality impacts during construction and are provided in Section 7.5.

# 7. Operational assessment

## 7.1 Sources of odour

The Project description in Section 2 provides detail on how the facility will operate. Primary odour generating activities planned to be undertaken at the Bromelton Compost Manufacturing Facility include:

– Material processing (including receivals), shredding and sterilisation
– Open GO compost windrows
– Aerated static FOGO piles
– Maturation stockpiles
– Leachate ponds
– Manure stockpiles.

There may be some fugitive sources of odour from trucks entering and leaving the site however these are considered to be negligible. Key sources of odour and conservative operating assumptions as far as volumes onsite have been assumed when preparing the odour emissions inventory below.

## 7.2 Odour emissions

### 7.2.1 Odour emission rate review

GHD has undertaken a review of similar FOGO and GO composting facilities and assessments in order to identify representative odour emission rates for assessing the proposed facility. Odour emission rates will vary based on many factors including odour sampling methodology, the composition of waste, age of waste, time of day the sampling is undertaken and season. It is generally considered good practice to take a range of odour samples to capture any variations in odour. As part of the review GHD reviewed the following odour assessment reports:

– SOILCO Wogamia Composting and Manufacturing Facility (CMF) Odour and Dust Assessment (ERM, 2020)
– Remondis Australia Awaba AWT Facility Odour Impact Assessment (GHD, 2016)
– SITA Brooklyn, Report for Green waste Composting Facility, Baseline Odour Impact Survey (GHD, 2009)
– Odour Audit: Lucas Heights Waste & Recycling Centre (Holmes Air Sciences, 2006)
– Odour Impact Assessment for the Proposed Food plus Garden Organics (FGO) Composting Operations at the Bucketts Way Resource Recovery Facility (UNSW, 2012)
– Odour assessment of the proposed composting process at the ANL Premises, Lilydale (URS, 2008)
– Odour Survey Lucas Heights Resource Recovery Park, (Ektimo, 2014).
– Odour Monitoring and dispersion modelling study for Tunnel Tech North Ltd, Newington, South Yorkshire (Odournet, 2012)

In selecting representative odour emission rates, GHD has adopted a precautionary principal and been conservative. Whilst the SOILCO composting facility at Wogamia would reflect the best practice process and odour controls anticipated at Project, there may be variations in feedstock and climate which would change the odour profile from the Project site. It is noted that SOILCO successfully manage odour at Wogamia with a layer of applied bio cover to the top of compost piles which effectively reduces odour however this approach is not yet confirmed for the Project.

### 7.2.2 Odour emissions inventory

Key considerations used to develop the odour emissions inventory are:

– Shredding, turning and aeration of leachate ponds which temporarily increase the odour profile only occur during daytime hours.

- Leachate ponds in either an aerated or quiescent state were modelled as identical overlapping area sources. Quiescent ponds were modelled as active sources 24 hours per day, whereas aerated ponds were active only 4 hours per day.

– It has been conservatively assumed in the model that turning of windrows occurs every day and that 25% of both the FOGO composting and GO composting areas gets turned at a time. Turning of windrows is assumed to increase odour by 100%.

– The modelled surface area in Table 7.1 is based on calculated windrow surface areas and may not match the designated areas provided in the site plan.

– As per Section 2.2.3 the material throughputs received at the site are seasonal.

– Other assumptions on how Specific Odour Emission Rate's (SOER's) were developed for each source are provided in Appendix C-2.

The odour emissions inventory for the Project is presented in Table 7.1 and the modelled locations are provided in B-2 More details of the emissions inventory are provided in Appendix C.

***Table 7.1 Odour emissions inventory***

| Source | Source type | Modelled SOER (OUV/m$^2$/s) | | Odour emission rate (OU/s) | | Hours per day source is active |
|---|---|---|---|---|---|---|
| Maturation and Storage - Open Windrows (Food and Garden Organics) (Area A) | Area | | 0.6 | | 9,398 | 24 |
| Aerated static pad emissions (Area B) | Area | Passive: | 1.5 | Passive: | 12,948 | 18 |
| | | Windrow turning: | 2 | Windrow turning: | 13,911 | 6 |
| Decontamination/ material processing (Area C) | Volume | | N/A | | 4,080 | 24 |
| Shredding and screening of organic material (Area C)* | Volume | | N/A | | 5,740 | 6 |
| Composting Facility - Open Windrows - Garden Organics (Area D) | Area | Passive: | 1.2 | Passive: | 21,641 | 18 |
| | | Windrow turning: | 1.6 | Windrow turning: | 24,085 | 6 |
| Leachate pond GO | Area | Quiescent: | 0.2 | Quiescent: | 897 | 20 |
| | | Aerated: | 1.2 | Aerated: | 6,881 | 4 |
| Leachate pond FOGO | Area | Quiescent: | 0.2 | Quiescent: | 515 | 20 |
| | | Aerated: | 1.2 | Aerated: | 3,945 | 4 |
| Leachate pond manufacturing | Area | Quiescent: | 0.2 | Quiescent: | 1,006 | 20 |
| | | Aerated: | 1.2 | Aerated: | 7,709 | 4 |
| Manure stockpile | Area | | 2.1 | | 429 | 24 |
| **Total odour emission rate (total adjusted for duration) (OU/s)** | | | | | **50,793** | |

GHD has undertaken additional comparative analysis of the total site odour emissions using the adopted SOERs compared to using measured odour data at the SOILCO Wogamia site. Analysis shows that the total OER in Table 7.1 is about 43% more than if data from SOILCO Wogamia was used, demonstrating the conservatism in the assessment.

## 7.3 Impact assessment

Data from the site odour emissions inventory was used in dispersion modelling to predict the 99.5$^{th}$ percentile odour impacts over the one year modelling period. Dispersion modelling assumes a range of meteorological conditions over the year and conservatively assumes the odour emissions are constant.

Results of odour dispersion modelling and assessment at sensitive receptors are provided below in Table 7.2 and Figure 7.1. Results show that predicted odour from the Project comply with the 2.5 OU criteria at all sensitive receptors.

*Table 7.2 Predicted 99.5$^{th}$ percentile 1 hour average odour impacts at sensitive receptors*

| Receptor ID | Receptor type | Address | Predicted odour concentration at receptor |
|---|---|---|---|
| R01 | Industrial | Beaudesert Saleyards, State Route 90 | 3.9 |
| R02 | Industrial | Quickcell Technology Products Pty Ltd, LOT 3 Beaudesert Boonah Rd | 2.4 |
| R03 | Industrial | SCT Logistics, 2603 Beaudesert Boonah Rd | 2.3 |
| R04 | Industrial | Scenic Rim Regional Council Waste Facility/Transfer Station – Beaudesert, Waste Facility Rd | 1.3 |
| R05 | Residential | 388 Swan Gully Road Bromelton QLD 4285 Australia | 0.4 |
| R06 | Residential | 2572 Beaudesert - Boonah Road | 1.3 |
| R07 | Industrial | 28 Swan Gully Road | 0.7 |
| R08 | Industrial | Bush's Proteins QLD (A J Bush & Sons (Manufactures) Pty Ltd), 358 Sandy Creek Rd | 0.6 |
| R09 | Industrial | 194 Swan Gully Road | 1 |
| R10 | Residential | 15 Tilley Rd | 1.2 |

The highest predicted 99.5$^{th}$ percentile odour impact is 3.9 OU at the industrial receptor R01, which is located to the northeast of the site as seen in Figure 7.1. This receptor is industrial and a source of odour and therefore not considered sensitive for the purpose of this assessment. The highest predicted odour concentration at a residential receptor is at R06, with a predicted odour concentration of 1.3, which is below the odour criteria of 2.5 OU.

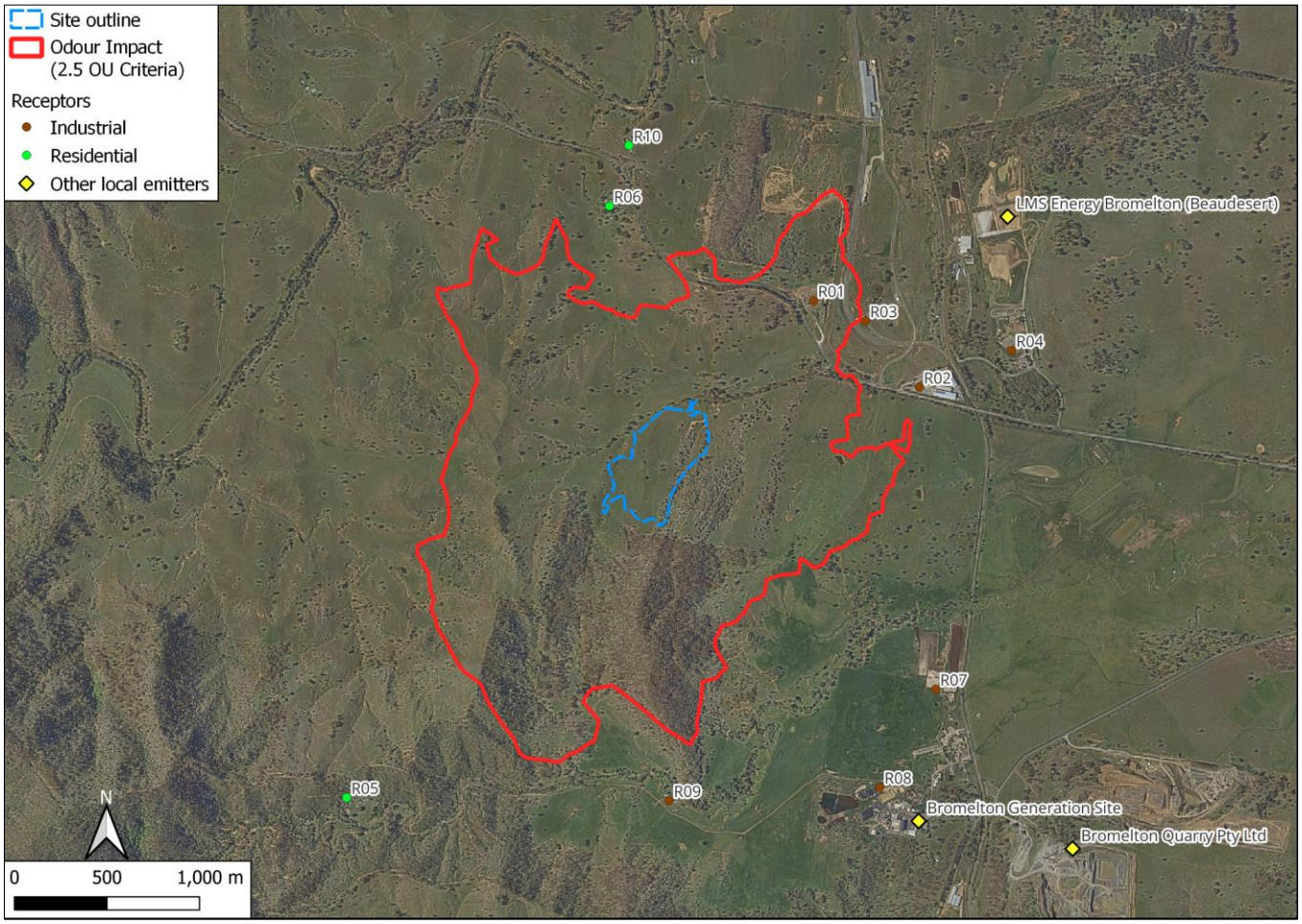



*Figure 7.1* ***Predicted 99.5th percentile odour impact from the Project***

## 7.3.1 Cumulative odour impacts

Cumulative odour impacts can occur when facilities of similar odour character result in increased odour occurring at the same time. This would generally only occur when the two similar odour sources are close to each other of if there is a receptor downwind from both. Based on the review of other sources of potential odour in the area undertaken in Section 5.3.3, other sources with potential for similar odours associated with composting is Scenic Rim Regional Council Waste Facility/Transfer Station. Inspection of satellite images of the site shows composting of organic material, as well as stock piling of general refuse. There is potential for odours of a similar character to combine with those from Bromelton Compost Manufacturing Facility. Based on the location of Scenic Rim Regional Council Waste Facility/Transfer Station and sensitive receptors, it is unlikely that downwind odour impacts from both facilities would lead to elevated odour at any common downwind receptors. This is due to relative location of receptors to each facility not providing an angle from which odour plumes from neighbouring emitters are likely to combine and contribute to cumulative impacts.

The main source of odour in the local area, Bush's Proteins has a distinct odour character associated with rendering and is not similar to the odour character experienced from composting. Cumulative odour impacts are therefore not likely due to the Project.

A review has also been undertaken of all identified odour sources within 2 km of the Project site and the location of sensitive receptors to determine if it would be likely that odour plumes from multiple facilities could lead to cumulative odours. No receptors were identified on the downwind direction of the Scenic Rim Regional Council Waste Facility or chicken meat farms where cumulative odour impacts with the project are likely to occur. The significant distance from the project site to receptors and other identified odour sources reduces the risk of odour impacts and cumulative odour impacts occurring.

Odour surveys described in 5.5 were undertaken taken during light southeasterly winds. No odours with a character similar to composting were detected at the nearest sensitive receptors to the Project, including R6.

The Project site and the nearest sensitive receptor (R6) are located on much higher ground than other sources of odour identified above including Bush's Proteins. Odour from Bush's Proteins is more likely to be confined to the lower lying areas including draining line surrounding the facility and to the north, south and west of the site however it is noted Bush's Proteins have some elevated and buoyant plumes which may disperse differently to ground based odour sources. It is recommended that DETSI work with Bush's Proteins to help reduce any problematic odours in the locality however it is noted that the odour character from Bush's Proteins and the Project are not alike and not considered cumulative.

The site based CALMET wind rose presented in A-3 demonstrates very little light winds from the southeast with most of the light calm winds coming from the western quadrants of the wind rose.

## 7.4 Operational dust impact

There is some potential for dust emissions during the operation of the Bromelton Compost Manufacturing Facility. Most dust would be from trucks and other vehicles travelling on unpaved roads and other sources associated with material handling onsite, wind erosion from unsealed surfaces and stockpiles, unloading and turning compost stockpiles and product screening. As discussed in Section 4, atmospheric dispersion modelling was not undertaken of operational dust impacts due to the low risk for offsite impacts and the proposed management measures which can readily control dust emissions.

Existing sources of dust in the area would be attributable to the industry described in Section 5.3, with the two quarries likely contributing to most of the local particulate load.

Material receivals and composting material have high moisture content, and this will be managed throughout the process to have an optimal moisture content for the production of compost, which reduces the potential for dust generation.

Dust emissions from unpaved access and site roads, as well as all composting operations are readily managed with application of watering and proactive dust controls. Watering would also apply to any soil and VENM stockpiles as required.

Given the distance from the site to receptors (minimum of 1,100 m to the nearest residential receptor) and the outcomes of the construction assessment, the risk of dust impacts from the site are low.

A review of the wind pattern of the site in Section 5.2.1 also shows that residential receptors are not located in the direction of the prevailing wind directions.

Management measures to reduce the risk of dust impacts from the development are outlined in Section 7.5.

## 7.5 Management and mitigation measures

Odour from the Project is not predicted to impact any surrounding sensitive receptors. Mitigation measures provided below will be incorporated at the site to minimise odour generated by the Project.

General air quality mitigation and management measures for construction and operation of the Project are provided below in Table 7.3.

*Table 7.3 Mitigation measures – air quality*

| No. | Outcome | Mitigation measure | Timing |
|---|---|---|---|
| AQ1 | Dust emissions are minimised during construction. | Prepare a construction dust control protocol that details management measures, a method for recording dust complaints, and monitoring requirements. | Pre-construction |
| AQ2 | Dust emissions are minimised during construction. | On days with forecast and actual high winds (i.e., over 10 m/s), reduce work effort accordingly if wind-blown dust is observed to be leaving the site boundary. | Construction |
| AQ3 | Dust emissions are minimised during construction and operation | Undertake dust suppression, as required, using water sprays, water extension agents, soil stabilising polymers or other media on:<br>– Unpaved work areas subject to traffic or wind.<br>– Spoil and aggregate stockpiles.<br>– Sand and soil stockpiles<br>– During the loading and unloading of dust generating materials.<br>– Unpaved access tracks. | Construction and operation |
| AQ4 | Dust emissions are minimised during construction. | If the works are creating levels of dust which may significantly impact on public amenity, modify or stop the works until the dust hazard is reduced to an acceptable level. | Construction |
| AQ5 | Dust emissions are minimised during construction. | Stockpile turning will be suspended during periods of high wind. | Construction |
| AQ6 | Ignition risk, spills, and air emissions are minimised during construction and operation. | Maintain plant and equipment in good condition to minimise ignition risk of fuel or chemicals, spills, and air emissions that may cause nuisance. | Construction and operation |
| AQ7 | Odour emissions are minimised during operation | Establish an onsite meteorological station to inform operational activities and identify odour sources in the event of a complaint. | Operation |
| AQ8 | Odour emissions are minimised during operation | Mixing putrescible feedstock materials immediately into the compost process, if not pre-treated or dried | Operation |
| AQ9 | Odour emissions are minimised during operation | Implementing a management strategy for turning open windrows to prevent anaerobic conditions which is determined by an experienced operator through site trials and measurements | Operation |
| AQ10 | Odour emissions are minimised during operation | Minimising turning events for open windrows, especially during the first 7-10 days of composting, with only the minimum turning required to support pasteurisation and moisture redistribution | Operation |
| AQ11 | Odour emissions are minimised during operation | Install and operate as needed an aerator in the leachate pond to reduce the odour potential from the stored leachate. Leachate is expected to be aerated 4 hours per day. | Operation |
| AQ12 | Odour emissions are minimised during operation | Scheduling activities for times when they will have least impact (e.g. avoid undertaking odour-generating activities such as turning windrows of compost at times when it is | Operation |

| No. | Outcome | Mitigation measure | Timing |
|---|---|---|---|
| | | windy, and the odour might carry to a sensitive or commercial place. | |
| AQ13 | Odour emissions are minimised during operation | If site activities are emitting odour at concentrations which are observed offsite, the odour generating activities should be modified or stopped until the odour is reduced to an acceptable level. | Operation |
| AQ14 | Odour emissions are minimised during operation | Train staff (internal and contractors) on odour management strategy and all relevant procedures. | Operation |
| AQ15 | Odour emissions are minimised during operation | An Odour Management Plan to be developed prior to the activity commencing which includes:<br>a) Identification of all odour sources, and potential odour sources at the site, including odours and potential odours generated from the activity; and<br>b) A requirement that odour investigations be completed by an appropriately qualified person; and<br>c) An analysis of routine and non-routine processes and operating conditions that could result in, and potentially result in, odour emissions; and<br>d) Measures to avoid the generation and minimise the impacts of odours; and<br>e) At a minimum, annual reviews of the effectiveness of the measures. | Operation |
| AQ16 | Odour emissions are minimised during operation | Upon receipt of a verified odour complaint, engage a suitable experienced odour professional to conduct odour surveillance (odour surveys) to determine the extent of odour from the site and investigate what site activities led to elevated odour. | Operation |
| AQ17 | Particulate matter emissions are minimised during operation | If compost windrows are dry enough to be a source of elevated dust, then water sprays should be applied before and during turning to limit dust. This can be confirmed with visual inspections and visible dust plumes should not be seen leaving the project footprint. | Operation |

# 8. Conclusion

The Project seeks to operate a composting facility at 260 Mitchell Road, Lot 4, Bromelton, Queensland. An air quality assessment has been undertaken for the development, which includes processing of approximately 250,000 tonnes per annum of garden organics and food organics and garden organics.

A qualitative assessment of the air quality impacts from construction of the Project was undertaken in accordance with the *Guidance on the assessment of dust from demolition and construction* (Institute of Air Quality Management, 2024). This took into account the sensitivity of the sensitive receptors surrounding the site, and the potential dust emission magnitude from earthworks, construction and trackout. Risk of dust impacts was found to be low risk for dust soiling, human health and ecological impacts.

A qualitative assessment of dust impacts during operation was also undertaken and it was determined that dust impacts from the operation of the composting facility will be low. Atmospheric dispersion modelling was not undertaken of operational dust impacts due to the low risk for offsite impacts and the proposed management measures which can readily control dust emissions.

A review was undertaken of similar operating FOGO and GO composting facilities in Australia in order to identify representative odour emission rates for assessing the proposed facility. Based on this review, GHD prepared a conservative odour emissions inventory for use in dispersion modelling. Based on odour sampling at a similar SOILCO facility the odour emission rates used in the assessment of this Project are 43% higher than what is anticipated during actual site operations.

Dispersion modelling was undertaken to estimate the impacts of odour emissions for the operational stage of the Project in accordance with the *Odour impact assessment from developments guideline* (Department of Environment and Heritage Protection, 2014). Results of the dispersion modelling predicted that odour concentrations comply with the QLD 99.5$^{th}$ percentile odour criterion of 2.5 OU at all sensitive receptors. The maximum predicted odour concentration at a residential receptor is 1.3 OU and the maximum predicted at an industrial receptor (R01) is 3.9 OU.

Based on the findings of this assessment, air quality impacts from the proposed composting facility at 260 Mitchell Road, Lot 4, Bromelton Queensland are not expected to cause significant environmental impacts and are predicted to comply with the assessed air quality criteria at all nearby (within 2 km of site) sensitive receptors.

# Appendix A

## Meteorological modelling methodology

# A-1 Overview

Local meteorology, including long term wind speed and direction as well as atmospheric stability, can influence how pollutants are dispersed into the local environment.

This appendix outlines the methodology used to synthesise site-representative meteorology for the Project. The meteorology is used in CALPUFF to drive the dispersion model.

# A-2 Methodology

The meteorology modelling methodology is summarised below:

– Selection of a model period.
– Development of coarsely gridded prognostic meteorological data set using The Air Pollution Model (TAPM).
– Development of fine gridded meteorological data set which takes in account local terrain features using the CALMET diagnostic meteorological model.
– Extraction of predicted meteorological parameters from the CALMET model.

## A-2-1 Nearby BoM station review

The nearest BoM station is the Beaudesert Drumley Street AWS (040983). It is located approximately 6.9 km east of the site. This station began operation in 2007 and collects all desired meteorological parameters except for cloud data. Cloud data was unavailable for this site, as such cloud data has been simulated using TAPM.

## A-2-2 Representative year selection

Climate data was averaged over five years. Data sets were then compared against the mean plots and the standard deviation from the mean was used to determine which year was most similar to the average. 2021 was determined to have data which most closely adhered to the average data. Furthermore, no significant storms or climactic events occurred in the vicinity during the year of 2021. As such 2021 was determined to be the most representative year used for modelling.

## A-2-3 Prognostic meteorology

TAPM was run with observations from the Beaudesert AWS assimilated to improve model performance. The parameters for the prognostic model TAPM are summarised in Table A.1.

***Table A.1 TAPM parameters***

| Parameter | Value |
|---|---|
| Modelled period | 01 January 2021 to 31 December 2021 |
| Domain centre | UTM zone 56S<br>Easting: 495,083_m<br>Northing: 6,905,566m |
| Number of grid points | 25 x 25 |
| Number of grids (spacing) | 4 (30 km, 10 km, 3 km, 1 km) |
| Number of vertical levels | 25 |
| Data assimilation | Beaudesert Drumley Street AWS |
| Radius of influence | 8 km |

# A-3 CALMET modelling

CALMET (Version 7) was used to resolve the wind field around the subject site to 100 metres spatial resolution. The application of CALMET for this purpose is an approved modelling approach in NSW as per the Approved Methods with model guidance documentation provided.

CALMET was run in no-observations (no-obs) mode using gridded prognostic data generated by TAPM as an initial guess field. This approach is consistent with guidance documentation.

Model settings were selected with consideration to the recommendations provided in the Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia (J Barclay and J Scire, Atmospheric Studies Group TRC Environmental Corporation, 2011) and the Department of Environment and Heritage Protection.

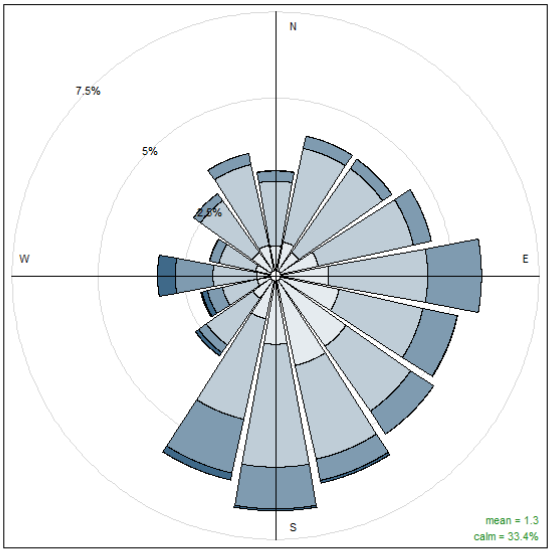
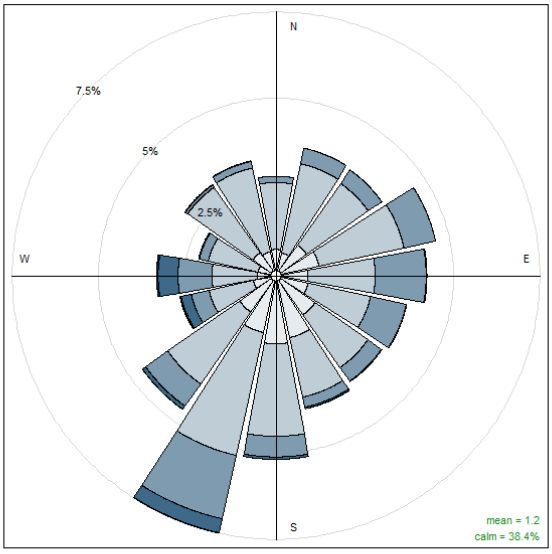
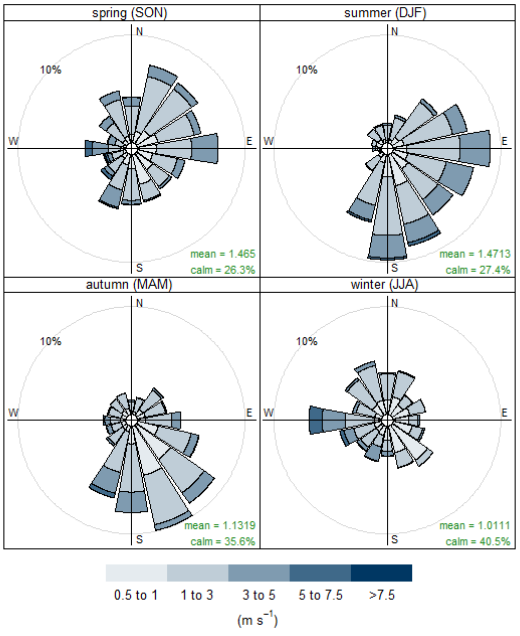
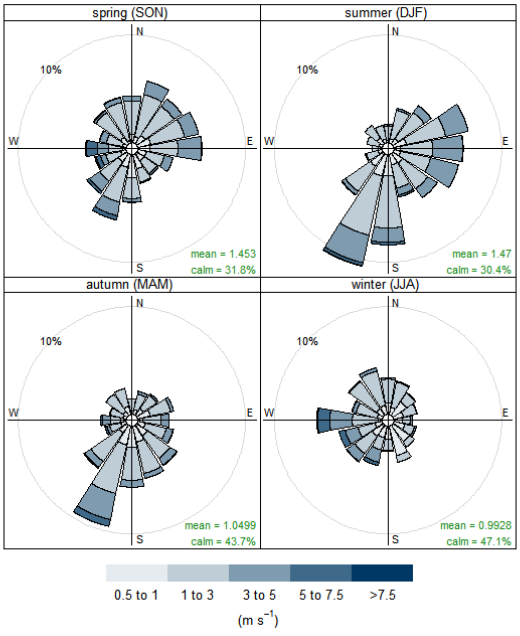
The CALMET model parameters are summarised in Table A.2. The TERRAD value was selected based on the 'base to peak' value of the terrain elevations in the immediate vicinity of the subject site.

Terrain and land use data used for the CALMET modelling are presented in Figures A.6 and A.7 respectively.

***Table A.2 Summary of CALMET model parameters***

| Parameter | Value |
|---|---|
| Modelled period | 1 January 2021 to 31 December 2021 |
| Mode | 'No-obs' |
| Initial guess field | TAPM .m3d file |
| UTM zone | 56S |
| Domain origin (Southwest corner) | Easting: 486,500 m<br>Northing: 6,897,000 m |
| Domain size | 180 x 180 at 0.1 km resolution<br>(18.0 km x 18.0 km) |
| Vertical resolution (cell heights) | 10 (0, 20, 40, 80, 160, 320, 640, 1200, 2000, 3000, 4000) |
| TERRAD | 2 km |
| IEXTRP | 1 |
| BIAS (NZ) | 0 × 10 |
| R1 and R2 | 0, 0 |
| RMAX1 and RMAX2 | 0, 0 |

Figure A.1 presents a comparison between the CALMET-generated data and the Beaudesert Drumley Street AWS observation. The annual, seasonal and diurnal wind roses show generally good agreement, providing confidence in the suitability of the modelled meteorological conditions used in this assessment.

| CALMET | Observations |
| --- | --- |
|  **Frequency of counts by wind direction (%)** |  **Frequency of counts by wind direction (%)** |
|  **Frequency of counts by wind direction (%)** |  **Frequency of counts by wind direction (%)** |

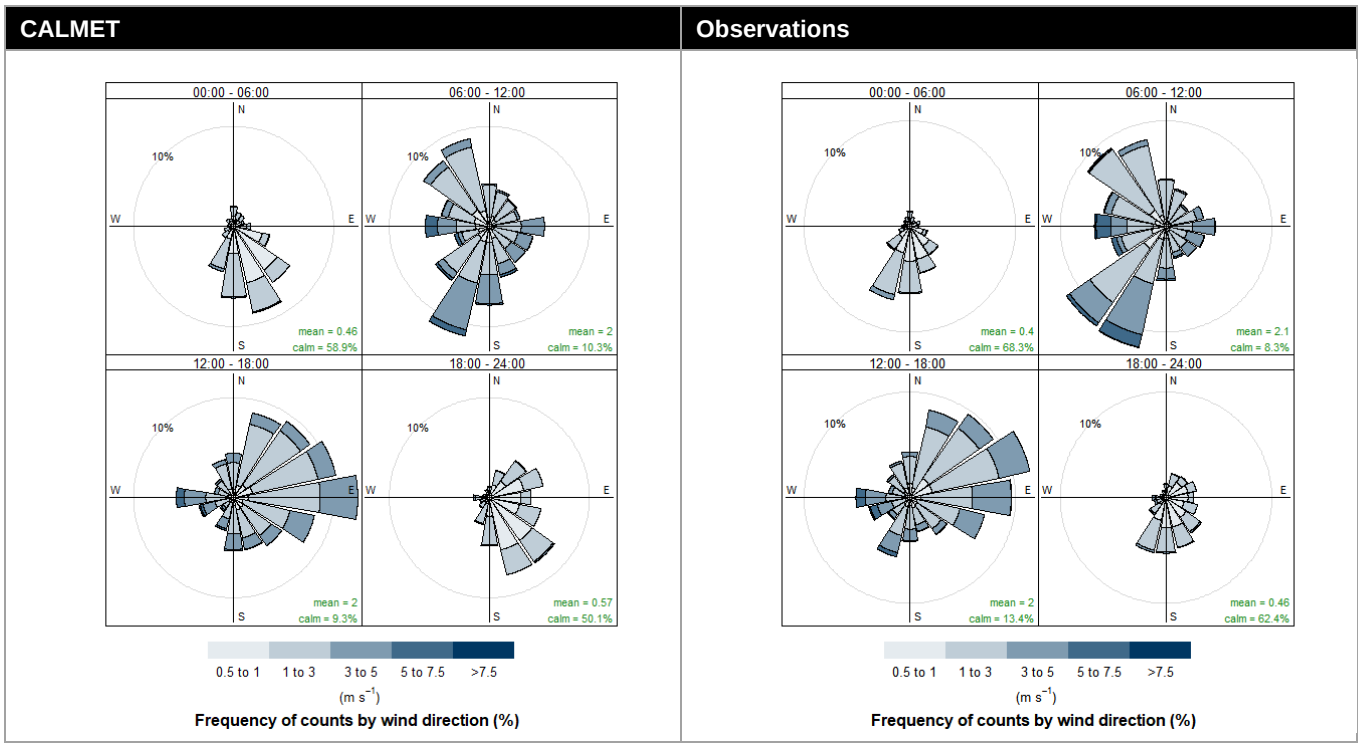



*Figure A.1 Modelled and observed wind data at Beaudesert Drumley Street AWS (2021)*

A detailed analysis of the CALMET generated meteorological dataset including wind speed and stability class, mixing height, and temperature at the Project site is presented below.

Figure A.2 shows the diurnal variation in both maximum and average mixing heights predicted by CALMET at the site during 2021. The diurnal mixing height profile is typical — starting low in the early morning due to stable conditions and surface inversions, rising rapidly after sunrise with surface heating, peaking in the mid to late afternoon, and decreasing again after sunset as cooling re-establishes stable conditions overnight.

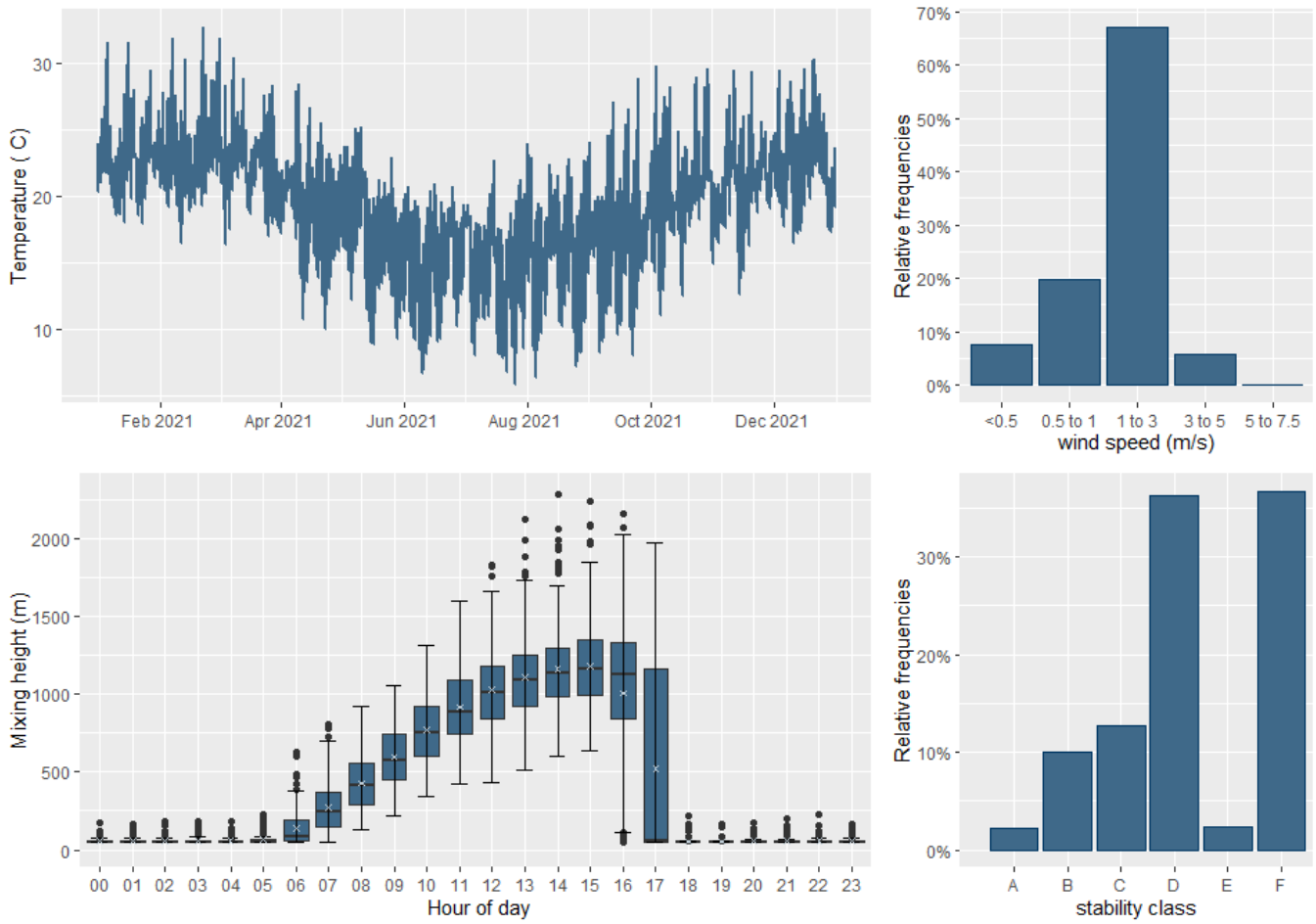



*Figure A.2* ***Predicted temperature, mixing height, wind speed and stability class frequency at the Project (2021)***

The wind rose for the entire data period taken at the Project site is shown in Figure A.3 and shows the following features:

- The predominant annual average wind directions are from the south-southwest and from the south.
- The average wind speed predicted was 1.5 m/s.
- Calm conditions (wind speeds less than 0.5 m/s) occurred 7.3% of the time.
- High wind speeds (winds greater than 5 m/s) which are often attributed to dust lift off mostly occur from the southeast and west.

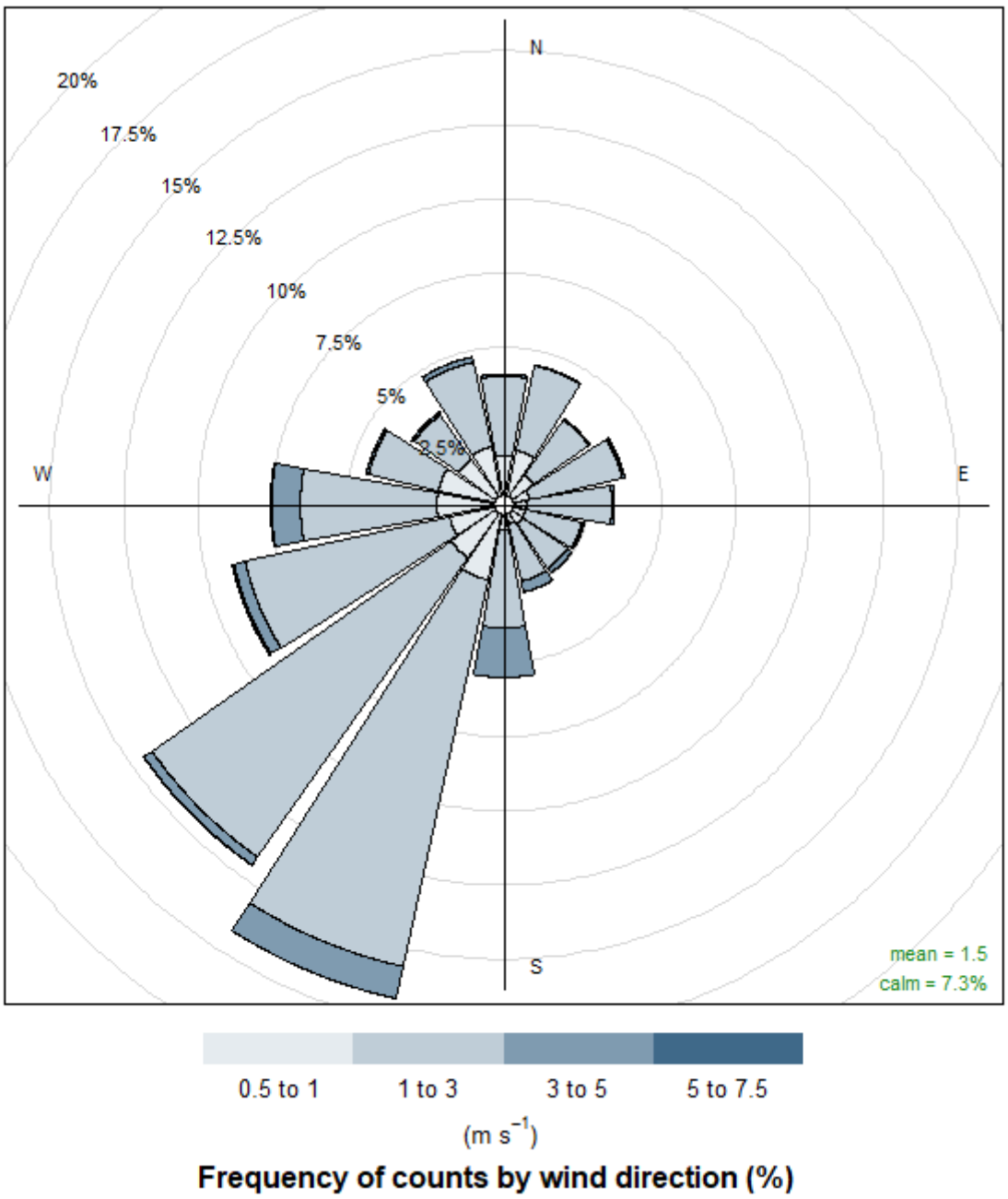



*Figure A.34 Wind rose at the Project from CALMET (2021)*

# Appendix B

## Dispersion Modelling Methodology

# B-1 CALPUFF modelling

CALPUFF(Version 7) was used to calculate odour dispersion around the subject site to 100 metres spatial resolution. The application of CALPUFF for this purpose is an approved modelling approach in NSW as per the Approved Methods with model guidance documentation provided.

Model settings were selected with consideration to the recommendations provided in the Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia (J Barclay and J Scire, Atmospheric Studies Group TRC Environmental Corporation, 2011) and the Department of Environment and Heritage Protection.

The technical CALPUFF model parameters are summarised in Table B.2.

| Parameter | Description | Value |
|---|---|---|
| MGAUSS | Near field vertical distribution (0 = uniform, 1 = Gaussian) | 1 |
| MCTADJ | Terrain adjustment method (0 = none, 1 = ISC-type, 2 = CALPUFF-type, 3 = partial plume path) | 3 |
| MCTSG | Model subgrid-scale complex terrain? (0 = no, 1 = yes) | 0 |
| MSLUG | Near-field puffs modelled as elongated slugs? (0 = no, 1 = yes) | 0 |
| MTRANS | Model transitional plume rise? (0 = no, 1 = yes) | 1 |
| MTIP | Apply stack tip downwash to point sources? (0 = no, 1 = yes) | 1 |
| MRISE | Plume rise module for point sources (1 = Briggs, 2 = numerical) | 1 |
| MTIP_FL | Apply stack tip downwash to flare sources? (0 = no, 1 = yes) | 0 |
| MRISE_FL | Plume rise module for flare sources (1 = Briggs, 2 = numerical) | 2 |
| MBDW | Building downwash method (1 = ISC, 2 = PRIME) | 1 |
| MSHEAR | Treat vertical wind shear? (0 = no, 1 = yes) | 0 |
| MSPLIT | Puff splitting allowed? (0 = no, 1 = yes) | 0 |
| MCHEM | Chemical transformation method (0 = not modelled, 1 = MESOPUFF II, 2 = User-specified, 3 = RIVAD/ARM3, 4 = MESOPUFF II for OH, 5 = half-life, 6 = RIVAD w/ISORROPIA, 7 = RIVAD w/ISORROPIA CalTech SOA) | 0 |
| MAQCHEM | Model aqueous phase transformation? (0 = no, 1 = yes) | 0 |
| MLWC | Liquid water content flag | 1 |
| MWET | Model wet removal? (0 = no, 1 = yes) | 0 |
| MDRY | Model dry deposition? (0 = no, 1 = yes) | 0 |
| MTILT | Model gravitational settling (plume tilt)? (0 = no, 1 = yes) | 0 |
| MDISP | Dispersion coefficient calculation method (1= PROFILE.DAT, 2 = Internally, 3 = PG/MP, 4 = MESOPUFF II, 5 = CTDM) | 2 |
| MTURBVW | Turbulence characterization method (only if MDISP = 1 or 5) | 3 |
| MDISP2 | Missing dispersion coefficients method (only if MDISP = 1 or 5) | 3 |
| MTAULY | Sigma-y Lagrangian timescale method | 0 |
| MTAUADV | Advective-decay timescale for turbulence (seconds) | 0 |
| MCTURB | Turbulence method (1 = CALPUFF, 2 = AERMOD) | 1 |
| MROUGH | PG sigma-y and sigma-z surface roughness adjustment? (0 = no, 1 = yes) | 0 |
| MPARTL | Model partial plume penetration for point sources? (0 = no, 1 = yes) | 1 |
| MPARTLBA | Model partial plume penetration for buoyant area sources? (0 = no, 1 = yes) | 0 |

| Parameter | Description | Value |
|---|---|---|
| MTINV | Strength of temperature inversion provided in PROFILE.DAT? (0 = no - compute from default gradients, 1 = yes) | 0 |
| MPDF | PDF used for dispersion under convective conditions? (0 = no, 1 = yes) | 1 |
| MSGTIBL | Sub-grid TIBL module for shoreline? (0 = no, 1 = yes) | 0 |
| MBCON | Boundary conditions modelled? (0 = no, 1 = use BCON.DAT, 2 = use CONC.DAT) | 0 |
| MSOURCE | Save individual source contributions? (0 = no, 1 = yes) | 0 |
| MFOG | Enable FOG model output? (0 = no, 1 = yes - PLUME mode, 2 = yes - RECEPTOR mode) | 0 |

# B-2 CALPUFF Sources

Source details are provided in table B.3 below. Location of modelled sources are provided in figure B.1

***Table B.1 Source details***

| Description | Type | Base_Elev (m) [m] | Height (m) [m] | SigmaY (m) | SigmaZ (m) |
|---|---|---|---|---|---|
| Composting Facility - Open Windrows - Garden Organics (Area D) | AREA_POLY | 134.5 | 1 | N/A | 1.5 |
| Leachate pond GO Quiescent | AREA_POLY | 123.71 | 0 | N/A | 0.5 |
| Leachate ponds FOGO quiescent | AREA_POLY | 115.3 | 0 | N/A | 0.5 |
| Maturation and Storage - Open Windrows (Food Organics) (Area A) | AREA_POLY | 117.38 | 1 | N/A | 2 |
| Aerated static pad emissions (Area B) | AREA_POLY | 123.6 | 2 | 9.3 | 2.3 |
| Composting Facility - Open Windrows - Garden Organics - Windrow Turning Factor (Area D) | AREA_POLY | 134.46 | 2 | N/A | 2.5 |
| Aerated static pad windrow turning emissions (Area B) | AREA_POLY | 123.6 | 2 | N/A | 2.5 |
| Shredding of organic material (Area C) | VOLUME | 125.2 | 2 | N/A | 2.5 |
| Leachate GO - Aerated 4 hours a day | AREA_POLY | 123.71 | 0 | 2.5 | 0.5 |
| Leachate FOGO Aerated 4 hours a day | AREA_POLY | 115.81 | 0 | N/A | 0.5 |
| Leachate Manuf Quiescent | AREA_POLY | 114.51 | 0 | N/A | 0.5 |
| Leachate Manuf Aerated | AREA_POLY | 113.98 | 0 | N/A | 0.5 |
| Decontamination/material processing (Area C) | VOLUME | 125.05 | 2.8 | N/A | 1.3 |
| Manure Pile | AREA_POLY | 114.42 | 2 | 9.3 | 2.2 |

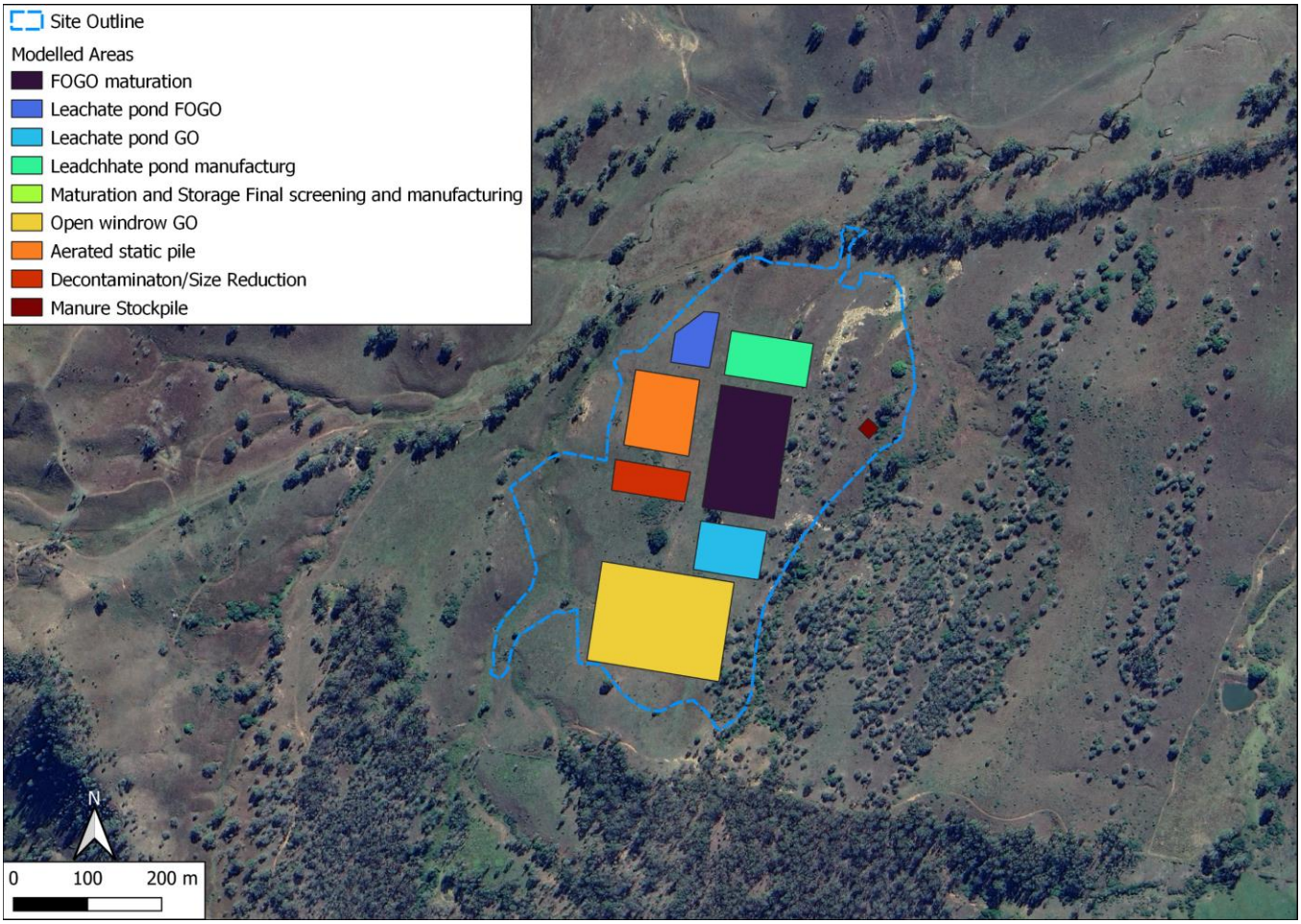



***Figure B.1 Modelled Areas***

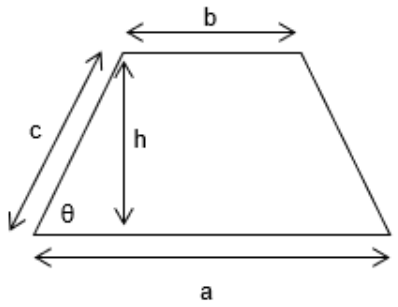
# Appendix C

## Emissions Inventory Additional Information

# C-1 Operational Parameters

*Table C.1 Operational parameters*

| Parameter | Descriptor | Value | Source |
|---|---|---|---|
| General Operational parameters | | | |
| Hours of Operation | Hours of operation Monday – Friday | 6am – 6 pm | SOILCO |
| | Hours worked – Saturday | 6am – 4 pm | |
| | Hours Worked – Sunday | 9 am – 4 pm | |
| | Hours worked – Monday - Friday | 12 hours | |
| | Hours worked Saturday | 10 hours | |
| | Hours worked Sunday | 7 hours | |
| Material dimensions | Windrow Dimensions | a = 5 m | Assumed |
| | | b = 3.1 m | |
| | | c = 4.4 m | |
| | | h = 4 m | |
| | Manure pile Dimensions | a = 4 m | |
| | | b = 2 m | |
| | | c = 2.8 m | |
| | | h = 2 m | |
| Material throughput information | | | |
| Maturation and storage (Area A) | Full production cycle length | 8-week cycle | SOILCO |
| | FOGO Material density | 0.55 t/m$^3$ | |
| | Volume of compost produced per year | Approximately 150,000 tonnes per annum | |
| | Compost produced during peak period | 21150 tonnes per 8 weeks | Calculated |
| | | 2643.75 tonnes per week | |
| | Compost produced during low period | 12906.667 tonnes per 8 weeks | |
| | | 1613.3 tonnes per week | |



| Parameter | Descriptor | Value | Source |
|---|---|---|---|
| | Compost produced during average period | 16,720 tonnes per 8 weeks | |
| | | 4180 tonnes per week | |
| Aerated Static Piles (Area B) | Full production cycle length | 3-week cycle | SOILCO |
| | FOGO material density | 0.55 t/m$^3$ | |
| | FOGO processed per year | 150,000 tonnes per annum | |
| | FOGO Processed during peak period | 7700 tonnes per 3 weeks | |
| | | 2566.7 tonnes per week | |
| | Fogo processed during low period | 4840 tonnes per 3 weeks | |
| | | 1613.3 tonnes per week | |
| | Fogo processed on average | 6270 tonnes per 3 weeks | |
| | | 2090 tonnes per week | |
| | Material turnover rate | 1 full turnover of material per 3-week period | |
| Pre-treatment of imported material – Decontamination line (Area C) | Decontamination line capacity | 70 tonnes per hour | SOILCO |
| | Screening volume – Peak period | 2567 tonnes per week | |
| | | 400 tonnes per weekday | |
| | | 333 tonnes per Saturday | |
| | | 233 tonnes per Sunday | |
| | | 33 tonnes per hour | |
| | Screening volume – Low Period | 2933 tonnes per week | |
| | | 251 tonnes per weekday | |
| | | 210 tonnes per Saturday | |
| | | 147 tonnes per Sunday | |
| | | 21 tonnes per hour | |
| Garden Organics Open Windrows (Area D) | GO Material density | 0.45 t/m$^3$ | SOILCO |
| | Compost produced during peak period | 13725.0 tonnes per 8 weeks | |
| | | 2375.0 tonnes per week | |
| | Compost produced during low period | 8550.0 tonnes per 8 weeks | |

| Parameter | Descriptor | Value | Source |
|---|---|---|---|
| | | 1068.8 tonnes per week | |
| | Compost produced during average period | 11,137.5 tonnes per 8 weeks | |
| | | 1392.2 tonnes per week | |
| Final Screening and Manufacturing | Maximum volume of manure on site | 200 tonnes | SOILCO |
| | Manure density | 195kg/$m^3$ | Khater, E. 2012, "Chemical and Physical Properties of Compost", *Misr Journal of Agricultural Engineering* 29(4): 1567 - 1582 |

# C-2 Odour Emissions Inventory

***Table C.2 Odour emission rate source information***

| Source | Waste Type | Waste age | Season of odour measurement | Odour measurement methodology | Reference for SOER | Description |
|---|---|---|---|---|---|---|
| Maturation and Storage - Open Windrows (Food and Garden Organics) (Area A)** | Green organics | 8 weeks | Autumn - Winter | Temporary Enclosure (wind tunnel) | GHD, "SITA Brooklyn, Report for Greenwaste Composting Facility, Baseline Odour Impact Survey" | SOER was derived from odour measurements of Green Organics at the end of the 4 week composting cycle at Bucketts Way RRF (SOER 0.86) and odour measurements at SITA Brooklyn at 8 weeks of food and garden organics composting (SOER 0.38). The weighted average SOER (0.6) was used for the combined maturation stockpile based on expected volumes of 100,000 tpa and 150,000 tpa of GO and FOGO respectively. |
| | Food and green organics | 4 weeks | Spring | Isolation flux chamber | Water research centre UNSW, "Odour Impact Assessment for the Proposed Food plus Garden Organics (FGO) Composting Operations at the Bucketts Way Resource Recovery Facility", N.D. | |
| Aerated static pad emissions (Area B) | Food and green organics | 8 days | Spring | Isolation flux chamber | Water research centre UNSW, "Odour Impact Assessment for the Proposed Food plus Garden Organics (FGO) Composting Operations at the Bucketts Way Resource Recovery Facility", N.D. | ASP emissions factor is derived from the average of measurements taken across composting of food and green organics undertaken at UNSW. Windrow turning is assumed to occur for 6 hours per day as a worst case scenario.<br>To be conservative, during turning of windrows, during turning, an additional 100% of the passive windrow emissions factor is applied on top of the ASP factor. The odour emission rate has been applied to 25% of the total windrow area, as it has been assumed that up to 25% of the entire windrow could be practically turned in one day.<br>We note measured odour emissions from this site are higher than the measured odour emissions at the SOILCO Wogamia site. |
| Decontamination/material processing (Area C) | Food and green organics | 8 days | Spring | Isolation flux chamber | Water research centre UNSW, "Odour Impact Assessment for the Proposed Food plus Garden Organics (FGO) Composting Operations at the Bucketts Way Resource Recovery Facility", N.D. | Unprocessed FOGO emissions factor was taken from a measurement of unprocessed food organics in the receival area of a FOGO processing facility. Source accounts for passive emissions from organic material. As such it has been assumed that odour is emitted 24 hours per day. Decontamination/Material processing area has been modelled. |

| Source | Waste Type | Waste age | Season of odour measurement | Odour measurement methodology | Reference for SOER | Description |
|---|---|---|---|---|---|---|
| Shredding and screening of organic material (Area C)* | Green organics | <24 hours | N/A | Odour Sample | URS, "Odour assessment of the proposed composting process at the ANL Premises, Lilydale" (Ref:43283297, Dated: 28 August 2008) | Odour emission rate for shredding and screening of organic matter was taken from a measurement of shredding decomposing garden organic. Modelled as a volume source (21.5$m^3$). Shredding is assumed to take place 6 hours per day as a worst case scenario. |
| Composting Facility - Open Windrows - Garden Organics (Area D) | Green organics | 8 weeks | Autumn - Winter | Temporary Enclosure (wind tunnel) | GHD, "SITA Brooklyn, Report for Greenwaste Composting Facility, Baseline Odour Impact Survey" | Emission factor taken from measurements previously undertaken by GHD as part of a green waste composting facility odour impact survey. OER was derived from an average of fresh and intermediately matured garden organic compost odour.<br>measurements. Emissions factor has been adjusted by predicted surface area of windrows, as seen in Figure 2.3.<br>Windrow turning is assumed to occur for 6 hours per day as a worst case scenario. To be conservative, during turning of windrows, during turning, an additional 100% of the passive windrow emissions factor is applied on top of the modelled emission source. The odour emission rate has been applied to 25% of the total windrow area, as it has been assumed that up to 25% of the entire windrow could be practically turned in one day. |
| Leachate Pond GO Quiescent | Green waste leachate dam | N/A | Autumn | Isolation flux chamber | Holmes Air Sciences, "Odour Audit: Lucas Heights Waste & Recycling Centre", (Ref: No. 14 LUCAS HEIGHTS_ODOUR AUDIT_final.doc, May 2006)<br>Ektimo, "Odour Survey Lucas Heights Resource Recovery Park", (Ref: No. 140107r Dated May and June 2014) | The leachate ponds were modelled assuming 4 hours of aeration in the daytime period each day. The SOER was selected from the compost pond IFC measurements taken from the composting leachate pond at the Lucas Heights Resource Recovery Park in 2006 and the aerated rate was derived from measurements at Lucas Height Landfill (Ektimo Report No. 140107r 2014 (Lucas Heights) Back Calculations by GHD), which apply the same increased factor measured for the landfill leachate pond. |
| Leachate Pond FOGO Quiescent | | | | | | |
| Leachate Pond Manufacturing Quiescent | | | | | | |
| Leachate Pond GO Aerated | Green waste leachate dam | N/A | N/A | Data scaled from upwind and downwind transect | | |
| Leachate POND FOGO Aerated | | | | | | |

| Source | Waste Type | Waste age | Season of odour measurement | Odour measurement methodology | Reference for SOER | Description |
|---|---|---|---|---|---|---|
| Leachate Pond Manufacturing Aerated | | | | | | |
| Manure pile | Manure | N/A | Autumn-Winter | Lindvall hood | Odournet; “Odour monitoring and dispersion modelling study for Tunnel Tech North Ltd, Newington, South Yorkshire” (Ref: TTN12FINAL Dated November 2012) | Emission factor sourced from odour measurements of horse manure were adopted for the purpose of this assessment. The manure pile has been modelled in the north easternmost storage bay within the processing and manufacturing area. Source area to surface area ratio has been determined assuming a trapezoidal shape. Assumed geometry and material density are outlined in Appendix C-1. |

*Table C.3 Source areas and odour emission rates*

| Source | Source type | Source Area($m^2$)/ Volume($m^3$) | Estimated surface area of windrows ($m^2$) | Source area to surface area scaling factor[1] | Reference SOER (OUV/$m^2$/s) | Modelled SOER (OUV/$m^2$/s) (See table B2-1 ) | | Odour emission rate (OU/s) | | Hours per day source is active |
|---|---|---|---|---|---|---|---|---|---|---|
| Maturation and Storage - Open Windrows (Food and Garden Organics) (Area A) | Area | 16,430 | 16,430 | 1 | 0.6 | 0.6 | | 9,398 | | 24 |
| Decontamination/ material processing (Area C) | Volume | 256 | N/A | N/A | 1.7 | 1.7 | | 7,137 | | 24 |
| Shredding and screening of organic material (Area C)* | Volume | 22 | N/A | N/A | - | - | | 5,740 | | 6 |
| Aerated static pad emissions (Area B) | Area | 9,135 | 8374 | 0.92 | 1.7 | Passive: | 1.6 | Passive: | 12,948 | 18 |
| | | | | | | Windrow turning: | 2 | Windrow turning: | 13,911 | 6 |
| Composting Facility - Open Windrows - Garden Organics (Area D) | Area | 24,438 | 18,181 | 0.74 | 1.6 | Passive: | 1.2 | Passive: | 21,641 | 18 |
| | | | | | | Windrow turning: | 1.6 | Windrow turning: | 24,085 | 6 |
| Leachate Pond GO Quiescent | Area | 5,983 | N/A | N/A | 0.15 | Quiescent: | 0.15 | Quiescent: | 897 | 20 |
| | | | | | | Aerated: | 1.15 | Aerated: | 6,881 | 4 |
| Leachate Pond FOGO | Area | 3,431 | N/A | N/A | 0.15 | Quiescent: | 0.15 | Quiescent: | 515 | 20 |
| | | | | | | Aerated: | 1.15 | Aerated: | 3,945 | 4 |
| Leachate Pond Manufacturing | Area | 6,704 | N/A | N/A | 0.15 | Quiescent: | 0.15 | Quiescent: | 1,006 | 20 |
| | | | | | | Aerated: | 1.15 | Aerated: | 7,709 | 4 |
| Manure Pile | Area | 386 | 204 | 0.53 | 4 | 2.1 | | 429 | | 24 |

Note: 1. Emissions scaling factor adjusts the emissions factor based on the expected area of odorous material in windrows divided by the area of source.

# Appendix D

## Odour Surveys

# Ambient Odour Survey Methodology

On 10 April 2025, GHD conducted a series of ambient odour surveys at various times throughout the day.

The primary objectives of these surveys were to evaluate:

- The intensity of the odour, and
- The characteristics of the detected odours.

Given the access restriction in the locality the extent of odour plumes was not able to be ascertained.

## Odour Intensity

During the odour surveys, GHD implemented a modified version of the German standard VDI 3882:1992 Part 1 for determining odour intensity. This approach was chosen due to the absence of an Australian Standard for rating odour intensity. The VDI 3882 standard is widely recognised and referenced by Australian regulatory bodies.

To evaluate odour intensity at each location where discernible odours were detected, the odour assessor classified the intensity based on a specified scale outlined below in table D.1.

***Table D.1 Summary of Odour Intensity Scale Utilised during the Field Odour Surveys***

| Odour | Intensity Level |
|---|---|
| Extremely Strong | 6 |
| Very Strong | 5 |
| Strong | 4 |
| Distinct | 3 |
| Weak | 2 |
| Very Weak | 1 |
| Not perceptible | 0 |

## Odour Characteristics

The aim of the surveys was to get an understanding of existing odour sources and characteristics in the local area, especially at nearby receptors to the Project. Known odour sources include Scenic Rim Regional Council Waste Facility/Transfer Station, poultry farms and Bush's Proteins. Odours from these facilities were the focus.

GHD personnel noted offensive descriptors related to these sites during the surveys however also noted more natural sources as well.

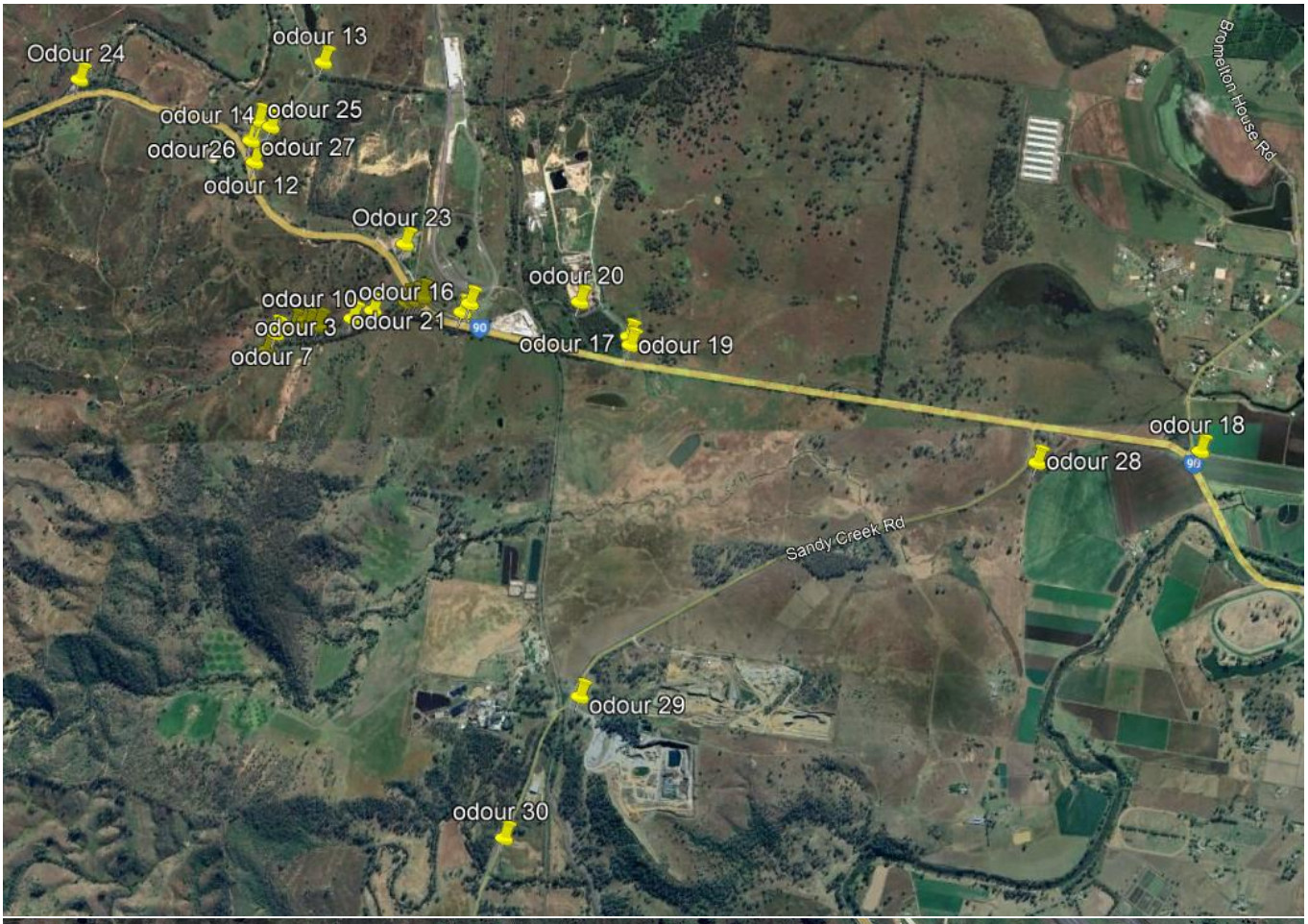
The assessment included publicly accessible areas mostly downwind of the Project site and also the Bush's Proteins site. Some survey locations were outside of the plume during the survey. Results of the surveys are summarised in table D.2.

Table D.2 Summary of Odour Survey Results

| Survey number | Start | Wind direction | Odour intensity | Odour character | Comment |
|---|---|---|---|---|---|
| 01 | 1.45pm | SE – light | 2 | Cow manure, agricultural | Constant odour |
| 02 | 1.48pm | SE – light | 0 | - | - |
| 03 | 1.53pm | SE – light | 1 | Cows, agricultural, cooking meat | More noticeable with wind gusts |
| 04 | 2.00pm | SE – light | 3 | Agricultural, cooking meat | Odour tended to increase with wind gusts |
| 05 | 2.02pm | SE – light, some gusts | 3 | Agricultural, cow poo, cooking meat | Constant |
| 06 | 2.05pm | SE – light, some gusts | 2 | Agricultural, cooking meat | |
| 07 | 2.10pm | SE – light | 0 | - | - |
| 08 | 2.14pm | SE – light | 0 | - | - |
| 09 | 2.16pm | SE – light | 0 | - | - |
| 10 | 2.20pm | SE – light | 0 | - | - |
| 11 | 2.23pm | SE – light | 0 | - | - |
| 12 | 2.31pm | SE – light, gusting | 0 | - | - |
| 13 | 2.34pm | SE – light | 0 | - | - |
| 14 | 2.37pm | SE – light | 0 | - | - |
| 15 | 2.40pm | SE – light | 0 | - | - |
| 16 | 2.45pm | SE – light | 0 | - | - |
| 17 | 2.50pm | SE – light | 1 | Cattle, cooking meat, grass, garbage | Not distinct, odour on and off. Odour also from garbage truck passing |
| 18 | 2.55pm | SE – light | 1 | Rural, cut grass, fertiliser, bitumen | Lawn farm opposite |
| 19 | 4.32pm | SE – light, gusting | 1 | Agricultural | - |
| 20 | 4.36pm | SE – light, none | 1 | Floral, garden smells | Local vegetation |
| 21 | 4.41pm | SE – light | 4 | Cow manure, cattle, meat cooking, agricultural | Low elevation next to creek, constant odour |
| 22 | 4.46pm | SE – light | 4 | Cattle, dog food, cooking meat, dairy | Constant odour |
| 23 | 4.50pm | SE – light to moderate | 3 | Cattle, cooking meat, beef | Odour fluctuates with wind, stronger with higher gusts |
| 24 | 4.59pm | SE – light | 1 | Natural grass smells | - |
| 25 | 5.02pm | SE – light to moderate | 2 | Cattle, dairy. Cooking meat | Odour stronger with wind gusts |
| 26 | 5.06pm | SE – light, gusts | 2 | Cattle, meat | Fluctuates from no odour to some |
| 27 | 5.10pm | SE – light | 2 | Cattle, beef | Odour mild but noticeable, fluctuates with wind and over the period. |
| 28 | 5.17pm | SE – light | 1 | Cut grass | - |
| 29 | 5.30pm | SE – light | 1 | Dust, dirt | Adjacent quarry and on gravel area |
| 30 | 5.35pm | SE – light | 0 | - | - |

An overview of the survey locations is provided in the images below.




Odour 24
odour 13
odour 14
odour 25
odour26
odour 27
odour 12
Odour 23
odour 20
odour 10
odour 16
odour 3
odour 21
odour 7
odour 17
odour 19
odour 18
odour 28
Bromelton House Rd
Sandy Creek Rd
odour 29
odour 30


odour 22
odour 01
odour 11
odour 2
odour 16
odour 10
odour 21
odour 5
odour 3
odour4
odour 8
odour 9
odour 7
odour 6

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The Power of Commitment

# Bromelton Compost Manufacturing Facility

## Acoustic Assessment

SOILCO Pty Ltd

04 April 2025

→ **The Power of Commitment**



PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

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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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# Appendices

Appendix A Noise monitoring charts

# 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 on RP85497, Bromelton, Queensland.

## 1.2 Purpose of this report

GHD has been engaged by SOILCO to prepare the acoustic assessment for 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.

The acoustic assessment will discuss potential impacts on the nearby sensitive receivers from the Project and will identify specific mitigation measures to be implemented for the construction and operational phases of the Project.

## 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 the 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.<br>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:<br>– 100,000 tpa of garden organics (GO), composted by Passive Open Windrow (OW) method.<br>– 150,000 tpa of Food Organics and Garden Organics (FOGO), processed on a Forced Aeration Pad system (ASP).<br>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.<br>VENM will be received and stored as required based on demand of finished products.<br>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<br>– Weigh bridges<br>– Internal road network<br>– Maintenance and storage shed<br>– Final screening and manufacturing area<br>– Water tanks<br>– Aeration Pad system<br>– Office, carparking and amenities<br>– FOGO receival area<br>– 3 x leachate ponds<br>– 1 x freshwater dam<br>– Open windrows pad<br>– FOGO maturation pad<br>– Hardstand areas<br>– Retaining wall<br>– Upgrade of Mitchell Road |
| Hours of operation | **Monday–Friday:** 6am to 6pm<br>**Saturday:** 6am to 4pm<br>**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 |

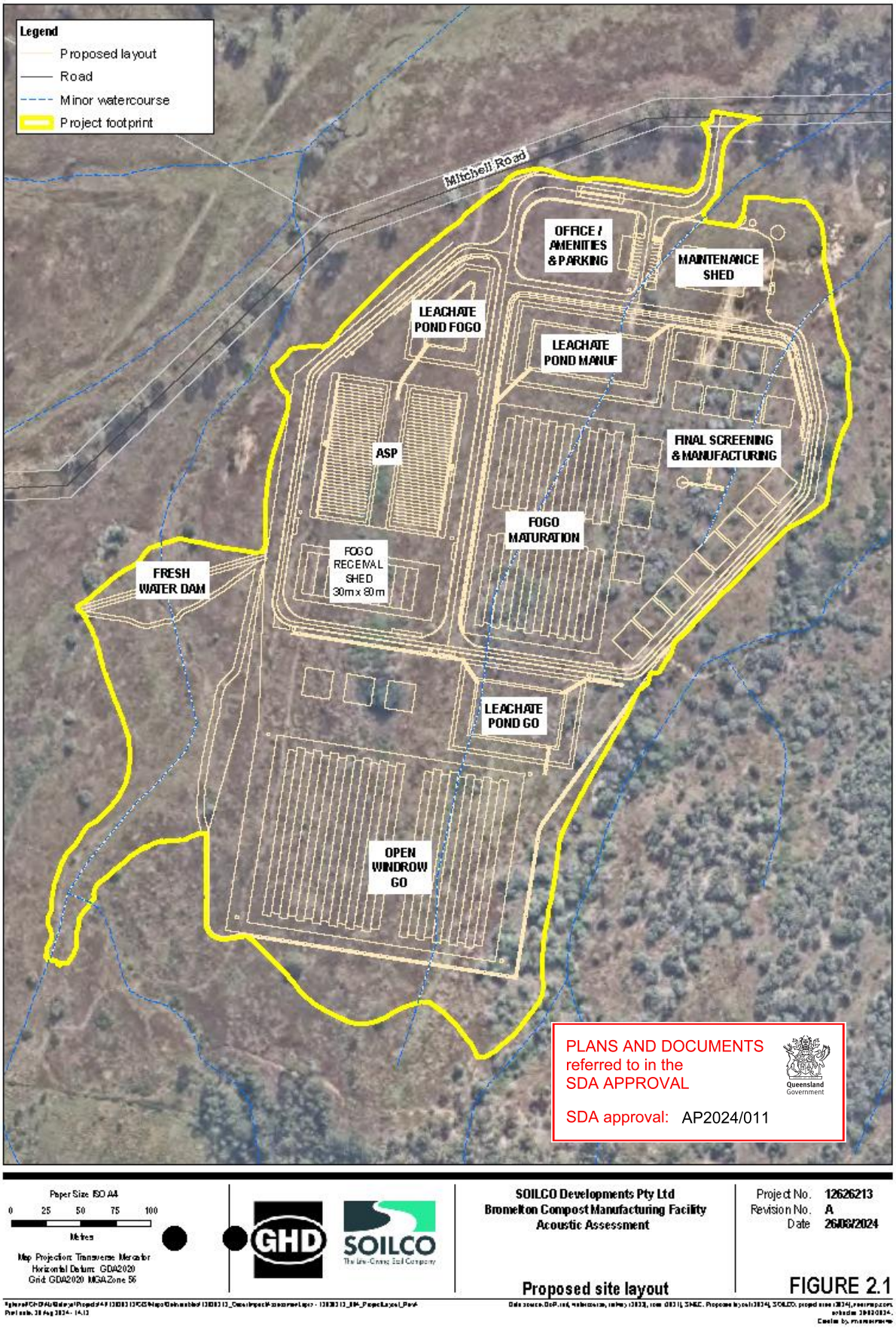



*Figure 2.1 Proposed site layout*

# 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<br>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<br>2613 Beaudesert Boonah Road, Bromelton QLD | Industrial[1] | 1,150 m east |
| R09 | SCT Logistics<br>2603 Beaudesert Boonah Road, Bromelton QLD | Industrial[1] | 1,830 m north-east |
| R10 | Beaudesert Saleyards<br>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 target operational noise emission levels for 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 were 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 existing ambient and representative background levels of 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 3.5 and Figure 3.1. Noise logger daily data results are summarised in Table 3.2 and Table 3.3. The summary of the Rating background levels and ambient noise levels recorded at Location ML1 and ML2 are summarised in Table 3.4. Daily noise monitoring charts are presented in Appendix A.

*Table 3.2 Summary of noise monitoring results – ML1 (98420) dB(A), $L_{A90}$, $L_{Aeq}$ and $L_{A10}$*

| Date | Rating background level, range and (10th percentile) $L_{A90(15min)}$, dB(A) | | | | Ambient average noise levels, $L_{Aeq(period)}$, range and (logarithmic average), dB(A) | | | | Statistical noise levels, Range and (90th percentile) $L_{A10(15min)}$, dB(A) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Morning Shoulder[1] | Day[1] | Evening[1] | Night[1] | Morning Shoulder[1] | Day[1] | Evening[1] | Night[1] | Morning Shoulder[1] | Day[1] | Evening[1] | Night[1] |
| Wednesday-19-Jun-24 | | 32 - 43 (37) | 24 - 33 (24) | 23 - 47 (23) | | 47 - 63 (54) | 39 - 50 (46) | 31 - 53 (46) | | 50 - 65 (54) | 42 - 53 (49) | 32 - 56 (43) |
| Thursday-20-Jun-24 | 42 - 47 (42) | 36 - 45 (37) | 24 - 39 (26) | 23 - 47 (23) | 51 - 53 (52) | 48 - 59 (52) | 39 - 47 (44) | 30 - 54 (47) | 54 - 56 (55) | 52 - 64 (53) | 41 - 50 (46) | 30 - 57 (44) |
| Friday-21-Jun-24 | 43 - 47 (43) | 36 - 46 (39) | 32 - 41 (34) | 19 - 42 (22) | 52 - 54 (53) | 47 - 67 (56) | 41 - 61 (51) | 26 - 54 (44) | 55 - 57 (56) | 51 - 71 (54) | 43 - 56 (48) | 26 - 55 (42) |
| Saturday-22-Jun-24 | 31 - 42 (31) | 35 - 47 (37) | 25 - 36 (25) | 21 - 44 (22) | 46 - 54 (51) | 46 - 65 (55) | 40 - 54 (47) | 27 - 52 (46) | 50 - 55 (53) | 50 - 67 (54) | 45 - 60 (50) | 28 - 55 (43) |
| Sunday-23-Jun-24 | 41 - 43 (41) | 32 - 48 (41) | 24 - 34 (25) | 25 - 48 (26) | 49 - 52 (51) | 50 - 58 (54) | 27 - 49 (44) | 29 - 63 (50) | 51 - 54 (54) | 52 - 61 (55) | 28 - 51 (48) | 30 - 67 (42) |
| Monday-24-Jun-24 | 38 - 48 (38) | 34 - 46 (36) | 25 - 34 (25) | 20 - 46 (24) | 53 - 63 (59) | 48 - 63 (54) | 34 - 48 (45) | 29 - 54 (45) | 56 - 67 (58) | 51 - 65 (54) | 38 - 52 (48) | 32 - 57 (43) |
| Tuesday-25-Jun-24 | 40 - 46 (40) | 37 - 45 (37) | 29 - 43 (29) | 24 - 45 (24) | 50 - 54 (52) | 49 - 68 (57) | 36 - 57 (48) | 30 - 55 (47) | 53 - 57 (55) | 51 - 73 (54) | 35 - 52 (47) | 29 - 57 (43) |
| Wednesday-26-Jun-24 | 43 - 45 (43) | 44 - 49 (44) | | | 52 - 55 (54) | 52 - 62 (56) | | | 55 - 57 (57) | 55 - 62 (57) | | |
| **RBL and Overall average[2] $L_{eq}$ and $L_{A10}$** | **41** | **37** | **25** | **23** | **54** | **55** | **47** | **47** | **55** | **54** | **48** | **43** |

Notes:

1. Morning Shoulder 6:00 am to 7:00 am, 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.
2. Average $L_{eq}$ was calculated using logarithmic average, while average $L_{A10}$ was calculated using the median of the daily data.

*Table 3.3 Summary of noise monitoring results – ML2 (98418) dB(A), $L_{A90}$, $L_{Aeq}$ and $L_{A10}$*

| Date | Rating background level, range and (10th percentile) $L_{A90(15min)}$, dB(A) | | | | Ambient average noise levels, $L_{Aeq(period)}$, range and (logarithmic average), dB(A) | | | | Statistical noise levels, Range and (90th percentile) $L_{A10(15min)}$, dB(A) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Morning Shoulder[1] | Day[1] | Evening[1] | Night[1] | Morning Shoulder[1] | Day[1] | Evening[1] | Night[1] | Morning Shoulder[1] | Day[1] | Evening[1] | Night[1] |
| Wednesday-19-Jun-24 | | 28 - 38 (29) | 21 - 28 (21) | 21 - 42 (22) | | 36 - 48 (43) | 32 - 42 (38) | 27 - 49 (41) | | 38 - 49 (43) | 37 - 46 (41) | 29 - 51 (41) |
| Thursday-20-Jun-24 | 38 - 42 (38) | 29 - 41 (30) | 25 - 40 (25) | 21 - 44 (22) | 45 - 49 (47) | 36 - 52 (44) | 32 - 46 (39) | 27 - 51 (42) | 48 - 51 (50) | 39 - 56 (45) | 35 - 49 (40) | 26 - 53 (41) |
| Friday-21-Jun-24 | 39 - 44 (39) | 30 - 46 (31) | 36 - 47 (37) | 21 - 43 (23) | 49 - 51 (49) | 36 - 49 (44) | 39 - 48 (46) | 26 - 48 (40) | 50 - 53 (52) | 37 - 53 (45) | 41 - 49 (48) | 28 - 50 (37) |
| Saturday-22-Jun-24 | 32 - 38 (32) | 26 - 39 (29) | 22 - 32 (22) | 21 - 46 (21) | 39 - 48 (46) | 33 - 46 (42) | 33 - 41 (38) | 25 - 54 (44) | 43 - 50 (48) | 35 - 49 (42) | 37 - 43 (42) | 26 - 53 (35) |
| Sunday-23-Jun-24 | 38 - 43 (38) | 33 - 47 (35) | 22 - 36 (23) | 21 - 41 (23) | 48 - 54 (51) | 40 - 52 (48) | 28 - 50 (41) | 26 - 49 (41) | 48 - 52 (52) | 43 - 54 (51) | 30 - 49 (41) | 27 - 51 (36) |
| Monday-24-Jun-24 | 38 - 41 (38) | 28 - 44 (31) | 22 - 35 (23) | 21 - 40 (22) | 45 - 49 (48) | 33 - 54 (45) | 29 - 51 (42) | 25 - 49 (41) | 48 - 51 (50) | 36 - 55 (44) | 29 - 48 (41) | 26 - 50 (39) |
| Tuesday-25-Jun-24 | 38 - 40 (38) | 29 - 45 (31) | 26 - 43 (27) | 21 - 42 (22) | 47 - 49 (48) | 36 - 53 (46) | 33 - 44 (38) | 24 - 52 (41) | 49 - 50 (49) | 39 - 55 (45) | 35 - 46 (40) | 25 - 56 (36) |
| Wednesday-26-Jun-24 | 38 - 42 (38) | 29 - 42 (31) | | | 46 - 52 (49) | 44 - 56 (51) | | | 47 - 56 (50) | 44 - 57 (50) | | |
| **RBL and Overall average[2] $L_{eq}$ and $L_{A10}$** | **38** | **31** | **23** | **22** | **49** | **46** | **41** | **41** | **50** | **45** | **41** | **37** |

Notes:

1. Morning Shoulder 6:00 am to 7:00 am, 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.
2. Average $L_{eq}$ was calculated using logarithmic average, while average $L_{A10}$ was calculated using the median of the daily data.

*Table 3.4 Noise monitoring results*

| Location | Background noise descriptors ($L_{A90(Period)}$)[1] | | | | Ambient noise descriptors ($L_{Aeq(period)}$)[2] | | | |
|---|---|---|---|---|---|---|---|---|
| | Morning Shoulder[3] | Day[3] | Evening[3] | Night[3] | Morning Shoulder[3] | Day[3] | Evening[3] | Night[3] |
| ML1 | 41 | 37 | 25 | 23 | 54 | 55 | 47 | 47 |
| ML2 | 38 | 31 | 23 | 22 | 49 | 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] Morning Shoulder 6:00 am to 7:00 am, 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.*

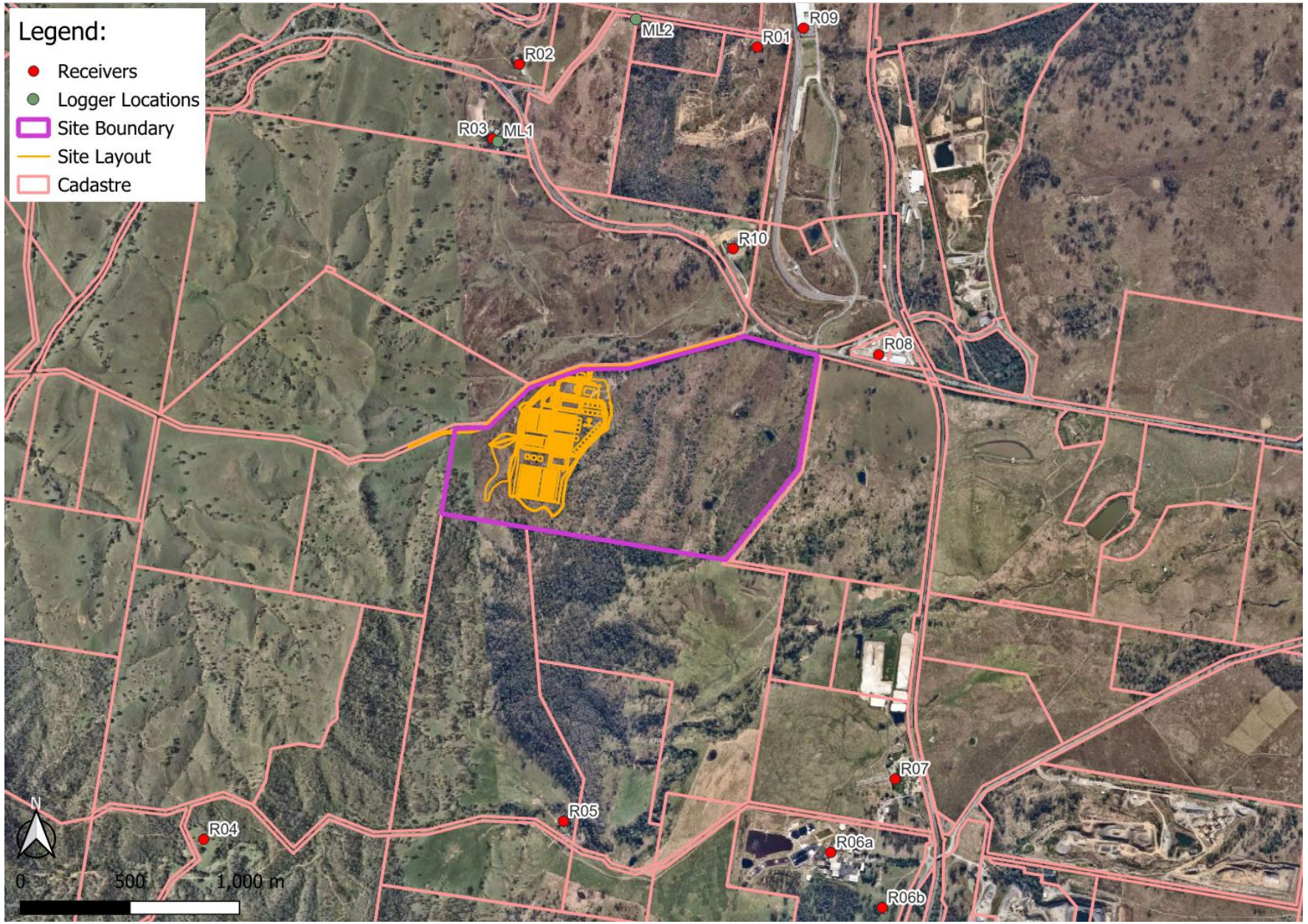



***Figure 3.1 Identified receivers and noise logging locations***

*Table 3.5 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 Deemed minimum background noise levels

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 (from Table 2 ESR/2016/1935, Version 2.04, effective: 21/02/2024). The minimum background noise levels presented in Table 3.6, 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. This ensures that in quiet areas, a noise producing activity would not require unreasonable (and possibly impractical) levels of noise attenuation to comply with the existing noise levels in the area.

***Table 3.6 Deemed background noise levels for isolated rural areas***

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

# 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<br>**Saturday:** 8:00 am to 1:00 pm |
| Non-Standard hours – day/evening | **Monday–Friday:** 6:00 pm to 10:00 pm<br>**Saturday:** 1:00 pm to 10:00 pm<br>**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) | 41 |
| | 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) | 44 |
| | 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 and morning shoulder (not exceeding quality objectives), where the background level is greater than the deemed minimum backgrounds.*

## 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 $L_{A10(18hr)}$<br>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<br>Average humidity of 70%<br>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<br>(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

#### Beaudesert Boonah Road

Beaudesert 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 Beaudesert 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 ($L_{Aeq, 15min}$) | Compliant? |
| R01 | 40 | 27 | Y | 41 | 27 | Y | 28 | <10 | Y |
| R02 | 42 | 30 | Y | 44 | 30 | Y | 28 | 10 | Y |
| R03 | 42 | 32 | Y | 44 | 32 | Y | 28 | 13 | Y |
| R04 | 40 | 19 | Y | 41 | 19 | Y | 28 | <10 | Y |
| R05 | 40 | 18 | Y | 41 | 18 | Y | 28 | <10 | Y |
| R06a | N/A | 26 | Y | N/A | 26 | Y | N/A | <10 | Y |
| R06b | 40 | 22 | Y | 41 | 22 | Y | 28 | <10 | Y |
| R07 | N/A | 26 | Y | N/A | 26 | Y | N/A | <10 | Y |
| R08 | N/A | 31 | Y | N/A | 31 | Y | N/A | 11 | Y |
| R09 | N/A | 26 | Y | N/A | 26 | Y | N/A | <10 | Y |
| R10 | N/A | 35 | Y | N/A | 35 | Y | 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)<br>(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:<br>– All relevant project-specific and standard noise and vibration mitigation measures<br>– Relevant licence and approval conditions<br>– Permissible hours of work<br>– Location of nearest sensitive receivers<br>– Construction employee parking areas<br>– Designated loading / unloading areas and procedures<br>– Site opening / closing times (including deliveries)<br>– Environmental incident procedures |
| Behavioural practices | – No swearing or unnecessary shouting or loud stereos / radios on-site<br>– 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.<br>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.<br>Potential complaints specific to these works could include:<br>– A cluster of noise complaints<br>In this instance, the response would be to:<br>– Verbally respond to the complainant; or provide a written response within seven (7) calendar days, if the complaint cannot be resolved verbally<br>– Log the complaint, and any actions taken with regards to the complaint within a complaints register<br>– Undertake monitoring at the complainant's residence(s), where appropriate<br>– Investigate the nature and causes of the impact<br>– 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.<br>– No truck movements before 7.00 am or after 6.00 pm.<br>– For any work that would take place outside of normal construction hours:<br>– Undertake an assessment of the potential noise and vibration impacts associated with the proposed activities and outline specific mitigation measures.<br>– Minimise consecutive night activities in the same locality and provide periods of quiet if activities occur for extended periods during the night.<br>– 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.<br>– The offset distance between noisy plant and adjacent sensitive receivers is to be in accordance with this report.<br>– 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.<br>– Contractors are to avoid dropping materials from height where practicable, during loading and unloading.<br>– 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. This acoustic assessment has determined potential impacts on the nearby sensitive receivers, and has discussed specific mitigation measures to be implemented by the Project.

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

*AS/NZS ISO 14001:2016 Environmental management systems – Requirements with guidance for use.* Standards Australia, 2016.

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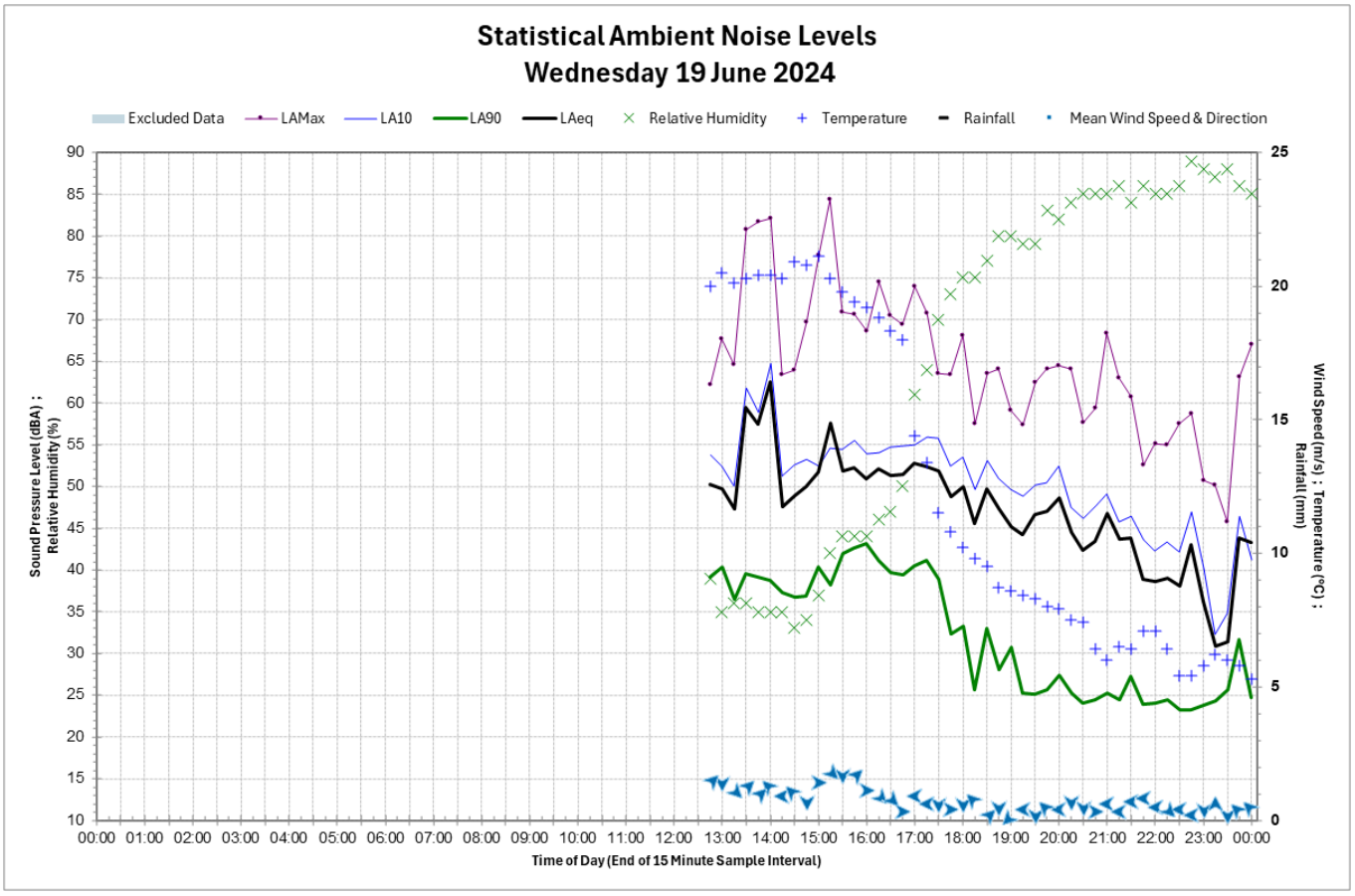
*Transport Noise Management Code of Practice Volume 2 – Construction Noise and Vibration (CoP Vol 2)*. Department of Transport and Main Roads (TMR), 2023.

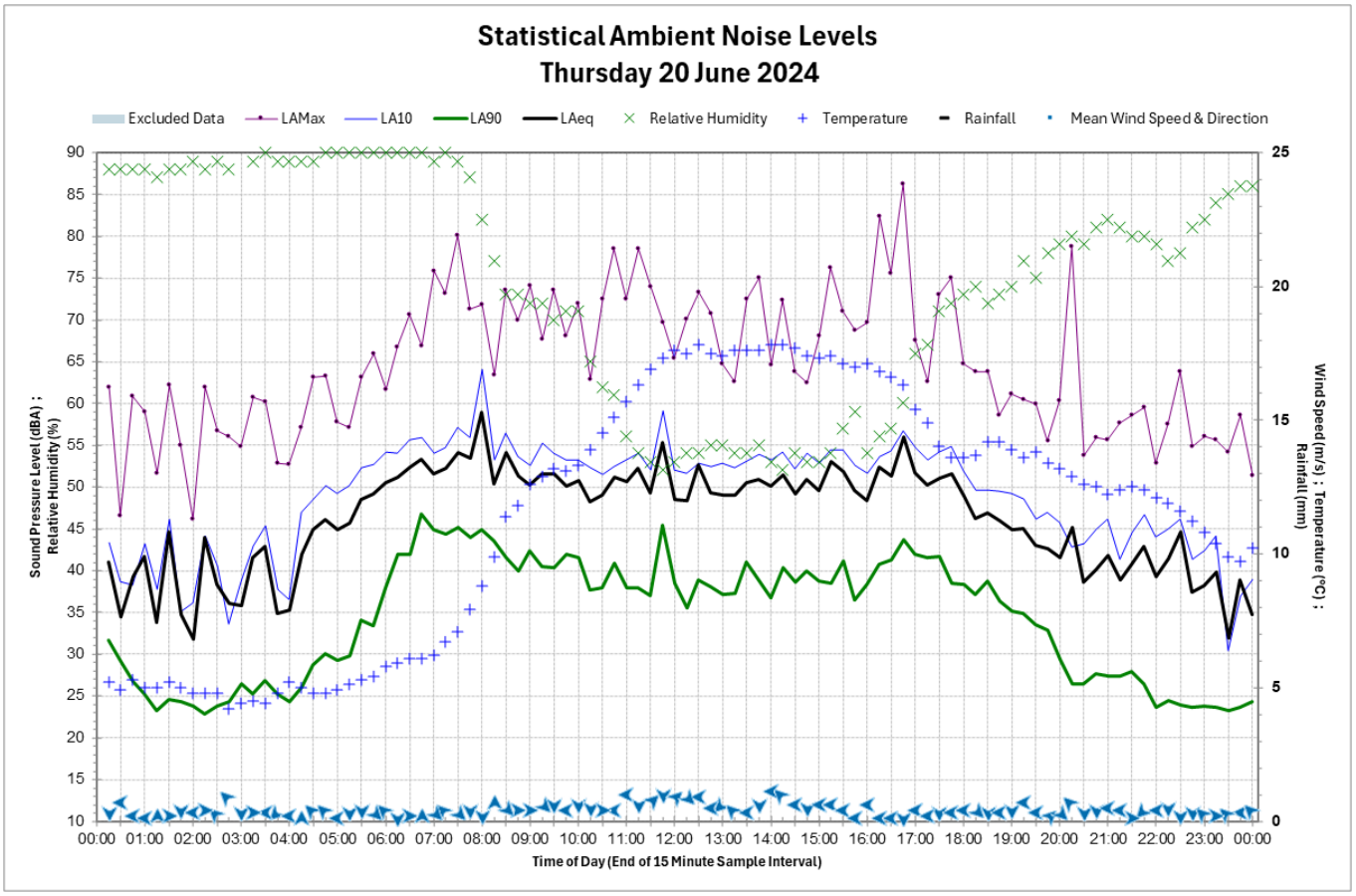
# Appendices

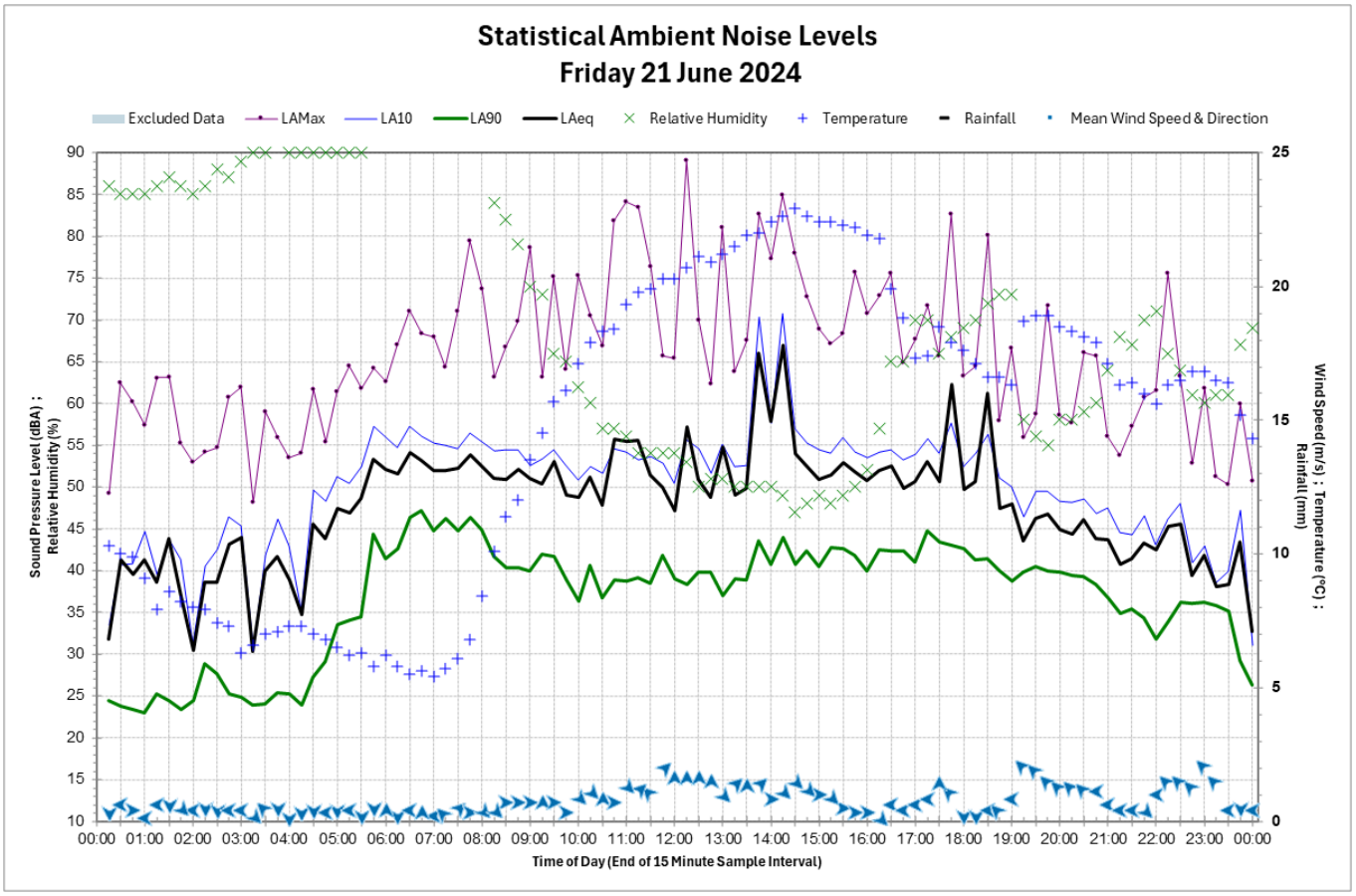
# Appendix A

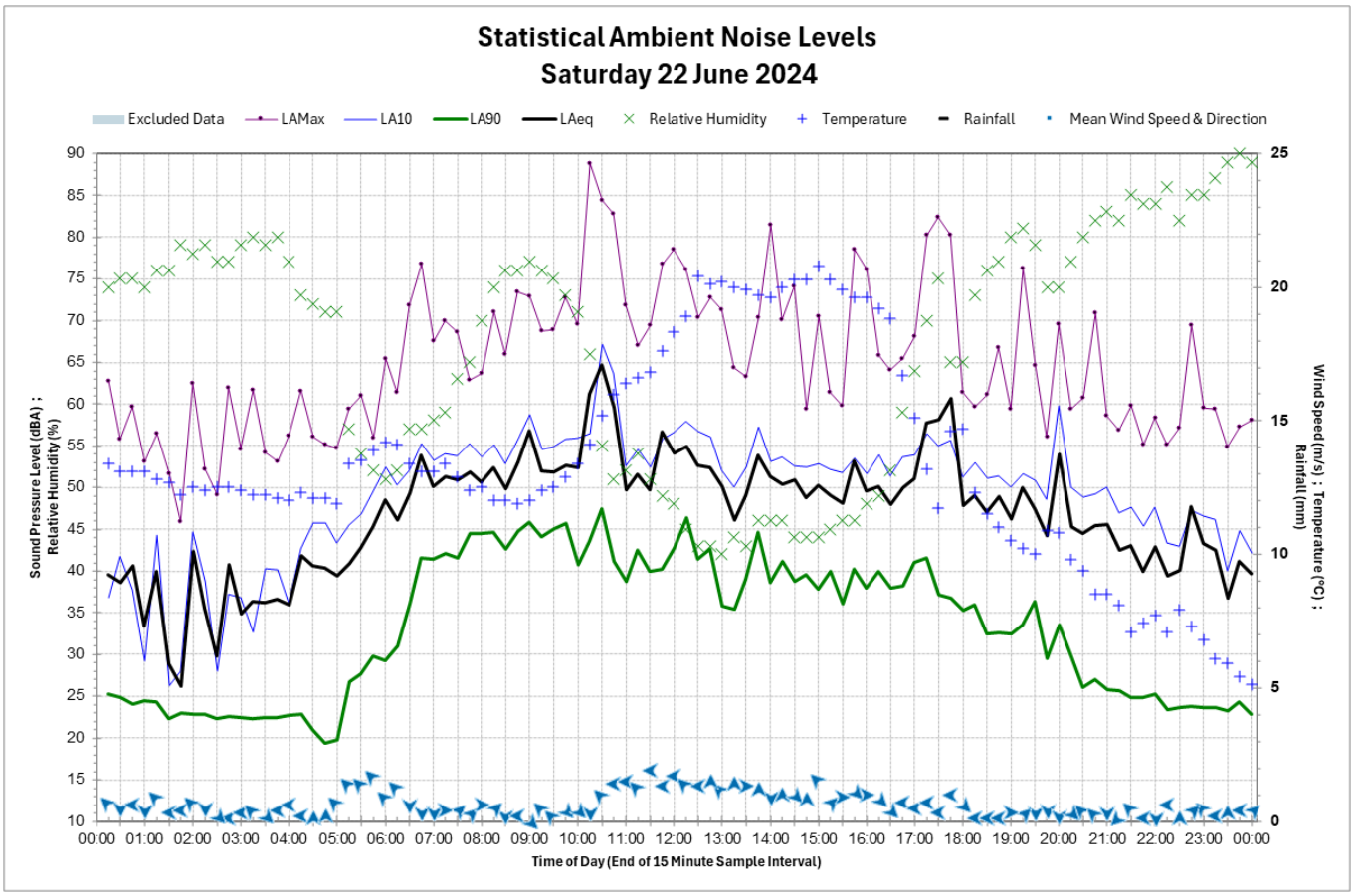
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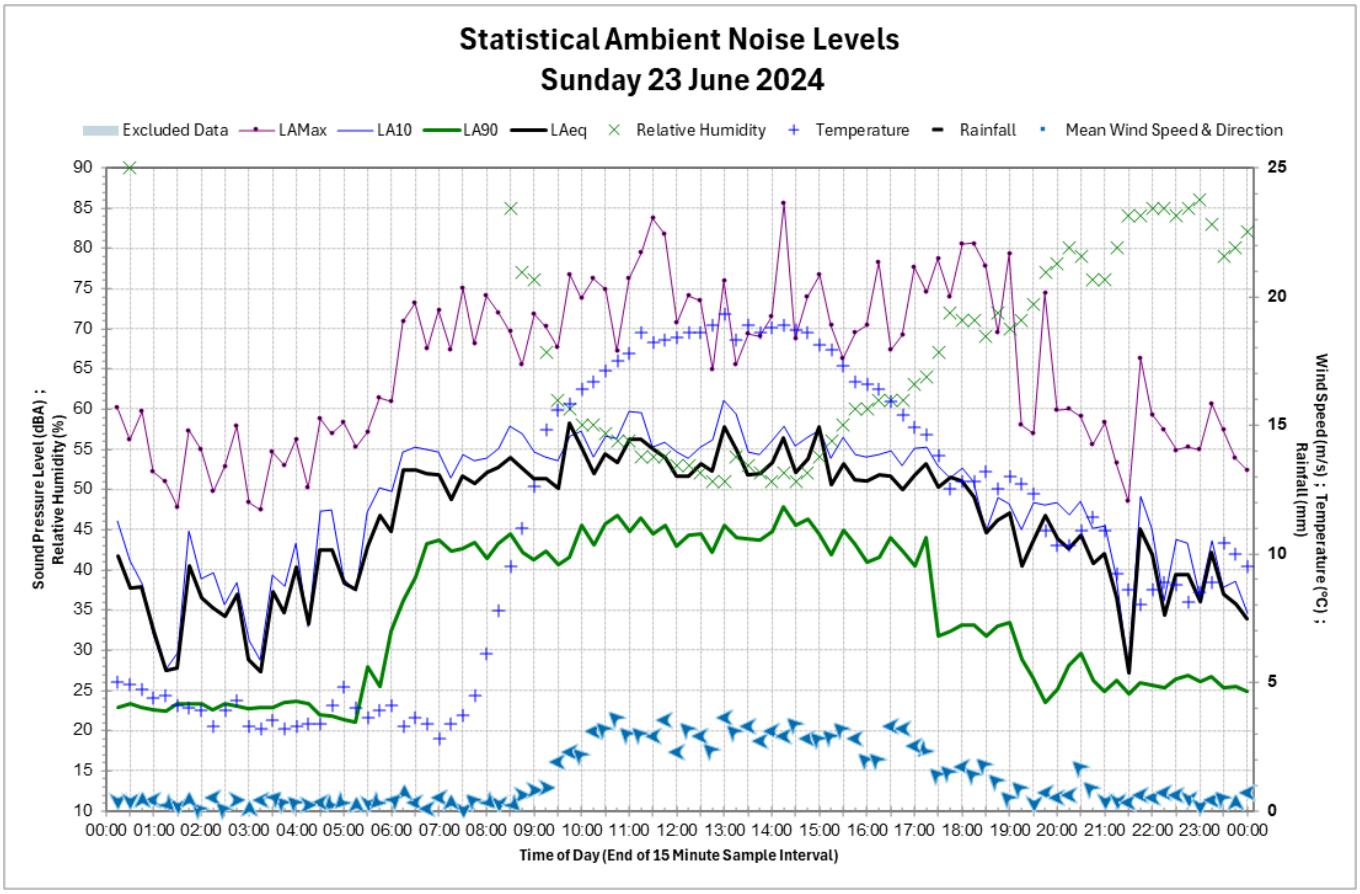
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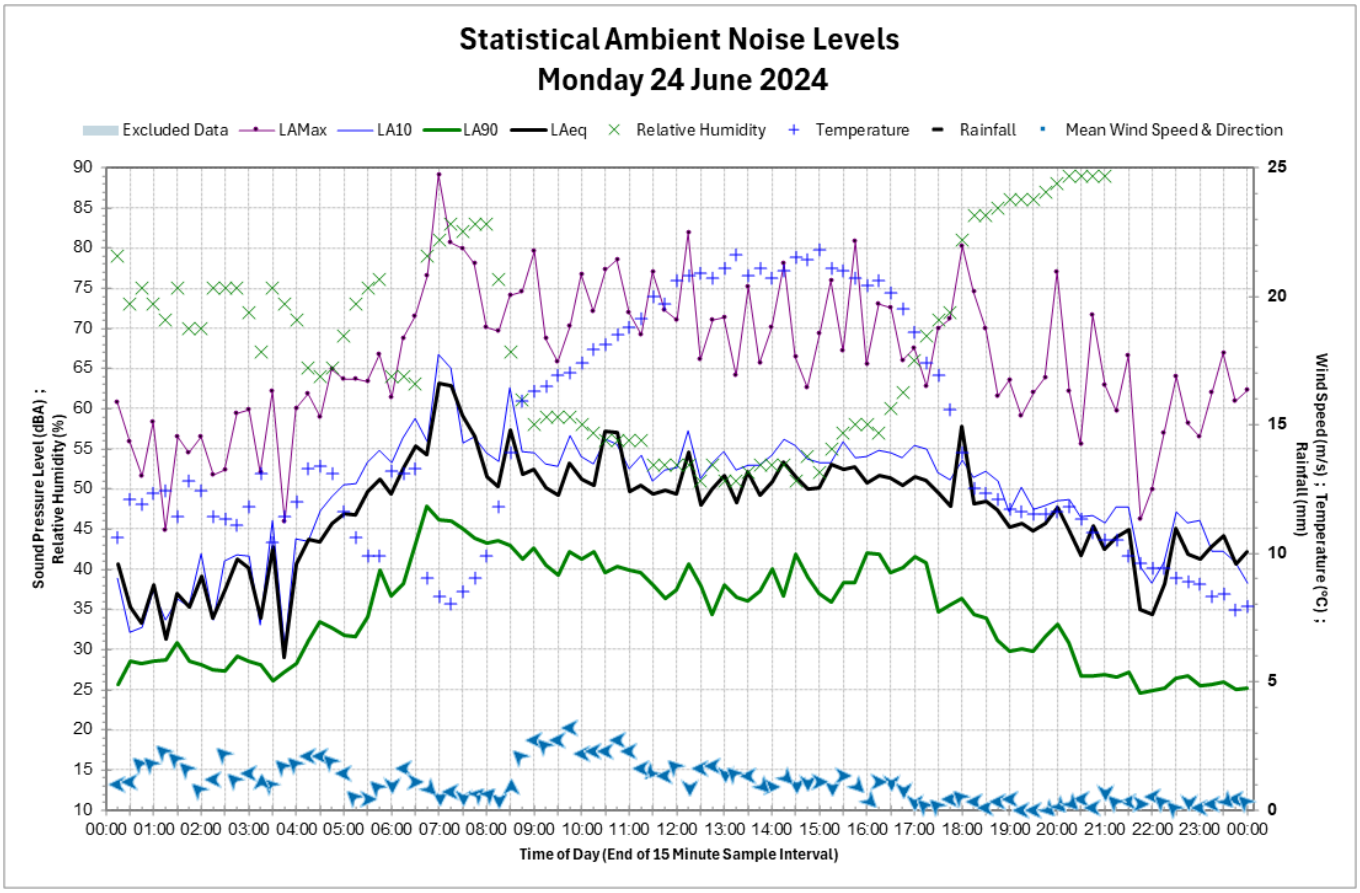


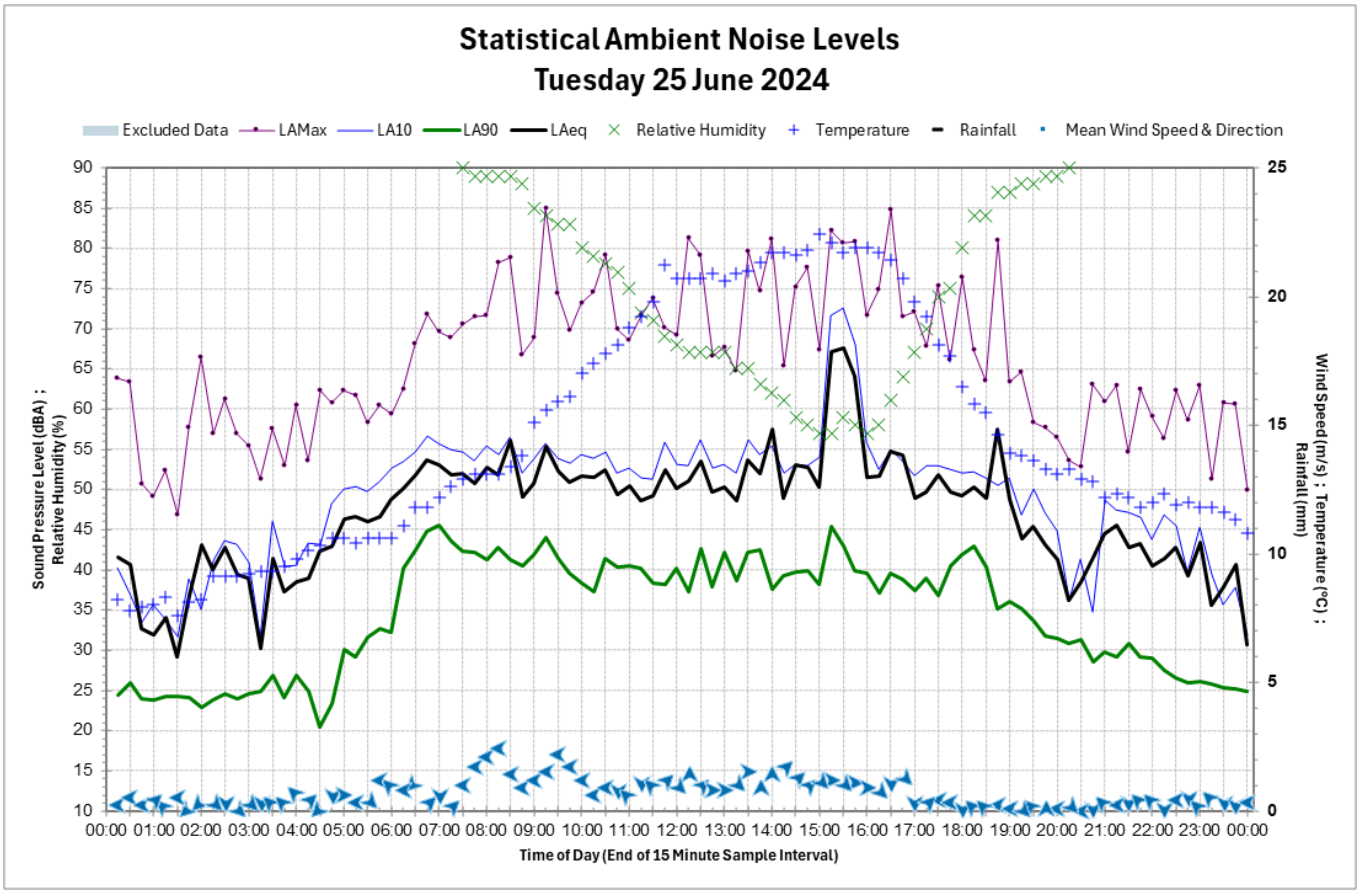



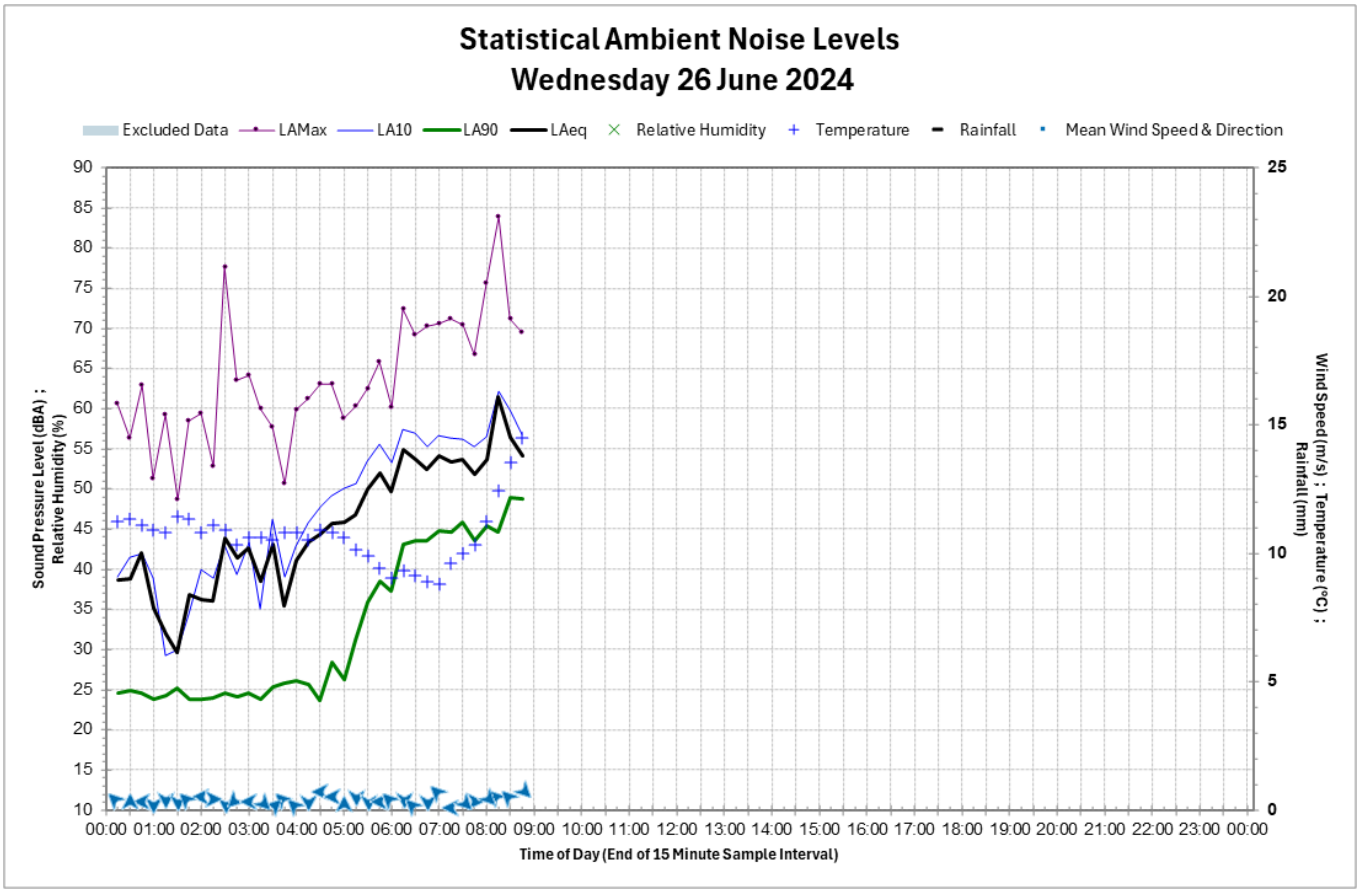

Statistical Ambient Noise Levels
Friday 21 June 2024
Excluded Data
LAMax
LA10
LA90
LAeq
Relative Humidity
Temperature
Rainfall
Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
Saturday 22 June 2024
Excluded Data
LAMax
LA10
LA90
LAeq
Relative Humidity
Temperature
Rainfall
Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

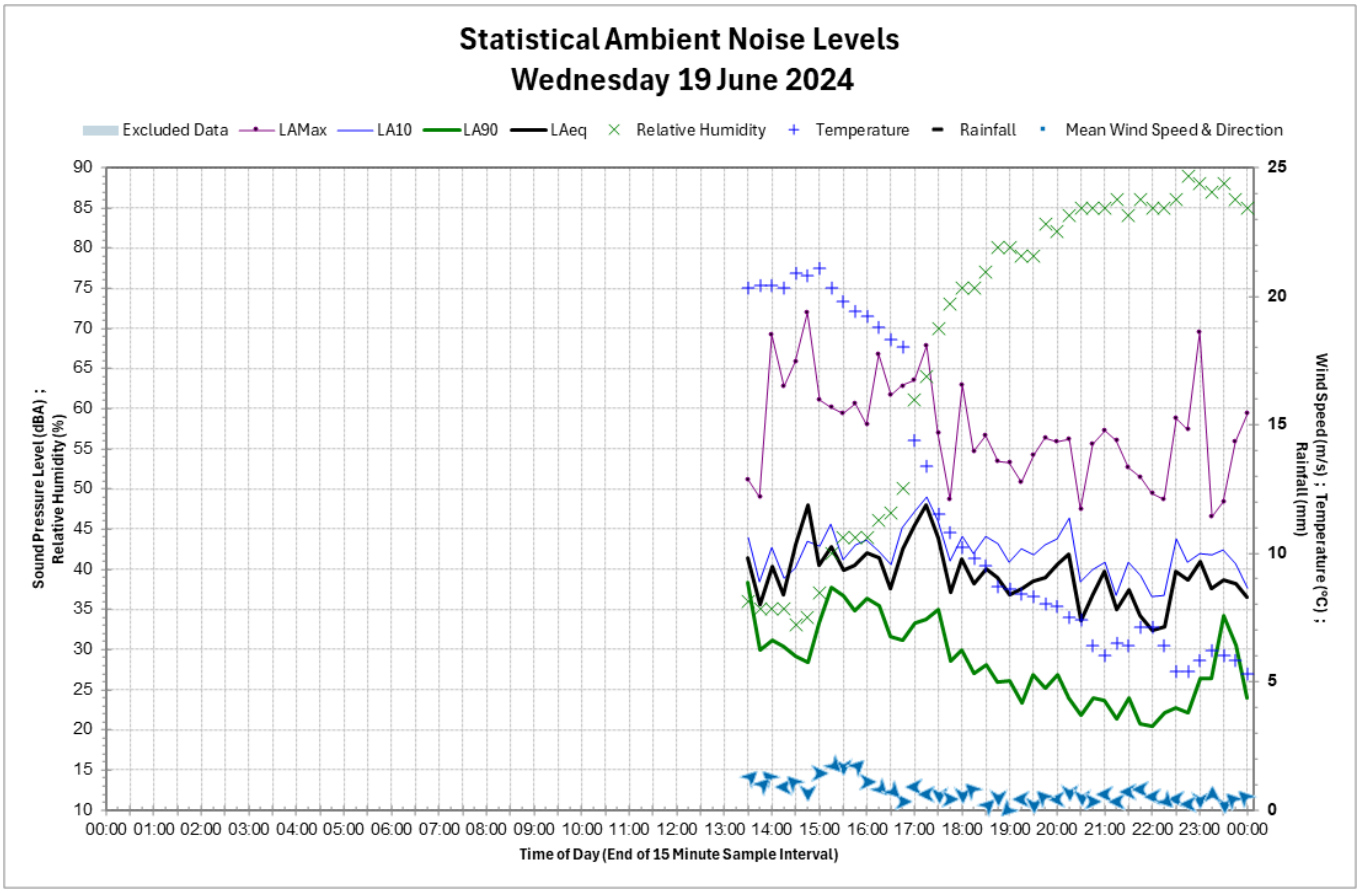

Statistical Ambient Noise Levels
Sunday 23 June 2024
Excluded Data
LAMax
LA10
LA90
LAeq
Relative Humidity
Temperature
Rainfall
Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

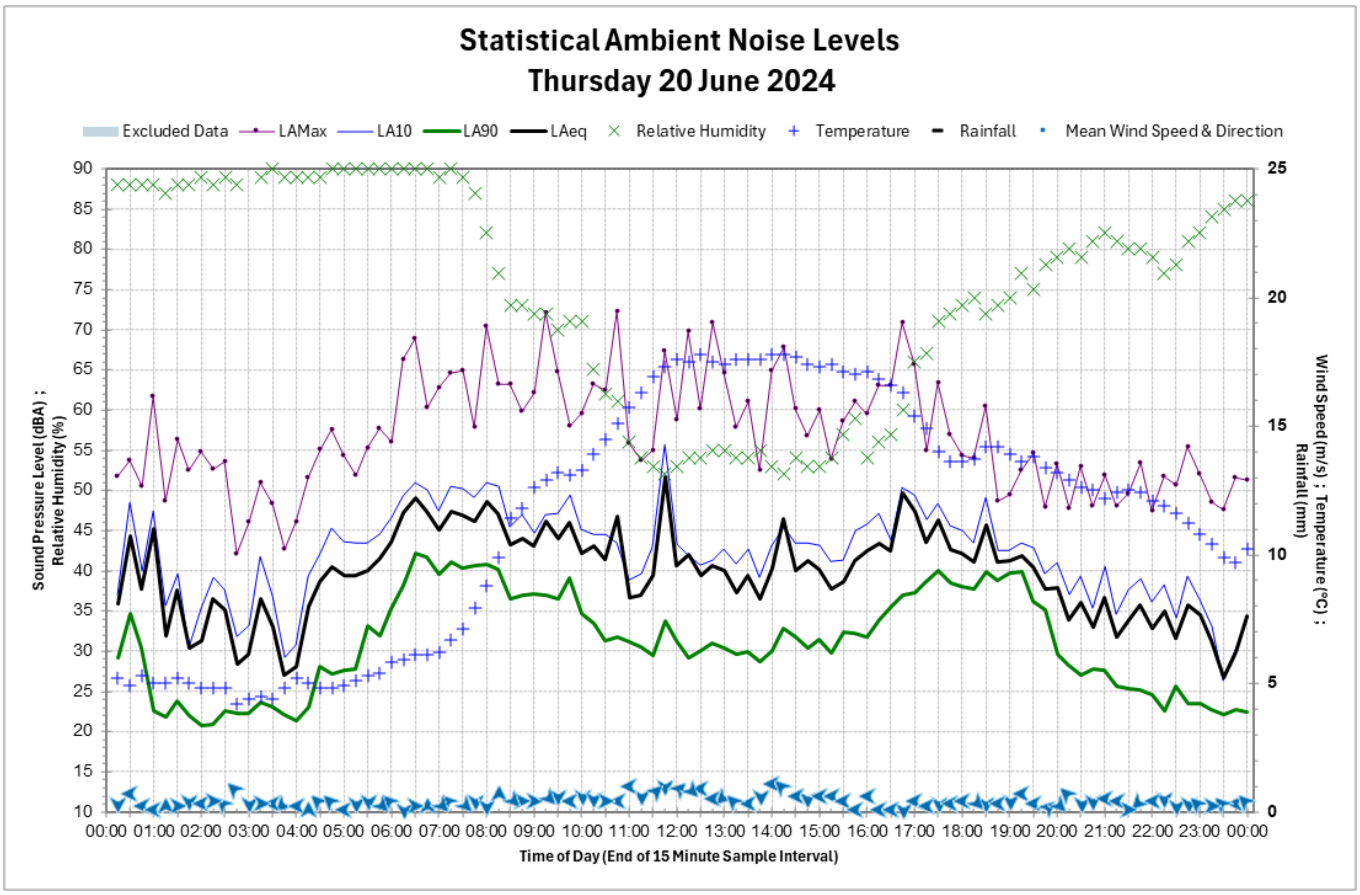

Statistical Ambient Noise Levels
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LA90
LAeq
Relative Humidity
Temperature
Rainfall
Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

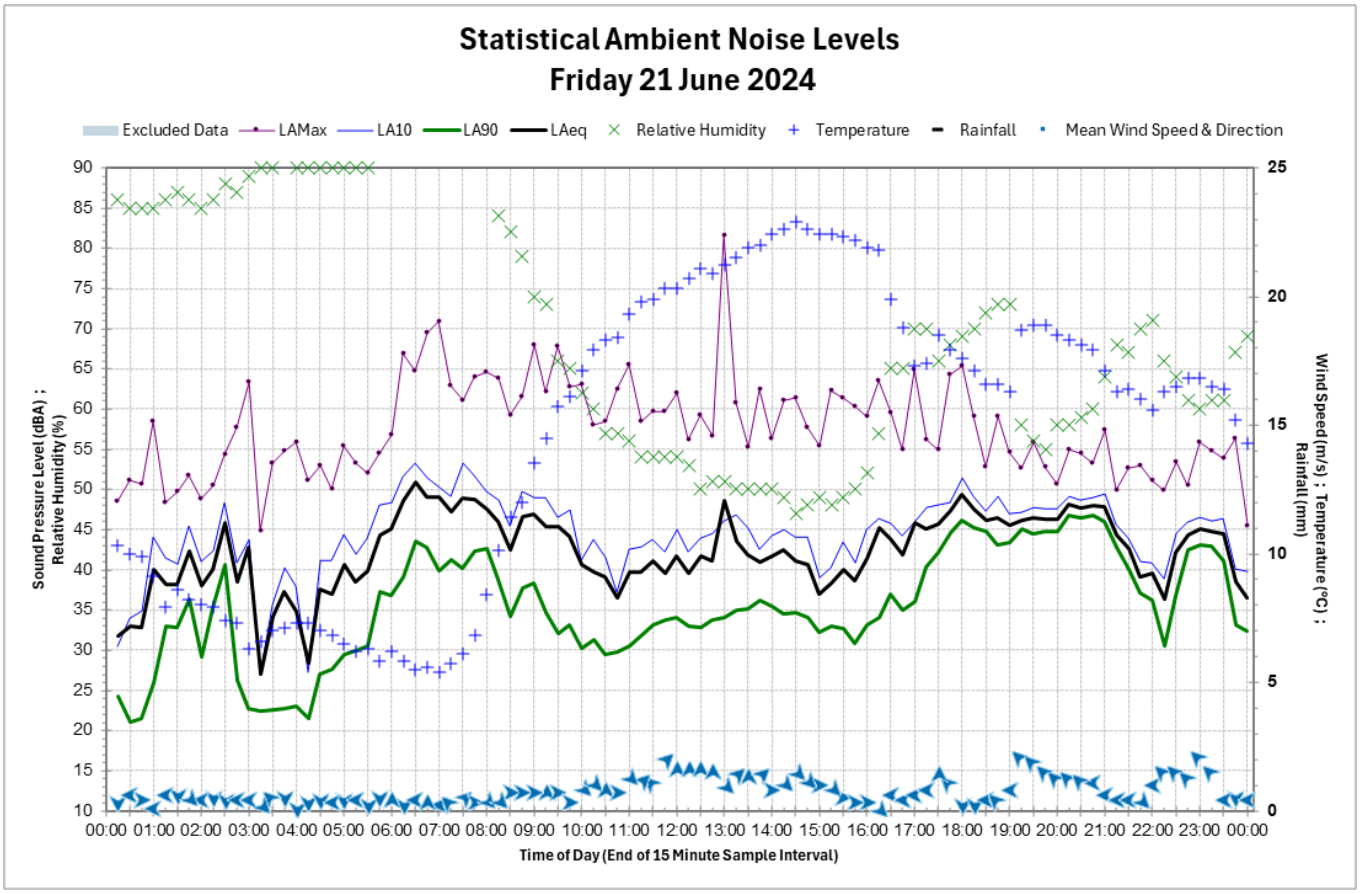

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LA90
LAeq
Relative Humidity
Temperature
Rainfall
Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

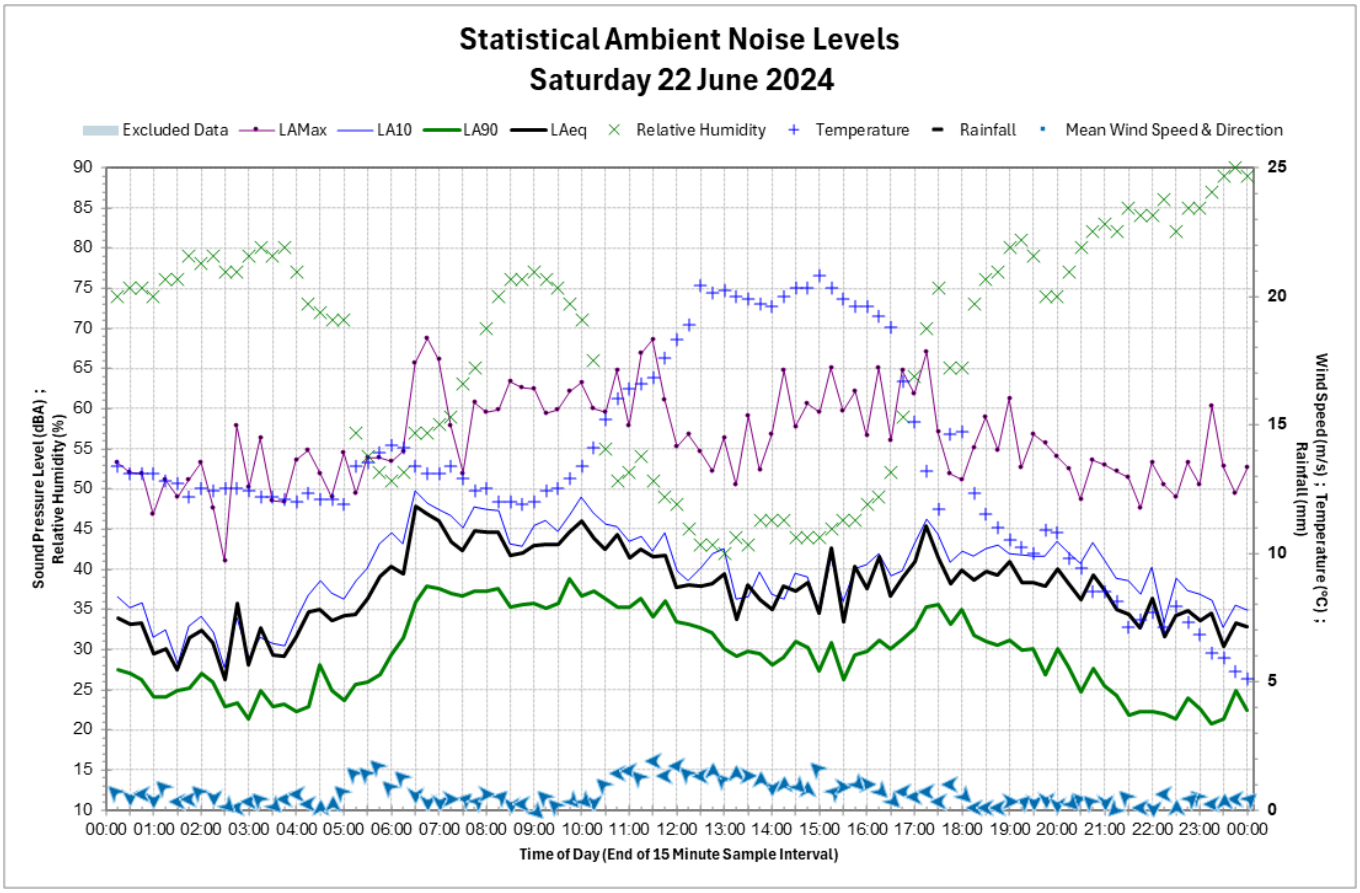

Statistical Ambient Noise Levels
Wednesday 26 June 2024
Excluded Data
LAMax
LA10
LA90
LAeq
Relative Humidity
Temperature
Rainfall
Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

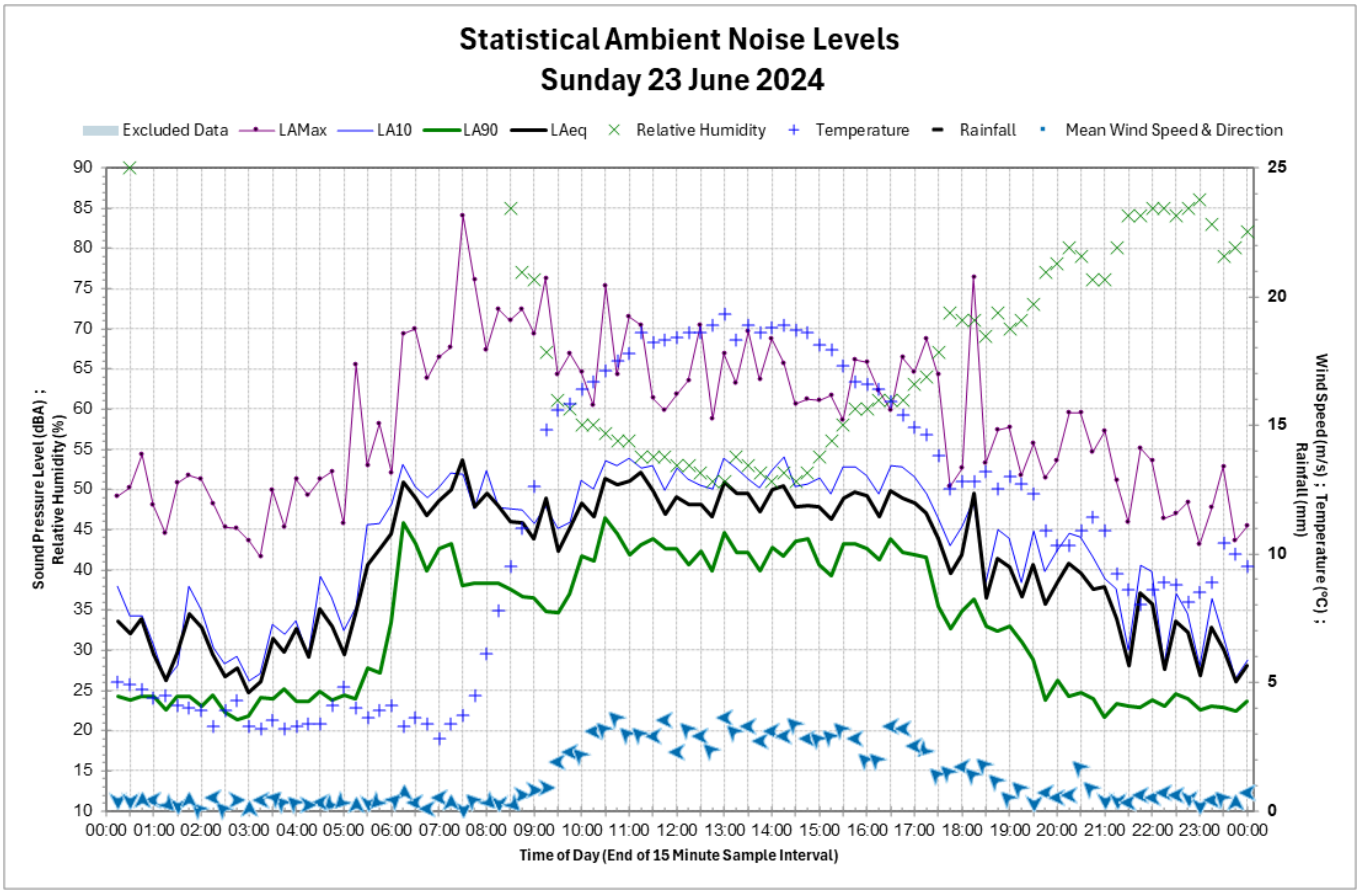
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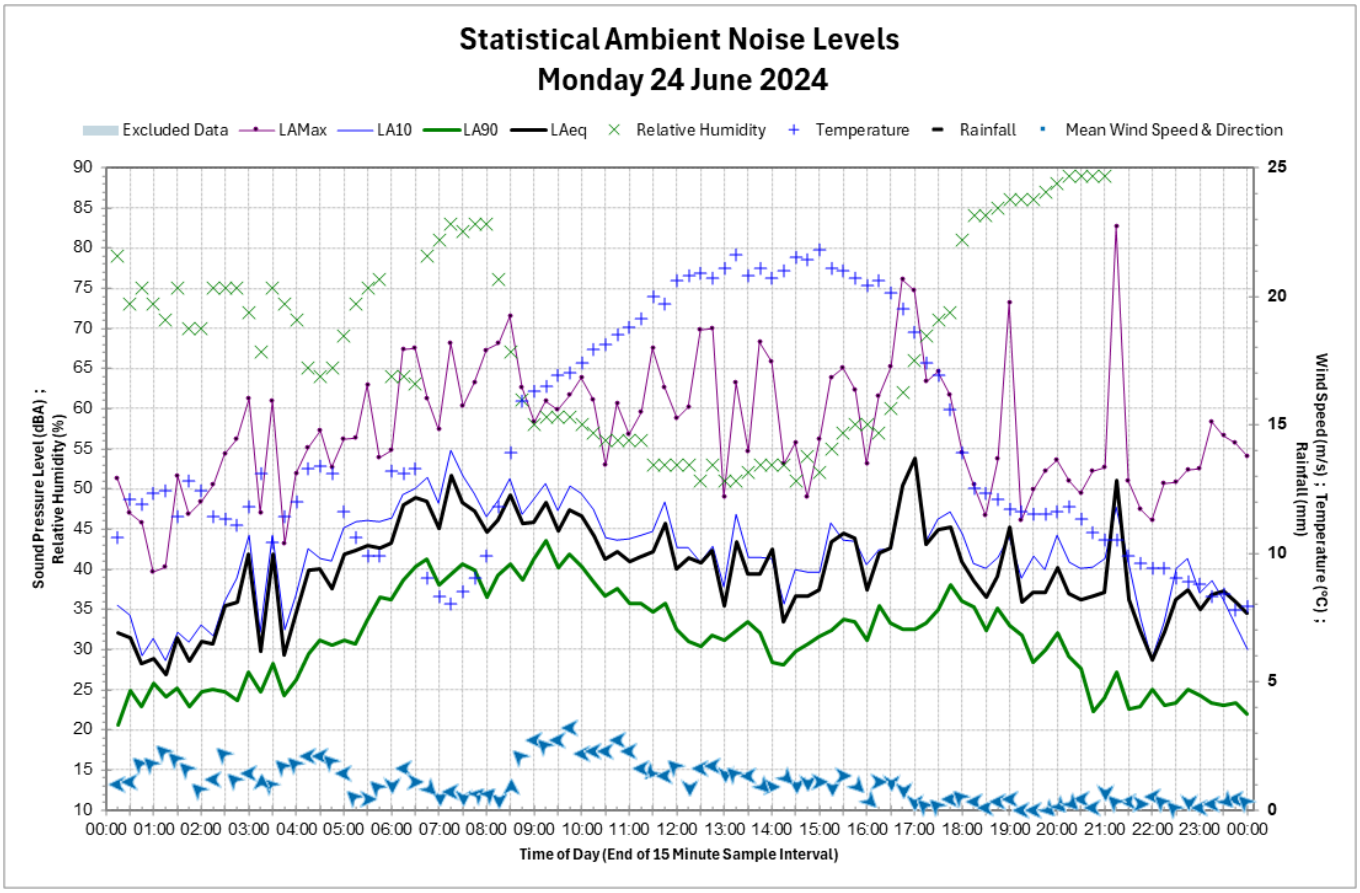


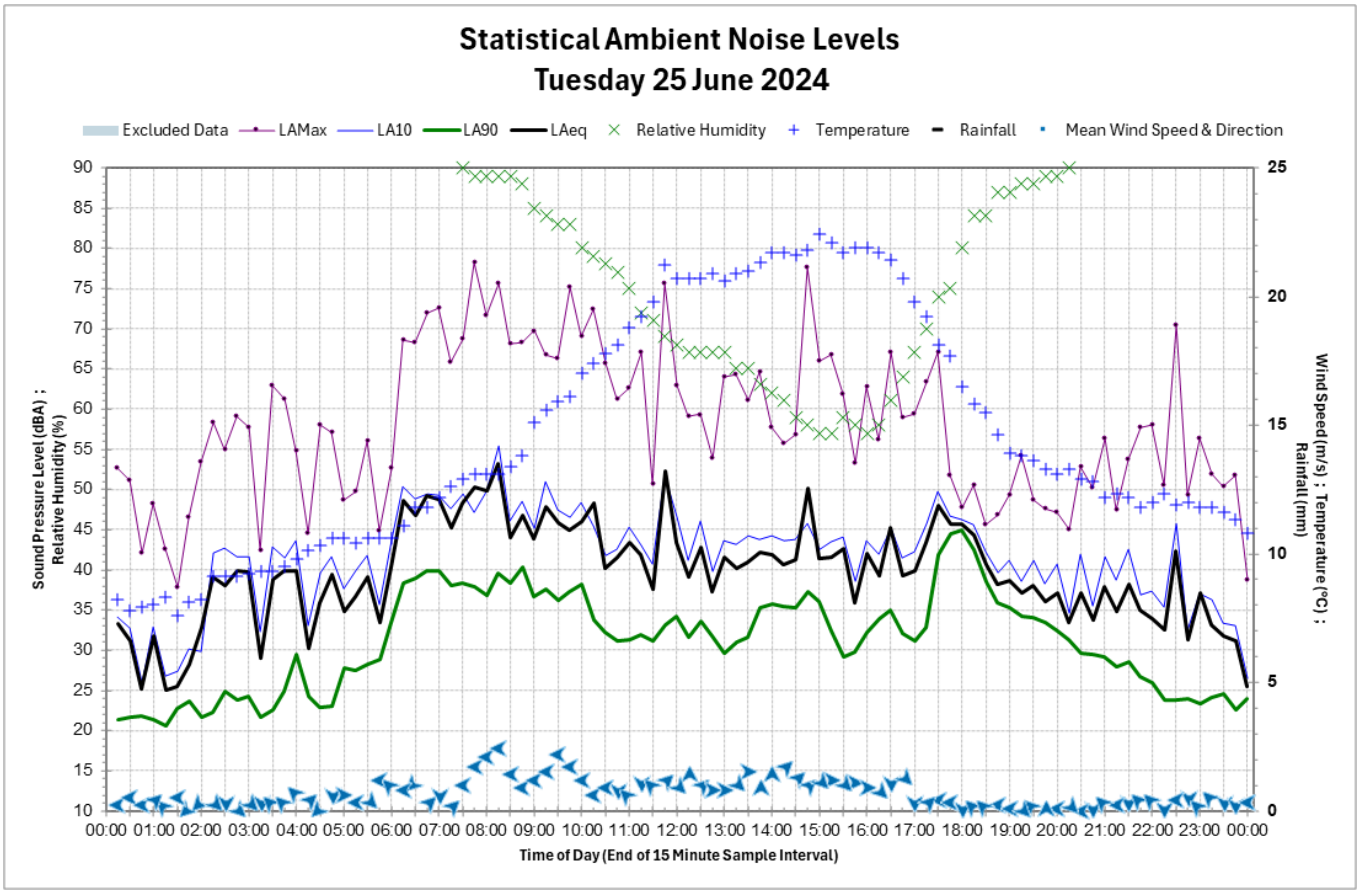



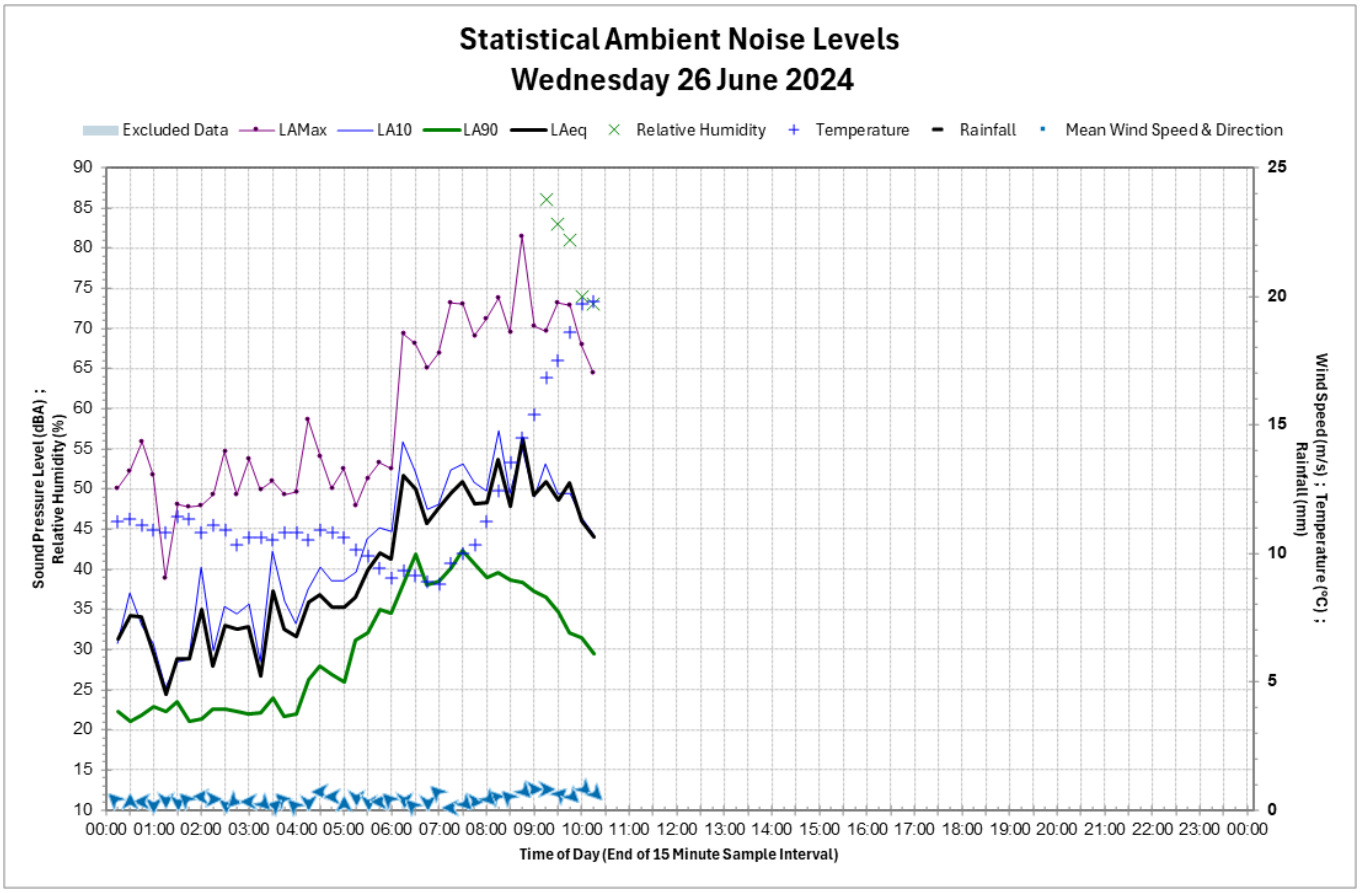

Statistical Ambient Noise Levels
Friday 21 June 2024
Excluded Data
LAMax
LA10
LA90
LAeq
Relative Humidity
Temperature
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Relative Humidity
Temperature
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Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
Wednesday 26 June 2024
Excluded Data
LAMax
LA10
LA90
LAeq
Relative Humidity
Temperature
Rainfall
Mean Wind Speed & Direction
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

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## PAVEMENT IMPACT ASSESSMENT REPORT

# PROPOSED COMPOST MANUFACTURING FACILITY – 260 MITCHELL RD, BROMELTON

JOB NO. 2467 | 26TH OF NOVEMBER 2024




PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

Queensland Government

SDA approval: AP2024/011

## Document Control

| | | | |
|---|---|---|---|
| Project Name | Proposed Compost Manufacturing Facility – 260 Mitchell Rd, Bromelton | Date of Issue | 26/11/2024 |
| Document No. | 2467-REP-Bromelton PIA-FINAL | Discipline | Traffic |
| Subject | Pavement Impact Assessment | Project No. | 2467 |
| Author/ s | Scott Dykman (RPEQ 28861)<br>Harry Wilson | Reviewed by | David Hayward (RPEQ 31378) |
| Prepared for | SOILCO Pty Ltd | Attention to | Jason Gaff |

| Revision | Revision Date | Details | Authorised by |
|---|---|---|---|
| 0 | 15/11/2024 | First Issue | David Hayward (RPEQ 31378) |
| 0.1 | 19/11/2024 | First Issue | David Hayward (RPEQ 31378) |
| 1 | 26/11/24 | Final Issue | David Hayward (RPEQ 31378) |

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# 1 Introduction

## 1.1 Background

DYKMAN Consulting (DC) has been engaged by SOILCO Pty Ltd to undertake a Pavement Impact Assessment (PIA) for the proposed development located on Mitchell Road, Bromelton (Lot 4 on RP85497). The development site is approximately 119.6ha in area.

The proposed development is for a large-scale compost manufacturing facility that will include a compost facility, freshwater dam, leachate ponds, storage areas and a weighbridge. The preliminary proposed site layout is attached in Appendix A.

This PIA is in response to an Information Request from the Department of Transport and Main Roads (TMR) dated 20 September 2024 for the Development Application (AP2024/011). The details of the PIA request are outlined below.

Item 1: *Pavement Impact Assessment*

*State Code 6 of the State Development Assessment Provisions, version 3.0, effective 18 February 2022 provides detailed guidance that supports assessment of the State's interest for the purpose of assessment of an application within the Bromelton SDA area and can be utilised to help demonstrate compliance with the requirements of the Bromelton State Development Scheme 2017.*

*The applicant is required to provide a Pavement Impact Assessment (PIA) which assesses the development's impacts on the State Transport Network and demonstrates compliance with the Bromelton State Development Scheme 2017. It is noted that the proposed development will involve haulage exceeding 10,000 tonnes per year and exceed thresholds under Schedule 20 of the Planning Regulation 2017.*

*The Guide to Traffic Impact Assessment (GTIA) (Chapter 13) requires proponents of development in Queensland to ensure that increased traffic generated by development does not worsen the pavement condition of the state transport network. The development must not damage the pavement of the state transport network and impacts on the pavement condition of the network is determined by undertaking a PIA.*

*The PIA must undertaken in accordance with Guide to Traffic Impact Assessment Practice Note: Pavement Impact Assessment, dated December 2018 (link: https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Guide-to-Traffic-Impact-Assessment).*

Response

Provided herein is the PIA of the proposed development operations traffic generation in accordance with TMR's Guide to *Traffic Impact Assessment Note: Pavement Impact Assessment (December 2018)*.

## 1.2 Scope of this Report

This scope of this PIA report includes the following components:

- Chapter 2 – Existing Conditions
- Chapter 3 – Proposed Development
- Chapter 4 – Development Traffic Operations Assumptions
- Chapter 5 – Pavement Impact Assessment

# 2 Existing Conditions

## 2.1 Subject Site

The development site is located at 260 Mitchell Road, Bromelton, within Scenic Rim Regional Council approximately 8km to the west of Beaudesert as presented in Figure 2.1.




Figure 2.1: Proposed Development Site

## 2.2 Site Access

The development site proposes to establish a private vehicle access driveway on Mitchell Road, approximately 800m to the south-west of the intersection with Beaudesert-Boonah Road.

## 2.3 Road Network Traffic Volumes

The AADT and associated heavy vehicle percentages for the surrounding state-controlled road network is presented in Table 2.1.

Table 2.1: Road Network 2023 AADT and Heavy Vehicle Percentages

| Road Name | Location | AADT | Heavy Vehicle % |
|---|---|---|---|
| BEAUDESERT - NERANG ROAD | West of Brisbane Street | 4740 | 15.3% |
| IPSWICH - BOONAH ROAD | North of Beaudesert – Boonah Rd | 2970 | 18.6% |
| BEAUDESERT – BOONAH ROAD | West of Beaudesert Bypass Road | 3136 | 18.7% |
| MOUNT LINDESAY HIGHWAY (BRISBANE – BEAUDESERT) | North of Brisbane Street | 11088 | 15.1% |

# 3 Proposed Development Details

## 3.1 Site Layout and Description

The site is located on the southern boundary of Mitchell Road, adjacent to Beaudesert-Boonah Road. The proposed development will gain access to the external road network via a new crossover on Mitchell Road at the northern frontage of the site.

The proposed development is for a large-scale compost manufacturing facility that will include:

- A compost facility;
- Freshwater dam;
- Leachate ponds;
- Storage areas; and
- A weighbridge.

## 3.2 Operational Details

The operational arrangements of the site will include the following:

- Average of 15 staff (to a maximum of 20) on site during normal operations
- Total processing volume of 400,000T per annum, including a planned scaled increase in operations:
    - 1-5 years of operation – 15% of total processing volume
    - 6-10 years of operation – 40% of total processing volume
    - 11-15 years of operation – 75% of total processing volume
    - 16-20 years of operation – 100% of total processing volume
- Facility operational arrangements:
    - Facility receivals operating at 10 hours per day
    - 5.5 operational days per week (including Monday to Friday and half day operations on Saturdays)
    - 286 operational days per year

## 3.3 Operational Truck Traffic Generation and Distribution

The expected daily traffic generation by truck type consistent with the L+R Traffic Impact Assessment Report (dated 16 July 2024) is summarised in Table 3.1.

Table 3.1: Operational Truck Traffic Generation Summary

| Operational Truck Type | Yearly Trucks | Daily Truck Trips | Trip Direction | Vehicle Class | Load | Trip Description |
|---|---|---|---|---|---|---|
| Waste Collection Truck | 2860 | 10 | Inbound | 5 | Loaded | Local GO & FOGO Deliveries - Councils etc |
| Walking Floor | 1430 | 5 | Inbound | 7 | Loaded | Long Haul Transfer Contracts |
| High Volume Side Tipper | 5434 | 19 | Inbound | 10 | Loaded | Long Haul Transfer Contracts |
| Rigid Truck & Dog | 4290 | 15 | Inbound | 8 | Loaded | Manufacturing Drop Off |
| Walking Floor | 3718 | 13 | Inbound | 7 | Loaded | Extra Vehicles- Material in - short haul |
| Rigid Truck & Dog | 3718 | 13 | Inbound | 8 | Loaded | Extra Vehicles- Material in - long haul |
| Waste Collection Truck | 2860 | 10 | Outbound | 5 | Unloaded | Trucks leave site empty |
| Walking Floor | 1430 | 5 | Outbound | 7 | Loaded | Walking floors in transport end product out |
| High Volume Side Tipper | 5434 | 19 | Outbound | 10 | Unloaded | Side Tippers Leave Site Empty |
| Rigid Truck & Dog | 10296 | 36 | Outbound | 8 | Loaded | Manufactured out |
| Rigid Truck & Dog | 1430 | 5 | Outbound | 8 | Loaded | Contamination out |

The planned operational truck distribution for the surrounding network is presented in Figure 3.1, highlighting three main origins and destinations for truck trips including:

- Brisbane – via Mount Lindsay Highway (65% of total truck trips)
- Ipswich – via Ipswich-Boonah Road (25% of total truck trips)
- Gold Coast – via Beaudesert-Nerang Road (10% of total truck trips)

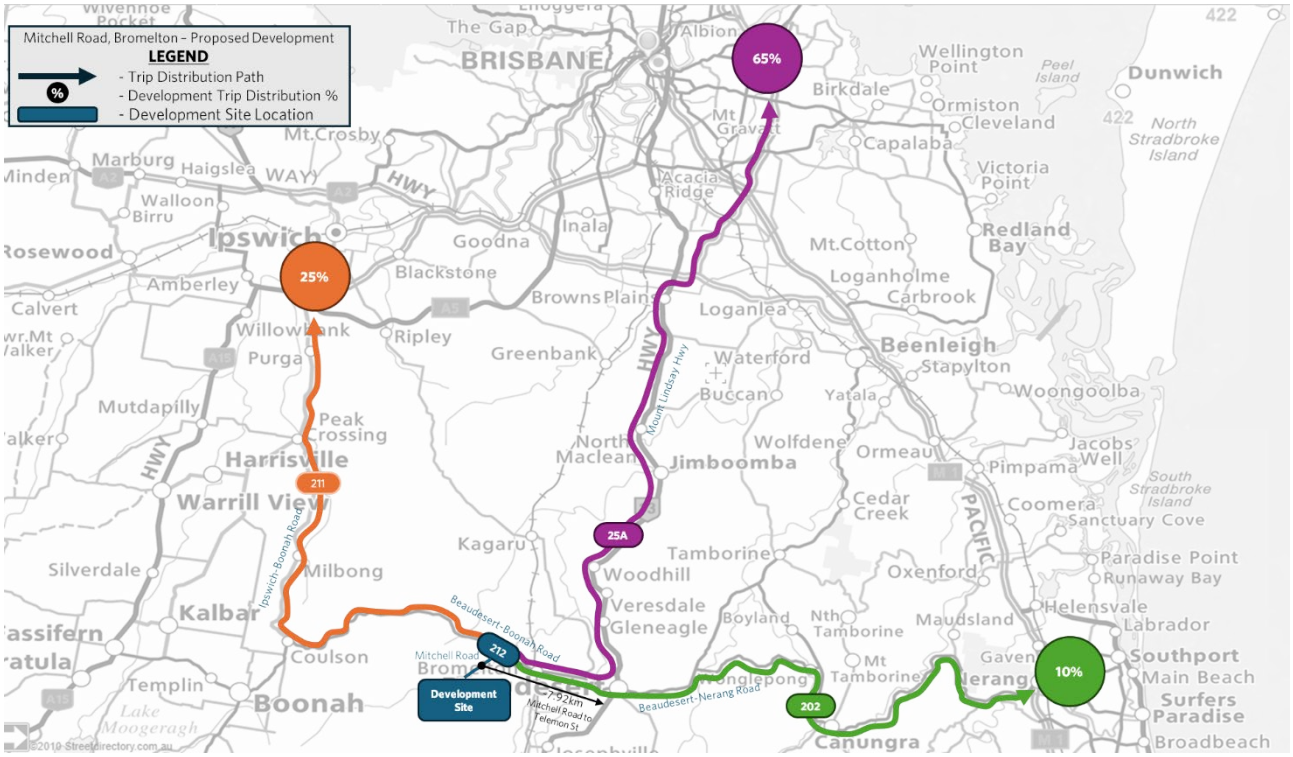



Figure 3.1: Operational Truck Traffic Generation and Distribution Map

# 4 Pavement Impact Assessment

## 4.1 Impact Assessment Area and TMR Road Asset Data

The impact area of the Pavement Impact Assessment includes the state-controlled roads highlighted in Figure 3.1 and are listed in Table 4.1.

Table 4.1: State-Controlled Roads Assessed

| Road ID | Road Name | Start Chainage | End Chainage |
|---|---|---|---|
| 202 | BEAUDESERT - NERANG ROAD | 0 | 52.11 |
| 211 | IPSWICH - BOONAH ROAD | 0 | 34.385 |
| 212 | BEAUDESERT – BOONAH ROAD | 0 | 31.63 |
| 25A | MOUNT LINDESAY HIGHWAY (BRISBANE – BEAUDESERT) | 0 | 41.85 |

The road asset data was provided by TMR on 22nd October 2024 for the roads listed in Table 4.1 to complete the Pavement Impact Assessment.

The pavement types listed in the road asset data for the assessed network is summarised in Table 4.2.

Table 4.2: Pavement Type Descriptions

| ARMIS-derived TMR Pavement Type | FAMLIT Pavement Type | Load Damage Exponent |
|---|---|---|
| Sprayed seal over flexible pavement, including cement modified and lime stabilised layer types C4 and C5 | GN | 4 |
| Sprayed seal or Asphalt over flexible pavement with bitumen stabilised pavement | AC | 5 |
| Asphalt over flexible pavement, including cement modified and lime stabilised layer types C4 and C5 | AC | 5 |
| Sprayed seal over semi rigid/semi rigid composite pavement | CS | 12 |
| Asphalt over semi rigid/semi rigid composite pavement | CS | 12 |

Given the three various pavement types presented in Table 4.2, the relevant design vehicle SARs applied in the Pavement Impact Analysis are presented in Table 4.3.

Table 4.3: Design Vehicle SARs

| Vehicle Type | Vehicle Class | SAR4 | | SAR5 | | SAR12 | |
|---|---|---|---|---|---|---|---|
| | | Loaded SAR | Unloaded SAR | Loaded SAR | Unloaded SAR | Loaded SAR | Unloaded SAR |
| Waste Collection Truck | Class 5 | 4.09 | 0.46 | 4.89 | 0.37 | 17.07 | 0.09 |
| Walking Floor | Class 7 | 5.02 | 0.56 | 5.73 | 0.44 | 15.13 | 0.11 |
| Rigid Truck & Dog | Class 8 | 5.61 | 0.52 | 6.58 | 0.41 | 20.61 | 0.11 |
| High Volume Side Tipper | Class 10 | 6.3 | 0.53 | 7.09 | 0.42 | 17.17 | 0.11 |

All inputs provided in the TMR Road Asset Data have been included in accordance with the GTIA process without adjustment, with the exception of the adopted traffic growth rates which included the following adjustments:

- Any road section with a traffic growth rate of less than 1%, a 1% growth rate was adopted
- Any road section with a traffic growth rate of more than 5%, a 5% growth rate was adopted
- Road sections with a traffic growth rate between 1-5% were adopted

## 4.2 Pavement Contributions

The estimated pavement impacts and resultant contributions have been assessed in accordance with TMR's GTIA. The pavement contribution cost calculation formula per the GTIA is presented in Figure 4.1.

$$\text{Pavement contribution} = \sum_{i=1}^{n} [(C + O)_i \times MC_i \times L_i]$$

where:

| | |
|---|---|
| I | is each road segment triggered |
| C | is construction period SARs |
| O | is operational period SARS for the impact mitigation period |
| MC | is the relevant marginal cost (cents per SAR-km) |
| L | is the length of road section in km |
| N | is the number of road segments triggered in the impact assessment area. |

*Source: TMR*

Figure 4.1: GTIA Pavement Contribution Formula

## 4.3 Summary

Development contributions for each state-controlled road from the proposed development at Bromelton is presented in Table 4.4.

Table 4.4: Proposed Development Pavement Contributions by State-Controlled Road

| Road ID | Road Name | Cost |
|---|---|---|
| 202 | BEAUDESERT - NERANG ROAD | $148,720 |
| 211 | IPSWICH - BOONAH ROAD | $95,653 |
| 212 | BEAUDESERT – BOONAH ROAD | $1,507,683 |
| 25A | MOUNT LINDESAY HIGHWAY (BRISBANE – BEAUDESERT) | $204,512 |
| | TOTAL | $2,018,427 |

Relevant details for each road segment and contribution calculations can be seen in Appendix B. In summary, the development is required to contribute **$2,018,427** over the 20 years of operation from opening, to offset development impacts.

Due to the staged increase of operations of the proposed development commencing in 2026, pavement contributions will not be required until 2031. As part of the development conditions, it is recommended annual development output and truck volume reviews are carried out to ensure contributions remain commensurate with actual pavement impacts to the surrounding state-controlled road network.