## Bushells Ridge Asphalt Plant Upgrade| Designated Development

# ENVIRONMENTAL IMPACT STATEMENT

Prepared for Fulton Hogan Industries Pty Ltd | 2 September 2023


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Hogan

# Bushells Ridge Asphalt Plant Upgrade

## DESIGNATED DEVELOPMENT | ENVIRONMENTAL IMPACT STATEMENT

Prepared for Fulton Hogan Industries Pty Ltd
2 September 2023

PR184

| | Prepared by | Reviewed by |
|---|---|---|
| Name | Luke Farrell | Neville Hattingh |
| Company | Element Environment | Element Environment |
| Position | Principal Environmental Consultant | Director |
| Project Role | Lead Author | Project Director |
| Signature |  |  |
| Date | 1 September 2023 | 2 September 2023 |

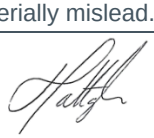


## DOCUMENT CONTROL

| Revision | Date | Description | Prepared by | Reviewed by |
|---|---|---|---|---|
| 0 | 27 February 2023 | For Fulton Hogan review | Element Environment | Fulton Hogan Industries Pty Ltd |
| 1 | 22 June 2023 | For submission to Council | Element Environment | Fulton Hogan Industries Pty Ltd |
| 2 | 2 September 2023 | Amended as requested by Council | Element Environment | Fulton Hogan Industries Pty Ltd |

# Certification Page

Submission of Environmental Impact Statement (EIS) prepared under Part 4 of the NSW *Environmental Planning and Assessment Act 1979*.

| Aspect | Details | |
|---|---|---|
| Name | Luke Farrell | Neville Hattingh |
| Position | Principal Environmental Scientist | Director |
| Project role | Project Manager | Project Director<br>Technical Reviewer |
| Qualifications | Bachelor of Environmental Science | BSc (Hons) Environmental Science |
| Address | Element Environment Pty Ltd<br>PO Box 1563, Warriewood, NSW, 2012 | |
| In respect of | Bushells Ridge Asphalt Plant Upgrade – Environmental Impact Statement | |
| Applicant name | Fulton Hogan Industries Pty Ltd (Fulton Hogan) | |
| Responsible person/applicant | Andrew Lyndon, National Planning Approvals Manager | |
| Responsible person/applicant address | PO Box 682<br>Campbelltown NSW 2560 | |
| Proposed development | Bushells Ridge Asphalt Plant Upgrade | |
| Land to be developed | The site address is 203 Tooheys Road, Bushells Ridge, NSW and is part of lot 10 in deposited plan 834953. | |
| Proposed development description | Fulton Hogan propose to:<br>▪ Remove the current asphalt production limit of 100,000 tonnes per annum (tpa) and increase production up to 400,000 tpa.<br>▪ Increase the current limit on the importation and processing of recycled asphalt pavement from 20,000 tpa to 99,000 tpa.<br>▪ Re-configure and improve existing ancillary infrastructure at the site. | |
| Environmental assessment | This environmental impact statement (EIS) addresses all matters in accordance with Part 4 of the NSW *Environmental Planning & Assessment Act 1979*. | |
| Preparation | This EIS has been prepared by Element Environment Pty Ltd (Element) on behalf of Fulton Hogan. In preparing the EIS, Element has relied upon data, designs and plans and other information provided by Fulton Hogan and other individuals and organisations referenced herein. | |
| Declaration | Pursuant to clause 190(3) of the NSW Environmental Planning and Assessment Regulation 2021, I declare that this EIS:<br>▪ has been prepared in accordance with the requirements of the NSW Environmental Planning and Assessment Act 1979, NSW Environmental Planning and Assessment Regulation 2021, and the Secretary's environmental assessment requirements (SEAR-1714) dated 31 August 2022;<br>▪ contains all available information that is relevant to the environmental assessment of the proposed development to which the document relates; and<br>▪ is true in all material particulars and does not, by its presentation or omission of information, materially mislead. | |
| Signature |  |  |
| Name | Luke Farrell | Neville Hattingh |
| Date | 2 September 2023 | 2 September 2023 |

# EXECUTIVE SUMMARY

## Introduction

Fulton Hogan Industries Pty Ltd (Fulton Hogan) owns and operates the Bushells Ridge Asphalt Plant (the 'site' or 'asphalt plant') at 203 Tooheys Road, Bushells Ridge, New South Wales (NSW).

The asphalt plant was previously approved and constructed under development consent (DA 1511/2016) by Central Coast Council (Council) on 9 April 2018, and permits the asphalt plant to:

- Produce up to 100,000 tonnes per annum (tpa) of asphalt.
- Process 20,000 tpa of reclaimed asphalt pavement (RAP).

The asphalt plant is approved to operate 24 hours a day, seven days a week.

Fulton Hogan propose to:

- Increase production to a maximum of 400,000 tpa.
- Increase the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the site.

The scope of the proposed development application (DA) is hereafter referred to as 'the project'.

This environmental impact statement (EIS) has been prepared for submission to Council to satisfy the provisions of Part 4, Division 4.10 of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act).

## Description of the site and surrounds

The site is at 203 Tooheys Road, Bushells Ridge, NSW (Lot 10 DP 834953) and is approximately 80 kilometres (km) north of Sydney in the Central Coast local government area (LGA).

The project is limited to the existing developed portion of the site currently used for asphalt production.

The site is owned and operated by Fulton Hogan and is zoned as E4 (General Industrial) under the Central Coast Local Environmental Plan 2022 (Central Coast LEP). Wallarah Creek is located approximately 100 m south-west of the asphalt plant, with the extent of the waterway and riparian corridor zoned C2 (Environmental Conservation). The land surrounding the site is zoned E4 to the north, east and west, and SP2 (Infrastructure) to the south.

Access to the site is via Tooheys Road, which runs in an east-west direction and connects Bushells Ridge Road (west of the site) to Motorway Link Road via an interchange directly east of the site.

The closest urban centre to the site is Blue Haven, approximately 1.7 km to the east. Residential properties in Blue Haven are separated from the site by environmental conservation areas, Motorway Link Road and the Main Northern Railway.

The closest residential property to the site is owned by Wyong Coal and is approximately 1 km west, in land zoned for industrial use and to be impacted in the future by the proposed Wallarah 2 Coal Mine. Beyond this, the closest residential dwellings are located approximately 1.6 km east of the asphalt plant in Blue Haven.

## Project overview

Fulton Hogan propose to:

- Increase production of asphalt at the project site from 100,000 tpa to a maximum of 400,000 tpa.
- Increase importation and processing RAP from 20,000 tpa up to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the project site, including:
    - Installing additional hot storage bins at the asphalt plant.
    - Re-configuring the existing office, parking, workshop and laboratory.
    - Adding an additional RAP storage area.
    - Increasing the height of RAP stockpiles.
    - Installing additional bulk material storage bays.
    - Storing additional hazardous substances and dangerous goods.
    - Installing rainwater tanks.
    - Re-configuring approved landscaping areas and providing additional landscaping.
    - Installing a new wastewater treatment system.

The project will not involve any extensions to the existing development footprint, clearing of native vegetation or bulk earthworks.

## Impact assessment

Key environmental matters requiring assessment in the EIS were identified in the scoping report (Element, 2022), which identified the key potential environmental factors or impacts associated with the project.

This comprised determining the key potential environmental impacts during project definition workshops and a site inspection by the project team and relevant environmental consultants. Environmental aspects which could be impacted by the project were organised into the groups defined in DPE's scoping worksheet. The worksheet was used to determine the level of assessment required for each environmental aspect, with levels allocated to 'detailed' or 'standard' assessment, or no assessment required.

The aspects requiring detailed assessment were assessed by technical specialists and the aspects requiring standard assessment were addressed in EIS chapters by Element.

**Noise**

A noise assessment determined the potential effect of the project on nearby sensitive receivers. The assessment was undertaken in accordance with the EPA (2017) Noise Policy for Industry (NPI), the former Department of Environment and Climate Change (DECC) (2009) Interim Construction Noise Guidelines (ICNG), and the former NSW Department of Environment, Climate Change and Water's (DECCW) (2011) Road Noise Policy (RNP).

The assessment determined that predicted noise levels for the project will comply with the construction management levels and operational noise trigger levels at all sensitive receiver locations.

Similarly, the project will achieve compliance with all road traffic noise criteria.

The residual noise impact is the exceedance of the project noise trigger level after all feasible and reasonable mitigation measures have been considered. No residual impacts are predicted at any privately-owned receivers and, therefore, receiver-based treatments or controls are not required.

Management measures will be included in a construction environmental management plan (CEMP) and updated operational environmental management plan (OEMP) and implemented to further reduce the potential for construction and operational noise impacts.

**Air quality**

An air quality impact assessment considered the effects of the project on nearby sensitive receivers. The assessment included the contribution of existing local emission sources and was undertaken in accordance with the EPA's (2017) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.

Air dispersion modelling was used to predict the potential for off-site dust, odour and air pollutant impacts in the surrounding area due to the operation of the project.

It is predicted that all the assessed air pollutants generated by the operation of the project will comply with the relevant assessment criteria at the receptors and therefore will not lead to any unacceptable level of environmental harm or impact in the surrounding area. Cumulative impacts with other nearby activities were also considered, however no potential risks of cumulative impacts arising were identified.

The predicted greenhouse gas (GHG) emissions generated by the project were compared to NSW and Commonwealth annual emissions to determine the project's contribution. The annual average GHG emissions will be approximately 0.005% of the Australian greenhouse emissions for 2021 and approximately 0.018% of the NSW greenhouse emissions for 2019.

Project related GHG emissions will not be significant in the State and national contexts. Notwithstanding, management measures will be implemented to reduce the project's GHG emissions.

A CEMP and updated OEMP will be prepared prior to construction of the project and the commencement of operations respectively. The plans will outline the measures to manage dust emissions at the site and include key performance indicators, response mechanisms, compliance reporting and complaints management.

**Traffic and access**

A traffic assessment determined the potential effect of the project on the capacity of the local and regional road network.

All light and heavy vehicles access the site via Tooheys Road. All vehicles enter and leave the site in an easterly direction, where they access the Motorway Link Road via a grade separated interchange.

From Tooheys Road, the site is accessed via a single entry and exit driveway. The main internal access road splits adjacent to the hazardous substances/dangerous goods storage area, with one roadway providing access to the RAP processing and storage area. The other roadway proceeds to the asphalt plant where vehicles access the bulk material storage bays or proceed clockwise around the back of the storage bays to access the load alley of the asphalt plant and/or depart the site.

Light vehicles proceed directly to the designated parking area adjacent to the office building.

Fulton Hogan uses the following transport routes for importation of products to the site:

- Vehicles travelling to the site from the south travel along the M1 Pacific Motorway and eastbound along Motorway Link Road, before taking the Tooheys Road off ramp, turning left into Tooheys Road and proceeding to the site.

- Vehicles travelling to the site from the north travel westbound along Motorway Link Road before taking the Tooheys Road off ramp, turn right and travel across the vehicular bridge over Motorway Link Road, and proceeding along Tooheys Road to the site.

Fulton Hogan transports asphalt products by road from the site to local and regional consumers using the following transport routes:

- Vehicles travelling south depart the site along Tooheys Road, cross a vehicular bridge across Motorway Link Road before turning right onto the Motorway Link Road on ramp and proceeding along Motorway Link Road to connect to the M1 Pacific Motorway.
- Vehicles travelling north depart the site along Tooheys Road and access the Motorway Link Road on ramp before proceeding east along Motorway Link Road, which merges with the M1 Pacific Highway at Doyalson. Vehicles then continue along the M1 Pacific Highway or Wyee Road to the north.

Heavy vehicles that access and depart the site are typically evenly split between northbound and southbound directions of travel.

The project will import additional RAP and raw materials, and transport additional asphalt product along Tooheys Road and beyond via the same transportation routes. The project will not alter the existing truck types, directional split of traffic to or from the site, with trucks travelling both east and west along Motorway Link Road and beyond. Trucks will have an average of 32 tonne payload.

Approximately 264 vehicle trips will be generated per day, comprising 88 staff vehicles and 176 heavy vehicles. This will equate to 44 inbound and 44 outbound light vehicle movements and 88 inbound and 88 outbound heavy vehicle movements per day.

The assessment demonstrated that the project will not significantly impact road capacity/safety and performance of intersections along the transport routes. Heavy vehicles entering and manoeuvring on site are not predicted to queue on public roads. There is sufficient existing parking to accommodate light and heavy vehicles associated with the project.

**Hazards and risks**

The project will present some minimal hazards and risks, including storage and management of hazardous substances and dangerous goods.

Hazardous substances to be used at the site were screened against the thresholds in DPE's (2011) Applying SEPP 33 to determine if the project will be hazardous or offensive development under State Environmental Planning Policy (Resilience and Hazards) 2021 (Hazards SEPP). The quantities of dangerous goods proposed to be stored and handled for the project will be below the thresholds in Applying SEPP 33 with the exception of liquified petroleum gas (LPG).

A preliminary hazard analysis was prepared to determine:

- if the project would be a hazardous or offensive development under the Hazards SEPP; and
- the general risks from the project to people, property and the environment.

The review and application of the Hazards SEPP found that:

- The potential for hazards associated with the transportation, use and storage of dangerous goods (including biodiesel, diesel, LPG, bitumen and other flammable goods) is unlikely, as dedicated, fully contained storage and handling areas which are compliant with the relevant Australian Standards will be designed and implemented for the project.
- Storage areas will be designed to be separated from the lot boundary and exceed the separation distances required under AS 3780 and AS 1940.

With the implementation of fit-for-purpose management practices for the transport, storage and handling of hazardous substances and dangerous goods used for the project, along with the effective implementation of an emergency response plan and workplace health and safety management systems, the project risk in relation to soil and water contamination, fire, explosion, public safety, road safety, surrounding land uses, or public health and the environment is low.

A variation to the site's existing environment protection licence will be required for the project as it is a scheduled activity under Schedule 1 of the POEO Act. Therefore, if the EPA deems that a license can be granted, which is likely given that potential impacts of the project can be prevented or suitably managed, the project will not be an offensive industry.

The site is on bushfire prone land. The site has been assessed against the aim and objectives of RFS (2019) Planning for Bushfire Protection and with the implementation of recommended bushfire protection measures, the site office and other infrastructure will be sufficiently separated from bushfire hazard vegetation and the risk of bushfire attack will be low.

Fulton Hogan will prepare an update to the existing pollution and incident response management plan, along with a bushfire emergency evacuation and management plan to reflect the project, which will be implemented at the site to reduce hazards and risk associated with the continuation of operations.

**Waste management**

Minimal quantities of waste will be generated during construction and operation of the project.

The project will accept wastes from off-site, which will be processed, with some material re-used in on-site processes and the remainder reused, recycled or disposed off-site. Some waste materials processed off-site will be used on-site in the production of asphalt. Material will be reused on-site to produce asphalt in accordance with the resource recovery exemptions and orders.

All waste generated at the site will be managed in accordance with waste mitigation and management measures detailed in a CEMP and updated OEMP. Waste streams generated will be classified according to EPA's (2014) Waste Classification Guidelines and disposed of accordingly.

**Biodiversity**

The project will be confined to existing operational areas of the site previously cleared of native vegetation. As such, the project will not impact existing remnant native vegetation or landscape plantings at the site and will therefore not directly impact biodiversity values or potential habitat of a threatened species afforded protection under the NSW *Biodiversity Conservation Act 2016* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Indirect impacts may occur during construction and operation of the project, however will be largely confined to the site and immediate surrounds.

A flora and fauna impact assessment has been completed for the project and confirms there is no significant direct or indirect impact to threatened ecological communities, populations or species identified within proximity to the project.

**Visual amenity**

Neighbouring industrial premises on Tooheys Road, along with passing motorists and pedestrians have a degree of visibility into the site through landscape vegetation and of the site frontage and access driveway.

Certain elements of the project will transform the existing visual landscape of the asphalt plant. Where new structures are proposed, such as additional bulk material storage bays and a re-

configured office building, the infrastructure has been designed in a manner which complements the existing industrial setting, including selection of colours and materials which are consistent with those currently installed at the site.

The new administration office will have a maximum height of approximately 5.5 m, while stockpiles of RAP will be stored in the RAP processing area and RAP storage area to a maximum height of 10 m, an increase of 6 m beyond the current maximum stockpile height of 4 m. The re-configured administration office and increased stockpile heights will be visible by neighbouring industrial premises on Tooheys Road, with fleeting views also experienced by passing motorists on Tooheys Road and the Motorway Link Road through landscape vegetation and the site frontage. Despite this change to the current visual landscape of the site, an office building and RAP stockpiles currently exist at the site and the re-configured office and storage of additional RAP in higher stockpiles is consistent with the existing function of the site and is in fitting with an industrial land use.

The project will require night time operations, however existing and approved lighting systems at the site will be sufficient and no upgrade to lighting is required for the project, thereby avoiding the potential for additional impacts to residential receivers and thoroughfare motorists associated with light spill.

With the above considered, the project will not result in substantial changes to the visual amenity of the site or location, or the views of surrounding neighbours or motorists and pedestrians along Tooheys Road or the Motorway Link Road.

**Geology and soils**

The project will require earthworks associated with surface leveling, foundations and trenching for pipelines. The required earthworks will be confined to an area previously disturbed associated with construction of the existing asphalt plant and RAP processing area. Engineering fill was imported to the site to provide level foundations for the construction of the asphalt plant and supporting infrastructure. As such, the proposed earthworks will be confined to soil profiles considered to be a low risk of contamination potential.

No recorded contaminated sites were identified within proximity to the site.

Other than an unforeseen localised hydraulic oil leak from vehicles or machinery associated with construction (and operations in the RAP processing area), the project is unlikely to result in contaminating activities. Following construction, the majority of the site will comprise impermeable hardstand and no potential for soil or groundwater contamination will be generated via ongoing operations in these areas.

**Hydrology**

Wallarah Creek is located approximately 100 m south-west of the asphalt plant. The project site is located outside of the predicted flood extent for 1% annual exceedance probability and the probable maximum events for Wallarah Creek.

The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system.

The project will not involve excavation or earthworks which will affect groundwater resources.

Threats to water quality associated with construction activities includes, the disturbance of soil and movement of sediment, contaminated or otherwise, into nearby stormwater drains and ultimately natural watercourses. The potential also exists for litter and other construction waste to

be mobilised by both wind and stormwater runoff and deposited in stormwater drainage systems and natural watercourses.

The potential for adverse water quality impacts associated with construction of the project will be minimal provided mitigation measures are implemented. These will include erosion and sediment controls installed and maintained in line with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) (the 'Blue Book').

Upon completion of construction works, all disturbed areas will be sealed with concrete hardstand to prevent erosion, thereby negating the risk of long-term erosion and sedimentation impacts.

The project does not include any changes to the existing asphalt plant operations and therefore will not require changes to water usage.

The project will not increase the total area of impervious hardstand previously assessed for the site and will not increase the quantity of stormwater runoff generated by the site and captured in the site's existing stormwater management and detention system.

Whilst the project will increase the consumption of raw materials and RAP at the site, the project will not introduce additional sources or types of pollutants. It is considered that the site's existing stormwater management system is equipped to treat the existing and continued pollutants generated by asphalt plant operations and as such no alteration or upgrade to the existing system is required for the project.

**Heritage**

The project will not impact upon a registered Aboriginal or non-Aboriginal heritage item or heritage value, nor disturb ground that has the potential to support any unidentified items of Aboriginal or non-Aboriginal heritage value.

**Social**

The generation of noise and air quality impacts, along with traffic, visual and access impacts during construction and operation of the project will result in minor amenity impacts on the surrounding community. Specifically, construction and operation of the project may result in:

- Continuation of noise for residents located in the vicinity due to the operation of plant and equipment and general construction works and operations.
- Continuation of traffic and associated road noise for residents located adjacent to the site access and transportation routes.
- Continuation in dust generated during construction and operations, predominantly for receivers in proximity to the site.
- Changes to the visual appearance of the locality.

**Economics**

There will be a positive economic impact from the project through increased expenditure in the local area during construction and operation. The project will enable the supply of asphalt to additional clients in the Central Coast and Hunter regions, who Fulton Hogan would have been unable to supply in the past and who would have had to pay higher costs to source asphalt from suppliers located further away.

## Justification and conclusion

The growth of development in the Central Coast and Hunter region is driven by the Central Coast Regional Plan 2036 (NSW Department of Planning and Environment, 2016) and the Hunter Regional Plan 2036 (NSW Department of Planning and Environment, 2016a). Major infrastructure projects in the Hunter and Central Coast regions driven by these planning policies will be reliant on asphalt, such as that produced at the site.

Asphalt products sought by many major infrastructure projects in NSW are also subject to strict design specifications. Asphalt produced at the site is able to meet these design specifications and is close to a number of the planned major development projects.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to, or development of other potentially more environmentally sensitive locations will be avoided.

The project will ensure the optimal utilisation of an existing industrial development and assist with the supply of essential asphalt to major infrastructure and associated development projects, thereby benefiting the NSW and Australian economies.

It is considered that the project will not result in any significant environmental and social impacts, avoids impacts where feasible, whilst providing Fulton Hogan with flexibility to operate the project effectively and allow the production of asphalt to be commercially viable over the long term.

The project is consistent with the principles of ecologically sustainable development. The assessment has been consistent with the precautionary principle with baseline site and regional environmental data used in predictions of the project's potential impacts. Mitigation and management measures have been proposed where negative impact to the environment is likely to be unavoidable.

The project is consistent with the principle of inter-generation equity as the project will not have significant impacts on surface and groundwater availability or quality, air quality or agricultural land. Therefore, the project will not detract from future generation's access to and equal enjoyment of water, air and agricultural resources.

The project is similarly consistent with the principle of conservation of biological diversity and ecological integrity. The project has been designed to confine operations to previously disturbed areas, thereby avoiding the disturbance of additional remnant vegetation surrounding the site. As such, the design is the most effective way to maintain biological diversity and ecological integrity at the site and surrounding locality, with alternatives considered to result in more severe biodiversity impact.

Local/State government stakeholders and surrounding landholders were consulted during preparation of the EIS. Consistent themes in the consultation were potential impacts of heavy vehicle traffic on the local road network and amenity impacts on nearby residential receivers.

The impact assessments determined the project is unlikely to have significant residual impacts provided the implementation of recommended mitigation and management measures.

On balance, given the need for the project, lack of alternatives, suitability of the site, consistency with plans and policies, minor environmental impacts (subject to recommended mitigation and management measures) and economic benefit of the project, it is clear the project is in the public interest and its approval is likely to benefit the state of NSW.

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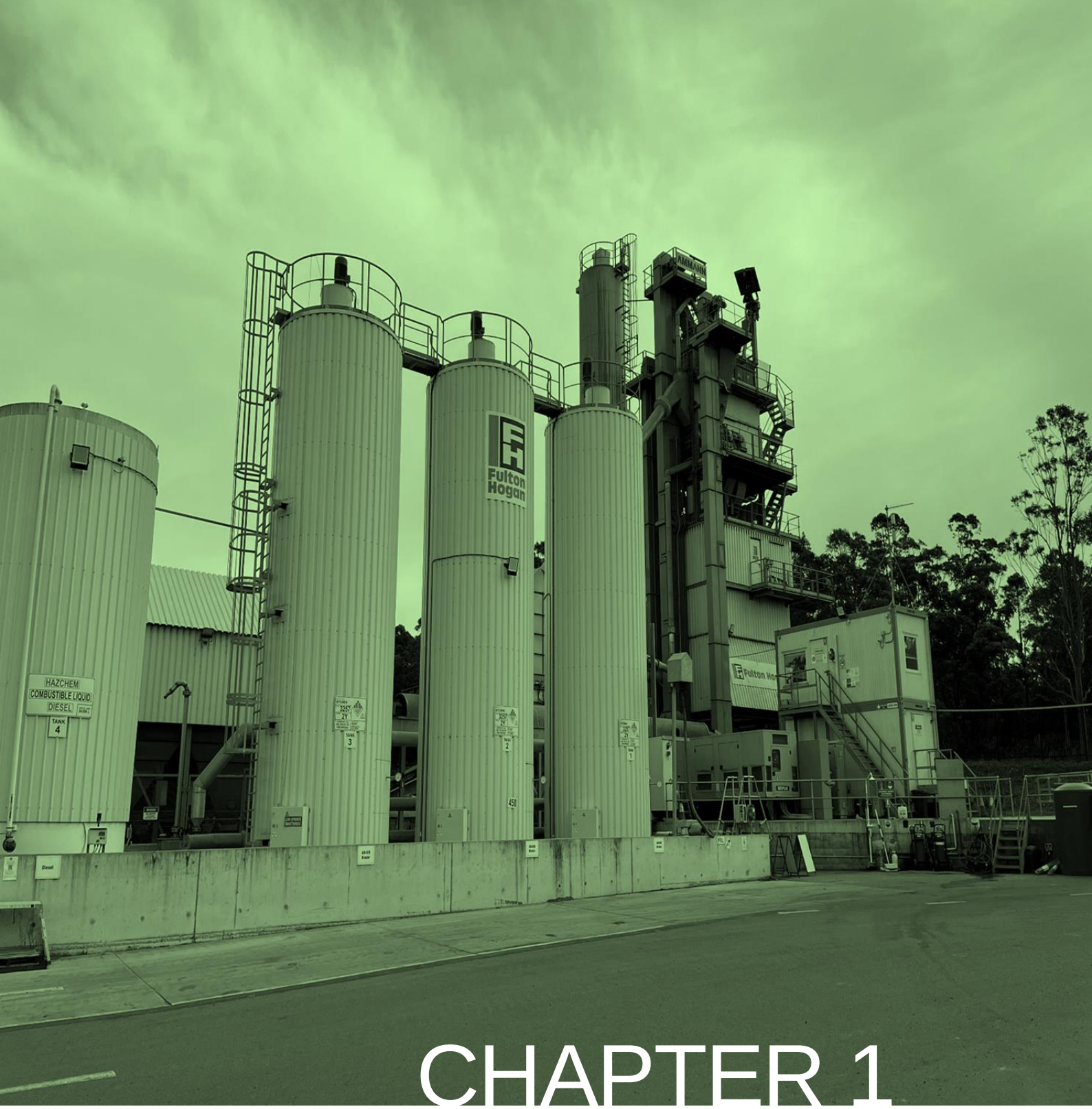
# ABBREVIATIONS

| Abbreviation | Definition |
|---|---|
| ABS | Australian Bureau of Statistics |
| ADG | Australian dangerous goods |
| AEP | Australian exceedance probability |
| AHD | Australian height datum |
| AHIMS | Aboriginal Heritage Information Management System |
| APZ | Asset protection zone |
| AQIA | Air quality impact assessment |
| AS | Australian Standard |
| BCA | Building Code of Australia |
| BC Act | NSW *Biodiversity Conservation Act 2016* |
| BDAR | Biodiversity development assessment report |
| BPM | Bushfire protection measures |
| CEMP | Construction environmental management plan |
| CLM Act | NSW *Contaminated Land Management Act 1997* |
| cm | Centimetre |
| DA | Development application |
| DCP | Development control plan |
| DECCW | Department of Environment, Climate Change and Water (now DPE) |
| DPE | Department of Planning and Environment |
| DPIE | Department of Planning, Industry and Environment (now DPE) |
| EEC | Endangered ecological community |
| Element | Element Environment Pty Ltd |
| EPA | NSW Environment Protection Authority |
| EP&A Act | NSW *Environmental Planning and Assessment Act 1979* |
| EP&A Reg | NSW Environmental Planning and Assessment Regulation 2021 |
| EPBC Act | Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* |
| EPI | Environmental planning instrument |
| EPL | Environment protection licence |
| ESCP | Erosion and sediment control plan |
| ESD | Ecologically sustainable development |
| IBC | Intermediate bulk container |
| ICNG | Interim Construction Noise Guideline (DECC 2009) |
| kL | Kilolitre |
| km | Kilometre |
| L | Litre |
| LEP | Local environmental plan |
| LGA | Local government area |
| LS | Level of service |
| Ltd | Limited |
| m | Metre |
| mm | Millimetre |
| ML | Megalitre |
| M | Million |
| NATA | National association of testing authorities Australia |

| Abbreviation | Definition |
|---|---|
| NCC | National Construction Code |
| NIA | Noise impact assessment |
| NML | Noise management level |
| NPI | Noise policy for industry |
| NPW Act | NSW *National Parks & Wildlife Act 1974* |
| NSW | New South Wales |
| OEH | Office of Environment and Heritage (now DPE) |
| OEMP | Operational environmental management plan |
| PANL | Project amenity noise level |
| PBP | Planning for Bushfire Protection, (A guide for Councils, planners, fire authorities and developers, November 2019, Rural Fire Service, NSW (RFS, 2019)) |
| PHA | Preliminary hazard assessment |
| PINL | Project intrusiveness nose level |
| PNTL | Project noise trigger level |
| POEO Act | NSW *Protection of Environment Operations Act 1997* |
| Pty | Proprietary |
| RFS | NSW Rural Fire Service |
| RMS | Roads and Maritime Service |
| RNP | Road Noise Policy |
| SEPP | State environmental planning policy |
| TEC | threatened ecological community |
| TIA | Traffic impact assessment |
| tpa | tonnes per annum |
| Water Act | NSW *Water Act 1912* |
| WIRES | NSW Wildlife Information, Rescue and Education Service Inc. |
| WM Act | NSW *Water Management Act 2000* |
| WMP | Waste management plan |




# CHAPTER 1

## INTRODUCTION

# 1 INTRODUCTION

## 1.1 Overview

Fulton Hogan Industries Pty Ltd (Fulton Hogan) owns and operates the Bushells Ridge Asphalt Plant (the 'site' or 'asphalt plant') at 203 Tooheys Road, Bushells Ridge, New South Wales (NSW). Refer to Figure 1.1 and 1.2 for the location of the site.

The asphalt plant was previously approved and constructed under development consent (DA 1511/2016) by Central Coast Council (Council) on 9 April 2018, and permits the asphalt plant to:

- Produce up to 100,000 tonnes per annum (tpa) of asphalt.
- Process 20,000 tpa of reclaimed asphalt pavement (RAP).

The asphalt plant is approved to operate 24 hours a day, seven days a week.

Fulton Hogan propose to:

- Increase production to a maximum of 400,000 tpa.
- Increase the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the site.

The scope of the proposed development application (DA) is hereafter referred to as 'the project'.

The project is limited to the existing developed portion of the site currently used for asphalt production, which is illustrated as the 'project site' on Figure 1.2.

This environmental impact statement (EIS) has been prepared by Element Environment Pty Limited (Element), on behalf of Fulton Hogan for submission to Council to satisfy the provisions of Part 4, Division 4.10 of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act).

Figure 1.1
**Regional context**

Bushells Ridge Asphalt Plant
ENVIRONMENTAL IMPACT STATEMENT

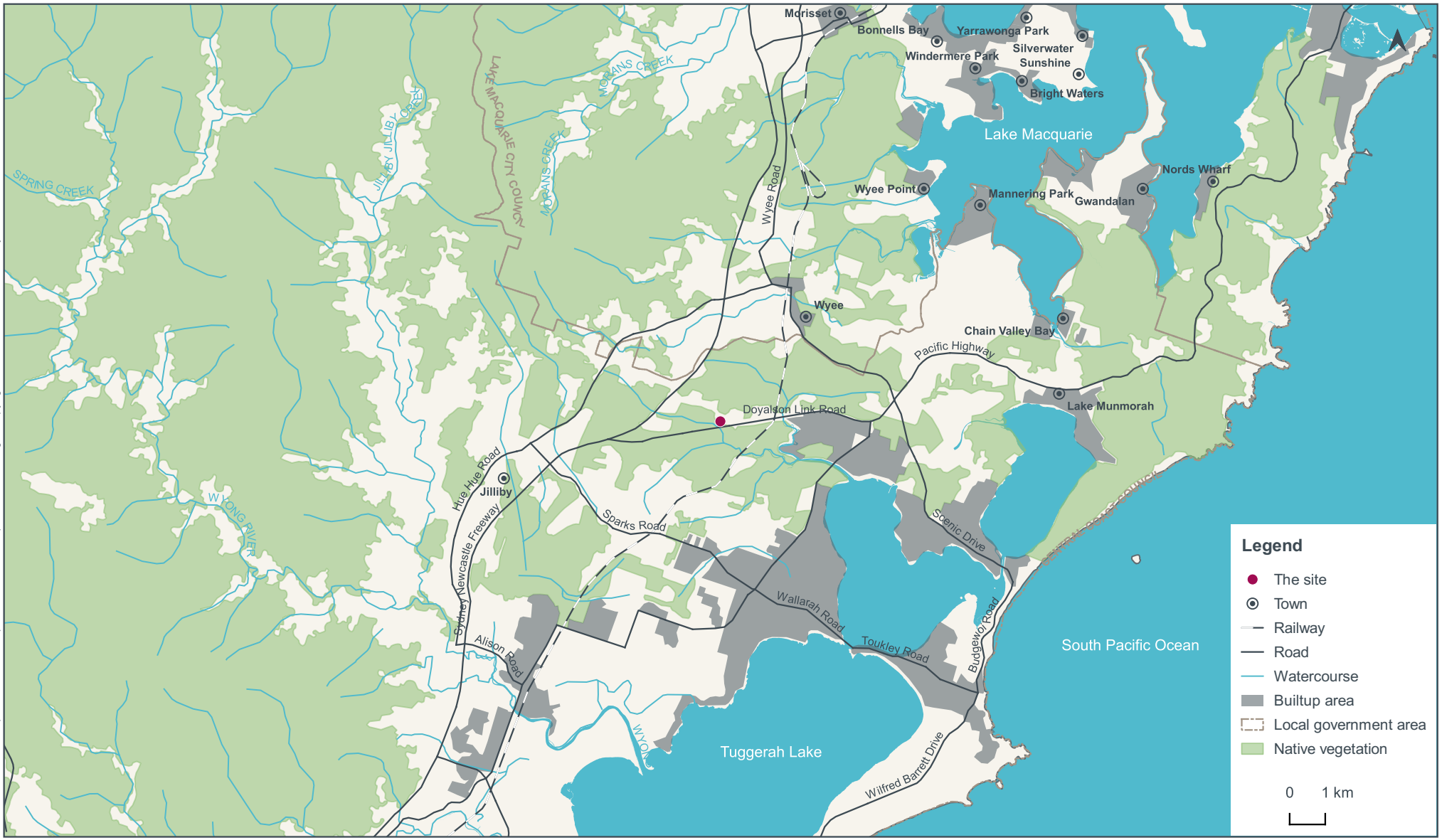


Figure 1.2
**Local context**

Bushells Ridge Asphalt Plant
ENVIRONMENTAL IMPACT STATEMENT




NearMap imagery: 16 April 2022

## 1.2 Existing operations

### 1.2.1 Asphalt plant

The asphalt plant produces an average of 150 tonnes per day and up to 100,000 tpa (up to 1,500 tonnes per day). The asphalt plant also receives and processes up to 20,000 tpa of RAP.

The asphalt plant includes the following components:

- Batching and mixing tower.
- Dust extraction baghouse.
- Aggregate hot elevator.
- Aggregate drier.
- Aggregate screen.
- Electronic weigh hopper (cold feed bins).
- Bitumen kettles.
- Bunded bitumen tank area.
- Surge silos.
- Weighbridge.
- Communication and control centre.
- Load alley.
- Diesel generator.

Asphalt is manufactured at the site via the following process:

- Raw materials are delivered to the site in separate truckloads. Bituminous product (bitumen) is fed into the bitumen tank, while graded aggregates are stockpiled in covered bulk material storage bays.
- Aggregates are prepared by being fed by a front-end loader into a dryer via a cold feed conveyor and then screened into different size fractions.
- Processed RAP is also fed by a front-end loader into the RAP feeder.
- Fine particulates derived from the preparation of aggregates is captured in a baghouse. Any fines are then deposited from the baghouse to a silo and later used in the asphalt mix, thereby constituting a closed system for the management of fines.
- The various raw materials (including aggregate of various graded sizes, RAP, sand, crumbed rubber, recovered glass, steel furnace slag and mineral filler) are mixed together with hot bitumen, according to the specification of the required asphalt mix.
- The product is kept hot to reduce viscosity and to allow it to be worked easily until it is laid at the paving site and compacted.
- The interiors of the dispatch trucks are sprayed with a biodegradable bitumen release agent (Slipway) prior to loading.
- The hot asphalt is loaded onto trucks direct from the plant via a load alley under the storage silos. Pre-mix (cold mix asphalt) can be loaded into trucks as required using the front-end loader.
- All truck loads are then covered and weighed at the weighbridge prior to departing the site.
- The laboratory tests the moisture content and particle size distribution of incoming raw materials to specifications and provides quality assurance of the finished end asphalt product, in accordance with the National Association of Testing Authorities (NATA) scope of accreditation for the site and the Transport for New South Wales (TfNSW) Asphalt Specifications.

### 1.2.2 Site infrastructure

The following ancillary infrastructure supports the operation of the asphalt plant:

- Bulk/raw material storage bays.
- RAP storage and processing area.
- Office and car parking.
- Internal access roadways.
- Laboratory.
- Hazardous substance and dangerous good storage facilities.
- Lighting, signage and perimeter fencing.
- Landscaping and retaining walls.
- Wastewater management infrastructure.
- Stormwater management infrastructure, inclusive of:

    - Stormwater pipes and pits.
    - Oil/water separator.
    - A 7 kilolitre (kL) rainwater tank at the office building.
    - A 18 kL rainwater tank to the rear of the material storage bays.
    - Swale drains.
    - Detention basin totalling 200 square metres ($m^2$), which collects and treats runoff from both the asphalt plant and RAP storage and processing area.
    - A 350 $m^2$ bioretention basin.

Refer to Figure **1.3** for the approved layout of the site and location of site infrastructure.

Figure 1.3
**Approved project**

Bushells Ridge Asphalt Plant
ENVIRONMENTAL IMPACT STATEMENT




Nearmap imagery: 16 April 2022

### 1.2.3 Site access and product transportation

Approximately 16 vehicles access the site per hour and include:

- Light vehicles of staff, delivery drivers, visitors and customers.
- Heavy vehicles delivering RAP, consumables and raw materials.
- Heavy vehicles collecting asphalt for dispatch.

All light and heavy vehicles access the site via Tooheys Road. All vehicles enter and leave the site in an easterly direction, where they access the Motorway Link Road via a grade separated interchange.

From Tooheys Road, the site is accessed via a single entry and exit driveway. The main internal access road splits adjacent to the hazardous substances/dangerous goods storage area, with one roadway providing access to the RAP processing and storage area. The other roadway proceeds to the asphalt plant where vehicles access the bulk material storage bays or proceed clockwise around the back of the storage bays to access the load alley of the asphalt plant and/or depart the site.

Light vehicles proceed directly to the designated parking area adjacent to the office building.

Fulton Hogan uses the following transport routes for importation of products to the site:

- Vehicles travelling to the site from the south travel along the M1 Pacific Motorway and eastbound along Motorway Link Road, before taking the Tooheys Road off ramp, turning left into Tooheys Road and proceeding to the site.
- Vehicles travelling to the site from the north travel westbound along Motorway Link Road before taking the Tooheys Road off ramp, turn right and travel across the vehicular bridge over Motorway Link Road, and proceeding along Tooheys Road to the site.

Fulton Hogan transports asphalt products by road from the site to local and regional consumers using the following transport routes:

- Vehicles travelling south depart the site along Tooheys Road, cross a vehicular bridge across Motorway Link Road before turning right onto the Motorway Link Road on ramp and proceeding along Motorway Link Road to connect to the M1 Pacific Motorway.
- Vehicles travelling north depart the site along Tooheys Road and access the Motorway Link Road on ramp before proceeding east along Motorway Link Road, which merges with the M1 Pacific Highway at Doyalson. Vehicles then continue along the M1 Pacific Highway or Wyee Road to the north.

Heavy vehicles that access and depart the site are typically evenly split between northbound and southbound directions of travel.

### 1.2.4 Employment

Fulton Hogan employ 20 full time staff at the asphalt plant (inclusive of one road laying crew).

### 1.2.5 Operating hours

The asphalt plant is approved to operate 24 hours per day, seven days a week. Typically, day shift is Monday to Saturday commencing at 6 am, with night shift Sunday to Thursday commencing at 6 pm.

### 1.2.6 Mobile plant and equipment

Mobile equipment operated at the site comprises:

- Prosizer crusher for RAP.
- Three front-end loaders (capacity nine tonnes).
- Bobcat.
- Water tanker.
- Semi-trailers, truck and dogs and rigid body trucks delivering raw materials to the site and dispatching asphalt product.
- Rigid body trucks to move RAP around the site.

Other equipment including pavers, rollers, trailers and other road paving equipment are stored at the site however not used in site operations.

### 1.2.7 Utilities and services

The following section summarises the availability of existing services and utilities at the site.

#### Electricity

The site is not connected to the electricity network and the site is powered by a diesel generator located at the asphalt plant.

#### Water

Rainwater tanks were installed adjacent to the office building and material storage bays (7 kL and 18 kL respectively) to capture rainwater from roofed structures for use in on-site ablutions, dust suppression and irrigation.

A water truck is also used on a campaign basis to provide water for dust suppression and top up rainwater tanks in extended dry periods. Bottled potable water is brought to site.

#### Wastewater

A holding tank captures wastewater from the site office, kitchen and amenities, with a second holding tank capturing wastewater from the laboratory amenities.

Both holding tanks are pumped out weekly by a licensed contractor for off-site disposal as liquid waste.

### 1.2.8 Planning approval history and licences

The site has been the subject of several development consents and various licences as outlined in Table 1.1 and Table 1.2.

**Table 1.1 Planning approval history**

| Development consent | Date of approval | Details | Status |
|---|---|---|---|
| DA/1402/2005 | 22 November 2005 | Subdivision into 29 industrial lots. | Lapsed |
| DA/1402/2005A | 28 November 2007 | Subdivision into 29 industrial lots (amended application). | Lapsed |
| DA/1402/2005B | 12 April 2010 | Subdivision into 29 industrial lots. | Lapsed |

| Development consent | Date of approval | Details | Status |
|---|---|---|---|
| DA/552/2010 | 23 September 2010 | Subdivision into 18 industrial lots (including 17 development lots and one residual lot to be dedicated to Council). | Surrendered |
| DA/552/2010A | 23 December 2015 | Subdivision into 18 industrial lots (amended application). | Withdrawn |
| DA/552/2010B | 8 January 2016 | Subdivision into 18 industrial lots (amended application including a revised subdivision layout which consolidated proposed lots 1-3 into a single allotment). | Surrendered |
| DA/251/2016 | 26 May 2016 | Subdivision of the previous consolidated lot into two lots. | Lapsed |
| DA/552/2010C | 27 May 2016 | Subdivision into 18 industrial lots (amended application to change the approved subdivision layout (including a reduction in the number of lots) and provide staging of the subdivision). | Lapsed |
| DA/1511/2016 | 9 April 2018 | Construction and operation of an Asphalt plant. | Current |
| DA/251/2016A | 31 May 2018 | Subdivision into two lots (amended application). | Current |
| DA/1511/2016A | 4 September 2018 | Amendment to a condition of consent associated with alteration of the asphalt plant layout in response to biodiversity constraints. | Current |
| DA/1511/2016B | 28 March 2019 | Amendment of conditions of consent. | Current |
| DA/1511/2016C | 5 November 2020 | Addition of waste products (crumbed rubber, recovered glass sand and steel furnace slag) stored at the site and used within the production of asphalt. | Current |

**Table 1.2 Licences and permits**

| Description | Licence number and authority | Comments |
|---|---|---|
| Environment Protection Licence (EPL) | EPL 21239 | Permits the processing of up to 20,000 tpa of RAP and storage of up to 12,500 tonnes of RAP at any one time. |

## 1.3 Project objectives

The project has the following main objectives:

- Enable the production of up to 400,000 tpa of asphalt at the site.
- Enable the importation and processing of up to 99,000 tpa of RAP for use in asphalt production.
- Enable the reconfiguration and improvement of existing site infrastructure at the plant to avoid the need to disturb additional areas.
- Continue operations at an approved facility in an appropriately zoned parcel of land, and in a location convenient to principal market areas, with direct access to major transport routes.
- Ensure that environmental impacts from noise, dust and odour are minimised and do not impact adversely on the surrounding locality.
- Ensure that there are no adverse impacts upon water quality as a result of site runoff or treatment of wastewater.
- Ensure that up-to-date technology is utilised in the production of asphalt to service the needs of the community.

## 1.4 Project summary

The project is summarised in Table 1.3 and described in detail in Chapter 3.

**Table 1.3 Project summary**

| Project element | Summary |
|---|---|
| Project site area | 34,809 $m^2$. |
| Maximum height (of tallest component) | 31 metres (m) – existing. |
| Annual production | ▪ Asphalt – up to 400,000 tpa.<br>▪ RAP (for use in asphalt production only) – up to 99,00 tpa. |
| Transport | Materials used in the production of asphalt that will be transported to the site include:<br>▪ Unprocessed RAP – up to 99,000 tpa.<br>▪ Aggregates – up to 318,000 tpa.<br>▪ Bitumen – up to 24,000 tpa.<br>▪ Hydrated lime – up to 6,000 tpa.<br>▪ Recycled glass – up to 10,000 tpa.<br>▪ Crumbed rubber – up to 4,000 tpa.<br>▪ Steel furnace slag – up to 10,000 tpa.<br>▪ Diesel – up to 3,600,000 litres per annum (lpa).<br>▪ Biodiesel – up to 125,000 lpa.<br>▪ Other chemicals/additives:<br>- Up to 24,000 L of Slipway in 2,000 L intermediate bulk container (IBC) totes deliveries.<br>- Up to 7,000 L of toluene and 2,300 L of ethanol (laboratory solvent) in 20 L drum deliveries.<br>- Up to 50,000 L of bitumen emulsion (cationic water-based bitumen emulsion) in 10,000 L deliveries.<br>▪ Up to 400,000 tpa of asphalt produced on site will be transported to regional projects as required and typically in 32 t deliveries. |
| Storage/stockpiling | The following volumes of materials used in asphalt production will be stockpiled/stored on site at any one time:<br>▪ Unprocessed RAP – up to 18,431 tonnes.<br>▪ Processed RAP– up to 6,702 tonnes.<br>▪ Aggregates – up to 3,600 tonnes in the existing bulk material storage bays adjacent to the asphalt plant and additional bulk material storage bays in the RAP processing area.<br>▪ Steel furnace slag – up to 600 tonnes in the bulk material storage bays in the RAP processing area.<br>▪ Recycled glass – up to 270 tonnes in the bulk material storage bays in the RAP processing area.<br>▪ Hydrated lime – up to 22 tonnes.<br>▪ Crumbed rubber – up to 100 tonnes in the RAP processing area.<br>▪ Bitumen – up to 204,000 L stored in three existing 48,000 L and an additional 60,000 L self-bunded bitumen tanks.<br>▪ Diesel – up to 54,000 L in a self-bunded tank.<br>▪ Biodiesel – up to 10,000 L in a self-bunded tank.<br>▪ Other chemicals/additives:<br>- Up to 4,000 L of Slipway.<br>- Up to 2,000 L of toluene and 1,000 L of ethanol (laboratory solvent) in 20 L drum deliveries.<br>- Up to 15,000 L of bitumen emulsion (cationic water-based bitumen emulsion). |
| Site establishment and timeframe | Minor earthworks are required to establish the project and will involve:<br>▪ Minor surface leveling for construction of additional bulk material storage bays and concrete slabs.<br>▪ Piled foundations for additional hot storage bins and office / lab building.<br>▪ Minor trenching for utility infrastructure including wastewater pipelines.<br>Civil works to establish the site will take approximately four months. |

| Project element | Summary |
|---|---|
| Construction phase vehicles | There will be a maximum of four heavy vehicles and 10 light vehicles per day during construction.<br>Heavy vehicle routes delivering concrete and other general construction materials for the civil work will be via the same access routes as operational vehicles. |
| Operational phase vehicles | There will be 176 heavy vehicles movements (88 two-way movements) per day with vehicles dispatching asphalt product and delivering raw materials and other chemicals/additives.<br>An additional 88 light vehicle movements (44 two-way movements) will be generated per day associated with employees, resulting in a maximum of 264 vehicle movements to and from the site per day.<br>During a peak hour of operation, the project will generate 56 heavy vehicle movements and 44 light vehicle movements resulting in a maximum of 100 vehicle movements per hour (37 inbound movements and 63 outbound). |
| Construction phase hours | Construction will occur between 7 am to 6 pm Monday-Friday and 8 am to 1 pm on Saturdays. Construction on Sundays and public holidays will be avoided. |
| Operating hours | 24 hours per day, seven days a week. |
| Construction phase employment | Up to 10 construction employees on site at any one time. |
| Operational employment | The project will provide employment for 20 full time staff. |
| Site access | All raw materials will be transported to site via the Motorway Link Road and Tooheys Road.<br>The existing access driveway for the site is shown on Figure **1.3**. |
| Car parking | The project requires up to 20 car parking spaces to accommodate employees. A total of 32 light vehicle parking spaces (inclusive of one accessible car space) will be provided adjacent to the site office. |
| Capital investment value (CIV) | $6,080,956 (excluding GST). |

## 1.5 The applicant

The applicant for the project is Fulton Hogan, with company and contact details in Table 1.4.

**Table 1.4 Applicant details**

| Item | Detail |
|---|---|
| Project contact | Andrew Lyndon, National Planning Approvals Manager |
| Postal address | PO Box 682<br>Campbelltown NSW 2560 |
| ABN | 54 000 538 689 |
| Site owner | Fulton Hogan |

Fulton Hogan has more than 80 years' experience as asphalt manufacturers and road surfacing experts and have developed world-leading best practices for producing high-performance road and pavement surfaces.

## 1.6 Document purpose

Clause 8(1) of Schedule 3 of the NSW Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) declares any facility that will produce more than 150 tonnes per day or 30,000 tonnes of bituminous materials per year to be designated development.

Additionally, clause 45(2) of Schedule 3 of the EP&A Regulation declares a waste management facility to be designated development if the facility or works has an intended handling capacity of

more than 30,000 tonnes per year of waste such as glass, plastic, paper, wood, metal, rubber or building demolition material.

The project will produce up to 400,000 tpa of asphalt and import and temporarily store up to 99,000 tpa of RAP prior to processing. As such, the project is designated development and requires an EIS to accompany the development application under Part 4, Division 4.3, Schedule 4.10 of the EP&A Act.

This EIS has been prepared in accordance with the form and content requirements specified in Division 5, clauses 190 and 192 of the EP&A Regulation.

The primary objective of this EIS is to inform the public, government authorities and other stakeholders about the project and the measures that will be implemented to mitigate, manage and/or monitor potential impacts, together with a description of the remaining social, economic and environmental impacts.

## 1.7 Secretary's environmental assessment requirements

This EIS addresses the specific requirements in the Secretary's environmental assessment requirements (SEARs) issued by DPE on 31 August 2022. The SEARs are in Appendix A along with identification on where each requirement has been addressed in the EIS. The EIS has also been prepared with input from several technical specialists.

The SEARs relevant to each environmental aspect are also provided at the introduction of each chapter for ease of reference.

## 1.8 Document structure

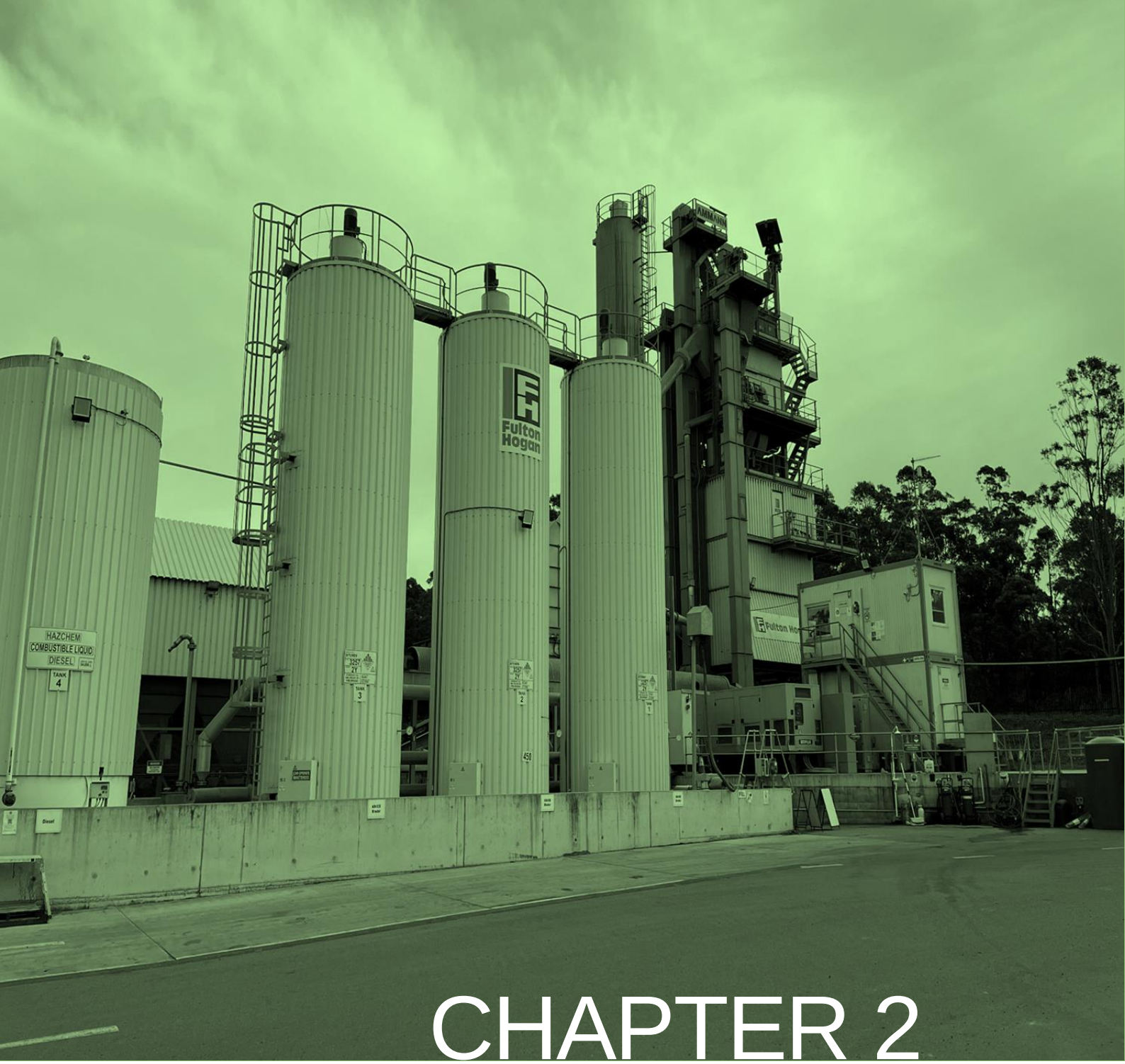
This EIS includes the main report that describes the project in the context of the existing environment, the planning framework, key environmental issues, potential impacts, proposed mitigation measures and residual impacts. It is informed by the technical assessments contained in the appendices and provides a concise summary of these specialist assessments.

The structure of the EIS is summarised in Table 1.5.

**Table 1.5 EIS structure**

| Chapter | Content |
|---|---|
| **Main report** | |
| Preliminary | ▪ EIS certification.<br>▪ Executive summary.<br>▪ Abbreviations. |
| Chapter 1: Introduction | ▪ Discusses the background to the project.<br>▪ Introduces the project and the applicant.<br>▪ Provides a description of the historical site ownership, planning approval history, and existing operations.<br>▪ Provides the document structure.<br>▪ Provides an overview of the approval process and SEARs issued for the project. |
| Chapter 2: Strategic context | ▪ Provides an outline and description of the existing site status, location, land use and a description of the surrounding environment.<br>▪ Discusses the justification for the project. |
| Chapter 3: Project description | ▪ Describes the project including construction and operational parameters. |

| Chapter | Content |
|---|---|
| | ▪ Provides a comparison of the project operations against those of the existing operations. |
| Chapter 4: Engagement | ▪ Describes the engagement and consultation strategies of the project.<br>▪ Summarises feedback and consultation received from stakeholders. |
| Chapter 5: Statutory context | ▪ Identifies the applicable local and regional environmental planning instruments, the relevant State and Commonwealth environment and planning legislation and regulations and discusses other approvals and permits that may be applicable to the project. |
| Chapter 6: Environmental assessment approach | ▪ Introduces the approach taken by the project team to identify key environmental, social and economic issues associated with the project and how these issues were considered in the assessment. |
| Chapter 7 - 11: Environmental impact assessment | ▪ These chapters assess key environmental issues, and the potential impact of the project.<br>▪ Describe the management measures proposed to mitigate and reduce potential adverse environmental risk of the project and/or offset any unavoidable impacts. |
| Chapter 12: Other environmental matters | ▪ Includes other environmental matters not assessed as key environmental issues. |
| Chapter 13: Environmental management | ▪ Provides a consolidated summary of all management measures and outlines Fulton Hogan's approach to responsible environmental management, monitoring and reporting of the project. |
| Chapter 14: Justification of the project | ▪ Draws conclusions based on the overall impacts and benefits of the project. |
| Chapter 15: References | ▪ Contains references used in this EIS. |
| **Appendices** | |
| Appendix A: Secretary's environmental assessment requirements | ▪ Secretary's environmental assessment requirements including government agency response letters to the scoping report. |
| Appendix B: Flora and fauna impact assessment report | ▪ Flora and fauna impact assessment report (Land Eco, 2023). |
| Appendix C: Plans and drawings | ▪ Drawings of the project including the general layout plan. |
| Appendix D: Wastewater management report | ▪ Wastewater management report (DCW, 2022). |
| Appendix E: Stakeholder engagement | ▪ Stakeholder engagement letters and responses. |
| Appendix F: Noise impact assessment report | ▪ Noise impact assessment (SLR, 2023). |
| Appendix G: Air quality impact assessment report | ▪ Air quality impact assessment (TAS, 2023). |
| Appendix H: Traffic impact assessment report | ▪ Traffic impact assessment (McLaren, 2023). |
| Appendix I: Preliminary hazard analysis report | ▪ Preliminary hazard analysis (SLR, 2023a). |
| Appendix J: Bushfire hazard assessment report | ▪ Bushfire hazard assessment (Peterson, 2023). |




# CHAPTER 2

## STRATEGIC CONTEXT

# 2 STRATEGIC CONTEXT

## 2.1 Location

The site is at 203 Tooheys Road, Bushells Ridge, NSW (Lot 10 DP 834953) and is approximately 80 kilometres (km) north of Sydney in the Central Coast local government area (LGA) (refer to Figure 1.1 and 1.2).

The asphalt plant is located on part of Lot 10 DP834953, with the balance of the lot currently retained in a rural / conservation state.

## 2.2 Site suitability and character

### 2.2.1 Zoning and land use

The site is owned and operated by Fulton Hogan and is zoned as E4 (General Industrial) under the Central Coast Local Environmental Plan 2022 (Central Coast LEP).

Wallarah Creek is located approximately 100 m south-west of the asphalt plant, with the extent of the waterway and riparian corridor zoned C2 (Environmental Conservation).

The land surrounding the site is zoned E4 to the north, east and west, and SP2 (Infrastructure) to the south (refer to Figure 2.1).

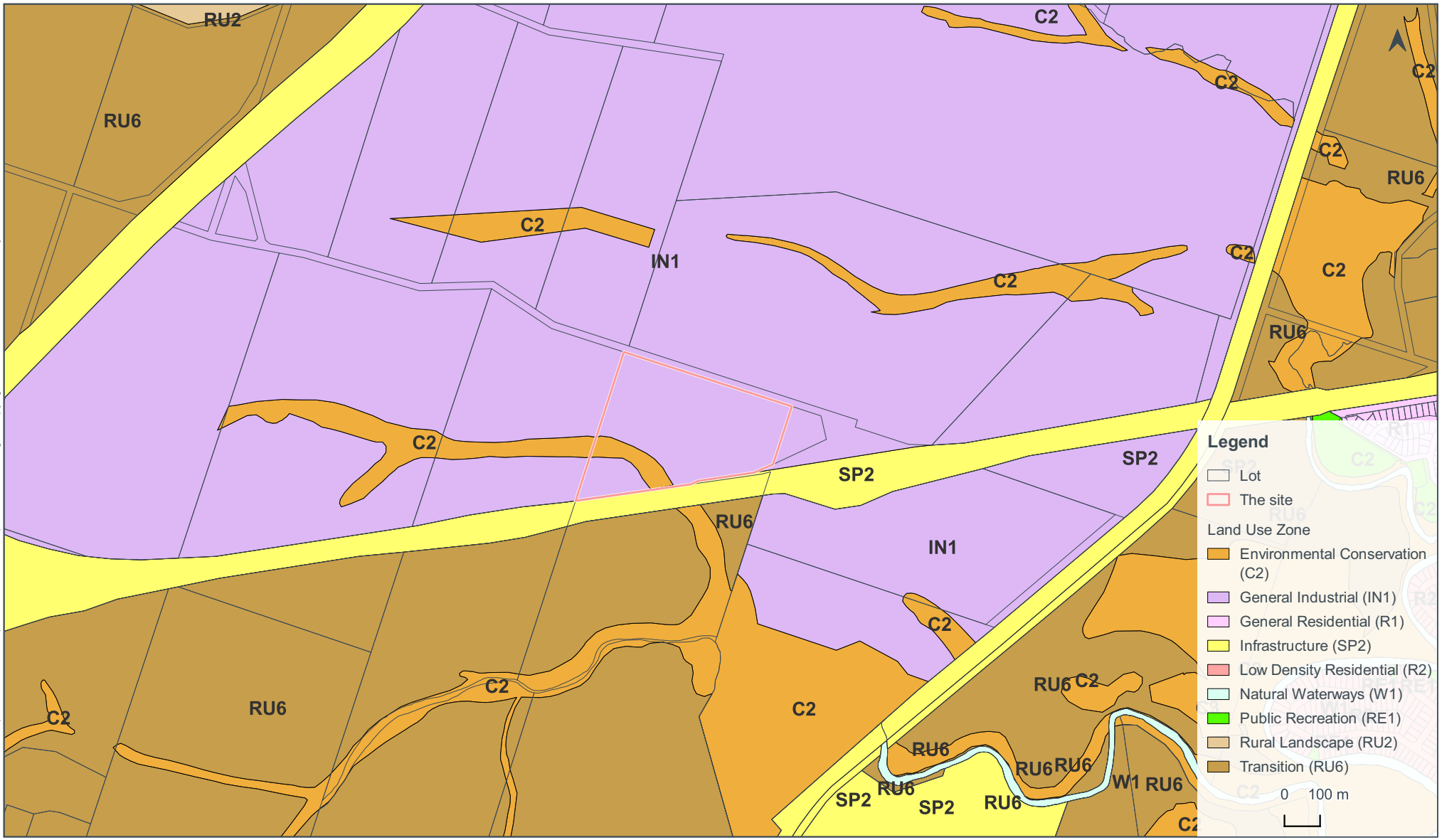
As outlined in Section 5.7.2, the site is in a planned future employment area.

The Boral roofing and masonry facility is north-east of the site at 288 Tooheys Road. The facility sells clay tiles used in roofing and flooring and includes a clay quarry and brickworks.

The proposed Wallarah 2 Coal Mine is located north and west of the site on Tooheys Road. The mine was granted consent in 2019 and will extract up to 5 million tpa of thermal coal by underground longwall methods over 28 years. A review of the mine's conceptual layout indicates that key infrastructure will be located along Tooheys Road to the west of the asphalt plant. Such infrastructure will include stockpiles, a coal conveyor system, water and gas management facilities, workshop and offices.

Figure 2.1
**Land use zoning**





### 2.2.2 Site suitability

The site is ideally and strategically located given its proximity to a major road route (M1 Pacific Motorway and Pacific Highway). The site is near the predicted source of demand in the Central Coast and Hunter region, thus reducing the requirement to transport RAP from developments in these areas to recycling or waste disposal facilities, or asphalt from plants further afield. The site is also positioned in a future employment area.

Given the land zoning and existing use of the site for the same purpose, it is a suitable area for industrial development and is separated from other sensitive land uses.

### 2.2.3 Access and road network

Access to the site is via Tooheys Road, which runs in an east-west direction and connects Bushells Ridge Road (west of the site) to Motorway Link Road via an interchange directly east of the site.

Motorway Link Road connects to the M1 Pacific Motorway approximately 3.3 km west of the site, and to the Pacific Highway approximately 3.8 km east of the site. The M1, Motorway Link Road and Pacific Highway are approved B-double routes.

The Main Northern Railway is approximately 1.2 km east of the site and runs in a north-south direction. The closest train station is located at Wyee.

#### Traffic volumes

Traffic was surveyed along Tooheys Road (bi-directional automated counts) between 25 July and 1 August 2022, with results summarised in Table 2.1. Heavy vehicles comprised approximately 21% of total traffic. The traffic counts were used to determine the morning (AM) and afternoon (PM) peak hours for traffic on Tooheys Road.

**Table 2.1 Daily and peak hour traffic along Tooheys Road**

| Direction | 5-day average | 7-day average | Weekday peak hour | | 85th%-ile speed |
|---|---|---|---|---|---|
| | | | AM (8-9am) | PM (4-5pm) | |
| East | 171 | 134 | 13 | 14 | 46.1 |
| West | 169 | 132 | 13 | 11 | 47.8 |
| **Total** | 340 | 266 | 26 | 25 | - |

#### Intersection performance

The Signalised and Unsignalised Intersection Design and Research Aid (SIDRA) model was used to determine the existing performance of the intersection of Tooheys Road with the Motorway Link interchange (on and off ramps).

The SIDRA results are expressed as level of service (LS), degree of saturation (DS) and average vehicle delay (AVD). The intersection criteria are summarised in Table 2.2. A LS D or better is the desirable design criteria for intersections.

**Table 2.2 LS criteria for intersections**

| LS | AVD (seconds per vehicle) | Traffic signals, roundabout | Give way and stop signs |
|---|---|---|---|
| A | <14 | Good operation. | Good operation. |

| LS | AVD (seconds per vehicle) | Traffic signals, roundabout | Give way and stop signs |
|---|---|---|---|
| B | 15 to 28 | Good with acceptable delays and spare capacity. | Acceptable delays and spare capacity. |
| C | 29 to 42 | Satisfactory. | Satisfactory, but accident study required. |
| D | 43 to 56 | Operating near capacity. | Near capacity and accident study required. |
| E | 57 to 70 | At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode. | At capacity, requires other control mode. |
| F | >70 | Intersection is oversaturated. | Oversaturated, requires other control method. |

The results of the SIDRA analysis on the current intersection performance is summarised in Table 2.3.

**Table 2.3 SIDRA results current intersection performance**

| Intersection | AM | | | | PM | | | | Control type |
|---|---|---|---|---|---|---|---|---|---|
| | DS | AVD (s) | LS | Worst movement | DS | AVD (s) | LS | Worst movement | |
| Tooheys Road/ Motorway Link Road (north side) | 0.01 | 2.9 | A | Left turn from off-ramp | 0.01 | 4.8 | A | Left from off-ramp | Give way |
| Tooheys Road/ Motorway Link Road (south side) | 0.01 | 8.0 | A | Right turn from off-ramp | 0.01 | 7.2 | A | Right turn from off-ramp | Give way |

The SIDRA modelling demonstrates that the intersection of Tooheys Road and the Motorway Link Road operates at LS A in both directions and experiences low vehicle delays in the morning and afternoon peak hours.

### Historical crash data

Statistics from the Transport for New South Wales (TfNSW) Centre for Road Safety for motor vehicle accidents along the roads and intersections near the site between 2017-2021 were reviewed to determine if there is a history of accidents in the area. There is no cluster of statistics near the site and motor vehicle accidents were not investigated further.

## 2.2.4 Sensitive receivers

The site is in the predominantly undeveloped area of Bushells Ridge, which comprises a mix of industrial and extractive industry land uses, and environmental conservation areas.

The closest urban centre to the site is Blue Haven, approximately 1.7 km to the east. Residential properties in Blue Haven are separated from the site by environmental conservation areas, Motorway Link Road and the Main Northern Railway.

The closest residential property to the site is owned by Wyong Coal and is approximately 1 km west, in land zoned for industrial use and to be impacted in the future by the proposed Wallarah

2 Coal Mine. Beyond this, the closest residential dwellings are located approximately 1.6 km east of the asphalt plant in Blue Haven.

The sensitive receivers in Table 2.4 could be impacted by project generated air and noise emissions.

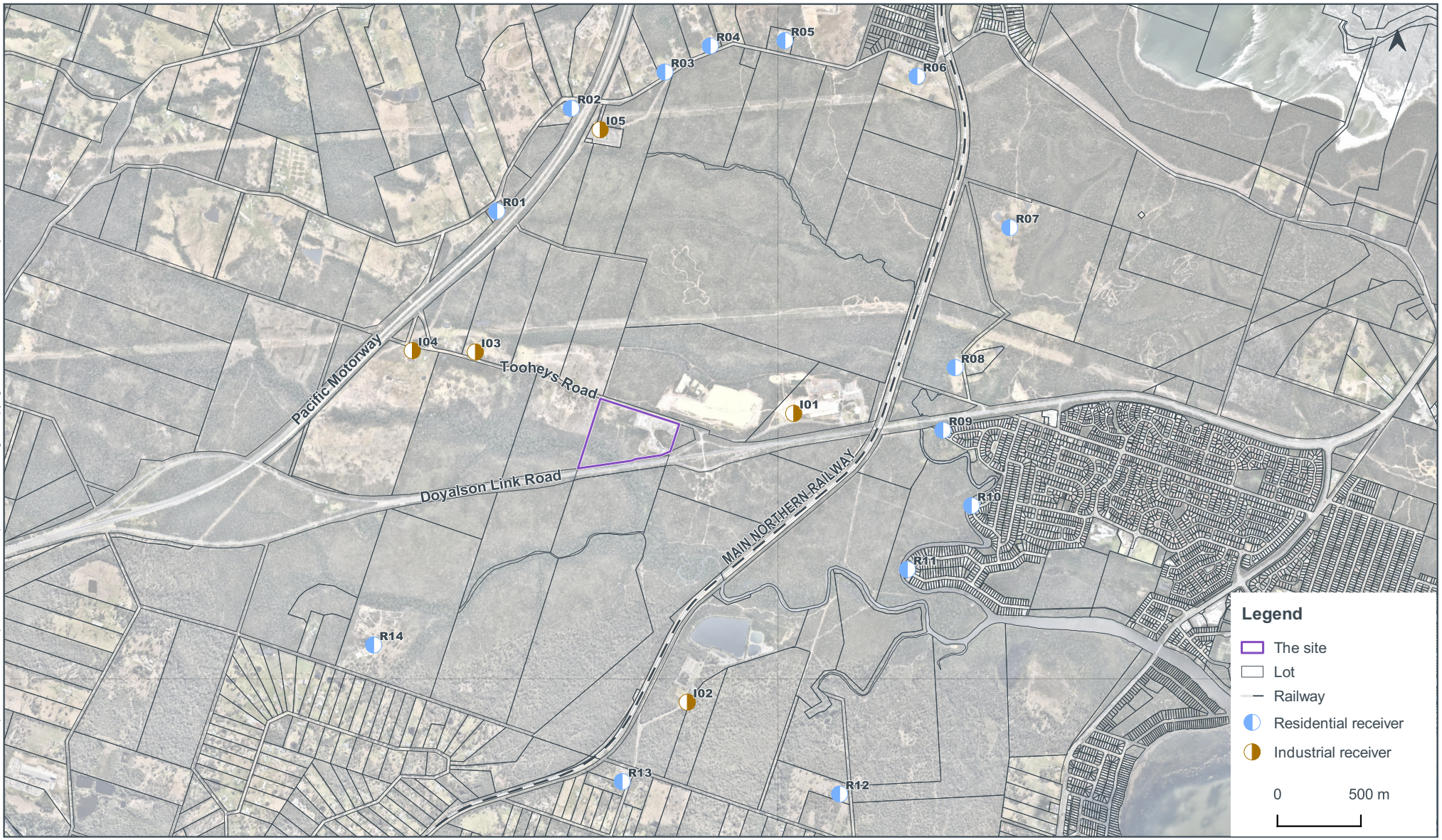
Figure 2.2 shows the sensitive receivers near the site.

**Table 2.4 Sensitive receivers**

| Receiver | Property address | Type of receiver | Proximity to the project (kilometres) |
|---|---|---|---|
| R01 | 245 Bushells Ridge Road, Kiar | Residential | 1.7 |
| R02 | 325 Bushells Ridge Road, Kiar | Residential | 2.0 |
| R03 | 388 Bushells Ridge Road, Wyee | Residential | 2.2 |
| R04 | 416 Bushells Ridge Road, Wyee | Residential | 2.3 |
| R05 | 450 Bushells Ridge Road, Wyee | Residential | 2.5 |
| R06 | 555 Bushells Ridge Road, Wyee | Residential | 2.6 |
| R07 | 740 Thompson Vale Road, Doyalson | Residential | 2.4 |
| R08 | 315 Thompson Vale Road, Doyalson | Residential | 1.8 |
| R09 | 11 Waterhen Close, Blue Haven | Residential | 1.7 |
| R10 | 40 Turner Close, Blue Haven | Residential | 1.9 |
| R11 | 107 Birdwood Drive, Blue Haven | Residential | 1.6 |
| R12 | 120 Arizona Road, Blue Haven | Residential | 2.4 |
| R13 | 152 Hiawatha Road, Woongarrah | Residential | 2.0 |
| R14 | 350A Bruce Crescent, Wallarah | Residential | 2.1 |
| I01 | 288 Tooheys Road, Bushells Ridge | Industrial | 0.7 |
| I02 | 107-135 Mona Road, Charmhaven | Industrial | 1.4 |
| I03 | 106 Tooheys Road, Bushells Ridge | Industrial | 1.3 |
| I04 | 77 Tooheys Road, Bushells Ridge | Industrial | 1.6 |
| I05 | 369 Bushells Ridge Road, Bushells Ridge | Industrial | 1.9 |

Figure 2.2
**Sensitive receivers**

Bushells Ridge Asphalt Plant
ENVIRONMENTAL IMPACT STATEMENT



## 2.3 Biophysical factors

### 2.3.1 Climate

The site is in Australia's cool temperate climatic region, which is characterised by mild to warm summers and cold winters, with common frost and occasional snow fall at higher elevations.

Rainfall data was obtained from Bureau of Meteorology (BoM) station 061082 (Wyee), approximately 3.5 km north of the site. The BoM weather station shows an average annual rainfall of 1,199 millimetres (mm).

A review of historical rainfall data over 118 years indicates that rainfall is relatively evenly spread over the first 6 months of the year, with average rainfall ranging from 109.0 mm in May to 134.2 mm in March. The latter half of the year is typically drier, with average rainfall ranging from 68.7 mm in September to 99.7 mm in December.

The Wyee station was decommissioned in 2017. A review of recent rainfall data was therefore obtained from the BoM station 061387 (Gorokan), approximately 6.3 km south-east of the site.

A review of data recorded in 2021 indicated that the highest monthly mean rainfall was 486.8 mm, recorded in March 2021. For the 2021 period, the total rainfall of 1,347.2 mm was above the historical annual mean of 1,229.8 mm.

Temperature data was obtained from BoM station 061412 (Coorangbong), approximately 12.3 km north of the site. The mean maximum and minimum temperature in January is 28.9ºC and 18.0ºC, while the mean maximum and minimum temperature in July is 18.7ºC and 4.9ºC.

The site has an operational weather station which collects daily meteorological data which can be used to supplement BoM data.

Discussion is provided in Chapters 7 and 8 on the application of climate data to noise and air quality impact assessment for the project.

### 2.3.2 Air quality

The main sources of air pollutants in the area are emissions from industrial and commercial operations and from other anthropogenic activities such as wood heaters and motor vehicle exhaust.

Atmospheric pollutants in the region may include:

- Deposited dust (DD).
- Total suspended particulate (TSP) matter, which is nominally taken to be less than 30 micrometres (µm) in diameter and refers to all suspended particles in the air.
- $PM_{10}$, which is a subset of TSP and has a diameter of 10 micrograms (µm) or less.
- $PM_{2.5}$, which is a subset of TSP and has a diameter of 2.5 µm or less.
- Pollutants generated through the combustion of fuel in vehicle engines (oxides of nitrogen and sulfur ($NO_2$ and $SO_2$), $PM_{10}$ and $PM_{2.5}$).

There is no site-specific air quality monitoring data. Therefore, background levels for the project site were estimated as part of the air quality impact assessment (refer to Chapter 8) using data from the Wyong monitoring station, which is maintained by DPE and approximately 8.5 km south-west of the project.

The ambient air quality monitoring data indicated that:

- $PM_{10}$ annual average levels were below the criterion of 25 µg/m³. The 24-hour average $PM_{10}$ levels were on occasion above the criterion of 50 µg/m³.
- $PM_{10}$ concentrations peak in spring and summer, with the warmer weather raising the potential for drier ground and elevating the occurrence of windblown dust. Elevated $PM_{10}$ concentrations at the monitor in 2018, 2019 and 2020 were attributed to regional dust storms, bushfire and drought.
- Annual average $PM_{2.5}$ levels were above the advisory reporting standard of 8 µg/m³ in 2019, attributed to bushfires in that year. The 24-hour average $PM_{2.5}$ levels were on occasion above the criterion of 25 µg/m³ in 2017, 2019 and 2020.
- $PM_{2.5}$ concentrations were relatively consistent throughout the year, with elevated $PM_{2.5}$ concentrations also attributed to major bushfire events in those years.
- Annual average and maximum one hour $NO_2$ levels were below the criteria of 57 and 286 µg/m³ respectively.
- The maximum one hour $SO_2$ levels were below the criteria of 164 µg/m³.
- The maximum eight hour average carbon monoxide (CO) levels were below the criteria of 10 µg/m³.

### 2.3.3 Noise

The site is adjacent to undeveloped lots and existing industrial land uses, which contain the following background noise sources:

- Natural (e.g. birdsong, insects and livestock).
- Road noise.
- Extractive industry and mining (existing Boral operations and approved Wallarah 2 mine to the north and north-east).
- Infrastructure (Motorway Link Road and Main Northern Railway).
- Industry (existing asphalt plant).

Advisian (2016) conducted unattended noise monitoring at representative locations to establish the ambient noise environment at the nearest sensitive receivers.

The rating background levels (RBLs) were determined using these noise levels in accordance with the NSW Environment Protection Authority's (EPA) (2017) Noise Policy for Industry (NPI). The ambient noise levels are in Table 2.5.

**Table 2.5 Ambient noise levels**

| Monitoring location | Address | Time of day[1] | Noise levels (dBA) | |
|---|---|---|---|---|
| | | | RBL | $L_{Aeq}$ |
| M1 | 12 Waterhen Close, Blue Haven | Day | 53 | 59 |
| | | Evening | 50 | 58 |
| | | Night | 35 | 55 |
| M2 | 115 Birdwood Road, Blue Haven | Day | 33 | 51 |
| | | Evening | 33 | 48 |
| | | Night | 30 | 45 |
| M3 | End of Tooheys Road, Bushells Ridge | Day | 36 | 47 |
| | | Evening | 38 | 46 |
| | | Night | 35 | 45 |
| M4 | 500A Bruce Crescent, Wallarah | Day | 41 | 51 |
| | | Evening | 41 | 51 |
| | | Night | 42 | 51 |

[1] Daytime (7 am - 6 pm); evening (6 pm – 10 pm); night time (10 pm – 7 am) (NPI).

### 2.3.4 Topography and drainage

Prior to construction of the asphalt plant, the topography of the project site was moderately sloping (at a grade of less than 5%). Elevation of the site ranged between 24.8 m Australian Height Datum (AHD) in the north-east corner of the site and 11.1 m AHD at the south-west corner of the site. Stormwater runoff followed topography and flowed towards the south-west of the site, draining to Wallarah Creek.

Tooheys Road to the north of the site acts as a ridge and restricts runoff from the north entering the project site.

The vacant lot to the east of the site slopes towards the site and as such stormwater runoff from a catchment estimated at 0.7 hectares enters the site. Conversely, the adjacent lot to the west does not slope towards the site and as such does not contribute to site runoff.

The construction of the existing asphalt plant required earthworks, including cutting into the original slope at the project site. As such, natural topography and drainage patterns have been altered and stormwater runoff within the site is collected and treated by a stormwater management system designed by Advisian (2016) to comply with relevant standards and approvals.

### 2.3.5 Hydrology

Surface water resources downslope of the site are managed as part of the Tuggerah Lakes Water Source under the Water Sharing Plan (WSP) for the Central Coast Unregulated Water Source 2019.

Wallarah Creek, a tributary of Budgewoi Lake, is located approximately 100 m south-west of the asphalt plant.

The project site is located outside of the predicted flood extent for 1% annual exceedance probability and the probable maximum events for Wallarah Creek.

### 2.3.6 Groundwater

Groundwater is expected to be present within underlying soils discharging into the adjacent Wallarah Creek.

Groundwater resources downslope of the site are managed as part of the Sydney Basin – Lower Hunter/Central Coast Groundwater Source in the WSP for North Coast Fractured and Porous Rock Groundwater Sources.

A search of available real time groundwater monitoring data maintained by Water NSW did not identify any monitoring bores in the vicinity of the site.

A search of the Australian Groundwater Explorer identified two groundwater boreholes (GW200380 and GW200379) associated with the Boral site to the north and were installed to a depth of 6 m below ground level. The standing water level of groundwater at the time of installation was 5.0 m and 5.6 m respectively.

### 2.3.7 Geology and soils

#### Geology

A review of the 1:100,000 Gosford-Lake Macquarie geological map indicates that the site is underlain by the Tuggerah formation of the Narrabeen group, and comprises early Triassic claystone, siltstone and sandstone deposits.

### Soils

The site is in the Gorokan soil landscape unit, which is characterised by undulating low hills and rises on lithic sandstones of the Tuggerah formation.

Soils comprise moderately deep (50 to 150 centimetre) soloths, yellow podzolic soils and grey-brown podzolic soils on slopes, with gleyed podzoilic soils along drainage lines. The soil landscape is typically limited by its very high erosion hazard, localised foundation hazard, seasonal waterlogging, hardsetting, strong acidity, low fertility, plasticity and impermeable soils (Advisian, 2016).

Acid sulfate soils (ASS) generally occur in low lying areas in and around coastal swamps, estuaries, and other coastal water bodies. If these soils are disturbed or exposed to oxygen, they have the potential to oxidise over time, resulting in acidic water leaching from these soils and scalding vegetation or killing aquatic fauna. ASS can also react with concrete and steel infrastructure.

The ASS maps contained within the Central Coast LEP were reviewed and did not identify potential ASS at the site.

## 2.3.8 Biodiversity

### The project site

Prior to construction of the asphalt plant, vegetation across the project site consisted of Narrabeen Doyalson Coastal Woodland. Due to historical pastoral grazing and understorey maintenance, the majority of the project site was cleared, with mature native trees sparsely distributed across the property. The sparsely distributed native trees were subsequently removed from the project site when the asphalt plant was developed in accordance with development consents. The project site is now void of any vegetation, with the exception of landscaping conditioned as part of the development consent.

Advisian (2016) identified a high proportion of native scrub and grasses in cleared areas of the site which were subsequently partially removed to construct the asphalt plant. In forested areas of the asphalt plant footprint, vegetation generally consisted of a dry open sclerophyll forest, composed of primarily mature trees. The canopy (up to 20 m high) was dominated by Scribbly gum (*Eucalyptus haemastoma*), Red bloodwood (*Corymbia gummifera*), Smooth-barked apple (*Angophora costata*) and Brown stringybark (*Eucalyptus capitellata*).

In previous forested areas, the understorey largely consisted of native shrubs and grasses. Minor weed occurrences were observed, particularly toward the northern extent of the site and adjacent to Tooheys Road.

A flora and fauna impact assessment prepared by Land Eco Consulting Pty Ltd (Appendix B) confirms that there is no native vegetation proposed for clearing by the project. The project site has no substantial habitat value, with low likelihood of native regeneration. Therefore, the vegetation that occurs within the project site does not constitute for substantial native vegetation or qualify for any threatened ecological community.

### Surrounding vegetation

Remnant bushland to the south and east of the site is also consistent with Narrabeen Doyalson Coastal Woodland (Advisian, 2016). Surrounding areas to the west of the asphalt plant site comprises previously cleared grazing areas and native vegetation at the south-west corner.

Surrounding vegetation is connected to a large area of forest habitat, which extends from Wyee in the north to Wallarah in the south, and from Charmhaven in the east to Jilliby to the west. This

forested area is also connected by wildlife corridors to Olney State Forest and Jilliby State Conservation Area to the west (Advisian, 2016).

Previous ecological surveys carried out for Advisian (2016) identified the threatened Charmhaven apple (*Angophora inopina*) and Little lorikeet (*Calyptorhynchus lathami*) as occurring in surrounding vegetation.

Subsequent targeted surveys were carried out by Advitect Pty Ltd in 2017 for threatened flora listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), including:

- Newcastle doubletail (*Diuris praecox*).
- Black-eyed susan (*Tetratheca juncea*).
- Thick-lipped spider orchid (*Caladenia tesselata*).
- Variable midge orchid (*Genoplesium insigne*).
- Wyong sun orchid (*Thelymitra adorata*).

No further targeted threatened flora species were recorded at the site. A total of 31 Black-eyed susan clumps were recorded within the study area, however were located beyond the asphalt plant footprint. The majority of clumps were found in the south-west corner of the study area at the edge of intact remnant riparian vegetation of Wallarah Creek.

Advitect also identified potential habitat for threatened orchids (Black-eyed susan and *Corunastylis sp. Charmhaven*) in undisturbed vegetation immediately adjacent to the east and west of the central portion of the project site (refer to Figure 6 in Appendix B).

Land Eco were commissioned in 2023 to conduct further targeted surveys in undisturbed vegetation surrounding the project site and identified the presence of additional Black-eyed susan, Charmhaven apple and *Corunastylis sp. Charmhaven* (refer to Figure 6 of Appendix B).

Land Eco also noted the presence of several threatened fauna species afforded protection under the BC Act and/or EPBC Act in vegetation surrounding the project site, including:

- Eastern Cave Bat (*Vespadelus troughtoni*).
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*).
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*).
- Greater Broad-nosed Bat (*Scoteanax rueppellii*).
- Large-eared Pied Bat (*Chalinolobus dwyeri*).
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*).
- Little Bent-winged Bat (*Miniopterus australis*).
- Southern Myotis (*Myotis macropus*).

Targeted survey by Advitect in 2017 also identified the presence of Wallum Froglet (*Crinia tinnula*).

## 2.4 Cultural factors

### 2.4.1 Non-Aboriginal heritage

A search of the National Heritage List, Australian Heritage Database, NSW State Heritage Register, State Heritage Inventory and Central Coast LEP did not identify the presence of any registered heritage listings within proximity to the site.

The project site has been previously heavily disturbed, associated with original construction of the asphalt plant and is unlikely to contain remaining items of historical heritage significance.

### 2.4.2 Aboriginal heritage

Aboriginal people have lived in and around the Central Coast LGA for many thousands of years. At the time of European settlement, the area was occupied by the Darkinjung, Awabakal and Guringai Aboriginal people. Physical evidence of the first people in the Wyong area can be seen in rock engravings, scar trees, rock shelter drawings and middens. The area is overseen by the Darkinjung Local Aboriginal Land Council (LALC), which remains active in the identification and management of Aboriginal heritage.

A search of the Aboriginal Heritage Information Management System (AHIMS) on 20 June 2022 identified one registered Aboriginal site within one kilometre of the site. The registered site was located south of the Motorway Link Road.

## 2.5 Hazards and risks

### 2.5.1 Bushfire

As illustrated in Figure **2.3**, the majority of the project site and the heavily wooded adjacent lots are mapped as 'Vegetation Category 1', which is considered to be the highest risk for bushfire. This vegetation category has the highest combustibility and likelihood of forming fully developed fires including heavy ember production.

A 2020-2025 Bushfire Risk Management Plan was developed for the Central Coast region by the Central Coast Bushfire Management Committee. The plan identifies land areas and associated community assets within the Central Coast LGA at risk of bushfire and recommends measures to reduce these risks. The site itself is not listed within the plan.

The bushfire season in the Central Coast region predominantly occurs during the hotter months of the year, between August and March. The prevailing weather conditions associated with the bushfire season are north westerly winds accompanied by high day time temperatures and relative low humidity.

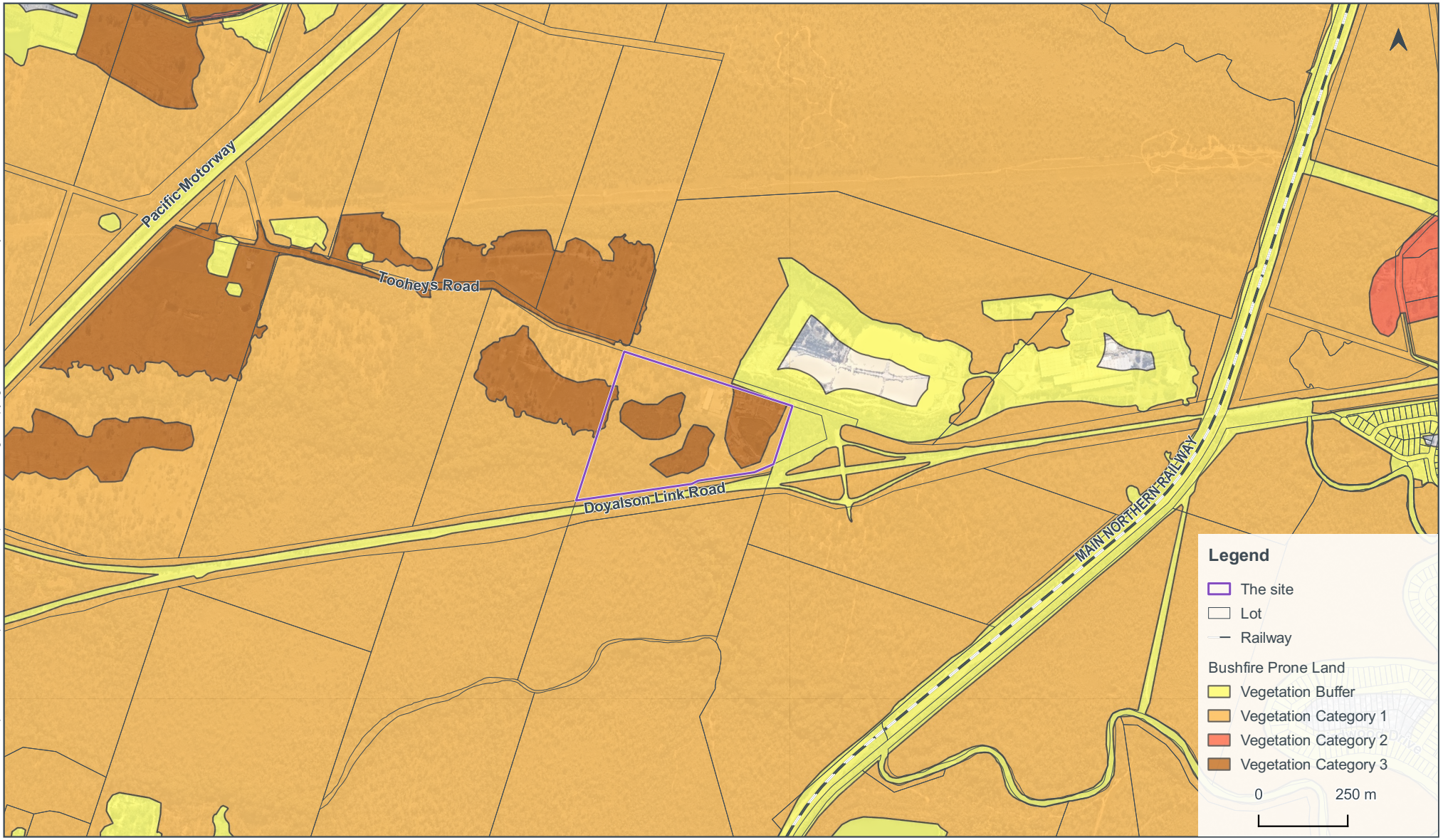
The Central Coast region has an average of 843 bushfires per year, with eight of these fires considered to be major fire events.

The main sources of bushfire ignition within the region include:

- Lightning.
- Arson.
- Car dumping.
- Fugitive embers from legal burn off events.
- Fugitive embers from illegal burning.
- Arcs from power lines in high winds.

Figure 2.3
**Bushfire prone land**





### 2.5.2 Hazardous substances and dangerous goods

Hazardous substances and dangerous goods are stored and used at the existing asphalt plant, and include (at any one time):

- 300 litres (L) of ethanol and toluene.
- 100 L of petrol.
- 54,000 L of diesel.
- 10,000 L of biodiesel in a self-bunded tank.
- 180 cubic metres ($m^3$) of bitumen.

All hazardous substances and dangerous goods are stored in dedicated bunded areas positioned immediately east of the asphalt plant, within the centre of the site.

Various other chemical substances are consumed in minor quantities and stored within the laboratory, workshop and office building.

All vehicles are refuelled on a designated concrete apron with controls adjacent to the diesel tank.

The existing asphalt plant consumes an estimated 1,330 kL of diesel per year, with diesel used in an on-site generator to power the site and fuel operational vehicles. A tanker delivers diesel weekly (or as required), which is stored in the diesel storage tank.

### 2.5.3 Public safety

The perimeter of the site is secured with fencing and a vehicle gate is positioned at the entrance to the site. This gate is closed and locked when the site is unoccupied but left open during operating hours.

As heavy vehicles accessing the site along Tooheys Road and Motorway Link Road interact with members of the public, driver awareness is an ongoing topic of training at the asphalt plant.

## 2.6 Socio-economic factors

### 2.6.1 Community profile

Socio-economic data derived from the 2021 Australian Census of Population and Housing provides a snapshot of the population profile in the LGA. The population in the suburb of Bushells Ridge was too low to establish a social profile and as such the nearby Blue Haven – San Remo statistical area was used.

#### Socio-economic indicators

Table 2.6 provides a comparison of populations in the Blue Haven – San Remo area and NSW overall in respect to a range of socio-economic indicators.

**Table 2.6 Socio-economic indicators**

| Socio-economic indicator | Blue Haven – San Remo | NSW |
|---|---|---|
| Total population | 11,290 | 8,072,163 |
| Male | 48.9% | 49.4% |
| Female | 51.1% | 50.6% |
| Aboriginal and Torres Straight Islander | 10.1% | 3.4% |
| Median age | 34 | 39 |

| Socio-economic indicator | Blue Haven – San Remo | NSW |
|---|---|---|
| Average children per family for families with children | 1.9 | 1.8 |
| Average people per household | 2.8 | 2.6 |
| Median weekly household income | $1,497 | $1,829 |
| Median monthly mortgage repayments | $1,733 | $2,167 |
| Median weekly rent | $400 | $420 |
| Average motor vehicles per dwelling | 1.9 | 1.8 |

### Family composition

Of the families in Blue Haven – San Remo, 43.2% were couple families with children, 17.5% were couple families without children and 26.0% were one parent families. Whilst couple families with and without children were comparable, the figure for one parent families is noted as considerably higher than the rest of NSW (10.9%).

### Education and employment

In Blue Haven – San Remo, 2.7% of the population were attending pre-school, 9.6% primary school; 7.1% secondary school and 9.7% of the population were attending university or TAFE institution. In contrast, 12.9% of the NSW population were attending university or TAFE institution and thus the figures for higher educational attendance in the area are lower than the NSW population.

In Blue Haven – San Remo, the total labour force equates to 45.5%, which is lower than the NSW data for the total labour force of 47.9%. Of the total labour force, 93.6% are employed and 6.1% are unemployed. Unemployment in Blue Haven – San Remo is higher than the 4.9% unemployed in NSW.

### Housing

In Blue Haven – San Remo, 94.0% of private dwellings were occupied and 6.0% were unoccupied. By comparison, in NSW 90.6% of private dwellings were occupied and a slightly higher percentage (9.3%) were unoccupied.

Of the housing tenure, 65.9% are owned (outright or with a mortgage), and 31.7% are renting. This is comparable to NSW data, where 64.0% of dwellings are owned and 32.6% are renting.

### Social disadvantage

The relative socio-economic advantage and disadvantage identifies and ranks areas in terms of people's access to material and social resources, including their ability to participate in society. A higher score on the index means a lower level of disadvantage. A lower score on the index means a higher level of advantage.

The Central Coast LGA scored 989 and is more disadvantaged than 40% of NSW.

## 2.7 Project need, justification and alternatives

### 2.7.1 Need and justification

The growth of development in the Central Coast LGA is driven by the Central Coast Regional Plan 2036 (NSW Department of Planning and Environment, 2016) (CCRP). The CCRP aims to strengthen the region's economic resilience, protect its well-established economic and

employment bases and build on its existing strengths to foster greater market and industry diversification.

The plan identifies a focus on the promotion of development of employment lands such as Bushells Ridge. Major public infrastructure investments are also identified, such as the Gosford Hospital and Wyong Hospital redevelopments, improved road and rail access to the proposed Warnervale Town Centre and upgrades to the Pacific and Central Coast Highways.

Similarly, as detailed in the Hunter Regional Plan 2036 (NSW Department of Planning and Environment, 2016a), the Hunter region is the largest regional economy in Australia, with the population of the region expected to grow by approximately 600,000 people over 20 years. The plan estimates an additional 70,000 dwellings would be required by 2036 to house the expanding population, together with forecast major commercial and health infrastructure development including proposed expansions of the University of Newcastle and John Hunter Hospital, and upgrades to transport infrastructure at Newcastle Airport, Port of Newcastle and strategic road networks (e.g. Nelson Bay Road duplication, Singleton bypass, M1 extension and the extension of the Newcastle Inner City Bypass).

The aforementioned major infrastructure projects in the Hunter and Central Coast regions will be reliant on asphalt, such as that produced at the site.

Asphalt products sought by many major infrastructure projects in NSW are also subject to strict design specifications. Asphalt produced at the site is able to meet these design specifications and is close to a number of the planned major development projects.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to, or construction of a new asphalt plant at other potentially more environmentally sensitive locations will be avoided.

The project will ensure the optimal utilisation of an existing industrial development and assist with the supply of essential asphalt to major infrastructure and associated development projects, thereby benefiting the NSW and Australian economies.

### 2.7.2 Project alternatives

#### Option 1 - Do nothing

If the project is not approved, the production capacity of the asphalt plant will be constrained, resulting in the inability to supply increased demand from the construction sector. The ability of the site to supply major infrastructure projects in the Hunter and Central Coast regions will be diminished given the requirement to maintain supply for existing supply contracts with Central Coast and Lake Macquarie City Council, as well as other government and private clients. This will require asphalt to be supplied from other asphalt plants further afield, increasing project delivery costs due to longer haulage distances, while also increasing greenhouse gas emissions and heavy vehicle traffic on roads.

#### Option 2 - Sourcing of additional product from existing plants

A modified ‘do nothing’ scenario could involve the sourcing of additional asphalt demand from other more distant plants within Fulton Hogan’s network of production plants.

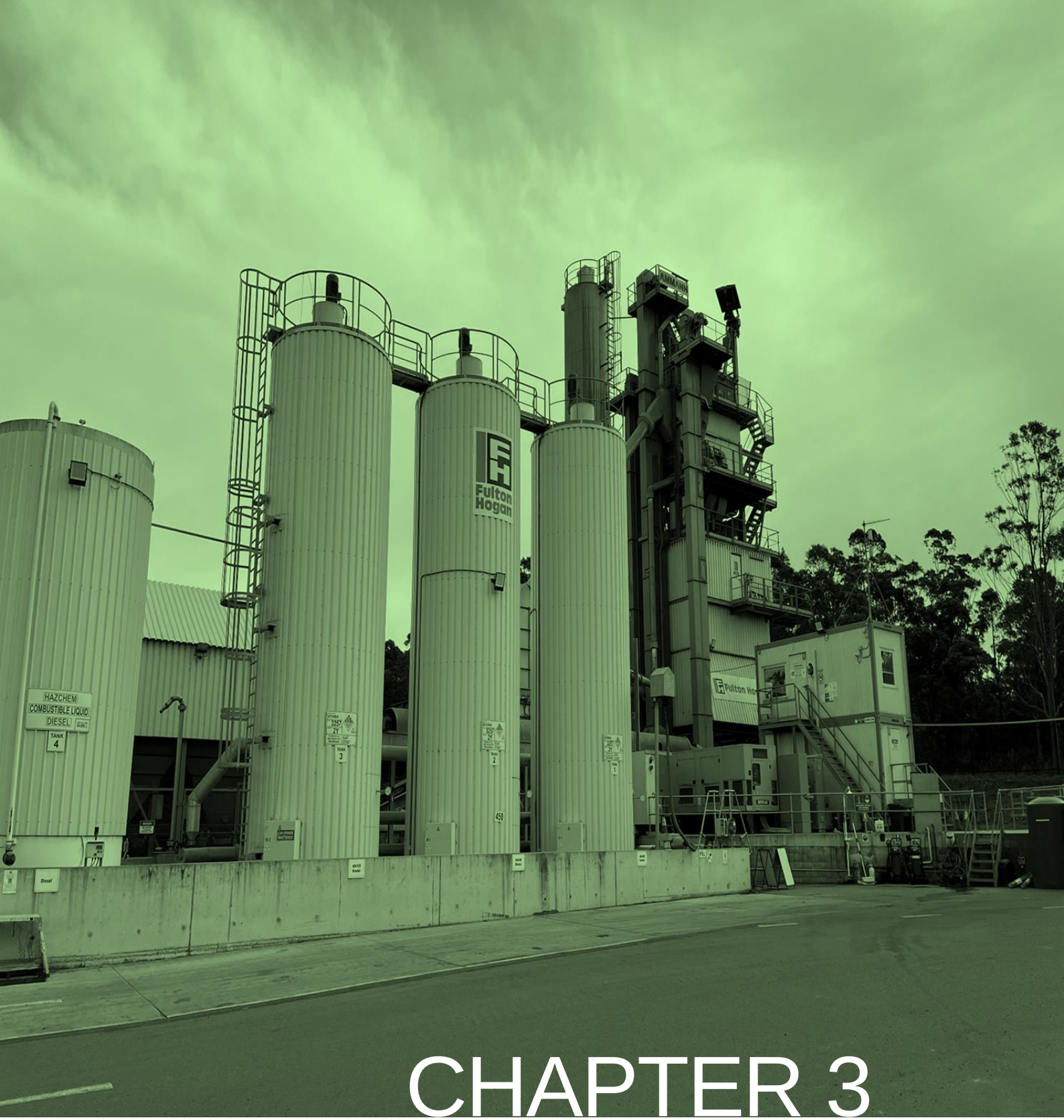
Asphalt road surfacing is a product with characteristics dictating a short transportation time. The material must be delivered to the destination project site at a high enough temperature for

successful and efficient application. Any production plant must be located in reasonable proximity to the catchment of the existing plant to enable quick and efficient service.

Excluding the asphalt plant at Bushells Ridge, the closest Fulton Hogan asphalt plant is approximately 118 km to the south of the region at Eastern Creek. As such, the sourcing of asphalt from other more distant production plants within the Fulton Hogan network is not a viable option.

### Option 3 - Increased production at the existing plant

Despite having approval to produce up to 100,000 tpa of asphalt, the existing asphalt plant installed at the site is state of the art and is capable of producing higher quantities of asphalt without the need for major upgrade or civil works. As such, the option to increase production at the existing asphalt plant is viewed as a way to achieve the desired objectives in supplying the demand for asphalt in a location close to the source of this demand, without the need to establish ancillary greenfield developments in other potentially more environmentally sensitive locations to supplement the demand for asphalt. This option is preferred and is the basis for the project.




# CHAPTER 3

## PROJECT DESCRIPTION

# 3 PROJECT DESCRIPTION

## 3.1 Project site

The project is limited to the existing developed portion of the site currently used as an asphalt plant, which is illustrated as the 'project site' on Figure 1.2.

## 3.2 Project overview

Fulton Hogan propose to:

- Increase production of asphalt at the project site from 100,000 tpa to a maximum of 400,000 tpa.
- Increase importation and processing RAP from 20,000 tpa up to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the project site.

Appendix C presents an overview of project components.

The project will not involve any extensions to the existing development footprint, clearing of native vegetation or bulk earthworks.

### 3.2.1 Additional hot storage bins

As shown in Appendix C, four additional 65 t hot storage bins will be installed at the asphalt plant (two in front and two behind the existing hopper above the load alley).

The additional storage bins will enable asphalt to be batched and stored in a larger volume for immediate dispatch to supply contracts at commencement of the next shift.

The storage bins will be mounted on footings constructed on piled foundations.

### 3.2.2 Re-configuration of existing office, parking, workshop and laboratory

The approved plans for DA 1511/2016 (also re-created in Figure **1.3**) show the site office, car park, workshop and laboratory positioned in the central northern part of the site, east of the hazardous substances/dangerous goods storage area. A future hardstand expansion area is shown to the east of the car park.

Fulton Hogan propose to alter the approved plans by changing the location and re-configuring the layout of the site office, car park, workshop and laboratory. The re-configured layout of these features is presented in Appendix C and has been positioned in a manner to avoid bushfire constraints.

The existing laboratory, amenities and workshop are proposed to be replaced with new structures constructed of grey colorbond and will occupy an area of 50 m by 20 m (inclusive of veranda and decking). The new buildings will have a maximum height of 5.5 m and be positioned on 0.58 m footings.

### 3.2.3 Addition of processed RAP storage area

There is insufficient space in the current RAP processing area to stockpile processed RAP as well as unprocessed RAP. Therefore, Fulton Hogan propose a designated processed RAP storage area adjacent to the west of the office, light vehicle car park and laboratory (refer to Appendix C).

As further outlined in Section 3.2.4, Fulton Hogan propose to increase the stockpile height of RAP from 4 m to 10 m.

Assuming 10 m stockpiles, each stockpile will occupy a surface area of 400 $m^2$, with a base diameter of 20 m, slope face of 14 m and maximum height of 10 m. The total volume of RAP per stockpile will be approximately 1,047 $m^3$.

Assuming a conversion ratio of 1.6 tonnes per cubic metre, the volume of processed RAP that will be stored in the new storage area at any one time will be 6,702 t in up to four stockpiles, whilst the volume of processed and unprocessed RAP in the re-configured RAP processing area will be 18,431 t at any one time in up to 11 stockpiles.

### 3.2.4 Increased height of RAP stockpiles

The current RAP stockpile height restriction at the site is 4 m in the site's EPL. Fulton Hogan propose to increase the stockpile height of unprocessed and processed RAP to 10 m.

Despite existing stockpile height limitation at the site, as further detailed in Chapter 8, RAP material is a bonded material due to the bitumen content which binds the aggregates together. Therefore, RAP stockpiles do not generate significant dust emissions from wind erosion and 10 m stockpiles will provide maximum operational efficiency for the site, whilst complying with all relevant air emission criteria.

### 3.2.5 Additional bulk material storage bays

To support increased production at the site, a new enclosed (three sided with roof) bulk material storage area similar in design to the existing structure to the west of the asphalt plant will be constructed in the RAP processing area in the lower part of the site (refer to Appendix C).

The proposed structure will comprise five enclosed bulk material storage bays to store:

- 10 mm steel furnace slag.
- 14 mm steel furnace slag.
- 28 mm aggregate.
- Cold mix asphalt.
- Recycled glass.

Each storage bay will be approximately 10.4 m long by 5.2 m wide and house up to 150 $m^3$ (up to 360 t) of each material.

The storage bay walls will be constructed with pre-cast concrete to a height of 2.5 m, while the remained of the enclosed bulk material storage area (rear and side walls above the concrete storage bay walls and roof) will be constructed of grey colorbond (refer to Appendix C). The maximum height of the new enclosed bulk material storage area will be approximately 10 m.

### 3.2.6 Additional hazardous substance/dangerous good storage

Additional hazardous substances and dangerous goods will be stored on site as follows:

- A 10,000 L self-bunded bio-diesel tank, housed within a dedicated bunded storage area to the west of the asphalt plant.
- A 15,000 L self-bunded bitumen emulsion tank to the south of the existing bitumen tanks, in a separate bund.
- An IBC bunded storage area will be established to the east of the asphalt plant. The IBC bunded storage area will be approximately 9 m long and 7 m wide. The IBC will include:
    - A 3,300 L tank to store AdBlue (diesel exhaust fluid).

- An additional 60,000 L diesel tank.

- Above ground tanks to the rear of the existing bulk material storage bays to store an estimated 35,000 L of liquid petroleum gas (LPG). The LPG storage area will be approximately 15 m long and 8 m wide.

The location of hazardous substance and dangerous good storage areas is in Appendix C.

### 3.2.7 Additional rainwater tanks

An additional 70 kL rainwater tank will be installed adjacent to the existing rainwater tanks at the rear of the existing bulk material storage bays for use in dust suppression and firefighting supply.

Two additional 10 kL rainwater tanks will be installed adjacent to the office and laboratory buildings for firefighting supply.

### 3.2.8 Re-configuration of approved landscaping areas and additional landscaping

To accommodate the project, Fulton Hogan will alter previously approved landscaped areas at the site, as well as introduce additional areas of landscaping around the site office, car park and laboratory. Refer to Appendix C for proposed landscaped areas for the site.

All landscaped areas will be integrated with the previously approved landscape plan for DA 552/2010C.

Landscaping principles for these areas include:

- Planting to supplement the existing landscape vegetation using the species recommended in the landscape plan for DA 552/2010C.
- Planting will be undertaken using standard re-vegetation techniques using ripping, tube-stock plants and grow tubes to enhance success rates for planting.
- All plants will be endemic species consisting of low, medium and upper canopy plantings.

Additional landscaping using endemic species consisting of low, medium and upper canopy species will also assist in reducing potential visual impact for neighbouring premises and throughfare motorists of Tooheys Road and the Motorway Link Road.

### 3.2.9 Utilities and services

#### Wastewater

As detailed in Section 1.2.7, a holding tank currently captures wastewater from the site office, kitchen and amenities, with a second holding tank capturing wastewater from the laboratory amenities. Both holding tanks are pumped out weekly by a licensed contractor for off-site disposal as liquid waste.

Fulton Hogan will install a new wastewater treatment system at the site to comply with Council development standards. A wastewater management report (WMR) has been prepared (Appendix D) and includes an evaluation of site, soil and local environmental constraints to select the appropriate wastewater management system based on site conditions.

The WMR identified that a wastewater treatment system is required to treat approximately 2,102 L of wastewater generated at the site per day.

The WMR concludes that installation of two ‘Wisconsin mounds’ as a secondary wastewater treatment method is the most appropriate solution for the site. The Wisconsin mound is a proven

wastewater management option for sites constrained by an elevated water table, low-lying land or shallow soil depths.

Each Wisconsin mound will cover an approximate area of 140 $m^2$, with the proposed location of the mounds and associated effluent line identified in Appendix C.

Each mound will be approximately 20 m long, 7 m wide and 1.3 m high and be constructed using sand fill, aggregate gravel, geofabric, topsoil and turf.

### Other utilities

With the exception of the additional rainwater tanks, there are no other changes proposed to the utilities or services of the asphalt plant. In the future, if utility connections become available, Fulton Hogan will connect to the network.

## 3.2.10 Plant and equipment

The fixed and mobile plant and equipment currently operated at the site (refer to Section 1.2.6) will continue to be used during the project.

The fixed asphalt batch plant will be altered to include the additional hot storage bins as described in Section 3.2.1.

No additional fixed or mobile plant and equipment is required for the project.

## 3.2.11 Transport

The project will import additional RAP and raw materials, and transport additional asphalt product along Tooheys Road and beyond via the same transportation routes as described in Section 1.2.3. The project will not alter the existing truck types, directional split of traffic to or from the site, with trucks travelling both east and west along Motorway Link Road and beyond. Trucks will have an average of 32 tonne payload.

Approximately 264 vehicle trips will be generated per day, comprising 88 staff vehicles and 176 heavy vehicles. This will equate to 44 inbound and 44 outbound light vehicle movements and 88 inbound and 88 outbound heavy vehicle movements per day.

The project's predicted average and maximum peak hour vehicle generation is summarised in Table 3.1.

**Table 3.1 Predicted average and maximum peak hour vehicle generation**

| Type | Period | Vehicles | | Total | |
|---|---|---|---|---|---|
| | | In | Out | In | Out |
| **Average** | | | | | |
| Heavy | 7 am - 8 am | 7 | 6 | 42 | 6 |
| Light | | 35 | - | | |
| Heavy | 4 pm - 5 pm | 3 | 4 | 12 | 39 |
| Light | | 9 | 35 | | |
| **Maximum** | | | | | |
| Heavy | 7 am - 8 am | 28 | 28 | 63 | 28 |
| Light | | 35 | - | | |
| Heavy | 4 pm - 5 pm | 28 | 28 | 37 | 63 |
| Light | | 9 | 35 | | |

### 3.2.12 Hours of operation

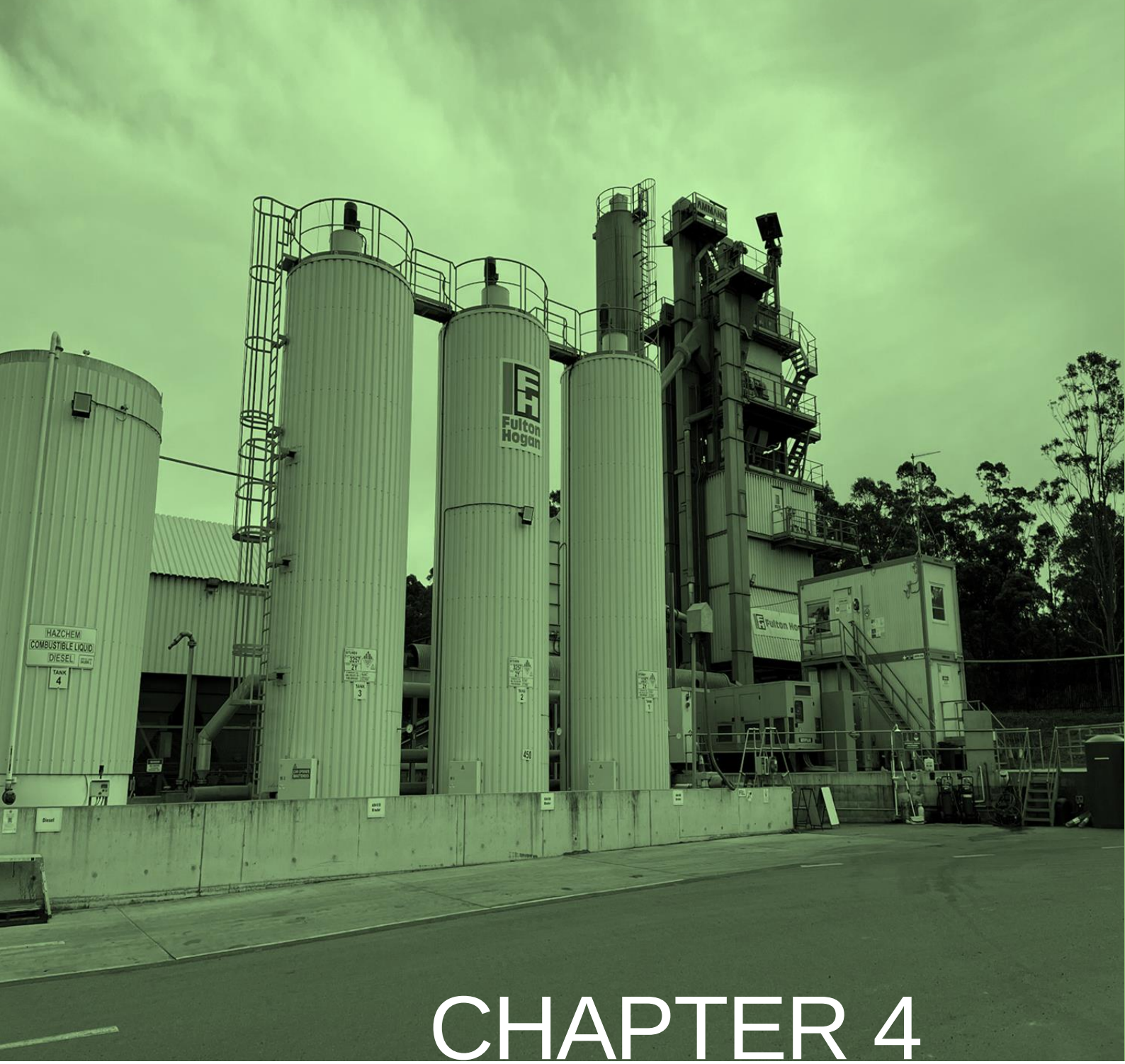
The project will continue to operate in accordance with the existing hours of operation as outlined in Section 1.2.5.

### 3.2.13 Employment

The project will provide employment for 20 full time staff. An additional 15 Fulton Hogan employees may also utilise the site for amenities.

### 3.2.14 Water management

No alterations to the existing approved stormwater management system will be required for the project.




# CHAPTER 4

## ENGAGEMENT

# 4 ENGAGEMENT

## 4.1 Introduction

Successful completion of the EIS required consultation with key stakeholders. This chapter provides a summary of the stakeholder engagement. The SEARs and government agency requirements are in Appendix A.

### 4.1.1 Assessment requirements

The SEARs in Table 4.1 require consultation with relevant stakeholders during the preparation of the EIS and documentation of the outcomes of stakeholder engagement.

**Table 4.1 Stakeholder engagement SEARs**

| Requirement | Section where addressed |
|---|---|
| During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the:<br>▪ Department of Planning and Environment, specifically the:<br>- Environment and Heritage Group (formerly Environment, Energy and Science Group)<br>- Environment Protection Authority<br>- Crown Lands Division<br>▪ Transport for NSW<br>▪ Fire & Rescue NSW<br>▪ WaterNSW<br>▪ Darkinjung Local Aboriginal Land Council<br>▪ Central Coast Council<br>▪ the surrounding landowners and occupiers that are likely to be impacted by the proposal | Section 4.2, Table 4.2 |
| Details of the consultation carried out and issues raised must be included in the EIS. | Table 4.2 |

It should be noted that the project will not impact any aspects governed by Water NSW including dams or drinking water catchments, and as such consultation with this agency was not deemed required.

### 4.1.2 Engagement strategy

Preparation of the EIS involved consultation with the agencies in Table 4.2 and local businesses.

Feedback provided through the consultation process assisted in identifying key issues associated with the project and have been considered in:

- assessment of impacts associated with the project;
- preparing concept designs for the project; and
- developing appropriate safeguards and environmental management measures.

Table 4.2 provides a summary of the aspects which were raised during stakeholder consultation and includes reference to the section of the EIS in which these aspects have been addressed.

The EIS will be publicly exhibited to allow for government agencies, organisations, interest groups, stakeholders and community members to provide written submissions.

All relevant stakeholders and the local community will be advised of the public exhibition of the EIS.

Once the EIS has been exhibited, Fulton Hogan will prepare a response to submissions report, if required, summarising and responding to the issues and concerns raised in written submissions, prior to determination of the development application.

## 4.2 Government consultation

Government agencies were issued a letter introducing the project in December 2022. The letter advised that the EIS was being prepared and the agency was invited to discuss the project, advise if it required any additional considerations beyond the SEARs in the EIS, or state whether it had no comments and would like to await exhibition of the EIS.

Table 4.2 provides a summary of government agency consultation and any key issues raised and provides a reference to where in the EIS these issues have been addressed.

**Table 4.2 Summary of government stakeholder consultation**

| Stakeholder | Comments | Response/EIS Section Reference |
|---|---|---|
| DPE | The SEARs application was lodged with DPE and a subsequent Scoping Report (Element, 2022) was lodged with DPE in July 2022.<br>The SEARs for the project were issued on 31 August 2022 by DPE. | Refer to Appendix A and the start of chapters of the EIS for DPE SEARs and where addressed by this EIS. |
| Council | A pre-lodgement meeting was held with Council on 22 February 2022.<br>Following receipt of the SEARs, in response to concerns raised by the Crown Lands division over the status of the transfer of the Crown Road along Tooheys Road to Council control, Fulton Hogan consulted with Council in December 2022 and January 2023 to discuss the status of the transfer of ownership.<br>Council confirmed on 17 February 2023 that an application has been submitted to Crown Lands Division. | Refer to Table 4.3 for Council requirements and where addressed by this EIS. |
| EPA | A response was received from EPA (contact Karen Gallagher) on 15 December 2022 stating that there were no additional comments from the EPA beyond that previously stipulated in the SEARs. | Refer to Appendix A for EPA requirements and where addressed by this EIS.<br>Refer to correspondence from the EPA in Appendix E. |
| DPE – Environment and Heritage | A response was received from Heritage NSW on 10 February 2023 (contact Colleen Klingberg) stating that there were no comments and the agency would await exhibition of the EIS before reviewing further. | Refer to Appendix A for DPE – Environment and Heritage requirements and where addressed by this EIS.<br>Refer to correspondence from Heritage NSW in Appendix E. |
| DPE – Crown Lands | A response was received from Crown Lands (contact Peter Draper) on 1 February 2023 stating that there were no additional comments beyond that previously stipulated in the SEARs. | Refer to Appendix A for Crown Lands requirements and where addressed by this EIS.<br>Refer to correspondence from Crown Lands in Appendix E. |
| Fire and Rescue NSW | A response was received from Fire and Rescue NSW (contact Aaron Ross) on 15 December 2022 stating that there were no comments from Fire and Rescue NSW and the agency would await exhibition of the EIS before reviewing further. | Refer to correspondence to Fire and Rescue in Appendix E. |
| TfNSW | A response was received from TfNSW (contact Tim Chapman) on 2 February 2023 stating that there were no additional comments beyond that previously stipulated in the SEARs. | Refer to Appendix A for TfNSW requirements and where addressed by this EIS.<br>Refer to correspondence from TfNSW in Appendix E. |

**Table 4.3: Council pre-lodgement notes specific requirements**

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| NSW *Rural Fires Act 1997* | The subject site is bushfire affected. The NSW Rural Fire Service (NSW RFS) has, under the NSW *Rural Fires Act 1997*, a statutory obligation to protect life, property and the environment through fire suppression and fire prevention. Section 4.14 of the *Environmental Planning and Assessment Act 1979* indicates that all new development on bush fire prone land to comply with Bush Fire Protection 2019 (PBP 2019). The proposed development application must be accompanied by a Bush Fire Assessment Report (BFAR) that explains how compliance with PBP 2019 is to be achieved. | Section 10.4.7 |
| NSW *Protection of the Environment Operations Act 1997* (POEO Act) | The EPA issues environment protection licences to the owners or operators of various industrial premises under the POEO Act. Licence conditions relate to pollution prevention and monitoring, and cleaner production through recycling and reuse and the implementation of best practice. The application will be referred to the EPA for their consideration. | Section 5.3.4 and 5.5. |
| NSW *Water Management Act 2000* | The proposed development involves works within 40 m of a watercourse and will require a controlled activity approval under the NSW *Water Management Act 2000*. You will need to identify the development as 'Nominated Integrated Development'. It is strongly recommended that the Natural Resources Access Regulator (NRAR) be contacted to discuss the proposal in regard to riparian zones, offsets and watercourse crossings etc prior to lodging a development application. | As outlined in Section 5.5, the project is not within 40 m of a waterway and does not constitute a controlled activity. |
| State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) | **Chapter 3**<br>A person who proposes to make a development application to carry out development for the purposes of a potentially hazardous industry must prepare (or cause to be prepared) a preliminary hazard analysis in accordance with the current circulars or guidelines published by the Department of Planning and submit the analysis with the development application.<br>**Chapter 4**<br>Demonstrate the land is not contaminated - submit a preliminary report to determine if the land is contaminated. Chapter 4 - Remediation of Land is relevant to the assessment of this Development Application. Clause 4.6 (b) requires that consent not be granted until Council has considered whether the land is contaminated. If the land is contaminated, the Council needs to be satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purposes for which the development is proposed to be carried out.<br>Details of the potential contamination of the subject site needs to be provided as part of the development application. | Section 5.6.1, Chapter 10 and 12. |
| State Environmental Planning Policy (Transport and | The final design and traffic generation of the proposal may be considered as integrated development under Schedule 3 Traffic generating development referred to Transport for NSW). | Section 5.6.1. |

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| Infrastructure) 2021 | If the proposal is considered to be integrated, the application would be required to be sent to Transport for NSW for their consideration. It is suggested to undertake discussions with Transport for NSW prior to the lodgement of an integrated development application in order to address any concerns Transport for NSW may have with the proposal. | |
| Wyong Local Environmental Plan 2013 | Clause 5.21 – Flood Planning:<br>The subject site is mapped as being flood affected and is to be considered under Clause 5.21 of the LEP.<br>The proposal must demonstrate how the development will be compatible with the flood hazard of the land and if it will adversely impact on flood behaviour in the area. The proposal must demonstrate how the flooding will be managed appropriately from the site and how this will not result in potential impacts on adjoining properties. | As confirmed in Section 2.3.5, the project site is not flood affected. |
| | Clause 7.9 - Essential services:<br>The consent authority cannot grant consent unless it is satisfied that all services that are essential for the development are available or that adequate arrangements have been made to make them available when required. | Section 5.6.2. |
| Wyong Development Control Plan 2013 | Part 1.2 - Notification of Development Proposals<br>The development application involving the modification of an asphalt plant will be notified to the adjoining properties. Please note that Council considers that the proposed modifications will not be assessed under Section 4.55 of the EP&A Act and will be required to assessed under a new development application. Therefore, the proposed development is classified as designated development and the application will be required to be advertised and notified for a period of thirty days. | Section 5.3.3. |
| | **Part 2: Development Provisions**<br>**Chapter 2.11: Parking and Access**<br>This Chapter of the DCP does not provide specific parking requirements for an asphalt plant. Therefore, the off-street car parking is to be assessed on its merits. However, it is advised that car parking spaces are to be provided for all staff to be working on site or are going to be leaving their cars on site, as well as additional visitor car parking spaces and spaces for any trucks to be parked on site.<br>**Chapter 2.12 Industrial Development**<br>This Chapter of the DCP is to be addressed as part of the development application.<br>Particular attention is drawn to the following main components:<br>▪ Front Setbacks – 10 m to Tooheys Road with a minimum 5m wide landscaped area.<br>▪ Side and Rear setbacks - Nil setbacks. However, the development has frontage to Motor Link Road which is a Classified Road. Chapter 2.12 does not address lots that have a dual frontage. Therefore, any future application will need to address the proposed setback to Motor Link Road and justify the proposed setback. | Section 5.7.1. |

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| | ▪ Floor Space Ratio and Site Coverage - The floor space ratio (FSR) of the proposed development is to be a maximum of 0.8:1 and the site coverage is a maximum of 50% over the whole of the subject site. Details of the development are to be provided as part of the application demonstrating compliance. | |
| | **Part 3: Environmental Controls**<br>**Chapter 3.1 - Site Waste Management**<br>The proposal is to be designed in accordance with the requirements of WDCP – Chapter 3.1 – Site Waste Management and this DCP chapter is to be addressed in the SEE. A Waste Management Plan is to be submitted with any Development Application, addressing demolition, construction and on-going waste.<br>**Chapter 3.3 Floodplain Management**<br>The proposed development is affected by flood controls and subject to related development controls. The proposed development is a permissible land use for the subject land zone and is to be consistent with the relevant objectives of this floodplain chapter.<br>**Chapter 3.6 Tree and Vegetation Management**<br>If works are proposed within the tree protection zone of trees to be retained on the site or on adjoining land then an Arborist Report is required. The report must be prepared by an AQF5 qualified Arborist and be prepared in accordance with AS4970-Protection of Trees on Development Sites. The site plan must clearly indicate which trees are to be removed as part of the development in accordance with the recommendations provided by the bushfire report accompanying the development application.<br>**Chapter 3.8 – Onsite Effluent Disposal in Non Sewered Areas**<br>The proposal is to be designed in accordance with the requirements of WDCP – Chapter 3.8 – Onsite effluent disposal in non-sewered areas and this DCP chapter is to be addressed in the SEE. | A waste management plan will be submitted as part of the development application.<br>The project is not in a flood prone area.<br>The project will be confined to existing operational areas of the site previously cleared of native vegetation. As such, the project will not impact existing remnant native vegetation or landscape plantings at the site. All development will be outside the protection zones of existing landscape vegetation. An arborist report is not required.<br>Refer to Appendix D for wastewater management system design. |
| Advice pertaining to referrals officers is provided below:<br>ENGINEERING | Tooheys Road is a Crown Road reserve. As such any application would be referred to the Crown Lands in accordance with the NSW Governments Administration of Crown Roads Policy. This will ultimately lead to Tooheys Road being dedicated to Council as a Public Road. | Section 5.5. |
| | Works will be required in Tooheys Road to facilitate access into the part of the site to be used as the Depot. This will require pavement construction in the order of 9.5m wide with suitable edge restraint (Kerb & Gutter or vee drain or concrete edge restraint) this will be subject to the ultimate design having regard for the longitudinal drainage of the road and the environment constraints. | N/A – no depot is proposed in this development application. |
| | The application will be referred to TFNSW as the site adjoins the Motorway link and potentially as a Traffic generating development depending on the final design and traffic generation. | Section 5.6.1. |

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| | Stormwater management will be required to provide OSD to pre developed flow rates for full range of storm events. | N/A – no alteration to the site's existing approved stormwater management system is required. |
| | Water quality facilities will be required to treat runoff in accordance with the removal targets in ARQ. There may also be additional requirements on stormwater discharge from an Ecological view point in terms of protecting the downstream vegetation from increased flows. | N/A – no alteration is required to the site's existing approved stormwater management system. |
| | The site is affected by flooding along the Riparian corridor. Further detail of the flooding can be attained from Council's Floodplain Management team. | Section 2.3.5. |
| Ecological Assessment – Biodiversity Conservation Act | The proposed development will be assessed in accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act) and associated Biodiversity Conservation Regulation 2017 (BC Regulation).<br>The proposed development as described in the pre DA meeting will trigger entry to the Biodiversity Offsets Scheme (BOS). The development application (including any modification application that has any additional biodiversity impacts) is required to be accompanied by a Biodiversity Development Assessment Report (BDAR) that has been prepared by an accredited person in accordance with the Biodiversity Assessment Method (BAM).<br>If the development triggers the BOS, Council cannot accept the DA unless it is accompanied by a BDAR that has been finalised and signed by the accredited assessor within 14 days of the DA lodgement date as per S 6.15 of the BC Act. The Biodiversity Credit Report "Like for Like" must be included and show that the case has been finalised within BOAMs within the required 14 days. The assessor is requested to add Central Coast Council as a case party to the BAM assessment in BOAMS and submit the case to the consent authority in BOAMs prior to lodgement of the DA (as per the DPIE document "Release notes – Consent Authority user access to BOAMs, March 2020").<br>The BDAR must address how ecological impacts have been avoided and minimised as per the BAM. Further detail can also be found in Council's Flora and Fauna Survey Guidelines 2019.<br>Council is required to assess direct and indirect impacts. For this site, it is expected that the surveys (including for orchids) and assessment will include the entire property, not just the direct footprint, to inform the required assessment of indirect impacts of further development on the site. | N/A – The project will be confined to existing operational areas of the site previously cleared of native vegetation. As such, the project will not impact existing remnant native vegetation or landscape plantings at the site and will therefore not directly impact biodiversity values or potential habitat of a threatened species afforded protection under the BC Act and/or the EPBC Act.<br>Indirect impacts have been assessed via a flora and fauna assessment (Appendix B), which confirms a BDAR is not required and tests of significance have been carried out for threatened flora and fauna species adjoining the project confirming there will be no significant indirect impact to these species. |
| | **Avoid and minimise as per BAM Stage 2 Operational Manual**<br>As per the Stage 2 BAM manual, the proponent and the accredited assessor must seek to avoid impacts on all biodiversity values. Avoidance must be demonstrated through site selection (i.e. locating the development footprint in | N/A – as above. |

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| | areas away from biodiversity values) and project design (i.e. adapting layout of the project). Avoidance of impacts is required prior to consideration of minimisation and offset of impacts. | |
| | **Serious and Irreversible Impact (SAII) on biodiversity values**<br>Under Section 7.16 (2) of the BC Act Council must refuse to grant consent if it is of the opinion that the proposed development is likely to have serious and irreversible impacts on biodiversity values.<br>The Serious and Irreversible Impact (SAII) assessment within the BDAR is to be prepared in accordance with BAM 2020 (Section 9.1), including provision of information to address each principle set out in clause 6.7 of the BC Regulation. Corunastylis sp. Charmhaven is one species that requires a SAII assessment. | N/A – as above. |
| | **Ecological Field Surveys**<br>Field surveys are to be undertaken in accordance with the NSW Biodiversity Assessment Method (BAM), Council's Flora and Fauna Survey Guidelines and with the OEH threatened species survey guidelines and Threatened Biodiversity Data Collection. Where relevant published survey guidelines are not available, surveys are to be undertaken using best practice methods that can be replicated for repeat surveys.<br>Field surveys must be less than 5 years old, as per the BAM. Previous surveys are to be incorporated into the results.<br>The development application is not to be lodged until such time as all required ecological surveys and assessments have been completed, including all required seasonal surveys for threatened flora and fauna.<br>The ecosystem/species credit species list generated by the BAM-C may not include all threatened species with habitat constraints on the site. To ensure all threatened species are assessed, in accordance with BAM 2020 S 1.4.1, include a table with Bionet search results in the BDAR to assess likelihood of occurrence for threatened species that have been recorded within 10km of the site. Threatened species with suitable habitat on the site are to be added to the BAM-C list to ensure they are subject to required targeted surveys. | N/A – as above.<br>Appendix B. |
| | **Study Area**<br>The study area must include all areas likely to be directly impacted by the development, including building footprints, road or access upgrades (including footpath, kerb and gutter), asset protection zones, stormwater infrastructure and water quality basins, water and sewer services to connection point.<br>The study area must also include areas likely to be indirectly impacted, particularly sensitive environments such as endangered ecological communities and threatened species habitat. Indirect impacts include altered flow regimes, pollution, noise, light, weeds, public access etc. | Appendix B. |
| | **Landscape Features and Vegetation Mapping**<br>Accurate identification and mapping of landscape features and vegetation communities will be required in accordance with the BAM or Council's Flora and Fauna Guidelines (2019) as this will inform the survey, reporting and offsetting | N/A – as above. |

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| | requirements. Vegetation communities are to be identified in accordance with the NSW plant community type classification (PCT).<br>The BAM requires that assessors justify, with evidence, their choice of PCT in the BDAR. This must include an explanation of how the PCTs were determined. | |
| | **Water Management Act 2000**<br>The proposed development involves works within 40 metres of a watercourse (Wallarah Creek) and will require a controlled activity approval under the Water Management Act 2000.<br>The application is to address the NSW Office of Water "Guidelines for riparian corridors on waterfront land". This includes provision of a suitable Vegetated Riparian Zone, calculated in accordance with the Guidelines.<br>The required Vegetation Management Plan is to address the requirements NSW Office of Water "Guidelines for vegetation management plans on waterfront land". | As outlined in Section 5.5, the project is not within 40 m of a waterway and does not constitute a controlled activity. |
| State Environmental Planning Policy (Biodiversity and Conservation) 2021 | The Koala SEPP 2021 applies in all land use zones on the Central Coast that has an area of at least 1 hectare (including adjoining land within the same ownership). The proposal requires an assessment under the SEPP. This can be addressed as part of the Ecological Assessment or BDAR. Where required, Koala Assessment Reports under the SEPP need to be prepared by a suitably qualified and experienced person, as defined by the SEPP. | There is no requirement to clear native vegetation. As such, the project will avoid impact to potential Koala habitat. |
| Vegetation and Threatened Species Management Plan | A Vegetation and Threatened Species Management Plan prepared by a suitably qualified and experienced Ecologist is to be submitted with the application.<br>The approved Conservation Management Plan for the site (Firebird, March 2019) was developed with expert advice from NSW Office of Environment and Heritage regarding management of Charmhaven orchid in particular. It is expected that the Vegetation and Threatened Species Management Plan for any proposed further development of the site is to incorporate the relevant requirements from both the approved Conservation Management Plan and the Vegetation Management Plan that was prepared for the asphalt plant, and including any additional requirements arsing from the new development.<br>The Plan must also address NSW Office of Water "Guidelines for vegetation management plans on waterfront land". | N/A – The project will be confined to existing operational areas of the site previously cleared of native vegetation. As such, the project will not impact existing remnant native vegetation or landscape plantings at the site. |
| Environment Protection and Biodiversity Conservation Act 1999 | Under the EPBC Act, it is the responsibility of the proponent to refer a proposed action to the Commonwealth if there is likely to be a significant impact on a federally listed species or ecological community. If there is a possibility of a significant impact, Council encourages applicants to consult with the Commonwealth Department of Environment prior to lodgement of the development application. If there is uncertainty about whether the proposal may have a significant impact, as per the departments published Significant Impact Guidelines, it is strongly advised the application is referred to the Federal Environment Minister for consideration. The Minister is obliged to advise within 20 business days as to whether or not approval is required under the EPBC Act. | Section 5.2.1. |

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| Arborist Report | An Arborist Report would be required including a tree schedule and plan and outlining protection measures for trees to be retained. The report must be prepared by an AQF5 qualified Arborist in accordance with AS4970-Protection of Trees on Development Sites. | N/A – The project will be confined to existing operational areas of the site previously cleared of native vegetation. As such, the project will not impact existing remnant native vegetation or landscape plantings at the site. All development will be outside the protection zones of existing landscape vegetation. |
| Environmental Health | A Soil and Water Management Plan (SWMP) should be prepared in accordance with the latest edition of the Landcom Publication 'Soils and Constructions - Volume 1' (The Blue Book) shall be provided. The SWMP is to be prepared, reviewed and updated by persons suitably qualified to interpret "The Blue Book" or trained in the use of "The Blue Book" for preparation of Soil and Water Management Plans). The plan should describe all measures that would be employed to prevent soil erosion and the discharge of sediment and other pollutants to lands and/or waters during construction activities. | Chapter 13 |
| | <u>Council requirements during construction:</u><br>▪ Details of dust suppression measures that would be implemented and maintained during excavation and construction works. Such measures are required to minimise the emission of dust and other impurities into the surrounding environment.<br>▪ Proposed measures to prevent material, including sediment from being tracked off-site.<br>▪ Plans for the disposal of any spoil gained from the site and/or details of the source of fill materials to be imported to the site.<br>▪ How noise emissions during construction would be managed to comply with the requirements of the NSW EPA's Industrial Noise Policy | Chapters 7, 8 and 13. |
| | Council requires more information about the design and management of:<br>▪ Containerised diesel storage tank (if this is to be used for refuelling vehicles, how will the refuelling area be designed (blind sump, sealed refuelling surface, all weather structure, spill kit?).<br>▪ Where vehicles will be washed down? In particular, spray seal vehicles / equipment. If that is to be done on-site, where and how will this space be designed and managed to prevent contaminated runoff? | There is no washing of vehicles at the site.<br>Vehicles will be re-fuelled in a temporary bunded area adjacent to the diesel tank at the site. A sealed system will transfer fuel from the diesel tank to the vehicle's fuel tank. Refer to |

| Reference no. (as per pre-application meeting notes) | Requirements of pre-application meeting notes | EIS reference / commentary |
|---|---|---|
| | | mitigation measures to be implemented in Section 10.5.1. |
| On-site sewage management (OSSM): | Upon completion of the bulk earthworks, an application is to be submitted to and approved by Council with regard to the installation or alteration of the on-site sewage management system proposed to serve the development. Such application shall be in the form prescribed by section 68 of the *Local Government Act 1993* and Section 26 of the Local Government (General) Regulation 1995 and comply with the requirements of the Environment and Health Protection Guidelines On Site Sewage Management for Single Households, AS1547:2000 On Site Domestic Wastewater Guidelines and Council's Development Control Plan 2013, Chapter 3.8 – On Site Effluent Disposal in Non Sewered Areas. | Noted. |
| | Obtain an approval to operate the on-site sewage management system from Council. | Noted. |
| | The report must be prepared by a suitably qualified wastewater consultant in accordance with AS1547:2012 On Site Domestic Wastewater Management and DLG (1998) Environment and Health Protection Guidelines On Site Sewage Management for Single Households. It is noted that no soil testing was carried out in preparation of the Advisian report, and therefore a range of options was provided based on various soil profiles. Site specific soil testing must be carried out and included in any new report to Council. | Appendix D |

## 4.3 Aboriginal stakeholders

As the project will not impact Aboriginal cultural heritage values, consultation with Darkinjung Local Aboriginal Land Council was not deemed necessary.

## 4.4 Community consultation

A community notification letter outlining details of the project and proposed development application was distributed to businesses along Tooheys Road on 25 January 2023 (refer to Appendix E). No objections, concerns or comments were raised regarding the project.

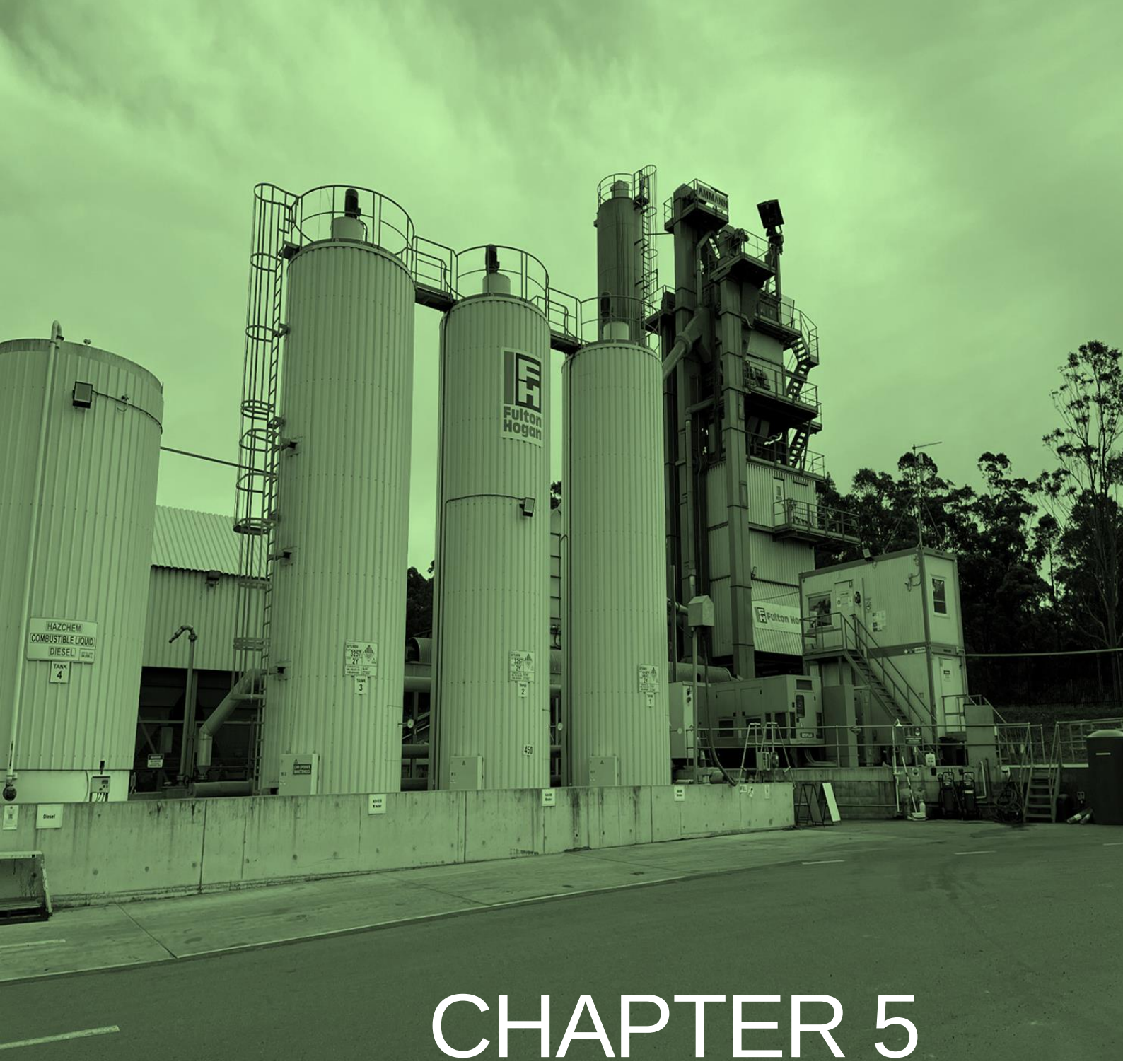
## 4.5 Ongoing engagement

As demonstrated in Table 4.2 and Table 4.3, all aspects raised by stakeholders (where relevant) have been considered in this EIS and during the preparation of technical specialist assessments.

Fulton Hogan is committed to the timely, orderly, consistent and credible dissemination of appropriate information within the constraints of legal and regulatory requirements to all interested stakeholders and the community.

Consultation with stakeholders will continue through the life of the project to:

- maintain strong and effective relationships with the community;
- ensure the community remains informed of the project's progress; and
- disseminate the outcomes of the EIS assessment process for the project.




# CHAPTER 5

## STATUTORY CONTEXT

# 5 STATUTORY CONTEXT

## 5.1 Introduction

This chapter summarises the Commonwealth and NSW regulatory and policy framework for development consent required under Part 4, Section 4.10, Division 4.3 of the EP&A Act. This chapter describes the assessment pathway for the project and identifies other approvals under State and Commonwealth legislation which are required.

### 5.1.1 Assessment requirements

The SEARs require the EIS to address legislative and policy requirements, which are listed in Table 5.1.

**Table 5.1 Legislation and policy related SEARs**

| Requirement | Section where addressed |
|---|---|
| The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in clauses 190 and 192 of the Environmental Planning and Assessment Regulation 2001. | Section 5.3.2 |
| Detailed justification for the proposal and suitability of the site for the development | Section 2.2, 2.7 and 5.3.5 |
| Demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies. This includes, but is not limited to: | Section 5.6 and 5.7 |
| ▪ State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4) | |
| ▪ State Environmental Planning Policy (Transport and Infrastructure) 2021 | |
| ▪ State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapters 2 and 4) | |
| ▪ Central Coast Local Environmental Plan 2022 | |
| ▪ relevant development control plans and section 7.11 plans. | Section 5.7 |
| A list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out. | Section 5.5 |
| A description of how the proposed expansion integrates with existing on-site operations | Chapter 3 |
| A description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development | Section 5.5 |

## 5.2 Commonwealth legislation

### 5.2.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Federal environmental legislation. The EPBC Act is administered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW), and provides a legal framework to protect and manage national and international important flora, fauna, ecological communities and heritage places, defined under the EPBC Act as matters of national environmental significance (MNES).

The EPBC Act also confers jurisdiction over actions that have a significant impact on the environment where the actions affect, or are taken on, Commonwealth land.

An action that has, will have or is likely to have a significant impact on a MNES or Commonwealth land may not be undertaken without prior approval from the Commonwealth Minister, as provided under Part 9 of the EPBC Act.

The protected matters search tool (PMST) is managed by DCCEEW and is used to identify MNES near a project. The PMST was searched in June 2022, with the results in Table 5.2. This data, combined with local knowledge and records and further technical studies where relevant, was used to assess whether the project will have or is likely to significantly impact a MNES or on Commonwealth land.

**Table 5.2 Matter of national environmental significance**

| MNES | Commentary |
|---|---|
| World heritage properties | There are no world heritage properties near the site. |
| National heritage places | There are no national heritage places near the site. |
| Wetlands of international importance (listed under the Ramsar Convention) | There are no wetlands of international importance near the site. |
| Listed threatened species and ecological communities | The following threatened ecological communities (TECs) have been recorded in the 10 km of the site:<br>▪ Coastal Swamp Oak Forest of NSW and South East Queensland (endangered).<br>▪ Coastal Swamp Sclerophyll Forest of NSW and South East Queensland (endangered).<br>▪ River-flat Eucalypt Forest on Coastal Floodplains of Southern NSW and Eastern Victoria (critically endangered).<br>A total of 46 threatened species were recorded in the search area.<br>The project will be on previously cleared areas and will not impact native vegetation or landscape plantings. Therefore, it will not directly impact biodiversity values or potential habitat of an EPBC listed threatened species. |
| Migratory species protected under international agreements | A total of 18 migratory species were recorded in the search area.<br>The habitat in and adjacent to the site is unlikely to provide important habitat for significant numbers of migratory species or contain habitat important to their lifecycle. Large aggregations of migratory species will not occur in the study area.<br>No migratory species will be significantly impacted by the project. |
| Commonwealth marine area | There are no Commonwealth marine areas near the site. |
| The Great Barrier Reef Marine Park | The Great Barrier Reef Marine Park is not near the site. |
| Nuclear actions (including uranium) | There are no nuclear actions near the site. |
| A water resource, in relation to coal seam gas development and large coal mining development | This is not applicable to the project. |

The project is not on Commonwealth land.

### 5.2.2 Native Title Act 1993

The Commonwealth *Native Title Act 1993* (NT Act) recognises and protects native title rights in Australia. It allows a native title determination application (native title claim) to be made for land or waters where native title has not been validly extinguished, for example, extinguished by the grant of freehold title to land.

Applications for compensation for extinguishment or impairment of native title rights can also be made. All native title claims are subjected to a registration test and will only be registered if claimants satisfy a number of conditions. A register of native title claims is maintained by the National Native Title Tribunal.

Proposed activities or development that may affect native title are called 'future acts'. Claimants whose native title claims have been registered have the right to negotiate about some future acts, including mining and granting of a mining lease over the land covered by their native title claim. Where a native title claim is not registered, a development can proceed through mediation and determination processes, though claimants will not be able to participate in future act negotiations.

The National Native Title Register, Register of Native Title Claims, and Register of Indigenous Land Use Agreements were searched for native title claimants in the LGA. There are no results for declared native title in the LGA.

### 5.2.3 National Greenhouse and Energy Reporting Act 2007

The Commonwealth *National Greenhouse and Energy Reporting Act 2007* (NGER Act) provides a single national framework for the reporting and dissemination of information about the greenhouse gas emissions, greenhouse gas projects, and energy use and production of corporations. It makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds.

Fulton Hogan triggers the threshold for reporting under the NGER Act, and reports energy use and greenhouse gas emissions from its operations, including the asphalt plant.

Fulton Hogan will continue to monitor and report energy use and greenhouse gas emissions associated with the project under its obligations under the NGER Act.

## 5.3 NSW Environmental Planning and Assessment Act 1979

### 5.3.1 Overview

The EP&A Act and the EP&A Regulation form the statutory framework for planning approval and environmental assessment in NSW. Implementation of the EP&A Act is the responsibility of the Minister for Planning and Homes, statutory authorities and local councils. It contains three parts that impose requirements for planning approval:

- Part 4, which provides for control of 'development' that requires development consent from the relevant consent authority.
- Part 5, which provides for control of 'activities' that do not require development consent under Part 4.
- Division 5.2, which provides for control of State significant infrastructure that does not require development consent under Part 4.

The requirement for development consent is set out in environmental planning instruments (EPIs), being State environmental planning policies (SEPPs) or local environmental plans (LEPs).

### 5.3.2 State significant development

Part 4, Division 4.7 of the EP&A Act relates to the assessment of development deemed to be significant to the State (State significant development (SSD) or infrastructure (SSI)). Under section 4.36(2) a development is SSD if it is declared by a SEPP. The relevant SEPP to the project is the State Environmental Planning Policy (Planning Systems) 2021 (Planning SEPP).

Under clause 2.13(1) of the Planning SEPP, development is declared SSI if:

- the development on the land concerned is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act; and
- the development is specified in Schedule 3.

As the project requires development consent under Part 4 and is not of a type specified in Schedule 3, it is not SSI.

Under clause 2.6(1) of the Planning SEPP, development is declared SSD if:

- the development on the land concerned is, by the operation of a State environmental planning policy, not permissible without development consent under Part 4 of the Act; and
- the development is specified in Schedule 1 or 2.

Clause 23 of Schedule 1 of the Planning SEPP is relevant to waste and resource management facilities and states if resource recovery or recycling facilities process more than 100,000 tonnes of waste per annum, the development is declared SSD and approval would be required under Division 4.7 of the EP&A Act.

As Fulton Hogan propose to process up to 99,000 tpa of RAP, the project is not SSD.

### 5.3.3 Designated development

A division of Part 4 (Division 4.10) of the EP&A Act relates to the assessment of designated development. Under section 4.10(1) a development is designated development if it is declared by an environmental planning instrument (EPI) or the EP&A Regulation.

Clause 8(1) of Schedule 3 of the EP&A Regulation declares bitumen pre-mix and hot-mix industries to be designated development if they have an intended production capacity of more than 150 tonnes per day or 30,000 tpa.

Additionally, clause 45(2) of schedule 3 of the EP&A Regulation declares a waste management facility to be designated development if:

- the facility or works sorts, consolidates or temporarily stores waste at a transfer station or material recycling facility for transfer to another site for final disposal, permanent storage, reprocessing, recycling, use or reuse; and
- the facility or works has an intended handling capacity of more than 30,000 tonnes per year of waste such as glass, plastic, paper, wood, metal, rubber or building demolition material.

The project is designated development as it will:

- produce up to 400,000 tpa of asphalt; and
- import and temporarily store up to 99,000 tpa of RAP prior to processing, which is consistent with the definition of a waste management facility.

Pursuant to Section 4.12(8) of the EP&A Act, this EIS has been prepared in accordance with the EP&A Regulation to accompany the development application for designated development. Division 5 of the EP&A Regulation defines general requirements of an EIS prepared under section 4.12(8) of the EP&A Act.

In accordance with clause 173(1) of the EP&A Regulation, a scoping report and request for SEARs was submitted to DPE on 22 July 2022. SEARs were received from DPE on 31 August 2022. Pursuant to Sections 191 and 192(2) of the EP&A Regulation, the assessment and content of this EIS has been prepared in compliance with the SEARs.

### 5.3.4 Integrated development

Clause 4.46(1) of the EP&A Act states that *integrated development is development (not being State significant development or complying development) that, in order for it to be carried out, requires development consent and one or more of the following approvals*:

…

- NSW *Protection of the Environment Operations Act 1997*;

…

Section 48 of the POEO Act states an EPL (separate approval) is required for any premises based scheduled activities listed under Schedule 1 of the POEO Act.

Fulton Hogan holds an EPL (21239) that permits:

- Receival and processing of 20,000 tpa of RAP per year.
- Receival and storage of 2,500 t of recovered glass sand per year.
- Receival and storage of 966 tpa of steel furnace slag per year.
- Receival and storage of 100 tpa of crumb rubber per year.
- Storage of up to 12,500 t of waste at any one time.
- Receival of up to 120,000 tpa of waste or other material.

The EPL will need to be varied as the project will process up to 99,000 tpa of RAP and increase storage of other raw materials and recovered waste streams. The proposal is integrated development under Section 4.46 of the EP&A Act as an EPL is required.

Council must refer the development application to the integrated development authority (i.e. EPA) Before granting development consent under Section 4.47 of the EP&A Act and incorporate the public authority's general terms of approval in any development consent. It must not approve the development application if the integrated authority recommends refusal. If the advice is not received in 21 days after the integrated authority has received the application or requested additional information, the consent authority can determine the development application.

### 5.3.5 Permissibility

The site is zoned E4 – General Industrial under the Central Coast Local Environmental Plan 2022 and general industries and waste management facilities are permissible with consent (by absence of being prohibited development).

### 5.3.6 Objectives of the EP&A Act

The objects of the EP&A Act are specified in Section 1.3, which seek to promote the management and conservation of natural and artificial resources, while also permitting appropriate development to occur. The consistency of the project with the objects of the Act is summarised in Table 5.3.

**Table 5.3 Objectives of the EP&A Act**

| Objectives of the EP&A Act | Consistency of the project |
|---|---|
| 1) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources, | Specialist consultants have been engaged to assess and report on the potential for the project to impact the natural and artificial resources of the project area, which are summarised in Chapters 7 to 11. |
| 2) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment, | The project is consistent with the principles of ecological sustainable development (ESD) as summarised in Section 5.4.1. |
| 3) to promote the orderly and economic use and development of land, | The orderly and economic use of land is best served by development which is permissible under the relevant planning regime and predominantly in accordance with the prevailing planning controls.<br>The project comprises a permissible development (with consent) which is consistent with the statutory and strategic planning controls.<br>As detailed in this EIS, the project will result in positive economic impacts, with appropriate mitigation measures and management strategies being proposed to reduce any adverse environmental and social impacts. |
| 4) to promote the delivery and maintenance of affordable housing, | Not applicable to the project. |
| 5) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats, | Specialist consultants have been engaged to assess and report on the potential for the project to impact upon the local environment.<br>No vegetation removal will be required as part of this project. |
| 6) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage), | The project would not impact upon built or cultural heritage values as described in Chapter 12. |
| 7) to promote good design and amenity of the built environment, | Potential noise, air quality and visual impacts on sensitive receivers have been assessed and described in Chapters 7, 8 and 12.<br>The project will require installation of infrastructure, which would be sourced from reputable materials and suppliers and built in accordance with relevant industry standards.<br>Design changes have occurred to avoid impacts in the first instance and management measures proposed to minimise and mitigate residual impacts. |
| 8) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants, | All construction associated with the project would be compliant with the Building Code of Australia and all other relevant statutory requirements. |
| 9) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State, | As outlined in this Chapter, the project is subject to the provisions of Part 4 of the EP&A Act, the assessment requirements were determined in consultation with relevant authorities and Council is the consent authority. |
| 10) to provide increased opportunity for community participation in environmental planning and assessment. | This EIS will be publicly exhibited by Council for 30 calendar days, in addition to the consultation during preparation of the EIS. |

### 5.3.7 Section 4.15 matters for consideration

The consent authority is required to consider the matters in Section 4.15 of the EP&A Act. Matters relating to the project are summarised in Table 5.4.

**Table 5.4 Section 4.15(1) matters for consideration**

| Clause and requirement | Comment |
|---|---|
| 4.15(1) Matters for consideration – general<br>In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:<br>(a) the provisions of - | - |
| (i) any environmental planning instrument, and | All EPIs relevant to the project are described in Section 5.6. |
| (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and | N/A |
| (iii) any development control plan, and | Where relevant, the requirements of Central Coast Development Control Plan 2022 have been considered in the design of the project. |
| (iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and | N/A |
| (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), | Refer to Section 5.4. |
| (v) (Repealed) | - |
| that apply to the land to which the development application relates, | - |
| (b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality, | Chapters 7 to 12. |
| (c) the suitability of the site for the development, | Section 2.2 |
| (d) any submissions made in accordance with this Act or the regulations, | This EIS will be placed on public exhibition and submissions will be sought from government agencies and the community. Any submissions received by Council will be reviewed and forwarded to Fulton Hogan for consideration in a submissions report (if required). |
| (e) the public interest. | This EIS has been prepared on the basis of detailed investigations aimed at defining the current social, biophysical and economic environment. Detailed assessment undertaken by appropriate technical specialises demonstrates that on balance the proposed development is unlikely to have significant impact on the receiving environment. On this basis, the proposed development is not considered to be contrary to the public interest. |

## 5.4 Environmental Planning and Assessment Regulation 2021

Section 4.12(8) of the EP&A Act refers to the EIS form and content provisions of the EP&A Regulation. Division 5, Sections 190, 192 and 193 of the EP&A Regulation describes the requirements for the form, content and principles of an EIS, which are summarised in Table 5.5.

**Table 5.5 EIS requirements**

| Details | Section where addressed |
|---|---|
| **Section 190 - Form of environmental impact statement:** | |
| 1) An environmental impact statement must contain the following information: | |
| a) The name, address and professional qualifications of the person who prepared the statement; | Certification page. |
| b) The name and address of the responsible person; | Certification page. |
| c) The address of the land:<br>i) to which the development application relates, or<br>ii) on which the activity or infrastructure to which the statement relates will be carried out, | Certification page. |
| d) A description of the development, activity or infrastructure; | Certification page. |
| e) An assessment by the person who prepared the statement of the environmental impact of the development, activity or infrastructure, dealing with the matters referred to in this Division. | This EIS (certification page). |
| 2) *Not applicable to the project* | |
| 3) An environmental impact statement must also contain a declaration by a relevant person that:<br>a) the statement has been prepared in accordance with this Regulation, and<br>b) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure, and<br>c) the information contained in the statement is not false or misleading. | Certification page. |
| **Section 192 – Content of environmental impact statement** | |
| 1) An environmental impact statement must also include each of the following: | |
| a) a summary of the environmental impact statement; | Executive summary. |
| b) a statement of the objectives of the development, activity or infrastructure; | Section 1.3. |
| c) an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure; | Section 2.7.2. |
| d) an analysis of the development, activity or infrastructure, including:<br>i) a full description of the development, activity or infrastructure; and | Chapter 3. |
| ii) a general description of the environment likely to be affected by the development, activity or infrastructure and a detailed description of the aspects of the environment that are likely to be significantly affected; and | Chapter 2, and Chapters 7 to 12. |
| iii) the likely impact on the environment of the development, activity or infrastructure; and | Chapters 7 to 12. |

| Details | Section where addressed |
|---|---|
| iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment; and | Chapter 13. |
| v) a list of the approvals that must be obtained under another Act or law before the development, activity or infrastructure may lawfully be carried out. | Section 5.5. |
| e) a compilation, in a single section of the environmental impact statement, of the measures referred to in paragraph (d) (iv), | Chapter 13. |
| f) the reasons justifying the carrying out of the development, activity or infrastructure considering biophysical, economic and social factors, including the principles of ecologically sustainable development set out in section 193. | Section 2.7 and Section 5.4.1. |
| 2) This section is subject to the environmental assessment requirements that relate to the environmental impact statement. | - |
| 3) Not applicable to the project | N/A |
| 4) A document adopted or referred to by an environmental impact statement is taken to form part of the statement | Appendices |
| **Section 193 – Principles of ecologically sustainable development** | |
| 1) The principles of ecologically sustainable development [ESD] are the following:<br>a) The precautionary principle,<br>b) Inter-generational equity,<br>c) Conservation of biological diversity and ecological integrity,<br>d) Improved valuation, pricing and incentive mechanisms. | Section 5.4.1 |
| 2) The precautionary principle is that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.<br>3) In applying the precautionary principle, public and private decisions should be guided by:<br>a) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and<br>b) an assessment of the risk-weighted consequences of various options. | |
| 4) The principle of inter-generational equity is that the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations, | |
| 5) The principle of the conservation of biological diversity and ecological integrity is that the conservation of biological diversity and ecological integrity should be a fundamental consideration, | |
| 6) The principle of improved valuation, pricing and incentive mechanisms is that environmental factors should be included in the valuation of assets and services, such as:<br>a) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, and<br>b) the users of goods and services should pay prices based on the full life cycle of the costs of providing the goods and services, including the use of natural | |

| Details | Section where addressed |
|---|---|
| resources and assets and the ultimate disposal of any waste, and<br>c) established environmental goals should be pursued in the most cost effective way by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems. | |

## 5.4.1 Ecologically sustainable development

One of the objects in Section 1.3 of the EP&A Act is:

> to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment". Clause 193 of the EP&A Regulation defines ESD.

The following sections summarise how the project aligns with the principles of ESD and how these principles have been incorporated into the design of the project.

### Precautionary principle

Where there are threats of serious or irreversible environmental damage, a lack of full scientific certainty should not be used as a reason for postponing measures to prevent such damage.

Baseline environmental characteristics have been monitored to understand the condition of the existing environment at and around the site, and to understand the environmental impacts of previous operations. This data in combination with publicly available data for the region has been used by the technical specialists to predict the project's environmental impacts.

As described in Chapter 6, environment aspects requiring assessment were considered and the level of assessment detail for each aspect was proportional to environmental risk.

Project options were considered throughout the EIS process, which resulted in optimisation of components based on the interactions of profitability, location/layout of components and environmental constraints.

Fulton Hogan has numerous similar operations around Australia and the potential environmental impacts associated with the activity are well understood and have been effectively managed resulting in negligible environmental impact. This experience and knowledge has been used to design the project and predict and manage potential environmental impacts.

Management measures have been proposed where serious or irreversible damage to the environment is likely to be unavoidable.

### Inter-generational equity

Inter-generational equity is the concept that the present generation should ensure the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

The project will reuse RAP and other recovered waste streams, which may have otherwise been landfilled. This will have the benefits of avoiding the use of land for landfilling and the use of raw extracted materials in production of asphalt. Therefore, there will be land and resources available for future generations to economically exploit.

As described in Chapters 8 and 12, the project will not have significant impacts on air quality or surface and groundwater availability.

Therefore, the project will not detract from future generation's access to and equal enjoyment of water and clean air.

### Conservation of biological diversity and ecological integrity

This is the concept that conservation of biological diversity and ecological integrity should be a fundamental consideration.

As outlined in Chapter 12, the project will not result in significant impacts to biodiversity.

### Improved valuation, pricing and incentive mechanisms

The principle of improved valuation, pricing and incentive mechanisms deems that environmental factors should be included in the valuation of assets and services, and that those who generate the pollution and waste should bear the cost of containment, avoidance or abatement.

Fulton Hogan acknowledges and accepts the financial costs associated with licensing the project and all measures required for the project to avoid, minimise, mitigate and manage potential environmental and social impacts.

## 5.5 Other New South Wales legislation

In addition to the requirements under Part 4 of the EP&A Act, the project may require additional approvals, licences and/or authorisation under various other pieces of NSW legislation and regulations, which are summarised in Table 5.6.

**Table 5.6 NSW legislation**

| Legislation | Objective | Application to the project |
|---|---|---|
| NSW *Protection of the Environment Operations Act 1997* (POEO Act) | The POEO Act aims to protect, restore and enhance the quality of the environment in the context of ecologically sustainable development and to reduce risks to human health and prevent degradation of the environment. | Section 48 of the POEO Act outlines that an EPL is required for any scheduled activities to be undertaken at a premise at which Schedule 1 of the POEO Act indicates that a licence is required.<br>As the project will process up to 99,000 tpa of RAP and increase storage of other raw materials and recovered waste streams, the EPL will need to be amended via a licence variation as part of the project. |
| NSW *Contaminated Land Management Act 1997* (CLM Act) | The CLM Act establishes a process for investigating, and where required remediating contaminated lands, that pose a risk to human health and the environment.<br>The CLM Act outlines the circumstances in which notification of the EPA is required in relation to the contamination of land. | The EPA's Contaminated Land Record and List of Contaminated Sites notified to the EPA was searched. No recorded contaminated sites requiring remediation under the CLM Act were identified in or adjacent to the site.<br>There will be low potential to disturb contaminated land given historical land use at the site and confinement of earthworks to a minimum.<br>The project could contaminate soils and groundwater by hydraulic oil leaks from equipment. The storage of fuel, the process of re-fuelling and the storage and use of other chemicals on site, also has the potential to contaminate soil and groundwater.<br>The provisions of the CLM Act may become relevant during construction and/or operation of the project should land become contaminated. |
| NSW *Roads Act 1993* (Roads Act) | The Roads Act provides for the classification of roads and determines which public authority is the appropriate road authority for public roads. | Under section 138 of the Roads Act, the consent or concurrence of the appropriate roads authority is required to:<br>▪ Erect a structure or carry out a work in, on or over a public road.<br>▪ Dig up or disturb the surface of a public road.<br>▪ Remove or interfere with a structure, work or tree on a public road.<br>▪ Pump water into a public road from any land adjoining the road.<br>▪ Connect a road (whether public or private) to a classified road.<br>No upgrades will be required to the local road network to accommodate the project and therefore a separate consent is not required under the Roads Act. |
| NSW *Biodiversity Conservation Act 2016* (BC Act) | The BC Act provides protection for threatened plants and animals native to NSW (excluding fish and marine vegetation) and integrates the conservation of threatened species into development control processes under the EP&A Act. | Section 7.7 of the BC Act applies to the project, which is under Part 4 of the EP&A Act (other than SSD or complying development) and states:<br>*if the proposed development is likely to significantly affect threatened species, the application for development consent is to be accompanied by a biodiversity development assessment report (BDAR).*<br>Under the NSW Biodiversity Conservation Regulation 2017, the 'biodiversity offset scheme' (BOS) is triggered under the following circumstances:<br>▪ Vegetation clearing exceeds thresholds associated with minimal Lot size as mapped in the LEP. |

| Legislation | Objective | Application to the project |
|---|---|---|
| | | ▪ Land is mapped as having high biodiversity value in the 'biodiversity values map', unless the proposal is not for subdivision, and on a Lot that was subdivided before 25 August 2017, and zoned R2, R3, RU5, B1, B2, B4, B5 or IN1.<br>▪ If a 'test of significance' indicates there could be a significant impact on any species, population or ecological community listed as threatened in NSW.<br>None of the BOS circumstances are triggered and therefore a BDAR is not required. |
| NSW *Water Management Act 2000* (WM Act) | The WM Act regulates the management of water by granting licences, approvals for taking and using water, and trading groundwater and surface water. The WM Act applies to those areas where a water sharing plan has commenced. Alternatively, if a water sharing plan has not yet commenced, the *NSW Water Act 1912* (Water Act) applies. The WM Act is progressively replacing the Water Act as relevant water sharing plans are introduced across the State.<br>Water sharing plans (WSP) have commenced for most of NSW. Licensing of monitoring bores continues under the Water Act until a regulation for aquifer interference gives a mechanism to approve these activities. Licensing of reinjection into groundwater systems is also still currently managed under the Water Act.<br>The NSW Aquifer Interference Policy (AIP), published by the NSW Office of Water in 2012, outlines the water licensing and assessment processes for aquifer interference activities under the WM Act and other relevant legislative frameworks. | The project will not extract water from any watercourses and will therefore not require a water access licence or water supply works approval under Chapter 3, Part 2 of the WM Act. Similarly, the project will not require a water use approval under section 89 or water management work approval under Section 90 of the WM Act.<br>Approval is required prior to undertaking works in, on or under waterfront land under the WM Act. Waterfront land is defined as land within 40 m of both sides of a river, lake or estuary, including the bed itself, and works requiring approval include construction, vegetation removal, deposition of material or any other works that may affect the water flow within the watercourse.<br>Under section 91E, a person must not carry out a controlled activity in, on or under waterfront land otherwise than in accordance with a controlled activity approval. A controlled activity includes:<br>▪ the erection of a building or the carrying out of a work;<br>▪ the removal of material or vegetation from land;<br>▪ the deposition of material on land, whether by way of landfill operations or otherwise; and<br>▪ the carrying out of any other activity that affects the quantity or flow of water in a water source.<br>The project does not constitute a controlled activity under the WM Act.<br>Activities that intercept aquifers require approval under Section 91F of the WM Act. The project will not trigger any aquifer interference approval as only minor excavation works are proposed and there will be no interaction with groundwater. |
| NSW *Heritage Act 1977* (Heritage Act) | Non-Aboriginal historical archaeological relics, buildings, structures, archaeological deposits and features are protected under the Heritage Act. | Desktop searches did not identify the presence of any registered non-Aboriginal heritage items within proximity to the site.<br>The site does not support any items of historic heritage value and as such no permits under the Heritage Act will be required. |
| NSW *National Parks and Wildlife Act 1974* (NPW Act) | The NPW Act contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal | Where impact to an Aboriginal object or place will occur, an Aboriginal heritage impact permit may be required under Part 6, Division 2 of the NPW Act. |

| Legislation | Objective | Application to the project |
|---|---|---|
| | heritage. The NPW Act provides statutory protection for Aboriginal objects by making it illegal to move, damage, deface or destroy a relic without written permission from DPE. | The asphalt plant footprint was previously cleared during construction of the site, with natural ground surfaces previously impacted by earthworks and importation of engineering fill. As such, minor excavations associated with the project, in previously disturbed/developed areas, are not expected to impact upon registered or previously unidentified Aboriginal objects.<br>A search of AHIMS in July 2022 indicates that no known Aboriginal objects or sites are located within the site and immediately surrounding the area. |
| NSW *Rural Fires Act 1997* | The NSW Rural Fire Service (NSW RFS) has an obligation under the NSW *Rural Fires Act 1997* to protect life, property and the environment through fire suppression and fire prevention. | Section 4.14 of the EP&A Act indicates that all new development on bushfire prone land must comply with the requirements of PBP.<br>As the project will be on bushfire prone land, a bushfire hazard assessment has been prepared to ensure the objectives of PBP are achieved (refer to Section 10.4.7). |
| NSW *Biosecurity Act 2015* (Biosecurity Act) | The Biosecurity Act provides a framework to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants.<br>The Biosecurity Act requires any person who deals with any biosecurity matter or who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.<br>Whilst the Biosecurity Act provides for all biosecurity risks, implementation of the Act for weeds is supported by regional strategic weed management plans developed for each region in NSW. | Weed species are present given the highly disturbed nature of the site. Fulton Hogan has a responsibility to implement appropriate controls to avoid any spread of weed species off site during the construction phase. This includes avoiding the spread of seed and fragments of vegetation. Weed species present at the site are in low quantities and therefore removal and disposal of these species within the project site prior to the commencement of construction is possible. |
| NSW *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) | The purpose of the WARR Act is to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development. The WARR Act provides for the making of policies and strategies to achieve this.<br>The WARR Act promotes a hierarchy of avoidance of unnecessary resource consumption; resource recovery (including reuse, reprocessing, recycling and energy recovery), and disposal (as a last resort). | As outlined in Chapter 11, all wastes generated by construction and operation of the project will be classified and disposed of in accordance with NSW Waste Classification Guidelines (EPA, 2014) and in accordance with the resource management hierarchy principles and associated requirements of the WARR Act and NSW Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation).<br>The EPA is permitted under clause 91 of the Waste Regulation to grant an exemption to a person from provisions of the POEO Act or Waste Regulation.<br>Clause 93 of the Waste Regulation imposes the requirements that must be met by suppliers of RAP to which the RAP exemption 2014 applies. The RAP exemption 2014 applies to the supply of RAP for use as an alternative raw material in the manufacture of asphalt. The RAP exemption 2014 is issued by the EPA under clauses 91 and 92 of the Waste Regulation. |

| Legislation | Objective | Application to the project |
|---|---|---|
| | | The RAP exemption 2014 exempts, amongst other clauses and sections, the requirement for an EPL under clause 39 (waste disposal – application to land) of the POEO Act and tracking of certain waste under Part 4 of the Waste Regulation. This enables an end user of RAP to apply RAP to land for use as a road construction material without requiring an EPL for each construction site at which it is proposed to be used.<br>The RAP exemption 2014 exempts the provider from needing to comply with Section 48 of the POEO Act. Section 48 relates to licensing (such as an EPL) or scheduled activities.<br>The project does not apply, or intend to apply, RAP to land or however will use RAP in connection with a process of thermal treatment. Therefore, the RAP exemption 2014 applies to the project. |
| NSW *Crown Land Management Act 2016* | The NSW *Crown Land Management Act 2016* provides for the administration and management of Crown land in the eastern and central divisions of NSW. Crown land may not be occupied, used, sold, leased, dedicated, reserved, or otherwise dealt with unless authorised by this Act. | The asphalt plant is accessed via Tooheys Road, which is located over a parcel of Crown land. At the time of writing this EIS, Council have applied to the Crown Lands Division of DPE to transfer control of Tooheys Road to Council. |

### 5.5.1 Summary of approval requirements

Licences, approvals and permits that are likely to be required for the project are summarised in Table 5.7.

**Table 5.7 Summary of approval requirements**

| Legislation | Authorisation | Consent of approving authority |
|---|---|---|
| EP&A Act | Development consent | Minister or IPC |
| POEO Act | Amended EPL | EPA |

## 5.6 Environmental planning instruments

Environmental planning instruments (EPIs) such as SEPPs and LEPs are legal documents that regulate land use and establish requirements for development consent in NSW.

### 5.6.1 State environmental planning policies

State environmental planning policies deal with issues significant to the State and people of NSW. They are made by the Governor on the recommendation of the Minister for Planning and Public Places and may be exhibited in draft form for public comment before being gazetted as a legal document.

The SEPPs relevant to the project are outlined below.

**Table 5.8: SEPPs relevant to the project**

| SEPP | Overview |
|---|---|
| SEPP (Planning Systems) 2021 (Planning SEPP) | The Planning SEPP provides detail as to the categories of projects that will be State significant development (SSD), State significant infrastructure (SSI) and those projects declared to be critical State significant infrastructure.<br>Under clause 2.13(1) of the Planning SEPP, development is declared SSI if:<br>▪ the development on the land concerned is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act; and<br>▪ the development is specified in Schedule 3.<br>As the project requires development consent under Part 4 and is not of a type specified in Schedule 3, it is not SSI.<br>Under clause 2.6(1) of the Planning SEPP, development is declared SSD if:<br>▪ the development on the land concerned is, by the operation of a State environmental planning policy, not permissible without development consent under Part 4 of the Act; and<br>▪ the development is specified in Schedule 1 or 2.<br>Clause 23 of Schedule 1 of the Planning SEPP is relevant to waste and resource management facilities and states if resource recovery or recycling facilities process more than 100,000 tonnes of waste per annum, the development is declared SSD and approval would be required under Division 4.7 of the EP&A Act.<br>As Fulton Hogan propose to process up to 99,000 tpa of RAP, the project is not SSD.<br>Part 2.4 of the Planning SEPP identifies regionally significant development as development specified in Schedule 6.<br>The project will trigger clause 7(1)(c) of Schedule 6, being a waste management facility defined as designated development.<br>As the project will constitute regionally significant development, in accordance with Section 4.5 of the EP&A Act, the Hunter and Central Coast Regional Planning Panel will assess and determine the DA. |

| SEPP | Overview |
|---|---|
| SEPP (Resilience and Hazards) 2021 (Hazards SEPP) | **Hazardous and offensive development**<br>Chapter 3 of the Hazards SEPP requires the consent authority to consider whether a development proposal is a potentially hazardous industry or a potentially offensive industry.<br>Whether the Hazards SEPP applies to the project will be determined by applying the screening process specified in Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (NSW Department of Planning, 2011).<br>The screening process identified that the quantity of LPG stored at the site will exceed the screening threshold and a preliminary hazard analysis was completed, as summarised in Chapter 10.<br>**Remediation of land**<br>Chapter 4 of the Hazards SEPP aims to provide a state-wide planning approach to the remediation of contaminated land and to reduce the risk of harm to human health and the environment by consideration of contaminated land as part of the planning process. Under section 4.6, a consent authority must not consent to the carrying out of development on land unless it has considered potential contamination issues.<br>Waste storage and treatment is listed in Table 1 of Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning, 1998) as an activity that may cause contamination.<br>Despite this, as described under the CLM Act above, there is no known contamination on the site and no duty to report identified contamination to the EPA under section 60(3) of the CLM Act. If previously unidentified contaminated land is identified during construction or operation of the project, the requirements of the Hazards SEPP will be complied with. |
| SEPP (Biodiversity and Conservation) 2021 (BCD SEPP) | The BCD SEPP provides for the protection of koala habitat by ensuring that areas subject to development proposals are considered for their value as habitat or potential habitat for koalas.<br>The BCD SEPP is applicable to the Central Coast LGA.<br>There is no requirement to clear native vegetation. As such, the project will avoid impact to potential Koala habitat. |
| SEPP (Transport and Infrastructure) 2021 (Infrastructure SEPP) | The Infrastructure SEPP provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The Infrastructure SEPP facilitates the development of State infrastructure, including telecommunication facilities, sewerage works and storm water management, and specifies when development consent is (and is not required) for such development when carried out in certain zones.<br>Under the Infrastructure SEPP, Council is required to formally forward development applications to TfNSW for certain developments listed in column 2 and 3 of Schedule 3 and consider any representations made by TfNSW.<br>The project triggers traffic generating development under Schedule 3 of the Infrastructure SEPP. Transport for New South Wales were consulted during preparation of the EIS and advised they will await exhibition of the EIS before making further comment. |

### 5.6.2 Central Coast Local Environmental Plan 2022

As set out in Section 5.3.5, the development is permissible with consent in the E4 – General Industrial zone under the Central Coast LEP.

The project has been considered against the objectives of the E4 zone in Table 5.9, as adopted under Clause 2.3 of the LEP.

**Table 5.9 Consideration of land use zone objectives**

| Zone objective | Consistency |
|---|---|
| To provide a wide range of industrial and warehouse, logistics and related land uses | The project will be an industrial development on land zoned E4 and, therefore, will be an appropriate use of the site. |
| To ensure the efficient and viable use of land for industrial uses. | The project will comprise a general industrial land use and will be an appropriate use of land in the E4 zone. |
| To minimise any adverse effect of industry on other land uses. | The proposed development is compatible with the surrounding land uses (extractive either side). As demonstrated by this EIS, the development will not adversely impact amenity or compromise/conflict with nearby land uses. |
| To encourage employment opportunities | The project will continue to provide employment for 20 full time employees. |
| To enable limited non-industrial land uses that provide facilities and services to meet the needs of businesses and workers. | The project will be in a discrete area of an industrially zoned site and will not prevent the use of or access to adjacent land. |
| To ensure that retail, commercial or service land uses in industrial areas are of an ancillary nature. | The project will support major infrastructure development and upgrades within the Central Coast region through the supply of asphalt, with the increased production capacity enabling the project to meet part of the forecasted increase in demand. |
| To support and protect industrial land for industrial uses. | The project will comprise a general industrial land use and will be an appropriate use of land in the E4 zone. |

The LEP lists various development considerations, including provisions for building height, floor space, heritage conservation, bushfire hazard reduction, ASS, flood planning, drinking water catchments, wetlands, essential services and public infrastructure. The aforementioned provisions have been considered in the EIS and relevant specialist studies where appropriate.

## 5.7 Other plans and policies

### 5.7.1 Central Coast Development Control Plan 2022

Development control plans (DCPs) are documents that supplement the provision of LEPs with more detailed planning and design guidelines. The DCP supports the LEP and provides guidance for applicants to achieve the aims and objectives of the LEP in relation to development in the applicable zones.

The Central Coast Development Control Plan 2022 (DCP) comprises several core parts which establish the fundamental development controls applicable within the LGA. The provisions that are relevant include the controls associated with Chapter 2.9 - Industrial Development.

Table 5.10 describes the relevant DCP requirements and provides information in relation to the project.

**Table 5.10 Relevant Central Coast DCP clauses**

| DCP clause | Comment |
|---|---|
| 2.9.2.1 Floor space ratio | The intent of this clause is to enable industrial development of an acceptable bulk and scale.<br>Given that the site is not included on the Floor Space Ratio Map, a maximum floor space ratio of 0.8:1 is applicable to the development.<br>The floor space ratio is not expected to change from its current 0.06:1 ratio, which is in compliance with this clause. |
| 2.9.2.2 Site coverage | The intent of this clause is to ensure that all necessary uses and activities related to the industrial development can be satisfactorily accommodated and limit the extent of hardstand to assist water infiltration and water sensitive design techniques.<br>The majority of the site will remain undeveloped, with a minor decrease in hardstand area. Landscaping will be re-configured as required. |
| 2.9.2.3 Setbacks | The intent of this clause is to require areas around buildings for environmental improvement and protection, control the visual impact of buildings and structures, and ensure buildings comply with the Building Code of Australia (BCA).<br>This clause requires a front setback of at least 10 m, including a minimum 5 m wide landscaped area. The project does not include any additional buildings or structures, and the current closest structure is setback approximately 18 m from the boundary, with a 5 m landscaped area adjoining the front boundary. The project therefore complies with this clause.<br>There is no requirement on side and rear setbacks, provided that the proposed building meets the requirements of the BCA, any requirements for bushfire protection are met, and any site-specific requirements for setbacks and landscaping are met.<br>The project does not propose any additional buildings, however the site office and carpark is proposed to be repositioned, along with workshop and laboratory which are proposed to be replaced by new structures constructed in compliance with the requirements of the BCA. The new site layout will not result in any building or structure situated within 10 m of the front boundary.<br>The site is on bushfire prone land, requiring the preparation of a bushfire hazard assessment. Bushfire risk will be assessed in accordance with the RFS (2019) Planning for Bushfire Protection (PBP) (refer Chapter 10). The development complies with this clause and does not trigger side or rear setback requirements.<br>Where a creek, river or lagoon adjoins or traverses the site, any buildings on-site are required to be set-back at least 6 m from the top of the bank. The closest building on-site is over 200 m from Wallarah Creek. The development complies with this clause. |
| 2.9.2.4 Design and appearance of buildings | The intent of this clause is to encourage industrial buildings with architectural merit and innovative designs for industrial buildings.<br>An additional bulk material storage bay structure is proposed for the development, and the office and laboratory buildings will be replaced with new structures. All new structures associated with the project have been designed to complement existing materials, colours and finishes of buildings at the approved site and will be constructed in compliance with the relevant requirements outlined in this clause. |
| 2.9.2.5 Car parking and manoeuvring | The intent of this clause is to ensure that car parking demands are met, adequate manoeuvring areas are available, and cyclist and pedestrian needs are adequately and safely accommodated.<br>See Chapter 9 for details of how the development complies with Chapter 2.13 – Transport and Parking of the Central Coast DCP 2022. |
| 2.9.2.7 Off-street loading/unloading | The intent of this clause is to accommodate heavy vehicle parking and manoeuvring, ensure safe and satisfactory operations within the adjoining road system, ensure all loading/unloading demands generated by the development are met on-site and ensure that adequate manoeuvring areas are available to permit entry and exit of vehicles. |

| DCP clause | Comment |
|---|---|
| | See Chapter 9 for details of how the development complies with Chapter 2.13 – Transport and Parking of the Central Coast DCP 2022 and Australian Standards 2890.1 and 2890.2.<br>All loading and unloading of materials would continue to take place on-site, with all loading areas in open air, with the landscaped area at the front boundary screening loading operations from public view.<br>Parking and loading areas are segregated and delineated on-site, with suitable bunding provided in required areas.<br>The development complies with this clause. |
| 2.9.2.7 Flooding and stormwater management | The intent of this clause is to collect and manage stormwater, protect the proposed development from flooding, manage stormwater discharge, encourage water efficient construction techniques and encourage environmentally sustainable developments with regard to water use.<br>The project is not within the vicinity of any natural drainage lines, creeks or rivers, or associated flood prone areas.<br>The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or require any extension to existing hardstand areas or changes to the existing approved stormwater treatment system. |
| 2.9.2.8 Earthworks and retaining walls | The intent of this clause it to avoid excessive earthworks, encourage construction techniques to minimise earthworks, and ensure developments are designed to minimise site disturbance and impacts on groundwater, drainage patterns, adjoining services and structures, the subject site and significant vegetation.<br>The project will not involve any bulk earthworks or additional retaining walls. Minimal earthworks may be required to achieve the proposed objectives of the development, such as minor excavations for footings.<br>The development complies with this clause. |
| 2.9.2.11 Site landscape works | The intent of this clause is to incorporate significant, threatened and endangered on-site vegetation into landscaped areas, provide or retain native fauna habitat and bushland corridors, screen parking and operational areas, provide functional plantings that enhance the visual presentation of buildings, create industrial precincts with unique landscape characteristics and assist in the promotion of water sensitive design elements.<br>The development does not involve the removal or disturbance of vegetation, with the exception of landscaped areas. Landscaped areas will be re-configured as necessary with the landscaping currently provided at the front boundary retained at a minimum depth of 5 m. The development complies with this clause. |
| 2.9.2.12 Storage areas | The intent of this clause is to ensure the visual impact of storage areas is minimised by landscape screening methods.<br>Storage structures are enclosed on three sides and covered by a roof. The open sides face the centre of the site and stored material not visible from public areas. Additionally, a 5 m landscaped area screens the site from Tooheys Road. The development complies with this clause. |
| 2.9.2.13 Design for safety | The intent of this clause is to minimise opportunities for crime by design and operation of industrial development through natural surveillance, access controls, territorial reinforcement and space management.<br>A vehicle gate is positioned at the entrance to the site. This gate is closed and locked when the site is unoccupied but left open during operating hours to permit the entry and exit of heavy and light vehicles from the site office and weighbridge. The perimeter of the site is fenced with security fencing.<br>Given the secure nature of the site, the opportunity for crime is considered low. |

| DCP clause | Comment |
|---|---|
| 2.9.2.14 Security fencing | The intent of this clause is to promote the erection of security fencing and other security devices which do not detract from the appearance of the development.<br>The development does not include any proposed changes to the existing security fencing, which is integrated with landscaping and meets Australian Standards. The development complies with this clause. |
| 2.9.2.15 Lighting | The intent of this clause is to enable the installation of external lighting which does not detract from the appearance of the development or locality, illuminate parts of the site to enhance security, and minimise energy wastage through correct orientation and layout of lighting.<br>No alteration to existing lighting systems at the site is required for the project. |
| 2.9.2.16 Site signs | The intent of this clause is to enable clear site identification, prevent proliferation of advertising signs, prevent distraction to motorists, permit adequate display of necessary identification and c contact information and encourage a coordinated approach to advertising signs.<br>The development will not alter existing signage at the site, which is contained wholly within the site, is consistent with Fulton Hogan's standard branding designs, and designed with materials and colours to comply with this clause, Chapter 2.15 – Signage and Advertising and SEPP (Exempt and Complying Development Codes) 2008. The development complies with this clause. |
| 2.9.2.17 Encouraging energy efficient construction and development | The intent of this clause is to encourage the use of energy efficient materials and construction techniques, encourage environmentally sustainable development with regard to energy use, and encourage the use of energy efficient appliances and fittings, and renewable energy sources where possible.<br>This clause has been considered and compliance will be demonstrated in the detailed design of the new on-site structures. |
| 2.9.2.18 Air quality and odour control | The intent of this clause is to protect local air quality and minimise the impact of odour generated by industrial activity.<br>The requirements of this clause have been considered in Chapter 8. |
| 2.9.2.19 Noise generation | The intent of this clause is to minimise the impact of noise generated by industrial activity.<br>The requirements of this clause have been considered in Chapter 7. |
| 2.9.2.20 Fire mitigation and control | The intent of this clause is to minimise the risk due to fire generated by industrial activity, ensure that people and property are protected in the event of a fire, and ensure optimal access for fire control and firefighting personnel and equipment in the event of a fire.<br>The requirements of this clause have been considered in Chapter 10. The development complies with this clause. |
| 2.9.2.21 Waste minimisation and disposal | The intent of this clause is to require an environmentally sound approach to the storage and disposal of waste and recyclable materials and satisfy the requirements of the WARR Act.<br>The requirements of this clause have been considered in Chapter 11. The development complies with this clause. |
| 2.9.2.23 Disabled access | The intent of this clause is to achieve equitable, cost-effective access to buildings and to facilities and services available in buildings for people with disabilities.<br>The requirements of this clause have been considered in Chapter 9. |

## 5.7.2 Strategic planning policies

Several regional strategies and plans have been prepared which set the economic goals for the LGA, particularly in view of generating future employment. These strategies include the site.

### North Wyong Shire Structure Plan

The North Wyong Shire Structure Plan (the 'plan') was adopted in 2012 by the Department of Planning and Infrastructure. The Plan provides high level identification of lands to guide ongoing development and infrastructure provision within the northern section of the former Wyong LGA.

The plan identified additional employment land beyond that considered in previous iterations of regional strategic planning policies needed to satisfy minimum employment targets.

The plan identified Bushells Ridge as a strategically located proposed employment area, 'subject to further investigation and offset strategies to define conservation requirements and development potential'. An indicative green corridor was also placed along Wallarah Creek.

The Bushells Ridge industrial area was designated as a short-term development target, considering:

- the ability to provide key infrastructure services, particularly water and sewer;
- the potential timing of mineral and coal resource extraction; and
- the ability of development to support the Wyong Employment Zone and the Warnervale Town Centre.

The project is consistent with objectives of the plan as it:

- is to be sited on existing zoned industrial land within Bushells Ridge; and
- will facilitate the supply of asphalt for future development of employment land in Bushells Ridge and the wider region.

### Central Coast Regional Plan 2036

By 2036, an additional 75,500 people are expected to be living in the Central Coast region (NSW Department of Planning and Environment, 2016). The CCRP aims to guide the delivery of homes, jobs, infrastructure and services to support the growing and changing needs of the Central Coast region. The CCRP provides an overarching framework to guide development and investment in the region to 2036.

In preparing the CCRP, the NSW Government has acknowledged the growing importance of the Central Coast and set the following regionally focused goals:

- A prosperous Central Coast with more jobs close to home.
- Protect the natural environment and manage the use of agricultural and resource lands.
- Well-connected communities and attractive lifestyles.
- A variety of housing choice to suit needs and lifestyles.

The Central Coast region has an estimated 116,730 jobs and this is projected to increase to 141,404 by 2036. The CCRP aims to strengthen the region's economic resilience, protect its well-established economic and employment bases and build on its existing strengths to foster greater market and industry diversification.

The project is consistent with the relevant directions and actions associated with Goal 1 of the CCRP, in that it would play a part in promoting a prosperous Central Coast region and facilitate the development of infrastructure and employment lands to promote the creation of new jobs.

Direction 2 focuses on economic development in the southern and northern growth corridors. The site is located in the northern growth corridor, in an area targeted for economic development. The project will form a part of a larger supply chain delivering essential services that will support the delivery of key infrastructure, jobs and housing in the growth corridors.

Direction 5 strives to support new and expanded industrial activity. Bushells Ridge was identified as a potential location for manufacturing, logistics and warehousing activities. The project by its very nature will expand industrial activity in Bushells Ridge, as well as assist in the development of adjoining industrial lands through the supply of an essential building material in the form of asphalt.

Direction 7 aims to increase job containment in the region. The project will provide a supply of asphalt to support development of employment lands within the Central Coast, creating the increased potential for job containment.

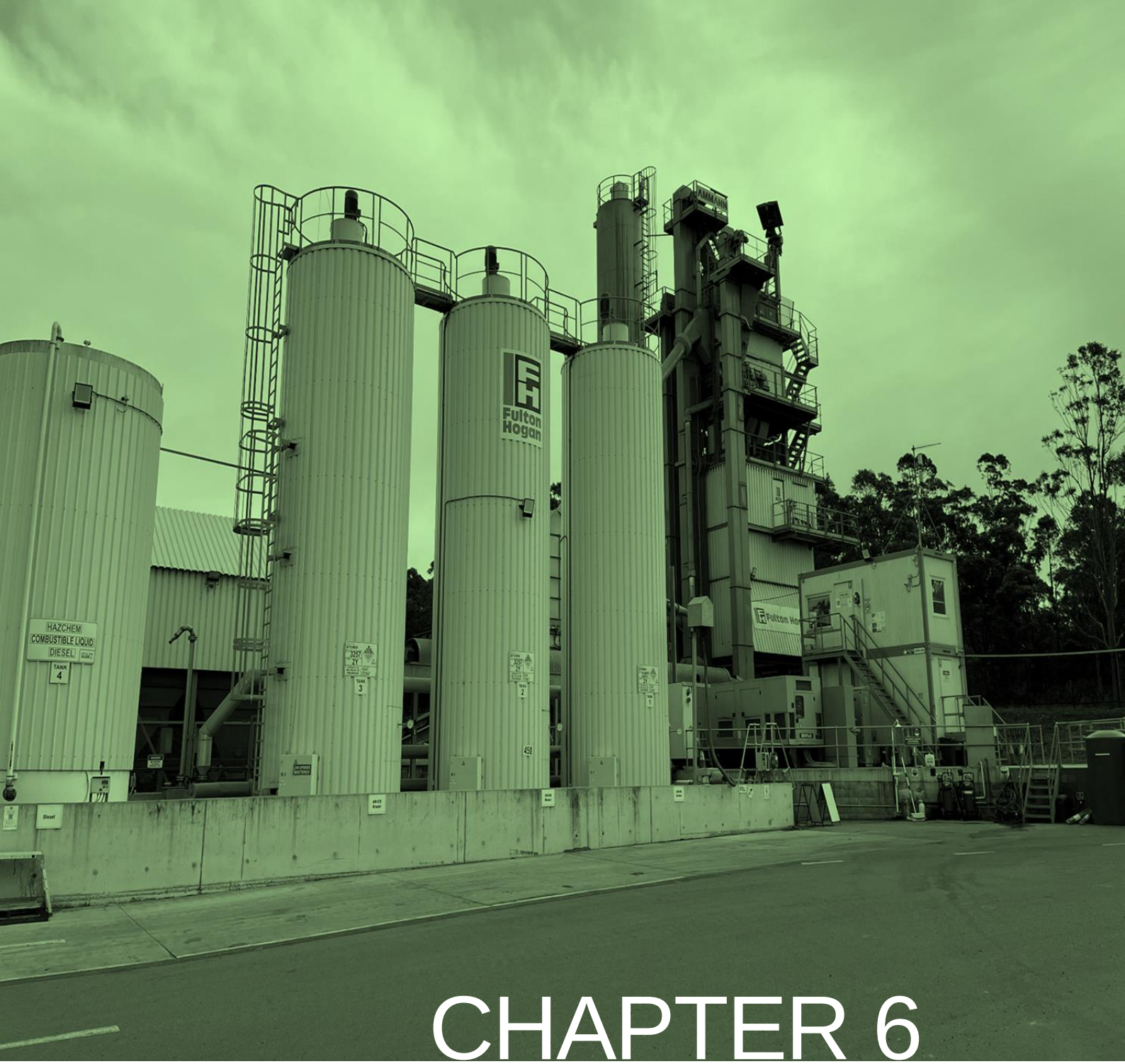
## 5.8 Planning pathway summary

As outlined previously, the EP&A Act is the principal legislation in NSW which sets out the planning regime in the State. The project will be assessed via a DA in accordance with Part 4 of the EP&A Act and the consent authority is Council. Table 5.11 summarises the planning pathway for this project.

**Table 5.11 Planning pathway summary**

| Question | Key applicable legislation | Application to the project |
|---|---|---|
| Is the project permitted with or without consent? | Central Coast LEP | The project is in a general industrial zone.<br>The use of the site for the proposed development is permissible with development consent in the E4 land use zone. |
| Who is the consent authority and what is the determining process? | EP&A Act | The EP&A Act determines the consent authority for the project. The EP&A Act identifies that development assessment is dealt with under Part 4 of the EP&A Act and if the development is not State significant development (SSD) then the consent authority is Council.<br>Section 2.19 of the Planning SEPP identifies regionally significant development as development specified in Schedule 6.<br>The project is declared to be regionally significant development under Section 5 of Schedule 6 of the Planning SEPP as the CIV is above the $5 million threshold for 'waste or resource management facilities'.<br>As such, the Hunter and Central Coast Regional Planning Panel will assess and determine the modification application. |
| What level of assessment is required? | EP&A Act | Part 4 (Development Assessment), Division 4.3 (the procedures for development that needs consent), Section 4.10 (Designated Development), states that:<br>*(1) Designated development is development that is declared to be designated development by an environmental planning instrument or the regulations; and* |

| Question | Key applicable legislation | Application to the project |
|---|---|---|
| | | *Designated development does not include State significant development despite any such declaration.* |
| | EP&A Regulation | Clause 8(1) of Schedule 3 of the EP&A Reg declares bitumen pre-mix and hot-mix industries to be designated development if they have an intended production capacity of more than 150 tonnes per day or 30,000 tpa.<br>Additionally, clause 45(2) of schedule 3 of the EP&A Regulation declares a waste management facility to be designated development if:<br>▪ the facility or works sorts, consolidates or temporarily stores waste at a transfer station or material recycling facility for transfer to another site for final disposal, permanent storage, reprocessing, recycling, use or reuse; and<br>▪ the facility or works has an intended handling capacity of more than 30,000 tonnes per year of waste such as glass, plastic, paper, wood, metal, rubber or building demolition material.<br>The project is consequently designated development as it:<br>▪ Will produce up to 400,000 tpa of asphalt.<br>▪ Will import and temporarily store up to 99,000 tpa of RAP prior to processing, thus being consistent with the definition of a waste management facility. |
| Is the project integrated development and will an EPL be required? | EP&A Act | The project requires approval under the POEO Act and is therefore classified as integrated development under Section 4.46 of the EP&A Act. |
| | POEO Act | Clause 48 of the Act outlines that an EPL (separate application) is required for any scheduled activities to be undertaken at a premise at which Schedule 1 of the Act indicates that a licence is required.<br>As outlined in Section 5.5, an EPL under the POEO Act is required for the project. |




# CHAPTER 6

## ENVIRONMENTAL ASSESSMENT APPROACH

# 6 ENVIRONMENTAL ASSESSMENT APPROACH

This chapter outlines the approach taken to assess the potential environmental and social impacts of the project.

## 6.1 Environmental risk assessment

It is integral to consider the environmental impacts of a proposed development early in the planning of the project. Careful planning of the development can avoid, or reduce, the likelihood of a significant impact on the environment. Where possible and practical, it is best to avoid impacts. If impacts cannot be avoided, they should be minimised or mitigated as much as possible.

The purpose of the environmental impact assessments of the project were to determine whether the project will result in significant impacts to the environment. Where a significant impact is likely, the project needs to be planned to avoid, manage, mitigate or offset this impact.

Chapters 7–11 summarise the assessments of key environmental issues, including the SEARs, assessment methods, results of site surveys, potential construction and operational environmental impacts, and the proposed management and mitigation measures to be implemented for the project in order to minimise the potential for adverse environmental impacts or risks.

### 6.1.1 Scoping process

Potential environmental risks associated with the project were summarised in Element (2022). The preliminary risk analysis was informed by early stakeholder and community engagement, early project planning and specialist study desktop research and site-based investigations.

The scoping report was used to determine the environmental matters requiring detailed or standard assessment in the EIS, and those matters which did not require further assessment.

The scoping report determined the following to be key matters requiring detailed assessment for the EIS:

- Access – road network and parking.
- Atmospheric emissions – particulate matter and gases.
- Amenity – noise.
- Amenity – odour.
- Hazards and risks – bushfire and hazardous goods storage

Assessment reports have been prepared for these key matters and are summarised in and attached to this EIS.

The following standard assessment matters in the scoping report were not considered via a detailed assessment as they are unlikely to be significantly impacted by the project:

- Amenity – visual.
- Biodiversity.
- Built environment.
- Economic.
- Hazards and risks (biosecurity, coastal hazards, dam safety, environmental hazards, flooding, groundwater contamination, land movement, waste and land contamination).
- Heritage.
- Land (land capability, soil chemistry, stability/structure and topography).

- Social.
- Water (hydrology, groundwater quality, surface water quality, water availability, wastewater).

The EIS qualitatively assesses these matters and describes why they were not subject to detailed assessment. However, it should be noted that some standard assessment matters are still assessed via technical studies where relevant.

The potential for cumulative impacts was identified for the following matters and has been considered further in this EIS:

- Air quality.
- Noise.
- Traffic.

## 6.2 Structure of environmental assessment

The SEARs state that an assessment of the likely impacts of the development on the environment, focussing on the key identified issues, must be undertaken, and include:

- A description of the existing environment likely to be affected by the development, using sufficient baseline data.
- An assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant laws, environmental planning instruments, guidelines, policies, plans and industry codes of practice.
- A description of the measures that will be implemented to mitigate and/or offset the potential impacts of the development, and an assessment of:
    - whether these measures are consistent with industry best practice, and represent the full range of reasonable and feasible mitigation measures that could be implemented;
    - the likely effectiveness of these measures; and
    - whether contingency plans will be necessary to manage any residual risks.
- A description of the measures that will be implemented to monitor and report on the environmental performance of the development if it is approved.

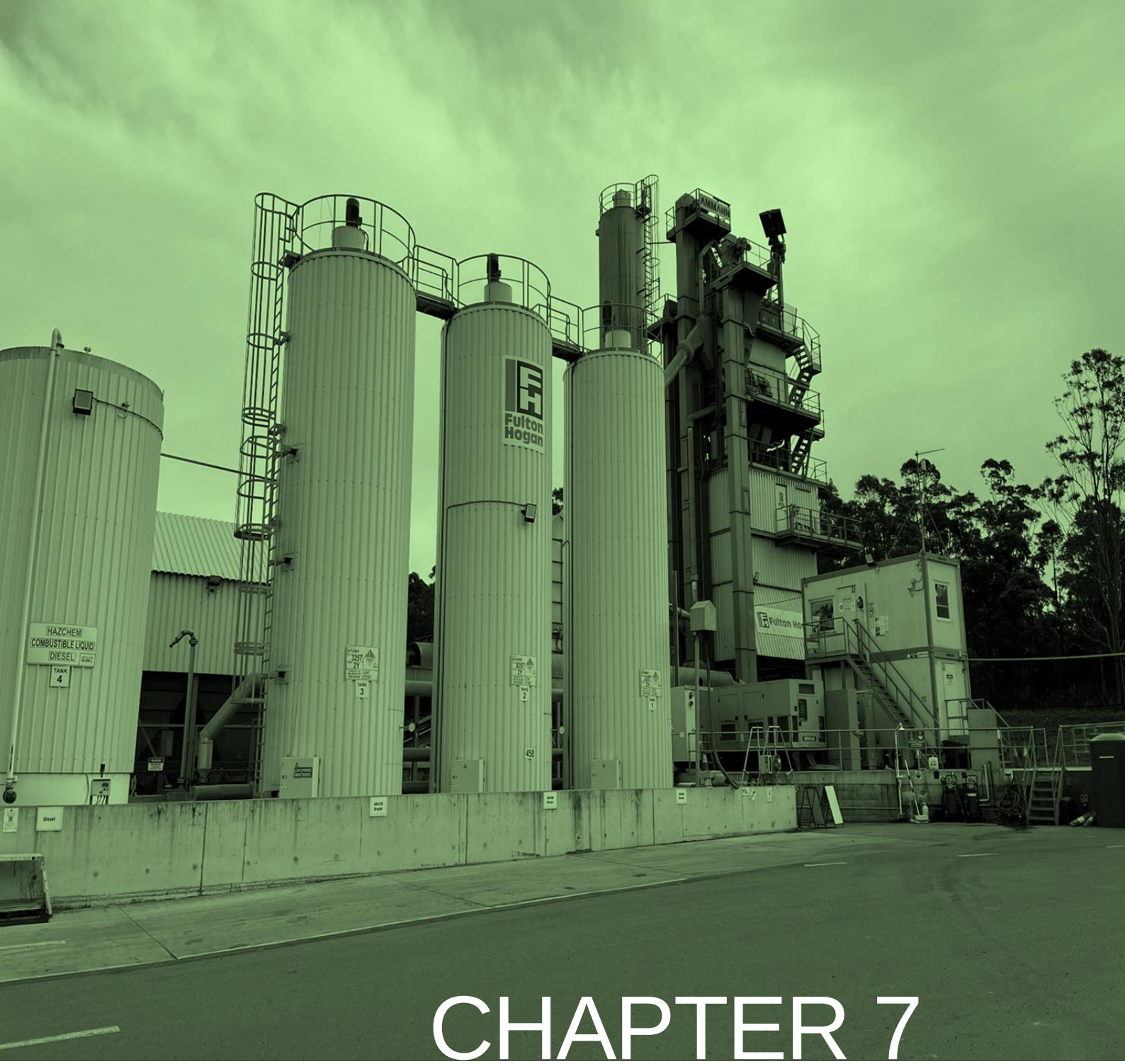
Where relevant, existing environment and baseline data for the project site and surrounding areas is summarised in Chapter 2.

The environmental impact assessment chapters set out the findings of key investigations into those elements of the project that were identified as requiring detailed assessment.

The assessment chapters summarise:

- Relevant legislation, guidelines, policies and plans relevant to each key environmental aspect.
- Desktop and site investigations.
- Assessments of the potential construction and operational impacts of the project prepared by technical specialists to address the regulatory requirements.

Where suitable, the project design has been adapted to avoid impacts and reduce risk ratings, where unavoidable impacts have been identified management and mitigation measures have been developed that will be implemented by Fulton Hogan to ensure any residual environmental impacts are minimised.




# CHAPTER 7

## NOISE

# 7 NOISE

## 7.1 Introduction

This chapter summarises the noise impact assessment (NIA) report, which is in Appendix R. It describes the noise assessment criteria which apply to the project, potential noise sources, modelling method and results, compliance with the noise criteria and good practice noise management measures to further reduce noise emissions from the project.

### 7.1.1 Assessment guidelines and requirements

The SEARs (Table 7.1) require an assessment of the likely impacts of noise generated by the project on receivers.

**Table 7.1 Noise and vibration relevant SEARs**

| Requirement | Section and appendix where addressed |
|---|---|
| A description of all potential noise and vibration sources during construction and operation, including road traffic noise | Section 7.1.2 and Appendix F. |
| A noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines | Section 7.2 and Appendix F. |
| Consideration of annoying characteristics of noise and prevailing meteorological conditions | Appendix F. |
| A description and appraisal of noise and vibration mitigation and monitoring measures. | Section 7.3. |

Noise impacts from construction and operation of the project have been assessed in accordance with the following guidelines:

- DECC (2009) Interim construction noise guideline (ICNG).
- EPA (2017) Noise policy for industry (NPI).
- DECCW (2011) Road noise policy (RNP).
- DEC (2006) Assessing vibration: a technical guide.
- Construction noise and vibration strategy (V4.1 Transport for NSW, 2019) (CNVS).

### 7.1.2 Overview of assessment methods

#### Construction

The project will be constructed during the ICNG recommended standard construction hours:

- 7 am to 6 pm Monday to Friday.
- 8 am to 1 pm Saturday.
- No work on Sunday or public holidays.

Noise modelling software was used to predict construction noise at the receivers based on the sound power level for the plant and equipment listed in Table 16 of Appendix F operating simultaneously during standard construction hours.

Predicted noise levels were assessed against the ICNG noise criteria. The ICNG recommends noise management levels (NMLs) to reduce the likelihood of noise impacts arising from construction activities. The project construction NMLs based on the ICNG for residential and non-residential receivers are in Table 7.2.

**Table 7.2 Construction noise management levels**

| Receiver ID (Type) | Standard Hours Daytime NML – $L_{Aeq(15minute)}$ dBA |
|---|---|
| R01 | 46 |
| R02 | 46 |
| R03 | 46 |
| R04 | 46 |
| R05 | 45 |
| R06 | 51 |
| R07 | 45 |
| R08 | 45 |
| R09 | 60 |
| R10 | 45 |
| R11 | 45 |
| R12 | 45 |
| R13 | 51 |
| R14 | 45 |
| I01 | 75 |
| I02 | 75 |
| I03 | 75 |
| I04 | 75 |
| I05 | 75 |

## Vibration

The CNVS sets out safe working distances to achieve the cosmetic damage and human response criteria for vibration. The key vibration generating sources proposed to be used at the site are trucks, a crane, an excavator, front end loaders, a bobcat and crushers during operation and construction.

The effects of vibration can be divided into three categories:

- Human comfort – where the occupants of buildings are disturbed.
- Building contents – where building contents may be affected.
- Structural/cosmetic damage – where the integrity of the building may be compromised.

The human comfort criteria for intermittent vibration are shown in Table 7.3.

**Table 7.3 Human comfort vibration – vibration dose values for intermittent vibration**

| Building Type | Assessment Period | Vibration Dose Value[1] ($m/s^{1.75}$) | |
|---|---|---|---|
| | | Preferred | Maximum |
| Critical working areas (eg operating theatres or laboratories) | Day or night-time | 0.10 | 0.20 |
| Residential | Daytime | 0.20 | 0.40 |
| | Night-time | 0.13 | 0.26 |
| Offices, schools, educational institutions and places of worship | Day or night-time | 0.40 | 0.80 |
| Workshops | Day or night-time | 0.80 | 1.60 |

## Construction sleep disturbance

Section 4.3 of the ICNG (DECC, 2009) states that a sleep disturbance assessment is required where construction activities are planned to occur for more than two consecutive nights. Given that construction activities are anticipated to occur during standard construction hours, sleep disturbance has not been considered.

## Operational noise

Noise modelling software was used to predict operational noise at the receivers based on the sound power levels for the plant and equipment listed in Table 12 of Appendix F operating simultaneously for the project operating hours.

Noise emissions from industry can be significantly influenced by prevailing weather. Light stable winds (<3 metres per second (m/s)) and temperature inversions have the potential to increase noise at a receiver (noise enhancing conditions).

The assessment used the noise enhancing meteorological conditions from Table D1 of the NPI, which are summarised in Table 7.4.

**Table 7.4 Meteorological parameters**

| Period | Meteorological conditions | Temperature (˚C) | Wind speed (m/s)/direction | Relative humidity (%) | Stability class |
|---|---|---|---|---|---|
| All | Standard | 10 | 0 | 80 | D |
| | Noise enhancing | 10 | 2 | 80 | F |

Note: day = 7am-6pm Monday to Saturday or 8am-6pm on Sundays and public holidays; evening = 6-10pm; Night = remaining periods.

The predicted noise levels were assessed against the project noise trigger levels (PNTL) determined in accordance with the NPI. In determining the PNTLs, a comparison has been made between the project amenity noise levels (PANL) and the project intrusiveness noise levels (PINL), and the lowest noise level was selected for each period (day, evening and night).

Table 7.5 shows the adopted PNTLs (in bold).

**Table 7.5 Project noise trigger levels**

| Monitoring Location (Representative Receivers) | Area Type | Period | Recommended Amenity Noise Level $L_{Aeq(period)}$ | Measured Noise Level (dBA) | | Project Noise Trigger Levels dBA $L_{Aeq(15minute)}$ | |
|---|---|---|---|---|---|---|---|
| | | | | RBL[1] | $L_{Aeq(period)}$ | Intrusiveness | Amenity[2,3] |
| M1 (R09) | Suburban | Day | 55 | 50 | 59 | 55 | **53** |
| | | Evening | 45 | 50 | 58 | 55 | **46** |
| | | Night | 40 | 35 | 55 | **40** | 43 |
| M2 (R05, R07, R08 R10, R11, R12, R14) | Suburban | Day | 55 | 35 (33 actual)[4] | 51 | **40** | 53 |
| | | Evening | 45 | 33 | 48 | **35** | 43 |
| | | Night | 40 | 30 | 45 | **35** | 38 |
| M3 (R01, R02, R03, R04) | Rural | Day | 50 | 36 | 47 | **41** | 48 |
| | | Evening | 45 | 36 (38 actual)[5] | 46 | **41** | 43 |
| | | Night | 40 | 35 | 45 | 40 | **38** |
| M4 (R06, R13) | Rural | Day | 50 | 41 | 51 | **46** | 48 |
| | | Evening | 45 | 41 | 51 | 46 | **43** |
| | | Night | 40 | 41 (42 actual)[5] | 51 | 46 | **38** |
| Industrial receivers (I01, I02, I03[7], I04[7] I05) | - | When in use | 70 | N/A | N/A | N/A | **68** |

[1]RBL = Rating Background Level
[2]The recommended amenity noise levels have been reduced by 5 dB to give the project amenity noise levels due to other sources of industrial noise being present in the area, as outlined in the NPfI.
[3]The project amenity noise levels have been converted to a 15 minute level by adding 3 dB, as outlined in the NPfI.
[4]The NPfI minimum RBL value has been used due to the measured RBL being lower than the minimum value.
[5] RBL reduced to match the daytime/evening RBL, as outlined in the NPfI.
[6]The measured LAeq noise level was dominated by existing road traffic noise and exceeds the recommended amenity noise level by 10 dB or more, therefore, the 'high traffic project amenity noise level' is the existing LAeq(traffic) noise level minus 15 dB, as outlined in the NPfI.
[7]An area defined as an industrial zone on a local environment plan; for isolated residences within an industrial zone the industrial amenity level would usually apply. (NPfI Table 2.2 notes)

### Maximum noise levels

Short duration but high intensity activities could cause sleep disturbance at night, without significantly affecting $L_{Aeq, 15min}$ noise levels. The project will operate 24 hours per day and maximum noise level events need to be considered for potential sleep disturbance.

The NPI recommends that, where the night time noise levels at residential receivers exceeds 52 dBA or the RBL plus 15 dBA, whichever is the greater, then a more detailed assessment of potential sleep disturbance impacts is warranted.

### Road traffic noise criteria

The RNP sets out criteria for assessment of noise from vehicles on public roads. The applicable criteria for arterial roads are set in Table 7.6.

**Table 7.6 Road traffic noise criteria**

| Road category | Land use | Criteria (dB(A) | |
|---|---|---|---|
| | | Day (7 am - 10 pm) | Night (10 pm – 7 am) |
| Freeway/arterial/sub-arterial road | Existing residences affected by additional traffic on existing freeways/sub-arterial/roads generated by land use developments | 60dB(A) $LA_{eq(15hr)}$ | 55dB(A) $LA_{eq(9hr)}$ |

The RNP also states that where predicted noise levels exceed the traffic noise criteria, an assessment of all feasible and reasonable mitigation options should be considered. The RNP states that an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

## 7.2 Potential impacts

### 7.2.1 Construction noise

Predicted noise levels during construction are presented in Table 7.7. Construction noise will comply with criteria during standard construction hours at all sensitive receivers.

**Table 7.7 Combined construction noise predictions**

| Receiver ID (type) | $L_{Aeq(15minute)}$ dBA noise level | Standard hours daytime NML – $L_{Aeq(15minute)}$ dBA | Exceedance of NML $L_{Aeq(15minute)}$ dBA |
|---|---|---|---|
| R01 | 34 | 46 | - |
| R02 | 31 | 46 | - |
| R03 | 30 | 46 | - |
| R04 | 28 | 46 | - |
| R05 | 28 | 45 | - |
| R06 | 26 | 51 | - |
| R07 | 28 | 45 | - |
| R08 | 32 | 45 | - |
| R09 | 33 | 60 | - |
| R10 | 31 | 45 | - |
| R11 | 32 | 45 | - |

| Receiver ID (type) | $L_{Aeq(15minute)}$ dBA noise level | Standard hours daytime NML – $L_{Aeq(15minute)}$ dBA | Exceedance of NML $L_{Aeq(15minute)}$ dBA |
|---|---|---|---|
| R12 | 28 | 45 | - |
| R13 | 30 | 51 | - |
| R14 | 30 | 45 | - |
| I01 | 42 | 75 | - |
| I02 | 33 | 75 | - |
| I03 | 37 | 75 | - |
| I04 | 34 | 75 | - |
| I05 | 32 | 75 | - |

### 7.2.2 Operational noise

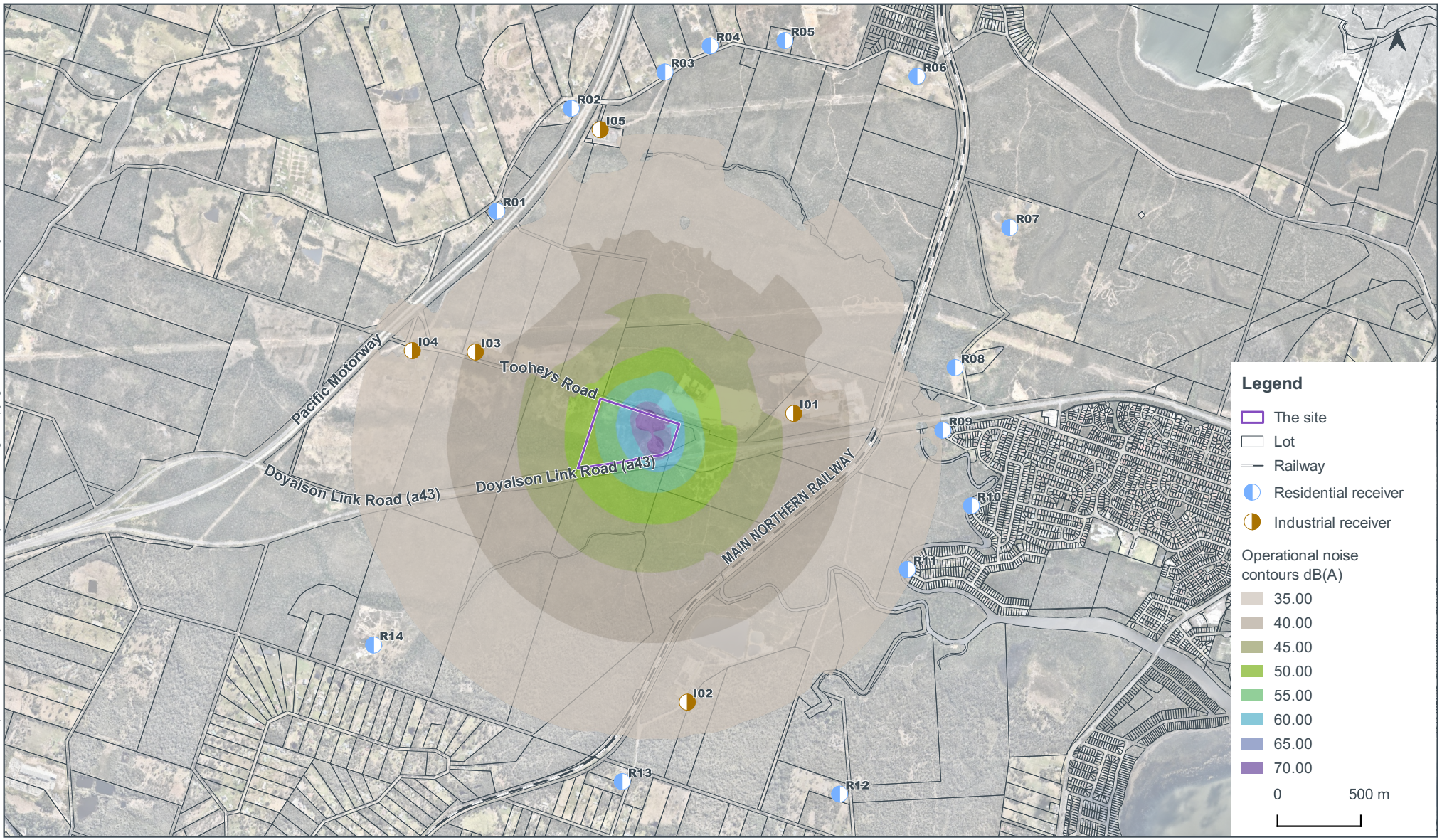
Predicted noise impacts from all operational sources (24-hour operation) at residential and industrial receivers are in Table 7.8, with corresponding noise contours shown on Figure **7.1**. Predicted noise levels will comply with the PNTLs at all receivers.

**Table 7.8 Predicted operational noise levels**

| Receiver | Predicted noise level dBA | | PNTL $L_{Aeq(15minute)}$ dBA | | |
|---|---|---|---|---|---|
| | Standard weather condition | Noise enhancing weather condition | Day | Evening | Night |
| R01 | 31 | 36 | 41 | 41 | 38 |
| R02 | 28 | 33 | 41 | 41 | 38 |
| R03 | 27 | 32 | 41 | 41 | 38 |
| R04 | 26 | 31 | 41 | 41 | 38 |
| R05 | 23 | 28 | 40 | 35 | 35 |
| R06 | 24 | 29 | 46 | 43 | 38 |
| R07 | 25 | 30 | 40 | 35 | 35 |
| R08 | 29 | 34 | 40 | 40 | 35 |
| R09 | 30 | 35 | 53 | 46 | 40 |
| R10 | 28 | 33 | 40 | 35 | 35 |
| R11 | 30 | 35 | 40 | 35 | 35 |
| R12 | 25 | 31 | 40 | 35 | 35 |
| R13 | 28 | 33 | 46 | 43 | 38 |
| R14 | 28 | 33 | 40 | 35 | 35 |
| I01 | 40 | 44 | 68 when in use | | |
| I02 | 31 | 37 | 68 when in use | | |
| I03 | 36 | 40 | 68 when in use | | |
| I04 | 32 | 37 | 68 when in use | | |
| I05 | 29 | 35 | 68 when in use | | |

Figure 7.1
**Operational noise contours**

Bushells Ridge Asphalt Plant
ENVIRONMENTAL IMPACT STATEMENT



### Maximum noise level

Predicted maximum noise levels during the night period are shown in Table 7.9. Maximum noise trigger levels will not be exceeded at assessed receivers.

**Table 7.9 Maximum noise level assessment (night)**

| Receiver | Predicted noise level dBA | | | | Sleep disturbance noise trigger level dBA | |
|---|---|---|---|---|---|---|
| | Standard weather conditions | | Noise enhancing weather conditions | | | |
| | $L_{Aeq(15minute)}$ | $L_{Amax}$ | $L_{Aeq(15minute)}$ | $L_{Amax}$ | $L_{Aeq(15minute)}$ | $L_{Amax}$ |
| R01 | 31 | 37 | 36 | 42 | 40 | 52 |
| R02 | 28 | 34 | 33 | 39 | 40 | 52 |
| R03 | 27 | 33 | 32 | 38 | 40 | 52 |
| R04 | 26 | 32 | 31 | 37 | 40 | 52 |
| R05 | 23 | 30 | 28 | 36 | 40 | 52 |
| R06 | 24 | 30 | 29 | 35 | 46 | 56 |
| R07 | 25 | 31 | 30 | 36 | 40 | 52 |
| R08 | 29 | 35 | 34 | 41 | 40 | 52 |
| R09 | 30 | 36 | 35 | 41 | 40 | 52 |
| R10 | 28 | 33 | 33 | 39 | 40 | 52 |
| R11 | 30 | 36 | 35 | 41 | 40 | 52 |
| R12 | 25 | 31 | 31 | 36 | 40 | 52 |
| R13 | 28 | 33 | 33 | 38 | 46 | 56 |
| R14 | 28 | 33 | 33 | 38 | 40 | 52 |

## 7.2.3 Road traffic noise

The project will increase traffic movements on the M1 Motorway and Motorway Link Road by up to 216 per day.

Existing traffic volumes on the Motorway Link Road and the M1 Motorway in the vicinity of the project are in excess of 19,000 and 47,000 vehicles per day respectively. The corresponding increase in road traffic noise due to additional traffic generated by the project is calculated to be less than 0.2 dB on both roads. As the predicted increase is significantly less than 2 dB, according to the RNP, this is unlikely to be discernible and will not require mitigation.

## 7.2.4 Vibration

Table 7.10 outlines the recommended safe working distances for vibration intensive plant that may be used for construction of the project with respect to cosmetic damage and human comfort. These are based on industry guidelines and databases of source vibration levels for construction equipment.

**Table 7.10:** Recommended safe working distances for vibration intensive plant.

| Plant item | Rating/description | Safe working distance – cosmetic damage (m) | Safe working distance – heritage structure (m) | Safe working distance – human comfort (m) |
|---|---|---|---|---|
| Vibratory roller | <50 kN (typically 1-2 tonnes) | 5 | 10 | 15-20 |

| Plant item | Rating/description | Safe working distance – cosmetic damage (m) | Safe working distance – heritage structure (m) | Safe working distance – human comfort (m) |
|---|---|---|---|---|
| | <100 kN (typically 2-4 tonnes) | 6 | 12 | 20 |
| | <200 kN (typically 4-6 tonnes) | 12 | 24 | 40 |
| | <300 kN (typically 7-13 tonnes) | 15 | 30 | 100 |
| | >300 kN (typically 13-18 tonnes) | 20 | 40 | 100 |
| | >300 kN (typically 18 tonnes) | 25 | 50 | 100 |
| Small hydraulic hammer | 5 to 12 tonne excavator | 2 | 4 | 7 |
| Medium hydraulic hammer | 18 to 20 tonne excavator | 7 | 14 | 23 |
| Large hydraulic hammer | 18 to 34 tonne excavator | 22 | 44 | 73 |
| Vibratory pile driver | Sheet piles | 2-20 | 40 | 20 |
| Pile boring | ≤ 800 mm | 2 (nominal) | 4 | 4 |
| Jackhammer | Hand held | 1 (nominal) | 2 | 2 |

Given the nearest structure is approximately 720 m from the site boundary, vibration levels at or above the relevant criteria for the majority of commercial and residential structures will not occur.

### 7.2.5 Cumulative noise impacts

Cumulative noise levels from multiple industrial noise sources are implicit in the amenity criteria.

As compliance with the PTNL are achieved, it is expected that the project will have a negligible contribution to cumulative noise levels at the identified receivers.

## 7.3 Mitigation and management measures

The management measures in Table 7.11 will be implemented to reduce impacts from noise generated during construction and operation of the project.

**Table 7.11 Noise management measures**

| Strategies | Management measures |
|---|---|
| Construction | Adhere to the standard daytime construction hours:<br>▪ Monday to Friday 7 am – 6 pm;<br>▪ Saturday 8 am – 1 pm; and<br>▪ No work Sundays or Public Holidays. |
| | Avoid operating noisy plant simultaneously wherever possible. |
| | Maintenance work on all construction plant will be carried out away from noise sensitive areas and confined to standard daytime construction hours, where practicable. |
| | Position noisy equipment behind structures that act as barriers, at the greatest distance from the noise-sensitive area, or orient the equipment so that noise emissions are directed away from any sensitive areas. |
| | Employ quiet practices when operating equipment (e.g. positioning and unloading of trucks in appropriate areas). |

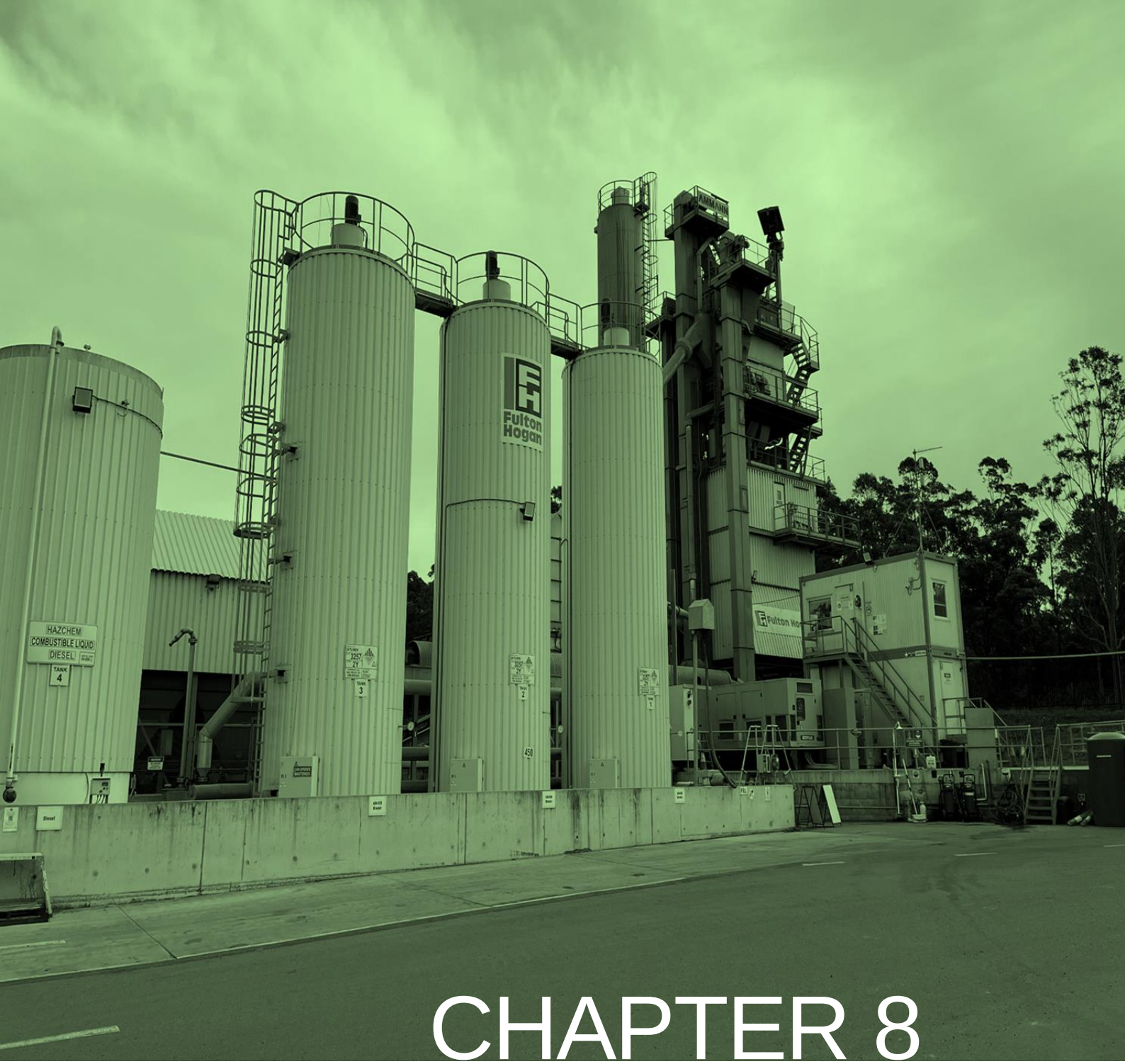
| Strategies | Management measures |
|---|---|
| Operations | Include awareness and understanding of noise issues and the use of quiet work practices in site inductions for all staff, contractors and visitors to the site. Specific mention of the following items will be included:<br>▪ Site specific noise management measures to be followed.<br>▪ Locations of nearby noise sensitive receivers. |
| | The simultaneous use of multiple items of significant noise generating equipment will be avoided wherever possible, and operations are to be scheduled so they are used separately rather than concurrently. |
| | The noisiest activities will be scheduled to the least noise sensitive times of the day (i.e. not during the night-time period) where practicable. |
| | All machinery and plant will be maintained and operated in a proper and efficient manner to minimise noise generation. |
| | Switch off plant and equipment when not in use and avoid excessive idling. |
| | Maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not operational until fully repaired. |

## 7.4 Residual impacts

Noise generated during construction and operation of the project will satisfy the relevant construction NMLs and operational PNTLs at all assessed residential and industrial receivers.

Residual noise impact is the exceedance of the project noise trigger level after all feasible and reasonable mitigation measures have been considered. The project is not likely to generate residual noise impacts at any receivers and therefore receiver-based noise treatments or controls are not required.

Management measures in Table 7.11 will be included in a construction environmental management plan (CEMP) and updated in the site's existing operational environmental management plan (OEMP) and implemented to further reduce the potential for noise impacts.




# CHAPTER 8

## AIR QUALITY

# 8 AIR QUALITY

## 8.1 Introduction

This chapter summarises the air quality impact assessment (AQIA) report, which is in Appendix G. It describes the air quality assessment criteria, potential air emission sources, modelling method and results, potential impacts and mitigation measures to minimise air emissions.

### 8.1.1 Assessment guidelines and requirements

The SEARs require an assessment of the likely impacts of the project on air quality (Table 8.1).

**Table 8.1 Air quality SEARs**

| Requirement | Section and appendix where addressed |
|---|---|
| A description of all potential sources of air and odour emissions during construction and operation. | Section 8.1.2 and Appendix G. |
| An air quality impact assessment in accordance with relevant EPA guidelines. | Section 8.2 and Appendix G. |
| A description and appraisal of air quality impact mitigation and monitoring measures. | Section 8.3 and Appendix G. |

Air quality impacts from operation of the project have been assessed in accordance with the following guidelines:

- NSW EPA (2022) Approved methods for the modelling and assessment of air pollutants in New South Wales (approved methods).
- NSW EPA (2006) Assessment and measurement of odour from stationary sources in NSW.

### 8.1.2 Overview of assessment methods

The objective of the AQIA was to identify and assess the potential for adverse construction and operational air quality impacts which may result from the project.

The following atmospheric pollutants are likely to be generated by the project:

- Deposited dust.
- TSP matter, which is nominally taken to be less than 30 µm in diameter and refers to all suspended particles in the air.
- $PM_{10}$, which is a subset of TSP and have a diameter of 10 µm or less.
- $PM_{2.5}$, which is a subset of TSP and have a diameter of 2.5 µm or less.
- Pollutants generated through the combustion of fuel in a diesel generator and vehicle engines (oxides of nitrogen and sulfur ($NO_2$ and $SO_2$), carbon monoxide (CO), $PM_{10}$ and $PM_{2.5}$).
- Gaseous emissions from asphalt plant stack.

Dispersion of air pollutants was modelled using the 'CALPUFF modelling system', which combines estimated emission rates, neighbouring emission sources, proposed mitigation measures and local meteorology to predict incremental and cumulative air quality impacts.

The AQIA assumed the following existing measures will be continued for the project to reduce emissions:

- Asphalt plant equipped with 12.2 m tall exhaust stack to disperse air emissions generated from the process.
- Asphalt plant positioned to the front of the site to minimise the overall travel distance on-site.

- Existing hardstand areas remain intact.
- Raw materials stored in designated storage bays in three side enclosed sheds.
- Unprocessed RAP stockpiles positioned to the rear of the site and traffic restricted through the RAP processing and storage areas.
- RAP stockpiles have a low propensity for dust due to bitumen binding the material.
- RAP stockpiles are profiled to improve air flow over the stockpiles.
- Silos equipped with closed loop system to minimise fugitive dust.
- Baghouse filter installed at the asphalt plant to minimise fugitive dust.

## Emission estimates

Dust emissions have been estimated by analysing the various types of dust generating activities and using suitable emissions sourced from both locally developed and United States EPA emission factors.

It should be noted that RAP is bound material with an average of 4.5% bitumen and 2-3% moisture. The combination of the bitumen and moisture hold the fine material bound together creating conglomerates with particle sizing greater than approximately 0.5 mm. Due to the size and density of the conglomerates their mobility is limited. The particles can still become airborne, however, due to their size are not able to be entrained in the atmosphere and typically fallout soon after lift-off.

In the process of stockpiling unprocessed RAP, the smaller particles are likely to travel to the bottom of the stockpile through gaps made by the larger particles and settle on the bottom of the pile. As wind hits the stockpile only the larger particles will be subject to the wind and unlikely to be lifted-off from the surface.

Average and peak dust emission conditions have been assessed for the operation of the project and are summarised in Table 8.2.

**Table 8.2 Summary of estimated dust emissions for the project (kg/year)**

| Activity | Dust emissions | | |
|---|---|---|---|
| | TSP | $PM_{10}$ | $PM_{2.5}$ |
| Average | 7,405 | 2,190 | 643 |
| Peak | 54,869 | 14,274 | 2,710 |

In addition to the estimated dust emissions from the project, operations at the adjacent industrial receivers and the future Wallarah 2 Coal Mine have been included in the modelling to assess the potential for cumulative dust effects.

Additionally, there will be numerous other distant sources that contribute to the total background dust levels. Modelling these sources explicitly is impractical, however, the residual dust attributable to all other such non-modelled sources has been included in the cumulative assessment in Section 8.2.2.

Emissions from the asphalt plant stack exhaust have been modelled as a point source with parameters outlined in Table 8.3.

**Table 8.3 Modelled emission rates for other pollutants**

| Pollutant | Emission rate (g/s) |
|---|---|
| $PM_{10}$ | 0.2 |
| $PM_{2.5}$ | 0.1 |
| CO | 1.4 |
| $SO_2$ | 1.7 |

| Pollutant | Emission rate (g/s) |
|---|---|
| $NO_X$ | 2.3 |
| Arsenic | 1.3E-05 |
| Beryllium | 4.3E-06 |
| Cadmium | 1.6E-05 |
| Chromium (VI) | 1.8E-05 |
| Copper | 7.0E-05 |
| Lead | 1.4E-05 |
| Manganese | 1.9E-04 |
| Mercury | 8.9E-06 |
| Nickel | 8.2E-05 |
| Zinc | 1.3E-04 |
| Acetone | 1.6E-02 |
| Acetaldehyde | 2.5E-02 |
| Benzene | 8.8E-03 |
| Formaldehyde | 6.2E-02 |
| Toluene | 1.8E-02 |
| Xylene | 5.3E-02 |
| Polycyclic Aromatic Hydrocarbons (PAH) (total) | 4.3E-03 |

Odour could be generated when asphalt is loaded onto trucks and from the asphalt plant stack. Odour emission rates are summarised in Table 8.4 in terms of odour units (OU).

**Table 8.4 Estimated odour emission rates**

| Location | Source | Emission rate ($OU/m^3/s$) |
|---|---|---|
| Asphalt plant | Loading asphalt to a truck | 1,400 |
| | Truck waiting to be covered | 1,080 |
| | Plant stack exhaust | 4,817 |

## Assessment criteria

The air quality criteria for key pollutants in the approved methods applicable to the project are summarised in Table 8.5. These relate to the total pollutants in the air, not only pollutants from the project (i.e. cumulative).

**Table 8.5 NSW EPA air quality impact assessment criteria**

| Pollutant | Averaging period | Impact | Criterion |
|---|---|---|---|
| TSP | Annual | Total | 90 $\mu g/m^3$ |
| $PM_{10}$ | Annual | Total | 25 $\mu g/m^3$ |
| | 24 hour | Total | 50 $\mu g/m^3$ |
| $PM_{2.5}$ | Annual | Total | 8 $\mu g/m^3$ |
| | 24 hour | Total | 25 $\mu g/m^3$ |
| Deposited dust | Annual | Incremental | 2 $g/m^2$/month |
| $SO_2$ | 1 hour | Incremental | 286 $\mu g/m^3$ |
| | 24 hour | Incremental | 57 $\mu g/m^3$ |
| $NO_2$ | 1-hour | Incremental | 164 $\mu g/m^3$ |
| | Annual | Incremental | 31 $\mu g/m^3$ |
| CO | 15-minute | Incremental | 100,000 $\mu g/m^3$ |

| Pollutant | Averaging period | Impact | Criterion |
|---|---|---|---|
| | 1-hour | Incremental | 30,000 µg/m$^3$ |
| | 8-hour | Incremental | 10,000 µg/m$^3$ |
| Arsenic | 1-hour | Incremental | 0.09 µg/m$^3$ |
| Beryllium | 1-hour | Incremental | 0.004 µg/m$^3$ |
| Cadmium | 1-hour | Incremental | 0.018 µg/m$^3$ |
| Chromium (VI) | 1-hour | Incremental | 0.09 µg/m$^3$ |
| Copper | 1-hour | Incremental | 3.7 µg/m$^3$ |
| Lead | Annual | Incremental | 0.5 µg/m$^3$ |
| Manganese | 1-hour | Incremental | 18 µg/m$^3$ |
| Mercury | 1-hour | Incremental | 0.18 µg/m$^3$ |
| Nickel | 1-hour | Incremental | 0.18 µg/m$^3$ |
| Zinc | 1-hour | Incremental | 90 µg/m$^3$ |
| Acetone | 1-hour | Incremental | 22,000 µg/m$^3$ |
| Acetaldehyde | 1-hour | Incremental | 42 µg/m$^3$ |
| Benzene | 1-hour | Incremental | 29 µg/m$^3$ |
| Formaldehyde | 1-hour | Incremental | 20 µg/m$^3$ |
| Toluene | 1-hour | Incremental | 360 µg/m$^3$ |
| Xylene | 1-hour | Incremental | 190 µg/m$^3$ |
| PAH (total) | 1-hour | Incremental | 0.4 µg/m$^3$ |

## Odour

Odour concentrations are used and are defined in odour units. The number of odour units represents the number of times that the odour would need to be diluted to reach a level that is just detectable to the human nose. Therefore, odour less than one odour unit (1 OU) would not be detectable to most people.

Air dispersion modelling is used to calculate the level of dilution of odours emitted from the source at the point to where odour reaches surrounding receivers. This approach allows the air dispersion model to produce results in terms of odour units.

The NSW criteria for acceptable levels of odour range from 2 to 7 OU, with the more stringent 2 OU criteria applicable to densely populated urban areas and the 7 OU criteria applicable to sparsely populated rural areas.

The odour criteria in the approved methods are summarised in Table 8.6.

**Table 8.6 Impact assessment criteria for complex mixtures of odorous air pollutants**

| Population of affected community | Impact assessment criteria for complex mixtures of odorous air pollutants (OU) |
|---|---|
| Urban (≥~2000) and/or schools and hospitals | 2.0 |
| ~500 | 3.0 |
| ~125 | 4.0 |
| ~30 | 5.0 |
| ~10 | 6.0 |
| Single rural residence (≤~2) | 7.0 |

## 8.2 Potential impacts

### 8.2.1 Construction air emissions

Dust emissions will be generated during construction, associated with material handling, vehicle movements and windblown dust generated from exposed areas and stockpiles. Exhaust emissions from the operation of construction vehicles and plant will also generate emissions.

Dust generated from construction is unlikely to be significant given the nature of the activities. Additionally, the potential dust emissions generated by construction will be less than the emissions produced during operations. Also, construction will be temporary and any minor impact to receivers will be short term.

### 8.2.2 Operational air emissions

Results from the incremental assessment are in Table 8.7 and results from the cumulative assessment are in Table 8.8.

**Table 8.7 24-hour and annual average particulate dispersion results – incremental**

| Receiver | $PM_{2.5}$ (µg/m$^3$) | | $PM_{10}$ (µg/m$^3$) | | TSP (µg/m$^3$) | Dust deposition (g/m$^3$/mth) |
|---|---|---|---|---|---|---|
| | 24 hour average | Annual average | 24 hour average | Annual average | Annual average | Annual average |
| | Criteria | | | | | |
| | - | - | - | - | - | 2 |
| R1 | 1.1 | <0.1 | 5.4 | <0.1 | 0.1 | <0.1 |
| R2 | 0.6 | <0.1 | 3.1 | <0.1 | <0.1 | <0.1 |
| R3 | 0.4 | <0.1 | 1.9 | <0.1 | <0.1 | <0.1 |
| R4 | 0.4 | <0.1 | 1.6 | <0.1 | <0.1 | <0.1 |
| R5 | 0.3 | <0.1 | 1.3 | <0.1 | <0.1 | <0.1 |
| R6 | 0.3 | <0.1 | 1.2 | <0.1 | <0.1 | <0.1 |
| R7 | 0.3 | <0.1 | 1.0 | <0.1 | <0.1 | <0.1 |
| R8 | 0.2 | <0.1 | 0.9 | <0.1 | <0.1 | <0.1 |
| R9 | 0.4 | <0.1 | 1.9 | <0.1 | <0.1 | <0.1 |
| R10 | 0.8 | <0.1 | 4.0 | <0.1 | 0.1 | <0.1 |
| R11 | 0.8 | <0.1 | 3.8 | <0.1 | 0.2 | <0.1 |
| R12 | 0.5 | <0.1 | 2.2 | <0.1 | 0.1 | <0.1 |
| R13 | 0.8 | <0.1 | 3.8 | 0.1 | 0.2 | <0.1 |
| R14 | 0.4 | <0.1 | 1.7 | <0.1 | <0.1 | <0.1 |
| R15 | 0.6 | <0.1 | 2.8 | <0.1 | 0.1 | <0.1 |
| R16 | 0.3 | <0.1 | 1.2 | <0.1 | <0.1 | <0.1 |
| I1 | 1.1 | <0.1 | 4.5 | 0.1 | 0.2 | <0.1 |
| I2 | 0.5 | <0.1 | 1.9 | <0.1 | <0.1 | <0.1 |
| I3 | 0.3 | <0.1 | 1.2 | <0.1 | <0.1 | <0.1 |
| I4 | 2.6 | <0.1 | 12.6 | 0.2 | 0.5 | <0.1 |

**Table 8.8 Annual average particulate dispersion results – cumulative**

| Receiver | $PM_{2.5}$ (µg/m$^3$) | $PM_{10}$ (µg/m$^3$) | TSP (µg/m$^3$) | Dust deposition (g/m$^3$/mth) |
|---|---|---|---|---|
| | Annual average criteria | | | |
| | 8 | 25 | 90 | 4 |
| R1[1] | - | - | - | - |
| R2[1] | - | - | - | - |
| R3 | 4.8 | 13.8 | 48.9 | 2.3 |
| R4 | 4.7 | 13.7 | 48.7 | 2.2 |
| R5 | 4.7 | 13.6 | 48.7 | 2.2 |
| R6 | 4.7 | 13.6 | 48.7 | 2.2 |
| R7 | 4.7 | 13.6 | 48.6 | 2.2 |
| R8 | 4.7 | 13.6 | 48.6 | 2.2 |
| R9 | 4.7 | 13.6 | 48.6 | 2.2 |
| R10 | 4.7 | 13.6 | 48.7 | 2.2 |
| R11 | 4.7 | 13.7 | 48.8 | 2.2 |
| R12 | 4.7 | 13.7 | 48.8 | 2.2 |
| R13 | 4.8 | 13.7 | 48.9 | 2.2 |
| R14 | 4.7 | 13.6 | 48.7 | 2.2 |
| R15 | 4.7 | 13.7 | 48.8 | 2.2 |
| R16 | 4.8 | 13.8 | 49.0 | 2.2 |
| I1 | 4.8 | 13.7 | 48.9 | 2.2 |
| I2 | 4.7 | 13.7 | 48.7 | 2.2 |
| I3[1] | - | - | - | - |
| I4 | 4.9 | 14.3 | 50.1 | 2.3 |

[1] Sensitive receiver not assessed for cumulative impact given future operation of Wallarah 2 Coal Mine.

Incremental and cumulative particulate matter and dust emissions from the project are predicted to be below criteria.

The cumulative annual average $PM_{2.5}$ and $PM_{10}$ concentrations generated by the project are illustrated in Figure 8.1 and Figure 8.2.

As indicated in Section 2.3.2, maximum 24-hour concentrations of $PM_{2.5}$ and $PM_{10}$ have exceeded or come close to the criteria on occasion at the Wyong monitoring station.

The EPA requires a more thorough assessment when the criteria is likely to be exceeded due to background levels, where the measured background level on a given day is added contemporaneously to the predicted incremental level using the same day's weather. This method has limits in predicting short term impacts, so impacts are described as 'systemic', or over five or more days.

The Level 1 contemporaneous assessment approach of Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA, 2022), which involves adding the maximum background levels to the maximum predicted levels from the project, would show levels above the criterion whether or not the project was operating.

In such situations, a Level 2 contemporaneous assessment approach is applied, where the measured background levels are added to the daily corresponding predicted dust level from the project. The ambient $PM_{2.5}$ and $PM_{10}$ concentrations corresponding with the daily concentrations from the year of modelling (2021) from the Wyong monitoring site were applied to represent the prevailing background levels at receivers around the project.

The results showed that the project will not increase the number of days above the 24-hour average criteria for $PM_{2.5}$ and $PM_{10}$ at any sensitive receiver.

Figure 8.1
**Cumulative annual average PM2.5 concentrations**

Bushells Ridge Asphalt Plant
ENVIRONMENTAL IMPACT STATEMENT

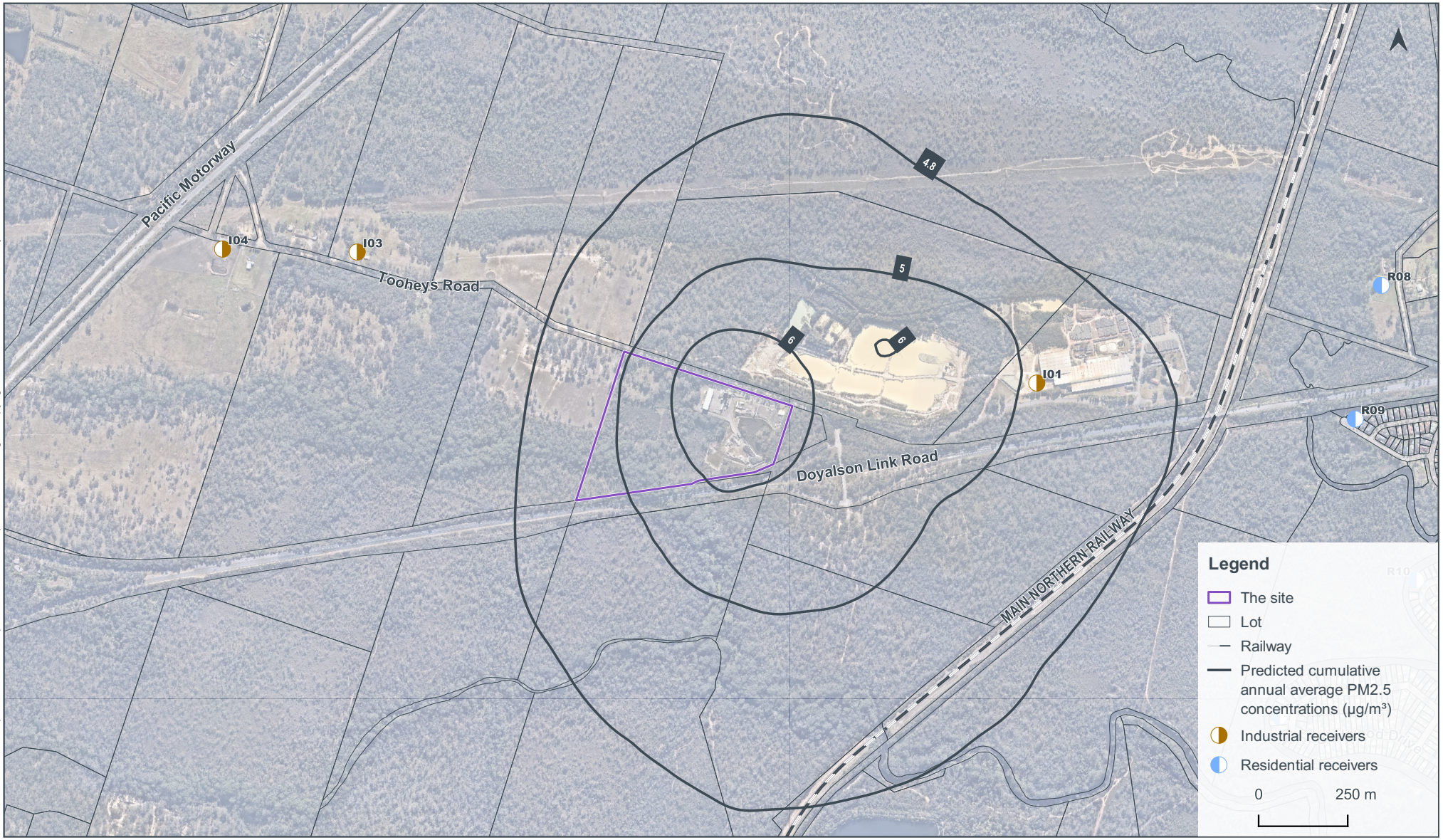
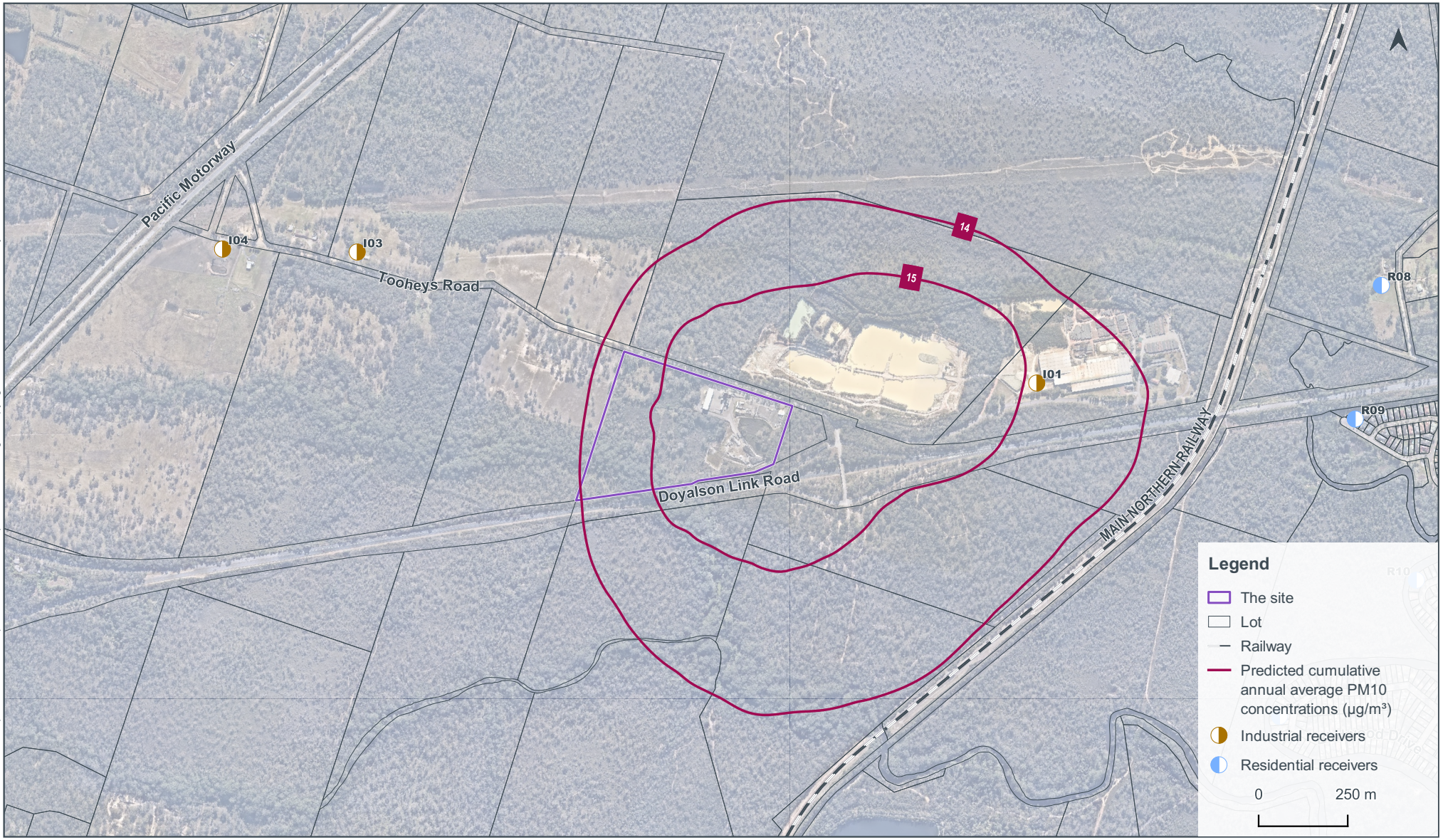


Figure 8.2
**Cumulative annual average PM10 concentrations**

Bushells Ridge Asphalt Plant
ENVIRONMENTAL IMPACT STATEMENT



### 8.2.3 Other pollutants

The criteria apply at the most impacted assessment locations or at any location off-site depending on the pollutant assessed. Maximum predicted impacts from other pollutants at the worst affected assessment location are in Table 8.9. The maximum contribution of these pollutants from the project will be below criteria.

**Table 8.9 Maximum dispersion results – other pollutants**

| Pollutant | Avg. period | Incremental (µg/m$^3$) | Background (µg/m$^3$) | Total (µg/m$^3$) | Criteria (µg/m$^3$) |
|---|---|---|---|---|---|
| $NO_2$ | 1 hour | 27.5 | 57.4 | 84.9 | 164 |
| | Annual | 0.2 | 5.9 | 6.1 | 31 |
| CO | 15 minute | 44.2 | 1,484 | 1,528 | 100,000 |
| | 1 hour | 33.5 | 1,125 | 1,158 | 30,000 |
| | 8 hour | 13.3 | 742 | 755 | 10,000 |
| $SO_2$ | 1 hour | 40.6 | 85.8 | 126.4 | 286 |
| | 24-hour | 5.6 | 14.3 | 19.9 | 57 |
| Lead | Annual | 0.000002 | - | 0.000002 | 0.5 |
| Arsenic | 1 hour | 0.001 | - | 0.001 | 0.09 |
| Beryllium | 1 hour | 0.0004 | - | 0.0004 | 0.004 |
| Cadmium | 1 hour | 0.001 | - | 0.001 | 0.018 |
| Chromium (VI) | 1 hour | 0.002 | - | 0.002 | 0.09 |
| Copper | 1 hour | 0.006 | - | 0.01 | 3.7 |
| Manganese | 1 hour | 0.02 | - | 0.02 | 18 |
| Mercury | 1 hour | 0.0008 | - | 0.0008 | 0.18 |
| Nickel | 1 hour | 0.007 | - | 0.01 | 0.18 |
| Zinc | 1 hour | 0.01 | - | 0.01 | 90 |
| Acetone | 1 hour | 1.4 | - | 1.4 | 22,000 |
| Acetaldehyde | 1 hour | 2.2 | - | 2.2 | 42 |
| VOCs (as benzene) | 1 hour | 0.8 | - | 0.8 | 29 |
| Formaldehyde | 1 hour | 5.4 | - | 5.4 | 20 |
| Toluene | 1 hour | 1.6 | - | 1.6 | 360 |
| Xylene | 1 hour | 4.6 | - | 4.6 | 190 |
| PAH (total) | 1 hour | 0.4 | - | 0.37 | 0.4 |

### 8.2.4 Odour

The predicted 99$^{th}$ percentile nose response average incremental ground level odour concentration for each receiver is in Table 8.10.

The odour contribution from the project will be below criteria.

**Table 8.10 Percentile nose response average incremental ground level odour concentrations**

| Receiver | Predicted odour level (OU) | Criteria (OU) |
|---|---|---|
| R1 | 0.1 | 2 |
| R2 | <0.1 | 2 |
| R3 | <0.1 | 2 |
| R4 | <0.1 | 2 |

| Receiver | Predicted odour level (OU) | Criteria (OU) |
|---|---|---|
| R5 | <0.1 | 2 |
| R6 | <0.1 | 2 |
| R7 | <0.1 | 2 |
| R8 | <0.1 | 2 |
| R9 | <0.1 | 2 |
| R10 | <0.1 | 2 |
| R11 | <0.1 | 2 |
| R12 | <0.1 | 2 |
| R13 | <0.1 | 2 |
| R14 | <0.1 | 2 |
| R15 | <0.1 | 2 |
| R16 | <0.1 | 2 |
| I1 | 0.1 | 2 |
| I2 | <0.1 | 2 |
| I3 | <0.1 | 2 |
| I4 | 0.2 | 2 |

### 8.2.5 Greenhouse gas emissions

Greenhouse gases (GHGs) generated by the project have been predicted with reference to:

- Department of the Environment and Energy (DEE) (2019a) National inventory report 2017.
- DEE (2019b) State and territory greenhouse gas inventories 2017.
- DEE (2019c) National greenhouse accounts factors – Australian national greenhouse accounts.

#### Summary of assessment methods

GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), sulphur hexafluoride, a hydroflurocarbon, a perfluorocarbon, or a prescribed gas. These atmospheric gases contribute to the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface.

GHG sources are described in three scopes:

- Direct GHG emissions – direct emissions that occur from on-site sources such as combustion of fuels in equipment.
- Electricity indirect GHG emissions – emissions from the generation of purchased electricity consumed on-site. Scope 2 emissions are indirect as they are generated off-site.
- Other indirect GHG emissions – an optional reporting category for all other indirect emissions activities not under the proponent's control.

The GHGs likely generated by the project were estimated by:

- Determining the quantities of fuels used by project related equipment to estimate scope 1 emissions and diesel used to transport asphalt product for scope 3 emissions.
- Using emissions factors in DEE (2019c) to convert GHG emissions ($CO_2$, $CH_4$ and $N_2O$) from the fuel and electricity use in terms of carbon dioxide equivalent ($CO_{2\text{-}e}$), which is the reporting standard for GHGs.

The predicted GHG emissions were compared to NSW and Australian annual emissions to determine the project's contribution.

## GHG sources

Scope 1 GHG emissions will be generated by the on-site combustion of diesel and LPG. Scope 3 GHG emissions will be generated by consumption of diesel for transport of asphalt product.

The estimated annual consumption of fuels is summarised in Table 8.11.

**Table 8.11 Estimated fuel consumption**

| Type | Quantity | Units |
|---|---|---|
| Diesel | 3,641 | Kilolitres (kL) |
| LPG | 133,000 | Gigajoules |

The quantity of diesel fuel required to transport materials to and from site is outlined in Table 8.12, and was estimated based on an average return travel distance for existing customers (80 km return trip) and average truck fuel consumption of 53.1 L/100 km.

**Table 8.12 Estimated consumption for product transport**

| Distance (km) | Material (tpa) | Payload (t) | Travel distance (km) | Fuel consumption (L) |
|---|---|---|---|---|
| 80 | 400,000 | 25 | 1,280,000 | 679,680 |

## Emission factors

The emission factors for consumption of fuels described above are shown in Table 8.13 in terms of $CO_2$-e.

**Table 8.13 Summary of emissions factors**

| Type | Energy content | Emission factor | | | Units | Scope |
|---|---|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_2O$ | | |
| Diesel | 38.6 | 69.9 | 0.1 | 0.2 | kg CO2-e/ GJ | 1 |
| | | 17.3 | - | - | | 3 |
| LPG | 25.7 | 60.2 | 0.2 | 0.2 | kg CO2-e/ GJ | 1 |
| | | 20.2 | - | - | | 3 |

## Predicted emissions

The scope 1 and 3 GHG emissions predicted to be generated by the project are summarised in Table 8.14 in terms of $CO_2$-e.

**Table 8.14 Summary of GHG emissions**

| Type | Scope 1 ($CO_2$-e) | Scope 3 ($CO_2$-e) |
|---|---|---|
| Diesel | 9,866 | 2,431 |
| LPG | 8,060 | 2,687 |
| Transport of product | - | 1,842 |
| **Total** | **17,926** | **6,960** |

### Contribution of GHG

The estimated Australian GHG emissions for the 2021/2022 financial year was 486.9 Mt $CO_2$-e. The estimated annual average project GHG emissions are 0.024 Mt $CO_2$-e (scope 1 and 2). Therefore, the annual project contribution compared to Australian emissions for 2021 will be approximately 0.005%.

The estimated NSW greenhouse emissions in 2019 was 136.6 Mt $CO_2$-e. The annual project contribution compared to NSW emissions for 2019 will be approximately 0.018%.

## 8.3 Mitigation and management measures

A CEMP and updated OEMP will be prepared prior to construction of the project and the commencement of operations respectively. The plans will outline the measures to manage dust emissions at the site and include key performance indicators, response mechanisms, compliance reporting and complaints management.

In addition to the air quality design and operational controls outlined in Section 8.1.2, the mitigation and management measures in Table 8.15 and Table 8.16 will be implemented to minimise air emissions during construction and operation of the project.

**Table 8.15 Air quality mitigation and management measures – construction phase**

| Source | Management measure |
|---|---|
| Communication | Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. |
| General | Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained using the available means). |
| | Minimise exposed ground surfaces. |
| | Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Any complaints, investigation details and actions will be recorded in a log book. |
| | Make the complaints log available to the local authority when asked. |
| | Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book. |
| Monitoring | Undertake daily visual monitoring for dust beyond the boundary and weekly inspection of equipment and recording results. |
| | Carry out regular site inspections. |
| | Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. |
| Site planning | Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. |
| | Fully enclose specific operations through solid screens, tarps or barriers where there is a high potential for dust production and the site is active for an extensive period. |
| | Avoid site runoff of water or mud. |
| | Keep site fencing, barriers and scaffolding clean using wet methods. |
| | Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below. |
| | Cover, seed or fence spoil stockpiles to prevent wind erosion. |

| Source | Management measure |
|---|---|
| | Use dust suppressants and place spoil stockpiles in sheltered areas away from wind. |
| Vehicles and machinery | Ensure all vehicles switch off engines when stationary - no idling vehicles. |
| | Vehicles and equipment to be maintained per manufacturers specification. |
| | Limit vehicle speed on site. |
| Construction activities | Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. |
| | Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. |
| | Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. |
| | Use enclosed chutes and conveyors and covered skips. |
| | Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. |
| Waste management | Do not burn waste materials. |

**Table 8.16 Air quality mitigation and management measures – operational phase**

| Source | Management measure |
|---|---|
| General | Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained using the available means). |
| | Weather forecast to be checked prior to processing RAP. |
| | Engines of on-site vehicles and plant to be switched off when not in use. |
| | Vehicles and plant are to be fitted with pollution reduction devices where practical. |
| | Vehicles are to be maintained and serviced according to manufacturer's specifications. |
| | Activities to be monitored visually to identify dust generation. |
| | Maintain an odour complaint logbook and in the event of a complaint conduct an immediate investigation of any odour sources, together with appropriate actions to eliminate any identified excessive odour. |
| | Ensure stack exhaust controls are operating as per manufacturers specifications. |
| | Monitor stockpiles and storage bays to avoid spilling once at capacity. |
| | Training provided to site personnel on appropriate air quality practices. |
| Exposed areas/stockpiles | The extent of exposed surfaces and stockpiles is to be kept to a minimum. Material in storage bays to be maintained within designated area. |
| | Stockpiles are to be visually monitored and dampened with water as far as is practicable if dust emissions are visible. |
| | RAP stockpiles will not exceed 10 m in height. |
| Material handling | Reduce drop heights from loading and handling equipment where practical. |
| | Dampen material when excessively dusty during handling. |
| Hauling activities | Spills on trafficked areas to be cleaned immediately. |
| | Driveways and hardstand areas to be swept/cleaned regularly as required. A road sweeper will be regularly deployed to the operational site to sweep/clean internal roads periodically to prevent any tracking of fine debris. |
| | Vehicle traffic is to be restricted to designated routes. |
| | Co-ordinate the delivery schedule to avoid a queue of incoming or outgoing trucks that will be idling for extended periods of time. |
| | Speed limits are to be enforced. |

| Source | Management measure |
|---|---|
| | Vehicle loads are to be covered when travelling off-site. |

Air quality monitoring is not proposed as there will be no exceedances of criteria at residential receivers.

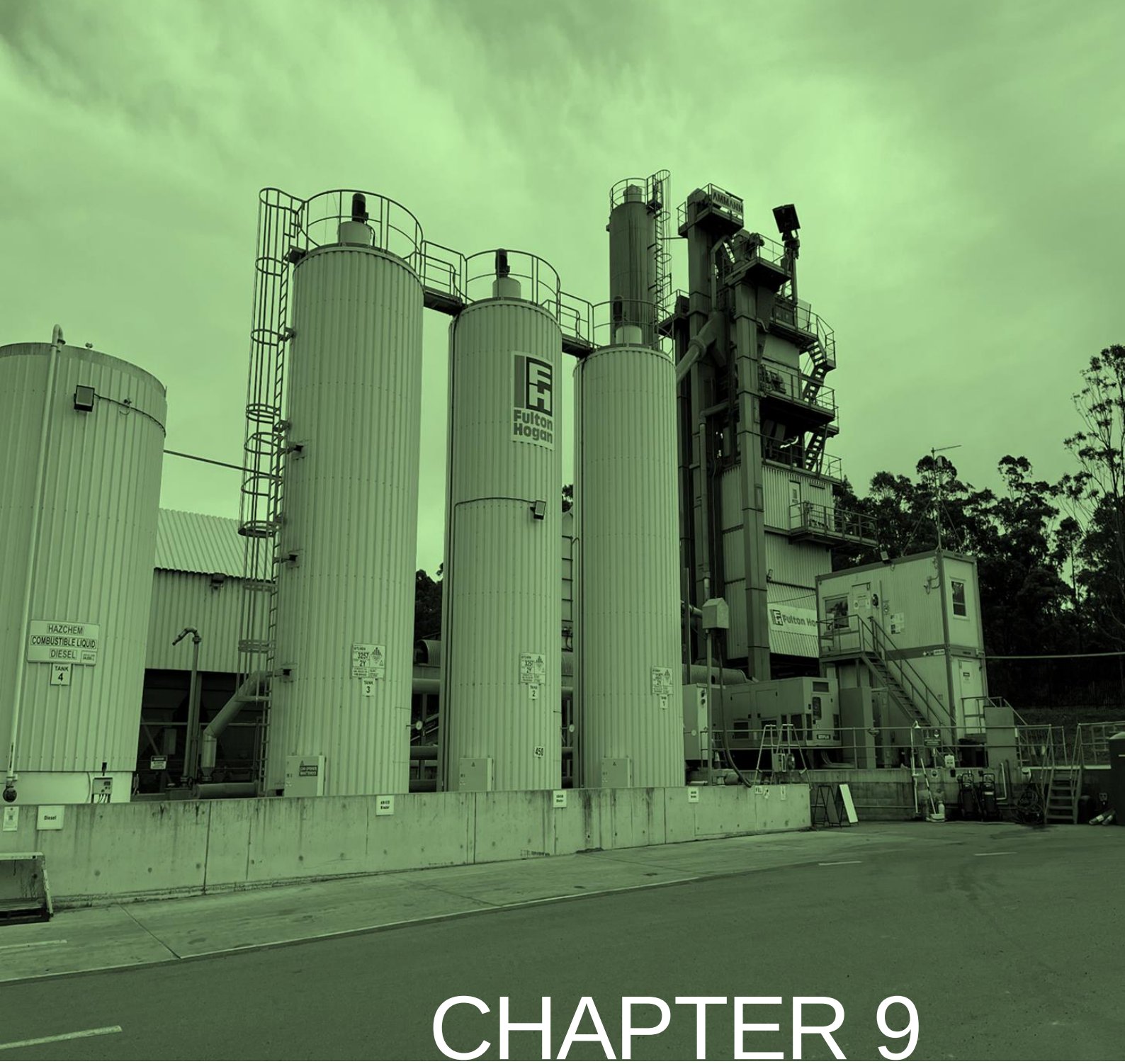
## 8.4 Residual impacts

Air dispersion modelling was used to predict the potential for off-site dust, odour and air pollutant impacts in the surrounding area due to the operation of the project. The estimated air emissions applied in the modelling are likely to be conservative and overestimate the likely actual impacts. Similarly, a conservative approach was applied in the selection of background data, and in how the modelling was carried out (for example, maximum emissions from all sources were assumed to be emitted at all times).

It is predicted that all the assessed air pollutants generated by the operation of the project will comply with the relevant assessment criteria at the receptors and therefore will not lead to any unacceptable level of environmental harm or impact in the surrounding area. Cumulative impacts with other nearby activities were also considered, however no potential risks of cumulative impacts arising were identified.

Nevertheless, mitigation and management measures will be applied to minimise further the potential for dust impacts during construction and operation of the project.

Overall, the AQIA demonstrates that the project can operate without causing any significant air quality impact at any receivers in the surrounding environment.




# CHAPTER 9

## TRAFFIC AND ACCESS

# 9 TRAFFIC AND ACCESS

## 9.1 Introduction

This chapter summarises the traffic impact assessment report, which is in Appendix H. It describes the existing traffic conditions on the nearby road network, potential impacts of the project on this network and provides measures to minimise and manage these impacts.

### 9.1.1 Assessment guidelines and requirements

The SEARs require an assessment of the likely impacts of the project on the local and State road network (Table 9.1).

**Table 9.1 Traffic SEARs**

| Requirement | Section and appendix where addressed |
|---|---|
| Details of road transport routes and access to the site. | 2.2.3, Appendix H. |
| Road traffic predictions for the development during construction and operation. | 9.2.1, 9.2.2 Appendix H. |
| Swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site. | Appendix C. |
| An assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development. | 0, 9.3 Appendix H. |

Traffic impacts from project related construction and operational vehicles were assessed in accordance with RMS (2002) Guide to traffic generating development.

### 9.1.2 Overview of assessment methods

As summarised in Section 2.2.3, traffic was counted along Tooheys Road. The SIDRA model was used to determine the existing performance of the intersection of Tooheys Road with the Motorway Link interchange (on and off ramps).

The distribution of the estimated maximum volume of project related vehicles was determined, as summarised in Table 3.1. Impacts of these increases on the performance of the intersection of Tooheys Road with the Motorway Link interchange was then assessed using the SIDRA model.

Finally, cumulative traffic impacts of the project operating in tandem with traffic generated by the future operations of Wallarah 2 Coal Mine (which will also utilise Tooheys Road through to the Motorway Link interchange) was considered and assessed using the SIDRA model.

## 9.2 Potential impacts

### 9.2.1 Construction traffic

Construction vehicles will include low loaders delivering earth working equipment, cranes, semi-trailers and truck and dog trailers delivering construction materials and light vehicles associated with the workforce.

The volume of these vehicles arriving and departing the site per hour and per day will be less than the number of trucks assessed for the operational impacts. Therefore, the traffic impacts associated with construction were not assessed separately.

### 9.2.2 Operational traffic

The SIDRA results for all vehicles currently using the Tooheys Road and M1 Motorway Link Road interchange plus project vehicles are summarised in Table 9.2.

**Table 9.2 SIDRA results current intersection performance plus project vehicles**

| Intersection | AM | | | | PM | | | | Control type |
|---|---|---|---|---|---|---|---|---|---|
| | DS | AVD (s) | LS | Worst movement | DS | AVD (s) | LS | Worst movement | |
| Tooheys Road/ Motorway Link Road (north side) | 0.06 | 4.7 | A | Left turn from off-ramp | 0.07 | 4.7 | A | Left from off-ramp | Give way |
| Tooheys Road/ Motorway Link Road (south side) | 0.06 | 9.1 | A | Right turn from off-ramp | 0.06 | 8.5 | A | Right turn from off-ramp | Give way |

The results demonstrate that when compared to existing intersection performance (Table 2.3), the intersection of Tooheys Road and the Motorway Link Road interchange will experience a slight increase in DS and AVD, but continue to operate at LS A.

The SIDRA results for the performance of the Tooheys Road and Motorway Link Road interchange based on the future traffic considering existing traffic, and traffic generated by the project and other traffic generating development is summarised in Table 9.3.

**Table 9.3 SIDRA results for future intersection performance**

| Intersection | AM | | | | PM | | | | Control type |
|---|---|---|---|---|---|---|---|---|---|
| | DS | AVD (s) | LS | Worst movement | DS | AVD (s) | LS | Worst movement | |
| Tooheys Road/ Motorway Link Road (north side) | 0.07 | 4.9 | A | Left turn from off-ramp | 0.10 | 4.6 | A | Left from off-ramp | Give way |
| Tooheys Road/ Motorway Link Road (south side) | 0.08 | 9.4 | A | Right turn from off-ramp | 0.07 | 8.5 | A | Right turn from off-ramp | Give way |

The modelling shows that the intersections will retain the same LS with only small increases in DS and AVD. Therefore, cumulative traffic impacts along Tooheys Road to and from the Motorway Link Road will be satisfactory.

### 9.2.3 Parking

The Central Coast DCP does not provide vehicle parking requirements for asphalt plants, however, one space will be provided per employee for the maximum amount of employees expected onsite at any one time (35 spaces).

The DCP requires provision of one motorcycle parking space. Additional employee motorcycles can be accommodated in car parking spaces.

The DCP requires provision of accessible parking at a rate of 1-2% of total parking. Therefore, one accessible parking space will be provided.

Cycling is prohibited on the Motorway Link Road and, therefore, no bicycle spaces will be provided.

Heavy vehicles are parked at the site as required and whilst the site is unoccupied. There is ample hardstand space available at the site to accommodate temporary parking of heavy vehicles for the project.

### 9.2.4 Other road users

The project will not negatively impact other road users such as pedestrians, cyclists and buses. While there will be an increase in trucks using the transport routes, the trucks will be spread over the day. In addition, once traffic has departed Tooheys Road, vehicles will follow State arterial roads and approved 25/26 m B-double routes. As State arterial roads, the roads are expected to carry heavy vehicles.

### 9.2.5 On-site operations

The project will not have any adverse impacts on site operations and/or result in any queuing in Tooheys Road as access to site is from a 780 m long private road. All access roads into and out of the site are wide enough for two-way operations and can already accommodate B double trucks. All vehicles can enter and exit the site in a forward direction.

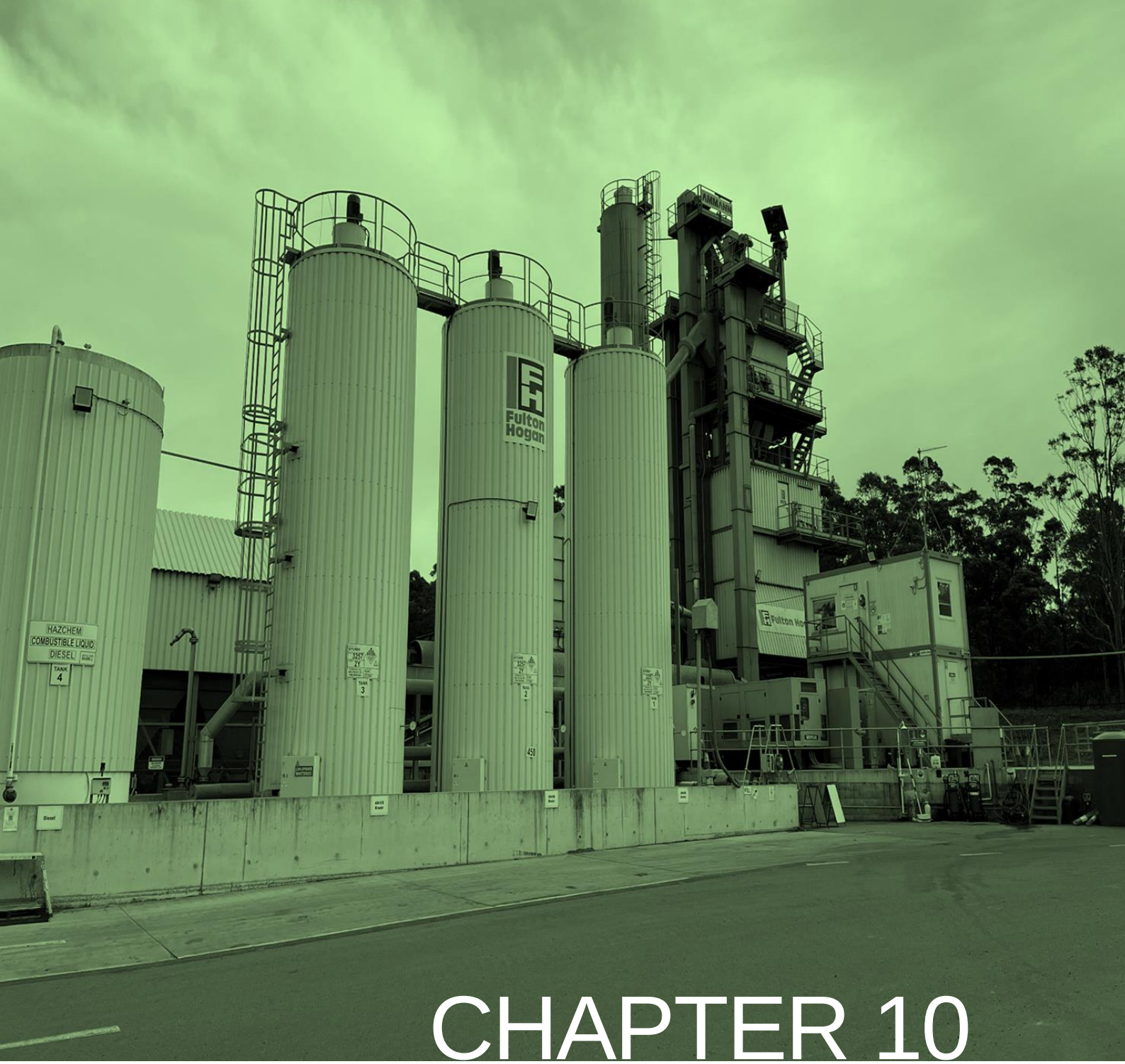
## 9.3 Residual impacts

Minimal traffic will be generated during construction given the limited proposed construction activities and road impacts will be minor and less than those for operation of the project.

The performance of assessed intersections will remain at LS A during operations and, therefore, no mitigation measures are required.

Heavy vehicles entering and manoeuvring on site are not predicted to queue on public roads.

There is sufficient parking on-site to accommodate light and heavy vehicles associated with the project.




# CHAPTER 10

## HAZARDS AND RISKS

# 10 HAZARDS AND RISKS

## 10.1 Introduction

This Chapter provides details on the potential hazards and risks associated with the project, including bushfire, risks to the biophysical environment, as well as risk to public and worker safety. This chapter also provides strategies and management measures which, when implemented, will reduce these hazards and risks to acceptable levels.

Additionally, the Chapter provides an assessment of the handling, transport, storage and use of dangerous goods at the project, and the implications of these dangerous goods with respect to the Hazards SEPP.

The application of the Hazards SEPP to the project has been determined in accordance with Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (NSW Department of Planning, 2011).

## 10.2 Assessment requirements

The SEARs require an assessment of the likely hazards and risks of the project, including whether the project would constitute hazardous or offensive development (Table 10.1).

**Table 10.1 Hazard and risk related SEARs**

| Requirement | Section where addressed |
|---|---|
| A preliminary risk screening completed in accordance with Chapter 3 of State Environmental Planning Policy (Resilience and Hazards) and Applying SEPP 33 with clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should the preliminary screening indicate that the development is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' and Multi-Level Risk Assessment. | Section 10.3 |
| Verification that all combustible or potentially combustible materials such as bitumen will not be heated beyond their flash points during normal and abnormal operations within the development. | Section 10.4.2 |

## 10.3 Application of Hazards SEPP

### 10.3.1 Potentially hazardous industry

A preliminary hazard assessment (PHA) is required if the screening process described in Applying SEPP 33 (DoP, 2011) indicates the project is potentially hazardous.

A 'hazardous industry' under the Hazards SEPP is one which, when all locational, technical, operational and organisational safeguards are employed, continues to pose a significant risk.

The screening process involves comparing the type and quantity of hazardous materials or dangerous goods to be used and stored on-site to the distance to public area thresholds in Applying SEPP 33.

A proposed development may also be potentially hazardous if the number of traffic movements (for significant quantities of hazardous materials entering or leaving the site) exceeds the annual or weekly cumulative vehicle movements outlined in Applying SEPP 33.

### 10.3.2 Potentially offensive industry

Potentially offensive industry is where in the absence of safeguards and controls, the project could 'emit a polluting discharge that could cause a significant level of offence'. Examples of this may include depositional dust, or operational noise impacts on adjacent residents or land uses.

Applying SEPP 33 states that a proposal is potentially offensive if it requires pollution licencing from the EPA. Granting of the license by the EPA is sufficient to demonstrate that emissions can be effectively managed and, therefore, the proposal is unlikely to be offensive.

Emissions to air are not predicted to exceed criteria at sensitive receivers and discharges from the existing surface water management system will continue to meet water quality objectives.

Therefore, the project is unlikely to qualify as offensive development under the Hazards SEPP.

An EPL will be required for the project as it is a scheduled activity under Schedule 1 of the POEO Act. Therefore, if the EPA deems that a license can be granted, which is likely given that potential impacts of the project can be prevented or suitably managed, the project will not be an offensive industry.

## 10.4 Potential impacts

### 10.4.1 Hazardous substances and dangerous goods

The results of the screening assessment comparing the type and quantity of hazardous materials or dangerous goods to be used and stored on-site to the distance to public area thresholds in Applying SEPP 33 is summarised in Table 10.2.

The screening assessment found that the quantity of LPG (35,000 L or 17.85 tonnes) to be stored on site in an above ground tank will exceed the screening threshold (10 tonnes) in Applying SEPP 33. Therefore, the project is 'potentially hazardous' and a PHA is required.

A route evaluation study is not required as the transportation screening thresholds for dangerous goods were not exceeded for any materials transported to and from site.

A PHA was prepared (Appendix G) to determine:

- if the project would be a hazardous or offensive development under the Hazards SEPP; and
- the general risks from the project to people, property and the environment.

Potential hazards associated with the transportation, use and storage of dangerous goods were assessed. The potential for off-site impacts will be avoided and the associated risks are low as materials will be separated from the lot boundary and will be contained in designated storage vessels in accordance with relevant Australian Standards, codes and regulations including AS1940:2017 The storage and handling of flammable and combustible liquids.

**Table 10.2 Applying SEPP 33 screening thresholds for storage**

| Classification | Class | Subclass | PG | Material | Storage location | Mode of storage | Storage quantity of material (tonnes) | Total quantity in class (tonnes) | Applying SEPP 33 threshold | Applying SEPP 33 determination | Threshold exceedance? | PHA required? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gases | 2 | 2.1 | - | Acetylene | Laboratory, workshop and office building | N/A | N/A | N/A | Class 2.1 Flammable gases – Pressurised (excluding LPG): Table 1, screening threshold is 100 kg | Does not exceed Applying SEPP 33 threshold | No | No |
| | | 2.1 | - | LPG | Rear of bulk material storage bays | Above ground tank | 17.9[1] | 17.9[1] | Class 2.1 – LPG aboveground: Table 1, screening threshold is 10 tonnes | Exceeds Applying SEPP 33 threshold | Yes | Yes |
| | | 2.2 | - | Oxygen – compressed | Laboratory, workshop and office building | N/A | N/A | N/A | No threshold for Class 2.2 (non-hazardous) based on Applying SEPP 33 | Does not exceed Applying SEPP 33 threshold | No | No |
| Flammable liquid | 3 | - | PGII | Toluene | Immediately east of asphalt plant | 20L drum | 0.347[7] | 0.763 | Class 3 PGII: Table 1, minimum quantity for further evaluation is 5 tonnes | Does not exceed minimum evaluation threshold, does not require assessment against Applying SEPP 33 threshold | No | No |
| | | | | Ethanol | | 20L drum | 0.316[8] | | | | | |
| | | | | Unleaded petrol | | 20L drum | 0.1 | | | | | |
| Corrosives | 8 | - | PGII | HD16 Degreaser | Laboratory, workshop and office building | N/A | N/A | N/A | Class 8 PGII: Table 1, screening | Does not exceed Applying SEPP 33 threshold | No | No |

| Classification | Class | Subclass | PG | Material | Storage location | Mode of storage | Storage quantity of material (tonnes) | Total quantity in class (tonnes) | Applying SEPP 33 threshold | Applying SEPP 33 determination | Threshold exceedance? | PHA required? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | threshold is 25 tonnes | | | |
| Miscellaneous dangerous substances and articles, including environmentally hazardous substances | 9 | Comb-ustible | - | Bitumen | Bunded tanks adjacent to asphalt plant | Tank | 150[6] | 195.4 | No SEPP 33 threshold for Class 9 materials | Diesel and bitumen tanks in bunded tank area. No interaction with Class 3 materials | No | No |
| | | | | Diesel | | Tank | 46.2[2] | | | | | |
| Not classified as DG | N/A | N/A | N/A | B100 Bio Diesel | Bunded storage area west of asphalt plant | Tank | 8.8[4] | 8.8[4] | No thresholds | | | |
| | | | | Hydrated Lime | Bulk material storage bays | Tank | 22 | 22 | | | | |
| | | | | Slipway | Bulk material storage bay | IBC | 2,000L[3] | 2,000L[3] | | | | |
| | | | | Rubber Crumb | Bulk material storage bays | Bulk bags | 100 | 100 | | | | |
| | | | | Emulsion – CRS 170/60 | IBC bunded storage area | Tank | 15.3[5] | 15.3[5] | | | | |
| | | | | EZ Street | Laboratory, workshop and office building | Pallets | 3.3 | 3.3 | | | | |
| | | | | Industrial Gear Oil | Laboratory, workshop and office building | 44 Gallon drum | 410L[3] | 410L[3] | | | | |
| | | | | HD12 Water-based Degreaser | Laboratory, workshop and office building | 44 Gallon drum | 410L[3] | 410L[3] | | | | |
| | | | | Adblue | IBC bunded storage area | Tank | 3,300L[3] | 3,300L[3] | | | | |
| | | | | Engine oil | Laboratory, workshop and office building | 44 Gallon drum | 205L[3] | 205L[3] | | | | |

| Classification | Class | Subclass | PG | Material | Storage location | Mode of storage | Storage quantity of material (tonnes) | Total quantity in class (tonnes) | Applying SEPP 33 threshold | Applying SEPP 33 determination | Threshold exceedance? | PHA required? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hydraulic oil | Laboratory, workshop and office building | 44 Gallon drum | 205L[3] | 205L[3] | | | | |

**Note:**
[1] Based on 40,000 L tank and 0.51 kg per L conversion
[2] Based on 55,000 L tank and 0.84 kg per L conversion
[3] No weight conversion available, reported in L
[4] Specific gravity = 0.88, based on 10,000 L tank
[5] Specific gravity = 1.02, based on 15,000L tank
[6] Based on 150,000 L tank and 1.00 kg per L conversion
[7] Based on 20 x 20L drums and 0.867 kg per L conversion
[8] Based on 10 x 20L drums and 0.789 kg per L conversion

## Flammable and combustible liquid storage

Diesel is classified as a combustible liquid by Australian Standard (AS) 1940:2017 The Storage and Handling of Flammable and Combustible Liquids (AS 1940:2004) (Class C1) for the purpose of storage and handling but is not classified as a dangerous good by the Australian Dangerous Goods (ADG) Code (National Transport Commission, 2014, Edition 7.3).

The project will require the use of biodiesel and diesel, stored within self-bunded tanks.

Biodiesel and diesel will be transported, stored, handled and managed in accordance with regulations and industry standards.

Any vehicles requiring re-fuelling with diesel will be parked on a bunded impermeable surface while re-fuelling, with any spills contained and managed in accordance with emergency response procedures. Any incidental contamination will be classified and disposed of in accordance with waste legislation.

Although bitumen is not classified as a combustible liquid it may be ignited and the risk of fire is increased when stored at elevated temperatures as it will be at the project. It is therefore recommended that it be treated as a Class C1 liquid and that the separation distances and firefighting requirements of AS1940 be applied.

The bitumen emulsion (cationic rapid setting (CRS)) is the only emulsion product to be stored on site. This CRS cold emulsion is primarily used for tack-coat prior to asphalt surfacing of road surfaces and road maintenance. It has proven environmental and economic benefits when compared to the use of traditional bitumen materials.

The CRS will be manufactured at an external site and will be stored on-site at ambient temperature and will not require heating. The CRS is not classified as a dangerous good.

The CRS will be transported at ambient temperature to the site as required, via a tri-axle semi road tanker (approximately 10,000 L). The tanker will deliver the bitumen emulsion to the site and transfer to the self-bunded storage tank (15,000 L) via a sealed pump system. The self-bunded storage tank will be made specific to prevent accidental spillage, off-site release and chemical destabilisation of the emulsion. The CRS is not heated, and the project does not require the product to be heated. Road surfacing trucks will collect CRS from the storage tank on site as required, typically in small quantities via a sealed pump process and transport it to the respective road project.

RAP will not pose a notable fire risk, hence, it is not a solid waste material that can readily ignite and burn under normal conditions. RAP is predominately aggregate and sand with bitumen making up between 1-8% of its total weight, which is the combustible component under extreme heat. Thus, RAP is not a combustible liquid or waste material.

The storage locations for the biodiesel tank, diesel tanks, bitumen and other flammable liquids will meet the requirements of AS1940 for separation from the site boundary and on-site protected places.

Thus, the storage and use of biodiesel, diesel, bitumen, and flammable liquids is not potentially hazardous under the Hazards SEPP as the tanks will be bunded and stored away from other flammable/combustible materials.

To meet the fire protection requirements of AS1940 the site will be equipped with at least two powder type fire extinguishers at the bitumen, biodiesel and diesel tanks. Other flammable liquid stores/IBC will be equipped with two powder-type extinguishers, one powder-type extinguisher at each entrance to the bunded area and two foam-type extinguishers.

### 10.4.2 Other hazards

Whilst not nominated under Applying SEPP 33 screening thresholds, bitumen has hazardous properties and there is potential for a fire or explosion in a bitumen storage tank, with the potential for off-site safety implications.

Additional hazards considered under Applying SEPP 33 are:

- Reactions between materials.
- Combustible dusts.
- Hazardous processing conditions (e.g. high temperatures and pressures).

These additional hazards were reviewed, with the following outcomes noted:

- No combustible dusts will be handled or generated by the project.
- Diesel will be used for refuelling and will be at ambient temperature (i.e. will not be heated).
- Combustible liquids such as bitumen will be handled at elevated temperatures, however will not be handled above the flashpoint. The flashpoint for bitumen is above 300˚C. The maximum temperature bitumen will be heated to on the project site will not exceed 200˚C and will normally be stored and pumped at 165˚C. Electrical heating for bitumen will be provided, which will be equipped with industry standard safeguards to prevent abnormal high temperature excursions such as heater power limitation and high temperature shutdown. Hot oil will not be used for the project.
- Bitumen is a complex mixture containing predominantly high molecular weight hydrocarbons with some lighter hydrocarbons. Flammable vapours can accumulate in the vapour space of bitumen storage tanks resulting in an explosion internal to the tank if ignited. Bitumen can also boil over if free water accumulates. These scenarios could cause a tank fire, eject hot bitumen or cause tank failure resulting in tank debris and impact on people or equipment.
- Apart from the bitumen hazards, no chemical processing incompatibilities or reaction hazards with the potential to cause significant off-site impacts were identified.

### 10.4.3 Risk to biophysical environment

There could be localised contamination of soil and water and health and safety impacts if there is a spill of hazardous substances and dangerous goods from human error or failure/rupture of storage vessels during transport or storage.

Uncontrolled releases of hydrocarbons to the environment may damage soils and aquatic ecosystems, and fires can occur if these materials are ignited.

Potentially hazardous materials such as hydrocarbons will be contained in bunded areas in accordance with relevant Australian Standards, codes and regulations.

Refuelling will be restricted to bunded hardstand areas within the site and mobile spill kits will be easily accessible.

Therefore, the risk of soil, surface water and groundwater contamination from an unforeseen spill will be low.

### 10.4.4 Risk to workers

As with any industrial operations, daily operations have inherent risk to workers and contractors and have the potential to result in injury or fatality if workers are not informed of the hazards involved, or risks associated with plant and machinery are not managed.

Examples of activities which could result in injury or fatality are crush injuries by moving plant and equipment, motor accidents or crush by heavy vehicles, exposure to hazardous materials, heat exhaustion, working from heights or confined spaces, and exposure to airborne dust and industrial noise.

Fulton Hogan has a rigorous workplace health and safety regime, as required by the NSW *Work Health and Safety Act 2011* (WHS Act). All workers, contractors and visitors will be inducted on safety protocols and procedures before entering active parts of the site. All personnel working on the site will be required to wear personal protective equipment such as hard hats, high visibility clothing and enclosed footwear. Communication of safety requirements and initiatives will also be undertaken on a regular basis.

Provided the implementation of workplace health and safety protocols during construction and operation of the project, as required by the WHS Act and other relevant regulations or standards, the potential for injuries or fatalities to workers, contractors or visitors to the site will be minimised.

### 10.4.5 Public safety

Risks to public safety may arise where members of the public gain unauthorised access to the site and come into contact with heavy vehicles and moving plant.

The perimeter of the site is fenced with security fencing and is monitored by two closed circuit television systems with a total of 15 cameras. A vehicle gate is positioned at the entrance to the site. This gate is closed and locked when the site is unoccupied but left open during operating hours to permit the entry and exit of heavy and light vehicles from the site office and weighbridge.

Signage directs all visitors to the visitor parking and site office where they are met by Fulton Hogan personnel and inducted on safety requirements before being allowed access to other parts of the site.

Other warning and safety signage and markings are highly visible throughout the site to warn and educate site personnel and visitors on safe practices.

### 10.4.6 Road safety

Heavy vehicles associated with construction and operation of the project will use local and arterial roads. Potential hazards associated with product transportation may occur in the event of a motor vehicle accident, or tip over resulting in the spill of materials across the roadway. Such events could result in injury, fatality, or general inconvenience (e.g. road closures) to the general public who utilise these roadways.

As outlined in Chapter 9, the project will not result in negative impacts to other road users and the safety of the public road network.

### 10.4.7 Bushfire

Undisturbed vegetation surrounding the project site to the east, south and west represent a high risk of bushfire. These areas will experience build-up of high fire fuel sources over time, associated with dense vegetation canopy contributing to leaf litter and tinder on the ground surface.

A combination of relatively low rainfall, dry nature of the landscape, topography, and dense vegetation and high fuel source in the adjacent woodland areas could pose a bushfire risk to the asphalt plant. Bushfires will be managed by NSW Rural Fire Service (RFS). Fulton Hogan will continue to work with the RFS and land authorities to co-ordinate any scheduled burn off events,

and monitor and report any fires, suspicious behaviour or hazardous fuel loads within proximity to the site boundary.

New development in NSW is assessed for bushfire risks in accordance with RFS (2019) Planning for Bushfire Protection (PBP).

The site includes valuable infrastructure and personnel will occupy the site during work hours. These assets could be vulnerable to damage or destruction, and personnel vulnerable to injury or fatality from a fire.

Bushfire hazards were assessed (Appendix J) against the aim and objectives of PBP as summarised below.

Under the National Construction Code (NCC), class 5 to 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities. The NCC defines a class 10a building as a non-habitable building or structure such as a private garage, carport, shed or the like.

Section 8.3.1 of PBP states that the NCC does not provide for any bushfire specific performance requirements for building classes 5 to 8. As such, the asset protection zone (APZ) and building construction requirements of PBP do not apply to the project, however the the following objectives of PBP apply:

- Provide safe access to/from the public road system for firefighters providing property protection during a bushfire and for site personnel to evacuate.
- Provide suitable emergency and evacuation (and relocation) arrangements for site personnel.
- Provide adequate services of water for the protection of buildings during and after the passage of bushfire, and locate gas and electricity so as not to contribute to the risk of fire to a building.
- Provide for the storage of hazardous materials away from the hazard wherever possible.

PBP requires the assessment of a suite of bushfire protection measures (BPMs) that provide an adequate level of protection for development proposals on bushfire prone land.

Table 10.3 outlines the recommended BPMs for class 5 to 8 buildings, which are formed from the basis of the above objectives.

**Table 10.3 Recommended bushfire protection measures**

| BPMs | BPM achievement |
|---|---|
| Defendable space and ongoing maintenance | In accordance with PBP, a defendable space is defined as:<br>*An area adjoining a building that is managed to reduce combustible elements, free from constructed impediments. It is a safe working environment in which efforts can be undertaken to defend the structure, before and after the passage of a bush fire.*<br>As the site does not include a dwelling or habitable building, PBP does not prescribe an APZ dimension, however an objective of PBP is to ensure appropriate hazard separation to prevent fire spread to buildings.<br>Defendable space is available around the reconfigured office and laboratory buildings and other infrastructure. In the event a fire front impacts on the buildings, defendable space is available surrounding the buildings from where the fire will be fought. |
| Utility services for firefighting | In order to ensure that utility services are able to meet the needs of firefighters it will be necessary to provide water supply points that will be at a suitable distance from buildings.<br>The asphalt plant benefits from existing rainwater tanks and dust suppression tanks which are equipped for use by fire-fighters. |
| Emergency site access | The existing access to the site along Tooheys Road will be an adequate emergency evacuation route in the event of a fire. Similarly, |

| BPMs | BPM achievement |
|---|---|
| | the existing internal access roads will provide suitable access for emergency service personnel and the RFS during a fire.<br>If there is a bushfire, fire fighters and emergency response personnel will have direct access to the surrounding bushland via the internal road network. |
| Emergency evacuation planning | A 'bushfire emergency management and evacuation plan' (BEMEP) is typically prepared for facilities within bushfire prone areas depending on the level of bushfire risk. A plan is prepared in accordance with the NSW Rural Fire Service document 'A Guide to Developing a Bushfire Emergency Management and Evacuation Plan' (RFS 2014).<br>Due to proximity to bushfire prone vegetation, the preparation of a BEMEP is recommended for the site.<br>Evacuation planning for the site in the event of bushfire will clearly indicate to workers to evacuate early and in a direction away from the fire. |
| Hazardous material storage | There is clear access to all proposed chemical/fuel storage locations for emergency response.<br>The storage location of hazardous materials is surrounded by defendable space comprising of the internal access road and hardstand areas. All aspects of the project will have a minimum defendable space of at least 15 m. |

The assessment of the project against the aim and objectives of PBP concludes that with the implementation of the above BPMs, the site office and other infrastructure will be sufficiently separated from bushfire hazard vegetation and the risk of bushfire attack will be low.

Notwithstanding the above, activities associated with the project may result in inadvertent bushfire ignition. Such activities may include fires sparked during hot work activities such as welding.

The risk of bushfire ignition can be suitability managed via implementation of measures in Section 10.5.2.

## 10.5 Mitigation and management measures

### 10.5.1 Hazardous substances

The objectives of hazardous substance storage and handling are to avoid contamination of soil and water and to minimise risks to health and safety of people.

The site's existing pollution and incident response management plan (PIRMP) will be updated to reflect the project and manage potential chemical or hydrocarbon spills. The PIRMP will incorporate the following mitigation measures:

- Hazardous substance storage facilities will meet the bunding and separation distance requirements set out in AS 1940 (storage and handling of flammable and combustible liquids) and AS 3780 (storage and handling of corrosive substances).
- All personnel will complete awareness training that includes hazardous substance management, emergency response and the use of spill kits.
- Hazardous materials will be transported to and from the site by a licensed contractor and stored and handled in accordance with the requirements of relevant regulatory requirements, Australian Standards and the ADG Code.
- Vehicles and transport vessels used on-site are to be regularly inspected for leaks, spills or other damage.
- Storage and handling of any dangerous goods shall comply with Australian Standards, including but not limited to AS 1940 and AS 3780.
- Appropriately sized and stocked spill response kits will be provided within strategic areas of the site, and within mobile vehicles used to transport hazardous materials at the site.

- Spill response kits will be maintained, clearly identified and readily accessible on site for use in case of accidental spills. Key staff will be skilled in their location as well as usage, application and disposal of contaminated material.
- During construction, all hazardous substances will be stored in appropriate containers in bunded areas within mobile vehicles, or designated storage areas to minimise the risk of spillages and mobilisation of any pollutants into the soil or stormwater drains.
- Refuelling, fuel decanting and vehicle maintenance will occur in a designated area away from stormwater drains with spill response kits immediately available.
- Equipment will not be used if there are any signs of fuel, oil or hydraulic leaks. Leaks will be repaired immediately, or the equipment will be removed from site and replaced with a leak-free item.
- Any chemicals and fuels will be stored, labelled, transported and used in accordance with Australian Standards and in line with best practices. All hazardous substances or chemicals imported to site shall be accompanied by a safety data sheet.
- A database will be maintained to assist in the recording and management of any chemicals and hazardous substances stored at the site.
- Any fuels spillage will be collected, and the contaminated material disposed of at a licensed waste management facility.
- Emergency procedures will be prepared and implemented for dealing with spillage of hazardous substances and dangerous goods.
- Any contaminated soil resulting from spills would be excavated, classified in accordance with the NSW Waste Classification Guidelines (EPA, 2014), and disposed to a licensed waste management facility, or, remediated on site in accordance with recommendations provided within a contaminated land management action plan developed by a contaminated land specialist.

### 10.5.2 Bushfire

The following management measures will continue to be implemented for the project:

- Fire extinguishers will be provided in the office and operational areas of the site.
- A water cart and front-end loader will be available for firefighting as required.
- Internal roads at the site will be maintained for operational and firefighting purposes.
- All employees will be trained through the induction process to be vigilant with regard to fire prevention, emergency procedures and reporting of fires to the RFS.

The following additional management measures will be implemented for the project:

- A Bushfire Emergency Management and Evacuation Plan will be prepared for the site.
- Vegetation clearance distances to any overhead powerline are to comply with ISSC 3 Guideline for Managing Vegetation Near Power Lines (Industry Safety Steering Committee 2005).
- Any gas services are to be installed and maintained in accordance with AS/NZS 1596-2014 The storage and handling of LP gas.

Fulton Hogan will continue to work with the RFS and respective land authorities to co-ordinate any scheduled burn off events, and monitor and report any fires, suspicious behaviour or hazardous fuel loads within proximity to the site boundary.

### 10.5.3 Risk to workers

Designated first aid and emergency response equipment will be available during construction and operation of the project. Appropriately trained personnel will be on site throughout the life of the operations to provide first aid and respond to site emergencies.

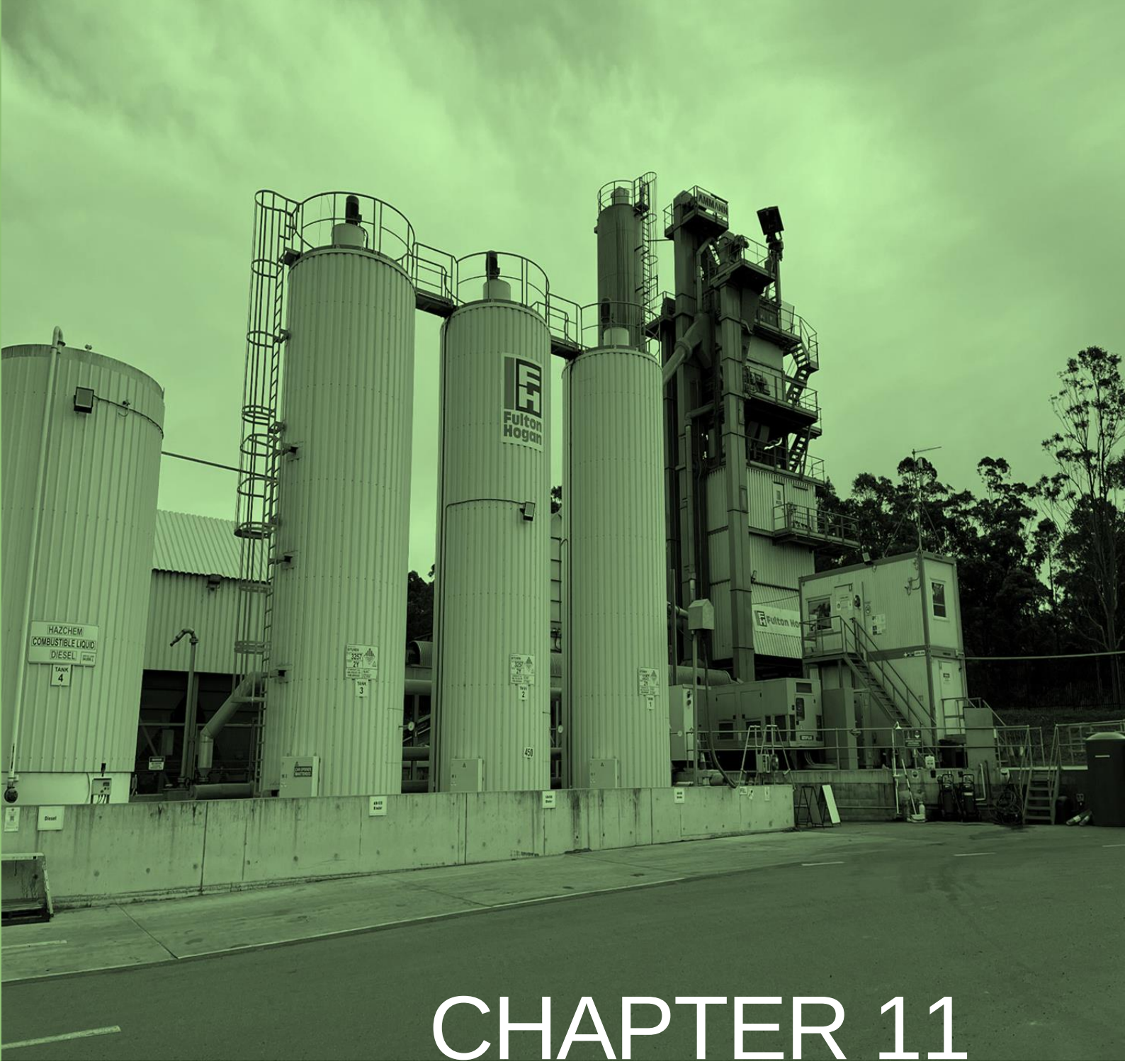
Any injuries incurred at the site will be reported and investigated in consultation with the NSW Resource Regulator and other relevant authorities. Any recommendations or findings of investigation reports will be implemented by Fulton Hogan where feasible and practical.

## 10.6 Residual impacts

The review and application of the Hazards SEPP found that:

- The potential for hazards associated with the transportation, use and storage of dangerous goods (including biodiesel, diesel, LPG, bitumen and other flammable goods) is unlikely, as dedicated, fully contained storage and handling areas which are compliant with the relevant Australian Standards will be designed and implemented for the project.
- Storage areas will be designed to be separated from the lot boundary and exceed the separation distances required under AS 3780 and AS 1940.

With the implementation of fit-for-purpose management practices for the transport, storage and handling of hazardous substances and dangerous goods used for the project, along with the effective implementation of an emergency response plan and workplace health and safety management systems, the project risk in relation to soil and water contamination, fire, explosion, public safety, road safety, surrounding land uses, or public health and the environment is low.




# CHAPTER 11

## WASTE MANAGEMENT

# 11 WASTE MANAGEMENT

## 11.1 Introduction

Waste will be generated by the project and will require responsible management in accordance with the objectives of the WARR Act, POEO Act and the NSW Waste and Sustainable Materials Strategy 2041: Stage One 2021-2027 (waste strategy). Failure to collect, separate and store waste, or transport and dispose of waste appropriately, can result in adverse impacts on the receiving environment.

This chapter outlines Fulton Hogan's company waste management practices and provides details of the expected quantities and classifications of waste streams generated on site during the project.

### 11.1.1 Assessment guidelines and requirements

The SEARs require consideration of the waste streams and quantities likely to be generated by the project (Table 11.1).

**Table 11.1 Waste SEARs**

| Requirement | Section where addressed |
|---|---|
| Details of the type, quantity and classification of waste to be received at the site. | Section 11.3 |
| Details of the resource outputs and any additional processes for residual waste. | Section 11.5 |
| Details of waste handling including, transport, identification, receipt, stockpiling and quality control. | Section 11.2, Section 11.3 and 11.4 |
| The measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Sustainable Materials Strategy 2041. | Section 11.2 and 11.4 |

## 11.2 Fulton Hogan waste practices

The main waste streams generated by the project will be general solid wastes from construction and operations.

Waste generated at the site will be separated, collected in designated waste disposal bins, reused where possible, or collected by a licenced waste removal company and disposed of at an appropriately licensed waste facility.

### 11.2.1 Waste management and minimisation practices

Fulton Hogan conducts its business in accordance with the NSW waste hierarchy, which underpins the objectives of the WARR Act, and follows the principles of waste management through the process of: avoidance; resource recovery; and environmentally sound disposal throughout its core operations.

The construction and operation of the project will assist in achieving the actions and goals for the management of waste in accordance with this WARR Act by:

- Re-using infrastructure at the site where feasible.
- Purchasing recycled products where appropriate.

- Developing and implementing waste management procedures to minimise the generation of waste and where unavoidable, re-use waste on-site.
- Recycling as many wastes as practically possible through appropriate handling, separation, storage, and collection.
- Where waste cannot be re-used or recycled, transportation and disposal of waste off-site at an appropriately licensed facility.

## General solid waste

The site generates small amounts of building and demolition waste, glass, plastic, rubber, garden waste, wood, paper and cardboard. Additionally, small amounts of general solid waste (putrescible), such as food waste, is generated by site personnel.

General solid waste streams are segregated where possible, and deposited in large bins, which are covered and collected regularly by a licensed waste removal contractor.

## Hazardous waste

Used hazardous substance and chemical containers, grease drums, and oil filters, are stored in accordance with standards and regulations, until collected for recycling or disposal by a licensed contractor.

Any spills in the collection areas are contained in bunds and managed in accordance with emergency response procedures.

## Liquid waste

A holding tank captures wastewater from the site office, kitchen and amenities, with a second holding tank capturing wastewater from the laboratory amenities.

Both holding tanks are pumped out weekly by a licensed contractor for off-site disposal as liquid waste.

As outlined in Section 3.2.9, the project will install a new wastewater treatment system at the site to treat approximately 623 kL of wastewater generated at the site per day and will comply with Council development standards. Following installation of the new treatment system, there will be no requirement to dispose wastewater offsite.

## Waste associated with asphalt production

Asphalt generally comprises:

- Binder (bitumen) – approximately 5%.
- Aggregate – approximately 78%.
- Sand – approximately 15%.
- Filler (lime/coal ash) – approximately 2%.

Fulton Hogan propose to continue to re-use the following off-site waste streams in the manufacture of asphalt:

- RAP.
- Crumbed rubber.
- Recycled glass.
- Steel furnace slag.

The beneficial reuse of waste in asphalt contributes to a lower carbon and ecological footprint, but their combination is also producing higher quality roads. Improvements known in the industry by re-use of these waste streams includes:

- Increased fatigue life of the asphalt.
- Resistance to deformation, increasing ability to resist damage from heavy traffic.
- Improvement in stiffness.
- Improving bearing capacity to carry heavy traffic.
- Providing the ability to lay a thinner surface, therefore reducing raw material quantities even further.

The proposed beneficial reuse of recovered RAP and other waste streams for the manufacture of asphalt will reduce the use of virgin aggregate and sand transported from quarries in NSW.

### 11.2.2 Waste strategy

The NSW Government released the waste strategy which sets the actions for the management of waste over the next seven years.

The waste strategy has set a target to recover an average of 80% of all waste streams by 2030.

The project will assist the State in achieving this goal by recycling up to 99,000 tpa of RAP, 500 tpa of recycled glass, 750 tpa of crumbed rubber and 10,000 tpa of steel furnace slag and diverting this waste from landfill for beneficial reuse.

## 11.3 Potential impacts

### 11.3.1 Construction phase

Minimal waste will be generated during the construction/establishment phase of the project.

Waste could be generated during the following construction activities:

- Minor quantities of excess concrete and asphalt during pouring of foundations for structures and pavements/hardstands.
- Minor quantities of metal and other material offcuts during construction of structures.
- Maintenance waste generated from construction plant and machinery maintenance, such as oil and fuel.
- General solid wastes (putrescible) and liquid waste from construction personnel.

The nature and volume of waste generated during construction will be non-hazardous and relatively minor. However, there is potential for adverse impacts on the local environment if waste is not managed appropriately.

Inappropriately managed waste will have potential adverse impacts upon:

- Visual amenity and aesthetic quality of the surrounding area.
- Health and safety of nearby residents or businesses, and workers and visitors at the site.
- Landfill space, through potentially reusable and/or recyclable materials contributing to landfill waste.
- Native fauna through ingestion of fugitive waste materials e.g. plastic bags.
- Hazardous waste, particularly fuels or oils, entering the stormwater system, local drainage lines and watercourses, leading to subsequent water quality degradation.

Land and/or water could also be polluted by waste incorrectly transported to a recycling or disposal site that is not appropriately licenced to accept it. Waste generated by the project during construction will only be transported to waste recycling or disposal facilities with the appropriate licences/approvals.

## 11.3.2 Operational phase

### General waste

Waste anticipated to be generated during operation of the project is summarised in Table 11.2.

**Table 11.2 Operational waste inventory**

| Waste description | Waste classification | Source | Approximate quantity | Re-used on-site? | Recycled? | Disposed of on-site / off-site |
|---|---|---|---|---|---|---|
| Sewerage | Liquid | Administration office and amenities | 623 kL daily | No | No | Treated on-site via Wisconsin mounds |
| Oil and grease | Liquid | Maintenance of mobile equipment | 1,000 L / year | No | No | Off-site |
| Maintenance / production waste | Solid | Workshop waste, packaging, waste from site processes | 4.5 m³ / month | No | No | Off-site |
| Office | Solid | General office waste | 3 m³ / month | No | No | Off-site |
| Paper | Solid | Office | 600 kg / year | No | Yes | Off-site |
| Scrap steel | Solid | Redundant equipment | 5 t per year | No | Yes | Off-site |

These wastes will continue to be managed in accordance with Fulton Hogan's waste management systems and practices.

All wastes generated by operations will be classified and disposed of in accordance with the NSW Waste Classification Guidelines and in accordance with the resource management hierarchy principles and associated requirements of the WARR Act and NSW Protection of the Environment Operations (Waste) Regulation 2014.

### RAP

Reclaimed asphalt pavement will be stored on site and reused in the asphalt making process. The use of RAP in asphalt production at a rate of up to 20% reduces emissions and virgin raw materials required.

Approximately 99,000 tpa of RAP will be received and no more than 18,431 tpa of unprocessed RAP and 6,702 tpa of processed RAP will be stored at any one time.

The RAP to be received and processed at the site will be 'general solid waste (non-putrescible)'.

The RAP will comprise an asphalt matrix which was previously used as an engineering material, and which will not contain a detectable quantity of coal tar or asbestos.

RAP will be weighed and processed using a mobile granulating and screening plant located in the RAP processing area.

All RAP will be used as aggregate in the asphalt making process. Fulton Hogan will process RAP and supply it in asphalt in accordance with the RAP order and exemption (2014).

The management measures in Section 11.4 will be implemented to ensure the RAP does not result in contamination of land and so that Fulton Hogan complies with the RAP order and exemption (2014).

## Waste volumes

As summarised in Table 11.3, Fulton Hogan will continue to receive and process sub-categories of 'general solid waste (non-putrescible)' and 'special waste' under the NSW Waste Classification Guidelines (EPA, 2014). Fulton Hogan will also receive material subject to resource recovery orders and exemptions as summarised in Table 11.4.

Table 11.5 describes the on-site facilities that will receive and process the waste, the annual and 'at any one time' storage in tonnes and fate of wastes.

The proposed storage locations and quantities of incoming aggregates and other quarried materials are summarised in Table 11.6 and shown on the site development plan in Appendix C as EPA is likely to consider this material as the virgin excavated material (VENM) waste type and will license these quantities as the 'authorised amount'. Also included is RAP (pre-processed and processed) and cold mix asphalt.

As described in Section 11.4.4, some of the wastes that will be used in asphalt manufacturing will be sourced, processed and supplied in accordance with the resource recovery orders and exemptions summarised in Table 11.4.

**Table 11.3 Waste classifications**

| Waste classification | Specific waste description |
|---|---|
| General solid waste (non-putrescible) | Reclaimed asphalt pavement (asphalt waste) |
| General solid waste (non-putrescible) | Glass fines |
| General solid waste (non-putrescible) | Steel furnace slag as described in 'The steel furnace slag exemption 2019'. |
| Special waste | Crumbed tyres (shredded tyres) |

**Table 11.4 Resource recovery orders and exemptions**

| Material | Source | Processing facility | Reuse facility | Fate | Resource recovery exemption | Resource recovery order |
|---|---|---|---|---|---|---|
| RAP | Road maintenance/ construction | RAP processing area | Asphalt plant | Asphalt | The reclaimed asphalt pavement exemption 2014 | The reclaimed asphalt pavement order 2014 |
| Glass fines | Third party supplier | N/A | Asphalt plant | Asphalt | The recovered glass sand exemption 2014 | The recovered glass sand order 2014 |
| Steel furnace slag | | | | | The steel furnace slag exemption 2019 | The steel furnace slag order 2019 |

**Table 11.5 Waste summary**

| Facility | Waste received onsite | Source | Receival (max. tpa) | Storage | | Fate | Quantity to be reused (tpa) | Quantity to be disposed offsite (tpa) | Method of offsite disposal |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Any one time (t) | Annual (tpa) | | | | |
| Asphalt plant | RAP | RAP processing area. Unprocessed RAP sourced from road construction projects in Hunter and Central Coast LGAs. | 99,000 | 25,778 | 99,000 | Reuse in asphalt | 99,000 | 0 | N/A |
| | Recycled glass | IQ Renew - Wyong | 10,000 | 270 | 10,000 | Reuse in asphalt | 10,000 | 0 | N/A |
| | Crumbed rubber | Tyrecycle Pty Ltd | 4,000 | 100 | 4,000 | | 4,000 | 0 | N/A |
| | Steel furnace slag | Australian Steel Mill Services | 10,000 | 600 | 10,000 | | 10,000 | 0 | N/A |

**Table 11.6 Calculation of at any one time waste storage volumes**

| Onsite facility | | | | | | | | Maximum storage at any one time (t) |
|---|---|---|---|---|---|---|---|---|
| **Material** | **Location** | **Length (m)** | **Width (m)** | **Height (m)** | **Density ($t/m^3$)** | **Volume ($m^3$)** | **Tonnes (t)** | |
| Unprocessed RAP | RAP processing area | 20 (per stockpile) | 20 (per stockpile) | 10 (per stockpile) | 1.6 | 1,676 (per stockpile) | 18,431 | 18,431 |
| Processed RAP | RAP storage area | 20 (per stockpile) | 20 (per stockpile) | 10 (per stockpile) | 1.6 | 1,676 (per stockpile) | 6,702 | 6,702 |
| Bin 2 – processed RAP | Bulk material storage bays – direct feed to asphalt plant | 15 | 10 | 3 | 1.6 | 450 | 645 | 645 |
| Bin 10 – steel furnace slag – 10 mm | Bulk material storage bays – RAP processing area | 10 | 5 | 3 | 2.0 | 150 | 300 | 300 |
| Bin 11 – steel furnace slag – 14 mm | | 10 | 5 | 3 | 2.0 | 150 | 300 | 300 |
| Bin 14 – recycled glass | | 10 | 5 | 3 | 1.8 | 150 | 270 | 270 |
| Crumbed rubber (bulk bags) | RAP processing area | - | - | - | - | 1 | 100 | 100 |

### 11.3.3 Cumulative impacts

General solid wastes, liquid and hazardous wastes will continue to be generated by project operations. However, waste quantities will be minimal, re-used at the site, and where disposal is required, licenced waste contractors will collect and dispose of these wastes to ensure recycling or disposal in a legislatively compliant manner.

Other land uses near the site, including other industrial applications, will be subject to waste related consent and EPL conditions. As such, waste at these facilities is likely to be managed in an environmentally responsible manner and in accordance with legislation, thereby minimising the potential for cumulative impacts from the project combined with nearby facilities.

## 11.4 Mitigation and management measures

### 11.4.1 General

Waste will be managed in accordance with the WARR Act by adopting the resource management hierarchy (in order of priority) of avoidance, re-use, recycling / re-processing / treatment and disposal.

Environmental management plans will be implemented for construction and operation of the project, which will include measures for:

- Quantification and classification of materials that will be required to be removed from the site.
- Disposal/reuse strategies for each type of material.
- Details of how waste will be stored and treated on site.
- Identification of non-recyclable waste.
- Identification of strategies to reduce, reuse and recycle.
- Procedures and disposal arrangements for potentially hazardous material.

The environmental management plans will include, or be updated to include the following:

- All waste generated by the project will be managed in accordance with the Waste Classification Guidelines and relevant regulatory requirements. This will include (i) its classification prior to leaving the site and (ii) recording (via an appropriate waste tracking system) its legal off-site transportation for re-use, recycling or disposal.
- Any waste generated would be stored in a suitable container, with a lid (where appropriate), and transported from the site to an appropriately licensed facility. A sufficient number of suitable receptacles for general waste, and recyclable materials would be provided for waste disposal at the site to allow separation of wastes.
- All wastes will be securely stored to ensure that any pollutants are prevented from escaping.
- Any fuel, lubricant or hydraulic fluid spillages would be collected using absorbent material and the contaminated material disposed of appropriately at a licensed waste facility.
- All hazardous or contaminated wastes on site (if identified) will be removed and disposed in accordance with the State and national regulations and guidelines and best practice for the removal of these materials. Hazardous materials will only be removed by suitably qualified, licensed and experienced contractors.
- Documents and records of the transport and fates of all materials removed from the site would be kept as proof of correct disposal and for environmental auditing purposes.
- Waste streams will be sorted to maximise the reuse/recycling potential and minimise disposal costs.
- Materials would be re-used or recycled wherever possible. Details relating to the recycling of materials at appropriately licensed recycling facilities would be provided.

- Waste would be covered stored and removed in a timely manner so as not to attract native animals or vermin.
- All waste material handling, transport and disposal will be in accordance with the requirements of the POEO Act, WARR Act and relevant EPA or SafeWork NSW Guidelines.

## 11.4.2 Standards for managing construction waste in NSW

As described above, the CEMP and updated OEMP will include measures for the management of incoming and outgoing waste and waste monitoring.

Additionally, Table 11.7 summarises how the project will meet the EPA (2019) Standards for managing construction waste in NSW (Standard). The right column responds to the requirements of the Standard and, therefore, needs to be read with reference to the Standard.

**Table 11.7 Response to *Standards for managing construction waste in NSW***

| Standard | How development meets the Standard |
|---|---|
| Standard 1.1 | 1. An elevated inspection platform will be in place to allow the weighbridge operator to visually inspect each load prior to admitting onto site.<br>2. In order to better identify asbestos contamination, all RAP processing personnel will have completed asbestos awareness training. Records of training will be available on site.<br>Any rejected loads are directed to leave the facility, and records of this are kept on site (refer to point 3). The reason for rejection (contaminant type) is also recorded.<br>3. Details recorded include:<br>- Date and time of load<br>- Vehicle registration number<br>- Weight of load (i.e. amount of material received); and<br>- Where material has come from (job number recorded) |
| Standard 1.2 | Not required as per Standard 1.2.1 'Exceptions to Standard 1.2' |
| Standard 1.3 | ▪ A training package will be incorporated into the site induction for relevant personnel.<br>▪ The operational environmental management plan will be updated and will also identify compliance requirements at the site.<br>▪ As noted for Standard 1.1, as per WHS Regulations, asbestos awareness training will be completed by all staff. |
| Standard 1.3.2 | Records will be available on site as noted against Standard 1.1. |
| Standard 1.4 | Refer to response against Standard 1.1. |
| Standard 2.1 | Not required as per Standard 2.1.1 'Exceptions to Standard 2.1' |
| Standard 3.1 | All waste material received is the same material type – RAP material.<br>All material received is inspected upon entry.<br>Therefore, all waste stored in RAP processing area on site is inspected and of the same material type.<br>As per Standard 4, processed and unprocessed RAP material is stored separately. |
| Standard 4.1 | 1. As noted above in response to Standard 3, all waste received in RAP processing area is the same material type – RAP material.<br>2. The stockpile areas are noted on the site map (RAP storage area). Fulton Hogan will ensure that the authorised unprocessed RAP storage area is marked and easily identifiable at the premises.<br>3. Not applicable.<br>4. As per number 5, all RAP material is same waste type and so 3 m delineation is not required. However, processed and unprocessed RAP material will be segregated. |
| Standard 4.2.1 | 1. Fulton Hogan will complete regular inspections of the RAP storage and processing areas on each business day, as required by this condition. Observations will be recorded including day/time and person completing inspection.<br>2. As noted above.<br>3. As noted above. |

| Standard | How development meets the Standard |
|---|---|
| Standard 5.1 | If waste is going offsite, inspections are completed for all outgoing loads. The same items noted in Standard 1.1 response are recorded. |

## 11.4.3 Weighbridges and record keeping

Fulton Hogan will weigh every load of waste on receival and dispatch and keep the following records of the material received on site:

- Weight.
- Description.
- Origin.
- Licence plate of truck.

These records will be used to meet all reporting obligations under the respective EPL and waste levy requirements.

## 11.4.4 RAP management

### Verification

Fulton Hogan has a strict inspection protocol for all waste received at the site, in particular RAP and these include:

- Verification by the supplier of the waste (if not Fulton Hogan), that it meets the relevant waste classification.
- When RAP is received at the site, a written statement of compliance certifying that all the requirements set out in the RAP order (2014) have been met will be provided to Fulton Hogan. Fulton Hogan will keep a record of the quantity of RAP received on site.
- Prior to tipping RAP at the site, the load is visually inspected. The RAP will be inspected for contaminants and the RAP quality verified.
- The RAP will then be tipped in the RAP processing area, but separate to the rest of the unprocessed RAP stockpiles. The RAP load will then be visually inspected again for contaminants and the RAP quality verified. If any contaminants are identified then that RAP load will be cordoned off and quarantined so that it does not contaminate the rest of the RAP stockpiles. The contaminated material (eg asbestos) will either be removed or the whole load will be rejected and removed from site for disposal at a suitably licenced facility.
- A procedure will be included in the updated OEMP to minimise the potential for receiving/processing coal tar in RAP, including documentation of compliance records. The procedure to be implemented at the site is summarised below:

    - Sites likely to contain coal tar are cored and tested for the presence of coal tar. This is usually in inner city areas and the councils concerned indicate the streets that are likely to contain tar. Asphalt millings containing coal tar are directed to appropriately licensed tip sites.
    - The laboratory undertakes coring and a contracted laboratory does the coal tar testing.
    - During milling the presence of coal tar can usually be detected by smell and appropriate measures are to be put in place to ensure that the asphalt millings containing the coal tar are sent to an appropriately licensed disposal site.
    - Asphalt millings containing coal tar are not to be included in processed RAP.

### Contamination

The RAP will be sourced from roads and is not likely to be contaminated with non-conforming wastes unless the road was constructed of contaminated material, which is unlikely given road products must conform to client technical specifications.

Notwithstanding, Fulton Hogan's current RAP work instruction for the existing RAP operations includes procedures and controls to prevent non-conforming waste from being delivered to the RAP facility as well as to identify, quarantine, manage and appropriately dispose of non-conforming waste if it was received at the facility.

The current RAP work instruction for existing RAP operations will be amended as required to reflect the project and include any additional procedures/controls for dealing with non-conforming waste.

### Contingency planning

There is potential for waste to accumulate on-site if there is a breakdown of RAP processing and asphalt manufacturing equipment. The following measures will be implemented if this occurs:

- RAP –
    - Diversion of RAP to other facilities for the duration of the stoppage if the stoppage is likely to result in incoming RAP exceeding licensed storage capacity.
    - Use of alternative granulating and screening equipment if repairs are long term or equipment is unable to be repaired (equipment is mobile and easily replaced).
- Asphalt – temporary stoppage of importation of asphalt additives (e.g. steel furnace slag, crumbed rubber etc.) if the breakdown is likely to result in incoming additives exceeding licensed storage capacity.

## 11.4.5 Steel furnace slag management

Fulton Hogan proposes to use steel furnace slag as an input to the asphalt making process. According to 'The steel furnace slag exemption 2019' the application of steel furnace slag which complies with the 'Steel furnace slag order 2019' to land for roadmaking activities, including asphalt aggregate, is exempt from certain provisions of the POEO Act and Waste Regulation.

Fulton Hogan will only accept steel furnace slag from a supplier that provides the following as required under the steel furnace slag order 2019:

- A written statement of compliance certifying that all the requirements set out in this order have been met.
- A copy of the steel furnace slag exemption, or a link to the EPA website where the steel furnace slag exemption can be found.
- A copy of the steel furnace slag order, or a link to the EPA website where the steel furnace slag order can be found.

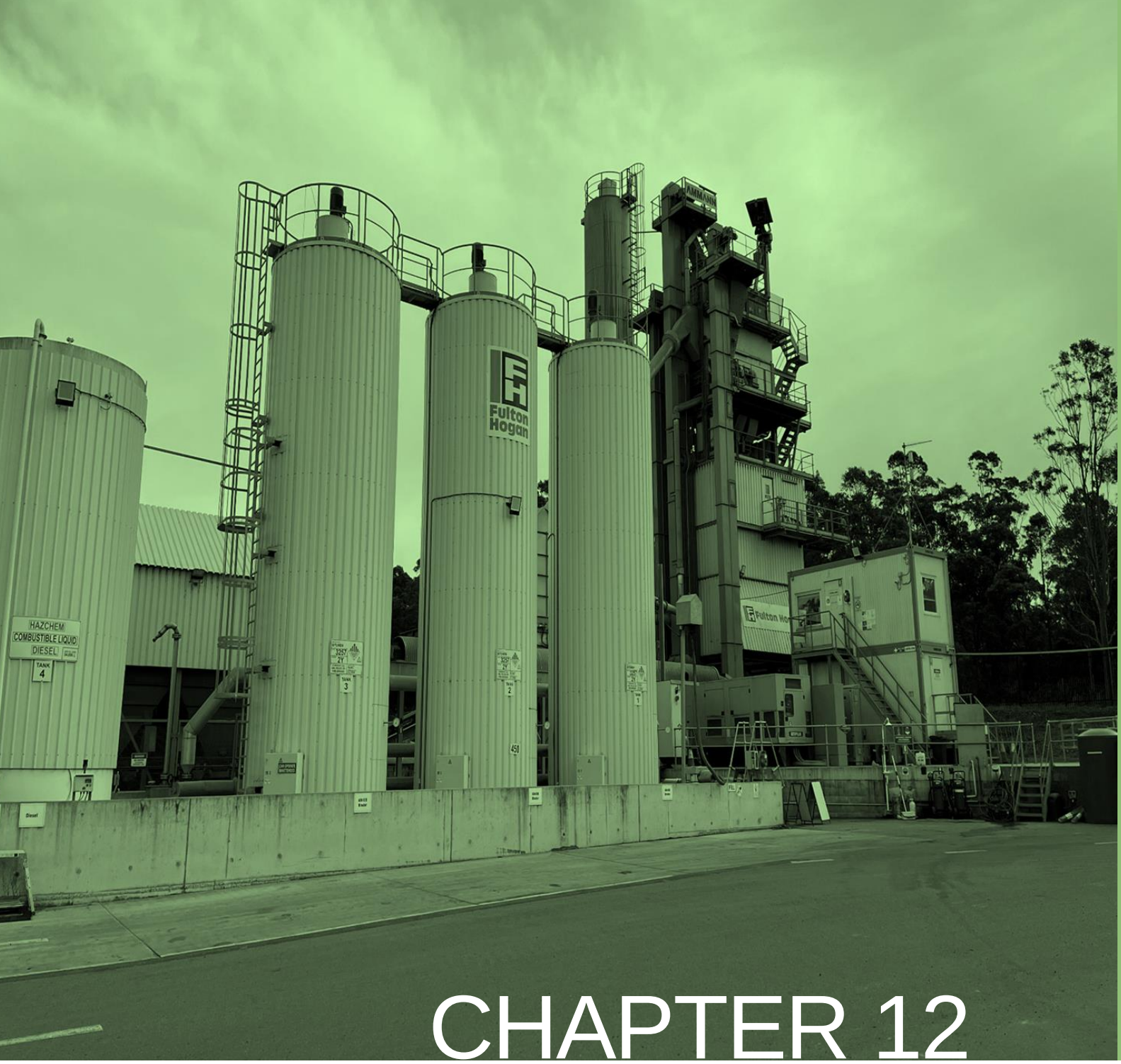
Fulton Hogan will only use steel furnace slag in accordance with the following under The steel furnace slag exemption 2019:

- The consumer must keep a written record of the following for a period of six years:
    - the quantity of any steel furnace slag and blended steel furnace slag received; and
    - the name and address of the supplier of any steel furnace slag and blended steel furnace slag received.

## 11.5 Residual impacts

As described in this chapter, minimal quantities of waste will be generated during construction and operation of the project, which will be managed in accordance with a CEMP and updated OEMP incorporating the management measures provided above.

The project will accept wastes from off-site, which will be processed, with some material re-used in on-site processes and the remainder reused, recycled or disposed off-site. Some waste materials processed off-site will be used on-site in the production of asphalt. Material will be reused on-site to produce asphalt in accordance with the resource exemptions and orders described in this Chapter.




# CHAPTER 12

## OTHER ENVIRONMENTAL MATTERS

# 12 OTHER ENVIRONMENTAL MATTERS

The matters in **Table 12.1** were not considered via detailed assessment as they contribute low risk or will not be impacted by the project.

**Table 12.1:** Low risk environmental aspects.

| Environmental aspect | Potential environmental impact |
|---|---|
| Biodiversity | The project will be confined to existing operational areas of the site previously cleared of native vegetation. With the exception of a small portion of mown exotic grass, the project will not impact existing remnant native vegetation or landscape plantings at the site and will therefore not directly impact biodiversity values or potential habitat of a threatened species afforded protection under the BC Act and/or the EPBC Act.<br>Indirect impacts may occur during construction and operation of the project, however will be largely confined to the site and immediate surrounds.<br>The primary indirect impacts may include:<br>▪ Increased noise and dust from the construction and operation of the project.<br>▪ Increased edge-effects for surrounding vegetated areas.<br>▪ Potential sources of ignition leading to a bushfire event (e.g. welding).<br>▪ Erosion and sedimentation in areas adjoining construction activities.<br>▪ Spill of light into adjoining bushland areas during night works.<br>▪ Spread of weed propagules, which could lead to invasion of native vegetation by weeds.<br>The flora and fauna impact assessment (Appendix B) identifies all biodiversity values adjacent to the proposed development and tests of significance have been carried out for identified threatened flora and fauna species confirming there is no significant direct or indirect impact to threatened ecological communities, populations or species afforded protection under the BC Act and/or BC Act.<br>The proposed on-site wastewater solution (Wisconsin mound) will be positioned in an existing cleared area of the site and will not require direct clearing of identified potential habitat for Black-eyed susan and *Corunastylis sp. Charmhaven*. The selection of a Wisconsin mound was most suited for the specific soil, environmental and development constraints applicable to the site. Wisconsin mounds are constructed using graded sand overlying scarified natural ground. Primary or secondary treated effluent is dosed into the mound system allowing further effluent polishing to take place in the sand-fill media. Sand mounds benefit from improved evapotranspiration due to their raised position above the surrounding ground surface. The improved quality of effluent discharges from the sand-fill media directly into the underlying soil beneath the mound, making these systems ideal to overcome site constraints associated with slowly permeable soils, shallow permeable soils over porous bedrock and permeable soils with a high-water table. The flow of effluent into the mound will achieve an even distribution, thereby reducing the potential for overloading and effluent breakout through the mound. The mound will also be planted with high transpiration plant species to maximise the rate of evapotranspiration. There will be no direct discharge of effluent into adjoining vegetation. As a final additional contingency, a 200 m open gravel lined drain was previously constructed at the site and is positioned downslope to collect any surface runoff from the mound, thereby minimising the potential for surface flow of effluent downslope into potential habitat of *Corunastylis sp. Charmhaven*.<br>The approved development is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system. It is considered that the site's existing stormwater management system is equipped to treat the existing and continued pollutants generated by asphalt plant operations and as such no alteration or upgrade to the existing system is required for the |

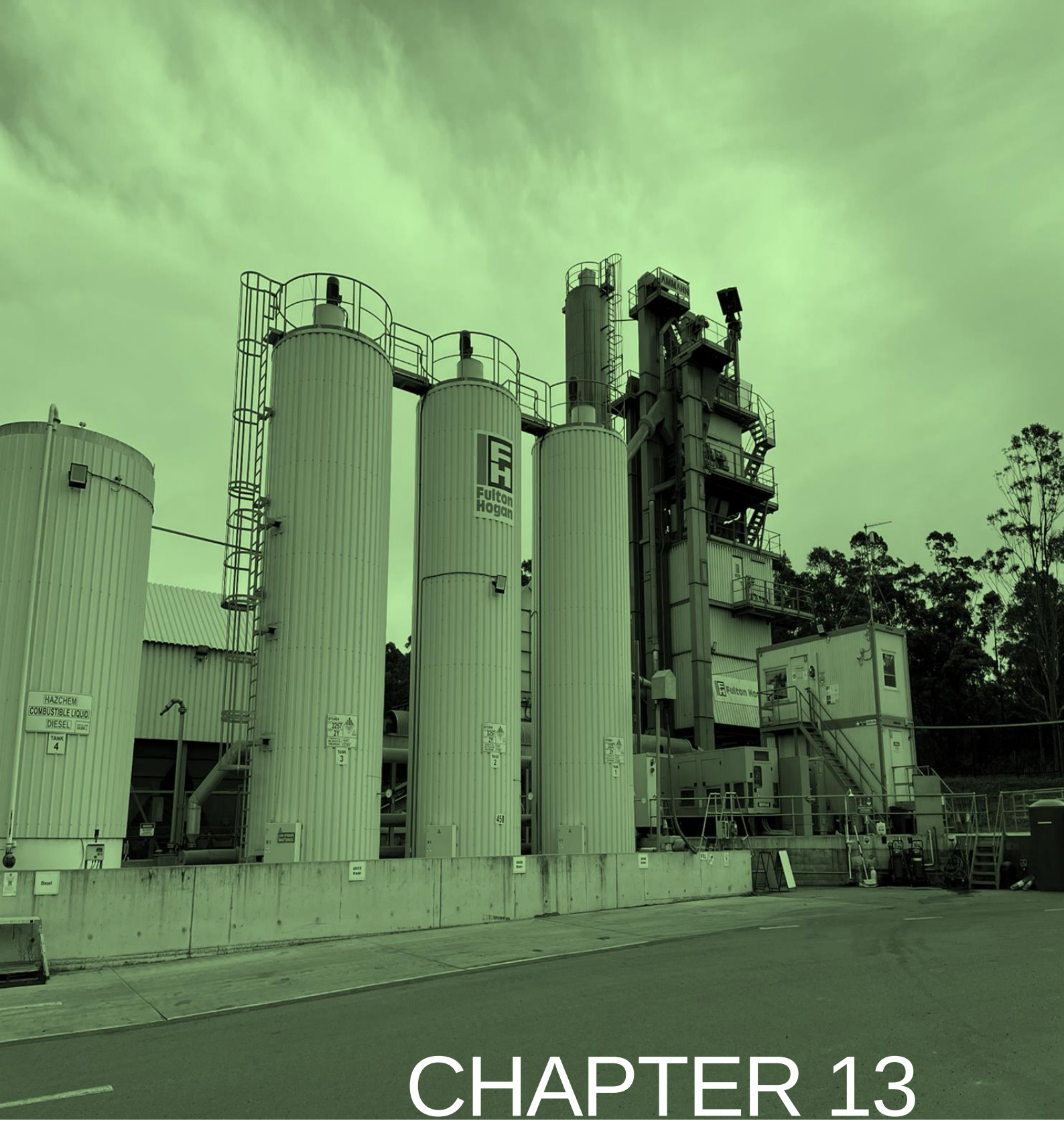
| Environmental aspect | Potential environmental impact |
|---|---|
| | project. The flora and fauna assessment has considered the potential for indirect impacts to Wallum Froglet and concludes via a test of significance there will be no significant impact upon the species.<br>Weed species are present given the highly disturbed nature of the site. Fulton Hogan has a responsibility to implement appropriate controls to avoid any spread of weed species off site during construction. This includes avoiding the spread of seed and fragments of vegetation. Weed species present at the site are in low quantities and therefore removal and disposal of these species within the project site prior to the commencement of construction is possible.<br>The following mitigation and management measures are recommended for inclusion in a CEMP and updated OEMP to reduce the impact on biodiversity values during construction and operation of the project:<br>▪ A suitably qualified and experience ecologist will advise on the implementation of the mitigation measures during construction and operation of the project.<br>▪ Permanent signage will be erected where the site abuts retained vegetation areas to warn personnel of the potential impacts on threatened species including the Wallum Froglet, Charmhaven apple and *Corunastylis sp. Charmhaven* for accidental chemical spill down the slope into the retention basins and surrounding bushland. Signs will state: 1. “Do not enter. Beware of threatened orchids and frogs in this area” and 2. “Refuelling of machinery is restricted to bunded appropriate areas”. This will ensure that operators and construction personnel are aware of the potential impact risk.<br>▪ If native fauna are encountered while construction is occurring, work should cease until the animal moves out of the impact area. Injured fauna should be taken to the nearest veterinary clinic for assessment. If relocation is required, employ appropriate expert assistance (e.g. WIRES, ecologists etc.).<br>▪ If any threatened species (flora or fauna) is discovered during the works, all work would stop immediately and a qualified ecologist would be notified. Work would only recommence once the impact on the species has been assessed by a qualified ecologist, appropriate control measures provided and any required additional assessments or approvals are obtained.<br>▪ Avoid distributing weeds on and off site by implementing suitable vehicle and equipment controls, for example checking vehicles prior to leaving the work area to remove soil and any plant matter including seeds.<br>▪ All weeds, propagules, other plant parts and excavated topsoil material that is likely to be infested with weed propagules that could regenerate will be removed from site and disposed of at a licensed waste disposal facility.<br>▪ Cover all vehicles transporting waste containing weeds and seeds for disposal.<br>▪ Where dust is washed off handstand, plant or machinery, this dust will not be permitted to run-off into the surrounding catchment. Appropriated sediment controls will be maintained to capture sediment.<br>▪ Refuelling of machinery is restricted to bunded hardstand surfaces only. Chemical spill kits will be available at all times in case of an accidental chemical spill during the construction and operation of the asphalt plant.<br>▪ Any stormwater generated will be diverted into the existing stormwater detention basins.<br>▪ As per the Conservation Plan of Management (Firebird ecoSultants, 2018) the existing asphalt plant was designed due to the discovery of a large population of *Corunastylis sp. Charmhaven* by Advitech (2017). Firebird ecoSultants (2018) indicated that 80 orchids recorded on the property would be retained within a conservation area, with a minimum 20 m buffer between the retained orchids and the development area. The asphalt plant must maintain the 20 m buffer between the conservation area and the development.<br>▪ It is recommended that the three-year monitoring and reporting program that was outlined in the Plan of Management for the conservation area be re-commenced following approval of the project. The existing vegetation management plan will be updated. At a minimum, monitoring must take place bi-annually for *Corunastylis sp. Charmhaven* and Charmhaven apple via targeted surveys. A monitoring report will be prepared and submitted to Council. The monitoring will be undertaken in December and in February to cover the flowering period of the different species.<br>▪ No hot works are to be conducted during Total Fire Bans unless necessary approvals have been obtained.<br>▪ Minimise disturbance to existing landscaping and retain groundcover vegetation as far as practicable. |

| Environmental aspect | Potential environmental impact |
|---|---|
| | ▪ Avoid leaving excavations open overnight. Carefully remove any fauna that may have fallen into excavations.<br>▪ Ensure good site housekeeping to prevent pest animals.<br>▪ Wastewater will be directed into the proposed Wisconsin mound system and maintained in accordance with relevant standards and requirements.<br>▪ Implement dust suppression as required.<br>▪ All storage, stockpile and laydown sites will be established away from any native vegetation that is planned to be retained. Stockpile will be avoided under the 'drip zone' of a tree. Fulton Hogan will avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site.<br>▪ Stockpiles will be located outside of flow paths that may impact the water quality of the nearby habitat for the Wallum Froglet. It is also recommended to minimise stockpile storage time where practicable. |
| Visual amenity | Neighbouring industrial premises on Tooheys Road, along with passing motorists and pedestrians have a degree of visibility into the site through landscape vegetation and of the site frontage and access driveway.<br>The site is in an area zoned 'general industrial' and the project is in connection to an approved and existing industrial land use. The continued use of the site as an asphalt plant and waste management/resource recovery facility is not in conflict with the objectives of the zone or with the form and scale of the existing development and local setting.<br>The following elements of the project will result in a visual transformation of the existing asphalt plant:<br>▪ Installation of additional hot storage bins at the asphalt plant.<br>▪ Re-configured office, workshop, parking and laboratory.<br>▪ Additional bulk material storage bays.<br>▪ Increased RAP stockpile height.<br>▪ Additional hazardous substance/dangerous good storage.<br>▪ Additional rainwater tanks.<br>▪ Re-configuration of landscaped areas.<br>▪ New wastewater treatment mounds.<br>Where new buildings are required, or existing elements re-configured, the infrastructure has been designed in a manner which complements the existing industrial setting, including selection of colours and materials which are consistent with those currently installed at the site.<br>The new administration office will have a maximum height of approximately 5.5 m, while stockpiles of RAP will be stored in the RAP processing area and RAP storage area to a maximum height of 10 m, an increase of 6 m beyond the current maximum stockpile height of 4 m. The re-configured administration office and increased stockpile heights will be visible by neighbouring industrial premises on Tooheys Road, with fleeting views also experienced by passing motorists on Tooheys Road and the Motorway Link Road through landscape vegetation and the site frontage. Despite this change to the current visual landscape of the site, an office building and RAP stockpiles currently exist at the site and the re-configured office and storage of additional RAP in higher stockpiles is consistent with the existing function of the site and is in fitting with an industrial land use.<br>The project will require night time operations, however existing and approved lighting systems at the site will be sufficient and no upgrade to lighting is required for the project, thereby avoiding the potential for additional impacts to residential receivers and thoroughfare motorists associated with light spill.<br>With the above considered, the project will not result in substantial changes to the visual amenity of the site or location, or the views of surrounding neighbours or motorists and pedestrians along Tooheys Road or the Motorway Link Road.<br>Additional landscaping using endemic species consisting of low, medium and upper canopy species will also assist in reducing potential visual impact for neighbouring premises and throughfare motorists of Tooheys Road and the Motorway Link Road. |

| Environmental aspect | Potential environmental impact |
|---|---|
| Topography, geology and soils | The project will require earthworks associated with surface leveling, foundations and trenching for pipelines. The required earthworks will be confined to an area previously disturbed associated with construction of the existing asphalt plant and RAP processing area. Engineering fill was imported to the site to provide level foundations for the construction of the asphalt plant and supporting infrastructure. As such, the proposed earthworks will be confined to soil profiles considered to be a low risk of contamination potential.<br>No recorded contaminated sites were identified within proximity to the site.<br>Other than an unforeseen localised hydraulic oil leak from vehicles or machinery associated with construction (and operations in the RAP processing area), the project is unlikely to result in contaminating activities. Following construction, the majority of the site will comprise impermeable hardstand and no potential for soil or groundwater contamination will be generated via ongoing operations in these areas.<br>Personnel will regularly check and maintain machinery to minimise the risk of oil leaks.<br>If contamination is identified or suspected during construction of the project, all work in the vicinity of the find shall cease and the area isolated appropriately. A specialist consultant experienced in the identification, sampling and testing of contamination will be engaged to undertake an assessment of site conditions prior to re-commencement of earthworks. The consultant should:<br>▪ Sample and analyse soil to determine the potential existence of contaminants. Analysis must be undertaken by a NATA accredited laboratory.<br>▪ Sample, analyse and determine classification of material to be excavated for disposal and/or confirm for re-use as backfill.<br>▪ Report and provide advice on management options, re-use onsite and disposal criteria. |
| Hydrology and water quality | Wallarah Creek, a tributary of Budgewoi Lake, is located approximately 100 m south-west of the asphalt plant.<br>The project site is located outside of the predicted flood extent for 1% annual exceedance probability and the probable maximum events for Wallarah Creek.<br>The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system.<br>The project will not involve excavation or earthworks which will affect groundwater resources.<br>The material to be excavated will primarily be removed directly from site in order to minimise temporarily stockpiled material. This method will also eliminate double handling of excavated material and minimise the risk of erosion by wind and rainfall and subsequent sedimentation off-site if not managed appropriately.<br>Threats to water quality associated with construction activities includes, the disturbance of soil and movement of sediment, contaminated or otherwise, into nearby stormwater drains and ultimately natural watercourses. The potential also exists for litter and other construction waste to be mobilised by both wind and stormwater runoff and deposited in stormwater drainage systems and natural watercourses.<br>The potential for adverse water quality impacts associated with construction of the project will be minimal provided mitigation measures are implemented. These will include erosion and sediment controls installed and maintained in line with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) (the 'Blue Book').<br>Upon completion of construction works, all disturbed areas will be sealed with concrete hardstand to prevent erosion, thereby negating the risk of long-term erosion and sedimentation impacts.<br>The project does not include any changes to the existing asphalt plant operations and therefore will not require changes to water usage.<br>As shown in Appendix C, the existing asphalt plant contains approximately 22,882 $m^2$ of impervious hardstand. Following re-configuration of the site associated with the project, the area of impervious hardstand will be decreased to 22,412 $m^2$, a reduction of 470 $m^2$. As a result, the project will not increase |

| Environmental aspect | Potential environmental impact |
|---|---|
| | the total area of impervious hardstand previously assessed for the site and will not increase the quantity of stormwater runoff generated by the site and captured in the site's existing stormwater management and detention system.<br>Whilst the project will increase the consumption of raw materials and RAP at the site, the project will not introduce additional sources or types of pollutants. It is considered that the site's existing stormwater management system is equipped to treat the existing and continued pollutants generated by asphalt plant operations and as such no alteration or upgrade to the existing system is required for the project.<br>Therefore, stormwater provisions in the Central Coast DCP do not require further consideration.<br>The following measures will be implemented during construction of the project to minimise the potential for erosion and sedimentation and subsequent water quality impacts:<br>▪ Appropriate erosion and sediment controls to be implemented prior to soil disturbance.<br>▪ Manage stormwater to avoid flow over exposed soils which may result in erosion and impacts to water quality.<br>▪ Locate stockpiles outside of flow paths.<br>▪ Inspect all permanent and temporary erosion and sedimentation control works prior to and post rainfall events.<br>▪ At the end of each working day inspect site access locations for mud tracking on public roadways. Roadways are to be swept if mud or debris from the site is visibly evident on the road.<br>▪ Minimise stockpile storage time where practicable. Avoid excessive storage of spoil by regularly removing from site using a registered contractor and disposing of to an appropriate facility. |
| Heritage | The project will not impact upon a registered Aboriginal or non-Aboriginal heritage item or heritage value.<br>The majority of the site is currently covered by impermeable concrete hardstand associated with operational areas of the asphalt plant and access driveways.<br>Earthworks required for construction will be in soil previously modified during construction of the original asphalt plant and RAP processing area to provide a level platform for the infrastructure. Furthermore, Advisian (2016) concluded that based on a review of previous environmental assessments for the site and archaeological investigations carried out for the nearby Wallarah 2 Coal Mine, the site contains no potential for archaeological resources.<br>Therefore, the project will not disturb ground that has the potential to support any unidentified items of Aboriginal or non-Aboriginal heritage value.<br>The following measures will be implemented during construction in the event that previously undiscovered items of potential Aboriginal or non-Aborigjnal significance are identified or suspected:<br>▪ Cease work in the immediate area of the identified potential Aboriginal object or archaeological find.<br>▪ Secure the area and ensure the site is safe.<br>▪ Provide temporary exclusion (pedestrian) fencing.<br>▪ Appropriate advice will be sought from a qualified archaeologist (and in consultation with Heritage NSW and the Local Aboriginal Land Council where appropriate).<br>▪ Implement additional mitigation measures or controls as required.<br>▪ Work in the affected area shall not recommence until permission is granted by Heritage NSW to proceed.<br>Should human remains or suspected Aboriginal skeletal material be identified, the above unexpected finds procedure will be followed. The NSW Police and Heritage NSW will be contacted immediately. Should the burial prove to be archaeological, consultation will be undertaken with a heritage professional, relevant Aboriginal parties and DPE. No further works will occur in the area until authorised in writing by Heritage NSW. |
| Social | The generation of noise and air quality impacts, along with traffic, visual and access impacts during construction and operation of the project will result in |

| Environmental aspect | Potential environmental impact |
|---|---|
| | minor amenity impacts on the surrounding community. Specifically, construction and operation of the project may result in:<br>▪ Continuation of noise for residents located in the vicinity due to the operation of plant and equipment and general construction works and operations.<br>▪ Continuation of traffic and associated road noise for residents located adjacent to the site access and transportation routes.<br>▪ Continuation in dust generated during construction and operations, predominantly for receivers in proximity to the site.<br>▪ Changes to the visual appearance of the locality.<br>The majority of the social impacts of the project relate to matters assessed in other sections of this EIS, including noise, air quality, traffic and access. Impacts to the surrounding community will therefore be mitigated through the implementation of measures recommended to reduce impacts associated with these matters. |
| Economic | There will be a positive economic impact from the project through increased expenditure in the local area during construction and operation. The project will enable the supply of asphalt to additional clients in the Central Coast and Hunter regions, who they would have been unable to supply in the past and who would have had to pay higher costs to source asphalt from suppliers located further away. |




# CHAPTER 13

## ENVIRONMENTAL MANAGEMENT

# 13 ENVIRONMENTAL MANAGEMENT

## 13.1 Introduction

This chapter summarises the key mitigation and management measures for addressing the potential environmental impacts of the project as required by the SEARs (Table 13.1).

**Table 13.1 Environmental management and mitigation SEARs**

| Requirement | Section and appendix where addressed |
|---|---|
| A consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. | Chapter 13 |

As outlined in Section 1.2.8, the site is currently managed in accordance with the conditions of consents and licences.

## 13.2 Environmental management measures

The environmental mitigation measures summarised in Table 13.2 will be implemented during construction and operation of the project.

**Table 13.2: Summary of environmental management and mitigation measures**

| Management measure |
|---|
| **Noise – construction phase** |
| Adhere to the standard daytime construction hours:<br>▪ Monday to Friday 7 am – 6 pm;<br>▪ Saturday 8 am – 1 pm; and<br>▪ No work Sundays or Public Holidays. |
| Avoid operating noisy plant simultaneously wherever possible. |
| Maintenance work on all construction plant will be carried out away from noise sensitive areas and confined to standard daytime construction hours, where practicable. |
| Position noisy equipment behind structures that act as barriers, at the greatest distance from the noise-sensitive area, or orient the equipment so that noise emissions are directed away from any sensitive areas. |
| Employ quiet practices when operating equipment (e.g. positioning and unloading of trucks in appropriate areas). |
| **Noise – operational phase** |
| Include awareness and understanding of noise issues and the use of quiet work practices in site inductions for all staff, contractors and visitors to the site. Specific mention of the following items will be included:<br>▪ Site specific noise management measures to be followed.<br>▪ Locations of nearby noise sensitive receivers. |
| The simultaneous use of multiple items of significant noise generating equipment will be avoided wherever possible, and operations are to be scheduled so they are used separately rather than concurrently. |
| The noisiest activities will be scheduled to the least noise sensitive times of the day (i.e. not during the night-time period) where practicable. |
| All machinery and plant will be maintained and operated in a proper and efficient manner to minimise noise generation. |
| Switch off plant and equipment when not in use and avoid excessive idling. |
| Maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not operational until fully repaired. |
| **Air quality – construction phase** |

| Management measure |
| --- |
| Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. |
| Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained using the available means). |
| Minimise exposed ground surfaces. |
| Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Any complaints, investigation details and actions will be recorded in a log book. |
| Make the complaints log available to the local authority when asked. |
| Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book. |
| Undertake daily visual monitoring for dust beyond the boundary and weekly inspection of equipment and recording results. |
| Carry out regular site inspections. |
| Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. |
| Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. |
| Fully enclose specific operations through solid screens, tarps or barriers where there is a high potential for dust production and the site is active for an extensive period. |
| Avoid site runoff of water or mud. |
| Keep site fencing, barriers and scaffolding clean using wet methods. |
| Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below. |
| Cover, seed or fence spoil stockpiles to prevent wind erosion. |
| Use dust suppressants and place spoil stockpiles in sheltered areas away from wind. |
| Ensure all vehicles switch off engines when stationary - no idling vehicles. |
| Vehicles and equipment to be maintained per manufacturers specification. |
| Limit vehicle speed on site. |
| Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. |
| Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. |
| Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. |
| Use enclosed chutes and conveyors and covered skips. |
| Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. |
| Do not burn waste materials. |
| **Air quality – operational phase** |
| Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained using the available means). |
| Weather forecast to be checked prior to processing RAP. |
| Engines of on-site vehicles and plant to be switched off when not in use. |
| Vehicles and plant are to be fitted with pollution reduction devices where practical. |
| Vehicles are to be maintained and serviced according to manufacturer’s specifications. |
| Activities to be monitored visually to identify dust generation. |
| Maintain an odour complaint logbook and in the event of a complaint conduct an immediate investigation of any odour sources, together with appropriate actions to eliminate any identified excessive odour. |
| Ensure stack exhaust controls are operating as per manufacturers specifications. |

| Management measure |
| --- |
| Monitor stockpiles and storage bays to avoid spilling once at capacity. |
| Training provided to site personnel on appropriate air quality practices. |
| The extent of exposed surfaces and stockpiles is to be kept to a minimum. Material in storage bays to be maintained within designated area. |
| Stockpiles are to be visually monitored and dampened with water as far as is practicable if dust emissions are visible. |
| RAP stockpiles will not exceed 10 m in height. |
| Reduce drop heights from loading and handling equipment where practical. |
| Dampen material when excessively dusty during handling. |
| Spills on trafficked areas to be cleaned immediately. |
| Driveways and hardstand areas to be swept/cleaned regularly as required. A road sweeper will be regularly deployed to the operational site to sweep/clean internal roads periodically to prevent any tracking of fine debris. |
| Vehicle traffic is to be restricted to designated routes. |
| Co-ordinate the delivery schedule to avoid a queue of incoming or outgoing trucks that will be idling for extended periods of time. |
| Speed limits are to be enforced. |
| Vehicle loads are to be covered when travelling off-site. |
| **Hazardous substance management** |
| The site's existing PIRMP will be updated to reflect the project and manage potential chemical or hydrocarbon spills. The PIRMP will incorporate the following mitigation measures:<br>▪ Hazardous substance storage facilities will meet the bunding and separation distance requirements set out in AS 1940 (storage and handling of flammable and combustible liquids) and AS 3780 (storage and handling of corrosive substances).<br>▪ All personnel will complete awareness training that includes hazardous substance management, emergency response and the use of spill kits.<br>▪ Hazardous materials will be transported to and from the site by a licensed contractor and stored and handled in accordance with the requirements of relevant regulatory requirements, Australian Standards and the ADG Code.<br>▪ Vehicles and transport vessels used on-site are to be regularly inspected for leaks, spills or other damage.<br>▪ Storage and handling of any dangerous goods shall comply with Australian Standards, including but not limited to AS 1940 and AS 3780.<br>▪ Appropriately sized and stocked spill response kits will be provided within strategic areas of the site, and within mobile vehicles used to transport hazardous materials at the site.<br>▪ Spill response kits will be maintained, clearly identified and readily accessible on site for use in case of accidental spills. Key staff will be skilled in their location as well as usage, application and disposal of contaminated material.<br>▪ During construction, all hazardous substances will be stored in appropriate containers in bunded areas within mobile vehicles, or designated storage areas to minimise the risk of spillages and mobilisation of any pollutants into the soil or stormwater drains.<br>▪ Refuelling, fuel decanting and vehicle maintenance will occur in a designated area away from stormwater drains with spill response kits immediately available.<br>▪ Equipment will not be used if there are any signs of fuel, oil or hydraulic leaks. Leaks will be repaired immediately, or the equipment will be removed from site and replaced with a leak-free item.<br>▪ Any chemicals and fuels will be stored, labelled, transported and used in accordance with Australian Standards and in line with best practices. All hazardous substances or chemicals imported to site shall be accompanied by a safety data sheet.<br>▪ A database will be maintained to assist in the recording and management of any chemicals and hazardous substances stored at the site.<br>▪ Any fuels spillage will be collected, and the contaminated material disposed of at a licensed waste management facility.<br>▪ Emergency procedures will be prepared and implemented for dealing with spillage of hazardous substances and dangerous goods.<br>▪ Any contaminated soil resulting from spills would be excavated, classified in accordance with the NSW Waste Classification Guidelines (EPA, 2014), and disposed to a licensed waste management facility, or, remediated on site in accordance with recommendations provided within a contaminated land management action plan developed by a contaminated land specialist. |
| **Bushfire management** |

| Management measure |
| --- |
| Fire extinguishers will be provided in the office and operational areas of the site. |
| A water cart and front-end loader will be available for firefighting as required. |
| Internal roads at the site will be maintained for operational and firefighting purposes. |
| All employees will be trained through the induction process to be vigilant with regard to fire prevention, emergency procedures and reporting of fires to the RFS. |
| A Bushfire Emergency Management and Evacuation Plan will be prepared for the site. |
| Vegetation clearance distances to any overhead powerline are to comply with ISSC 3 Guideline for Managing Vegetation Near Power Lines (Industry Safety Steering Committee 2005). |
| Any gas services are to be installed and maintained in accordance with AS/NZS 1596-2014 The storage and handling of LP gas. |
| Fulton Hogan will continue to work with the RFS and respective land authorities to co-ordinate any scheduled burn off events, and monitor and report any fires, suspicious behaviour or hazardous fuel loads within proximity to the site boundary. |
| **Worker safety** |
| Designated first aid and emergency response equipment will be available during construction and operation of the project. Appropriately trained personnel will be on site throughout the life of the operations to provide first aid and respond to site emergencies. |
| Any injuries incurred at the site will be reported and investigated in consultation with the NSW Resource Regulator and other relevant authorities. Any recommendations or findings of investigation reports will be implemented by Fulton Hogan where feasible and practical. |
| **Waste management** |
| Waste will be managed in accordance with the WARR Act by adopting the resource management hierarchy (in order of priority) of avoidance, re-use, recycling / re-processing / treatment and disposal. |
| Environmental management plans will be implemented for construction and operation of the project, which will include measures for:<br>▪ Quantification and classification of materials that will be required to be removed from the site.<br>▪ Disposal/reuse strategies for each type of material.<br>▪ Details of how waste will be stored and treated on site.<br>▪ Identification of non-recyclable waste.<br>▪ Identification of strategies to reduce, reuse and recycle.<br>▪ Procedures and disposal arrangements for potentially hazardous material. |
| The environmental management plans will include, or be updated to include the following:<br>▪ All waste generated by the project will be managed in accordance with the Waste Classification Guidelines and relevant regulatory requirements. This will include (i) its classification prior to leaving the site and (ii) recording (via an appropriate waste tracking system) its legal off-site transportation for re-use, recycling or disposal.<br>▪ Any waste generated would be stored in a suitable container, with a lid (where appropriate), and transported from the site to an appropriately licensed facility. A sufficient number of suitable receptacles for general waste, and recyclable materials would be provided for waste disposal at the site to allow separation of wastes.<br>▪ All wastes will be securely stored to ensure that any pollutants are prevented from escaping.<br>▪ Any fuel, lubricant or hydraulic fluid spillages would be collected using absorbent material and the contaminated material disposed of appropriately at a licensed waste facility.<br>▪ All hazardous or contaminated wastes on site (if identified) will be removed and disposed in accordance with the State and national regulations and guidelines and best practice for the removal of these materials. Hazardous materials will only be removed by suitably qualified, licensed and experienced contractors.<br>▪ Documents and records of the transport and fates of all materials removed from the site would be kept as proof of correct disposal and for environmental auditing purposes.<br>▪ Waste streams will be sorted to maximise the reuse/recycling potential and minimise disposal costs.<br>▪ Materials would be re-used or recycled wherever possible. Details relating to the recycling of materials at appropriately licensed recycling facilities would be provided.<br>▪ Waste would be covered stored and removed in a timely manner so as not to attract native animals or vermin.<br>▪ All waste material handling, transport and disposal will be in accordance with the requirements of the POEO Act, WARR Act and relevant EPA or SafeWork NSW Guidelines. |
| Fulton Hogan will weigh every load of waste on receival and dispatch and keep the following records of the material received on site:<br>▪ Weight.<br>▪ Description. |

| Management measure |
| --- |
| ▪ Origin.<br>▪ Licence plate of truck.<br>These records will be used to meet all reporting obligations under the respective EPL and waste levy requirements. |
| A procedure will be included in the updated OEMP to minimise the potential for receiving/processing coal tar in RAP, including documentation of compliance records. The procedure to be implemented at the site is summarised below:<br>▪ Sites likely to contain coal tar are cored and tested for the presence of coal tar. This is usually in inner city areas and the councils concerned indicate the streets that are likely to contain tar. Asphalt millings containing coal tar are directed to appropriately licensed tip sites.<br>▪ The laboratory undertakes coring and a contracted laboratory does the coal tar testing.<br>▪ During milling the presence of coal tar can usually be detected by smell and appropriate measures are to be put in place to ensure that the asphalt millings containing the coal tar are sent to an appropriately licensed disposal site.<br>▪ Asphalt millings containing coal tar are not to be included in processed RAP. |
| The current RAP work instruction for existing RAP operations will be amended as required to reflect the project and include any additional procedures/controls for dealing with non-conforming waste. |
| The following measures will be implemented if there is potential for waste to accumulate on-site during a breakdown of RAP processing and asphalt manufacturing equipment:<br>▪ RAP –<br>- Diversion of RAP to other facilities for the duration of the stoppage if the stoppage is likely to result in incoming RAP exceeding licensed storage capacity.<br>- Use of alternative granulating and screening equipment if repairs are long term or equipment is unable to be repaired (equipment is mobile and easily replaced).<br>▪ Asphalt –<br>- Temporary stoppage of importation of asphalt additives (e.g. steel furnace slag, crumbed rubber etc.) if the breakdown is likely to result in incoming additives exceeding licensed storage capacity |
| Fulton Hogan will only accept steel furnace slag from a supplier that provides the following as required under the steel furnace slag order 2019:<br>▪ A written statement of compliance certifying that all the requirements set out in this order have been met.<br>▪ A copy of the steel furnace slag exemption, or a link to the EPA website where the steel furnace slag exemption can be found.<br>▪ A copy of the steel furnace slag order, or a link to the EPA website where the steel furnace slag order can be found. |
| Fulton Hogan will keep a written record of the following for a period of six years:<br>▪ The quantity of any steel furnace slag and blended steel furnace slag received.<br>▪ The name and address of the supplier of any steel furnace slag and blended steel furnace slag received. |
| **Biodiversity** |
| The following mitigation and management measures are recommended for inclusion in a CEMP and updated OEMP to reduce the impact on biodiversity values during construction of the project:<br>▪ A suitably qualified and experience ecologist will advise on the implementation of the mitigation measures during construction and operation of the project.<br>▪ Permanent signage will be erected where the site abuts retained vegetation areas to warn personnel of the potential impacts on threatened species including the Wallum Froglet, Charmhaven apple and *Corunastylis sp. Charmhaven* for accidental chemical spill down the slope into the retention basins and surrounding bushland. Signs will state: 1. “Do not enter. Beware of threatened orchids and frogs in this area” and 2. “Refuelling of machinery is restricted to bunded appropriate areas”. This will ensure that operators and construction personnel are aware of the potential impact risk.<br>▪ If native fauna are encountered while construction is occurring, work should cease until the animal moves out of the impact area. Injured fauna should be taken to the nearest veterinary clinic for assessment. If relocation is required, employ appropriate expert assistance (e.g. WIRES, ecologists etc.).<br>▪ If any threatened species (flora or fauna) is discovered during the works, all work would stop immediately and a qualified ecologist would be notified. Work would only recommence once the impact on the species has been assessed by a qualified ecologist, appropriate control measures provided and any required additional assessments or approvals are obtained.<br>▪ Avoid distributing weeds on and off site by implementing suitable vehicle and equipment controls, for example checking vehicles prior to leaving the work area to remove soil and any plant matter including seeds. |

| Management measure |
| --- |
| ▪ All weeds, propagules, other plant parts and excavated topsoil material that is likely to be infested with weed propagules that could regenerate will be removed from site and disposed of at a licensed waste disposal facility.<br>▪ Cover all vehicles transporting waste containing weeds and seeds for disposal.<br>▪ Where dust is washed off handstand, plant or machinery, this dust will not be permitted to run-off into the surrounding catchment. Appropriated sediment controls will be maintained to capture sediment.<br>▪ Refuelling of machinery is restricted to bunded hardstand surfaces only. Chemical spill kits will be available at all times in case of an accidental chemical spill during the construction and operation of the asphalt plant.<br>▪ Any stormwater generated will be diverted into the existing stormwater detention basins.<br>▪ As per the Conservation Plan of Management (Firebird ecoSultants, 2018) the existing asphalt plant was designed due to the discovery of a large population of *Corunastylis sp. Charmhaven* by Advitech (2017). Firebird ecoSultants (2018) indicated that 80 orchids recorded on the property would be retained within a conservation area, with a minimum 20 m buffer between the retained orchids and the development area. The asphalt plant must maintain the 20 m buffer between the conservation area and the development.<br>▪ It is recommended that the three-year monitoring and reporting program that was outlined in the Plan of Management for the conservation area be re-commenced following approval of the project. The existing vegetation management plan will be updated. At a minimum, monitoring must take place bi-annually for *Corunastylis sp. Charmhaven* and Charmhaven apple via targeted surveys. A monitoring report will be prepared and submitted to Council. The monitoring will be undertaken in December and in February to cover the flowering period of the different species.<br>▪ No hot works are to be conducted during Total Fire Bans unless necessary approvals have been obtained.<br>▪ Minimise disturbance to existing landscaping and retain groundcover vegetation as far as practicable.<br>▪ Avoid leaving excavations open overnight. Carefully remove any fauna that may have fallen into excavations.<br>▪ Ensure good site housekeeping to prevent pest animals.<br>▪ Wastewater will be directed into the proposed Wisconsin mound system and maintained in accordance with relevant standards and requirements.<br>▪ Implement dust suppression as required.<br>▪ All storage, stockpile and laydown sites will be established away from any native vegetation that is planned to be retained. Stockpile will be avoided under the 'drip zone' of a tree. Fulton Hogan will avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site.<br>▪ Stockpiles will be located outside of flow paths that may impact the water quality of the nearby habitat for the Wallum Froglet. It is also recommended to minimise stockpile storage time where practicable. |
| **Land contamination** |
| Personnel will regularly check and maintain machinery to minimise the risk of oil leaks. |
| If contamination is identified or suspected during construction of the project, all work in the vicinity of the find shall cease and the area isolated appropriately. A specialist consultant experienced in the identification, sampling and testing of contamination will be engaged to undertake an assessment of site conditions prior to re-commencement of earthworks. The consultant should:<br>▪ Sample and analyse soil to determine the potential existence of contaminants. Analysis must be undertaken by a NATA accredited laboratory.<br>▪ Sample, analyse and determine classification of material to be excavated for disposal and/or confirm for re-use as backfill.<br>▪ Report and provide advice on management options, re-use onsite and disposal criteria. |
| **Water quality** |
| The following measures will be implemented during construction of the project to minimise the potential for erosion and sedimentation and subsequent water quality impacts:<br>▪ Appropriate erosion and sediment controls to be implemented prior to soil disturbance.<br>▪ Manage stormwater to avoid flow over exposed soils which may result in erosion and impacts to water quality.<br>▪ Locate stockpiles outside of flow paths.<br>▪ Inspect all permanent and temporary erosion and sedimentation control works prior to and post rainfall events.<br>▪ At the end of each working day inspect site access locations for mud tracking on public roadways. Roadways are to be swept if mud or debris from the site is visibly evident on the road.<br>▪ Minimise stockpile storage time where practicable. Avoid excessive storage of spoil by regularly removing from site using a registered contractor and disposing of to an appropriate facility. |
| **Heritage** |

| Management measure |
| --- |
| The following measures will be implemented during construction in the event that previously undiscovered items of potential Aboriginal or non-Aborigjnal significance are identified or suspected:<br>▪ Cease work in the immediate area of the identified potential Aboriginal object or archaeological find.<br>▪ Secure the area and ensure the site is safe.<br>▪ Provide temporary exclusion (pedestrian) fencing.<br>▪ Appropriate advice will be sought from a qualified archaeologist (and in consultation with Heritage NSW and the Local Aboriginal Land Council where appropriate).<br>▪ Implement additional mitigation measures or controls as required.<br>▪ Work in the affected area shall not recommence until permission is granted by Heritage NSW to proceed. |
| Should human remains or suspected Aboriginal skeletal material be identified, the above unexpected finds procedure will be followed. The NSW Police and Heritage NSW will be contacted immediately. Should the burial prove to be archaeological, consultation will be undertaken with a heritage professional, relevant Aboriginal parties and DPE. No further works will occur in the area until authorised in writing by Heritage NSW. |

## 13.3 Environmental reporting

Environmental reporting will be required in accordance with the varied/new EPL and/or conditions of consent of the development application.

## 13.4 Environmental management plans

### 13.4.1 Construction environmental management plan

A CEMP will be prepared for the project and contain the site-specific management and mitigation measures identified in Table 13.2 to be implemented during construction, including timeframes and responsibilities. It will provide a framework for the management of potential construction impacts identified in this EIS.

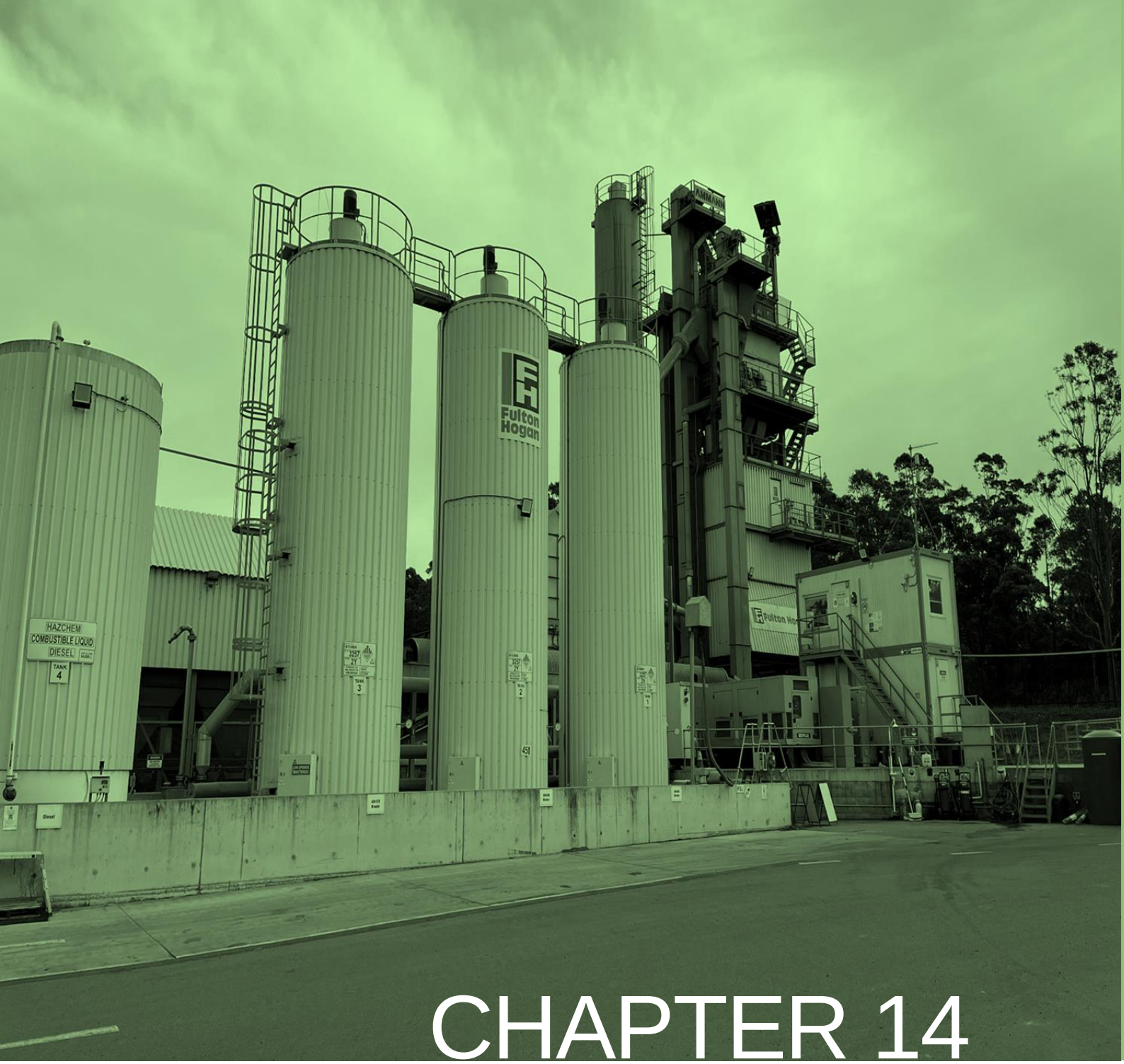
The CEMP will include procedures for the management of specific environmental aspects and mitigation of impacts, and specific monitoring and construction rehabilitation measures.

The CEMP will also contain provisions for site-specific training and induction of construction personnel so that they are made aware of the requirements in the CEMP that are relevant to their respective work activities.

### 13.4.2 Operational environmental management plan

Environmental aspects of the project will be managed in accordance with Fulton Hogan's existing OEMP for the site, which will be updated following approval of the project to:

- Be consistent with the relevant conditions of development consent and statutory obligations.
- Contain the impact-specific management measures identified in Table 13.2 to be implemented during operations, including timeframes and responsibilities.
- Describe the processes and procedures for the management of specific environmental aspects and mitigation of impacts, as well as any specific monitoring measures.
- Contain provisions for site-specific training and induction of employees and relevant contractors so that they are made aware of the applicable requirements to their respective work activities.




# CHAPTER 14

## JUSTIFICATION FOR THE PROJECT

# 14 JUSTIFICATION FOR THE PROJECT

Fulton Hogan owns and operates an asphalt plant at 203 Tooheys Road, Bushells Ridge, NSW which:

- Produces up to 100,000 tpa of asphalt.
- Processes 20,000 tpa of RAP.

Fulton Hogan propose to:

- Increase production to a maximum of 400,000 tpa.
- Increase the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the site.

The project is wholly located on land zoned E4 – General Industry under the Central Coast LEP. The project is permissible in this zone with consent. The Hunter and Central Coast Regional Planning Panel is the determining authority and the development application must be accompanied by an EIS.

The growth of development in the Central Coast and Hunter region is driven by the Central Coast Regional Plan 2036 (NSW Department of Planning and Environment, 2016) and the Hunter Regional Plan 2036 (NSW Department of Planning and Environment, 2016a). Major infrastructure projects in the Hunter and Central Coast regions driven by these planning policies will be reliant on asphalt, such as that produced at the site.

Asphalt products sought by many major infrastructure projects in NSW are also subject to strict design specifications. Asphalt produced at the site is able to meet these design specifications and is close to a number of the planned major development projects.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to, or development of other potentially more environmentally sensitive locations will be avoided.

The project will ensure the optimal utilisation of an existing industrial development and assist with the supply of essential asphalt to major infrastructure and associated development projects, thereby benefiting the NSW and Australian economies.

It is considered that the project will not result in any significant environmental and social impacts, avoids impacts where feasible, whilst providing Fulton Hogan with flexibility to operate the project effectively and allow the production of asphalt to be commercially viable over the long term.

The project is consistent with the principles of ESD. The assessment has been consistent with the precautionary principle with baseline site and regional environmental data used in predictions of the project's potential impacts. Mitigation and management measures have been proposed where negative impact to the environment is likely to be unavoidable.

The project is consistent with the principle of inter-generation equity as the project will not have significant impacts on surface and groundwater availability or quality, air quality or agricultural land. Therefore, the project will not detract from future generation's access to and equal enjoyment of water, air and agricultural resources.

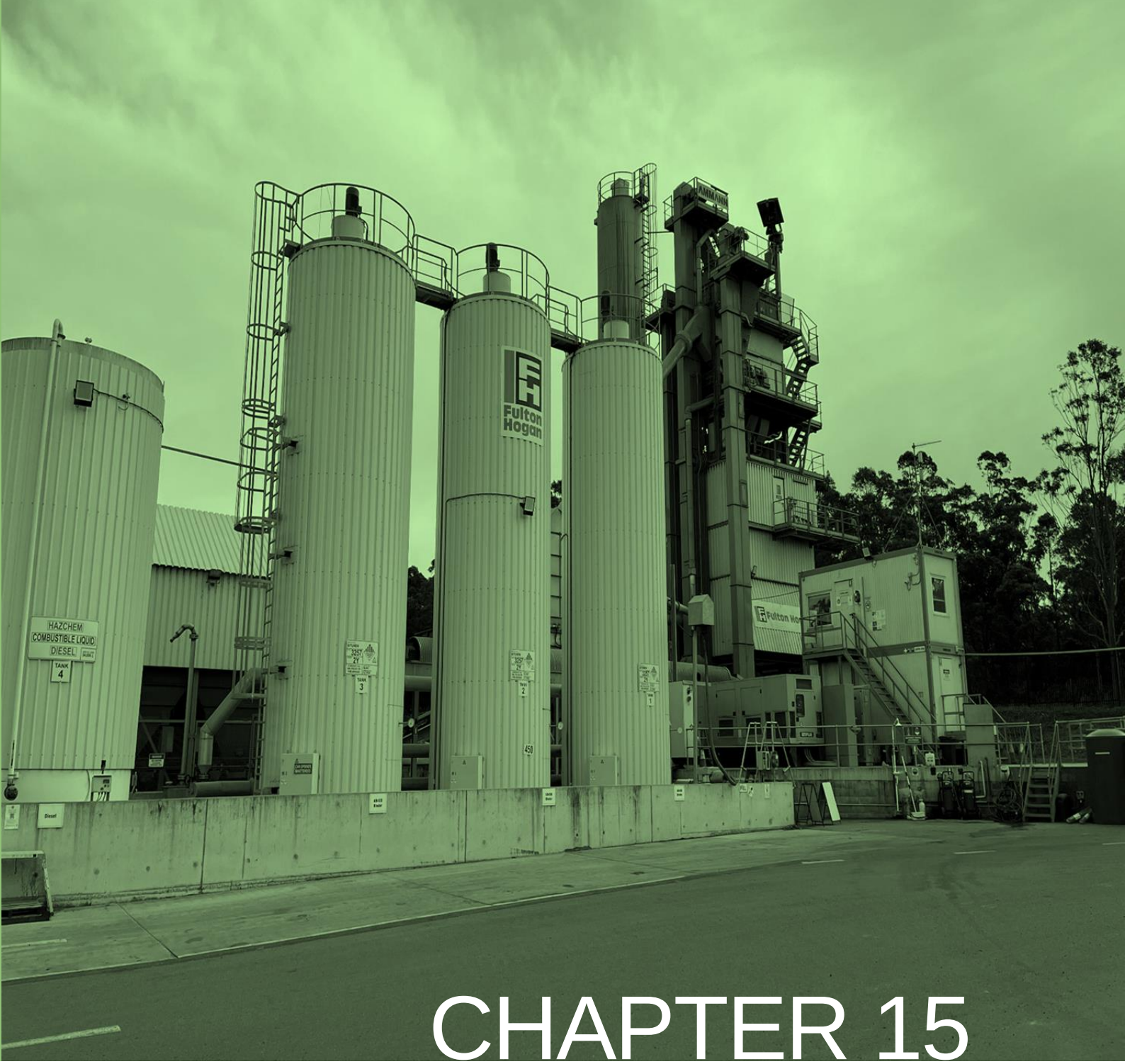
The project is similarly consistent with the principle of conservation of biological diversity and ecological integrity. The project has been designed to confine operations to previously disturbed areas, thereby avoiding the disturbance of additional remnant vegetation surrounding the site. As such, the design is the most effective way to maintain biological diversity and ecological integrity

at the site and surrounding locality, with alternatives considered to result in more severe biodiversity impact.

Local/State government stakeholders and surrounding landholders were consulted during preparation of the EIS. Consistent themes in the consultation were potential impacts of heavy vehicle traffic on the local road network and amenity impacts on nearby residential receivers.

The impact assessments determined the project is unlikely to have significant residual impacts provided the implementation of recommended mitigation and management measures.

On balance, given the need for the project, lack of alternatives, suitability of the site, consistency with plans and policies, minor environmental impacts (subject to recommended mitigation and management measures) and economic benefit of the project, it is clear the project is in the public interest and its approval is likely to benefit the state of NSW.




# CHAPTER 15

## REFERENCES

# 15 REFERENCES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# APPENDIX A

## SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Department of Planning and Environment

31 August 2022

Mr Andrew Lyndon
Fulton Hogan Industries Pty Ltd
PO Box 682
Campbelltown NSW 2560

EF22/10652
SEAR 1714

Dear Mr Lyndon

**Bitumen Pre-Mix and Hot-Mix – Asphalt Plant expansion**
**203 Tooheys Road, Bushells Ridge (Lot 10 DP 834953)**
**Planning Secretary's Environmental Assessment Requirements (SEAR) 1714**

Thank you for your request for the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above development proposal. I have attached a copy of these requirements.

In support of your application, you indicated that your proposal is both designated and integrated development under Part 4 of the *Environmental Planning and Assessment Act 1979* and requires an approval under the *Protection of the Environment Operations Act 1997* and the *Road Act 1993*. In preparing the SEARs, the Department of Planning and Environment (the Department) has consulted with the Environment Protection Authority and Crown Lands. A copy of their requirements is attached.

The Department has also consulted with the Transport for NSW as required by Schedule 3 of Chapter 2 of State Environmental Planning Policy (Transport and Infrastructure) 2021. A copy of their requirements is attached.

The Department has also consulted with the Biodiversity and Conservation Division. A copy of their additional requirements for the EIS are attached.

If other integrated approvals are identified before the Development Application (DA) is lodged, you must undertake direct consultation with the relevant agencies, and address their requirements in the EIS.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will require an additional approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Commonwealth Department of Agriculture, Water and the Environment on (02) 6274 1111.

Should you have any further enquiries, please contact Zoe Halpin, Planning and Assessment, at the Department on (02) 9995 6430 or via email at zoe.halpin@planning.nsw.gov.au.

Yours sincerely

Chris Ritchie
**Director**
**Industry Assessments**
*as delegate of the Planning Secretary*

# Planning Secretary's Environmental Assessment Requirements

**Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*.**
**Schedule 3 of the Environmental Planning and Assessment Regulation 2021.**

**Designated Development**

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| **SEAR Number** | 1714 |
| **Proposal** | The expansion of an existing asphalt plant to process up to 300,000 tonnes per annum of asphalt, and process up to 75,000 tonnes per annum of reclaimed asphalt pavement (RAP) |
| **Location** | 203 Tooheys Road, Bushells Ridge (Lot 10 DP 834953) in the Central Coast local government area. |
| **Applicant** | Fulton Hogan Industries Pty Ltd |
| **Date of Issue** | 31 August 2022 |
| **General Requirements** | The Environmental Impact Statement (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021. |
| **Key Issues** | The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed:<br>• **strategic and statutory context** – including:<br>– a detailed justification for the proposal and suitability of the site for the development<br>– a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies<br>– a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out.<br>– a description of how the proposed expansion integrates with existing on-site operations<br>– a description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development.<br>• **suitability of the site** – including:<br>– a detailed justification that the site can accommodate the proposed processing capacity, having regard to the scope of the operations and its environmental impacts and relevant mitigation measures<br>– plans depicting the proposed layout, including the location of machinery and equipment.<br>• **waste management** – including:<br>– details of the type, quantity and classification of waste to be received at the site<br>– details of the resource outputs and any additional processes for residual waste<br>– details of waste handling including, transport, identification, receipt, stockpiling and quality control |

- the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Sustainable Materials Strategy 2041*.

- **hazards and risk** – including:
  - A preliminary risk screening completed in accordance with Chapter 3 of SEPP (Resilience and Hazards) 2021 and 'Applying SEPP 33' with clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should the preliminary screening indicate that the development is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' and Multi-Level Risk Assessment
  - verification that all combustible or potentially combustible materials such as bitumen will not be heated beyond their flash points during normal and abnormal operations within the development
- **fire and incident management** – including:
  - an assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines
  - technical information on the environmental protection equipment to be installed on the premises such as air, water and noise controls, spill clean-up equipment, fire management (including the location of fire hydrants and water flow rates at the hydrants) and containment measures
  - details of the size and volume of stockpiles and their arrangements to minimise fire spread and facilitate emergency vehicle access
  - the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the NSW Fire and Rescue guideline *Fire Safety in Waste Facilities* dated 27 February 2020
- **air quality** – including:
  - a description of all potential sources of air and odour emissions during construction and operation
  - an air quality impact assessment in accordance with relevant Environment Protection Authority guidelines
  - a description and appraisal of air quality impact mitigation and monitoring measures.
- **noise and vibration** – including:
  - a description of all potential noise and vibration sources during construction and operation, including road traffic noise
  - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines
  - a description and appraisal of noise and vibration mitigation and monitoring measures.
- **soil and water** – including:
  - a description of local soils, topography, drainage and landscapes
  - details of water usage for the proposal including existing and proposed water licencing requirements in accordance with the *Water Act 1912* and/or the *Water Management Act 2000*
  - an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment
  - details of sediment and erosion controls
  - a detailed site water balance
  - a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo
  - an assessment of potential impacts on the quality and quantity of surface and groundwater resources
  - details of the proposed stormwater and wastewater management systems

| | |
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| | (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts<br>– characterisation of the nature and extent of any contamination on the site and surrounding area<br>– a description and appraisal of impact mitigation and monitoring measures.<br>• **traffic and transport** – including:<br>– details of road transport routes and access to the site<br>– road traffic predictions for the development during construction and operation<br>– swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site<br>– an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development.<br>• **biodiversity** – including:<br>– accurate predictions of any vegetation clearing on site or for any road upgrades<br>– a detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements<br>– details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies<br>– a detailed description of the measures to avoid, minimise, mitigate and/or offset biodiversity impacts.<br>• **visual** – including an impact assessment at private receptors and public vantage points.<br>• **heritage** – including Aboriginal and non-Aboriginal cultural heritage. |
| **Environmental Planning Instruments and other policies** | The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to:<br>• State Environmental Planning Policy (Transport and Infrastructure) 2021<br>• State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapters 2 and 4)<br>• State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4)<br>• Central Coast Local Environmental Plan 2022<br>• relevant development control plans and section 7.11 plans. |
| **Guidelines** | During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Industries. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development. |
| **Consultation** | During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the:<br>• Department of Planning and Environment, specifically the:<br>○ Environment and Heritage Group (formerly Environment, Energy and Science Group)<br>○ Environment Protection Authority<br>○ Crown Lands Division<br>• Transport for NSW<br>• Fire & Rescue NSW<br>• WaterNSW<br>• Darkinjung Local Aboriginal Land Council<br>• Central Coast Council<br>• the surrounding landowners and occupiers that are likely to be impacted by the proposal. |

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| | Details of the consultation carried out and issues raised must be included in the EIS. |
| **Further consultation after 2 years** | If you do not lodge an application under Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* within 2 years of the issue date of these SEARs, you must consult with the Planning Secretary in relation to any further requirements for lodgement. |

8/08/2022

Record Number: 22/00069#97

Planning Number: SEAR 1714

**Asphalt Plant Expansion – 203 Tooheys Road, Bushells Ridge (Lot 10 DP 834953) – SEAR 1714**

The Department of Planning and Environment – Crown Lands (the Department) has reviewed the proposal and objects to the proposed development on the basis that section 2.1.6 of the *Scoping Report* identifies the use of a Crown road, being Tooheys Road, to access the proposed development site.

The Department notes the site has been the subject of several development consents as outlined in section 3.1.8 of the *Scoping Report*. Crown roads are considered appropriate for transfer to council if development consent has been granted by a council that requires a Crown road to service a development that increases traffic on the road. More information regarding Crown roads can be found at the following link: https://www.industry.nsw.gov.au/lands/access/roads

Previous correspondence from the Department to Central Coast Council (Council) on 27 February 2017 in relation to the proposed development site identified the need to transfer the affected part of Tooheys Road adjoining Lot 10 DP 834953 to Council (see Attachment 1). The Department is concerned that transfer of the road to Council has not been progressed to date and that failure to transfer the road may become a limiting factor for the proposed development.

The Department notes a development application is yet to be submitted. The Department formally advises an objection will be lodged to any development application if the section of Tooheys Road directly adjacent to and impacted by the development, is not transferred to Council's control. An objection will not be lodged if the transfer of the impacted sections of Tooheys Road is completed before submission of the development application.

If the proponent requires further information, or has any questions, please contact Peter Draper, Natural Resource Management Project Officer on 4937 9311 or at peter.draper@crownland.nsw.gov.au

Yours sincerely

Brian Jones
**Group Leader – Property Management, Hunter**

PO Box 2185 Dangar NSW 2309
LAM.projects@crownland.nsw.gov.au ABN: 20 770 707 468

NSW GOVERNMENT | Department of Industry Lands

**Our Reference:** 16/07918

Tracey Sharp
Central Coast Council (Wyong Office)
PO Box 20
WYONG NSW 2259

Dear Ms Sharp,

**DA-1511/2016 – Asphalt Plant – 203 Tooheys Road, Bushells Ridge**

I refer to Council's letter of 18 January 2017 providing the Department of Industry – Lands (the Department) with the opportunity to comment on the subject proposal. The Department has reviewed the proposal and provides the following comments:

1. An upgrade to a Crown road, being part Tooheys Road adjoining Lot 10 DP 834953, is required as part of the proposal. Development requiring an approval under the *Environmental Planning and Assessment Act 1979* requires the written consent from the Department, as landowner, to lodge the application with Council. The Department has not issued landowners consent for this proposal. The proponent must therefore seek landowners consent from the Department (on behalf of the Minister) before this application can be determined.
2. Notwithstanding the above advice, proposed works on a Crown road must be approved by the Department under s.138 of the *Roads Act 1993* on behalf of the Minister for Lands as the Roads Authority. This development application should be regarded as an 'integrated development' under the *Environmental Planning & Assessment Act 1979*.
3. Further, the proposal involves major works on a Crown road. The development will also result in increased usage of the road. The Department's role as a Roads Authority is limited to the administration of 'paper' roads. The Department is not resourced to undertake road construction and maintenance works nor does it prefer to provide an approval under the *Roads Act 1993* for such works. As the Crown road forms an integral part of the proposal, the Department would support either:
    a. Road closure and acquisition by the proponent where there is no longer a need for the road to be part of the public road network; or
    b. Transfer of the affected part of Tooheys Road to Central Coast Council if the road is required to remain open as a public road.
4. However, the Department advises that it is already in receipt of a road closure application for Tooheys Road, that includes the section adjoining Lot 10 DP 834953. This closure request is associated with a proposed state significant development for a coal mine. The applicant should contact Josephine O'Connell on 02 4920 5035 to discuss the implications of the closure application citing ref W562973.

If you wish to discuss this matter further please contact Mark Grace direct on (02) 4937 9331 or email mark.grace@crownland.nsw.gov.au

Yours sincerely

Tim Deverell
**Area Manager, Hunter**
27 February 2017

Transport for NSW

9 August 2022

File No: NTH22/00482/01
Your Ref: SEAR 1714

Department of Planning & Environment
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

**Attention: Zoe Halpin**

**SEARS: 1714**
**SEARS ADVICE – ASPHALT PLANT EXPANSION, 203 TOOHEYS ROAD, BUSHELLS RIDGE (LOT: 10 DP: 834954)**

I refer to the request by the Department of Planning and Environment (DPE) dated 236 July 2022 seeking input from Transport for NSW (TfNSW) to the Secretary's Environmental Assessment Requirements (SEARs) for the abovementioned development proposal.

TfNSW key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with the *Future Transport Strategy 2056*.

TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and Roads and Maritime Guide to Traffic Generating Developments.

The TIA should be tailored to the scope of the proposed development and include, but not be limited to, the following:

- A map of the surrounding road network identifying the site access, nearby accesses, intersections, relevant traffic route/s and connections to the classified (State) road network.

- Assessment of all relevant vehicular traffic routes and intersections to / from the subject properties.

- Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network.

- The anticipated additional vehicular traffic generated from construction, operational and decommissioning stages of the project.

- The distribution on the road network of the trips generated by the project. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.

- Detailed assessment of all vehicular transport routes, relevant intersections and connections to the classified (State) road network for access to / from the proposed development site/s (including any ancillary sites).

- Assessment of Over Size Over Mass (OSOM) and heavy vehicle routes for all components associated with the asphalt plant, including swept path analysis for the largest design vehicle/s accessing the site, and turning, at relevant intersections along the classified (State) road network.

- Consideration of the traffic impacts on existing and proposed intersections, including access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during construction, operational and decommissioning stages.

- Vehicle types to be considered:
  - Commuter (employee and contractor) light vehicles and pool vehicles,
  - Heavy vehicles,
  - Over size and over mass (OSOM) vehicles.

- Consideration of cumulative impacts to identify and assess the implications of any projects that will potentially be occurring simultaneously with the scheduling of any OSOM movements along the proposed OSOM routes.
  The assessment should consider the following:
  - The cumulative impacts from traffic generated from the construction workforces in terms of the routes, access, AM/PM peaks where there is overlap with other projects.
  - The cumulative impacts of heavy vehicle movements in terms of AM/PM peaks and routes where there is an overlap with other projects.
  - Cumulative impacts and consideration in relation to the timing of movements of OSOMs where other projects will be utilising the same routes as proposed for this development.
  - Any potential for future expansion of the subject development and the potential impacts any such expansion would have on the development, the broader road network and the AM/PM peaks. It should be noted, any future expansion beyond the scope of the subject application, will require additional applications and approvals.
  - Strategies to manage the risk of damage to public road assets where accelerated deterioration of the road pavement occurs during construction and/or operation.

- An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for each relevant intersection along the identified transport route/s, including connections to the classified (State) road network.

- Identify the necessary road network infrastructure upgrades that are required to cater for, and mitigate, the impact of project related traffic on both the local and classified road network for the development (for instance, road widening and/or intersection treatments).

  Strategic (2D) design drawings for any proposed road upgrades and the site access should be prepared to support the TIA and demonstrate the scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure.
  All proposed works must be:
  - Designed in accordance with Austroads Guidelines, Australian Standards and TfNSW Supplements
  - Appropriately designed for the existing posted speed limit.
  - To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.
  - To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.
  - Submitted with the EIS and TIA.

  For any roadwork deemed necessary on the classified (State) road, the developer will be required to enter into a Works Authorisation Deed (WAD) or other suitable agreement as required by TfNSW. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website.

- Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:
  - Current traffic counts and 10 year traffic growth projections
  - With and without development scenarios
  - 95th percentile back of queue lengths
  - Delays and level of service on all legs for the relevant intersections
  - Electronic data for TfNSW review.

- Relevant swept paths analysis for the largest design vehicle accessing the site.

- Impacts on public transport (public and school bus routes consideration for alternative transport modes such as walking and cycling or carpooling and shuttle buses during construction.

- Details of any Traffic Management Plan (TMP) proposed to address the construction, operation and decommissioning phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017.

  It is recommended that any TMP include, but not necessarily limited to, the following;
  - A map of the primary transport route/s highlighting critical locations.
  - An induction process for vehicle operators and regular toolbox meetings.
  - Procedures for travel through residential areas, school zones and/or bus route/s.
  - any proposed temporary measures such a Traffic Guidance Scheme (TGS)
  - A Driver Code of Conduct for heavy vehicle operators.
  - A complaint resolution and disciplinary procedure.
  - Community consultation measures proposed for peak periods.
  - Work, health and safety requirements under the Work Health and Safety Regulation 2017.

- A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.

- Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.

Should you require further information please contact Court Walsh, Development Services Case Officer, on 1300 207 783 or 0488 631 890 or by emailing development.north@transport.nsw.gov.au.

Yours sincerely

K. Leonard

**Kate Leonard**
A/ Team Leader Development Services
North Region | Community & Place
Regional & Outer Metropolitan

Our ref: DOC22/642669-4

Ms Zoe Malpin
Planning Officer
Department of Planning and Environment
4 Paramatta Square
PARRAMATTA NSW 2150

By email: zoe.halpin@planning.nsw.gov.au

Dear Ms Malpin

**RE: Secretary's Environmental Assessment Requirements – Bushells Ridge Asphalt Plant (SEAR 1714)**

I refer to the Department of Planning and Environment's (DPE's) request on 26 July 2022 for the Environment Protection Authority's (EPA) Secretary's Environmental Assessment Requirements (SEARs) to assist with the preparation of an Environmental Assessment (EA) for the Bushells Ridge Asphalt Plant (SEAR 1714) - 203 Tooheys Road, BUSHELLS RIDGE NSW 2259.

The Proponent currently operates an asphalt plant, as approved under Development Consent (DA1511/2016) by Central Coast Council on 9 April 2018. The asphalt plant operates 24 hours per day, seven days per week, and produces up to 100,000 tonnes per annum (tpa) of asphalt and processes up to 20,000 tpa of reclaimed asphalt pavement (RAP). These works are undertaken in accordance with an Environment Protection Licence (EPL 21239) issued by the EPA.

Based on the information provided, the EPA understands that the Proponent is seeking to:

1. Increase output from 100,000 tpa to over 300,000 tpa; and
2. Increase processing of RAP from 20,000 tpa to 75,000 tpa.

By virtue of Part 3.2 of the *Protection of the Environment Operations Act 1997* (POEO Act), the Proponent holds an EPL for the current operations (EPL 21239) for waste processing (non-thermal treatment) and waste storage. The EPL prescribes limits on receival of RAP to 20,000 tpa, and 12,500 tonnes at any one time. If the development is approved, this EPL will need to be varied to account for an increase in receival and processing of RAP. There may also be considerations under the EPA's Waste Levy Framework as set out in the POEO (Waste) Regulation 2014.

In addition, as a requirement of an EPL, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or Plans in accordance with Section 153A of the POEO Act.

The EPA has considered the details of the proposal as provided by DPE and has identified the information it requires to issue its general terms of approval in **Attachment A**. In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. current land ownership details of nearby residential receptors potentially impacted by the proposal;
2. air quality impacts including particulates, gases, and odours;
3. noise impacts;
4. surface water and groundwater impacts; and
5. Waste, chemicals and hazardous materials.

In carrying out the assessment, the Proponent should refer to the relevant guidelines as listed in **Attachment B** and any relevant industry codes of practice and best practice management guidelines.

It is important that all assumptions and conclusions made in the EA are supported by adequate data. The Proponent should be made aware that any commitments made in the EA may be formalised as approval conditions and may also be placed as formal licence conditions.

If you have any further questions about this issue, please contact Dr Cameron Jennings, Senior Operations Officer, Regulatory Operations Metro - North, on (02) 4908 6828 or at Cameron.jennings@epa.nsw.gov.au.

Yours sincerely

8/8/2022

Maria Moreno
**A/ Unit Head**
**Regulatory Operations Metro – North**
**Environment Protection Authority**

# ATTACHMENT A:

# The EPA's Recommended Environmental Assessment Requirements – Bushells Ridge Asphalt Plant (SEAR 1714)

## A Executive summary

The document's executive summary should include a discussion of the proposed development, the key environmental risks, the identified mitigation measures, and an overall conclusion and justification for the proposal.

## B The proposal

### 1. Objectives of the proposal

- The objectives of the proposal should be clearly stated and refer to:
  a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced
  b) a life cycle approach to the production, use or disposal of products
  c) the anticipated level of performance in meeting required environmental standards and cleaner production principles
  d) the staging and timing of the proposal and any plans for future expansion
  e) the proposal's relationship to any other industry or facility.

### 2. Description of the proposal

#### *General*

- Outline the production process including:
  a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill etc)
  b) any life-cycle strategies for the products.
- Outline cleaner production actions, including (as appropriate):
  a) measures to minimise waste (typically through addressing source reduction)
  b) proposals for use or recycling of by-products
  c) proposed disposal methods for solid and liquid waste
  d) air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points
  e) water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge.
  f) soil contamination treatment and prevention systems.
- Outline construction works including:
  a) actions to address any existing soil contamination
  b) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site)
  c) construction timetable and staging; hours of construction; proposed construction methods

d) environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.

- Include a site diagram showing the site layout and location of environmental controls.

### *Air*

- Identify all sources or potential sources of air emissions from the development.
  *Note: emissions can be classed as either:*
  - *point (eg. emissions from stack or vent) or*
  - *fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).*
- Provide details of the project that are essential for predicting and assessing air impacts including:
  a) the quantities and physio-chemical parameters (e.g. concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored
  b) an outline of procedures for handling, transport, production and storage
  c) the management of solid, liquid and gaseous waste streams with potential to generate emissions to air.

### *Noise and vibration*

- Identify all noise sources or potential sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.
- Specify the times of operation for all phases of the development and for all noise producing activities.
- For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.

### *Water*

- Provide details of the project that are essential for predicting and assessing impacts to waters including:
  a) the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on http://www.environment.nsw.gov.au/ieo/index.htm, using technical criteria derived from *the Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, ANZECC 2000)
  b) the management of discharges with potential for water impacts
  c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.
- Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts e.g., effluent ponds) and showing potential areas of modification of contours, drainage etc.
- Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm

and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

### *Waste and chemicals*

Provide details of the quantity and type of both liquid waste and non-liquid waste generated, handled, processed or disposed of at the premises. Waste must be classified according to the EPA's *Waste Classification Guidelines 2014 (as amended from time to time)*

- Provide details of liquid waste and non-liquid waste management at the facility, including:
  a) the transportation, assessment and handling of waste arriving at or generated at the site
  b) any stockpiling of wastes or recovered materials at the site
  c) any waste processing related to the facility, including reuse, recycling, reprocessing (including composting) or treatment both on- and off-site
  d) the method for disposing of all wastes or recovered materials at the facility
  e) the emissions arising from the handling, storage, processing and reprocessing of waste at the facility
  f) the proposed controls for managing the environmental impacts of these activities.
- Provide details of spoil disposal with particular attention to:
  a) the quantity of spoil material likely to be generated
  b) proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil
  c) the need to maximise reuse of spoil material in the construction industry
  d) identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material
  e) designation of transportation routes for transport of spoil.
- Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes.
- Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.

- Reference should be made to the guidelines: EPA's *Waste Classification Guidelines 2014 (as amended from time to time)*

### *ESD*

- Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including:
  a) an assessment of a range of options available for use of the resource, including the benefits of each option to future generations

  proper valuation and pricing of environmental resources

  b) identification of who will bear the environmental costs of the proposal.

## 3. Rehabilitation

- Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).

## 4. Consideration of alternatives and justification for the proposal

- Consider the environmental consequences of adopting alternatives, including alternative:

a) sites and site layouts
b) access modes and routes
c) materials handling and production processes
d) waste and water management
e) impact mitigation measures
f) energy sources

- Selection of the preferred option should be justified in terms of:
  a) ability to satisfy the objectives of the proposal
  b) relative environmental and other costs of each alternative
  c) acceptability of environmental impacts and contribution to identified environmental objectives
  d) acceptability of any environmental risks or uncertainties
  e) reliability of proposed environmental impact mitigation measures
  f) efficient use (including maximising re-use) of land, raw materials, energy and other resources.

# C The location

## 1. General

- Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:
  a) meteorological data (e.g. rainfall, temperature and evaporation, wind speed and direction)
  b) topography (landform element, slope type, gradient and length)
  c) surrounding land uses (potential synergies and conflicts)
  d) geomorphology (rates of landform change and current erosion and deposition processes)
  e) soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils)
  f) ecological information (water system habitat, vegetation, fauna)
  g) availability of services and the accessibility of the site for passenger and freight transport.

## 2. Air

- Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models.
- Describe surrounding buildings that may affect plume dispersion.
- Provide and analyse site representative data on following meteorological parameters:
  a) temperature and humidity
  b) rainfall, evaporation and cloud cover
  c) wind speed and direction
  d) atmospheric stability class
  e) mixing height (the height that emissions will be ultimately mixed in the atmosphere)
  f) katabatic air drainage (if applicable)
  g) air re-circulation.

## 3. Noise and vibration

- Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically, the location of any noise sensitive locations in relation to the site should be included on a map of the locality.

- Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.

### 4. Water

- Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: http://www.environment.nsw.gov.au/ieo/index.htm should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.

### 5. Soil Contamination Issues

- Provide details of site history – if earthworks are proposed, this needs to be considered with regard to possible soil contamination, for example if the site was previously a landfill site or if irrigation of effluent has occurred.

## D Identification and prioritisation of issues / scoping of impact assessment

- Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account:
  a) relevant NSW government guidelines
  b) industry guidelines
  c) EISs for similar projects
  d) relevant research and reference material
  e) relevant preliminary studies or reports for the proposal
  f) consultation with stakeholders.
- Provide a summary of the outcomes of the process including:
  a) all issues identified including local, regional and global impacts (e.g. increased/ decreased greenhouse emissions)
  b) key issues which will require a full analysis (including comprehensive baseline assessment)
  c) issues not needing full analysis though they may be addressed in the mitigation strategy
  d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).

## E The environmental issues

### 1. General

- The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution.
- Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. This is in accordance with ESD requirements.

*Note: The level of detail should match the level of importance of the issue in decision making which is dependent on the environmental risk.*

### *Describe baseline conditions*

- Provide a description of existing environmental conditions for any potential impacts.

### *Assess impacts*

- For any potential impacts relevant for the assessment of the proposal provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.
- Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts.
- The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts eg. assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.
- The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant.
- The level of assessment should be commensurate with the risk to the environment.

### *Describe management and mitigation measures*

- Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.
- Proponents are expected to implement a 'reasonable level of performance' to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology-based criteria if available, or identify good practice for this type of activity or development. A 'reasonable level of performance' involves adopting and implementing technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.
- Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts.
- Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the EIS will be implemented. Areas that should be described include:

  a) operational procedures to manage environmental impacts
  b) monitoring procedures
  c) training programs
  d) community consultation
  e) complaint mechanisms including site contacts
  f) strategies to use monitoring information to improve performance
  g) strategies to achieve acceptable environmental impacts and to respond in event of exceedances.

## 4. Air

### *Describe baseline conditions*

- Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include the following parameters: Particulate matter (deposited dust, Total Suspected Particulates [TSP], $PM_{10}$ - particulate matter with an aerodynamic diameter up to 10 micrometres, and PM2.5 -particulate matter with an aerodynamic diameter up to 2.5 micrometres), odour, and relevant gases from fuel use and other relevant activities on-site.

### *Assess impacts*

- Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.
- Estimate the resulting ground level concentrations of all pollutants. Where necessary (eg. potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.
- Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.
- Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.
- For potentially odorous emissions provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.

  *Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.*
- Reference should be made to Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2016); Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007); Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); and Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006).

### *Describe management and mitigation measures*

- Outline specifications of pollution control equipment (including manufacturer's performance guarantees where available) and management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes.

## 5. Noise and vibration

### *Describe baseline conditions*

- Determine the existing background (LA90) and ambient (LAeq) noise levels, as relevant, in accordance with the *NSW Noise Policy for Industry*.
- Determine the existing road traffic noise levels in accordance with the *NSW Road Noise Policy*, where road traffic noise impacts may occur.
- The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:

  a) details of equipment used for the measurements

  b) a brief description of where the equipment was positioned

c) a statement justifying the choice of monitoring site(s), including the procedure used to choose the site(s), having regards to Fact Sheets A and B of the *NSW Noise Policy for Industry.*

d) details of the exact location of the monitoring site and a description of land uses in surrounding areas

e) a description of the dominant and background noise sources at the site

f) day, evening and night assessment background levels for each day of the monitoring period

g) the final Rating Background Level (RBL) value

h) graphs of the measured noise levels for each day should be provided

i) a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring.

### *Assess impacts*

- Determine the project noise trigger levels for the site. For each identified potentially affected receiver, this should include:
  a) determination of the project intrusive noise level for each identified potentially affected receiver
  b) selection and justification of the appropriate amenity category for each identified potentially affected receiver
  c) determination of the project amenity noise level for each receiver
  d) determination of the appropriate maximum noise level event assessment (sleep disturbance) trigger level.
- Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible effects on sleep. Determine expected noise level and noise character likely to be generated from noise sources during:
  a) site establishment
  b) construction
  c) operational phases
  d) transport including traffic noise generated by the proposal
  e) other services.

  *Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).*
- Determine the noise levels likely to be received at the reasonably most affected location(s) (these may vary for different activities at each phase of the development).
- The noise impact assessment report should include:
  a) a plan showing the assumed location of each noise source for each prediction scenario
  b) a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site
  c) any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc
  d) methods used to predict noise impacts including identification of any noise models used.
  e) the weather conditions considered for the noise predictions

f) the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario

g) for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived

h) an assessment of the need to include modification factors as detailed in Fact Sheet C of the *NSW Noise Policy for Industry*.

- Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional feasible and reasonable mitigation measures.
- The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.
  a) Where relevant noise/vibration levels cannot be met after application of all feasible and reasonable mitigation measures the residual level of noise impact needs to be quantified
- For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.
- Where blasting is intended an assessment in accordance with the *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990) should be undertaken. The following details of the blast design should be included in the noise assessment:
  a) bench height, burden spacing, spacing burden ratio
  b) blast hole diameter, inclination and spacing
  c) type of explosive, maximum instantaneous charge, initiation, blast block size, blast frequency.

### *Describe management and mitigation measures*

- Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.
- For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include:
  a) use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage
  b) control of traffic (e.g., limiting times of access or speed limitations)
  c) resurfacing of the road using a quiet surface
  d) use of (additional) noise barriers or bunds
  e) treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern
  f) more stringent limits for noise emission from vehicles (i.e. using specially designed ‘quite’ trucks and/or trucks to use air bag suspension
  g) driver education
  h) appropriate truck routes
  i) limit usage of exhaust brakes
  j) use of premium muffles on trucks

k) reducing speed limits for trucks
l) ongoing community liaison and monitoring of complaints
m) phasing in the increased road use.

## 4. Water

### *Describe baseline conditions*

- Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).

  *Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC 2004) *or be approved and analyses undertaken by accredited laboratories).*

- Provide site drainage details and surface runoff yield.
- State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: http://www.environment.nsw.gov.au/ieo/index.htm. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.
- State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 *Guidelines for Fresh and Marine Water Quality* (http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html) (Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the more recent ANZECC 2000 Guidelines). NB: While specific guidelines for groundwater are not available, the ANCECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.
- State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries or the NSW Salinity Strategy (DLWC, 2000) (http://www.environment.nsw.gov.au/salinity/government/nswstrategy.htm).
- Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained.
- Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (ie. are Water Quality and River Flow Objectives being achieved?). Proponents are generally only expected to source available data and information. However, proponents of large or high-risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could include:
  a) lake or estuary flushing characteristics
  b) specific human uses (eg. exact location of drinking water offtake)
  c) sensitive ecosystems or species conservation values
  d) a description of the condition of the local catchment eg. erosion levels, soils, vegetation cover, etc

e) an outline of baseline groundwater information, including, but not restricted to, depth to water-table, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment

f) historic river flow data where available for the catchment.

### *Assess impacts*

- No proposal should breach clause 120 of the *Protection of the Environment Operations Act* 1997 (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).
- Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented.
- Include a rationale, along with relevant calculations, supporting the prediction of the discharges.
- Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater).
- Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity resulting from changes in frequency and magnitude of stream flow).
- Identify any potential impacts on quality or quantity of groundwater describing their source.
- Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, instream siltation, floodplain erosion and floodplain siltation.
- Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.
- Containment of spills and leaks shall be in accordance with EPA's guidelines section 'Bunding and Spill Management' at http://www.epa.nsw.gov.au/mao/bundingspill.htm and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.
- The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:

  a) will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and

  b) will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.
- Consult with the EPA as soon as possible if a mixing zone is proposed (a mixing zone could exist where effluent is discharged into a receiving water body, where the quality of the water being discharged does not immediately meet water quality objectives. The mixing zone could result in dilution, assimilation and decay of the effluent to allow water quality objectives to be met further downstream, at the edge of the mixing zone). The EPA will advise the proponent under what conditions a mixing zone will and will not be acceptable, as well as the information and modelling requirements for assessment.

  *Note: The assessment of water quality impacts needs to be undertaken in a total catchment management context to provide a wide perspective on development impacts, in particular cumulative impacts.*

- Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.
- Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.
- Reference should be made to Managing Urban Stormwater: Soils and Construction (Landcom, 2004), Guidelines for Fresh and Marine Water Quality ANZECC 2000), Environmental Guidelines: Use of effluent by Irrigation (DEC, 2004).

### *Describe management and mitigation measures*

- Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.
- Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.
- Describe waste-water treatment measures that are appropriate to the type and volume of wastewater and are based on a hierarchy of avoiding generation of wastewater; capturing all contaminated water (including stormwater) on the site; reusing/recycling wastewater; and treating any unavoidable discharge from the site to meet specified water quality requirements.
- Outline pollution control measures relating to storage of materials, possibility of accidental spills (e.g., preparation of contingency plans), appropriate disposal methods, and generation of leachate.
- Describe hydrological impact mitigation measures including:
  a) site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition)
  b) minimising runoff
  c) minimising reductions or modifications to flow regimes
  d) avoiding modifications to groundwater.
- Describe groundwater impact mitigation measures including:
  a) site selection
  b) retention of native vegetation and revegetation
  c) artificial recharge
  d) providing surface storages with impervious linings
  e) monitoring program.
- Describe geomorphological impact mitigation measures including:
  a) site selection
  b) erosion and sediment controls
  c) minimising instream works
  d) treating existing accelerated erosion and deposition
  e) monitoring program.
- Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC 2004).

## 5. Soils and contamination

### *Describe baseline conditions*

- Provide any details (in addition to those provided in the location description - Section C) that are needed to describe the existing situation in terms of soil types and properties and soil contamination.

### *Assess impacts*

- Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of:
  a) disturbing any existing contaminated soil
  b) contamination of soil by operation of the activity
  c) subsidence or instability
  d) soil erosion
  e) disturbing acid sulfate or potential acid sulfate soils.
- Reference should be made to Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011); Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (EPA, 2015).

### *Describe management and mitigation measures*

- Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:
  a) erosion and sediment control measures
  b) proposals for site remediation – see *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
  c) proposals for the management of these soils – see *Acid Sulfate Soil Manual* (Acid Sulfate Soil Advisory Committee 1998) and *Acid Sulfate Soils Assessment Guidelines* (Acid Sulfate Soil Advisory Committee 1998).

## 6. Waste and chemicals

### *Describe baseline conditions*

- Describe any existing waste or chemicals operations related to the proposal.

### *Assess impacts*

- Assess the adequacy of proposed measures to minimise natural resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.
- Reference should be made to the EPA's *Waste Classification Guidelines 2014 (as in force from time to time)*
- If the proposal is an energy from waste facility it must:
  - demonstrate that the proposed operation will comply with the NSW EPA's Energy from Waste Policy Statement;
  - describe of the classes and quantities of waste that would be thermally treated at the facility;
  - demonstrate that waste used as a feedstock in the waste to energy plant would be the residual from a resource recovery process that maximises the recovery of material;

- detail procedures that would be implemented to control the inputs to the waste to energy plant, including contingency measures that would be implemented if inappropriate materials are identified;
- detail the location and size of stockpiles of unprocessed and processed recycled waste at the site;
- demonstrate any waste material (eg. biochar, ash) produced from the waste to energy facility for land application is fit-for-purpose and poses minimal risk of harm to the environment in order to meet the requirements for consideration of a resource recovery order and /or exemption by the EPA;
- detail procedures for the management of other solid, liquid and gaseous waste streams;
- describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods; and
- identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.

### *Describe management and mitigation measures*

- Outline measures to minimise the consumption of natural resources.
- Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.
- Outline measures to support any approved regional or industry waste plans.

### 7. Cumulative impacts

- Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute.
- Assess the impact of the proposal against the long-term air, noise and water quality objectives for the area or region.
- Identify infrastructure requirements flowing from the proposal (eg. water and sewerage services, transport infrastructure upgrades).
- Assess likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts (eg. travel demand management strategies).

# F. List of approvals and licences

- Current activities on-site are subject to Environment Protection Licence 21239. This licence permits the receival of Reclaimed Asphalt Pavement (RAP) for waste processing (non-thermal treatment), not exceeding 20,000 tonnes per year, and not exceeding 12,5000 tonnes at any one time.
- A licence variation will be required to account for the increased in RAP processing and waste storage under the proposal.

# G. Compilation of mitigation measures

- Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (eg. outline of an environmental management plan).

- The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.

## H. Justification for the Proposal

- Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.

# ATTACHMENT B: GUIDANCE MATERIAL

| Title | Web address |
|---|---|
| **Relevant Legislation** | |
| *Contaminated Land Management Act 1997* | http://www.legislation.nsw.gov.au/#/view/act/1997/140 |
| *Environmentally Hazardous Chemicals Act 1985* | http://www.legislation.nsw.gov.au/#/view/act/1985/14 |
| *Environmental Planning and Assessment Act 1979* | http://www.legislation.nsw.gov.au/#/view/act/1979/203 |
| *Protection of the Environment Operations Act 1997* | http://www.legislation.nsw.gov.au/#/view/act/1997/156 |
| *Water Management Act 2000* | http://www.legislation.nsw.gov.au/#/view/act/2000/92 |
| **Licensing** | |
| Guide to Licensing | www.epa.nsw.gov.au/licensing/licenceguide.htm |
| **Air Issues** | |
| **Air Quality** | |
| Approved methods for modelling and assessment of air pollutants in NSW (2016) | http://www.epa.nsw.gov.au/air/appmethods.htm<br>http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf |
| POEO (Clean Air) Regulation 2010 | http://www.legislation.nsw.gov.au/#/view/regulation/2010/428 |
| **Noise and Vibration** | |
| NSW Noise Policy for Industry | http://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017) |
| Interim Construction Noise Guideline (DECC, 2009) | http://www.epa.nsw.gov.au/noise/constructnoise.htm |
| Assessing Vibration: a technical guideline (DEC, 2006) | http://www.epa.nsw.gov.au/noise/vibrationguide.htm |
| NSW Road Noise Policy (DECCW, 2011) | http://www.epa.nsw.gov.au/your-environment/noise/transport-noise |
| NSW Rail Infrastructure Noise Guideline (EPA, 2013) | http://www.epa.nsw.gov.au/your-environment/noise/transport-noise |
| **Human Health Risk Assessment** | |
| Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards (enHealth, 2012) | http://www.eh.org.au/documents/item/916 |
| **Waste, Chemicals and Hazardous Materials and Radiation** | |

| | |
|---|---|
| **Waste** | http://www.epa.nsw.gov.au/wastestrategy/warr.htm |
| Environmental Guidelines: Solid Waste Landfills (EPA, 2016) | http://www.epa.nsw.gov.au/waste/landfill-sites.htm |
| Draft Environmental Guidelines - Industrial Waste Landfilling (April 1998) | http://www.epa.nsw.gov.au/resources/waste/envguidlns/industrialfill.pdf |
| EPA's Waste Classification Guidelines 2014 | http://www.epa.nsw.gov.au/wasteregulation/classify-guidelines.htm |
| Resource recovery orders and exemptions | http://www.epa.nsw.gov.au/wasteregulation/orders-exemptions.htm |
| European Unions Waste Incineration Directive 2000 | http://ec.europa.eu/environment/archives/air/stationary/wid/legislation.htm |
| EPA's Energy from Waste Policy Statement | http://www.epa.nsw.gov.au/wastestrategy/energy-from-waste.htm |
| NSW Waste Avoidance and Resource Recovery Strategy 2014-2021 | http://www.epa.nsw.gov.au/wastestrategy/warr.htm |
| **Chemicals subject to Chemical Control Orders** | |
| Chemical Control Orders (regulated through the EHC Act ) | http://www.epa.nsw.gov.au/pesticides/CCOs.htm |
| National Protocol - Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes - July 1994 | Available in libraries |
| National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes - July 1994 | Available in libraries |
| **Water and Soils** | |
| **Acid sulphate soils** | |
| Coastal acid sulfate soils guidance material | http://www.environment.nsw.gov.au/acidsulfatesoil/ and http://www.epa.nsw.gov.au/mao/acidsulfatesoils.htm |
| Acid Sulfate Soils Planning Maps | http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm |
| **Contaminated Sites Assessment and Remediation** | |
| Managing land contamination: Planning Guidelines – SEPP 55 Remediation of Land | http://www.epa.nsw.gov.au/clm/planning.htm |
| Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000) | http://www.epa.nsw.gov.au/resources/clm/20110650consultantsglines.pdf |
| Guidelines for the NSW Site Auditor Scheme - 2nd edition (DEC, 2006) | http://www.epa.nsw.gov.au/resources/clm/auditorglines06121.pdf |
| Sampling Design Guidelines (EPA, 1995) | http://www.epa.nsw.gov.au/resources/clm/95059sampgdlne.pdf |
| National Environment Protection (Assessment of Site Contamination) Measure 1999 (or update) | http://www.scew.gov.au/nepms/assessment-site-contamination |
| **Soils – general** | |

| | |
|---|---|
| Managing land and soil | http://www.environment.nsw.gov.au/soils/landandsoil.htm |
| Managing urban stormwater for the protection of soils | http://www.environment.nsw.gov.au/stormwater/publications.htm |
| Landslide risk management guidelines | http://australiangeomechanics.org/admin/wp-content/uploads/2010/11/LRM2000-Concepts.pdf<br>http://www.australiangeomechanics.org/resources/downloads/ |
| Site Investigations for Urban Salinity (DLWC, 2002) | http://www.environment.nsw.gov.au/resources/salinity/booklet3sitei nvestigationsforurbansalinity.pdf |
| Local Government Salinity Initiative Booklets | http://www.environment.nsw.gov.au/salinity/solutions/urban.htm |
| **Water** | |
| Water Quality Objectives | http://www.environment.nsw.gov.au/ieo/index.htm |
| ANZECC (2000) Guidelines for Fresh and Marine Water Quality | http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html |
| Applying Goals for Ambient Water Quality Guidance for Operations Officers - Mixing Zones | Contact the EPA on 131555 |
| Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004) | http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf |

Our ref: DOC22/645131-3
Your ref: SEAR 1714

Zoe Halpin

Planning Officer
Industry Assessments
Department of Planning and Environment
Zoe.Halpin@planning.nsw.gov.au

28 July 2022

Dear Zoe,

**Input into Secretary's Environmental Assessment Requirements – Designated Development – Asphalt Plant Expansion, 203 Tooheys Road, Bushells Ridge (Lot 10 DP 834953) – SEAR 1714**

I refer to your e-mail dated 26 July 2022 seeking input into the Department of Planning Industry and Environment Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for a local designated development.

Biodiversity and Conservation Division (BCD) understands that the development is an expansion of an asphalt plant located at 203 Tooheys Road, Bushells Ridge (Lot 10 DP 834953); in the Central Coast local government area. The proposal seeks to increase the production limitation of the plant from 100,000 tonnes per annum (tpa) to 300,000 tpa, increase the importation and processing of reclaimed asphalt pavement from 20,000 tpa to 75,000 tpa as well as re-configure and improve ancillary infrastructure onsite. BCD understands that this proposed development is a designated development as per Schedule 3, Section 8(1) and 45(2) of the Environmental Planning and Assessment Regulation 2021. BCD has considered your request and provides input to SEARs for the proposed development in **Attachment A**. BCD acknowledges that the attached information is generic, and some sections may not be relevant to the proposal.

BCD has conducted a desk-top review of the proposed development site and from this the proposal may impact on the following matters that BCD administers. BCD recommends the EIS needs to appropriately address the following, if applicable:

1. threatened biodiversity and offsetting
2. impacts to National Parks and Wildlife estate
3. coastal wetlands and littoral rainforests
4. soils and water
5. flooding, floodplain management and coastal erosion.

If you require any further information regarding this matter please contact Jayme Lennon, Senior Conservation Planning Officer, on 9585 6935.

Yours sincerely

**STEVEN CRICK**
**Senior Team Leader Planning**
**Hunter Central Coast Branch**
**Biodiversity and Conservation Division**
28 July 2022

Enclosure: Attachments A and B

# Attachment A – Biodiversity and Conservation Division's recommended Secretary's environmental assessment requirements (SEARs) for designated development

## TABLE OF CONTENTS



### 1. The proposal

The objectives of the proposal should be clearly stated and identify:

- the size, scale and type of the proposed activity / development
- all anticipated environmental impacts including: direct and indirect; construction and operational; and extent of vegetation / habitat clearing or disturbance
- threatened species, populations, ecological communities or habitats impacted upon
- the staging and timing of the proposal
- the proposal's relationship to any other proposals and developments.

### 2. Environmental impacts of the proposal

The proponent must consider, assess, quantify and report on the likely environmental impacts of the proposal if applicable, particularly:

- threatened biodiversity
- National Parks and Wildlife estate: land reserved or acquired under the *National Parks and Wildlife Act 1974*
- flooding, floodplain issues and coastal erosion
- acid sulfate soils

The Secretary's Environmental Assessment Requirements should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines and reference material is presented in **Attachment B**. Appropriate justification should be provided in instances where the below matters are not addressed.

## 3. Biodiversity

### Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)

The EIS should include an assessment of the following:

a. The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species" for the purposes of Section 7.2 of the *Biodiversity Conservation Act 2016* (BC Act), as follows:

   a. The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:

      i. **The clearing of native vegetation exceeds the thresholds** listed under Clause 7.23 of the BC Regulation, **or**

      ii. The clearing of native vegetation, or other action, **on land included on the Biodiversity Values Map** published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).

   b. If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on '*the test for determining whether proposed development likely to significant affect threatened species or ecological communities'* in Section 7.3 of the BC Act.

   c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.

   d. If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

### Required Information

Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:

- Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.
- The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
  - The total number and classes of biodiversity credits required to be retired for the proposal.
  - The number and classes of like-for-like biodiversity credits proposed to be retired.
  - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
  - Any proposal to fund a biodiversity conservation action.
  - Any proposal to make a payment to the Biodiversity Conservation Fund.

- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the *Biodiversity Conservation Act 2016*.

Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of the site, conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on BCD website including the Bionet Atlas, Threatened Species Profile and Bionet Vegetation Classification (see **Attachment B**).

**4. National Parks and Wildlife Service estate**

**Land reserved or acquired under the *National Parks and Wildlife Act 1974* (NPW Act)**

If the proposed development is within, adjacent to, or in proximity to a watercourse that flows directly into National Parks and Wildlife Service (NPSW)-managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the *Wilderness Act 1987*) then the EIS should include:

- The following (as appropriate):
    - Evidence that the proponent has consulted with NPWS on the legal permissibility of the proposal under the NPW Act and its appropriateness.
    - In the case of proposals on land declared as wilderness under the *Wilderness Act 1987*, evidence that the proponent has consulted with NPWS on the appropriateness of the proposal. That is, whether it is consistent with the objects of the *Wilderness Act 1987* (section 3) and the management principles for wilderness areas (section 9).
    - Alternative options that have been explored to avoid the NPWS estate (on-park) and a clear justification of any on-park components of the proposal.
    - If on-park impacts are considered unavoidable, consideration of the issues, including details of any compensation proposal, consistent with BCD *Revocation, Recategorisation and Road Adjustment Policy* (2012) for proposals that are located wholly or partly in a National Park or other land acquired or reserved under the *National Parks and Wildlife Act 1974*.
- Consideration of the matters identified in the *Guidelines for developments adjoining land and water managed by the OEH* (DECCW 2010) where a proposal adjoins or is immediate vicinity of NPWS estate, or is upstream of NPWS estate.
- A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified impacts associated with the proposal. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

**5. Water and soils**

- The EIS must map the following features relevant to water and soils including:
    - Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map)
    - Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method)
    - Wetlands (as described in s4.2 of the Biodiversity Assessment Method)
    - Groundwater
    - Groundwater dependent ecosystems
    - Proposed intake and discharge locations.

- The EIS must describe background conditions for any water resource likely to be affected by the proposal, including:
    - Existing surface and groundwater.
    - Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.
    - Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters.
    - Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* and / or local objectives, criteria or targets endorsed by the NSW Government.
    - *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions*.
- The EIS must assess the impacts of the proposal on water quality, including:
    - The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
    - Identification of proposed monitoring of water quality.
    - Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).
- The EIS must assess the impact of the proposal on hydrology, including:
    - Water balance including quantity, quality and source.
    - Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.
    - Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.
    - Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
    - Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.
    - Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.
    - Identification of proposed monitoring of hydrological attributes.

**Project specific requirements**

Where the proposal (or part thereof) is located on land marked Class 1, 2, 3 or 4 on the relevant Acid Sulfate Soil Planning Map OR within 500 metres of adjacent Class 2, 3 or 4 land that is below 5 metres Australian Height Datum (AHD) and likely to lower the water table in this adjacent land below 1 metre AHD, the EIS should include the following:

- An assessment of the potential impacts of the proposal on acid sulfate soils in accordance with the relevant guidelines in the Acid Sulfate Soils Manual (Stone *et al*. 1998) and the Acid Sulfate Soils Laboratory Methods Guidelines (Ahern *et al*. 2004).
- Mitigation and management options that will be used to prevent, control, abate or minimise potential impacts from the disturbance of acid sulfate soils to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

Where the proposal is large or high risk with a heightened potential to impact on water quality and hydrology, the EIS should include the following:

- A description of existing water quality / hydrology based on suitable data (meaning data collection may be required) and must include:
    - Water chemistry.
    - A description of receiving water processes, circulation and mixing characteristics and hydrodynamic regimes.
    - Lake or estuary flushing characteristics.
    - Sensitive ecosystems or species conservation values.
    - Specific human uses and values (e.g. fishing, proximity to recreation areas).
    - A description of any impacts from existing industry or activities on water quality.
    - A description of the condition of the local catchment e.g. erosion, soils, vegetation cover.
    - An outline of baseline groundwater information, including, for example, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment.
    - Historic river flow data.
- An assessment of the impacts of the proposal on water quality and hydrology including:
    - Water circulation, current patterns, water chemistry and other appropriate characteristics such as clarity, temperature, nutrient and toxicants, and potential for erosion.
    - Changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, and groundwater).
    - Disturbance of acid sulfate soils and potential acid sulfate soils.
    - Stream bank stability and impacts on macro invertebrates.
    - Water quality and hydrology modelling and / or monitoring, where necessary.
- Proposed water quality monitoring in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC 2004). The water quality and aquatic ecosystem monitoring program must include:
    - Adequate data for evaluating maintenance, or progress towards achieving, the relevant Water Quality Objectives.
    - Measurement of pollutants identified or expected to be present.

**6. Flooding**

- The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
    - Flood prone land.
    - Flood planning area, the area below the flood planning level.
    - Hydraulic categorisation (floodway and flood storage areas).
    - Flood hazard.
- The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.
- The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.
- All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.
- Modelling in the EIS must consider and document:

- Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.
- The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.
- Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
- Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.
- Relevant provisions of the NSW Floodplain Development Manual 2005.

- The EIS must assess the impacts on the proposal on flood behaviour, including:
  - Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
  - Consistency with Council floodplain risk management plans.
  - Compatibility with the flood hazard of the land.
  - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
  - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
  - Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
  - Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.
  - Any impacts the proposal may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
  - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
  - Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
  - Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding.

**7. Coastal hazards**

- The EIS must describe the potential effects on the coastal zone and management objectives for coastal management areas (within the meaning of the *Coastal Management Act 2016*, including the effects of coastal hazards, sea level rise and climate change):
  - On the proposal.
  - Arising from the proposal.
- The EIS must consider the effects of coastal hazards impacting the site under the following scenarios:
  - Current sea level.
  - Projected future climate change (including sea level rise).
- The EIS must have regard to and document:
  - Consistency with any certified Coastal Management Program (or Coastal Zone Management Plan).

- Consistency with the objectives of coastal management areas described in the *Coastal Management Act 2016* and mapped under State Environmental Planning Policy Coastal Management 2018.
- Consistency with any existing entrance management strategies for coastal lagoons.

**8. Coastal Wetlands and Littoral Rainforest**

The EIS must assess the impacts on coastal wetlands and littoral rainforest areas in accordance with the State Environmental Planning Policy (Coastal Management) 2018.

The EIS must identify measures that will be taken to protect, and where possible enhance, the:

- Biophysical processes of the coastal wetland or littoral rainforest.
- Hydrological process of the coastal wetland or littoral rainforest.
- Ecological integrity of the coastal wetland or littoral rainforest.

Where the proposed development is on land mapped in proximity to coastal wetlands or littoral rainforest, the EIS must identify whether the proposed development will have a significant impact on:

- The biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or
- The quantity and quality or surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

## Attachment B – Guidance material

| Title | Web address |
|---|---|
| **Relevant legislation** | |
| *Biodiversity Conservation Act 2016* | https://www.legislation.nsw.gov.au/#/view/act/2016/63/full |
| *Coastal Management Act 2016* | https://www.legislation.nsw.gov.au/#/view/act/2016/20/full |
| Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* | http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/ |
| *Environmental Planning and Assessment Act 1979* | http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N |
| *Fisheries Management Act 1994* | http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N |
| *Marine Parks Act 1997* | http://www.legislation.nsw.gov.au/maintop/view/inforce/act+64+1997+cd+0+N |
| *National Parks and Wildlife Act 1974* | http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N |
| *Protection of the Environment Operations Act 1997* | http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N |
| *Water Management Act 2000* | http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N |
| *Wilderness Act 1987* | http://www.legislation.nsw.gov.au/viewtop/inforce/act+196+1987+FIRST+0+N |
| **Biodiversity** | |
| Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC 2004) | www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf |
| BCD Threatened Species website | www.environment.nsw.gov.au/Threatenedspecies/ |
| Atlas of NSW Wildlife | www.environment.nsw.gov.au/wildlifeatlas/about.htm |
| Vegetation Types databases | www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm |
| PlantNET | http://plantnet.rbgsyd.nsw.gov.au/floraonline.htm |
| Online Zoological Collections of Australian Museums | http://australianmuseum.net.au/Australian-Museum-Collection-Search |
| Threatened Species Test of Significance Guidelines (OEH 2018) | https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/threatened-species-test-significance-guidelines-170634.pdf |
| BCD principles for the use of biodiversity offsets in NSW | www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm |
| Biodiversity Values Map | https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap |
| Biodiversity Assessment Method (DPIE 2020) | https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-200438.pdf |

| Title | Web address |
|---|---|
| Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (DPIE, 2019) | https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/guidance-decision-makers-determine-serious-irreversible-impact-190511.pdf |
| Ancillary rules: Biodiversity conservation actions | http://www.environment.nsw.gov.au/resources/bcact/ancillary-rules-biodiversity-actions-170496.pdf |
| Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules | http://www.environment.nsw.gov.au/resources/bcact/ancillary-rules-reasonable-steps-170498.pdf |
| BCD Threatened Species Profiles | http://www.environment.nsw.gov.au/threatenedspeciesapp/ |
| BioNet Atlas | http://www.environment.nsw.gov.au/wildlifeatlas/about.htm |
| BioNet Vegetation Classification | http://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx |
| Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method (DPIE 2020) | https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method |
| NSW Survey Guide for Threatened Frogs – A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE 2020) | https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs |
| 'Species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method | https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method |
| Threatened Species Assessment Guideline - The Assessment of Significance (DECC 2007) | www.environment.nsw.gov.au/resources/Threatenedspecies/tsaguide07393.pdf - to be replaced with new 5-part-test guidelines when available. |
| Fisheries NSW policies and guidelines | http://www.dpi.nsw.gov.au/fisheries/habitat/publications/policies,-guidelines-and-manuals/fish-habitat-conservation |
| **NPWS estate** | |
| Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water (DECCW, 2010) | http://www.environment.nsw.gov.au/protectedareas/developmntadjoiningdecc.htm |
| List of national parks | http://www.environment.nsw.gov.au/NationalParks/parksearchatoz.aspx |
| Revocation, recategorisation and road adjustment policy (OEH, 2012) | http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm |
| List of aquatic reserves | www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/mpa |
| List of marine parks | www.mpa.nsw.gov.au/contact.html |
| **Water and soils** | |
| **Water** | |
| Water Quality Objectives | http://www.environment.nsw.gov.au/ieo/index.htm |
| ANZECC (2000) Guidelines for Fresh and Marine Water Quality | www.environment.gov.au/water/publications/quality/australian-and-new-zealand-guidelines-fresh-marine-water-quality-volume-1 |

| Title | Web address |
|---|---|
| Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions | http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning |
| Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones | http://deccnet/water/resources/AWQGuidance7.pdf |
| Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales (DEC 2004) | http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf |
| **Acid sulfate soils** | |
| Acid Sulfate Soils Planning Maps via Data.NSW | http://data.nsw.gov.au/data/ |
| Acid Sulfate Soils Manual (Stone *et al*. 1998) | http://www.environment.nsw.gov.au/resources/epa/Acid-Sulfate-Manual-1998.pdf |
| Acid Sulfate Soils Laboratory Methods Guidelines (Ahern *et al*. 2004) | http://www.environment.nsw.gov.au/resources/soils/acid-sulfate-soils-laboratory-methods-guidelines.pdf<br>This replaces Chapter 4 of the Acid Sulfate Soils Manual above. |
| **Flooding** | |
| Floodplain Development Manual | http://www.environment.nsw.gov.au/floodplains/manual.htm |
| Floodplain Risk Management Guidelines | http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines |
| NSW Climate Impact Profile | http://climatechange.environment.nsw.gov.au/ |
| Climate Change Impacts and Risk Management | Climate Change Impacts and Risk Management: A Guide for Business and Government, AGIC Guidelines for Climate Change Adaptation |
| **Coastal erosion** | |
| Reforms to coastal erosion management | http://www.environment.nsw.gov.au/coasts/coastalerosionmgmt.htm |
| Guidelines for Preparing Coastal Zone Management Plans | http://www.environment.nsw.gov.au/resources/coasts/130224CZMPGuide.pdf |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| DPE<br>Chris Ritchie<br>Director<br>Industry Assessments | **GENERAL** | |
| | The Environmental Impact Statement (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021.<br>In particular, the EIS must include: | Section 5.4. |
| | ▪ an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. | Chapter 7 to 12. |
| | ▪ strategic and statutory context, including:<br>- a detailed justification for the proposal and suitability of the site for the development | Section 2.7. |
| | - a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies | Chapter 5. |
| | - a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out | Section 5.5.1. |
| | - a description of how the proposed expansion integrates with existing on-site operations | Chapter 1 and 3. |
| | - a description of any amendments to and/or additional licence(s) or approval(s) required to carry out the proposed development. | Section 5.5.1. |
| | ▪ Suitability of the site, including:<br>- a detailed justification that the site can accommodate the proposed processing capacity, having regard to the scope of the operations and its environmental impacts and relevant mitigation measures | Chapter 1 and 2. |
| | - plans depicting the proposed layout, including the location of machinery and equipment. | Appendix C. |
| | **WASTE** | |
| | ▪ details of the type, quantity and classification of waste to be received at the site<br>▪ details of the resource outputs and any additional processes for residual waste<br>▪ details of waste handling including, transport, identification, receipt, stockpiling and quality control<br>▪ the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the NSW Waste Avoidance and Sustainable Materials Strategy 2041 | Chapter 11. |
| | **HAZARDS AND RISK** | |
| | ▪ a preliminary risk screening completed in accordance with Chapter 3 of SEPP (Resilience and Hazards) 2021 and 'Applying SEPP 33' with clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should the preliminary screening indicate that the development is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' and Multi-Level Risk Assessment | Chapter 10. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| | ▪ verification that all combustible or potentially combustible materials such as bitumen will not be heated beyond their flash points during normal and abnormal operations within the development | |
| | **FIRE AND INCIDENT MANAGEMENT** | |
| | ▪ an assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines | Chapter 10. |
| | ▪ technical information on the environmental protection equipment to be installed on the premises such as air, water and noise controls, spill clean-up equipment, fire management (including the location of fire hydrants and water flow rates at the hydrants) and containment measures | No alteration to existing environmental controls or fire suppression equipment at the site is required. |
| | ▪ details of the size and volume of stockpiles and their arrangements to minimise fire spread and facilitate emergency vehicle access | Chapter 3 and Appendix C. |
| | ▪ the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the NSW Fire and Rescue guideline Fire Safety in Waste Facilities dated 27 February 2020 | The project will not store or process combustible waste material. |
| | **AIR QUALITY** | |
| | ▪ a description of all potential sources of air and odour emissions during construction and operation | Chapter 8. |
| | ▪ an air quality impact assessment in accordance with relevant Environment Protection Authority guidelines | |
| | ▪ a description and appraisal of air quality impact mitigation and monitoring measures. | |
| | **NOISE AND VIBRATION** | |
| | ▪ a description of all potential noise and vibration sources during construction and operation, including road traffic noise | Chapter 7. |
| | ▪ a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines | |
| | ▪ a description and appraisal of noise and vibration mitigation and monitoring measures. | |
| | **SOIL AND WATER** | |
| | ▪ a description of local soils, topography, drainage and landscapes | Section 2.3. |
| | ▪ details of water usage for the proposal including existing and proposed water licencing requirements in accordance with the Water Act 1912 and/or the Water Management Act 2000 | Section 5.5. |
| | ▪ an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment | Chapter 12. |
| | ▪ details of sediment and erosion controls | |
| | ▪ a detailed site water balance | |
| | ▪ a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo | |
| | ▪ an assessment of potential impacts on the quality and quantity of surface and groundwater resources | |
| | ▪ details of the proposed stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts | |
| | ▪ characterisation of the nature and extent of any contamination on the site and surrounding area | Chapter 12. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| | ▪ a description and appraisal of impact mitigation and monitoring measures. | Chapter 13. |
| | **TRAFFIC AND TRANSPORT** | |
| | ▪ details of road transport routes and access to the site | Chapter 9 and Appendix C. |
| | ▪ road traffic predictions for the development during construction and operation | |
| | ▪ swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site | |
| | ▪ an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development. | |
| | **BIODIVERSITY** | |
| | ▪ accurate predictions of any vegetation clearing on site or for any road upgrades | Chapter 12. |
| | ▪ a detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements | |
| | ▪ details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies | |
| | ▪ a detailed description of the measures to avoid, minimise, mitigate and/or offset biodiversity impacts. | |
| | **VISUAL** | |
| | ▪ including an impact assessment at private receptors and public vantage points. | Chapter 12. |
| | **HERITAGE** | |
| | ▪ including Aboriginal and non-Aboriginal cultural heritage. | Chapter 12. |
| | **ENVIROMENTAL PLANNING INSTRUMENTS AND OTHER POLICIES** | |
| | ▪ The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to: | Chapter 5. |
| | - State Environmental Planning Policy (Transport and Infrastructure) 2021 | |
| | - State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapters 2 and 4) | |
| | - State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4) | |
| | - Central Coast Local Environmental Plan 2022 | |
| | - relevant development control plans and section 7.11 plans. | |
| | **STAKEHOLDER CONSULTATION** | |
| | ▪ During the preparation of the EIS, you must consult with relevant local, State and Commonwealth Government authorities, service providers, community groups, and address any issues they may raise in the EIS. | Chapter 4. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | ▪ in particular, you should consult with the:<br>- Department of Planning and Environment, specifically the:<br>> Environment and Heritage Group (formerly Environment, Energy and Science Group)<br>> Environment Protection Authority<br>> Crown Lands Division;<br>- Transport for NSW;<br>- Fire & Rescue NSW<br>- WaterNSW;<br>- Darkinjung Local Aboriginal Land Council<br>- Central Coast Council<br>- the surrounding landowners and occupiers that are likely to be impacted by the proposal. | |
| Crown Lands<br>Brian Jones<br>Group Leader<br>Property Management<br>Hunter | ▪ The Department formally advises an objection will be lodged to any development application if the section of Tooheys Road directly adjacent to and impacted by the development, is not transferred to Council's control. An objection will not be lodged if the transfer of the impacted sections of Tooheys Road is completed before submission of the development application. | Chapter 4 and Section 5.5.<br>Central Coast Council is currently in the process f transferring control of Tooheys Road from DPE - Crown Lands. |
| Transport for NSW<br>Kate Leonard<br>A/ Team Leader Development Services – North Region | ▪ TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and Roads and Maritime Guide to Traffic Generating Developments. | Chapter 9 and Appendix H. |
| | ▪ The TIA should be tailored to the scope of the proposed development and include, but not be limited to, the following: | |
| | - A map of the surrounding road network identifying the site access, nearby accesses, intersections, relevant traffic route/s and connections to the classified (State) road network. | |
| | - Assessment of all relevant vehicular traffic routes and intersections to / from the subject properties. | |
| | - Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network. The anticipated additional vehicular traffic generated from construction, operational and decommissioning stages of the project. | |
| | - The distribution on the road network of the trips generated by the project. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation. | |
| | - Detailed assessment of all vehicular transport routes, relevant intersections and connections to the classified (State) road network for access to / from the proposed development site/s (including any ancillary sites). | |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | - Assessment of Over Size Over Mass (OSOM) and heavy vehicle routes for all components associated with the asphalt plant, including swept path analysis for the largest design vehicle/s accessing the site, and turning, at relevant intersections along the classified (State) road network. | |
| | - Consideration of the traffic impacts on existing and proposed intersections, including access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during construction, operational and decommissioning stages. | |
| | - Vehicle types to be considered:<br>> Commuter (employee and contractor) light vehicles and pool vehicles,<br>> Heavy vehicles,<br>> Over size and over mass (OSOM) vehicles. | |
| | ▪ Consideration of cumulative impacts to identify and assess the implications of any projects that will potentially be occurring simultaneously with the scheduling of any OSOM movements along the proposed OSOM routes. The assessment should consider the following: | |
| | - The cumulative impacts from traffic generated from the construction workforces in terms of the routes, access, AM/PM peaks where there is overlap with other projects. | |
| | - The cumulative impacts of heavy vehicle movements in terms of AM/PM peaks and routes where there is an overlap with other projects. | |
| | - Cumulative impacts and consideration in relation to the timing of movements of OSOMs where other projects will be utilising the same routes as proposed for this development. | |
| | - Any potential for future expansion of the subject development and the potential impacts any such expansion would have on the development, the broader road network and the AM/PM peaks. It should be noted, any future expansion beyond the scope of the subject application, will require additional applications and approvals. | |
| | - Strategies to manage the risk of damage to public road assets where accelerated deterioration of the road pavement occurs during construction and/or operation. | |
| | ▪ An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for each relevant intersection along the identified transport route/s, including connections to the classified (State) road network. | |
| | ▪ Identify the necessary road network infrastructure upgrades that are required to cater for, and mitigate, the impact of project related traffic on both the local and classified road network for the development (for instance, road widening and/or intersection treatments).<br><br>Strategic (2D) design drawings for any proposed road upgrades and the site access should be prepared to support the TIA and demonstrate the scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. All proposed works must be: | |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | - Designed in accordance with Austroads Guidelines, Australian Standards and TfNSW Supplements<br>- Appropriately designed for the existing posted speed limit.<br>- To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.<br>- To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.<br>- Submitted with the EIS and TIA.<br>For any roadwork deemed necessary on the classified (State) road, the developer will be required to enter into a Works Authorisation Deed (WAD) or other suitable agreement as required by TfNSW. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website. | |
| | ▪ Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:<br>- Current traffic counts and 10 year traffic growth projections<br>- With and without development scenarios<br>- 95th percentile back of queue lengths<br>- Delays and level of service on all legs for the relevant intersections<br>- Electronic data for TfNSW review. | |
| | ▪ Relevant swept paths analysis for the largest design vehicle accessing the site. | |
| | ▪ Impacts on public transport (public and school bus) routes consideration for alternative transport modes such as walking and cycling or carpooling and shuttle buses during construction | |
| | ▪ Details of any Traffic Management Plan (TMP) proposed to address the construction, operation and decommissioning phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. | |
| | ▪ It is recommended that any TMP include, but not necessarily limited to, the following;<br>- A map of the primary transport route/s highlighting critical locations.<br>- An induction process for vehicle operators and regular toolbox meetings.<br>- Procedures for travel through residential areas, school zones and/or bus route/s.<br>- any proposed temporary measures such a Traffic Guidance Scheme (TGS)<br>- A Driver Code of Conduct for heavy vehicle operators.<br>- A complaint resolution and disciplinary procedure.<br>- Community consultation measures proposed for peak periods.<br>- Work, health and safety requirements under the Work Health and Safety Regulation 2017. | |
| | ▪ A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056. | |
| | ▪ Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines. | |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| EPA<br><br>Maria Moreno<br>Acting Unit Head<br>Regulatory Operations<br>Metro – North | **THE PROPOSAL** | |
| | **GENERAL**<br><br>▪ EPA's key information requirements for the proposal include an adequate assessment of:<br>- current land ownership details of nearby residential receptors potentially impacted by the proposal;<br>- air quality impacts including particulates, gases, and odours;<br>- noise impacts;<br>- surface water and groundwater impacts; and<br>- Waste, chemicals and hazardous materials. | Executive summary.<br><br>Chapter 2 and 7-12. |
| | ▪ The document's executive summary should include a discussion of the proposed development, the key environmental risks, the identified mitigation measures, and an overall conclusion and justification for the proposal. | |
| | ▪ The objectives of the proposal should be clearly stated and refer to:<br>- the size and type of the operation, the nature of the processes and the products, by-products and wastes produced<br>- a life cycle approach to the production, use or disposal of products<br>- the anticipated level of performance in meeting required environmental standards and cleaner production principles<br>- the staging and timing of the proposal and any plans for future expansion<br>- the proposal's relationship to any other industry or facility. | Chapter 3 |
| | ▪ Outline the production process including:<br>- the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill etc)<br>- any life-cycle strategies for the products. | |
| | ▪ Outline cleaner production actions, including (as appropriate):<br>- measures to minimise waste (typically through addressing source reduction)<br>- proposals for use or recycling of by-products<br>- proposed disposal methods for solid and liquid waste<br>- air management systems including all potential sources of air emissions, proposals to reuse or treat emissions, emission levels relative to relevant standards in regulations, discharge points<br>- water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge.<br>- soil contamination treatment and prevention systems. | |
| | ▪ Outline construction works including:<br>- actions to address any existing soil contamination<br>- any earthworks or site clearing; re-use and disposal of cleared material (including use of<br>- spoil on-site)<br>- construction timetable and staging; hours of construction; proposed construction methods | |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | - environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.<br>▪ Include a site diagram showing the site layout and location of environmental controls. | |
| | **AIR**<br>▪ Identify all sources or potential sources of air emissions from the development.<br>*Note: emissions can be classed as either:*<br>- *point (eg. emissions from stack or vent) or*<br>- *fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).*<br>▪ Provide details of the project that are essential for predicting and assessing air impacts including:<br>- the quantities and physio-chemical parameters (e.g. concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored<br>- an outline of procedures for handling, transport, production and storage<br>- the management of solid, liquid and gaseous waste streams with potential to generate emissions to air. | Chapter 8 and Appendix G. |
| | **NOISE AND VIBRATION**<br>▪ Identify all noise sources or potential sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.<br>▪ Specify the times of operation for all phases of the development and for all noise producing activities.<br>▪ For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, Road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks. | Chapter 7 and Appendix F. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | **WATER**<br><br>▪ Provide details of the project that are essential for predicting and assessing impacts to waters including:<br>- the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on http://www.environment.nsw.gov.au/ieo/index.htm, using technical criteria derived from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC 2000)<br>- the management of discharges with potential for water impacts<br>- drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.<br>▪ Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts e.g. effluent ponds) and showing potential areas of modification of contours, drainage etc.<br>▪ Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options. | Chapter 12.<br><br>The project is not within the vicinity of any natural drainage lines, creeks or rivers, or associated flood prone areas.<br><br>The site is equipped with an approved operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site.<br><br>The project will not introduce new pollutant sources or require any extension to existing hardstand areas, or changes to the existing approved stormwater treatment system. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | **WASTE AND CHEMICALS**<br><br>▪ Provide details of liquid waste and non-liquid waste management at the facility, including:<br>- the transportation, assessment and handling of waste arriving at or generated at the site<br>- any stockpiling of wastes or recovered materials at the site<br>- any waste processing related to the facility, including reuse, recycling, reprocessing (including composting) or treatment both on- and off-site<br>- the method for disposing of all wastes or recovered materials at the facility<br>- the emissions arising from the handling, storage, processing and reprocessing of waste at the facility<br>- the proposed controls for managing the environmental impacts of these activities.<br>▪ Provide details of spoil disposal with particular attention to:<br>- the quantity of spoil material likely to be generated<br>- proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil<br>- the need to maximise reuse of spoil material in the construction industry<br>- identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material<br>- designation of transportation routes for transport of spoil.<br>▪ Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes.<br>▪ Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.<br>▪ Reference should be made to the guidelines: EPA's Waste Classification Guidelines 2014 (as amended from time to time) | Chapter 10 and 11. |
| | **ESD**<br><br>▪ Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including:<br>- an assessment of a range of options available for use of the resource, including the benefits of each option to future generations proper valuation and pricing of environmental resources<br>- identification of who will bear the environmental costs of the proposal. | Section 5.4.1. |
| | **REHABILITATION**<br><br>▪ Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses). | The project does not comprise an extractive industry or mining operation and no consideration of rehabilitation of final land use is required.<br><br>Existing landscaped areas will be retained and re- |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | | configured to maintain biodiversity and visual amenity across the site. |
| | **CONSIDERATION OF ALTERNATIVES AND JUSTIFICATION FOR THE PROPOSAL**<br><br>▪ Consider the environmental consequences of adopting alternatives, including alternative:<br>- sites and site layouts<br>- access modes and routes<br>- materials handling and production processes<br>- waste and water management<br>- impact mitigation measures<br>- energy sources<br>▪ Selection of the preferred option should be justified in terms of:<br>- ability to satisfy the objectives of the proposal<br>- relative environmental and other costs of each alternative<br>- acceptability of environmental impacts and contribution to identified environmental objectives<br>- acceptability of any environmental risks or uncertainties<br>- reliability of proposed environmental impact mitigation measures<br>- efficient use (including maximising re-use) of land, raw materials, energy and other resources | Section 2.7. |
| | **THE LOCATION** | |
| | **GENERAL**<br><br>▪ Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:<br>- meteorological data (e.g. rainfall, temperature and evaporation, wind speed and direction)<br>- topography (landform element, slope type, gradient and length)<br>- surrounding land uses (potential synergies and conflicts)<br>- geomorphology (rates of landform change and current erosion and deposition processes)<br>- soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils)<br>- ecological information (water system habitat, vegetation, fauna)<br>- availability of services and the accessibility of the site for passenger and freight transport. | Chapter 2. |
| | **AIR**<br><br>▪ Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models.<br>▪ Describe surrounding buildings that may affect plume dispersion. | Chapter 8 and Appendix G. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | ▪ Provide and analyse site representative data on following meteorological parameters:<br>- temperature and humidity<br>- rainfall, evaporation and cloud cover<br>- wind speed and direction<br>- atmospheric stability class<br>- mixing height (the height that emissions will be ultimately mixed in the atmosphere)<br>- katabatic air drainage (if applicable)<br>- air re-circulation. | |
| | **NOISE AND VIBRATION**<br><br>▪ Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically, the location of any noise sensitive locations in relation to the site should be included on a map of the locality.<br>▪ Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas. | Chapter 7 and Appendix F. |
| | **WATER**<br><br>▪ Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: http://www.environment.nsw.gov.au/ieo/index.htm should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area. | Chapter 12. |
| | **SOIL CONTAMINATION ISSUES**<br><br>▪ Provide details of site history – if earthworks are proposed, this needs to be considered with regard to possible soil contamination, for example if the site was previously a landfill site or if irrigation of effluent has occurred. | Chapter 12. |
| | **SCOPING OF IMPACT ASSESSMENT** | |
| | ▪ Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account:<br>- relevant NSW government guidelines<br>- industry guidelines<br>- EISs for similar projects<br>- relevant research and reference material<br>- relevant preliminary studies or reports for the proposal<br>- consultation with stakeholders. | Chapter 6. |
| | ▪ Provide a summary of the outcomes of the process including:<br>- all issues identified including local, regional and global impacts (e.g. increased/ decreased greenhouse emissions)<br>- key issues which will require a full analysis (including comprehensive baseline assessment)<br>- issues not needing full analysis though they may be addressed in the mitigation strategy | |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | - justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment). | |
| | **THE ENVIRONMENTAL ISSUES** | |
| | **GENERAL**<br><br>▪ The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution.<br>▪ Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. this is in accordance with ESD requirements. | Chapter 7 to 12. |
| | **Describe baseline conditions**<br>▪ Provide a description of existing environmental conditions for any potential impacts. | Chapter 2. |
| | **Assess impacts**<br>▪ For any potential impacts relevant for the assessment of the proposal provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.<br>▪ Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts.<br>▪ The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts eg. assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.<br>▪ The assessment needs to consider impacts at all phases of the project cycle including exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant.<br>▪ The level of assessment should be commensurate with the risk to the environment. | Chapter 7 to 12. |
| | **Describe management and mitigation measures**<br>▪ Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.<br>▪ Proponents are expected to implement a 'reasonable level of performance' to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology-based criteria if available, or identify good practice for this type of activity or development. A 'reasonable level of performance' involves adopting and implementing technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.<br>▪ Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts. | Chapter 13. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | ▪ Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the EIS will be implemented. Areas that should be described include:<br>- operational procedures to manage environmental impacts<br>- monitoring procedures<br>- training programs<br>- community consultation<br>- complaint mechanisms including site contacts<br>- strategies to use monitoring information to improve performance<br>- strategies to achieve acceptable environmental impacts and to respond in event of exceedances. | |
| | **AIR**<br>**Describe baseline conditions**<br>▪ Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include the following parameters: Particulate matter (deposited dust, Total Suspected Particulates [TSP], PM10 - particulate matter with an aerodynamic diameter up to 10 micrometres, and PM2.5 -particulate matter with an aerodynamic diameter up to 2.5 micrometres), odour, and relevant gases from fuel use and other relevant activities on-site. | Chapter 8 and Appendix G. |
| | **Assess impacts**<br>▪ Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.<br>▪ Estimate the resulting ground level concentrations of all pollutants. Where necessary (eg. potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.<br>▪ Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.<br>▪ Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.<br>▪ For potentially odorous emissions provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate. Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.<br>▪ Reference should be made to Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2016); Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007); Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); and Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006). | |
| | **Describe management and mitigation measures**<br>▪ Outline specifications of pollution control equipment (including manufacturer's performance guarantees where available) and management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes. | |
| | **NOISE AND VIBRATION** | Chapter 7 and Appendix F. |

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| | **Describe baseline conditions**<br>▪ Determine the existing background (LA90) and ambient (LAeq) noise levels, as relevant, in accordance with the NSW Noise Policy for Industry.<br>▪ Determine the existing road traffic noise levels in accordance with the NSW Road Noise Policy, where road traffic noise impacts may occur.<br>▪ The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:<br>- details of equipment used for the measurements<br>- a brief description of where the equipment was positioned<br>- a statement justifying the choice of monitoring site(s), including the procedure used to choose the site(s), having regards to Fact Sheets A and B of the NSW Noise Policy for Industry.<br>- details of the exact location of the monitoring site and a description of land uses in surrounding areas<br>- a description of the dominant and background noise sources at the site<br>- day, evening and night assessment background levels for each day of the monitoring period<br>- the final Rating Background Level (RBL) value<br>- graphs of the measured noise levels for each day should be provided<br>- a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any remonitoring. | |
| | **Assess impacts**<br>▪ Determine the project noise trigger levels for the site. For each identified potentially affected receiver, this should include:<br>- determination of the project intrusive noise level for each identified potentially affected receiver<br>- selection and justification of the appropriate amenity category for each identified potentially affected receiver<br>- determination of the project amenity noise level for each receiver<br>- determination of the appropriate maximum noise level event assessment (sleep disturbance) trigger level.<br>▪ Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible effects on sleep. Determine expected noise level and noise character likely to be generated from noise sources during:<br>- site establishment<br>- construction<br>- operational phases<br>- transport including traffic noise generated by the proposal<br>- other services.<br>*Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).*<br>▪ Determine the noise levels likely to be received at the reasonably most affected location(s) (these may vary for different activities at each phase of the development).<br>▪ The noise impact assessment report should include:<br>- a plan showing the assumed location of each noise source for each prediction scenario | |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | - a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site<br>- any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc<br>- methods used to predict noise impacts including identification of any noise models used.<br>- the weather conditions considered for the noise predictions<br>- the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario<br>- for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived<br>- an assessment of the need to include modification factors as detailed in Fact Sheet C of the NSW Noise Policy for Industry.<br>▪ Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional feasible and reasonable mitigation measures.<br>▪ The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.<br>- Where relevant noise/vibration levels cannot be met after application of all feasible and reasonable mitigation measures the residual level of noise impact needs to be quantified<br>▪ For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.<br>▪ Where blasting is intended an assessment in accordance with the Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC, 1990) should be undertaken. The following details of the blast design should be included in the noise assessment:<br>- bench height, burden spacing, spacing burden ratio<br>- blast hole diameter, inclination and spacing<br>- type of explosive, maximum instantaneous charge, initiation, blast block size, blast frequency. | |
| | **Describe management and mitigation measures**<br>▪ Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.<br>▪ For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include:<br>- use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage<br>- control of traffic (e.g., limiting times of access or speed limitations)<br>- resurfacing of the road using a quiet surface<br>- use of (additional) noise barriers or bunds<br>- treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern | |

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| | - more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension<br>- driver education<br>- appropriate truck routes<br>- limit usage of exhaust brakes<br>- use of premium muffles on trucks<br>- reducing speed limits for trucks<br>- ongoing community liaison and monitoring of complaints<br>- phasing in the increased road use. | |
| | **WATER**<br>**Describe baseline conditions**<br>▪ Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).<br><br>*Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC 2004) or be approved and analyses undertaken by accredited laboratories).*<br><br>▪ Provide site drainage details and surface runoff yield.<br>▪ State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: http://www.environment.nsw.gov.au/ieo/index.htm. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.<br>▪ State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 Guidelines for Fresh and Marine Water Quality (http://www.environment.gov.au/water/publications/quality/nwqmsguidelines-4-vol1.html) (Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the more recent ANZECC 2000 Guidelines). NB: While specific guidelines for groundwater are not available, the ANCECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.<br>▪ State any locally specific objectives, criteria or targets, which have been endorsed by the government e.g. the Healthy Rivers Commission Inquiries or the NSW Salinity Strategy (DLWC, 2000) (http://www.environment.nsw.gov.au/salinity/government/nswstrategy.htm).<br>▪ Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained. | Chapter 12. |

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| | ▪ Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (ie. are Water Quality and River Flow Objectives being achieved?). Proponents are generally only expected to source available data and information. However, proponents of large or high-risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could include:<br>- lake or estuary flushing characteristics<br>- specific human uses (eg. exact location of drinking water offtake)<br>- sensitive ecosystems or species conservation values<br>- a description of the condition of the local catchment eg. erosion levels, soils, vegetation cover, etc<br>- an outline of baseline groundwater information, including, but not restricted to, depth to water-table, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment<br>- historic river flow data where available for the catchment. | |
| | **Assess impacts**<br>▪ No proposal should breach clause 120 of the *Protection of the Environment Operations Act* 1997 (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).<br>▪ Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented.<br>▪ Include a rationale, along with relevant calculations, supporting the prediction of the discharges.<br>▪ Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater).<br>▪ Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity resulting from changes in frequency and magnitude of stream flow).<br>▪ Identify any potential impacts on quality or quantity of groundwater describing their source.<br>▪ Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, instream siltation, floodplain erosion and floodplain siltation.<br>▪ Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.<br>▪ Containment of spills and leaks shall be in accordance with EPA's guidelines section 'Bunding and Spill Management' at http://www.epa.nsw.gov.au/mao/bundingspill.htm and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.<br>▪ The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:<br>- will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and<br>- will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters. | |

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| | ▪ Consult with the EPA as soon as possible if a mixing zone is proposed (a mixing zone could exist where effluent is discharged into a receiving water body, where the quality of the water being discharged does not immediately meet water quality objectives. The mixing zone could result in dilution, assimilation and decay of the effluent to allow water quality objectives to be met further downstream, at the edge of the mixing zone). The EPA will advise the proponent under what conditions a mixing zone will and will not be acceptable, as well as the information and modelling requirements for assessment.<br>*Note: The assessment of water quality impacts needs to be undertaken in a total catchment management context to provide a wide perspective on development impacts, in particular cumulative impacts.*<br><br>▪ Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.<br>▪ Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.<br>▪ Reference should be made to Managing Urban Stormwater: Soils and Construction (Landcom, 2004), Guidelines for Fresh and Marine Water Quality ANZECC 2000), Environmental Guidelines: Use of effluent by Irrigation (DEC, 2004).<br><br>**Describe management and mitigation measures**<br>▪ Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.<br>▪ Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.<br>▪ Describe waste-water treatment measures that are appropriate to the type and volume of wastewater and are based on a hierarchy of avoiding generation of wastewater; capturing all contaminated water (including stormwater) on the site; reusing/recycling wastewater; and treating any unavoidable discharge from the site to meet specified water quality requirements.<br>▪ Outline pollution control measures relating to storage of materials, possibility of accidental spills (e.g., preparation of contingency plans), appropriate disposal methods, and generation of leachate.<br>▪ Describe hydrological impact mitigation measures including:<br>- site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition)<br>- minimising runoff<br>- minimising reductions or modifications to flow regimes<br>- avoiding modifications to groundwater.<br>▪ Describe groundwater impact mitigation measures including:<br>- site selection<br>- retention of native vegetation and revegetation<br>- artificial recharge<br>- providing surface storages with impervious linings<br>- monitoring program.<br>▪ Any proposed monitoring should be undertaken in accordance with the Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC 2004). | |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
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| | ▪ Describe geomorphological impact mitigation measures including:<br>- site selection<br>- erosion and sediment controls<br>- minimising instream works<br>- treating existing accelerated erosion and deposition<br>- monitoring program. | Chapter 13 |
| | **SOILS AND CONTAMINATION**<br><br>**Describe baseline conditions**<br>▪ Provide any details (in addition to those provided in the location description - Section C) that are needed to describe the existing situation in terms of soil types and properties and soil contamination. | Section 2.3.7. |
| | **Assess impacts**<br>▪ Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of:<br>- disturbing any existing contaminated soil<br>- contamination of soil by operation of the activity<br>- subsidence or instability<br>- soil erosion<br>- disturbing acid sulfate or potential acid sulfate soils.<br>▪ Reference should be made to Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011); Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (EPA, 2015). | Chapter 12. |
| | **Describe management and mitigation measures**<br>▪ Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:<br>- erosion and sediment control measures<br>- proposals for site remediation – see Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)<br>- proposals for the management of these soils – see Acid Sulfate Soil Manual (Acid Sulfate Soil Advisory Committee 1998) and Acid Sulf*ate Soils Assessment Guidelines* (Acid Sulfate Soil Advisory Committee 1998). | Chapter 12. |
| | **WASTE AND CHEMICALS**<br><br>**Describe baseline conditions**<br>▪ Describe any existing waste or chemicals operations related to the proposal. | Chapter 10 and 11. |
| | **Assess impacts**<br>▪ Assess the adequacy of proposed measures to minimise natural resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.<br>▪ Reference should be made to the EPA's Waste Classification Guidelines 2014 (as in force from time to time)<br>▪ If the proposal is an energy from waste facility it must:<br>- demonstrate that the proposed operation will comply with the NSW EPA's Energy from Waste Policy Statement; | Chapter 11.<br><br>The project is not an energy from waste facility. |

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| | - describe of the classes and quantities of waste that would be thermally treated at the facility;<br>- demonstrate that waste used as a feedstock in the waste to energy plant would be the residual from a resource recovery process that maximises the recovery of material;<br>- detail procedures that would be implemented to control the inputs to the waste to energy plant, including contingency measures that would be implemented if inappropriate materials are identified;<br>- detail the location and size of stockpiles of unprocessed and processed recycled waste at the site;<br>- demonstrate any waste material (eg. biochar, ash) produced from the waste to energy facility for land application is fit-for-purpose and poses minimal risk of harm to the environment in order to meet the requirements for consideration of a resource recovery order and /or exemption by the EPA;<br>- detail procedures for the management of other solid, liquid and gaseous waste streams;<br>- describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods; and<br>- identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21. | |
| | **Describe management and mitigation measures**<br>▪ Outline measures to minimise the consumption of natural resources.<br>▪ Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.<br>▪ Outline measures to support any approved regional or industry waste plans. | Chapter 11 |
| | **CUMULATIVE IMPACTS**<br>▪ Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute.<br>▪ Assess the impact of the proposal against the long-term air, noise and water quality objectives for the area or region.<br>▪ Identify infrastructure requirements flowing from the proposal (eg. water and sewerage services, transport infrastructure upgrades).<br>▪ Assess likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts (eg. travel demand management strategies). | Chapter 7 to 12. |
| | **LIST OF APPROVALS AND LICENCES** | |
| | ▪ Current activities on-site are subject to Environment Protection Licence 21239. This licence permits the receival of Reclaimed Asphalt Pavement (RAP) for waste processing (non-thermal treatment), not exceeding 20,000 tonnes per year, and not exceeding 12,5000 tonnes at any one time.<br>▪ A licence variation will be required to account for the increased in RAP processing and waste storage under the proposal. | Section 5.5. |
| | **COMPILIATION OF MITIGATION MEASURES** | |
| | ▪ Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (eg. outline of an environmental management plan). | Chapter 13. |

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| | ▪ The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program. | |
| | **JUSTIFICATION FOR THE PROPOSAL** | |
| | ▪ Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts. | Chapter 14 |
| DPIE Biodiversity and Conservation Division<br><br>Steven Crick<br>Senior Team Leader – Planning<br>Hunter Central Coast Branch | **THE PROPOSAL**<br><br>▪ The objectives of the proposal should be clearly stated and identify:<br>- the size, scale and type of the proposed activity / development<br>- all anticipated environmental impacts including: direct and indirect; construction and operational; and extent of vegetation / habitat clearing or disturbance<br>- threatened species, populations, ecological communities or habitats impacted upon<br>- the staging and timing of the proposal<br>- the proposal's relationship to any other proposals and developments | Chapter 1, 3, and 7-12. |
| | **ENVIRONMENTAL IMPACTS OF THE PROPOSAL**<br>▪ The proponent must consider, assess, quantify and report on the likely environmental impacts of the proposal if applicable, particularly:<br>- threatened biodiversity<br>- National Parks and Wildlife estate: land reserved or acquired under the National Parks and Wildlife Act 1974<br>- flooding, floodplain issues and coastal erosion<br>- acid sulfate soils<br>▪ The Secretary's Environmental Assessment Requirements should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines and reference material is presented in Attachment B. Appropriate justification should be provided in instances where the below matters are not addressed | Chapters 7 to 12 |
| | **BIODIVERSITY**<br>**Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)**<br>▪ The EIS must assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species" for the purposes of Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), as follows:<br>- The EIS must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) by determining whether the proposed development involves:<br>> The clearing of native vegetation exceeds the thresholds listed under Clause 7.23 of the BC Regulation, or | The project will be confined to existing operational areas of the site previously cleared of native vegetation. As such, the project will not impact existing remnant native vegetation or landscape plantings at the site and will therefore not directly impact biodiversity values or potential habitat of a threatened species |

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| | > The clearing of native vegetation, or other action, on land included on the Biodiversity Values Map published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as<br>- declared under Section 3.1 of the BC Act).<br>- If the proposal does not trigger any of the criteria in (a) above, then the EIS must determine whether the proposed development is likely to have a significant impact based on 'the test for determining whether proposed development likely to significant affect threatened species or ecological communities' in Section 7.3 of the BC Act.<br>- Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the EIS must justify how the conclusion has been reached.<br>- If the development exceeds the thresholds in (a) or (b), then the EIS must be accompanied by a biodiversity development assessment report (BDAR) prepared in accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.<br>**Required information**<br>Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:<br>▪ Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.<br>▪ The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.<br>▪ The BDAR must include details of the measures proposed to address the offset obligation as<br>▪ follows:<br>- The total number and classes of biodiversity credits required to be retired for the proposal.<br>- The number and classes of like-for-like biodiversity credits proposed to be retired.<br>- The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.<br>- Any proposal to fund a biodiversity conservation action.<br>- Any proposal to make a payment to the Biodiversity Conservation Fund.<br>▪ If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.<br>▪ The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the Biodiversity Conservation Act 2016.<br>▪ Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the EIS must include a field survey of the site, conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on BCD website including the Bionet Atlas, Threatened Species Profile and Bionet Vegetation Classification (see Attachment B). | afforded protection under the BC Act and/or the EPBC Act.<br>No BDAR is required for the project. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| | **NATIONAL PARKS AND WILDLIFE SERVICE ESTATE**<br>**Land reserved or acquired under the National Parks and Wildlife Act 1974 (NPW Act)**<br>▪ If the proposed development is within, adjacent to, or in proximity to a watercourse that flows directly into National Parks and Wildlife Service (NPSW)-managed conservation estate (e.g. a national park, nature reserve, state conservation area, land which is declared wilderness under the Wilderness Act 1987) then the EIS should include the following (as appropriate):<br>- Evidence that the proponent has consulted with NPWS on the legal permissibility of the proposal under the NPW Act and its appropriateness.<br>- In the case of proposals on land declared as wilderness under the Wilderness Act 1987, evidence that the proponent has consulted with NPWS on the appropriateness of the proposal. That is, whether it is consistent with the objects of the Wilderness Act 1987 (section 3) and the management principles for wilderness areas (section 9).<br>- Alternative options that have been explored to avoid the NPWS estate (on-park) and a clear justification of any on-park components of the proposal.<br>- If on-park impacts are considered unavoidable, consideration of the issues, including details of any compensation proposal, consistent with BCD Revocation, Recategorisation and Road Adjustment Policy (2012) for proposals that are located wholly or partly in a National Park or other land acquired or reserved under the National Parks and Wildlife Act 1974.<br>▪ Consideration of the matters identified in the Guidelines for developments adjoining land and water managed by the OEH (DECCW 2010) where a proposal adjoins or is immediate vicinity of NPWS estate, or is upstream of NPWS estate.<br>▪ A description of the mitigation and management options that will be used to prevent, control, abate or minimise identified impacts associated with the proposal. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented. | The project will not directly or indirectly impact NPWS estate. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| | **WATER AND SOILS**<br>▪ The EIS must map the following features relevant to water and soils including:<br>- Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map)<br>- Rivers, streams, estuaries (as described in s4.2 of the Biodiversity Assessment Method)<br>- Wetlands (as described in s4.2 of the Biodiversity Assessment Method)<br>- Groundwater<br>- Groundwater dependent ecosystems<br>- Proposed intake and discharge locations.<br>▪ The EIS must describe background conditions for any water resource likely to be affected by the proposal, including:<br>- Existing surface and groundwater.<br>- Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.<br>- Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters.<br>- Indicators and trigger values/criteria for the identified environmental values in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and / or local objectives, criteria or targets endorsed by the NSW Government.<br>- Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions.<br>▪ The EIS must assess the impacts of the proposal on water quality, including:<br>- The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the proposal protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management<br>- during and after construction.<br>- Identification of proposed monitoring of water quality.<br>- Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).<br>▪ The EIS must assess the impact of the proposal on hydrology, including:<br>- Water balance including quantity, quality and source.<br>- Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.<br>- Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.<br>- Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches). | The project is not within the vicinity of any natural drainage lines, creeks or rivers, or associated flood prone areas.<br>The site is equipped with an approved operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site.<br>The project will not introduce new pollutant sources or require any extension to existing hardstand areas, or changes to the existing approved stormwater treatment system. |

- Changes to environmental water availability, both regulated / licensed and unregulated / rules-based sources of such water.
- Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.
- Identification of proposed monitoring of hydrological attributes.

**Project specific requirements**

Where the proposal is large or high risk with a heightened potential to impact on water quality and hydrology, the EIS should include the following:

- A description of existing water quality / hydrology based on suitable data (meaning data collection may be required) and must include:
  - Water chemistry.
  - A description of receiving water processes, circulation and mixing characteristics and hydrodynamic regimes.
  - Lake or estuary flushing characteristics.
  - Sensitive ecosystems or species conservation values.
  - Specific human uses and values (e.g. fishing, proximity to recreation areas).
  - A description of any impacts from existing industry or activities on water quality.
  - A description of the condition of the local catchment e.g. erosion, soils, vegetation cover.
  - An outline of baseline groundwater information, including, for example, depth to watertable, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment.
  - Historic river flow data.
- An assessment of the impacts of the proposal on water quality and hydrology including:
  - Water circulation, current patterns, water chemistry and other appropriate characteristics such as clarity, temperature, nutrient and toxicants, and potential for erosion.
  - Changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, and groundwater).
  - Disturbance of acid sulfate soils and potential acid sulfate soils.
  - Stream bank stability and impacts on macro invertebrates.
  - Water quality and hydrology modelling and / or monitoring, where necessary.
- Proposed water quality monitoring in accordance with the Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC 2004). The water quality and aquatic ecosystem monitoring program must include:
  - Adequate data for evaluating maintenance, or progress towards achieving, the relevant Water Quality Objectives.
  - Measurement of pollutants identified or expected to be present.

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| | Where the proposal (or part thereof) is located on land marked Class 1, 2, 3 or 4 on the relevant Acid Sulfate Soil Planning Map OR within 500 metres of adjacent Class 2, 3 or 4 land that is below 5 metres Australian Height Datum (AHD) and likely to lower the water table in this adjacent land below 1 metre AHD, the EIS should include the following:<br>▪ An assessment of the potential impacts of the proposal on acid sulfate soils in accordance with the relevant guidelines in the Acid Sulfate Soils Manual (Stone et al. 1998) and the Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al. 2004).<br>▪ Mitigation and management options that will be used to prevent, control, abate or minimise potential impacts from the disturbance of acid sulfate soils to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented. | The project is not in mapped with acid sulfate soil risk. |
| | **FLOODING**<br>▪ The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:<br>- Flood prone land.<br>- Flood planning area, the area below the flood planning level.<br>- Hydraulic categorisation (floodway and flood storage areas).<br>- Flood hazard.<br>▪ The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.<br>▪ The EIS must model the effect of the proposal (including fill) on the current flood behaviour for a range of design events as identified above, and the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.<br>▪ All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified in the EIS and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.<br>▪ Modelling in the EIS must consider and document:<br>- Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.<br>- The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood (PMF), or an equivalent extreme flood.<br>- Impacts of the proposal on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.<br>- Impacts of earthworks and stockpiles within the flood prone land up to the PMF level. The assessment should be based on understanding of cumulative flood impacts of construction and operational phases.<br>- Relevant provisions of the NSW Floodplain Development Manual 2005.<br>▪ The EIS must assess the impacts on the proposal on flood behaviour, including:<br>- Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.<br>- Consistency with Council floodplain risk management plans. | The project is not located on flood prone land. |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| | - Compatibility with the flood hazard of the land.<br>- Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.<br>- Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.<br>- Whether there will be a direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.<br>- Appropriate mitigation measures to offset potential flood risk arising from the proposal. Any proposed mitigation work should be modelled and assessed on the overall catchment basis in order to ensure it fits its purpose and meets the criteria of the Council where it is located, and to ensure it has no adverse impact to surrounding areas.<br>- Any impacts the proposal may have upon existing community emergency management<br>- arrangements for flooding. These matters are to be discussed with the NSW SES and Council.<br>- Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.<br>- Emergency management, evacuation and access, and contingency measures for the proposal during both construction and operational phases considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.<br>- Any impacts the proposal may have on the social and economic costs to the community as a consequence of flooding. | |
| | **COASTAL HAZARDS**<br><br>▪ The EIS must describe the potential effects on the coastal zone and management objectives for coastal management areas (within the meaning of the Coastal Management Act 2016, including the effects of coastal hazards, sea level rise and climate change):<br>- On the proposal.<br>- Arising from the proposal.<br>▪ The EIS must consider the effects of coastal hazards impacting the site under the following scenarios:<br>- Current sea level.<br>- Projected future climate change (including sea level rise).<br>▪ The EIS must have regard to and document:<br>- Consistency with any certified Coastal Management Program (or Coastal Zone Management Plan).<br>- Consistency with the objectives of coastal management areas described in the Coastal Management Act 2016 and mapped under State Environmental Planning Policy Coastal Management 2018.<br>- Consistency with any existing entrance management strategies for coastal lagoons. | The project is not located within a coastal zone. |
| | **COASTAL WETLANDS AND LITTORAL RAINFOREST**<br><br>▪ The EIS must assess the impacts on coastal wetlands and littoral rainforest areas in accordance with the State Environmental Planning Policy (Coastal Management) 2018.<br>▪ The EIS must identify measures that will be taken to protect, and where possible enhance, the: | The project will not impact directly or indirectly on coastal wetland or littoral rainforest. . |

| Stakeholder | Environmental Requirement | EIS reference/commentary |
|---|---|---|
| | - Biophysical processes of the coastal wetland or littoral rainforest.<br>- Hydrological process of the coastal wetland or littoral rainforest.<br>- Ecological integrity of the coastal wetland or littoral rainforest.<br>▪ Where the proposed development is on land mapped in proximity to coastal wetlands or littoral rainforest, the EIS must identify whether the proposed development will have a significant impact on:<br>- The biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or<br>- The quantity and quality or surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest. | |


# APPENDIX B

## FLORA AND FAUNA IMPACT ASSESSMENT REPORT

# Flora and Fauna Impact Assessment Report

for
Asphalt Plant Upgrade
at
203 Tooheys Road,
Bushells Ridge

28 August 2023

| | |
|---|---|
| **Report:** | Flora and Fauna Impact Assessment Report for<br>Asphalt Plant Upgrade<br>203 Tooheys Road,<br>Bushells Ridge<br>NSW 2259 |
| Prepared for: | Fulton Hogan |
| Prepared by: | Land Eco Consulting |
| Date: | 28 August 2023 |
| Version: | **Final 1.0** |



**Land Eco Pty Ltd**

www.landeco.com.au

# Report Certification

This report was prepared by:

| Name | Company /Position | Role |
|---|---|---|
| Serene White | Land Eco Consulting<br>Ecologist | Report compilation |
| Kurtis Lindsay | Land Eco Consulting<br>Principal Ecologist | Report review |

# Document Control

| Version | Document Name | Date |
|---|---|---|
| Draft 1.0 | Flora and Fauna Impact Assessment Report for<br>Asphalt Plant Upgrade<br>203 Tooheys Road,<br>Bushells Ridge NSW 2259 | 22/08/2023 |
| Final 1.0 | Flora and Fauna Impact Assessment Report for<br>Asphalt Plant Upgrade<br>203 Tooheys Road,<br>Bushells Ridge NSW 2259 | 28/08/2023 |

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# Glossary

| Acronym/ Term | Definition |
|---|---|
| **APZ** | Asset Protection Zone |
| **BAM** | Biodiversity Assessment Method (NSW) |
| **BC Act** | New South Wales Biodiversity Conservation Act 2016 |
| **BDAR** | Biodiversity Development Assessment Report |
| **BOS** | Biodiversity Offset Scheme |
| **DA** | Development Application |
| **DCCEEW** | Department of Climate Change, Energy, the Environment and Water Agriculture, Water |
| **DCP** | Development Control Plan |
| **Development** | The use of land, and the subdivision of land, and the carrying out of a work, and the demolition of a building or work, and the erection of a building, and any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument but does not include any development of a class or description prescribed by the regulations for the purposes of this definition (Environmental Planning and Assessment Act 1979). |
| **DI** | Department of Industry |
| **DotE** | Department of the Environment |
| **DPI** | Department of Planning Industries |
| **DPIE** | Department of Planning Industry and Environment |
| **EIS** | Environmental Impact Statement |
| **EPBC Act** | Environment Protection and Biodiversity Conservation Act 1999 |
| **FFA** | Flora and Fauna Assessment Report (this report) |
| **ha** | Hectares |
| **Km** | Kilometre |
| **KTP** | Key Threatening Process (as listed in the BC Act) |
| **LEP** | Local Environmental Plan |
| **LGA** | Local Government Area |
| **Locality** | The area within a 10km radius of the Subject Property. The same meaning when describing a local population of a species or local occurrence of an ecological community. |
| **m** | Metres |
| **mm** | Millimetres |
| **MNES** | Matters of National Significance |
| **NPWS** | NSW National Parks and Wildlife Services |
| **NSW** | The state of New South Wales, Australia |
| **OEH** | Office of Environment and Heritage (now the Department of Planning Industry and Environment) |
| **Proposal** | The development, activity or action proposed. |
| **SIS** | Species Impact Statement pursuant to s. 5A of the Environmental Planning and Assessment Act 1979 |
| **Development Footprint** | Location of the proposed development (Asphalt Plant Upgrade) within the Subject Property including the existing approved landscaping to be removed. |
| **Subject Property** | 203 Tooheys Road Bushells Ridge, New South Wales 2259 (Lot 10/-/DP834953) |
| **Threatened species, populations and ecological communities** | Species, populations and ecological communities specified in Schedules 1, 1A and 2 and *threatened species, population or ecological community* means a species, population or ecological community specified in any of those Schedules. |

# 1. Introduction

## 1.1 Background and Project Proposal

Land Eco Pty Ltd (Land Eco) was engaged to deliver a Flora and Fauna Impact Assessment Report (FFA) for an upgrade of an existing asphalt plant at 203 Tooheys Road, Bushells Ridge, New South Wales (NSW) 2259 (Lot 10/-/DP834953) (**Figure 1**). Here forward referred to as the 'Subject Property'.

### 1.1.1. Proposed Development

The proposed development application (DA) is for the upgrade of the existing Asphalt Plant at 203 Tooheys Road, Bushells Ridge, New South Wales (NSW) (**Figure 3**). The Asphalt Plant currently operates 24 hours a day, seven days a week, produces up to 100,000 tonnes per annum (tpa) of asphalt and processes 20,000 tpa of reclaimed asphalt pavement (RAP). The DA proposes to increase production to a maximum of 400,000 tpa, increases the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa and re-configure and improve existing ancillary infrastructure at the site. The proposed development will not involve any extensions to the existing development footprint or bulk earthworks. The proposed Wisconsin Mound (Sewer Filtration Area) will be located on existing hardstand, and any discharge will be diverted into existing swale drainage (**Figure 2; Figure 3**). The area of vegetation clearing associated with the development is limited to a small area of landscaping situated in the Existing Facility. This area of vegetation clearing is referred to as the 'Development Footprint' (**Figure 1**). No other vegetation is proposed to be cleared.

### 1.1.2. Proposed Direct Impact

The proposed development is limited to the existing developed portion of the site currently used for asphalt production. The proposed development does not require clearing of any vegetation that provides habitat value. A small area of landscaping will be cleared for the relocation of a carpark, admin office and lab, and for the construction of a proposed RAP Storage Area. This area is referred to as 'The Development Footprint' (**Figure 1**). This consists of bare ground with heavily compacted dirt and sparse/heavily mown grass. This area of landscaping removal is limited to approximately 0.047ha and is shown in **Figure 1**.

The proposed Wisconsin Mound (Sewer Filtration Area) is to be located on the existing hardstand area within the Asphalt Plant.

As per the Environmental Impact Statement (EIS; Element Environment 2023):

> "*the proposed development will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system. The project will not increase the total area of impervious hardstand previously assessed for the site and will not increase the quantity of stormwater runoff generated by the site and captured in the site's existing stormwater management and detention system.*"

### 1.1.3. Proposed Indirect Impact

Indirect impacts from the development are the main focus of this report. Indirect impacts such as increased noise and dust, soil disturbance, spread and introduction of novel weeds, accidental wastewater overflow/release and accidental chemical spill from machinery, may occur. It is considered unlikely that any of these indirect impacts could cause a significantly impact upon any threatened species or ecological communities that occur in the locality. These indirect impacts will be managed through appropriate impact mitigation controls which will avoid any significant impacts on vegetation or threatened entities (see **Section 6**).

Of particular note is the Wisconsin Mound (Sewer Filtration Area) which is to be located on the existing hardstand area within the Asphalt Plant According to the Wastewater Engineer (Decentralised Water 2023) the system is highly efficient and compliant with the Australian Standard for treating wastewater. Any treated water discharge from the system is to an open 200m long gravel lined drain that has recently been constructed for the asphalt plant development. The wastewater treatment system includes an intercept trench at the downslope of the Wisconsin mound to capture any treated / untreated water accidentally discharging from the mound. No untreated or treated water will be discharged to the habitat of threatened plant species, such as *Corunastylis sp. Charmhaven*.

### 1.1.4. Site Description and Location

The Subject Property is located on Tooheys Road and Doyalson Link Road in the Suburb of Bushells Ridge, NSW in the Central Coast Council of Central Coast. The Subject Property is zoned as 'E4 - General Industrial' and 'C2 - Environmental Conservation'. The Development Footprint is limited to the General Industrial (zone E4). Most of the surrounding land is General Industrial (zone E4) to the north and Transition (zone RU6) to the south. The Pacific Motorway (M1) zoned 'SP2 – Road and traffic facility', occurs approximately 1.4km to the west of the Subject Property.

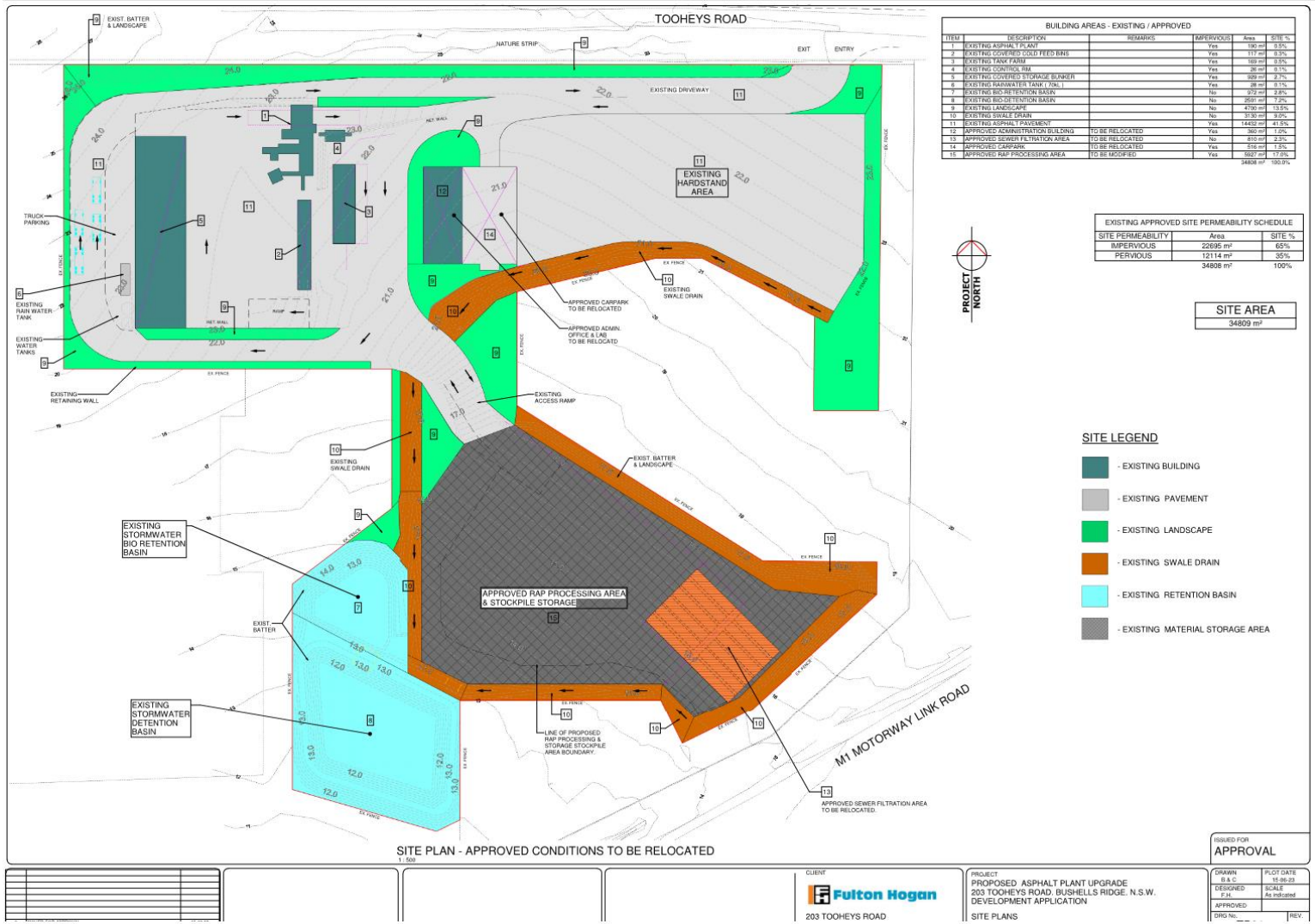
### 1.1.5. Soils and Geology

The Subject Property occurs two soil landscapes the 'Wyong' soil landscape and the 'Gorokan' soil landscape. The Development Footprint is situated on the 'Gorokan' soil landscape (DPIE 2023b). This soil landscape is described undulating low hills and rises on lithic sandstones of the Tuggerah Formation. Local relief <30 m; slope gradients <15%. Broad crests and ridges, long gently inclined slopes and broad drainage lines. Partially cleared low open-forest (DPIE 2023b).

### 1.1.6. Hydrology

No mapped watercourses run through the Development Footprint. One mapped watercourse runs through the Subject Property, Wallarah Creek. At its closes point Wallarah Creek occurs approximately 160m south-west of the Development Footprint (NSW Spatial Services 2023). Two stormwater detention basins occur in the southern portion of the facility, these will be retained and undisturbed by the development.


**Figure 1. Map of Subject Property, the Existing Facility, and the Development Footprint (Landscaped Vegetation to be removed)**



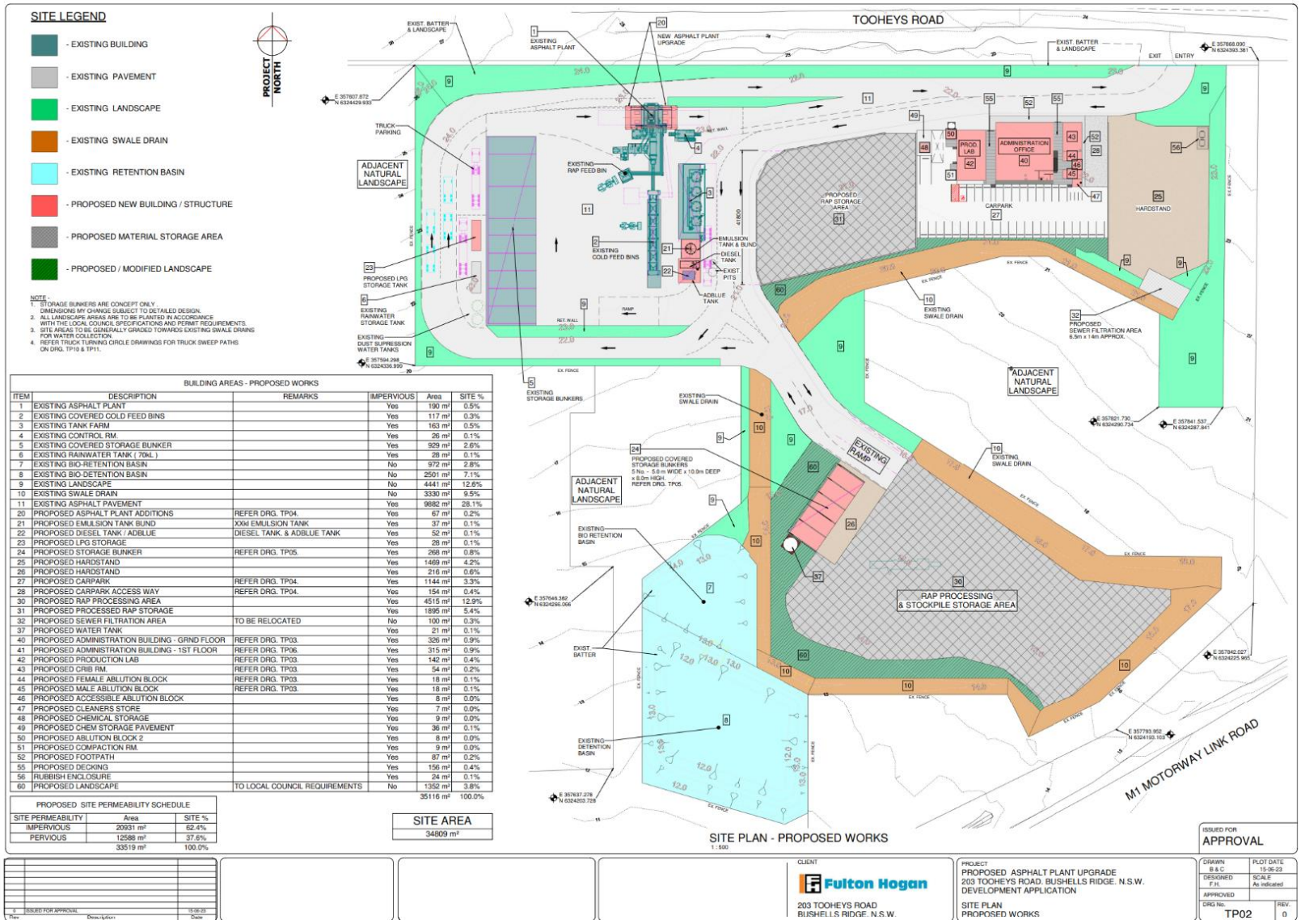

BUILDING AREAS - EXISTING / APPROVED

| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
|---|---|---|---|---|---|
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.5% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 117 m² | 0.3% |
| 3 | EXISTING TANK FARM | | Yes | 169 m² | 0.5% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 2.7% |
| 6 | EXISTING RAINWATER TANK ( 70KL ) | | Yes | 26 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 2.8% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 7.2% |
| 9 | EXISTING LANDSCAPE | | No | 4700 m² | 13.5% |
| 10 | EXISTING SWALE DRAIN | | No | 3130 m² | 9.0% |
| 11 | EXISTING ASPHALT PAVEMENT | | Yes | 14432 m² | 41.5% |
| 12 | APPROVED ADMINISTRATION BUILDING | TO BE RELOCATED | Yes | 360 m² | 1.0% |
| 13 | APPROVED SEWER FILTRATION AREA | TO BE RELOCATED | No | 810 m² | 2.3% |
| 14 | APPROVED CARPARK | TO BE RELOCATED | Yes | 516 m² | 1.5% |
| 15 | APPROVED RAP PROCESSING AREA | TO BE MODIFIED | Yes | 5927 m² | 17.0% |
| | | | | 34808 m² | 100.0% |

EXISTING APPROVED SITE PERMEABILITY SCHEDULE

| SITE PERMEABILITY | Area | SITE % |
|---|---|---|
| IMPERVIOUS | 22695 m² | 65% |
| PERVIOUS | 12114 m² | 35% |
| | 34808 m² | 100% |

**Figure 2. Existing Site Plan to be Relocated showing the direction of flow of the existing swale drain**




NOTE :-
1. STORAGE BUNKERS ARE CONCEPT ONLY. DIMENSIONS MY CHANGE SUBJECT TO DETAILED DESIGN.
2. ALL LANDSCAPE AREAS ARE TO BE PLANTED IN ACCORDANCE WITH THE LOCAL COUNCIL SPECIFICATIONS AND PERMIT REQUIREMENTS.
3. SITE AREAS TO BE GENERALLY GRADED TOWARDS EXISTING SWALE DRAINS FOR WATER COLLECTION.
4. REFER TRUCK TURNING CIRCLE DRAWINGS FOR TRUCK SWEEP PATHS ON DRG. TP10 & TP11.

BUILDING AREAS - PROPOSED WORKS

| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
|---|---|---|---|---|---|
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.5% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 117 m² | 0.3% |
| 3 | EXISTING TANK FARM | | Yes | 163 m² | 0.5% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 2.6% |
| 6 | EXISTING RAINWATER TANK ( 70kL ) | | Yes | 28 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 2.8% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 7.1% |
| 9 | EXISTING LANDSCAPE | | No | 4441 m² | 12.6% |
| 10 | EXISTING SWALE DRAIN | | No | 3330 m² | 9.5% |
| 11 | EXISTING ASPHALT PAVEMENT | | Yes | 9882 m² | 28.1% |
| 20 | PROPOSED ASPHALT PLANT ADDITIONS | REFER DRG. TP04. | Yes | 67 m² | 0.2% |
| 21 | PROPOSED EMULSION TANK BUND | XXkl EMULSION TANK | Yes | 37 m² | 0.1% |
| 22 | PROPOSED DIESEL TANK / ADBLUE | DIESEL TANK. & ADBLUE TANK | Yes | 52 m² | 0.1% |
| 23 | PROPOSED LPG STORAGE | | Yes | 28 m² | 0.1% |
| 24 | PROPOSED STORAGE BUNKER | REFER DRG. TP05. | Yes | 268 m² | 0.8% |
| 25 | PROPOSED HARDSTAND | | Yes | 1469 m² | 4.2% |
| 26 | PROPOSED HARDSTAND | | Yes | 216 m² | 0.6% |
| 27 | PROPOSED CARPARK | REFER DRG. TP04. | Yes | 1144 m² | 3.3% |
| 28 | PROPOSED CARPARK ACCESS WAY | REFER DRG. TP04. | Yes | 154 m² | 0.4% |
| 30 | PROPOSED RAP PROCESSING AREA | | Yes | 4515 m² | 12.9% |
| 31 | PROPOSED PROCESSED RAP STORAGE | | Yes | 1895 m² | 5.4% |
| 32 | PROPOSED SEWER FILTRATION AREA | TO BE RELOCATED | No | 100 m² | 0.3% |
| 37 | PROPOSED WATER TANK | | Yes | 21 m² | 0.1% |
| 40 | PROPOSED ADMINISTRATION BUILDING - GRND FLOOR | REFER DRG. TP03. | Yes | 326 m² | 0.9% |
| 41 | PROPOSED ADMINISTRATION BUILDING - 1ST FLOOR | REFER DRG. TP06. | Yes | 315 m² | 0.9% |
| 42 | PROPOSED PRODUCTION LAB | REFER DRG. TP03. | Yes | 142 m² | 0.4% |
| 43 | PROPOSED CRIB RM. | REFER DRG. TP03. | Yes | 54 m² | 0.2% |
| 44 | PROPOSED FEMALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 45 | PROPOSED MALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 46 | PROPOSED ACCESSIBLE ABLUTION BLOCK | | Yes | 8 m² | 0.0% |
| 47 | PROPOSED CLEANERS STORE | | Yes | 7 m² | 0.0% |
| 48 | PROPOSED CHEMICAL STORAGE | | Yes | 9 m² | 0.0% |
| 49 | PROPOSED CHEM STORAGE PAVEMENT | | Yes | 36 m² | 0.1% |
| 50 | PROPOSED ABLUTION BLOCK 2 | | Yes | 8 m² | 0.0% |
| 51 | PROPOSED COMPACTION RM. | | Yes | 9 m² | 0.0% |
| 52 | PROPOSED FOOTPATH | | Yes | 87 m² | 0.2% |
| 55 | PROPOSED DECKING | | Yes | 156 m² | 0.4% |
| 56 | RUBBISH ENCLOSURE | | Yes | 24 m² | 0.1% |
| 60 | PROPOSED LANDSCAPE | TO LOCAL COUNCIL REQUIREMENTS | No | 1352 m² | 3.8% |
| | | | | 35116 m² | 100.0% |

PROPOSED SITE PERMEABILITY SCHEDULE

| SITE PERMEABILITY | Area | SITE % |
|---|---|---|
| IMPERVIOUS | 20931 m² | 62.4% |
| PERVIOUS | 12588 m² | 37.6% |
| | 33519 m² | 100.0% |

| SITE AREA |
|---|
| 34809 m² |

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

**Figure 3. Proposed Works Site Plan**

## 1.2 Matters for Consideration

The following list of legislation and policy are addressed in this report (**Table 1**).

**Table 1. Relevant Legislation and Policy Addressed**

| Legislation/ Policy | Relevance | Triggered | Action Required |
|---|---|---|---|
| **Environmental Planning and Assessment Act 1979 (EP&A Act)** | The proposed development is being assessed under Part 4 of the EP&A Act. This requires the development to be assessed of impacts to threatened species, populations or communities that are listed under the BC Act. | Yes | This Flora and Fauna Impact Assessment Report includes a Test of Significance under section 7.3 of the BC Act, as required for a DA under Part 4 of the EP&A Act. |
| **Central Coast Council Local Environmental Plan 2022 (LEP)** | The proposed development is being assessed under Part 4 of the EP&A Act. This requires the development to be assessed under the LEP. | Yes | This Flora and Fauna Impact Assessment Report includes information on how the project meets the requirements of the LEP, as required for a DA under Part 4 of the EP&A Act. |
| **Central Coast Council Development Control Plan 2022 (DCP)** | The proposed development is being assessed under Part 4 of the EP&A Act. This requires the development to be assessed under the DCP. | Yes | This Flora and Fauna Impact Assessment Report includes information on how the project meets the requirements of the DCP, as required for a DA under Part 4 of the EP&A Act. |
| **Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)** | The proposed development may indirectly impact upon habitat that could be utilised by threatened species that are listed Matters of National Environmental Significance (MNES) including the Critically Endangered *Corunastylis sp. Charmhaven (NSW896673)* and the Vulnerable *Angophora inopia*.<br><br>The proposed development will only require approval by the Commonwealth Minister for Environment if it is likely to have a significant impact upon a MNES. | Yes | The development should be assessed in accordance with the Significant Impact Criteria Significant Impact Guidelines 1.1 (DCCEEW 2013; **Appendix 2**). Upon completing an impact assessment for all potentially occurring MNES, it was concluded that the development will not pose a significant impact. |
| **Biodiversity Conservation Act 2016 (BC Act)** | Habitat for threatened species or populations listed under the BC Act may be impacted by the proposed development. This includes the Critically Endangered *Corunastylis sp. Charmhaven (NSW896673)* and the Vulnerable Wallum Froglet (*Crinia tinnula*). | Yes | Test of Significance (5-part Test) in accordance with Section 7.3 of the BC Act were undertaken to assess the impact of the proposed development (**Appendix 1**). Upon completing a 5-part Test for all potentially occurring BC Act listed threatened species, it was concluded that the development will not pose a significant impact. |
| **Water Management Act 2000 (WM Act)** | The are no mapped watercourses to be impacted by the proposed development The Development is not located within 40m of a watercourse, water body or wetland therefore it is not a waterfront development. | No | No further action. |
| **State Environmental Planning Policy (Biodiversity and Conservation) Chapter 4 Koala Habitat Protection 2021** | The Subject Property is in a Local Government Area listed in Schedule 1, and Schedule 2. It is not considered to be 'core koala habitat' as it is not considered highly suitable for koalas and is not an area of land with recent proximal koala records. | No | No further action. |
| **State Environmental Planning Policy (Resilience and Hazards) 2021** | The SEPP (Resilience and Hazards) 2021 identifies Coastal Environment Area approximately 87m south-east of the Subject Property and Coastal Use Area approximately 340m south-east of the Subject Property mapping (DPIE 20223a). The Subject Property is not identified as Coastal Wetlands and Littoral Rainforest. | No | No further action. |

## 1.3 Central Coast Local Environmental Plan 2022

The Subject Property is located in Central Coast Council and is therefore subject to the planning provisions of the Central Coast Council LEP. This section details Environmental controls relevant to the terrestrial biodiversity associated with the Subject Property and surrounds (**Table 2**).

**Table 2. Central Coast Local Environmental Plan 2022**

| Local Environmental Plan Reference | Application | Suitable Action |
|---|---|---|
| **Part 2.3 Zone Objectives and Land Use Table** | The Development Footprint is zones 'E4 - General Industrial'. | The proposed development of an Asphalt Plant Upgrade is permitted with consent. This Flora and Fauna Assessment Report accompanies the DA that seeks consent for the proposed development. |
| **Part 5.23 Public Bushland** | The proposed development may indirectly impact upon Public Bushland. | Developments that have the potential to impact public bushland require development consent from the consent authority (i.e., Central Coast Council). This Flora and Fauna Assessment Report accompanies the DA that seeks consent for the proposed development.<br><br>This development may cause indirect impacts to vegetation in nearby public bushland, however, these indirect impacts can be avoided and managed through implementation of the Impact Mitigation Measures (**Section 6**). |

## 1.4 Central Coast Development Control Plan 2022

The Subject Property is located in Central Coast Council and is therefore subject to the planning provisions of the Central Coast Council DCP. This section details Environmental Controls relevant to the terrestrial biodiversity associated with the Subject Property and surrounds (**Table 3**).

**Table 3. Central Coast Development Control Plan 2022**

| Central Coast Development Control Plan 2022 | Application | Suitable Action |
|---|---|---|
| **Chapter 2.9.2.3 Industrial Development – Setbacks** | Wallarah Creek traverses the Subject Property. | All buildings are required to be set-back six metres from the top of Wallarah Creek bank. As per the Environmental Impact Statement (EIS; Element Environment 2023) the closest building on-site is over 200m from Wallarah Creek. |
| **Chapter 2.9.2.3 Industrial Development – Earthworks and Retaining Walls** | The proposed development involves earthworks associated with surface levelling, foundations and trenching pipelines (Element Environment 2023). | The required earthworks will be confined to an area previously disturbed associated with construction of the existing Asphalt Plant to avoid removal of significant vegetation and to minimise disruption on natural drainage patterns. |
| **Chapter 2.9.2.11 Industrial Development – Site Landscape Works** | The proposed development will involve additional landscaping. | To accommodate the proposed development, Fulton Hogan will alter previously approved landscaped areas within the Development Footprint, as well as introduce additional areas of landscaping around the site office, car park and laboratory.<br><br>As per Chapter 2.9.2.11 a Landscape Design Report and associated plan(s) must be prepared by a suitably qualified landscape professional and submitted with the DA. The Environment Impact Statement (Element Environment 2023) confirms all landscaped areas will be integrated with the previously approved landscape plan for DA 552/2010C.<br><br>It is recommended that the additional landscaping is targeted at promoting fauna habitat and bushland corridors. All plants will be endemic species consisting of low, medium, and upper canopy plantings.<br><br>The proposed development must be designed to optimise retention and survival of significant, threatened, and endangered vegetation. Any proposed landscaping must consist only of native flora that already exist on the Subject Property. |

## 1.5 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The Subject Property is located within a Local Government Area listed in Chapter 4 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity Conservation SEPP). A review of NSW Wildlife Atlas data (BioNet) (DPIE 2022c) revealed seven koala records in the 10km locality surrounding the Subject Property. The nearest record is from 2020 approximately 610m south-east of the Subject Property. The Subject Property is not considered to be 'Core Koala Habitat' Habitat' under Chapter 4 of the Biodiversity Conservation SEPP (2021) (DPIE 2021). It does not contain highly suitable koala habitat or have koalas recorded present in the last 18 years.

## 1.6 Qualifying for the NSW Biodiversity Offset Scheme

The requirements of the BC Act and *Biodiversity Conservation Regulation 2017* are mandatory for all development applications assessed pursuant to Part 4 of the EP&A Act submitted in the Central Coast Council Local Government Area.

The BC Act and its regulations stipulate native vegetation clearing 'area threshold' values that determine whether a development is required to be assessed in accordance with the 'Biodiversity Offset Scheme' (BOS). Minimum entry thresholds for native vegetation clearing depend on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan [LEP]), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP). Vegetation clearing includes all lopping, felling, slashing, or mowing of native trees, shrubs, or groundcover for the purpose of construction, landscaping, excavation, or bushfire Asset Protection Zone (APZ) works. Developments that trigger the Biodiversity Offset scheme will require a 'Biodiversity Development Assessment Report' (BDAR) that addresses the Biodiversity Assessment Method and the purchasing of Biodiversity Credits.

The minimum lot size assigned to the Subject Property is 40ha, falling within the '1ha or more' category. To avoid triggering the BOS, the proponent must avoid the clearing/management of native vegetation more than 1ha (**Table 4**). The area of native vegetation to be removed to facilitate this DA falls under the required clearing threshold of 1ha.

**Table 4. Biodiversity Offset Scheme Entry Thresholds**

| Minimum lot size associated with the property | Threshold for clearing, above which the BAM and offsets scheme apply |
|---|---|
| Less than 1 ha | 0.25 ha or more |
| 1 ha to less than 40 ha | 0.5 ha or more |
| **40 ha to less than 1000 ha** | **1 ha or more** |
| 1000 ha or more | 2 ha or more |

The Subject Property has been mapped as containing biodiversity values within the Biodiversity Values (BV) Map (DPIE 2023d) (**Figure 4).** However, the Development Footprint is situated outside of the BV Map.

Owing to the above findings:

- the BOS is not triggered,
- the BAM calculator does not apply,
- an Accredited Assessor is not required to prepare a BDAR for the DA, and
- no offset credit calculations are required.

A Flora and Fauna Impact Assessment Report (this report) including Test of Significance pursuant to section 7.3 of the BC Act (**Appendix 1**) has been produced to assess the impact of the proposed DA.

If any native vegetation within the BV map is removed the BOS will be triggered and the proposed development must be reassessed.


**Figure 4. Mapped Biodiversity values in reference to the Subject Property, the Existing Facility and the Development Footprint (DPIE 2023b)**

# 2. Methods

## 2.1 Sources of Information Used

A thorough literature review of local information relevant to the locality and the Central Coast Council Local Government Area (LGA) was undertaken. Relevant literature that was reviewed in preparation of this report included:

- Relevant State and Commonwealth Databases
  - Protected Matters Search Tool (Commonwealth of Australia Department of the Environment 2023)
  - NSW BioNet. The website of the Atlas of NSW Wildlife (DPIE 2023c)
  - Atlas of Living Australia Spatial Portal (ALA 2022)

- Vegetation and Landscape Mapping
  - eSpade Soil and Land Information (DPIE 2023b)
  - Central Coast Online Mapping (Central Coast Council 2023)
  - NSW WeedWise (DI 2023)

- Council Documents
  - Central Coast Council Local Environmental Plan (LEP) 2022
  - Central Coast Council Development Control Plan (DCP) 2022

- Site-specific Documents of Relevance
  - Plan of Management for a Conservation Area at 203 Tooheys Road Bushells Ridge (Firebird ecoSultants 2018)
  - Proposed Lot 1 DP 832953 Bushells Ridge: Flora and fauna impact assessment – Addendum (biosis 2017)
  - Biodiversity Assessment 2023 203 Tooheys Road, Bushells Ridge – Draft (NGH 2021)
  - Flora and Fauna Impact Assessment Proposed Lot 1 DP 832953 Bushells Ridge. Advisian, 3 August, 2017 Rev 5 (Final) (Advitech 2017)
  - Bushells Ridge Asphalt Plant Upgrade | Designated Development - Environmental Impact Statement. Prepared for Fulton Hogan Industries Pty Ltd (Element Environmental 2023)

Online databases and literature review were utilised to gain an understanding of the natural environment and ecology of the Subject Property and its surrounds to an area of approximately 10 km$^2$. Searches utilising NSW Wildlife Atlas (DPIE 2023c) and the Commonwealth Protected Matters Search Tool (Commonwealth of Australia Department of the Environment 2023) were conducted to identify current threatened and migratory flora and fauna records within a 10km$^2$ search area centred on the Subject Property. This data was used to assist in establishing the presence or likelihood of any such ecological values as occurring on or adjacent the Subject Property.

Soil landscape and geological mapping (DPIE 2023b) was examined to gain an understanding of the environment on the Subject Property and assist in determining whether any threatened flora or ecological communities may occur there.

## 2.2 Ecological Site Assessment

### 1.8.1 General Ecological Survey

Land Eco were not commissioned to undertake a site visit for this proposed development, however Land Eco has previously been commissioned to undertake extensive targeted surveys within the western portion of the Subject Property outside of the Development Footprint. Therefore, Land Eco are familiar with the general site area and have performed a further desktop assessment of the Development Footprint based off information provided by the client and in the Environmental Impact Statement (Element Environment 2023).

### 1.8.2 Vegetation Community Assessment

Land Eco examined local satellite imagery, geological mapping, soil landscape mapping and topographic mapping, in addition to existing vegetation mapping (Central Coast Council 2023; DPE 2011; DPIE 2023b) to stratify the Subject Property and guide the survey efforts. The vegetation community was determined based on desktop analysis of the geomorphology and geology of the Subject Property.

# 3. Native Vegetation

## 3.1 Historical Vegetation Mapping

Central Coast Council (Central Coast Council 2023) has mapped several vegetation communities within vicinity of the Subject Property (**Figure 5**). The majority of the Existing Facility is not mapped. The surrounding mapped vegetation communities include:

- Disturbed – Underscrubbed
- Narrabeen Doyalson Coastal Woodland
- Alluvial Riparian Blackbutt Forest
- Swamp Mahogany – Paperbark Forest
- Buttonderry Footslopes Forest
- Narrabeen Alluvial Sedge Woodland
- Coastal Floodplain Wet Heath
- Disturbed – Regrowth


**Figure 5. Mapped Historical Vegetation in reference to Subject Property (Central Coast Council 2023)**

## 3.2 Confirmed Vegetation

There is no native vegetation proposed for clearing/direct impact by the proposed development. Analysis of recent aerial imagery indicates sparse/heavily mown grass and bare ground. The soil appears dry and compacted. The Development Footprint has no substantial habitat value, with low likelihood of native regeneration. Therefore, the vegetation that occurs within the Development Footprint does not constitute for substantial native vegetation or qualify for any threatened ecological community.

# 4. Threatened Species

## 4.1 Threatened Flora

The NSW Wildlife Atlas online survey tool (DPIE 2023c) was used to obtain a list of threatened flora previously recorded within a 10km radius of the Subject Property (**Table 5**). There were several historical records of threatened flora within the Subject Property including:

- *Tetratheca juncea* – vulnerable (BC Act); vulnerable (EPBC Act)
- *Angophora inopina* – vulnerable (BC Act); vulnerable (EPBC Act)
- *Corunastylis sp. Charmhaven (NSW896673)* – critically endangered (BC Act); critically endangered (EPBC Act)

Land Eco Consulting was previously commissioned by the Subject Property owner to survey for a range of threatened flora species in the remainder of the Subject Property outside of the Development Footprint. Land Eco identified the following threatened flora species (**Figure 6**):

- *Tetratheca juncea* - vulnerable (BC Act); vulnerable (EPBC Act)
- *Angophora inopina* - vulnerable (BC Act); vulnerable (EPBC Act)
- *Corunastylis sp. Charmhaven (NSW896673)* - critically endangered (BC Act); critically endangered (EPBC Act)

Other Ecologists including Advitech (2017) have conducted targeted surveys in 2017 that identified all three species *Tetratheca juncea*, *Angophora inopina* and *Corunastylis sp. Charmhaven (NSW896673)* within the Subject Property (**Figure 6**). Biosis (2021) also identified *Tetratheca juncea* during Winter and Spring targeted surveys in 2021.

The habitat requirements of each species were assessed (DPIE 2023c) in order to determine the likelihood of species occurrence and/or impact from the proposed development.


**Figure 6. Location of threatened flora and fauna species previously recorded within the Subject Property in reference to the Development Footprint by Land Eco Consulting and Advitech (2017)**

**Table 5. List of Threatened Flora that May Occupy the Subject Property at Some Stage of their Lifecycles as Identified by BioNet (DPIE 2021c)**

| Species | BC Act | EPBC Act | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|
| ***Acacia bynoeana*** | Endangered | Vulnerable | Unlikely. This species prefers open habitats that is present within the Subject Site. However, the Development Footprint is highly disturbed and not likely to support a viable population of this species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Angophora inopina*** | Vulnerable | Vulnerable | Present. This species has been previously identified on the Subject Property by Land Eco Consulting and other Ecologists (Advitech 2017), including an individual within the Existing Facility outside of the Development Footprint. This individual already exists given the indirect impacts from the Existing Facility. The Development Footprint is highly disturbed and therefore unlikely to support a viable population of this species. | Yes |
| ***Asperula asthenes*** | Vulnerable | Vulnerable | Unlikely. While damp habitat occurs along the creek within the Subject Property, no suitable damp habitat occurs within the Development Footprint. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Callistemon linearifolius*** | Vulnerable | Not Listed | Unlikely. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Corunastylis sp. Charmhaven (NSW896673)*** | Critically Endangered | Critically Endangered | Present. This species has previously been identified within the Subject Property outside of the Existing Facility and Development Footprint by Land Eco and other Ecologists (Advitech 2017). The Development Footprint is highly disturbed and therefore unlikely to support a viable population of this species. | Yes |
| ***Corybas dowlingii*** | Endangered | Not Listed | Unlikely. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this orchid species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Cryptostylis hunteriana*** | Vulnerable | Vulnerable | Unlikely. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this orchid species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Eucalyptus camfieldii*** | Vulnerable | Vulnerable | Unlikely. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this distinct tree species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Eucalyptus parramattensis subsp. decadens*** | Vulnerable | Vulnerable | Unlikely. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this distinct tree species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Eucalyptus parramattensis subsp. parramattensis - endangered population*** | Endangered Population | Not Listed | Unlikely. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this distinct tree species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |

| Species | BC Act | EPBC Act | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|
| ***Genoplesium insigne*** | Critically Endangered | Critically Endangered | Unlikely. The Subject is highly disturbed therefore not suitable habitat to support a viable population of this orchid species. There are no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Grevillea parviflora subsp. parviflora*** | Vulnerable | Vulnerable | Unlikely. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this distinct shrub species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Maundia triglochinoides*** | Vulnerable | Not Listed | Unlikely. While wetland habitat occurs on Subject Property, the Development Footprint is highly modified with no suitable wetland habitat for this species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Melaleuca biconvexa*** | Vulnerable | Vulnerable | Unlikely. While damp habitat occurs within the Subject Property on alluvial soils, the Development Footprint is highly modified and not suitable habitat to support a viable population of this distinct shrub species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Rhodamnia rubescens*** | Critically Endangered | Critically Endangered | Unlikely. This species prefers rainforest habitat that is absent from the highly modified Development Footprint. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Rutidosis heterogama*** | Vulnerable | Vulnerable | Unlikely. This species is known to occur along the disturbed roadsides. The Development Footprint is heavily disturbed and not suitable habitat to support a viable population of this distinct herb species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Syzygium paniculatum*** | Endangered | Vulnerable | Unlikely. This species prefers rainforest habitat that is absent from the highly modified Development Footprint. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |
| ***Tetratheca juncea*** | Vulnerable | Vulnerable | Moderate. This species has been previously identified on the Subject Property outside of the development footprint by Land Eco Consulting and other Ecologists (Advitech 2017). However all records were restricted to good quality vegetation in the west of the property. The Development Footprint is highly disturbed and therefore not suitable habitat to support a viable population of this species. | No |
| ***Thelymitra adorata*** | Critically Endangered | Critically Endangered | Unlikely. The Subject is highly disturbed therefore not suitable habitat to support a viable population of this large tree species. There are no recent proximal records, and no records from the Subject Property despite extensive surveys undertaken on the property to date. | No |

## 4.2 Threatened Fauna

The NSW Wildlife Atlas online survey tool (DPIE 2023c) was used to obtain a list of threatened fauna previously recorded within a 10km radius of the Subject Property (**Table 7**). There were several historical records of threatened fauna within and in close proximity to the Subject Property including:

- Little Lorikeet (*Glossopsitta pusilla*) – vulnerable (BC Act)
- Squirrel Glider (*Petaurus norfolcensis*) – vulnerable (BC Act)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) – vulnerable (BC Act)
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*) – vulnerable (BC Act)
- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) – vulnerable (BC Act)
- White-throated Needletail (*Hirundapus caudacutus*) – vulnerable (EPBC Act)
- Powerful Owl (*Ninox strenua*) – vulnerable (BC Act)
- Varied Sittella (*Daphoenositta chrysoptera*) – vulnerable (BC Act)

Land Eco Consulting was previously commissioned by the Subject Property owner to survey for a range of threatened fauna species in the remainder of the Subject Property outside of the Development Footprint. Land Eco identified the following threatened fauna species:

- Eastern Cave Bat (*Vespadelus troughtoni*) – vulnerable (BC Act)
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – vulnerable (BC Act)
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*) – vulnerable (BC Act); vulnerable (EPBC Act)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) – vulnerable (BC Act)
- Large-eared Pied Bat (*Chalinolobus dwyeri*) - vulnerable (BC Act); vulnerable (EPBC Act)
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – vulnerable (BC Act)
- Little Bent-winged Bat (*Miniopterus australis*) – vulnerable (BC Act)
- Southern Myotis (*Myotis macropus*) – vulnerable (BC Act)

Additionally, targeted surveys in 2017 conducted by Advitech (2017) recorded Wallum Froglet (*Crinia tinnula*) within the Subject Property outside of the Development Footprint (**Figure 6**). This species is listed as vulnerable under the BC Act.

The Development Footprint has minimal habitat features suitable for use by threatened fauna. The aerial imagery indicates sparse/heavily mown grass and bare ground that holds no substantial habitat value **(Table 6)**.

**Table 6. Threatened fauna habitat features in or adjacent to the Development Footprint**

| Habitat component | Site values |
|---|---|
| Hollow-bearing trees, including dead stags | Nil |
| Large trees with basal cavities | Nil |
| Rock outcrops and bush rock | Nil |
| Caves, crevices and overhangs | Nil |
| Natural burrows | Nil |
| Coarse woody debris (logs) | Nil |
| Wetlands, soaks and streams | Two Stormwater Retention Basins are located within the Existing Facility outside of the Development Footprint that provide suitable habitat for wetland species such as frogs. Further Wetland habitat occurs within the remainder of the Subject Property outside of the Development Footprint. |
| Open water bodies | Nil |
| Nests and roosts | Nil |
| Sap and gum sources (feed trees for gliders) | Nil |
| Distinctive scats or latrine sites | Nil |
| She-oak fruit (Glossy Black Cockatoo feed) | Nil |
| Culverts, bridges, mine shafts, or abandoned structures (microbat subterranean roosts) | Nil. The only remotely possible roosting habitat is discarded heavy machinery, however it is unlikely that this would be used for roosting by microbats. |
| Decorticating bark or palm fronds suitable for microbat roosts | Nil |
| Flying-fox camps | Nil. Nearest is the Grey-headed Flying Fox Camp in Watanobbi, ~8.4km south-east from the Subject Property (National Flying-fox monitoring viewer; DCCEEW 2023). |

| Habitat component | Site values |
|---|---|
| Nectar-bearing trees (e.g. winter-flowering) | Nil |
| Lerp-bearing trees | Nil |
| Nectar-bearing shrubs | Nil |
| Mistletoes | Nil |
| Koala browse trees | Nil |
| Seed-bearing trees and shrubs | Nil |
| Soft-fruit-bearing trees or shrubs | Nil |
| Dense shrubbery and leaf litter | Nil |
| Dense grassland | Nil |
| Estuarine, beach, mudflats, and rocky foreshores | Nil |

**Table 7. List of Threatened Fauna that May Occupy the Subject Property at Some Stage of their Lifecycles as Identified by BioNet**

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Amphibia** | *Crinia tinnula* | Wallum Froglet | Vulnerable | Not Listed | Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests.<br>The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months, but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs (DPIE 2022d). | Low. This species may utilise the habitat within the retention basins in the Existing Facility outside of the Development Footprint on rare occasion. Further suitable habitat occurs in the remainder of the Subject Property in wetland habitat and along Wallarah creek. There are 79 records of this species in the locality. This includes a record from 2012 approximately 1km west of the Development Footprint and three records from 2011 approximately 400m to the north. This species was recorded during targeted surveys within the Subject Property in 2017 by other Ecologists (Advitech 2017). However, this species was not recorded during targeted surveys by Land Eco Consulting of the remainder of the Subject Property outside of the Development Footprint. These targeted surveys were conducted in 2023 along Wallarah Creek and wetland areas throughout the Subject Property. Call-playback was completed on 4 separate nights from 28-31 March 2023. | Yes |
| **Amphibia** | *Litoria aurea* | Green and Golden Bell Frog | Endangered | Vulnerable | Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.*) or spikerushes (*Eleocharis spp.*). | Unlikely. Only three historical records of this species in the locality. This species was not recorded during targeted surveys of the remainder of the Subject Property outside of the Development Footprint. | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Amphibia** | *Litoria brevipalmata* | Green-thighed Frog | Vulnerable | Not Listed | Green-thighed Frogs occur in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain. It prefers wetter forests in the south of its range, but extends into drier forests in northern NSW and southern Queensland (DPIE 2022d). | Unlikely. Four records in the locality, none since 2003. This species was not recorded during targeted surveys of the remainder of the Subject Property outside of the Development Footprint. | No |
| **Amphibia** | *Mixophyes iteratus* | Giant Barred Frog | Endangered | Endangered | Giant Barred Frogs are found along freshwater streams with permanent or semi-permanent water, generally (but not always) at lower elevation. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. However, Giant Barred Frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams. | Unlikely. Only three records of this species in the locality, only one recent record from 2022 approximately 3.9km north-west of the Development Footprint with minimal habitat connectivity. This species was not recorded during targeted surveys of the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Anthochaera phrygia* | Regent Honeyeater | Critically Endangered | Critically Endangered | The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. | Unlikely. The habitat is too heavily disturbed by the close proximity to people, cars and machinery. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Artamus cyanopterus cyanopterus* | Dusky Woodswallow | Vulnerable | Not Listed | Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. | Unlikely. The habitat is too heavily disturbed by the close proximity to people, cars and machinery. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Aves** | *Botaurus poiciloptilus* | Australasian Bittern | Endangered | Endangered | Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.).<br>Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.<br>Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.<br>Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch. | Low. The Subject Property has suitable wetland habitat with *Typha spp*. Presence of large proximal wetlands such as Budgewoi Lake indicate that this species may forage on rare occasion on the Subject Property. However, the Development Footprint is heavily modified and unlikely that the species would forage amongst the highly modified habitat. | No |
| **Aves** | *Callocephalon fimbriatum* | Gang-gang Cockatoo | Vulnerable | Endangered | In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests.<br>In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.<br>Favours old growth forest and woodland attributes for nesting and roosting. | Low. Suitable feed trees occur within vicinity of the Development Footprint. However, preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Calyptorhynchus lathami* | Glossy Black-Cockatoo | Vulnerable | Vulnerable | Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. | Low. This species was identified to be foraging and breeding on the western edge of the Subject Property outside of the Development Footprint (**Figure 6**). However, the habitat within the Development Footprint is too heavily disturbed by the close proximity to people, cars and machinery. | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Aves** | *Climacteris picumnus victoriae* | Brown Treecreeper (eastern subspecies) | Vulnerable | Not Listed | Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. | Unlikely. The habitat is too heavily disturbed by the close proximity to people, cars and machinery. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Daphoenositta chrysoptera* | Varied Sittella | Vulnerable | Not Listed | Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. | Low. This species has previously been recorded within the Subject Property on BioNet. However, the habitat within the Development Footprint is too heavily disturbed by the close proximity to people, cars and machinery for this sensitive woodland bird to inhabit. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Ephippiorhynchus asiaticus* | Black-necked Stork | Endangered | Not Listed | Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. | Low. The Subject Property has wetland habitat. Presence of large proximal wetlands such as Budgewoi Lake indicate that this species may forage on rare occasion on the Subject Property. However, the Development Footprint is heavily modified and unlikely that the species would forage amongst the highly modified habitat. | No |
| **Aves** | *Glossopsitta pusilla* | Little Lorikeet | Vulnerable | Not Listed | Occurs most commonly in open woodlands and forests where it forages on lerp and nectar from flowering | Low. This species has previously been recorded within the Subject Property. However, this species is unlikely to | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| | | | | | *Eucalyptus spp., Corymbia spp.,* and *Angophora spp.* Nests in hollows in tall, smooth-barked trees typically along watercourses. | regularly utilise the habitat within the Development Footprint for foraging or breeding as it is too heavily disturbed by the close proximity to people, cars and machinery. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | |
| **Aves** | *Haliaeetus leucogaster* | White-bellied Sea-Eagle | Vulnerable | Not Listed | Habitats are characterised by the presence of large areas of open water. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).<br>Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby. | Low. This species has previously been recorded flying in the vicinity of the Subject Property. This species is likely to fly over the Development Footprint, however the Development Footprint has minimal habitat value for the species to hunt within. Preferential habitat for hunting, roosting and potential breeding occurs in the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Hieraaetus morphnoides* | Little Eagle | Vulnerable | Not Listed | Occupies open eucalypt forest, woodland or open woodland. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. | Low. This species is likely to fly over the Development Footprint, however the Development Footprint has minimal habitat value for the species to hunt within. Preferential habitat for hunting, roosting and potential breeding occurs in the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Hirundapus caudacutus* | White-throated Needletail | Protected | Vulnerable | In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest. Does not breed in Australia. | Low. Will forage over the Development Footprint. Is an aerial forager only that will not be impacted by the proposed development. | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Aves** | *Ixobrychus flavicollis* | Black Bittern | Vulnerable | Not Listed | Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. | Low. The Subject Property has wetland habitat. Presence of large proximal wetlands such as Budgewoi Lake indicate that this species may forage on rare occasion on the Subject Property. However, the Development Footprint is heavily modified and unlikely that the species would forage amongst the highly modified habitat. | No |
| **Aves** | *Lathamus discolor* | Swift Parrot | Endangered | Critically Endangered | Migrates to the Australian south-east mainland between February and October.<br>On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. | Low. This species is unlikely to regularly utilise the habitat within the Development Footprint for foraging or breeding as it is too heavily disturbed by the close proximity to people, cars and machinery. No suitable feed trees within the Development Footprint. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Limicola falcinellus* | Broad-billed Sandpiper | Vulnerable | Not Listed | Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. Occasionally, individuals may be recorded in sewage farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches. | Unlikely. Development Footprint contains no suitable habitat for roosting or foraging. | No |
| **Aves** | *Lophoictinia isura* | Square-tailed Kite | Vulnerable | Not Listed | Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. | Low. This species is likely to fly over the Development Footprint, however the Development Footprint has minimal habitat value for the species to hunt within. Preferential habitat for hunting, roosting and potential breeding occurs in the remainder of the Subject Property outside of the Development Footprint. | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Aves** | *Ninox connivens* | Barking Owl | Vulnerable | Not Listed | Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. It nests in large hollows greater than 20cm in diameter in trees that are at least eight metres above ground. | Low. This species is likely to fly over the Development Footprint, however the Development Footprint has minimal habitat value for the species to hunt within. Preferential habitat for hunting, roosting and potential breeding occurs in the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Ninox strenua* | Powerful Owl | Vulnerable | Not Listed | The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, and a number of eucalypt species. | Low. Present within close proximity to the Subject Property. This species is likely to fly over the Development Footprint, however the Development Footprint has minimal habitat value for the species to hunt within. Preferential habitat for hunting, roosting and potential breeding occurs in the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Pandion cristatus* | Eastern Osprey | Vulnerable | Not Listed | Favour coastal areas, especially the mouths of large rivers, lagoons and lakes.<br>Feed on fish over clear, open water. | Unlikely. No suitable open water habitat for this species to forage upon within the Development Footprint. This species is more likely to forage, roost and breed at the large proximal wetlands in the locality such as Budgewoi Lake and Lake Munmorah. | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Aves** | *Petroica boodang* | Scarlet Robin | Vulnerable | Not Listed | The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. | Unlikely. The habitat within the Development Footprint is too heavily disturbed by the close proximity to people, cars and machinery for this sensitive woodland bird. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Ptilinopus superbus* | Superb Fruit-Dove | Vulnerable | Not Listed | Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. | Unlikely. No suitable rainforest habitat. | No |
| **Aves** | *Sternula alnifrons* | Little Tern | Endangered | Not Listed | Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records).<br>Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. | Unlikely. The Development Footprint contains no suitable habitat for roosting or foraging. | No |
| **Aves** | *Tyto novaehollandiae* | Masked Owl | Vulnerable | Not Listed | Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. | Low. This species is likely to fly over the Development Footprint, however the Development Footprint has minimal habitat value for the species to hunt within. Preferential habitat for hunting, roosting and potential breeding occurs in the remainder of the Subject Property outside of the Development Footprint. | No |
| **Aves** | *Tyto tenebricosa* | Sooty Owl | Vulnerable | Not Listed | Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Nests in very large tree-hollows. | Low. This species is likely to fly over the Development Footprint, however the Development Footprint has minimal habitat value for the species to hunt within. Preferential habitat for hunting, | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| | | | | | | roosting and potential breeding occursin the remainder of the Subject Property outside of the Development Footprint. | |
| **Mammalia** | *Cercartetus nanus* | Eastern Pygmy-possum | Vulnerable | Not Listed | Found in a broad range of habitats from rainforest through sclerophyll forest, but in most areas woodlands and heath appear to be preferred.<br>Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. | Low. The Development Footprint is too disturbed and fragmented. Suitable habitat occurs in the remainder of the Subject Property outside of the Development Footprint. However, extensive targeted surveys by Land Eco have not identified the presence of this species within the western portion of the Subject Property. | No |
| **Mammalia** | *Chalinolobus dwyeri* | Large-eared Pied Bat | Vulnerable | Vulnerable | Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies. | Low. Present within proximity to the Subject Property. However, the Development Footprint is unlikely to represent an important source for this species. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. | No |
| **Mammalia** | *Dasyurus maculatus* | Spotted-tailed Quoll | Vulnerable | Endangered | Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.<br>Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. | Low. The Development Footprint is an exposed habitat patch that is highly disturbed with low foraging potential. The Development Footprint would not form important habitat for this species. Preferential habitat occurs in the remainder of the Subject Property outside of the Development Footprint. | No |
| Mammalia | *Falsistrellus tasmaniensis* | Eastern False Pipistrelle | Vulnerable | Not Listed | Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.<br>Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. | Low. Present within proximity to the Subject Property. However, the Development Footprint is unlikely to represent an important source for this species. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Mammalia** | *Micronomus norfolkensis* | Eastern Coastal Free-tailed Bat | Vulnerable | Not Listed | Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. | Low. Present within proximity to the Subject Property. However, the Development Footprint is unlikely to represent an important source for this species. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. | No |
| **Mammalia** | *Miniopterus australis* | Little Bent-winged Bat | Vulnerable | Not Listed | Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.<br>Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. | Low. Present within proximity to the Subject Property. However, the Development Footprint is unlikely to represent an important source for this species. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. | No |
| **Mammalia** | *Miniopterus orianae oceanensis* | Large Bent-winged Bat | Vulnerable | Not Listed | Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. | Low. Present within proximity to the Subject Property. However, the Development Footprint is unlikely to represent an important source for this species. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. | No |
| **Mammalia** | *Myotis macropus* | Southern Myotis | Vulnerable | Not Listed | Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.<br>Forage over streams and pools catching insects and small fish by raking their feet across the water surface. | Moderate. This species was recorded by Land Eco Consulting in March and April 2023 within proximity to the Subject Property. This species may forage in and around the stormwater basins within the Existing Facility on occasion. However, suitable habitat occurs in the remainder of the Subject Property in wetland habitat and along Wallarah creek. | Yes |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Mammalia** | *Petauroides volans* | Greater Glider | Endangered | Endangered | The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. | Unlikely. The Development Footprint has low habitat suitability for this species. The habitat is too heavily disturbed by the close proximity to people, cars and machinery. Preferential habitat occurs within the remainder of the Subject Property outside of the Development Footprint. No recent proximal records with direct habitat connectivity. | No |
| **Mammalia** | *Petaurus australis* | Yellow-Bellied Glider | Vulnerable | Vulnerable | Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. | Unlikely. Low-suitability habitat within the Development Footprint as it is disturbed and fragmented. Suitable habitat occurs along Wallarah Creek within the Subject Property for this species. | No |
| **Mammalia** | *Petaurus norfolciensis* | Squirrel Glider | Vulnerable | Not Listed | Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Require abundant Tree Hollows for refuge and nest sites. Diet consists of *Acacia* Gum, eucalypt sap, nectar honeydew and manna, with invertebrates providing protein. | Present within the Subject Property. This species has previously been recorded on BioNet within the Subject Property. However, this species has not been recorded in the Subject Property since 2012 and extensive targeted surveys by Land Eco has not identified the presence of this species within the western portion of the Subject Property. This species is unlikely to utilise the low suitability habitat within Development Footprint as it is heavily disturbed. Better habitat utilised by Sugar Gliders exists in the western portion of the Subject Property outside of the Development Footprint. | No |
| **Mammalia** | *Phascolarctos cinereus* | Koala | Endangered | Endangered | Inhabit eucalypt woodlands and forests. | Unlikely. The Development Footprint is too open and disturbed by people, cars and machinery. The Development Footprint is not considered to be 'core koala habitat' as it is does not contain highly suitable koala habitat (small patch | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| | | | | | | surrounded by roads) or have koalas recorded present. This species may pass through the remainder of the Subject Property outside of the Development Footprint on rare occasion. | |
| **Mammalia** | *Phoniscus papuensis* | Golden-tipped Bat | Vulnerable | Not Listed | Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, Casuarina-dominated riparian forest and coastal Melaleuca forests. Roost mainly in rainforest gullies on small first- and second-order streams in usually abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests modified with an access hole on the underside. Bats may also roost under thick moss on tree trunks, in tree hollows, dense foliage and epiphytes. | Unlikely. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. The Development Footprint is unlikely to represent an important source for this species. | No |
| **Mammalia** | *Pseudomys gracilicaudatus* | Eastern Chestnut Mouse | Vulnerable | Not Listed | Mostly found, in low numbers, in heathland and is most common in dense, wet heath and swamps. Optimal habitat appears to be in vigorously regenerating heathland burnt from 18 months to four years previously. By the time the heath is mature, the larger Swamp Rat becomes dominant, and Eastern Chestnut Mouse numbers drop again. | Unlikely. No suitable heathland habitat within the Development Footprint. The habitat is low suitability as it is heavily disturbed by people, cars and machinery and supports pest rodent species that will outcompete this sensitive rodent. | No |
| **Mammalia** | *Pteropus poliocephalus* | Grey-headed Flying-fox | Vulnerable | Vulnerable | Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. | Low. This species may on occasion fly over the Development Footprint to access preferential habitat within the remainder of the Subject Property outside of the Development Footprint. No roost camps are recorded within or in close proximity to the Development Footprint (nearest camp ~8.4km south-east from the Subject Property in Wattanobi). | No |

| Class | Scientific Name | Common Name | BC Act | EPBC Act | Habitat Required (OEH Species Profiles) | Likelihood of Occurrence within the Development Footprint and Immediate Adjacent Areas | 5-Part Test Required? |
|---|---|---|---|---|---|---|---|
| **Mammalia** | *Saccolaimus flaviventrus* | Yellow-bellied Sheathtail-bat | Vulnerable | Not Listed | Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. | Unlikely. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. The Development Footprint is unlikely to represent an important source for this species. | No |
| **Mammalia** | *Scoteanax rueppellii* | Greater Broad-nosed Bat | Vulnerable | Not Listed | Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. | Low. Present within proximity to the Subject Property. However, the Development Footprint is unlikely to represent an important source for this species. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. | No |
| **Mammalia** | *Vespadelus troughtoni* | Eastern Cave Bat | Vulnerable | Not Listed | A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. | Low. Present within proximity to the Subject Property. However, the Development Footprint is unlikely to represent an important source for this species. The Existing Facility operates 24 hours a day seven days a week. This renders the habitat within the Development Footprint largely unsuitable for this nocturnal species. | No |
| **Reptilia** | *Hoplocephalus stephensii* | Stephens' Banded Snake | Vulnerable | Not Listed | Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day. | Unlikely. Only one record in the locality from 2008 along the Motorway Link road site approximately 1.1km south-east of the Subject Property. No suitable rock outcrop or similar proximal habitat. | No |

# 5. Impact Summary

This section of the report provides a summary of impacts to biodiversity because of the proposed development upon threatened species, populations and ecological communities listed under the BC Act.

## 5.1 Vegetation Effects

The Development Footprint has limited ecological value. The Development Footprint has been historically degraded and cleared for the existing Asphalt Plant. The proposed development will result in approximately 0.047ha of existing approved landscaping being removed. This area consists of sparse/heavily mown grass and bare ground that appears to have no substantial habitat value from aerial imagery, with low likelihood of native regeneration.

## 5.2 Threatened Species Effects

Threatened flora species have previously been recorded on BioNet, by Land Eco Consulting and other Ecologists (Advitech 2017) on the Subject Property within close proximity to the proposed development (**Figure 6**). This includes *Angophora inopina* and *Corunastylis sp. Charmhaven (NSW896673)*.

A single specimen of the BC Act and EPBC Act listed Vulnerable *Angophora inopina* tree has been previously identified by Land Eco Consulting near the southern edge of the Existing Facility. A test of significance pursuant to section 7.3 of the BC Act and an impact significance assessment in accordance with Significant impact guidelines 1.1 EPBC Act 1999 confirmed that it is unlikely the species would be significantly impacted by the proposed development. It is unlikely that this species would occur within the Development Footprint, including within the seedbank. The location of the development is simply too disturbed from existing plant operations.

A significant population of the BC Act and EPBC Act listed Critically Endangered *Corunastylis sp. Charmhaven (NSW896673)* orchid has been identified in proximity to the Development Footprint by Land Eco Consulting in 2023 and other Ecologists in 2017 (Advitech 2017) (**Figure 6**). This critically endangered orchid is more susceptible to potential indirect impacts from the proposed development. Accordingly, a test of significance pursuant to section 7.3 of the BC Act and an impact significance assessment in accordance with Significant impact guidelines 1.1 EPBC Act 1999 was prepared to assess the significance of the proposed development including indirect impacts upon *Corunastylis sp. Charmhaven (NSW896673)*. It was confirmed that the proposed development is unlikely to significantly impact the species.

It is possible that the BC Act listed Vulnerable Wallum Froglet and Southern Myotis may occur near the stormwater detention basins within the Existing Facility. The Southern Myotis was identified by Land Eco Consulting in proximity to the Subject Property in 2023. The Wallum Froglet was identified by Advitech (2017) within the Subject Property outside of the Development Footprint. However, these species are unlikely to utilise the landscaping habitat to be removed in the Development Footprint as the ground appears to be too dry and compacted, and the groundcover vegetation is sparse.

These two fauna species may be impacted through indirect impacts such as increased noise and dust, accidental chemical spill from machinery, and wastewater/ stormwater runoff. A test of significance pursuant to section 7.3 of the BC Act was prepared in this report to assess the significance of the proposed development including indirect impacts upon the Wallum Froglet and the Southern Myotis. It was confirmed that the proposed development is unlikely to significantly impact upon these species.

# 6. Impact Mitigation Measures

A suite of impact mitigation measures is proposed in order to avoid, minimise and mitigate impacts to threatened species from the proposed development (**Table 8**). A more detailed suit of mitigation and management measures are detailed in the Environmental Impact Statement (Element Environment 2023).

**Table 8. Measures to be Implemented Before, During and After Construction to Avoid and Minimise the Impacts of the Project**

| Action | Mitigation Measure / Outcome | Timing |
|---|---|---|
| **Project Location and Design** | The location of the proposed development is limited to the existing developed portion of the Subject Property currently used for asphalt production. The Development Footprint including the existing landscaping to be removed is situated outside of the BV mapping on the Subject Property. The proposed development does not require any vegetation clearing of habitat value. | Pre-construction phase |
| **Engage Project Ecologist** | A suitably qualified and experience Ecologist with a minimum of a tertiary degree in a relevant discipline, and license under the NSW Department of Planning Industry and Environment should be engaged to oversee the implementation of the impact mitigation measures in this report. | Pre-construction Phase |
| **Signage** | Permanent signage should be erected where the site facility abuts retained vegetation areas to warn of the potential impacts on threatened species including the Wallum Froglet, *Angophora inopina* and *Corunastylis sp. Charmhaven (NSW896673)* for accidental chemical spill down the slope into the retention basins and surrounding bushland. Signs should state:<br>1. "Do not enter. Beware of threatened orchids and frogs in this area" and<br>2. "Refuelling of machinery is restricted to bunded appropriate areas". This will ensure that operators and construction personnel are aware of the potential impact risk. | Design, construction phase Operational phase |
| **Preventing Release of Coarse Pollutants and Accidental Chemical Spills** | To avoid contaminating the nearby wetland habitat that the Wallum Froglet and Southern Myotis may be utilising, management of coarse pollutants and dust should be incorporated into daily site 'housekeeping'. Where dust washed off handstand, plant or machinery, this dust should not be allowed to run-off into the surrounding catchment. Appropriated sediment traps should be maintained to capture sediment.<br><br>It is recommended that refuelling of machinery is restricted to bunded hardstand surfaces only. Chemical spill kits must be available at all times in case of an accidental chemical spill during the construction and operation of the facility. | Design, construction phase Operational phase |
| **Threatened Flora Species Protection** | As per the Conservation Plan of Management (Firebird ecoSultants 2018) the existing asphalt plant was designed due to the discovery of a large population of *Corunastylis sp. Charmhaven (NSW896673)* orchids by Advitech (2017). Firebird ecoSultants (2018) indicated that 80 orchids recorded on the Subject Property was retained within a conservation area, with a minimum 20m buffer between the retained orchids and the development area. The proposed development must maintain the 20m buffer between the conservation area and the development.<br><br>It is recommended that there is a recommencement of the three-year monitoring and reporting program that was outlined in the *Plan of Management for a Conservation Area at 203 Tooheys Road Bushells Ridge* (Firebird ecoSultants 2018). An updated Vegetation Management Plan must be submitted as a condition of consent. At minimum population monitoring must take place bi-annually for *Corunastylis sp. (NSW896673)* and *Angophora inopina*, via targeted surveys. A monitoring report must be submitted to council. The monitoring must be undertaken in December and in February to encapsulate the flowering period of different species. | Design, construction phase Operational phase |
| **Stormwater Management** | Any stormwater generated will be processed into the existing stormwater detention basins. | Design, construction phase Operational phase |
| **Wastewater Management** | Sewage will be directed into the existing piped sewage system and managed best practice as required by Central Coast Council (Decentalised Water 2023). The proposed Wisconsin Mound will direct discharge into the existing artificial swale drains (**Figure 2**; **Figure 3**). This is unlikely to encroach on the known orchid habitat adjacent to the Asphalt Plant.<br>The proposed wastewater system is highly efficient and compliant with Australian Standards for treating waste water. The wastewater treatment system includes an intercept trench at the downslope of the Wisconsin mound to capture any untreated/ treated water | Design, construction phase Operational phase |

| Action | Mitigation Measure / Outcome | Timing |
|---|---|---|
| | accidentally discharging from the mound into the surrounding bushland. No treated water will be discharged to the buffer areas.<br><br>As per the Environmental Impact Statement (Element Environment 2023) *"the proposed development will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system."* | |
| **Erosion and Sedimentation** | Appropriate erosion and sediment control will be erected and maintained during construction. At minimum such measures will comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004). | Design, construction phase Operational phase |
| **Dust Suppression** | Dust suppression techniques will be enforced to reduce impacts on local fauna and flora. Watercarts and dust control systems must be maintained as frequently as requires. | Construction phase Operational phase |
| **Noise Suppression** | Existing noise suppression techniques will be maintained and enforced to reduce impacts on local fauna. | Design, construction phase Operational phase |
| **Minimising Artificial lighting** | Given the existing facility operates 24/7 with artificial lighting, it is unlikely the proposed development will increase the lighting levels above the base level. | Design, construction phase Operational phase |
| **Storage and Stockpiling (Soil and Materials)** | All storage, stockpile and laydown sites will be established away from any native vegetation that is planned to be retained. The applicant will never stockpile under the 'drip zone' of a tree. The applicant will avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site.<br><br>Stockpiles should also be located outside of flow paths that may impact the water quality of the nearby habitat for the Wallum Froglet. It is also recommended to minimise stockpile storage time where practicable. | Design, construction phase Operational phase |
| **Weed and pathogen prevention** | Avoid distributing weeds and pathogens on and off site by implementing suitable vehicle and equipment controls, for example checking vehicles prior to leaving the work area to remove soil and any plant matter including seeds. | Design, construction phase Operational phase |

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# 8. Appendices

## Appendix 1. Biodiversity Conservation Act 2016 - Test of Significance (5 Part Test)

**Flora**

- *Corunastylis sp. Charmhaven (NSW896673)* – critically endangered (BC Act)
- *Angophora inopina* – vulnerable (BC Act)

**Fauna**

- *Crinia tinnula* (Wallum Froglet) – vulnerable (BC Act)
- *Myotis macropus* (Southern Myotis) – vulnerable (BC Act)

| **Test of Significance<br>(Five Part Test)<br>s.7.3 of the Biodiversity Conservation Act 2016<br><br>*Corunastylis sp. Charmhaven (NSW896673)*<br><br>Status: Critically Endangered** | | |
|---|---|---|
| **Ecology<br>(DPIE 2023c)** | It occurs within low woodland to heathland with a shrubby understorey and ground layer. Dominants include Black She-oak (*Allocasuarina littoralis*), Prickly Tea-tree (*Leptospermum juniperinum*), Prickly-leaved Paperbark (*Melaleuca nodosa*), Narrow-leaved Bottlebrush (*Callistemon linearis*) and Zig-zag Bog-rush (*Schoenus brevifolius*). | |
| **Habitat Impacted by this Activity/Development** | A significant population of *Corunastylis sp. Charmhaven (NSW896673)* was identified by Land Eco Consulting in 2023 in the western portion of the Subject Property outside of the Development Footprint (**Figure 6**). Previous consultants (Firebird ecoSultants 2018) found this species in bushland to the south of the proposed development. No area of native groundcover suitable for this species will be directly cleared for the development.<br><br>Although, it is unlikely any individuals of this species occur within the Development Footprint given the heavily disturbed nature and heavily compacted bare ground, indirect impacts from the proposed may impact upon this significant population.<br><br>Indirect impacts such as an accidental chemical spill, stormwater runoff, accidental release of wastewater from Wisconsin mounds, and the spread and introduction of novel weeds may impact upon the *Corunastylis sp. Charmhaven (NSW896673)*. However, these indirect impacts are unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition. The Subject Property is already heavily weed infested and disturbed with rubbish. As per the EIS (Element Environment 2023):<br>*"The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system."*<br><br>Although the proposed Wisconsin Mound is adjacent to the known orchid habitat which risks indirect impacts, spillage will be managed by including an intercept trench downslope of the Winconsin Mound to capture any treated/untreated water discharging from the mound into habitat for the orchid. | |
| **(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,** | All individuals identified by Land Eco Consulting is likely to continue occur within the western portion of the Subject Property outside of the Development Footprint post development.<br><br>Given the heavily modified state of the Development Footprint from past earthworks and the Existing Facility it is unlikely this species would persist in the soil seedbank within the Development Footprint.<br><br>Indirect impacts are unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition.<br><br>This considered, the proposed development is not likely to have an adverse effect on the life cycle of the species such that the local population will be at risk of extinction. | |
| **(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:** | (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or | N/A |
| | (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction, | N/A |
| **(c) in relation to the habitat of a threatened species or ecological community:** | (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and | No individuals of this species and no known suitable habitat will be directly removed for the proposed development.<br><br>Indirect impacts may have potential to modify habitat, however these impacts are unlikely. Such indirect impacts accidental chemical spill, stormwater runoff, accidental release of wastewater from Wisconsin mounds, and the spread and introduction of novel weeds may impact upon |

| **Test of Significance**<br>**(Five Part Test)**<br>**s.7.3 of the Biodiversity Conservation Act 2016**<br><br>***Corunastylis sp. Charmhaven (NSW896673)***<br><br>**Status: Critically Endangered** | | |
|---|---|---|
| | | the nearby significant population of *Corunastylis sp. Charmhaven (NSW896673)*. |
| | (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and | The habitat within the Development Footprint is already disturbed and fragmented from the remainder of the Subject Property where the known significant population occurs due to existing industrial land usage. |
| | (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality, | The habitat to be directly removed is unlikely to represent an important source for this species in the locality. The Development Footprint is heavily modified with hardstand surfaces and patches of compressed bare soil. Indirect impacts may impact upon the important population in the western portion of the Subject Property outside of the Development Footprint. However, if indirect impacts did occur it is unlikely that the proposed development would significantly exacerbate the effect of these indirect impacts beyond the current state from the Existing Facility. |
| **(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),** | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly. | |
| **(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.** | The Subject Property is already impacted by several key threatening processes including:<br>• Invasion of native plant communities by exotic perennial grasses<br>• Invasion and establishment of exotic vines and scramblers<br>• Invasion, establishment and spread of Lantana (Lantana camara L. sens. lat)<br>• Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants<br>• Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanocephala*)<br>• Clearing of native vegetation<br>• Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.<br><br>These processes have degraded the condition of this habitat and its potential to be utilised by threatened species. No additional key threatening processes are likely to result from the proposed development. | |

| **Test of Significance<br>(Five Part Test)<br>s.7.3 of the Biodiversity Conservation Act 2016<br><br>*Angophora inopina*<br><br>Status: Vulnerable** | | |
|---|---|---|
| **Ecology<br>(DPIE 2023c)** | Occurs most frequently in four main vegetation communities: (i) *Eucalyptus haemastoma–Corymbia gummifera–Angophora inopina woodland/forest*; (ii) *Hakea teretifolia–Banksia oblongifolia* wet heath; (iii) *Eucalyptus resinifera–Melaleuca sieberi–Angophora inopina* sedge woodland; (iv) *Eucalyptus capitellata–Corymbia gummifera–Angophora inopina* woodland/forest. | |
| **Habitat Impacted by this Activity/Development** | This species has previously been identified on the Subject Property by Land Eco Consulting and other Ecologists (Advitech 2017), including an individual within the Existing Facility outside of the Development Footprint.<br><br>Indirect impacts such as an accidental chemical spill, stormwater runoff, accidental release of wastewater from Wisconsin mounds, and the spread and introduction of novel weeds may impact *Angophora inopina*. However, these indirect impacts are unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition. *Angophora inopina* already exists given the indirect impacts from the Existing Facility. As per the EIS (Element Environment 2023):<br>*"The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system."*<br><br>The Development Footprint is highly disturbed and therefore unlikely to support a viable population of this species. | |
| **(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,** | All individuals identified by Land Eco Consulting and other Ecologists in the Subject Property are likely to continue occur post development.<br><br>Given the heavily modified state of the Development Footprint from past earthworks and the Existing Facility it is unlikely this species would persist in the soil seedbank within the Development Footprint.<br><br>Indirect impacts may occur. Despite being unlikely, if they did occur, such impacts are unlikely to have an adverse effect on the lifecycle of the species such that the species are placed at risk of extinction.<br><br>This considered, the proposed development is not likely to have an adverse effect on the life cycle of the species such that the local population will be at risk of extinction. | |
| **(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:** | (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or | N/A |
| | (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction, | N/A |
| **(c) in relation to the habitat of a threatened species or ecological community:** | (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and | No individuals of this species and no known suitable habitat will be directly cleared/removed for the proposed development.<br><br>Albeit unlikely, indirect impacts from the proposed development may impact upon the nearby *Angophora inopina* individuals. |
| | (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and | The habitat within the Development Footprint is already disturbed and fragmented from the remainder of the Subject Property where several individuals occur due to existing industrial land usage. |

| **Test of Significance**<br>**(Five Part Test)**<br>**s.7.3 of the Biodiversity Conservation Act 2016**<br><br>***Angophora inopina***<br><br>**Status: Vulnerable** | | |
|---|---|---|
| | (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality, | The habitat to be directly removed is unlikely to represent an important source for this species in the locality. The Development Footprint is heavily modified with hardstand surfaces and patches of compressed bare soil. Albeit unlikely, indirect impacts may impact upon *Angophora inopina* individuals in the Subject Property outside of the Development Footprint. However, if indirect impacts did occur it is unlikely that the proposed development would significantly exacerbate the effect of these indirect impacts beyond the current state from the Existing Facility. |
| **(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),** | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly. | |
| **(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.** | The Subject Property is already impacted by several key threatening processes including:<br>• Invasion of native plant communities by exotic perennial grasses<br>• Invasion and establishment of exotic vines and scramblers<br>• Invasion, establishment and spread of Lantana (Lantana camara L. sens. lat)<br>• Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants<br>• Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanocephala*)<br>• Clearing of native vegetation<br>• Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.<br><br>These processes have degraded the condition of this habitat and its potential to be utilised by threatened species. No additional key threatening processes are likely to result from the proposed development. | |

| **Test of Significance<br>(Five Part Test)<br>s.7.3 of the Biodiversity Conservation Act 2016<br><br>*Crinia tinnula* (Wallum Froglet)<br><br>Status: Vulnerable** | | |
|---|---|---|
| **Ecology<br>(DPIE 2023c)** | Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests.<br><br>The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months, but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs.<br><br>Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge. | |
| **Habitat Impacted by this Activity/Development** | The Existing Facility contains potential habitat in the stormwater retention basins. Further wetland habitat exists along Wallarah Creek The proposed development is unlikely to directly disturb the existing retention basins.<br><br>The Wallum Froglet is unlikely to shelter within the Development Footprint as it is sparse/heavily mown grass and bare ground. The soil appears too dry and compacted on the aerial imagery for this species that prefers to shelter at wet or very damp sites.<br><br>Albeit unlikely, indirect impacts may impact upon the habitat in the existing retention basin through stormwater runoff, accidental release of wastewater from the Wisconsin mound, and increased dust . However, if these indirect impacts did occur it is unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition. As per the EIS (Element Environment 2023):<br>"*The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system.*" | |
| **(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,** | No suitable habitat is likely to be directly impacted by the proposed development. Albeit unlikely, indirect impacts may occur, and if they did occur are unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition.<br><br>As such, the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species could be placed at risk of extinction. | |
| **(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:** | (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or | N/A |
| | (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction, | N/A |
| **(c) in relation to the habitat of a threatened species or ecological community:** | (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and | No known habitat for this species is likely to be directly impacted by the proposed development. Albeit unlikely, indirect impacts such as stormwater runoff, from the proposed development may impact upon potential habitat for the Wallum Froglet. |
| | (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and | The Wallum Froglet is not highly mobile. However, no habitat is being directly removed for the proposed development. The Development Footprint is already heavily fragmented and suitable habitat is likely to remain outside of the Development Footprint. Therefore, the proposed development is not likely to exacerbate the fragmentation of the habitat within the Development Footprint. |
| | (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality, | The habitat to be directly removed is unlikely to represent an important source for this species in the locality. The approved existing landscaping within the Development Footprint to be removed is heavily modified with hardstand surfaces and patches of compressed bare soil. Although, this species may utilise the stormwater detention basins, suitable wetland habitat also occurs in the remainder of the Subject Property |

| **Test of Significance<br>(Five Part Test)<br>s.7.3 of the Biodiversity Conservation Act 2016<br><br>*Crinia tinnula* (Wallum Froglet)<br><br>Status: Vulnerable** | | |
|---|---|---|
| | | outside of the Development Footprint. Therefore, the habitat to be potentially indirectly impacted is unlikely to be important for the long-term survival of the species in the locality. |
| **(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),** | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly. | |
| **(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.** | The Subject Property is already impacted by several key threatening processes including:<br>• Invasion of native plant communities by exotic perennial grasses<br>• Invasion and establishment of exotic vines and scramblers<br>• Invasion, establishment and spread of Lantana (Lantana camara L. sens. lat)<br>• Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants<br>• Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanocephala*)<br>• Clearing of native vegetation<br>• Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.<br>These processes have degraded the condition of this habitat and its potential to be utilised by threatened species. No additional key threatening processes are likely to result from the proposed development. | |

| **Test of Significance<br>(Five Part Test)<br>s.7.3 of the Biodiversity Conservation Act 2016<br><br>*Myotis Macropus* (Southern Myotis)<br><br>Status: Vulnerable** | | |
|---|---|---|
| **Ecology<br>(DPIE 2023c)** | Southern Myotis generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. | |
| **Habitat Impacted by this Activity/Development** | The Existing Facility contains potential foraging habitat for this species in the stormwater retention basins. Further foraging habitat exists along Wallarah Creek and other wetland habitat outside of the Existing Facility. The proposed development is unlikely to directly disturb the existing retention basins.<br><br>The Southern Myotis is unlikely to roost within the Development Footprint as the Existing Facility operates 24 hours seven days a week and there are no suitable hollow-bearing trees on the aerial imagery.<br><br>Albeit unlikely, indirect impacts may impact upon the habitat in the existing retention basin through stormwater runoff, and increased dust and noise. However, if these indirect impacts did occur it is unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition. As per the EIS (Element Environment 2023):<br>"*The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system.*" | |
| **(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,** | No suitable habitat is likely to be directly impacted by the proposed development. Albeit unlikely, indirect impacts may occur, and if they did occur are unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition.<br><br>As such, the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species could be placed at risk of extinction. | |
| **(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:** | (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or | N/A |
| | (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction, | N/A |
| **(c) in relation to the habitat of a threatened species or ecological community:** | (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and | No known habitat for this species is likely to be directly impacted by the proposed development. Albeit unlikely, indirect impacts such as stormwater runoff, from the proposed development may impact upon potential habitat for the Southern Myotis. |
| | (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and | The Southern Myotis is extremely mobile flying several kilometres from nests to forage. The proposed development will not prevent access to surrounding habitat. The Development Footprint is already heavily fragmented and suitable habitat is likely to remain outside of the Development Footprint. Therefore, the proposed development is not likely to exacerbate the fragmentation of the habitat within the Development Footprint. |
| | (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality, | The habitat to be directly removed is unlikely to represent an important source for this species in the locality. The approved existing landscaping within the Development Footprint to be removed is heavily modified with hardstand surfaces and patches of compressed bare soil. Although, this species may utilise the stormwater detention basins, suitable wetland habitat also occurs in the remainder of the Subject Property outside of the Development Footprint. Therefore, the habitat to be potentially indirectly impacted is unlikely to be important for the long-term survival of the species in the locality. |

| **Test of Significance**<br>**(Five Part Test)**<br>**s.7.3 of the Biodiversity Conservation Act 2016**<br><br>***Myotis Macropus* (Southern Myotis)**<br><br>**Status: Vulnerable** | | |
|---|---|---|
| | | |
| **(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),** | The development proposed is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly. | |
| **(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.** | The Subject Property is already impacted by several key threatening processes including:<br>• Invasion of native plant communities by exotic perennial grasses<br>• Invasion and establishment of exotic vines and scramblers<br>• Invasion, establishment and spread of Lantana (Lantana camara L. sens. lat)<br>• Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants<br>• Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanocephala*)<br>• Clearing of native vegetation<br>• Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.<br>These processes have degraded the condition of this habitat and its potential to be utilised by threatened species. No additional key threatening processes are likely to result from the proposed development. | |

## Appendix 2. Environment Protection and Biodiversity Conservation Act 1999 – Test of Significance

**Vulnerable Species**

- *Angophora inopina*

**Critically Endangered Species**

- *Corunastylis sp. Charmhaven (NSW896673)*

| Matters of National Environmental Significance<br>Significant Impact Guidelines 1.1<br>Environment Protection and Biodiversity Conservation Act 1999<br>Vulnerable species Significant impact criteria | |
|---|---|
| ***Angophora inopina***<br>**EPBC Act: Vulnerable** | |
| **An Action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:** | |
| **• lead to a long-term decrease in the size of an important population** | A population of *Angophora inopina* in the Subject Property including one individual within the Existing Facility outside of the Development Footprint was identified by Land Eco Consulting (**Figure 6**). Although, it is unlikely any individuals of this species occur within the Development Footprint given the highly disturbed nature and heavily compacted bare ground, indirect impacts from the proposed may impact upon the proximal *Angophora inopina*.<br><br>Indirect impacts such as an accidental chemical spill, stormwater runoff, and the spread and introduction of novel weeds may impact upon the proximal *Angophora inopina*. However, these indirect impacts are unlikely to significantly increase the indirect impacts from the Existing Facility beyond its current condition. The Subject Property is already heavily weed infested and disturbed with rubbish. As per the EIS (Element Environment 2023):<br><br>*"The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system."*<br><br>As such, the proposed activity is unlikely lead to a long-term decrease in the size of an important population of any of these species. |
| **• reduce the area of occupancy of the species** | This species has a restricted range of occupancy and is endemic to the Central Coast region of NSW. Approximately 1250ha of occupied habitat has been mapped in the Wyong–southern Lake Macquarie area. The main population occurs between Charmhaven and Morrisset.<br><br>It is unlikely any *Angophora inopina* individuals will be directly removed for the proposed development.<br><br>The indirect impacts from the proposed development are unlikely to significantly exacerbate the current conditions of these impacts from the Existing Facility. Therefore, the species is likely to remain within the Subject Property post development.<br><br>As such, the proposed development will not reduce the area of occupancy of this species. |
| **• fragment an existing population into two or more populations** | It is unlikely that the existing population will be fragmented beyond its current condition as it occurs outside of the Development Footprint. The proposed development is unlikely to directly remove any individuals.<br><br>The Development Footprint is already heavily degraded and fragmented from the existing bushland where the majority of th population of *Angophora inopina* occurs.<br><br>As such, the proposed development will not fragment an existing important population of any of these species into two or more populations. |
| **• adversely affect habitat critical to** | The proposed development is unlikely to directly affect habitat critical to the survival of the species. The habitat within the Development Footprint is heavily modified, it is mostly covered in hardstand surfaces and buildings, along with sporadic bare ground and sparse grass. |

| Matters of National Environmental Significance<br><br>Significant Impact Guidelines 1.1<br><br>Environment Protection and Biodiversity Conservation Act 1999<br><br>Vulnerable species Significant impact criteria | |
|---|---|
| **the survival of a species** | Indirect impacts may impact upon known habitat for this species in the remainder of the Subject Property outside of the Development Footprint. However, given that this population exists along with the Existing Facility and its indirect impacts, it is unlikely this species and the known habitat will be significantly impacted beyond its current condition.<br><br>As such, the proposed development will not adversely affect habitat critical to the survival of this species. |
| **• disrupt the breeding cycle of an important population** | Given the heavily modified state of the Development Footprint from past earthworks and the Existing Facility it is unlikely this species would persist in the soil seedbank within the Development Footprint. Therefore, the proposed development is unlikely to directly disrupt the breeding cycle of an important population of this species.<br><br>Although, the adjacent population may be indirectly impacted from the proposed development, these impacts are unlikely to significantly exacerbate the current degraded conditions of the habitat.<br><br>As such , the proposed development will not disrupt the breeding cycle of an important population of these species. |
| **• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** | The habitat to be directly impacted is already heavily modified and degraded from the existing land use. The existing approved landscaping to be removed within the Development Footprint consists of bare ground and sparse/heavily mown grass. The habitat to be directly impacted represents no substantial habitat value.<br><br>As such, the proposed development will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| **• result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat** | A range of invasive flora already occur within the Development Footprint. The proposed activity will not directly result in an increased propensity of invasive species being introduced into the Development Footprint. |
| **• introduce disease that may cause the species to decline, or** | The proposed activity is unlikely to introduce a novel disease that may cause these species to decline. |
| **• interfere with the recovery of the species.** | The proposed development will not directly impact upon any known *Angophora inopina*.<br><br>While the proposed development may indirectly impact upon the adjacent population within the remainder of the Subject Property outside of the Development Footprint. This population of trees already persists in the degraded habitat alongside the Existing Facility. If indirect impacts did occur, it is unlikely these impacts would |

| Matters of National Environmental Significance<br><br>Significant Impact Guidelines 1.1<br><br>Environment Protection and Biodiversity Conservation Act 1999<br><br>Vulnerable species Significant impact criteria | |
|---|---|
| | significantly exacerbate the current condition of the habitat this tree species currently persists in. As per the EIS (Element Environment 2023) *"The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system."*<br><br>Thus, the proposed development will not interfere substantially with the recovery of this vulnerable species. |

| Matters of National Environmental Significance<br>Significant Impact Guidelines 1.1<br>Environment Protection and Biodiversity Conservation Act 1999<br>Critically Endangered and Endangered Species Significant impact criteria | |
|---|---|
| ***Corunastylis sp. Charmhaven (NSW896673)***<br>**EPBC Act: Critically Endangered** | |
| **An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:** | |
| **• lead to a long-term decrease in the size of a population** | A significant population of *Corunastylis sp. Charmhaven (NSW896673)* was identified by Land Eco Consulting in 2023 in the western portion of the Subject Property outside of the Development Footprint (**Figure 6**). Other Ecologists (Advitech 2017) identified significant populations in close proximity to the Existing Facility in 2017 on the eastern portion of the Subject Property outside of the Development Footprint (**Figure 6**). Although, it is unlikely any individuals of this species occur within the Development Footprint given the heavily disturbed nature and heavily compacted bare ground, indirect impacts from the proposed may impact upon this significant population.<br><br>Indirect impacts such as an accidental chemical spill, stormwater runoff, wastewater release, and the spread and introduction of novel weeds may impact upon the *Corunastylis sp. Charmhaven (NSW896673)*. However, these indirect impacts are unlikely to occur, and if they did, less likely to significantly increase the indirect impacts from the Existing Facility beyond its current condition.<br><br>The Subject Property is already heavily weed infested and disturbed with rubbish. As per the EIS (Element Environment 2023) *"The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system."*<br><br>Wastewater will be managed to best practice with a Wisconsin Mound. Although the proposed Wisconsin Mound is adjacent to the known orchid habitat which risks indirect impacts, spillage will be managed by including an intercept trench downslope of the Winconsin Mound to capture any treated/untreated water accidentally discharging from the mound.<br><br>As such, the proposed development is unlikely to lead to a long-term decrease in the size of a population. |
| **• reduce the area of occupancy of the species** | This species has a very restricted range of occupancy and is only known from the former Wyong shire of the Central Coast Council where it is restricted to a few locations in the Charmhaven, Warnervale and Tooheys Road (Bushells Ridge – i.e., the Development Footprint) areas.<br><br>It is unlikely any *Corunastylis sp. Charmhaven (NSW896673)* individuals will be directly removed for the proposed development.<br><br>The indirect impacts from the proposed development are unlikely to significantly exacerbate the current conditions of these impacts from the Existing Facility. Therefore, the species is likely to remain within the Subject Property post development.<br><br>As such, the proposed development will not reduce the area of occupancy of this species. |
| **• fragment an existing population into two or more populations** | It is unlikely that the existing population will be fragmented beyond its current condition as it occurs outside of the Development Footprint. The proposed development is unlikely to directly remove any individuals.<br><br>The Development Footprint is already heavily degraded and fragmented from the existing bushland where the significant population occurs.<br><br>As such, the proposed development will not fragment an existing population into two or more populations. |

| Matters of National Environmental Significance<br>Significant Impact Guidelines 1.1<br>Environment Protection and Biodiversity Conservation Act 1999<br>Critically Endangered and Endangered Species Significant impact criteria | |
|---|---|
| **• adversely affect habitat critical to the survival of a species** | The proposed development is unlikely to directly affect habitat critical to the survival of the species. The habitat within the Development Footprint is heavily modified, it is mostly covered in hardstand surfaces and buildings, along with sporadic bare ground and sparse grass.<br><br>Albeit unlikely, indirect impacts may impact upon habitat critical to the survival of this species in the remainder of the Subject Property outside of the facility. However, given that this significant population exists along with the Existing Facility and its indirect impacts, it is unlikely this species and the critical habitat will be significantly impacted beyond its current condition.<br><br>As such, the proposed development will not adversely affect habitat critical to the survival of this species. |
| **• disrupt the breeding cycle of a population** | Given the heavily modified state of the Development Footprint from past earthworks and the Existing Facility it is unlikely this species would persist in the soil seedbank within the Development Footprint. Therefore, the proposed development is unlikely to directly disrupt the breeding cycle of the population.<br><br>Although, the adjacent population may be indirectly impacted from the proposed development, these impacts are unlikely to significantly exacerbate the current degraded conditions of the habitat.<br><br>As such, the proposed development will not disrupt the breeding cycle of a population of either of this species. |
| **• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline** | The habitat to be impacted is already heavily modified and degraded from the existing land use. The existing approved landscaping to be removed within the Development Footprint consists of bare ground and sparse/heavily mown grass. The habitat to be directly impacted represents no substantial habitat value.<br><br>As such, the proposed development will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. |
| **• result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat** | A range of invasive flora already occur within the Development Footprint. The proposed development will not directly result in an increased propensity of invasive species being introduced into the Development Footprint. |

| Matters of National Environmental Significance<br>Significant Impact Guidelines 1.1<br>Environment Protection and Biodiversity Conservation Act 1999<br>Critically Endangered and Endangered Species Significant impact criteria | |
|---|---|
| **• introduce disease that may cause the species to decline, or** | The proposed development is unlikely to introduce disease that may cause this species to decline. |
| **• interfere with the recovery of the species.** | The proposed development will not directly impact upon any known *Corunastylis sp. Charmhaven (NSW896673)*.<br><br>While the proposed development may indirectly upon the adjacent significant population within the remainder of the Subject Property outside of the Development Footprint, this population already persists in the degraded habitat alongside the Existing Facility. If indirect impacts did occur, it is unlikely these impacts would significantly exacerbate the current condition of the habitat these species currently persist in. As per the EIS (Element Environment 2023) *"The site is equipped with an operational stormwater management system which collects and treats stormwater runoff prior to discharge from the site. The project will not introduce new pollutant sources or increase the area of the site covered by impermeable surfaces (hardstand areas) or changes to the existing approved stormwater treatment system."*<br><br>Thus, the proposed development will not interfere with the recovery of the species. |

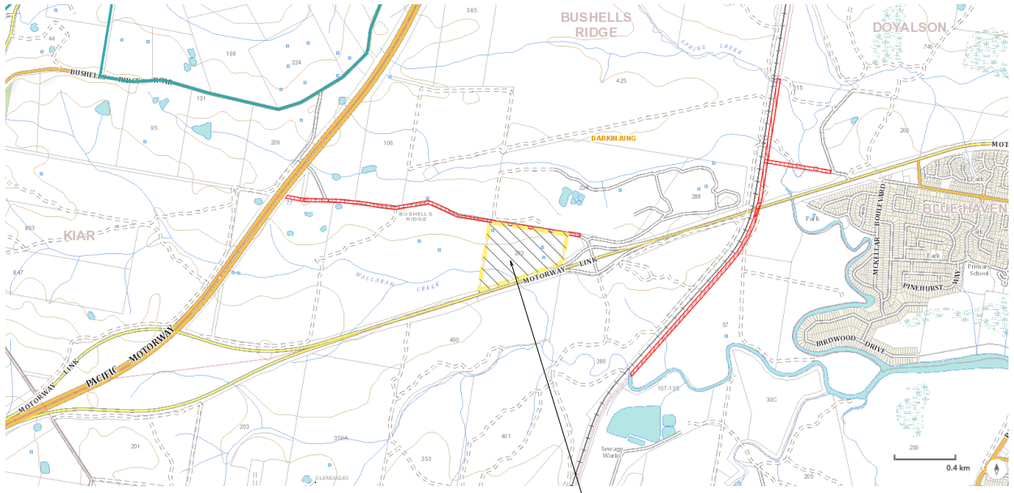
Land Eco consulting

www.landeco.com.au


# APPENDIX C

## PLANS AND DRAWINGS

# PROPOSED ASPHALT PLANT UPGRADE
# 203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
# DEVELOPMENT APPLICATION




PROPOSED SITE

LOCATION PLAN
1 : 20000

| DRAWING INDEX - DEVELOPMENT APPLICATION | |
|---|---|
| DRG. No. | TITLE |
| TP00 | LOCATION PLAN & DRAWING INDEX |
| TP01 | SITE PLANS - EXISTING CONDITIONS |
| TP02 | SITE PLAN - PROPOSED WORKS |
| TP03 | PROPOSED WORKS - ADMINISTRATION & CARPARKING PLAN |
| TP04 | PROPOSED WORKS - ASPHALT PLANT UPGRADE |
| TP05 | PROPOSED WORKS - RAP STORAGE BUNKER GENERAL ARRANGEMENT |
| TP06 | PROPOSED WORKS - BUILDING FLOOR PLAN |
| TP07 | PROPOSED WORKS - BUILDING ROOF PLAN |
| TP08 | PROPOSED WORKS - BUILDING ELEVATIONS & SECTIONS |
| TP09 | NOT USED |
| TP10 | VEHICLE & CARPARK DETAILS |
| TP11 | VEHICLE SWEEP PATH PLAN - B-DOUBLE SITE CIRCULATION |
| TP12 | VEHICLE SWEEP PATH PLAN - TRUCK & DOG_SITE CIRCULATION |
| TP13 | VEHICLE SWEEP PATH PLAN - 19m SEMI SITE CIRCULATION |
| TP14 | VEHICLE SWEEP PATH PLAN - CHEM. STORE & REFUSE MEDIUM TRUCK - SITE CIRCULATION |
| TP15 | VEHICLE SWEEP PATH PLAN - B85 CARPARK ACCESS |

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

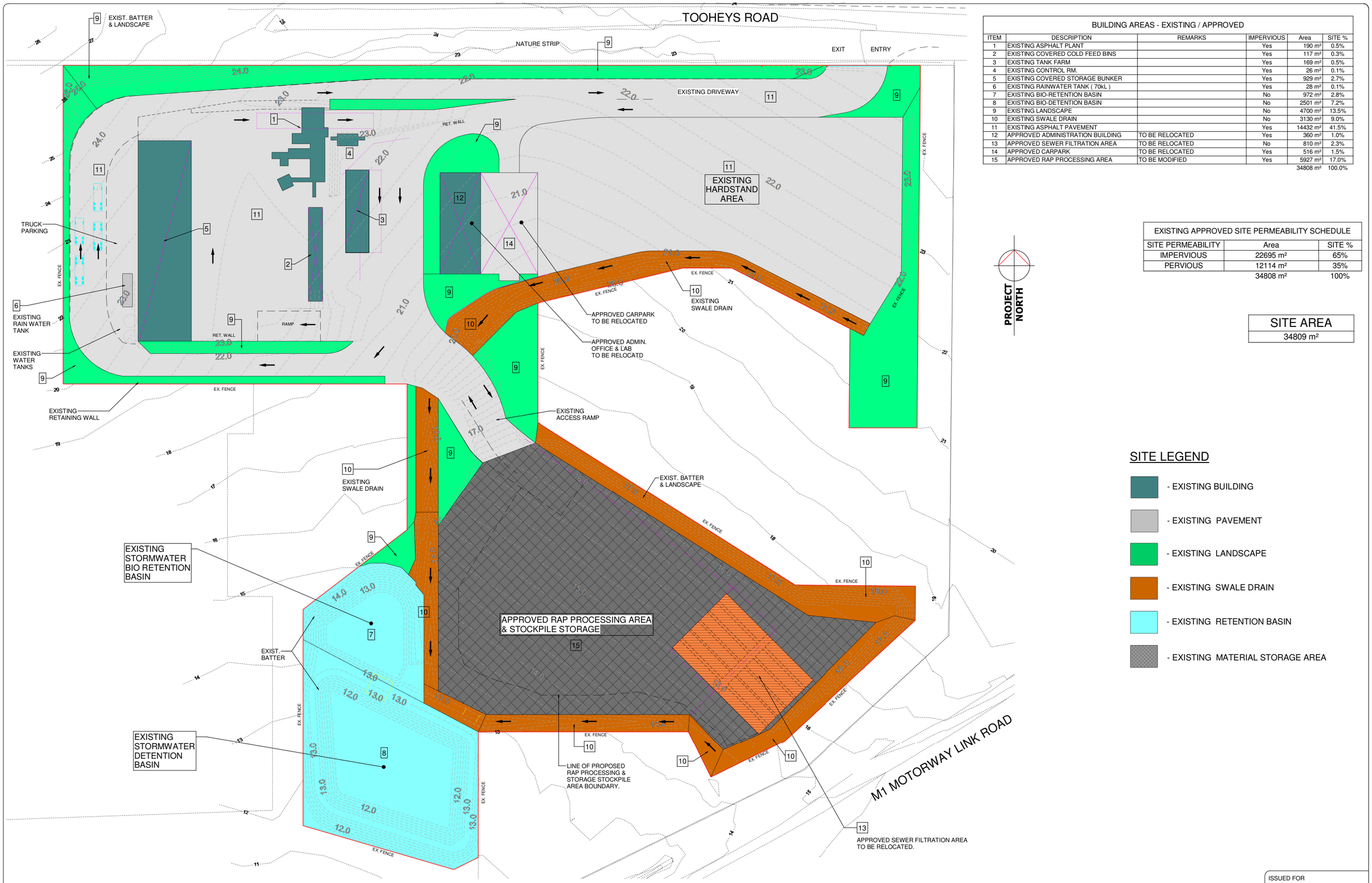
CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

LOCATION PLAN & DRAWING INDEX

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 20000 |
| APPROVED | |
| DRG No. TP00 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%




## BUILDING AREAS - EXISTING / APPROVED

| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
|---|---|---|---|---|---|
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.5% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 117 m² | 0.3% |
| 3 | EXISTING TANK FARM | | Yes | 169 m² | 0.5% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 2.7% |
| 6 | EXISTING RAINWATER TANK ( 70kL ) | | Yes | 28 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 2.8% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 7.2% |
| 9 | EXISTING LANDSCAPE | | No | 4700 m² | 13.5% |
| 10 | EXISTING SWALE DRAIN | | No | 3130 m² | 9.0% |
| 11 | EXISTING ASPHALT PAVEMENT | | Yes | 14432 m² | 41.5% |
| 12 | APPROVED ADMINISTRATION BUILDING | TO BE RELOCATED | Yes | 360 m² | 1.0% |
| 13 | APPROVED SEWER FILTRATION AREA | TO BE RELOCATED | No | 810 m² | 2.3% |
| 14 | APPROVED CARPARK | TO BE RELOCATED | Yes | 516 m² | 1.5% |
| 15 | APPROVED RAP PROCESSING AREA | TO BE MODIFIED | Yes | 5927 m² | 17.0% |
| | | | | 34808 m² | 100.0% |

PROJECT NORTH

## EXISTING APPROVED SITE PERMEABILITY SCHEDULE

| SITE PERMEABILITY | Area | SITE % |
|---|---|---|
| IMPERVIOUS | 22695 m² | 65% |
| PERVIOUS | 12114 m² | 35% |
| | 34808 m² | 100% |

## SITE AREA

34809 m²

## SITE LEGEND

- EXISTING BUILDING
- EXISTING PAVEMENT
- EXISTING LANDSCAPE
- EXISTING SWALE DRAIN
- EXISTING RETENTION BASIN
- EXISTING MATERIAL STORAGE AREA

## SITE PLAN - APPROVED CONDITIONS TO BE RELOCATED

1 : 500

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

SITE PLANS
APPROVED CONDITIONS TO BE RELOCATED

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE As indicated |
| APPROVED | |
| DRG No. TP01 | REV. 0 |

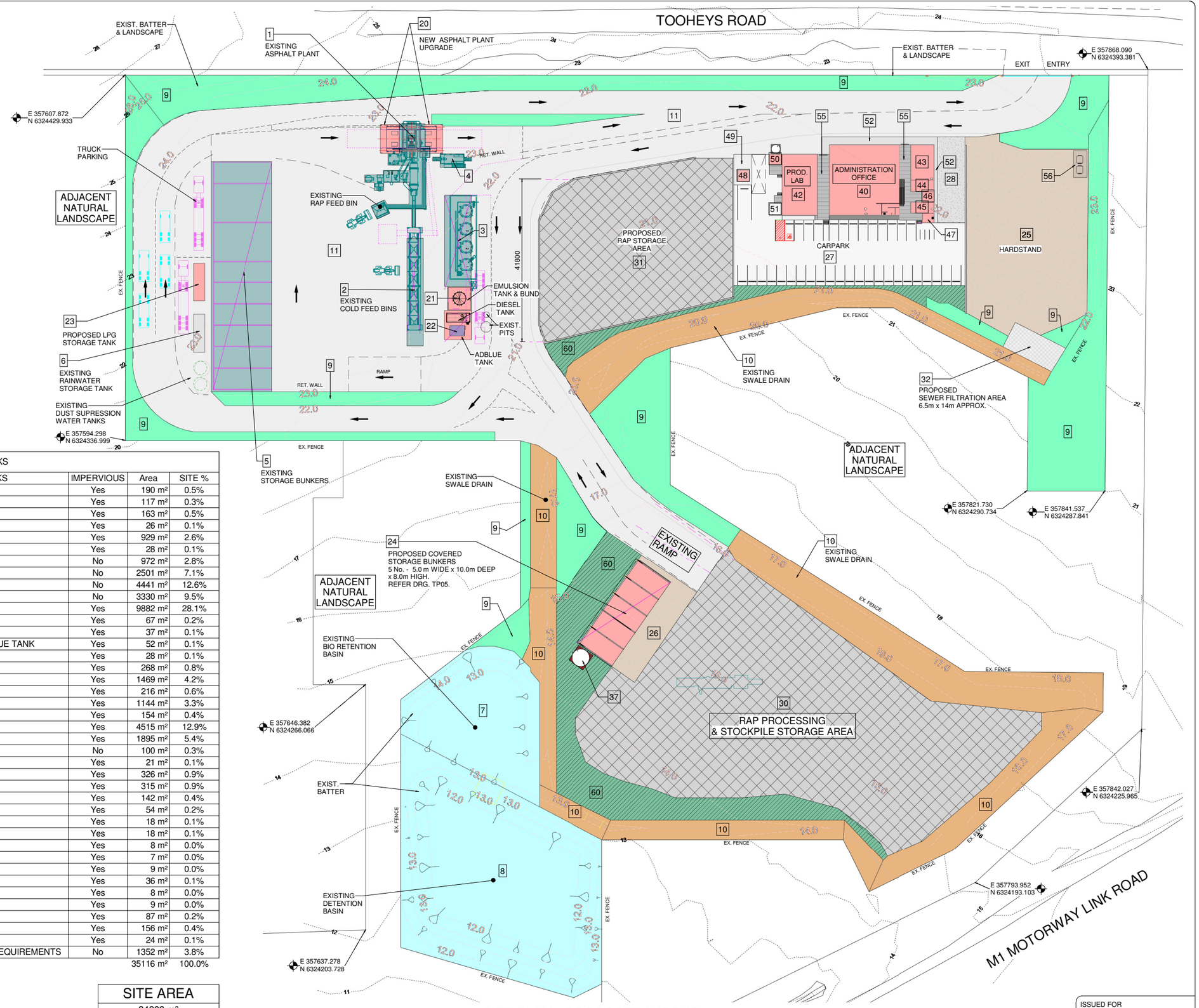
A1 AT 100% FULL SIZE.
A3 AT 50%

## SITE LEGEND

- EXISTING BUILDING
- EXISTING PAVEMENT
- EXISTING LANDSCAPE
- EXISTING SWALE DRAIN
- EXISTING RETENTION BASIN
- PROPOSED NEW BUILDING / STRUCTURE
- PROPOSED MATERIAL STORAGE AREA
- PROPOSED / MODIFIED LANDSCAPE

PROJECT NORTH

NOTE -
1. STORAGE BUNKERS ARE CONCEPT ONLY . DIMENSIONS MY CHANGE SUBJECT TO DETAILED DESIGN.
2. ALL LANDSCAPE AREAS ARE TO BE PLANTED IN ACCORDANCE WITH THE LOCAL COUNCIL SPECIFICATIONS AND PERMIT REQUIREMENTS.
3. SITE AREAS TO BE GENERALLY GRADED TOWARDS EXISTING SWALE DRAINS FOR WATER COLLECTION.
4. REFER TRUCK TURNING CIRCLE DRAWINGS FOR TRUCK SWEEP PATHS ON DRG. TP10 & TP11.




SITE PLAN - PROPOSED WORKS
1 : 500

| BUILDING AREAS - PROPOSED WORKS | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.5% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 117 m² | 0.3% |
| 3 | EXISTING TANK FARM | | Yes | 163 m² | 0.5% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 2.6% |
| 6 | EXISTING RAINWATER TANK ( 70kL ) | | Yes | 28 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 2.8% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 7.1% |
| 9 | EXISTING LANDSCAPE | | No | 4441 m² | 12.6% |
| 10 | EXISTING SWALE DRAIN | | No | 3330 m² | 9.5% |
| 11 | EXISTING ASPHALT PAVEMENT | | Yes | 9882 m² | 28.1% |
| 20 | PROPOSED ASPHALT PLANT ADDITIONS | REFER DRG. TP04. | Yes | 67 m² | 0.2% |
| 21 | PROPOSED EMULSION TANK BUND | XXkl EMULSION TANK | Yes | 37 m² | 0.1% |
| 22 | PROPOSED DIESEL TANK / ADBLUE | DIESEL TANK. & ADBLUE TANK | Yes | 52 m² | 0.1% |
| 23 | PROPOSED LPG STORAGE | | Yes | 28 m² | 0.1% |
| 24 | PROPOSED STORAGE BUNKER | REFER DRG. TP05. | Yes | 268 m² | 0.8% |
| 25 | PROPOSED HARDSTAND | | Yes | 1469 m² | 4.2% |
| 26 | PROPOSED HARDSTAND | | Yes | 216 m² | 0.6% |
| 27 | PROPOSED CARPARK | REFER DRG. TP04. | Yes | 1144 m² | 3.3% |
| 28 | PROPOSED CARPARK ACCESS WAY | REFER DRG. TP04. | Yes | 154 m² | 0.4% |
| 30 | PROPOSED RAP PROCESSING AREA | | Yes | 4515 m² | 12.9% |
| 31 | PROPOSED PROCESSED RAP STORAGE | | Yes | 1895 m² | 5.4% |
| 32 | PROPOSED SEWER FILTRATION AREA | TO BE RELOCATED | No | 100 m² | 0.3% |
| 37 | PROPOSED WATER TANK | | Yes | 21 m² | 0.1% |
| 40 | PROPOSED ADMINISTRATION BUILDING - GRND FLOOR | REFER DRG. TP03. | Yes | 326 m² | 0.9% |
| 41 | PROPOSED ADMINISTRATION BUILDING - 1ST FLOOR | REFER DRG. TP06. | Yes | 315 m² | 0.9% |
| 42 | PROPOSED PRODUCTION LAB | REFER DRG. TP03. | Yes | 142 m² | 0.4% |
| 43 | PROPOSED CRIB RM. | REFER DRG. TP03. | Yes | 54 m² | 0.2% |
| 44 | PROPOSED FEMALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 45 | PROPOSED MALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 46 | PROPOSED ACCESSIBLE ABLUTION BLOCK | | Yes | 8 m² | 0.0% |
| 47 | PROPOSED CLEANERS STORE | | Yes | 7 m² | 0.0% |
| 48 | PROPOSED CHEMICAL STORAGE | | Yes | 9 m² | 0.0% |
| 49 | PROPOSED CHEM STORAGE PAVEMENT | | Yes | 36 m² | 0.1% |
| 50 | PROPOSED ABLUTION BLOCK 2 | | Yes | 8 m² | 0.0% |
| 51 | PROPOSED COMPACTION RM. | | Yes | 9 m² | 0.0% |
| 52 | PROPOSED FOOTPATH | | Yes | 87 m² | 0.2% |
| 55 | PROPOSED DECKING | | Yes | 156 m² | 0.4% |
| 56 | RUBBISH ENCLOSURE | | Yes | 24 m² | 0.1% |
| 60 | PROPOSED LANDSCAPE | TO LOCAL COUNCIL REQUIREMENTS | No | 1352 m² | 3.8% |
| | | | | 35116 m² | 100.0% |

| PROPOSED SITE PERMEABILITY SCHEDULE | | |
|---|---|---|
| SITE PERMEABILITY | Area | SITE % |
| IMPERVIOUS | 20931 m² | 62.4% |
| PERVIOUS | 12588 m² | 37.6% |
| | 33519 m² | 100.0% |

| SITE AREA |
|---|
| 34809 m² |

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

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CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

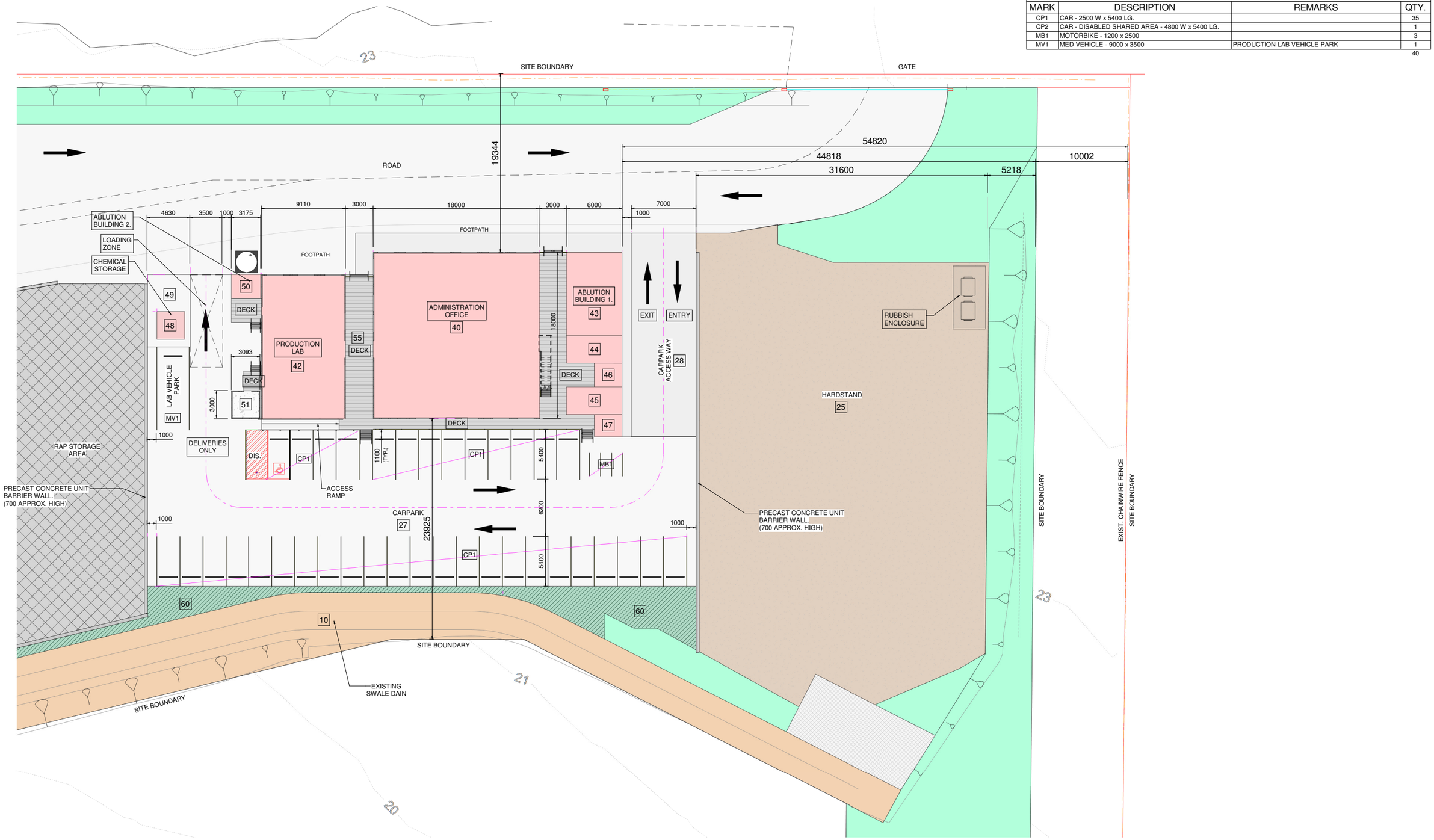
SITE PLAN
PROPOSED WORKS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE As indicated |
| APPROVED | |
| DRG No. TP02 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%

## CAR PARK SCHEDULE

| MARK | DESCRIPTION | REMARKS | QTY. |
|---|---|---|---|
| CP1 | CAR - 2500 W x 5400 LG. | | 35 |
| CP2 | CAR - DISABLED SHARED AREA - 4800 W x 5400 LG. | | 1 |
| MB1 | MOTORBIKE - 1200 x 2500 | | 3 |
| MV1 | MED VEHICLE - 9000 x 3500 | PRODUCTION LAB VEHICLE PARK | 1 |
| | | | 40 |




## SITE PLAN - PROPOSED WORKS - ADMINISTRATION & CARPARK

1 : 200

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APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

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203 TOOHEYS ROAD
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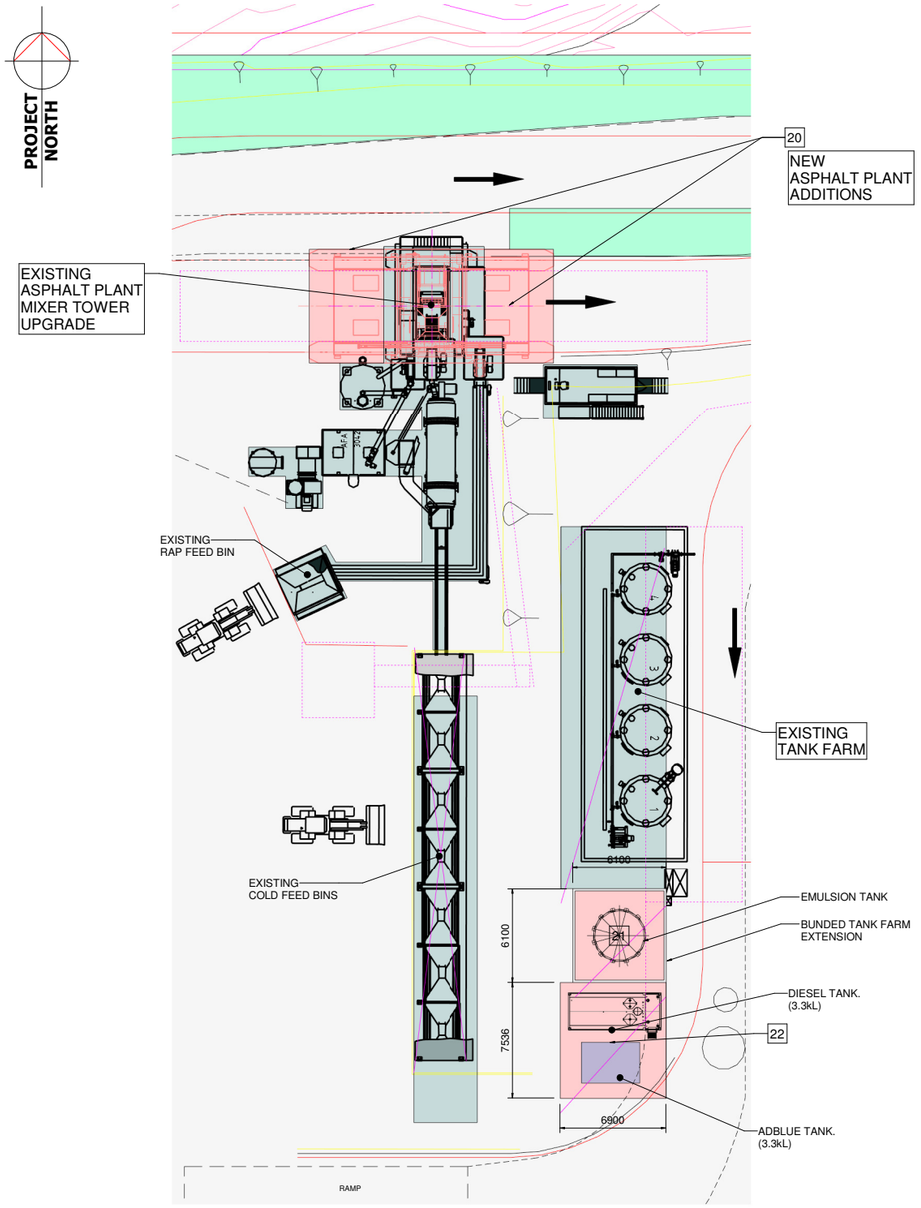
PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

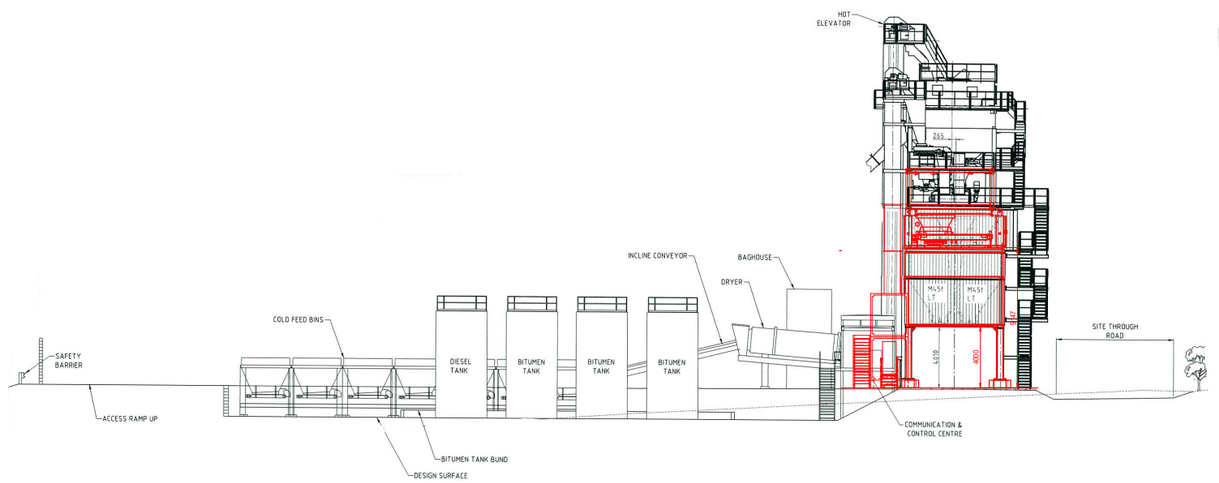
SITE PLAN - PROPOSED WORKS
ADMINISTRATION & CARPARKING PLAN

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 200 |
| APPROVED | |
| DRG No. TP03 | REV. 0 |

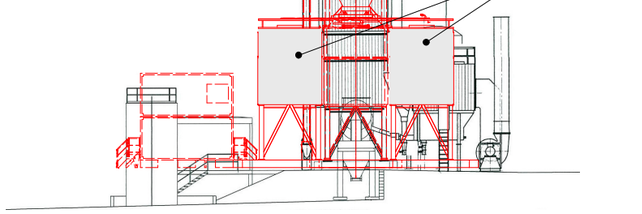
A1 AT 100% FULL SIZE.
A3 AT 50%




SITE PLAN - PROPOSED WORKS - ASPHALT PLANT UPGRADE
1 : 200




ASPHALT PLANT - EAST ELEVATION
1 : 200




ASPHALT PLANT - NORTH ELEVATION
1 : 200

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

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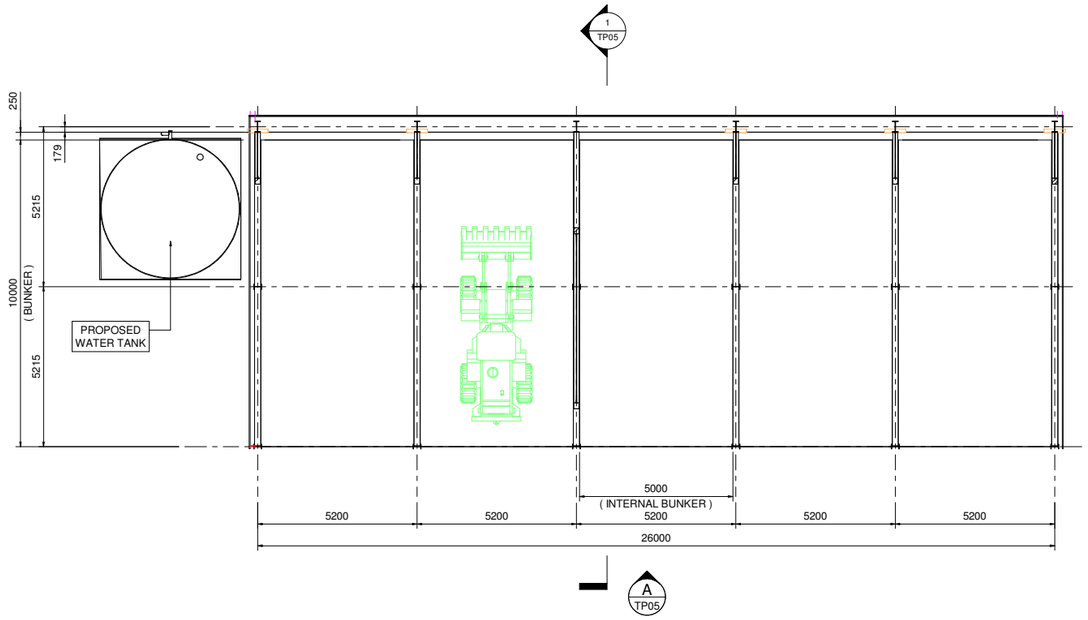
203 TOOHEYS ROAD
BUSHELLS RIDGE

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

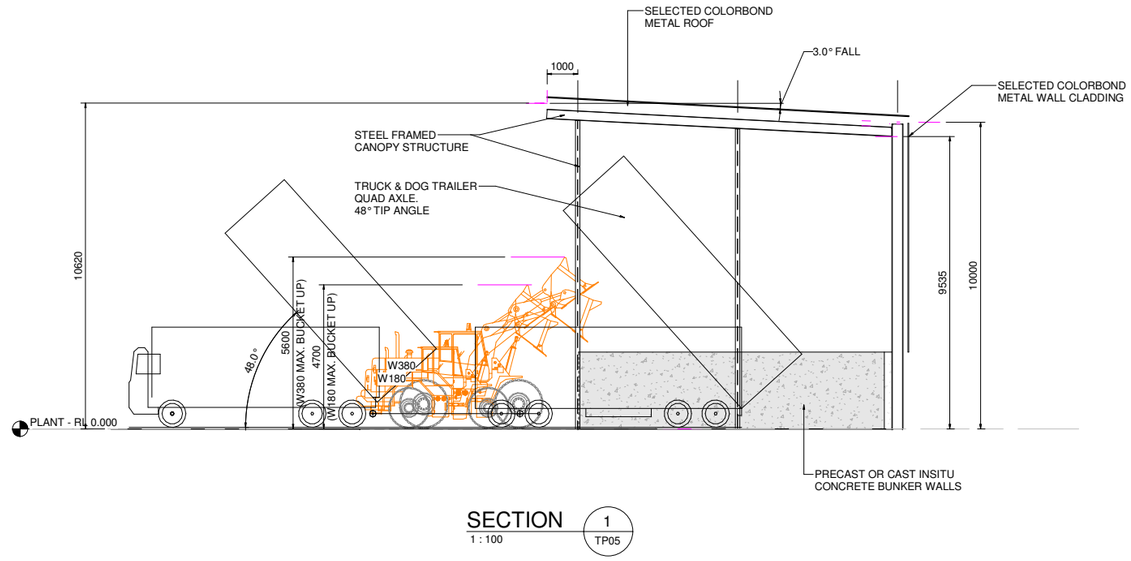
PROPOSED WORKS
ASPHALT PLANT UPGRADE

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED D.J.D. | SCALE 1 : 200 |
| APPROVED | |
| DRG No. TP04 | REV. 0 |

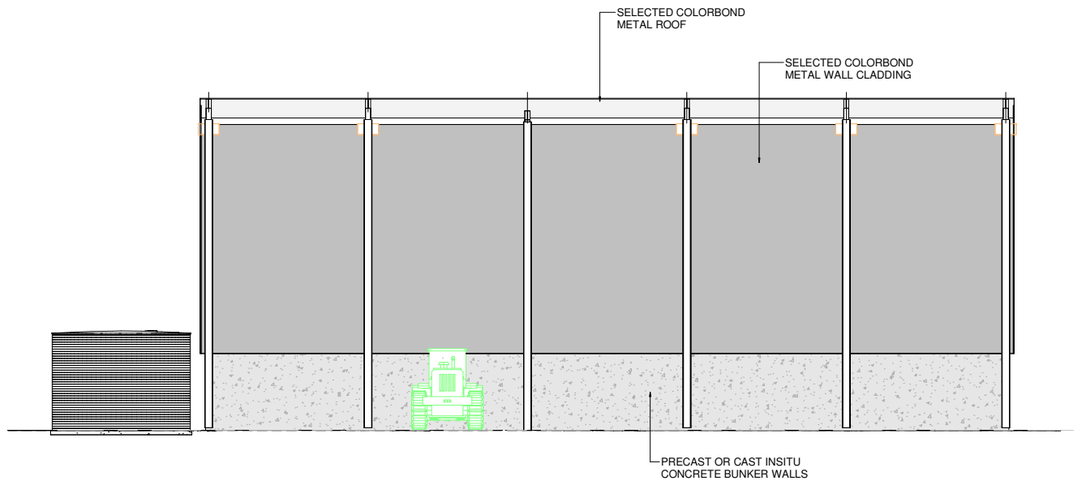
A1 AT 100% FULL SIZE.
A3 AT 50%



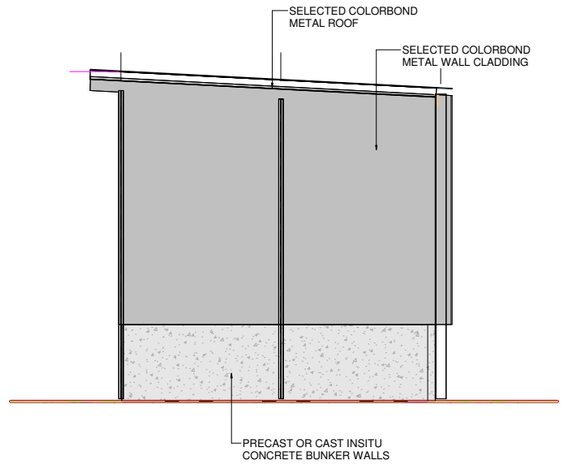

TP - SITE PLAN - RAP STORAGE BUNKERS
1 : 100




SECTION 1
1 : 100 TP05




ELEVATION A
1 : 100 TP05




ELEVATION B
1 : 100 TP05

## COLOUR SCHEDULE

COLORBOND ROOF & WALL CLADDING

- MUTED GREY TONES

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|---|---|---|
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203 TOOHEYS ROAD
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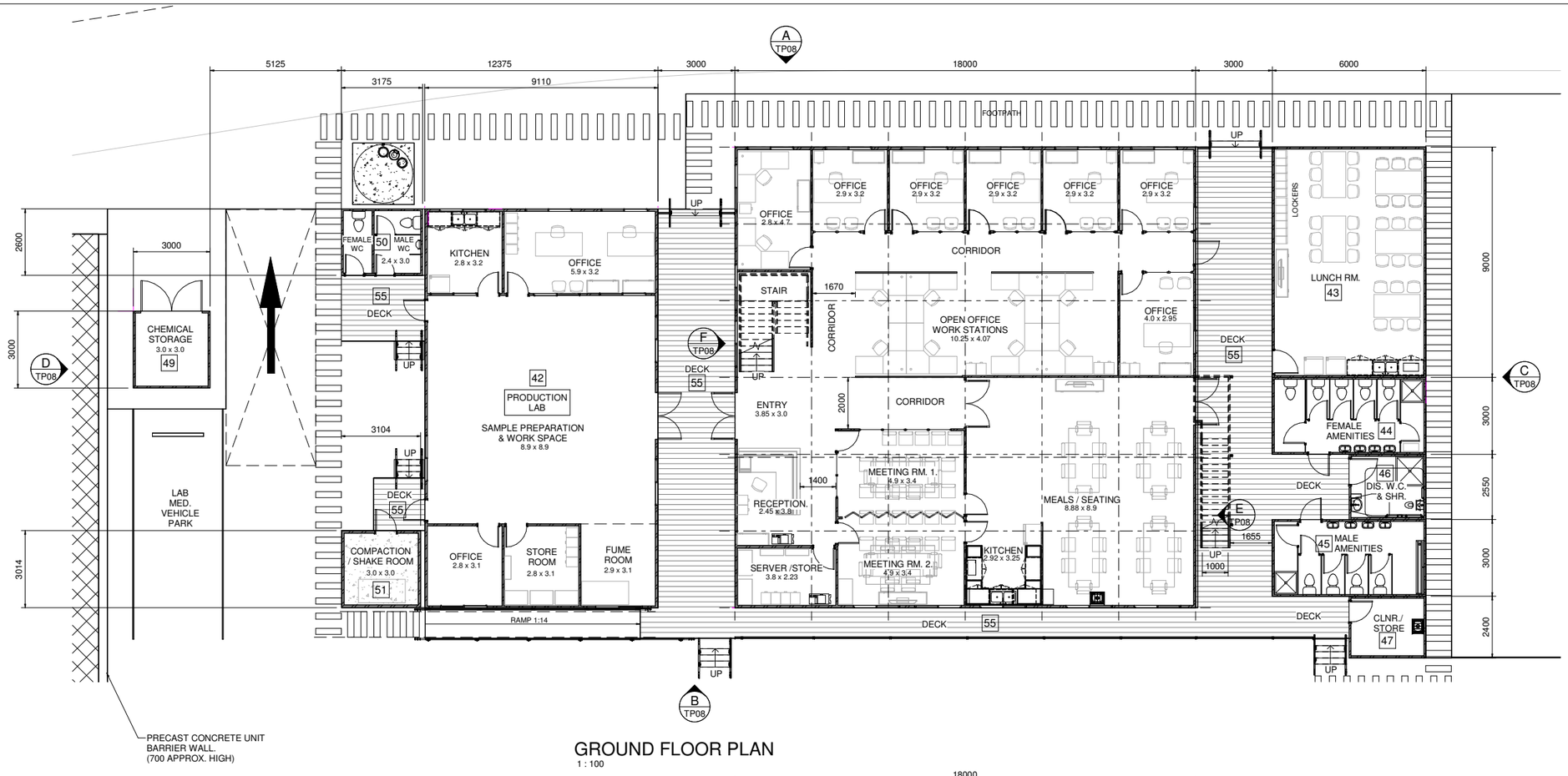
PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

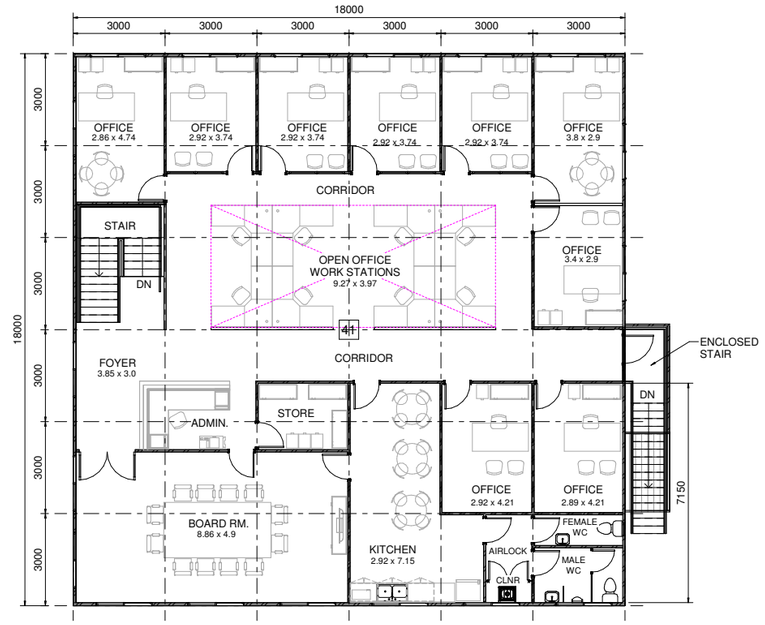
PROPOSED WORKS
RAP STORAGE BUNKER GENERAL ARRANGEMENT

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE As indicated |
| APPROVED | |
| DRG No. TP05 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%




## GROUND FLOOR PLAN
1 : 100




## ADMINISTRATION - FIRST FLOOR
1 : 100

NOTE

1. ALL BUILDINGS TO BE PREFABRICATED MODULAR TYPE MOUNTED ON STRUCURAL FOUNDATIONS AND BASE FRAME AS REQUIRED BY THE BUILDING SUPPLIER.
2. ROOF TO BE COLORBOND METAL DECK INSULATED PANELS AS PROVIDED BY SELECTED SUPPLIER.
3. EXTERNAL WALL TO BE COLORBOND INSULATED PANELS AS PROVIDED BY SELECTED SUPPLIER.
4. INTERNAL WALLS TO BE PLASTER BOARD OR POLY PLY LINED STUD WALLS.
5. WINDOWS TO BE ALUMINIUM SLIDDING TO BUILDING SUPPLIERS SPECIFICATIONS.
6. DOORS TO BE METAL CLAD TO BUILDING SUPPLIERS SPECIFICATIONS.
7. ALL STAIRS , STEPS , RAMPS AND HANDRAILING TO BE IN ACCORDANCE WITH BCA VOL. 1 & AS 1428-1 2009. FINAL FFL (FINISHED FLOOR LEVELS) & FSL (FINISHED SURFACE LEVELS) TO BE DETERMINED IN FINAL DETAIL DESIGN. STEPS , STAIRS AND RAMPS MAY BE ADJUSTED TO SUIT THE FINAL DESIGN.
8. ALL WORKS TO BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS , THE NATIONAL BUILDING CODE AND ANY LOCAL AUTHORITY REQUIREMENTS.

BUILDING FLOOR AREA SCHEDULE

| ITEM No. | DESCRIPTION | REMARKS | Area |
|---|---|---|---|
| 40 | PROPOSED ADMINISTRATION BUILDING - GRND FLOOR | | 326 m² |
| 41 | PROPOSED ADMINISTRATION BUILDING - 1ST FLOOR | | 315 m² |
| 42 | PROPOSED PRODUCTION LAB | | 142 m² |
| 43 | PROPOSED CRIB RM. | | 54 m² |
| 44 | PROPOSED FEMALE ABLUTION BLOCK | | 18 m² |
| 45 | PROPOSED MALE ABLUTION BLOCK | | 18 m² |
| 46 | PROPOSED ACCESSIBLE ABLUTION BLOCK | | 8 m² |
| 47 | PROPOSED CLEANERS STORE | | 7 m² |
| 48 | PROPOSED CHEMICAL STORAGE | | 9 m² |
| 49 | PROPOSED CHEM STORAGE PAVEMENT | | 36 m² |
| 50 | PROPOSED ABLUTION BLOCK 2 | | 8 m² |
| 51 | PROPOSED COMPACTION RM. | | 9 m² |
| 52 | PROPOSED FOOTPATH | CONCRETE | 87 m² |
| 55 | PROPOSED DECKING | | 156 m² |

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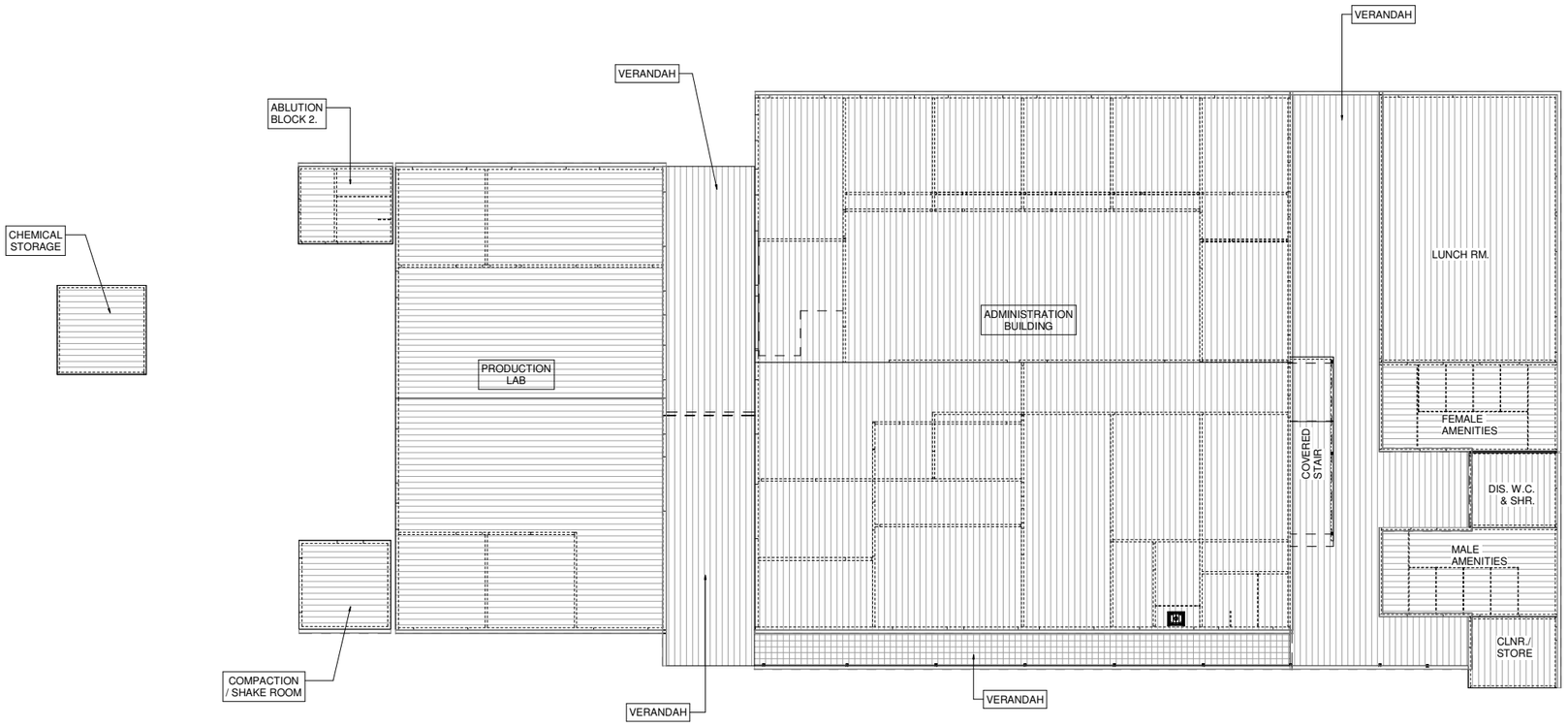
PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

PROPOSED WORKS
ADMIN , LAB & ABLUTION BUILDING FLOOR PLANS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 100 |
| APPROVED | |
| DRG No. TP06 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%




## PROPOSED WORKS - ROOF PLANS

1 : 100

- ALL BUILDING ROOF CLADDING TO BE COLORBOND METAL DECK INSULATED PANELS AS PROVIDED BY SELECTED BUILDING SUPPLIER.
- ALL VERANDAH ROOF CLADDING TO BE SELECTED COLORBOND SHEETING.
- ALL GUTTERS TO BE SELECTED COLORBOND RECTANGULAR PROFILE CONNECTED TO SELECTED COLORBOND DOWNPIPES TO S.W.D. TO L.P.O.D.

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

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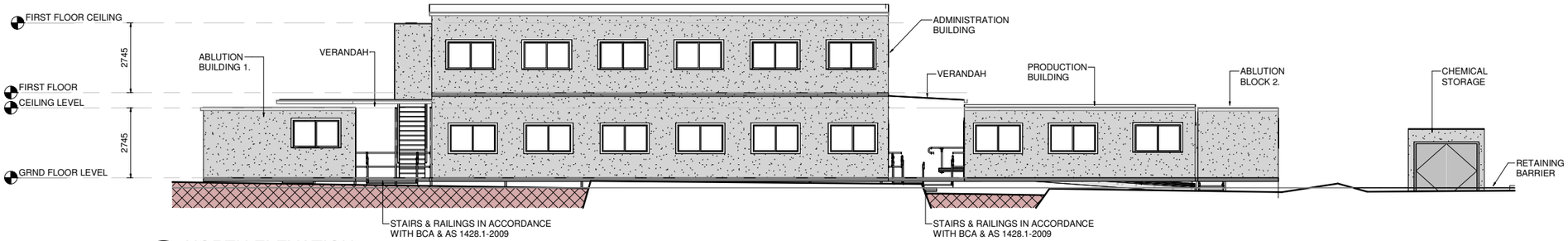
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

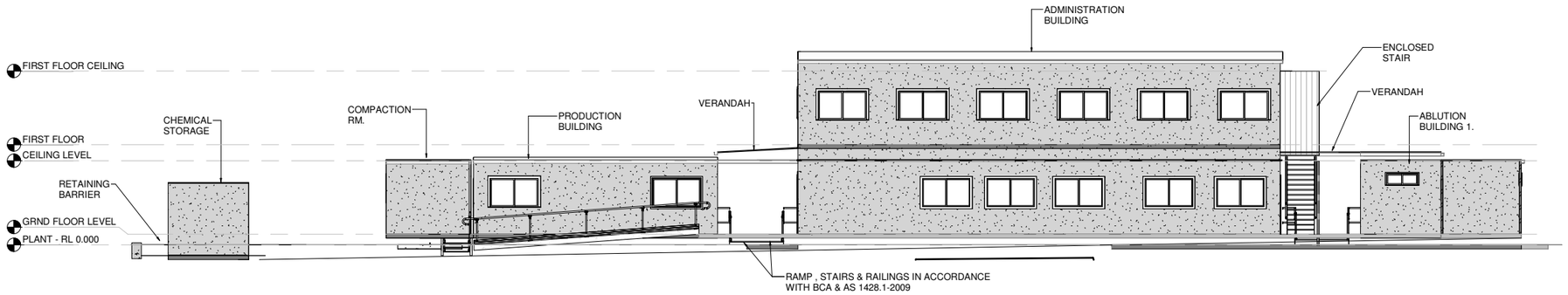
PROPOSED WORKS -
BUILDING ROOF PLAN

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 100 |
| APPROVED | |
| DRG No. TP07 | REV. 0 |

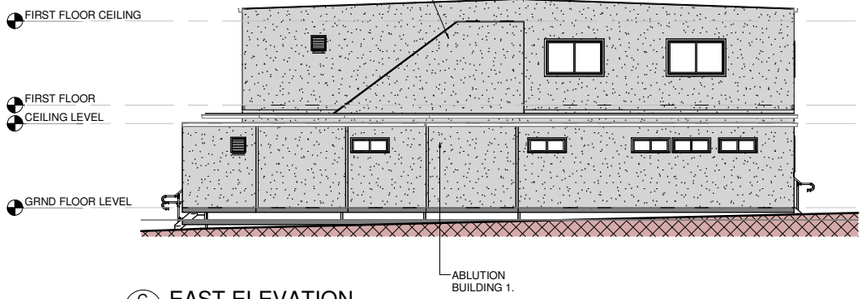
A1 AT 100% FULL SIZE.
A3 AT 50%



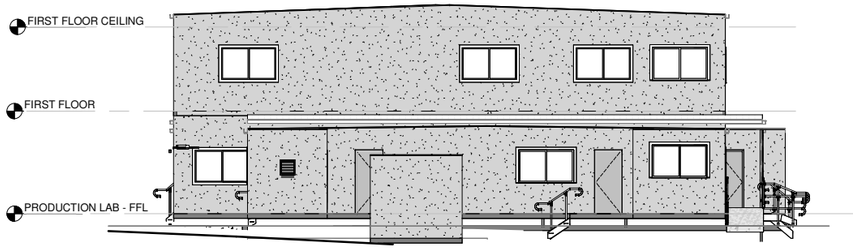

A TP06 NORTH ELEVATION
1 : 100



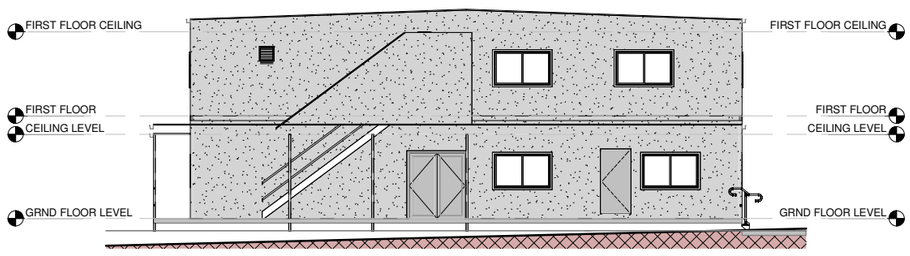

B TP06 SOUTH ELEVATION
1 : 100



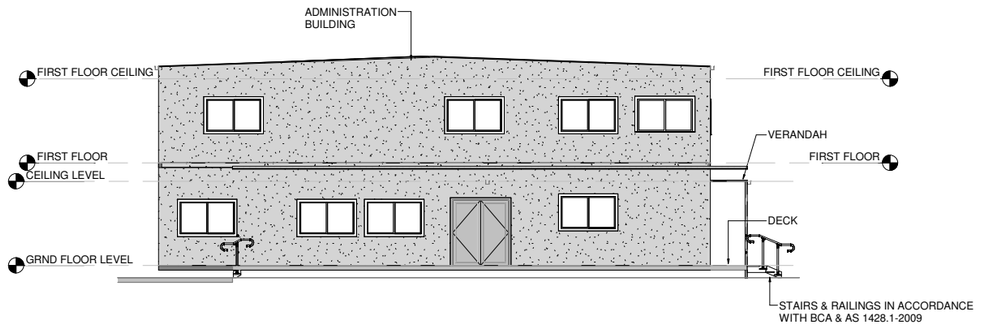

C TP06 EAST ELEVATION
1 : 100




D TP06 WEST ELEVATION
1 : 100




E TP06 ADMINISTRATION - EAST WALL
1 : 100




F TP06 ADMINISTRATION - WEST WALL
1 : 100

## COLOUR SCHEDULE

ROOF & WALL CLADDING

- MUTED GREY TONES (EG. COLORBOND SOUTHERLY)

GUTTERS , DOWNPIPES , DOOR & WINDOW TRIMS

- DARK GREY TONES (EG. COLORBOND MONUMENT)

FINAL COLOURS MAY VARY SLIGHTLY SUBJECT TO BUILDING SUPPLIERS SPECIFICATIONS AND DETAILS

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APPROVAL

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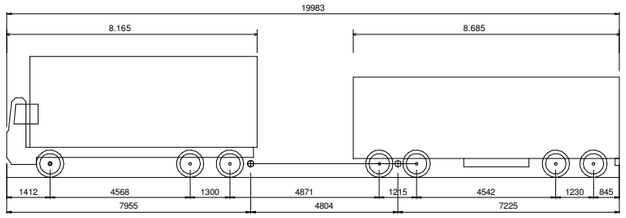
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

PROPOSED WORKS -
ELEVATIONS & SECTIONS

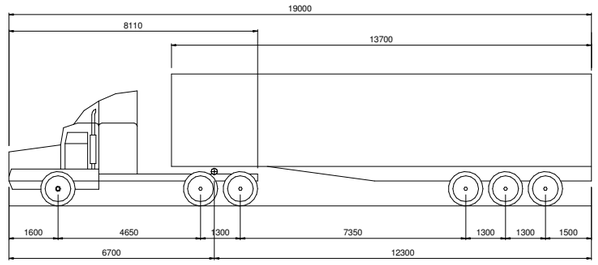
| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE As indicated |
| APPROVED | |
| DRG No. TP08 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%



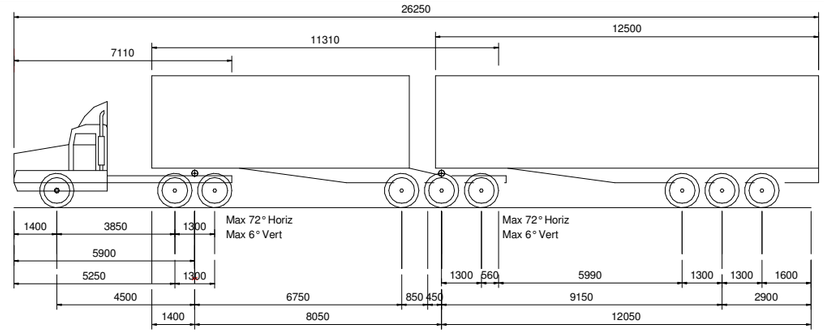

## TRUCK & DOG - QUAD AXLE TRAILER

| | |
|---|---|
| Overall Length | 19.983m |
| Overall Width | 2.550m |
| Overall Body Height | 3.942m |
| Min Body Ground Clearance | 0.346m |
| Track Width | 2.550m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 12.500m |



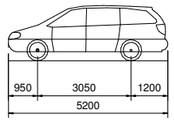

## PRIME MOVER AND SEMI-TRAILER (19m)

| | |
|---|---|
| OVERALL LENGTH | 19.000m |
| OVERALL WIDTH | 2.500m |
| OVERALL BODY HEIGHT | 4.300m |
| MIN BODY GROUND CLEARANCE | 0.540m |
| TRACK WIDTH | 2.500m |
| Lock-to-lock time | 6.00s |
| Curb to Curb Turning Radius | 12.500m |



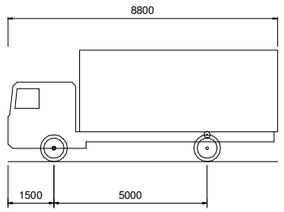

## B-DOUBLE (26.0m) - MANDATORY STOP

| | |
|---|---|
| Overall Length | 26000mm |
| Overall Width | 2500mm |
| Overall Body Height | 4300mm |
| Min Body Ground Clearance | 540mm |
| Track Width | 2500mm |
| Lock-to-lock time | 6.00s |
| Curb to Curb Turning Radius | 12500mm |



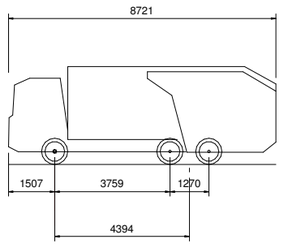

## B85 PASSENGER VEHICLE (5.2 m)

| | |
|---|---|
| OVERALL LENGTH | 5.200m |
| OVERALL WIDTH | 1.940m |
| OVERALL BODY HEIGHT | 1.804m |
| MIN BODY GROUND CLEARANC | 0.295m |
| TRACK WIDTH | 1.840m |
| LOCK-TO-LOCK TIME | 4.00s |
| CURB TO CURB TURNING RADI | 6.300m |



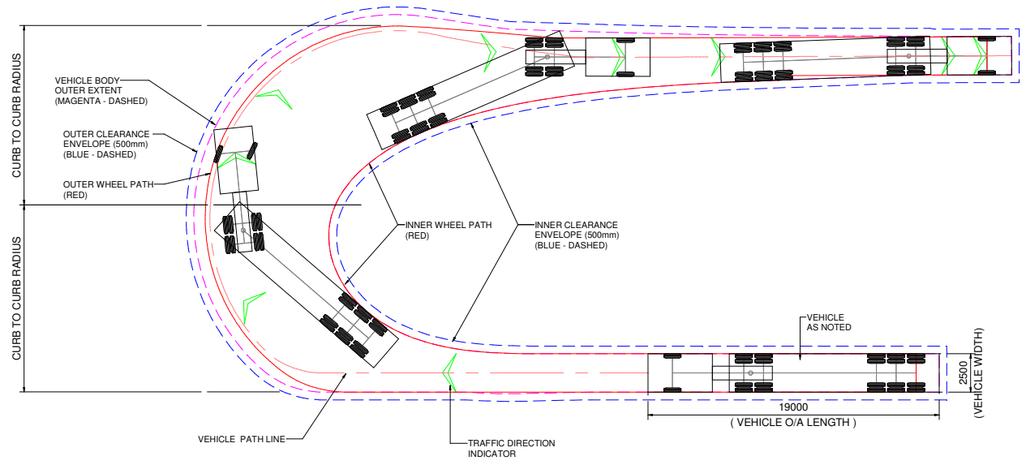

## SERVICE VEHICLE (8.8 m) - MANDATORY STOP

| | |
|---|---|
| OVERALL LENGTH | 8.800m |
| OVERALL WIDTH | 2.500m |
| OVERALL BODY HEIGHT | 3.632m |
| MIN BODY GROUND CLEARANCE | 0.427m |
| TRACK WIDTH | 2.500m |
| LOCK-TO-LOCK TIME | 4.00s |
| CURB TO CURB TURNING RADIUS | 9.000m |



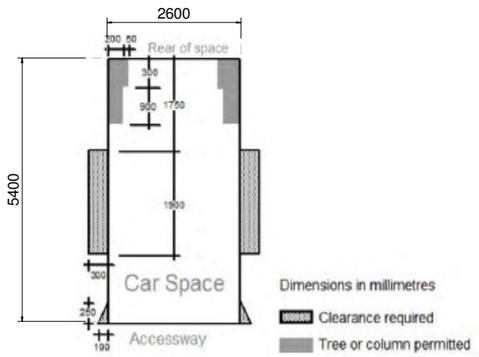

## EXAMPLE REFUSE VEHICLE

| | |
|---|---|
| OVERALL LENGTH | 8.721m |
| OVERALL WIDTH | 2.438m |
| OVERALL BODY HEIGHT | 3.195m |
| MIN BODY GROUND CLEARANCE | 0.400m |
| TRACK WIDTH | 2.438m |
| LOCK-TO-LOCK TIME | 6.00s |
| CURB TO CURB TURNING RADIUS | 10.211m |



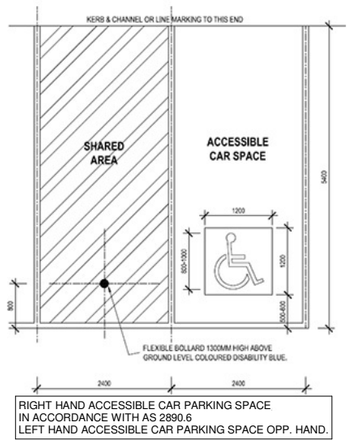

## VEHICLE SWEEP PATH LEGEND

NOTE - VEHICLE SWEEP PATHS SHOWN ON THESE DRAWINGS ARE BASED ON 5km/h MANDATORY STOP DESIGN SPEED.




## STANDARD CAR PARKING SPACE - STANDARD - 2.6m x 5.4m

1 : 50




RIGHT HAND ACCESSIBLE CAR PARKING SPACE
IN ACCORDANCE WITH AS 2890.6
LEFT HAND ACCESSIBLE CAR PARKING SPACE OPP. HAND.

## CAR PARKING SPACE - DISABLED AS 2890.6 - 4.8m x 5.4m

1 : 10

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| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

CLIENT

Fulton Hogan

203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

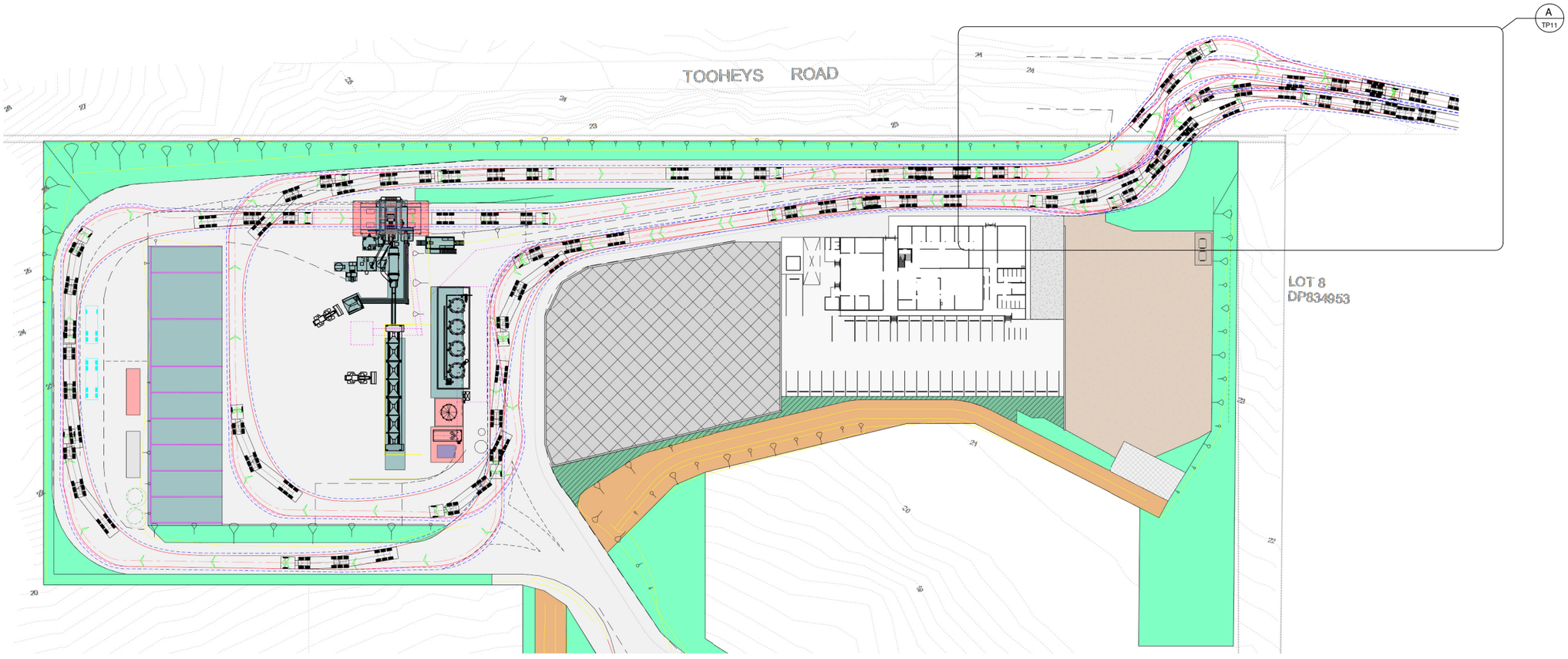
PROJECT

PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

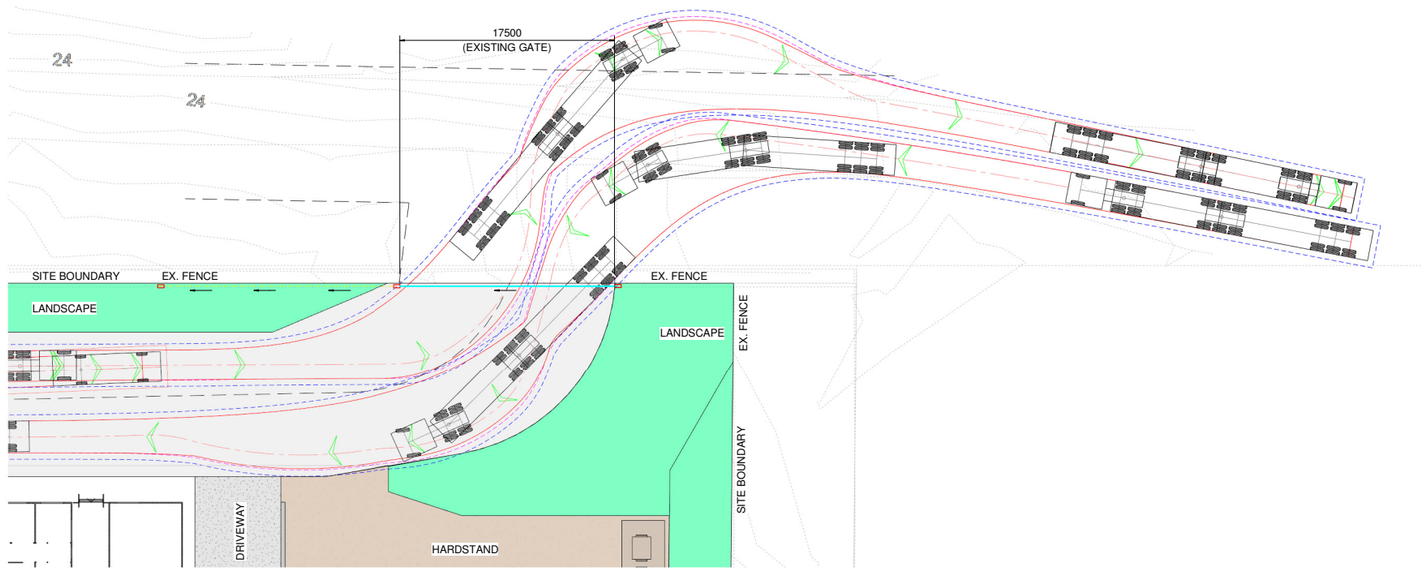
CARPARK & VEHICLE DETAILS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE As indicated |
| APPROVED | |
| DRG No. TP10 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%




SITE PLAN - VEHICLE SWEPT PATHS - B-DOUBLE SITE CIRCULATION
1 : 500




DETAIL A/TP11
1 : 250

NOTE
REFER VEHICLE DETAILS AND SWEEP PATH LEGEND ON DRG. TP10.

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| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

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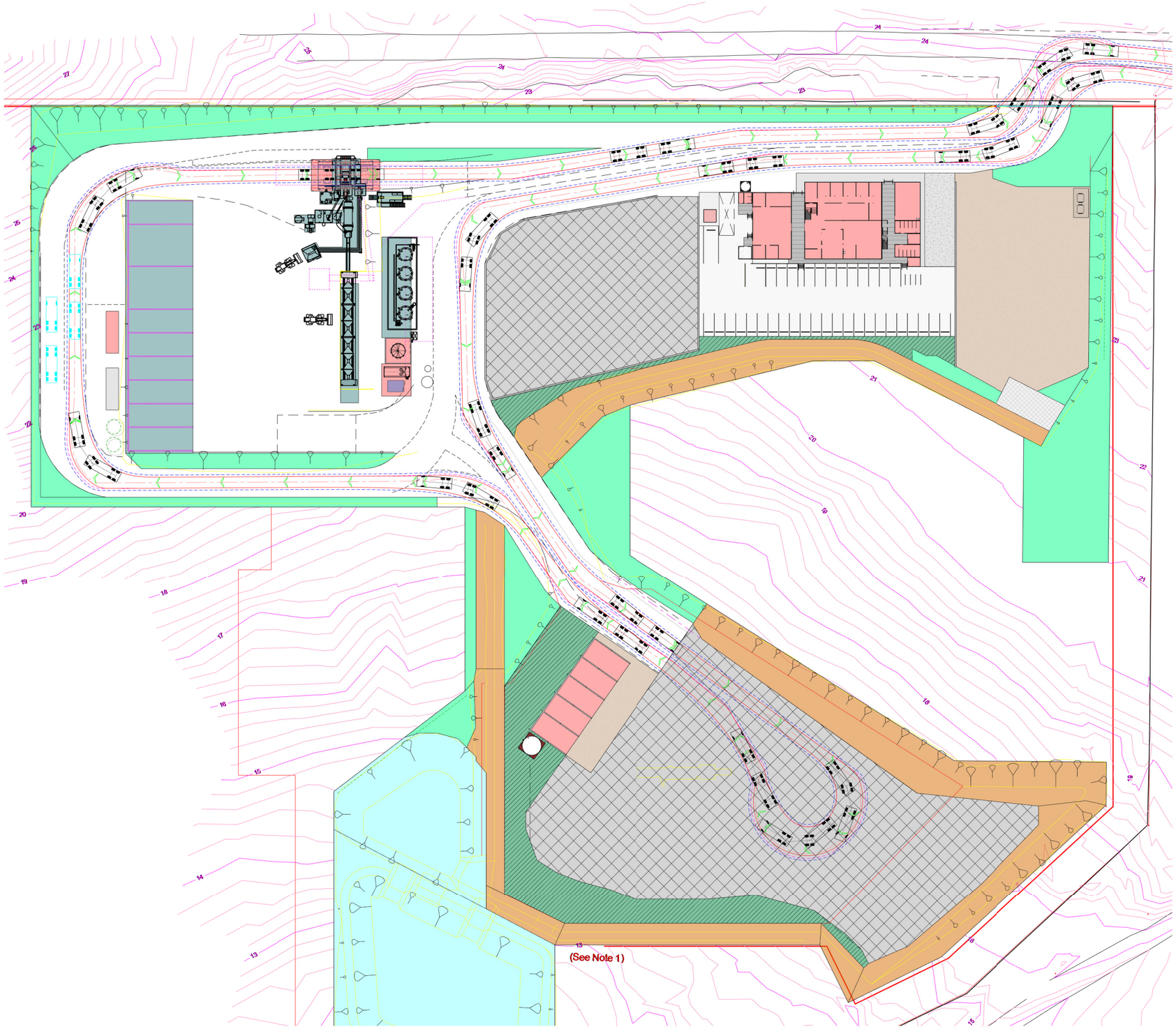
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

VEHICLE SWEEP PATH PLAN
B-DOUBLE - SITE CIRCULATION

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE As indicated |
| APPROVED | |
| DRG No. TP11 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%




SITE PLAN - VEHICLE SWEPT PATHS - TRUCK & DOG SITE CIRCULATION
1 : 500

NOTE
REFER VEHICLE DETAILS AND SWEEP PATH LEGEND ON DRG. TP10.

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

VEHICLE SWEEP PATH PLAN
TRUCK & DOG_SITE CIRCULATION

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 500 |
| APPROVED | |
| DRG No. TP12 | REV. 0 |

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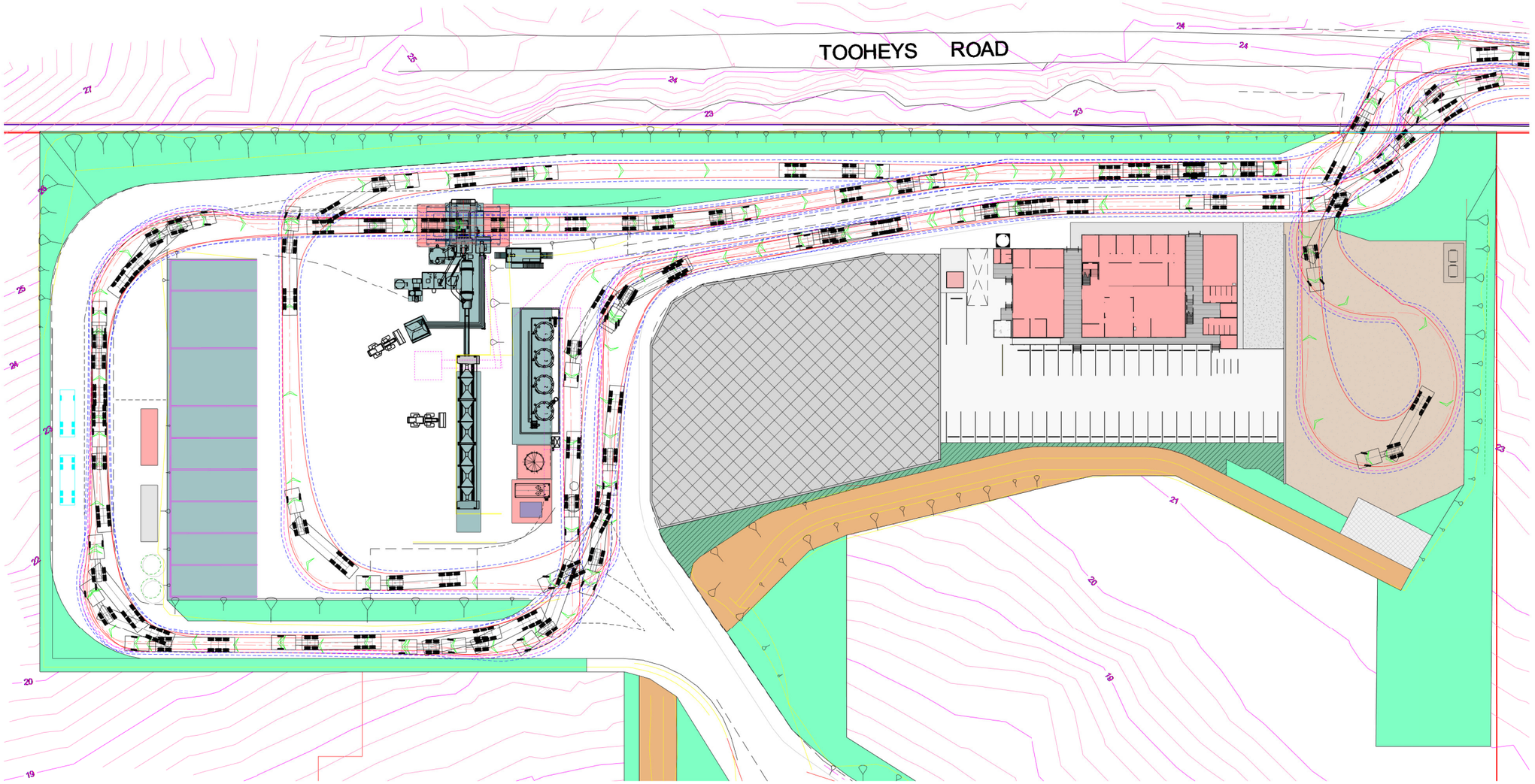
A3 AT 50%




SITE PLAN - VEHICLE SWEPT PATHS - 19m SEMI SITE CIRCULATION
1 : 400

NOTE
REFER VEHICLE DETAILS AND SWEEP PATH LEGEND ON DRG. TP10.

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APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

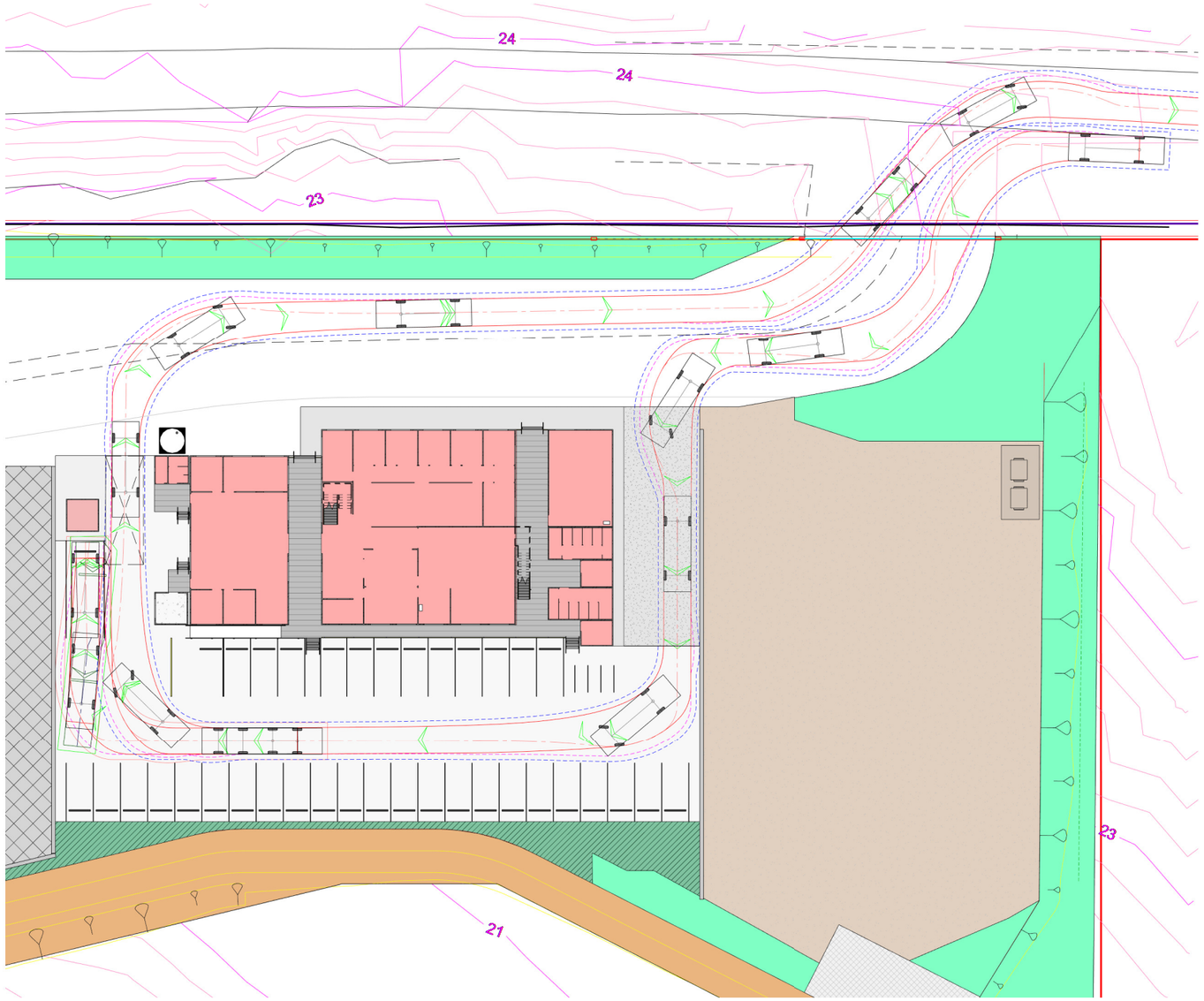
CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

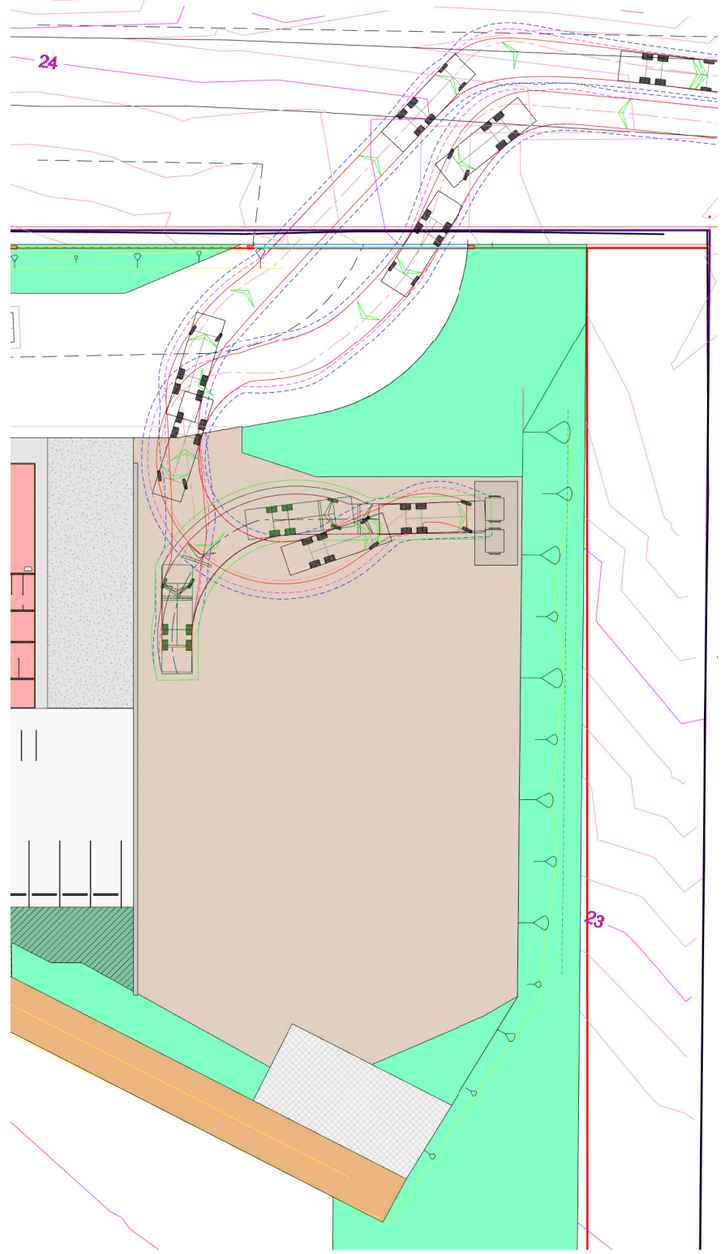
VEHICLE SWEEP PATHS
19m SEMI - SITE CIRCULATION

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 400 |
| APPROVED | |
| DRG No. TP13 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%




SITE PLAN - VEHICLE SWEPT PATHS - MEDIUM TRUCK - CHEM STORE ACCESS
1 : 250




SITE PLAN - VEHICLE SWEPT PATHS - MEDIUM TRUCK - REFUSE ACCESS
1 : 250

NOTE
REFER VEHICLE DETAILS AND SWEEP PATH LEGEND ON DRG. TP10.

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

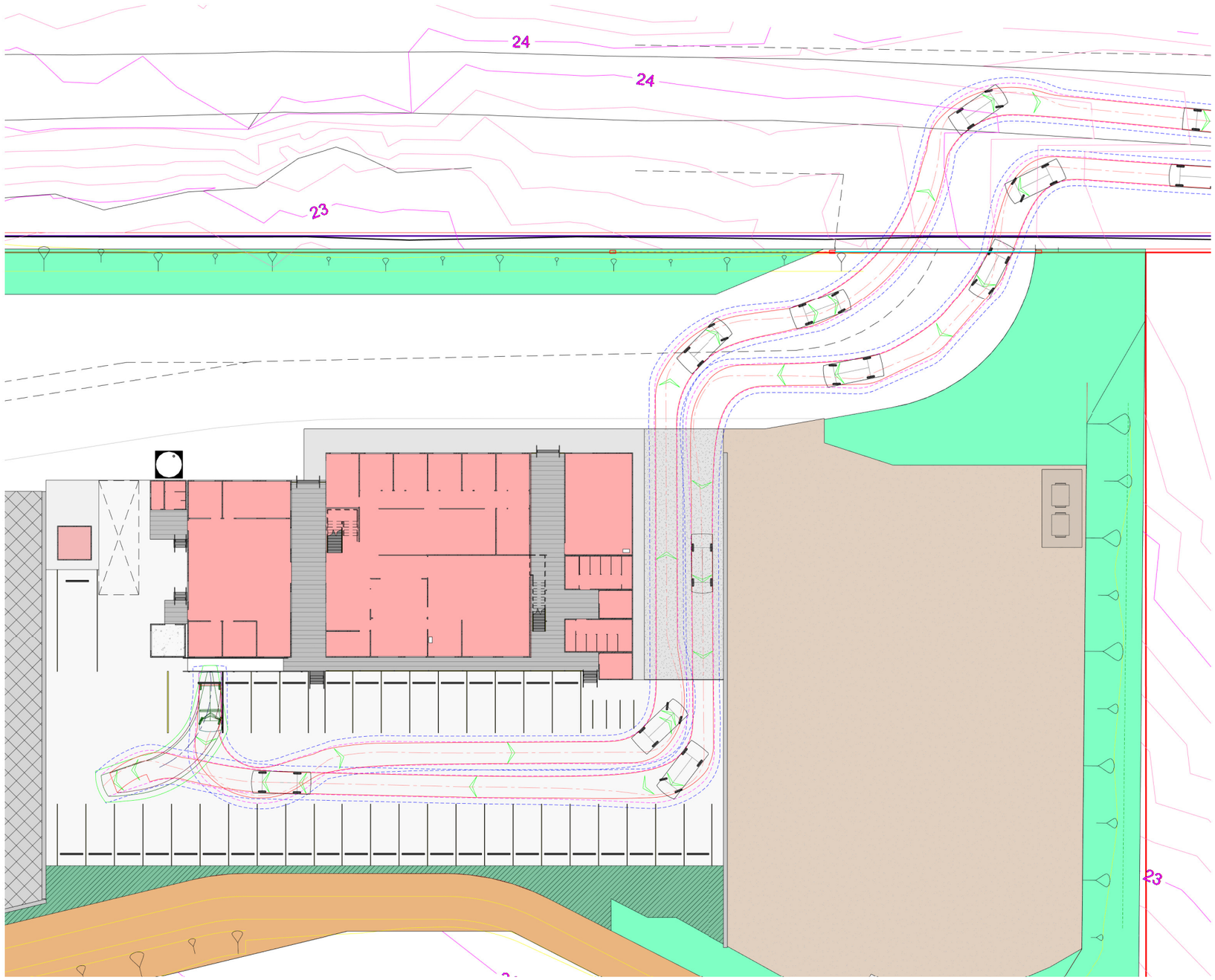
CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

VEHICLE SWEEP PATH PLAN
CHEM. STORE & REFUSE MED. TRUCK - SITE ACCESS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 250 |
| APPROVED | |
| DRG No. TP14 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%




SITE PLAN - VEHICLE SWEPT PATHS - B85 CARPARK ACCESS
1 : 200

NOTE
REFER VEHICLE DETAILS AND SWEEP PATH LEGEND ON DRG. TP10.

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

VEHICLE SWEEP PATH PLAN
B85 CARPARK ACCESS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE 1 : 200 |
| APPROVED | |
| DRG No. TP15 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%


# APPENDIX D

## WASTEWATER MANGEMENT REPORT

DECENTRALISED WATER AUSTRALIA

# Wastewater Management Report

Fulton Hogan Pty Ltd

203 Tooheys Road, Bushells Ridge NSW 2259

17/04/2023

## DOCUMENT CONTROL

**Decentralised Water Australia Pty Ltd**

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| | |
|---|---|
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| **Report Type** | Non-domestic Report |
| **Title** | Wastewater Management Report |
| **Project Manager** | Scott Jordan |
| **Author(s)** | Scott Jordan |
| | Andrew Weekes |
| **Client** | Fulton Hogan Pty Ltd |
| **Client Contact** | Andrew Lyndon |
| **Client Reference** | - |

## REVISION/CHECKING

| REVISION HISTORY | DATE | CHECKED BY | | ISSUED BY | |
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| R.0634.001.00 | 19/09/22 | AW |  | SJ |  |
| R.0634.001.01 | 23/11/22 | AW |  | SJ |  |
| R.0634.001.02 | 17/04/23 | AW |  | SJ |  |

## Acknowledgement

DWA acknowledges the Traditional Custodians throughout Australia and their continuing connection to land, water, culture and community, and pays respect to their Elders past, present and future.

## Limitations Statement

This report and the associated services performed by Decentralised Water Australia (DWA) relate solely to the scope, budget, time, and access constraints as set out in the engagement agreement and quotation between DWA and the Client. DWA accept no liability for any use or reliance on this Report for any purpose not documented in this agreement and quotation by the Client. It has been prepared for the exclusive use of the Client and DWA accepts no liability for any use of or reliance upon this report by any third party.

The outcomes and recommendations contained in this report may have relied upon a range of information and data sources including information and discussions with the client, field investigations (limited to those described in this report), publicly available information and other sources. DWA have not verified the accuracy of third-party data and any inaccuracies or inadequacies may influence the accuracy of our findings. Similarly, both the inherent variability of environmental and ground conditions and the passage of time can lead to changes in ground conditions and other factors which may affect the accuracy of our findings. The Client should seek advice from DWA on the accuracy of findings after more than six months has passed or where changes in relevant conditions are known to have occurred. Data and information collected during field investigations should not be taken as accurate and complete for all depths and locations across the site.

The report and services have been completed in accordance with relevant industry standards, guidelines, and government legislation as of the date of publication unless stated otherwise. Where an engineering design is included, this design has been based on site and construction plans as provided by the Client and/or their representative and documented in the report. DWA accepts no liability for the impact of any changes to site conditions and / or building layout and extents on our design where DWA were not notified of the changes prior to completing our services. Additional costs may be incurred where work has already been completed.

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# Table of Contents

## Table of Figures



## Table of Contents

# 1 Introduction

This Wastewater Management Report (WMR) has been prepared by Decentralised Water Australia (DWA) for Fulton Hogan Pty Ltd. The report summarises the outcomes from a land capability assessment and proposed design for an on-site wastewater management system to service an existing asphalt plant and associated structures located at 203 Tooheys Road, Bushells Ridge NSW 2259.

Central Coast Council (CCC) will require submission of a Wastewater Management Report (WMR) to confirm the suitability of the site for management of wastewater from the proposed development as part of the Development Application (DA) process. The report will demonstrate that adequate arrangements for the management and disposal of sewage are achievable in accordance with the provisions of Councils Local Environmental Plan. The WMR will also be suitable for submission to Council in support of an application to install a wastewater treatment system in accordance with the *Local Government Act* should the client wish to proceed.

This report outlines the outcomes of the project, which involved site and soil assessment, concept design and comprehensive environmental assessment for an on-site wastewater management system to accept, treat and land apply wastewater from the proposed development.

Notwithstanding several identified limitations, the site is generally well suited to on-site wastewater management, with the primary constraints to on-site wastewater management being the limited availability of land, and the soil water regime. Based on the outcomes of the site and soil assessment, it was however determined that an on-site sewage management solution is feasible for the site.

## 1.1 Site Information

The site is identified as 203 Tooheys Road, Bushells Ridge NSW 2259. The lot, which is approx. 15.4ha in size, is irregular in shape with a northern frontage and access from Tooheys Road. The development footprint comprising the asphalt plant and ancillary structures is 3.46ha in size is contained within the broader lot due to the presence of mapped biodiversity values. The slope across the site is variable however is between 5 - 7% in the developed area. The natural direction of grade is the to southeast in the location of the asphalt plant and to the southwest in the position of the offices, carparking and stockpiles. Vegetation across the undeveloped area of the lot comprises grassed and timbered areas. The lot is not encumbered with any natural hydrolines however Wallarah Creek is located approx. 150m to the southwest of the southern lot boundary. Two

unmarked hydroareas are in the southwest of the property which are thought to be stormwater detention ponds.

The location of the site is shown in Figure 1 with details of the site are summarised in Table 1.

Table 1 Summary of Site Information

| Site Information | |
|---|---|
| Property Details | 203 Tooheys Road, Bushells Ridge NSW 2259<br>Lot 10 DP 834953 |
| Owner / Applicant | Fulton Hogan Pty Ltd |
| Allotment Size | 15.4ha |
| Land Zoning | C2 Environmental Conservation<br>IN1 General Industrial (Predominant) |
| Development Type | Non-domestic |
| Description of proposed development | Regularise existing asphalt plant and associated structures (office and bathroom facilities) |
| Water Supply | Reticulated Supply |
| Power Supply | Grid connected |
| Sewer Availability | Not available |
| Local Government Area | Central Coast Council (CCC) |


*Figure 1 Locality Plan*

0 500 1,000 1,500 m

Project: 0634
Drawn: 16/8/2022
Revision: 00

# 2 Performance Objectives

## 2.1 Legislation

### 2.1.1 Development Applications

Development applications made under the *Environmental Planning and Assessment Act* and the Central Coast Local Environmental Plan 2022 require that adequate arrangements must be made for the provision of essential services that are appropriate for the proposed development. Essential services are generally addressed in the LEP and includes the provision of adequate arrangements for the disposal and management of sewage. Given the development site is in an area not provided with reticulated sewer, alternative suitable arrangement must be developed by the applicant.

### 2.1.2 Future On-site Sewage Management System Approvals

The NSW local Government Act prescribes matters that apply to the installation and operation of Wastewater Management Systems. Under Chapter 7, Part 1 of the Act the installation and operation of systems are activities that require the approval of the Local Council. That is, a person may only carry out an activity specified in the Table of Approvals under Section 68 of the Act with the prior approval of the council, except in so far as this Act, the regulations or a local policy adopted under Part 3 allows the activity to be carried out without that approval.

The *Local Government (General) Regulation* prescribes further requirements and guidance. A Council must not approve an application for an approval relating to sewerage work unless it is satisfied that the activity as proposed to be carried out will comply with applicable standards and any applicable requirement of the Regulation. This applies to the installation of a new, or upgrade of an existing Wastewater Management System as well as the ongoing operation of these systems.

The installation of a wastewater management system requires from Council an approval to install under Section 68(C5) of the Act. In determining an application for approval to install, construct or alter a Wastewater System the Council must consider environmental and health protection performance matters that are prescribed in the Regulation. These include:

- Preventing the spread of disease by micro-organisms,
- Preventing the spread of foul odours, contamination of water and degradation of soil and vegetation,
- Discouraging insects and vermin,

- Ensuring that persons do not come into contact with untreated sewage or effluent (whether treated or not) in their ordinary activities on the premises concerned,
- The re-use of resources (including nutrients, organic matter and water),
- The minimisation of any adverse impacts on the amenity of the land on which it is installed or constructed and other land in the vicinity of that land.

The council must also consider any matter specified in guidelines or directions issued by the Director-General in relation to the matters referred to in the above performance objectives.

Additionally, the council must not grant an application for an approval to install, construct or alter a waste treatment device or sewage management facility unless it is satisfied that the activity as proposed to be carried out will comply with any applicable standards established by this Regulation or by or under the Act.

Note: While there are no standards established by the Regulation or Act it is accepted that AS1547: 2012 On-site domestic wastewater management and Environment and Health Protection Guidelines (DLG: 1998) are 2 appropriate reference documents commonly used in the assessment and design of On-site Sewage Management Systems.

The continued operation of Wastewater Management Systems is also addressed in the Regulation. Systems must be operated in a manner that achieves the same installation performance standards mentioned above. Additionally, systems must be operated in accordance with relevant operating specifications and procedures for the system and allow the removal of any treated sewage in a safe and sanitary manner. Further conditions of approval require that the system is maintained in a sanitary condition and that he operation of the system must not discharge into any watercourse or onto any land other than the effluent application area.

The proposed development must also consider the following legislation relevant to wastewater management.

- *Environmental Planning and Assessment Act (1979).*
- *Protection of the Environment Operations Act (1997).*

### 2.1.3 Policies, Standards and Guidelines

The key policies used in this assessment may include:

- NSW Groundwater Policy (specifically the Groundwater Quality Policy),
- Local Planning for Healthy Waterways using NSW Water Quality Objectives,
- NSW Oyster Industry Sustainable Aquaculture Strategy (2016), and
- Using the ANZECC Guidelines and Water Quality Objectives in NSW.

At a broad level, the ANZECC Water Quality Guidelines for Fresh and Marine Waters (2000) and NSW Oyster Industry Sustainable Aquaculture Strategy have been used (in accordance with NSW policy) to determine water quality objectives for the system (where applicable).

The following guidelines and technical references are used by local and state government in assessing applications for systems of this scale.

- AS/NZS1547:2012 On-site domestic wastewater management.
- Environment and Health Protection Guidelines: On-site Sewage Management for Single Households (NSW DLG, 1998).

### 2.1.4 State Environmental Planning Policy (Resilience and Hazards) 2021

The aim of the SEPP is to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objectives of the Coastal Management Act 2016. The SEPP addresses 4 coastal management areas including coastal wetlands, littoral rainforests, coastal vulnerability areas, and coastal environment areas.

Coastal wetlands and littoral rainforests area are areas with inherent hydrological or ecological characteristics (this area includes a 100-metre proximity or buffer area).

Most development within a mapped coastal wetland and littoral rainforest area or buffer area requires consent and is generally designated development - meaning a detailed assessment of environmental impacts, an Environmental Impact Statement must be prepared to support a development application.

Low impact development, if identified as exempt development, can continue in this area. Complying development, especially residential, is restricted in this area.

**Coastal Wetlands** are identified as plant communities dominated by any of the following six vegetation types:

- Mangroves, salt marshes, melaleuca forests, casuarina forests, sedgelands, brackish and freshwater swamps, and wet meadows

**Littoral Rainforest** are identified as plant communities dominated by any of the following five combinations of tree species:

- Riberry, broad-leaved lilly pilly, tuckeroo, brush box, yellow tulip, bauerella, red olive plum, lilly pilly, various figs, cabbage palm and plum pine.

**Coastal vulnerability area** is the area subject to coastal hazards (beach erosion, shoreline recession, coastal lake or watercourse instability, coastal flooding, coastal cliff or slope instability. Development within this area establishes special requirements to be met to be approved. Complying residential development cannot occur in this area.

**Coastal environment area** includes land with coastal features that have environmental values that the State wish to protect and manage. Development is subject to controls that aim to protect the values and associated processes while minimising environmental impacts.

**Coastal use area** is land adjacent to the coast where development can be considered taking into account impacts that accommodates urbanised and natural parts of the coastline while protecting and enhancing the scenic, social and cultural values of the area.

The SEPP identifies management objectives for each coastal management area. These are:

- Managing development in the coastal zone and protecting the environmental assets of the coast.
- Establishing a framework for land use planning to guide decision-making in the coastal zone.
- Mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the Coastal Management Act 2016.

**Coastal SEPP Assessment**

An assessment of the NSW Government Coastal SEPP maps was undertaken to determine any relevant management areas. The results are presented in Table 3. The mapped areas are presented in Figure 2 below.

Table 3 Coastal SEPP Assessment

| Area | Mapped Outcome |
|---|---|
| Coastal Wetland | No |
| Proximity area for Coastal Wetlands | No |
| Littoral rainforest | No |
| Coastal vulnerability area | No map |
| Coastal environment area | No |
| Coastal use area | No |

For further information the reader is directed to the NSW Government Coastal Management SEPP website. This can be found at: (NSW Department of Planning and Environment, 2022) https://www.planning.nsw.gov.au/Policy-and-Legislation/Coastal-and-marine-management/Coastal-management/Coastal-Management-SEPP

# 3 Site and Soil Evaluation

A site and soil evaluation of the property was undertaken based on AS/NZS 1547:2012, Section 5.2 and several Appendices including B and D. The broad goal of the site and soil evaluation was to collect sufficient information about the site, soil and local environmental constraints. This information enables good decision making on the suitability for land based on-site wastewater systems for the development and if appropriate, inform the design, location and operation of the system.

The assessment was performed in two stages.

**Stage 1** was a desktop study with the objective to collect, in advance, regulatory, planning, and environmental information for the site, development and general area. DWA also used its Geographic Information System (GIS) to identify spatial and geographic data relevant to the site and broader area to help inform decisions during site assessment and in the system selection and design process.

**Stage 2** involved a visit to the site to undertake a site and soil assessment having regard to an overall evaluation of not only the individual lot but the broader surrounds. Of importance during this stage is an evaluation of the land within and surrounding the study area with an emphasis on the interaction between surface shape, surface gradient, and water regime. The site visit also allows for the identification, inspection and analysis of sensitive receptors that may influence suitability and subsequent design tasks. A soil survey was completed across the study site with soil samples collected for characterisation and laboratory testing. The complexity of the soil survey is dependent on the size of the lot and the variability in land and soils. While AS1547 (D3.1.1) suggests that an evaluation of 3 representative soil observation boreholes within the lot should be inspected, the exact number will be dependent on several factors including the size of the lot and the homogeneity of the landform and soils across the lot.

Soil test pits were excavated to a suitable depth using a shovel and auger with soil samples collected and photographed for examination, laboratory analysis and reporting.

The overall aims of the assessment were to:

- Provide sufficient information for deciding whether the lot is suitable to sustain an on-site system,
- Provide detailed site-specific information identifying the site-and-soil characteristics to be considered when selecting and designing the on-site system,
- Identify, analyse, and evaluate any risks posed by site-and-soil characteristics which might compromise the long-term effectiveness of the on-site system,

- Identify, analyse, and evaluate any risks of contamination of groundwater or surface water and of associated health risks, and
- Develop and refine measures required to reduce and monitor identified risks that can be considered in the design phase of the study.

The individual lot field investigation was undertaken on **10 August 2022.**

The outcomes of the site assessment are presented in Section 3.1, with the soil assessment information in Section 3.2 and overall outcomes presented in Section 3.3. A plan showing the site and surrounding area is presented in Figure 2 with photos also provided for context.

## 3.1 Site Assessment

Site assessment observations for the lot were determined based on AS1547, Section 5.2 (Site and Soil Evaluation). The evaluation utilised methodologies and procedures from Appendices B, C and D of AS1547 as well as the NSW Environment and Health Protection Guidelines, Section 4.3.3 and Table 4 (Site Assessment: Rating for On-site Systems).

Results and corresponding outcomes from the site assessment are presented in Table 2

Table 2 Desktop Site Assessment

| Site Factor | | Observation | Classification | Outcome |
|---|---|---|---|---|
| Flood potential[1] | - | Site located above Council defined flood levels | Minor limitation | No impact on design |
| Exposure | - | High sun and wind | Minor limitation | No impact on design |
| Slope % | - | 0 - 10 | Minor limitation | Consider the degree of slope in the design and location of the LAA. Ensure that the adopted LAA design is appropriate for the observed slope and aligns with AS1547, Table K1. |
| Landform | - | Linear convergent. Relatively poor drainage expected. Possible control measures include cut-off drains and bunds. | Moderate limitation | Consider the landform in the design and location of the LAA. Adopt a higher standard of treatment and/or implement |

| Site Factor | | Observation | Classification | Outcome |
|---|---|---|---|---|
| | | | | suitable control measures to manage less suitable landforms such as diversion drains, cut-off drains or bunds. |
| Run-on and seepage | - | None, low | Minor limitation | No impact on design |
| Erosion potential | - | No signs of erosion observed | Minor limitation | No impact on design |
| Site drainage | - | No visible signs of surface dampness | Minor limitation | Consider poorer site drainage in the design and location of LAA. Consider appropriate control measures to manage drainage through diversion drain, or cut-off drains. |
| Fill | - | Fill observed | Moderate limitation | The depth and extent of fill must be considered in the selection and design of the LAA. Consideration should be given to removal/replacement or remediation. |
| Rocks and rock Outcrops | - | No surface rock observed | Minor limitation | No impact on design |
| Vegetation | - | Mixed grass and trees | Minor limitation | No impact on design |
| Watercourses and sensitive receptors | - | Several surface dams are present to the southwest of the asphalt plant site. A constructed (open) stormwater drainage line extends from the south of the office area to the southern dam. Wallarah Creek traverses through the property ~150m to the | Minor limitation | Consider level of treatment and LAA method to minimise impacts on hydroareas or hydrolines. Consider improved level of treatment and contained methods of land application such as sub-surface |

| Site Factor | | Observation | Classification | Outcome |
|---|---|---|---|---|
| | | southwest of the southern asphalt plant boundary. | | irrigation. Perform modelling as required. |
| Soil water regime | - | Weakly structured sandy loam to a depth of 500mm over horizons of light and medium clay to a depth of 400mm (900mm total profile depth). | Moderate limitation | Consider treatment standard and LAA method to mitigate poorer soil water regimes. Adopt conservative design loading rate (DLR) to ensure adequate hydraulic performance. |
| Acid Sulfate Soils[1] | - | N/A | Minor limitation | No impact on design |
| Biodiversity Values Map[2] | - | Yes, biodiversity values mapped | Minor limitation | Consider design and location of LAA that minimises impact to mapped biodiversity value area(s). The development site within the broader lot has been fenced off from the mapped biodiversity values. |
| Drinking Water Catchment[1] | - | No | Minor limitation | No impact on design |
| Aquaculture Areas[3] | - | No aquaculture mapped | Minor limitation | No impact on design |

[1] NSW Government eSpatial Viewer

[2] NSW Government Biodiversity Values Map and Threshold Tool

[3] NSW Fisheries Spatial Data Portal

### 3.1.2 Site Photos

Example of vegetation on or adjacent to the property. Fence delineates development site from mapped biodiversity values.

Existing portable amenties in foreground

Portable offices and carpark

Asphalt plant

Soil and mulch mound on northern boundary parralel to Tooheys Road

Stormwater swale

Stockpile area

Potential LAA


*Figure 2 Site Assessment Plan*

0 40 80 120 m

Project: 0634
Drawn: 19/9/2022
Revision: 00


*Figure 3 Site Assessment Plan (detailed)*

0 20 40 60 m

Project: 0634
Drawn: 19/9/2022
Revision: 00

## 3.2 Soil Assessment

The site is located on the Somersby soil landscape as mapped on the Soil Landscapes of the Gosford-Lake Macquarie 1:100 000 Sheet. This Residual soil landscape typically consists of gently undulating and rolling rises on deeply weathered Hawkesbury sandstone. Limitations of this landscape typically include high permeability (and thus higher nutrient leaching potential).

Discrete soil samples from the test pit determined to be the most representative of the location of the proposed land application area were analysed in-house for physical parameters including pH, Electrical Conductivity and Emerson Aggregate Test (modified). A composite soil sample of the same test pit was submitted to Sydney Environmental Soil Laboratory (SESL) for chemical analysis.

A summary of the sub-surface profile is presented in the table below.

Table 3 Summary of soil profile characteristics

| Test Pit | Depth (mm) | Texture[1] | Structure | Colour | Coarse Fragments |
|---|---|---|---|---|---|
| TP1 | 0 – 500 | Sandy Loam (2) | Weak | Brown | <2% Very few |
| | 500 – 600 | Medium clay (6) | Strong | Orange | <2% Very few |
| | 600 – 650 | Light clay (5) | Moderate | Yellowish | <2% Very few |
| | 650 – 800 | Medium clay (6) | Strong | Off white | <2% Very few |
| | 800 – 900 | Light clay (5) | Moderate | Yellowish | <2% Very few |

[1] Soil category in brackets

### 3.2.1 Laboratory Results

The outcomes of the laboratory analysis are outlined in Table 5.

#### *3.2.1.1 pH*

The pH of the soils was reasonably consistent across the five depths with the results ranging from 5.4 to 6.0 which is in the moderately to strongly acidic range. The composite sample for test pit 1 returned a result of 5.9 which is consistent with the discrete sample results and classified moderately acidic. The pH value of the soil can influence the soil conditions, vegetation growth and the mobility/availability of nutrients and metals. The pH of the subject soils is within the range most suitable for plant growth of 5.5 – 9.0 therefore remediation of the soil pH is not recommended.

#### *3.2.1.2 Salinity and Sodicity*

Soil salinity is the accumulation of water-soluble salts in the soil. The predominant cations and anions that contribute to salinity are sodium, calcium, and magnesium in the form of chlorides, sulphates or carbonates. Elevated salinity can impact plant growth and contribute to erosion and a change in soil texture. Salinity is directly proportional to the measured electrical conductivity of a soil - water extract with the standard units being decisiemens per metre (dS/m). The EC result is converted to ECe to reflect the estimated water-holding capacity of the soil with the conversion factor a function of the soil texture.

Hazelton and Murphy (2016) states that soils with a salinity (ECe) <2 dS/m are considered non-saline and will have negligible effects on plant growth. Soils with a salinity above 4dS/m may start to impact plants. The electrical conductivity (ECe) results for the five profiles and the composite sample returned results less than 2dS/m indicating that the soils are non-saline.

Sodicity is defined as the level of exchangeable sodium cations in the soil with implications of dispersion on wetting and shrink-swell properties. According to Hazelton and Murphy (2016), soils that are sodic can exhibit the following properties that may be detrimental to the application of wastewater:

- Surface crusting,
- Low infiltration and hydraulic conductivity,
- Hard and dense sub-soils,
- Susceptibility to gully and tunnel erosion.

Sodicity is determined using Exchangeable Sodium Percentage which is calculated as a function of the soluble sodium and cation exchange results. ESP of > 10% (Environment

and Health Protection Guideline) is considered a major limitation which must be addressed. The ESP results for the composite soil sample was 1% and non-sodic.

A further indication of sodicity can be obtained from the results of the Emerson Aggregate Test (EAT). Generally, soils with an EAT class of 3(2), 3(1), 7 and 8 are unlikely to be sodic. EAT class of 3(3), and 2(1) may be sodic with class 2(2), 2(3) and 1 most likely to be sodic. The EAT soil results were predominantly 3(1) and 3(2).

#### *3.2.1.3 Cation Exchange Capacity*

The cation exchange capacity (CEC) is the ability of soil particles to retain cations at a given pH and is useful in understanding the ability of a soil to retain pollutants. CEC provides pH buffering and can influence availability of nutrients, calcium levels and soil structural changes. Exchangeable cations are a measure of the most abundant cation sodium, potassium, calcium, magnesium, and aluminium. CEC tends to vary according to soil type with clay soils more likely to exhibit higher results due to the greater ability to bind cations. The CEC result of 29cmol/kg is classified as high and not a limitation. The result is a function of the very high calcium concentration.

#### *3.2.1.4 Phosphorus sorption capacity*

The phosphorus sorption capacity is an indicator of the capacity of a soil to absorb phosphorus as effluent moves through the soil profile. Due to an issue with the laboratory result, a phosphate sorption index result was obtained from eSpade (NSW Government). The profile report was for a sample located to the north of the subject site and in the same soil landscape. A copy of the profile report is included in Appendix 2. The P-sorb result of 132mg/kg is in the moderate range which is satisfactory for immobilisation of phosphorus within land application areas.

### 3.2.2 Discussion and Recommendations

Physically, the above soil profile is considered to be moderately suited to effluent application due to the category 2 upper profile, depth profile, reasonable permeability and organic content. Chemically, the soil is satisfactory. Based on the soil results remediation of the soils within and below the LAA is not proposed.

Table 4 Soil Chemical and Physical Result for TP1

| Depth | Parameter | Value | Interpretation |
|---|---|---|---|
| 0 - 500 | pH | 5.45 | Strongly acidic |
| | Electrical Conductivity (ECe dS/m) | 0.25 | Non-saline |
| | Emerson class | N/A | N/A |
| 500 – 600 | pH | 5.56 | Moderately acidic |
| | Electrical Conductivity (ECe dS/m) | 0.47 | Non-saline |
| | Emerson class | Class 3(1) | Low |
| 600 - 650 | pH | 5.95 | Moderately acidic |
| | Electrical Conductivity (ECe dS/m) | 0.44 | Non-saline |
| | Emerson class | Class 3(1) | Low |
| 650 - 800 | pH | 5.35 | Strongly acidic |
| | Electrical Conductivity (ECe dS/m) | 0.66 | Non-saline |
| | Emerson class | Class 3(2) | Low |
| 800 - 900 | pH | 5.6 | Moderately acidic |
| | Electrical Conductivity (ECe dS/m) | 0.46 | Non-saline |
| | Emerson class | Class 3(1) | Low |
| Soil Composite | pH | 5.87 | Moderately acidic |
| | Electrical conductivity (EC dS/m) | 0.07 | Non-saline |
| | Cation Exchange Capacity | 29.0 | Very low |

| Depth | Parameter | Value | Interpretation |
|---|---|---|---|
| | (cmol+/kg) | | |
| | Exchangeable sodium percentage<br>ESP | 1% | Non-sodic |
| | P-sorption<br>(mg/kg @70%) | 132 | Medium |

## 3.3 Available Area for Land Application

A setback distance analysis was performed to determine appropriate setback distances for various site features that are referenced in AS1547 – 2012 Appendix R1/R2. As stated in the standard, local conditions and sensitive receiving environments typically require different setback distances. The table is used in conjunction with the outcomes from the site and soil evaluation to provide guidance on what would be an appropriate setback distance for the adopted land application method and design effluent quality against each relevant site feature.

Appendix R of the standard applies a risk-based approach to the determination of setback distances for the various site features. Each setback distance is a range rather than a single prescribed value with the physical horizontal or vertical setback distance determined as a function of a constraint scale for each site or system feature. Selection of a higher or lower distance for each relevant feature is based on the assessor's knowledge and experience using guidance notes included in the Appendix.

The results are presented in Table 5.

The results indicate that where setback distances to specific site features are not achieved or not achievable, that appropriate existing controls exist, or proposed controls can be implemented to ensure an adequate level of protection.

Table 5 LAA Setback Distance Analysis

| Site Feature | AS1547 Criteria Table R1 | Contributing Factors Table R2 | AS1547 Criteria adopted | Comments |
|---|---|---|---|---|
| Property boundary | 1.5 – 50m | Microbial (A)<br>Slope (D)<br>Application Method (J) | | - Effluent quality is secondary standard with active disinfection achieving an assumed 20/30/30 BOD/TSS/E. coli levels.<br>- Slope is within criteria of 0 – 10%.<br>- The proposed method of land application is a Wisconsin Mound. This approach affords enhanced levels of environmental protection due to the contained nature of the effluent application and biophysical processes. |
| Buildings / houses | 2.0 - >6m | Microbial (A)<br>Slope (D)<br>Application Method (J) | >6m | - The setback achieves maximum setback criteria. |
| Surface water | 15 – 100m | Microbial (A)<br>Surface Water (B)<br>Slope (D)<br>Position of LAA (E)<br>Drainage (F)<br>Flood Potential (G)<br>Application Method (J) | >100m | - The setback achieves maximum setback criteria. |

| Site Feature | AS1547 Criteria Table R1 | Contributing Factors Table R2 | AS1547 Criteria adopted | | Comments |
|---|---|---|---|---|---|
| Bore, well | 15 – 50m | Microbial (A)<br>Groundwater (C)<br>Geology & Soils (H)<br>Application Method (J) | >50m | - | Closest NGIS bore is GW200380 (monitoring) which located ~400m NE (and upgradient) of property. |
| Recreational areas<br>(Children's play areas, swimming pools etc) | 3 – 15m | Microbial (A)<br>Position of LAA (E)<br>Application Method (J) | N/A | - | Commercial property |
| In-ground water tank | 4 – 15m | Microbial (A)<br>Position of LAA (E)<br>Application Method (J) | N/A | - | No inground tanks |
| Retaining wall, embankments and escarpment | 3.0m or 45° angle from toe of wall<br>(Whichever is greatest) | Slope (D)<br>Flood potential (G)<br>Geology (H) | N/A | - | No retaining walls |
| Groundwater | 0.6 - >1.5m | Microbial (A)<br>Groundwater (C)<br>Position of LAA (E)<br>Drainage (F) | 0.9m<br>TP1 | -<br>- | Sub-soils are identified loam to light clay and not highly permeable.<br>No water supply bores identified in proximity to lot. |

| Site Feature | AS1547 Criteria Table R1 | Contributing Factors Table R2 | AS1547 Criteria adopted | Comments |
|---|---|---|---|---|
| | | Geology (H)<br>Landform (I)<br>Application Method (J) | | - Effluent quality is of a secondary nature with active disinfection. Wisconsin mound LAA approach an above grade design providing an additional 600mm of media. |
| Hardpan or bedrock | 0.5 - ≥1.5m | Microbial (A)<br>Groundwater (C)<br>Application Method (J) | 0.90m TP1 | - Hardpan not encountered to 0.90m BGL.<br>- Available soil depth is appropriate for preferred method of LAA. |

## 3.4 Outcomes of Site and Soil Assessment

The outcomes from the site and soil assessment have identified the following major or moderate limitations:

### 3.4.1 Major Limitations

- Nil

### 3.4.2 Moderate Limitations

- Availability of land suitable for LAA
- Landform
- Soil water regime

A treatment system and land application approach has been identified in Section 4 that is considered the most suitable wastewater management option taking into consideration the above site constraints.

DWA has also identified the following management controls to address the constraints identified and ensure the preferred system is designed correctly for the site:

- Completion of hydraulic and nutrient balance calculations to size the land application area using assumptions and criteria from published standards, guidelines and references.
- Demonstration of appropriate horizontal and vertical setbacks to site features, development features and sensitive receptors as outlined in AS1547 (2012 - Appendix R), and
- Selection of a treatment system, land application area design and effluent quality standard that is suitable for the observed site, soil, environmental and development features and subsequent related limitations.

# 4 Design Basis

The outcomes from the detailed site and soil assessment have determined that the site is generally suitable for a wide range of on-site wastewater management options. These options and a final design basis are discussed in further detail in the following sections.

## 4.1 Wastewater Servicing Options Evaluation

Several broad options for wastewater servicing solutions were initially considered by DWA that encapsulated the full range of servicing strategies available for this site. These were shortlisted to a single preferred servicing option following an initial screening process as summarised in Table 6 below.

Table 6 Outcomes of Initial Screening Process

| No. | Potential servicing option | | Evaluation | Progress? |
|---|---|---|---|---|
| | Treatment | LAA | | |
| 1 | Sewer | N/A | - Sewer is not available to the property. | **No** |
| 2 | Secondary | Sub-surface irrigation | - This is a commonly utilised wastewater management option that provides a high level of performance. Secondary treatment systems provide significantly improved effluent quality characteristics over primary systems. The subsurface land application method delivers enhanced levels of environmental and human health protection resulting from superior assimilation of the applied effluent and nutrients through soil and biological processes.<br>- Based on the outcomes of the site and soil evaluation, this option has not been carried forward. This is because of the lack of available land in a location capable of achieving adopted setback distances. | **No** |
| 3 | Primary | Wisconsin Mound | - This is a proven wastewater management option for sites constrained by seasonally or permanently elevated water table, low-lying land or shallow soil depths. Mound systems are specially designed to overcome the limitations associated with category 4 – 6 soils and sites with seasonal soil saturation. They are appropriate for slope gradients of approx. 15% however an increase in the importation of sand is required | **No** |

| No. | Potential servicing option | | Evaluation | Progress? |
|---|---|---|---|---|
| | Treatment | LAA | | |
| | | | and the risk of seepage on steep slopes is also greater.<br>- Based on the outcomes of the site and soil evaluation, this option has not been carried forward. This is because a higher level of treatment is considered appropriate. | |
| 4 | Secondary | Wisconsin Mound | - This is a proven wastewater management option for sites constrained by seasonally or permanently elevated water table, low-lying land or shallow soil depths. The selection of a secondary treatment system has been considered given the need for a higher effluent quality to preserve environmental and human health performance targets. Mound systems are specially designed to overcome the limitations associated with category 4 – 6 soils and sites with seasonal soil saturation. They are appropriate for slope gradients of approx. 15% however an increase in the importation of sand is required and the risk of seepage on steep slopes is also greater.<br>- Based on the outcomes of the site and soil evaluation, this option has been carried forward. This is because: a) a higher level of treatment is deemed appropriate, b) the smaller footprint of the mound design aligns with the limited availability of suitable land, and c) the mound design is suitable for sites limited by soil depth or sites with in-situ fill material. | **Yes** |
| 5 | Effluent pump-out system | N/A | - It is acknowledged that Effluent Pump Out systems are not a very sustainable method for managing wastewater. They are however necessary where an on-site system utilising land application is unachievable and considered too risky due to identified site or soil limitations.<br>- EPO's can typically be cheaper to install however they can be significantly more expensive to operate over the long term compared with other system types. These system types do not meet the principles of ecological sustainable | **Possible** |

| No. | Potential servicing option | | Evaluation | Progress? |
|---|---|---|---|---|
| | Treatment | LAA | | |
| | | | development. Council will generally only approve them where no other system type can achieve the required environmental and human health objectives of the Regulation and guidelines. Notwithstanding the hesitancy of Councils to approved EPO's, there does not appear to be any legislative provision restricting their approval and are sometimes necessary as a system of last resort.<br>- Based on the outcomes of the site and soil evaluation, this option while not preferred could be carried forward if the capital and associated life cycles costs are able to demonstrate a superior financial outcome. If this approach is considered, then it is recommended that a brief economic assessment is performed to support the decision. Additionally, the operation of EPO's is typically not prone to mismanagement which can be possible in other situations. | |

## 4.2 Design Wastewater Flows

It is accepted practice that design wastewater flows in non-domestic situations can typically be derived from:

- Development type,
- Occupancy characteristics,
- Operational characteristics (shift work, weekend work etc), and
- Water supply source.

The design basis for the proposed wastewater management system has been developed based on the above assumptions for an asphalt plant and information obtained from the client (email dated 20/3/2023). DWA understands that the plant operates two shifts over 24-hours across a 7-day basis. Day shift operates between 8am and 5pm, with night shift between 6pm and 6am. While some variability in the number of sit and non-site-based staff was provided by the client, DWA have adopted the maximum number of staff for conservatism.

Wastewater design flow allowances have been derived with reference to the NSW Health Septic Tank and Accreditation Guideline (2001) – Factories and Offices. The site is connected to a reticulated water supply. Standard domestic human effluent has been assumed.

A summary of the occupancy data for the site is provided in Table 7 with adopted peak wastewater flows presented in Table 8.

Table 7 Occupancy Data (Client)

| Activity | Monday – Friday Day Shift | Monday – Friday Night Shift | Weekday Adopted | Weekend Day/Night Shift | Weekend Adopted[2] |
|---|---|---|---|---|---|
| **Site Based Staff** | | | | | |
| Office Staff | 15 – 26 | 0 – 2 | **28** | 0 – 2 | **4** |
| Laboratory Staff | 2 – 4 | 0 – 2 | **6** | 0 – 2 | **4** |
| Plant and Site Staff | 3 – 5 | 2 – 5 | **10** | 2 – 5 | **10** |
| Visitors | 6 | 0 | **6** | 0 | **0** |
| **Non-site Based Staff** | | | | | |
| Truck Drivers | 5 – 5 | 5 – 5 | **10** | 5 – 5 | **10** |
| Road Crew | 10 – 20 | 10 - 20 | **30** | 10 - 20 | **30** |

Table 8 Design Wastewater Flows

| Activity | Total Staff Weekday/ Nights | Total Staff Weekends/ Nights | Adopted Wastewater Flow L/person/day | Peak Design Wastewater Flow L/day |
|---|---|---|---|---|
| **Site Based Staff** | | | | |
| Office Staff | 28 | 4 | 14 | **392** |
| Laboratory Staff | 6 | 4 | 50[3] | **300** |
| Plant and Site Staff | 10 | 10 | 27 | **270** |
| Visitors | 6 | - | 10 | **60** |
| **Non-site Based Staff** | | | | |
| Truck Drivers | 10 | 10 | 27 | **270** |
| Road Crew | 30 | 30 | 27 | **810** |
| | | | **TOTAL** | **2,102L/Day** |

[2] Includes both day and night shifts.
[3] Includes wastewater of a domestic nature from laboratory work.

## 4.3 Treatment System

A treatment system has been selected based on the outcomes from the site and soil assessment, site location and environmental considerations. Due to identified site and soil limitations, a treatment option capable of producing a higher level of treatment is deemed appropriate. Due to the relatively modest daily wastewater flows for this type of activity, a small commercial wastewater treatment system capable of treating up to 2,000L/day is considered appropriate. Some flow balancing will be necessary with a total balance volume of 3,000L sufficient. The selected treatment system is presented in Table 9.

Table 9 Adopted Treatment System Design

| Treatment System Type | System Design Capacity |
|---|---|
| Flow balance tank | 3,000L |
| Secondary treatment system | 2,000L/day |

## 4.4 Land Application Design Basis

A land application method has been selected based on the outcomes from the site and soil assessment, site location and environmental considerations. The size of the LAA has been determined based on a hydraulic calculation. Sufficient land and separation distance is available downslope of the development site boundary (different to lot boundary) to act as a nutrient buffer.

Key design parameters are summarised in Table 10 and Table 11 the calculations found in Appendix C.

Table 10 Land Application Design Sizing Parameters

| Parameter | Value | Basis |
|---|---|---|
| Design Loading/Irrigation Rate | 24 mm/day | AS1547: 2012 Table N1<br>Category 2 soil |
| Linear Loading Rate | 70L/m/day | Converse and Tylor<br>Sandy loam, 0.31 – 0.6m limiting layer depth on slope <5% |
| Soil Depth to Limiting Layer | 0.50m | Based on TP1 – depth to medium clay |

| Parameter | Value | Basis |
|---|---|---|
| Climate Data – Rainfall | SILO Data | SILO Data |
| Climate Data - Evaporation | SILO Data | SILO Data |
| Typical Effluent Quality<br>Total Nitrogen | 35mg/L | Secondary Effluent Quality |
| Typical Effluent Quality<br>Total Phosphorus | 12 mg/L | |
| Adopted crop nitrogen uptake | 250 kg/ha/year | 25% of typical mixed grass (to account for reduced clippings removal and soil health). |
| Adopted crop phosphorus uptake | 30 kg/ha/year | |
| P-sorption capacity | 132 mg/kg | Assumed based on literature value (eSpade soil profile data) |
| Depth of soil for P-sorption | 0.90m | Based on Test Pit |
| Bulk density | 1.4 g/cm$^2$ | Typical |
| Soil P-sorption effectiveness | 75% | Typical |
| Nitrogen lost to soil processes | 40% | Geary and Gardner (1996) |

Table 11 Design Basis for Proposed System

| Calculation Method | Values | Comment |
|---|---|---|
| Peak wastewater volume per mound | 1,000L/Day | Total volume of 2,000L/Day based on peak capacity of treatment system |
| Number of mounds | 2 | - |
| Hydraulic (per mound) | 132m$^2$ | Mound calculation |
| Nitrogen | 409m$^2$ | Requires 20m downslope nutrient buffer |
| Phosphorus | 759m$^2$ | Requires 45m downslope nutrient buffer |
| **Adopted** | **2 x 132m$^2$** | **Sufficient setback distances to receiving environments achieved** |

## 4.5 Outcomes

Based on the design sizing presented above and in Appendix C, the following design basis is considered capable of meeting the environmental and health protection objectives of Council and the *Local Government (Approvals) Regulation 2005*. The wastewater design is presented in Figure 4and Figure 5 with the final design basis below and further detail in the Appendices.

Table 12 Selected Wastewater System

| Proposed Treatment System | Proposed Land Application Method |
|---|---|
| Secondary treatment system with a peak capacity of 2kL/Day. Flow balance tank with a total volume of 3kL (upfront). | 2 x Wisconsin mounds each of 132m$^2$ |


*Figure 4 Wastewater Plan*

0 15 30 45 m

Project: 0634
Drawn: 17/04/2023
Revision: 03

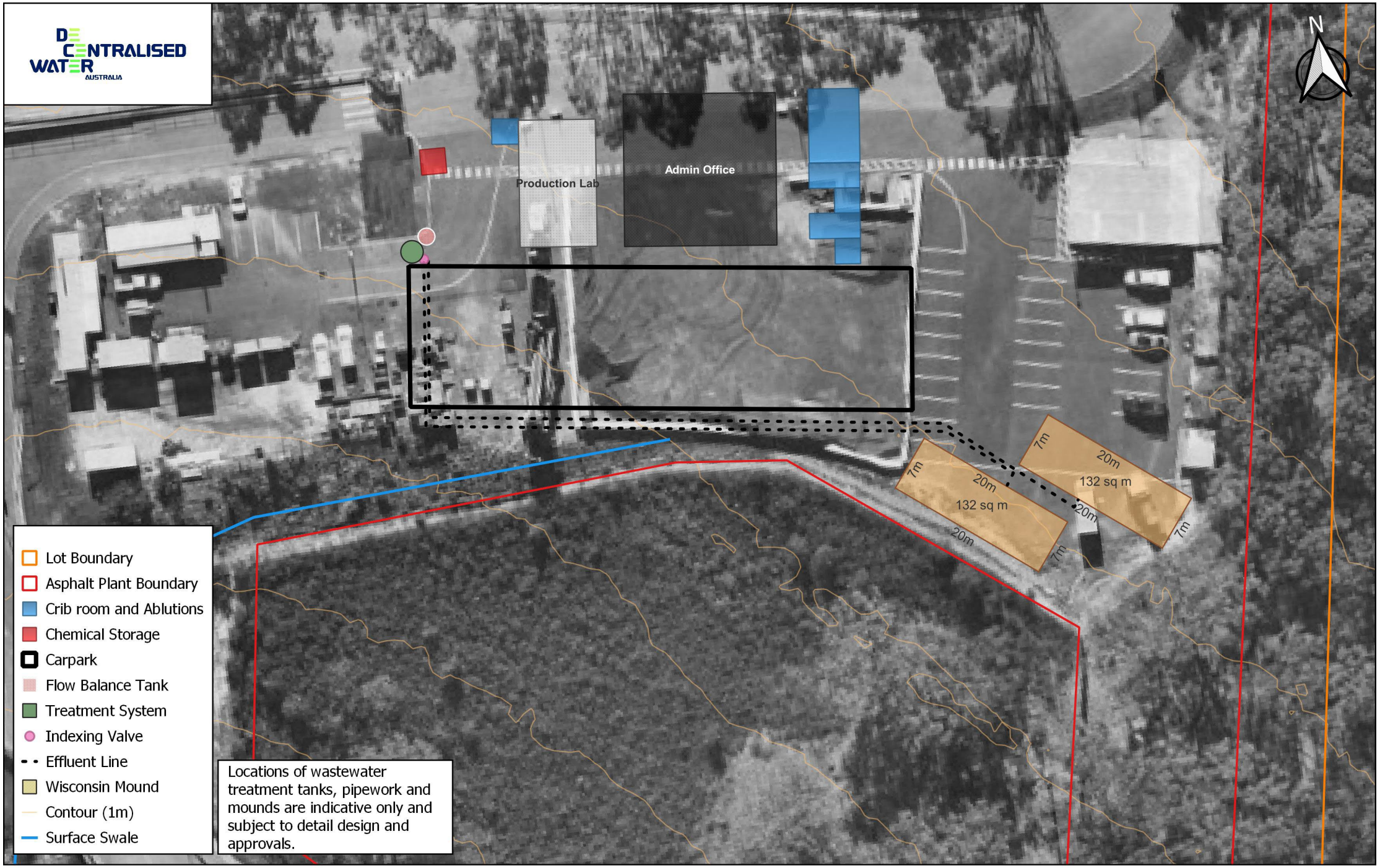


*Figure 5 Wastewater Plan (detailed)*

0 10 20 30 m

Project: 0634
Drawn: 17/04/2023
Revision: 03

# 5 Operation and Maintenance

The wastewater management concept described above has been developed as a relatively low maintenance option. Notwithstanding, AS1547 (T5) provides advice on several operational and maintenance concepts for treatment systems and land application areas that should be considered by owners and occupiers.

## 5.1 Operation – Treatment System

Reduce the potential for sludge build up and impacts in the treatment tank by:

- Using sink drainers and scraping plates before washing to reduce food scraps entering the system,
- Minimising disposal of oils and fats down the sink, and
- Disposing of hygiene products appropriately.

Reduce impacts on the biological processes within the treatment system and LAA by:

- Using soaps and detergents that are biodegradable, low-phosphorus and low in sodium,
- Avoiding the use of bleaches, whiteners, disinfectants, and nappy soakers,
- Not putting chemicals down the drain,
- Installing water conservations fixtures in the bathroom and laundry,
- Reducing the volume of water used in the house,
- Using water conserving washing machines, shower heads, toilets and dishwashers, and
- Avoiding excess washing on one day.

## 5.2 Maintenance – Treatment System

- Engage the services of a reputable company to periodically service the secondary treatment system on a frequency specified in the NSW Health accreditation for the system.
- Monitor the alarm panel for problems with the aeration blower or irrigation pump and contact the service technician if it activates.
- Monitor the treatment system for unusual sounds, smells or vibration and contact the service technician if it a problem is detected, and
- Periodically clean the irrigation filter if advised by the service technician.

## 5.3 Maintenance – Land Application Area

- Periodically mow the irrigation area and remove the grass clippings,
- Monitor the irrigation equipment for signs of damage or failure. Replace or repair as required or discuss with the service technician,
- Monitor the condition of the LAA for surface ponding and wet spots and discuss with the service technician if observed,
- Ensure that the appropriate effluent warning signs remain in place and visible to persons entering the LAA, and
- Restrict access to the LAA from vehicles and livestock.

# 6 References

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# Appendix 1 Design Specification and Drawings

# Appendix 1 Mound Design Specification and Drawings

This Design Specification summarise the outcomes of the wastewater design and includes guidance on materials and construction considerations. It is not a detailed construction specification however is intended to assist installation companies and plumbers when installing the wastewater system.

## Appendix 1.1 System Summary

The following table describes the system design determined to be appropriate for the site based on the outcomes of the environmental constraints, land capability assessment and development type.

| Design Summary | |
|---|---|
| Calculated design wastewater profile | 2,000L/day |
| Wastewater collection system | Sanitary drainage by licenced drain layer in accordance with PCA and AS3500 (as required) |
| Wastewater treatment system | Secondary treatment system |
| Land application method | Wisconsin Mound |
| Land application area size and dimensions | 2 x 132m$^2$<br>6.8m (W) x 19.6m (L) |

## Appendix 1.2 Sanitary Collection System

| Element | Details |
|---|---|
| Wastewater | - All raw wastewater (blackwater and greywater) is to drain to the treatment system via new or existing sanitary pipework. |
| Sanitary pipework | - All sanitary pipework must be installed in accordance with the Plumbing Code of Australia and AS3500 by a plumber/drainer holding a license with NSW Fair Trading. |

## Appendix 1.3 Treatment System Details

| Element | Reference | Detail |
|---|---|---|
| System type | Local Government (General) Regulation, Cl 41 | - Secondary treatment system that is the subject of accreditation from the Director-General of the Department of Health, being a certificate that is in force. |
| Tank lid | AS1547 6.2.4.1(i)<br>AS1546.3 A4.1 | - The tank and access lids must be adequately sealed and positioned at least 100mm above finished ground level. In flood prone land situations, the access lids must be located above the Flood Planning Level (FPL) nominated by the Local Authority. |
| Electrical installation and components | AS1547.3 6.2.(c)<br><br>AS1546C4(q) | - Have all mechanical and electrical components readily accessible for maintenance or replacement.<br>- Electrical installation and connections must comply with current codes and AS3000 Electrical installations. |
| Installation compliance | AS1546.3<br>AS1547 6.2 | - Installation must be in accordance with relevant sections of AS1546, AS1547, NSW Health accreditation and the manufacturers installation requirements. |
| Alarm | AS1546.3 2.3.12<br>AS1546 B3.2(d) | - An audio-visual alarm system shall be provided to identify a malfunction of any electrical or mechanical component that is integral to the treatment process.<br>- The alarm system shall:<br>- (a) provide audio and visual signal failure of all electrical equipment, including, but not limited to, aeration equipment, electrolysis equipment, UV light disinfection equipment, solenoids, ozone generators and internal and irrigation pumps.<br>- (b) provide high water level, and where applicable, low water level, and audio and visual signal failure.<br>- (c) have a temporary muting facility that automatically resets to audible after a maximum time period of 24 h.<br>- (d) be in a readily visible position from within the premises or as required by the regulatory authority. |
| Disinfection | AS1547: 2012<br>5.4.2.5<br>5.4.2.5.1 | - Examples of disinfection include chlorine, ultra-violet, ozone or other means.<br>- Disinfection systems for secondary treated wastewater shall be designed to kill or inactivate pathogenic microorganisms to mitigate public health risks from direct or indirect human contact.<br>- The disinfection system shall be used in accordance with local regulatory requirements wherever there is such a risk.<br>- Performance criteria for disinfection shall be based on the criteria for disinfection treatment in AS/NZS 1546.3. |

| Element | Reference | Detail |
|---|---|---|
| Pumps | AS1547 – 2012<br>L6.3<br>L10 | - The pump must be of a suitable duty for the bed design, location and hydraulic loading. Advice should be sought from a suitably qualified and experienced pump professional. |

## Appendix 1.4 Land Application System

A Wisconsin Mound has been chosen as an appropriate method of land application to accept and dispose of treated effluent from the treatment system. Specifications and construction details for each mound are provided along with hydraulic design parameters and details for the gravel and sand materials.

| Mound Design Parameters | | Value | Units |
|---|---|---|---|
| Total area of mound | | 132 | $m^2$ |
| Number of mounds | | 2 | - |
| Depth of sand below base of gravel bed | | 0.60 | m |
| Mound batter slope | | 1:3 | - |
| Gravel absorption bed dimensions | Length | 14.3 | m |
| | Width | 1.4 | m |
| | Thickness | 0.3 | m |
| | Area | 20.0 | $m^2$ |
| Overall mound dimensions | Length | 19.6 | m |
| | Width | 6.8 | m |
| | Height | 1.0 | m |
| | Downslope width | 3.1 | m |
| | Upslope width | 2.3 | m |
| | End slope width | 2.6 | m |
| Flush points per mound (each end) | | 3 | - |

## Appendix 1.5 Mound Hydraulic Design Parameters

| Parameters | | Value | Units |
|---|---|---|---|
| Flow rate | | 80 | L/min |
| Duty pump head | | ~21 | m |
| Effluent dosing design detail | Number of hydraulic zones | 3 | - |
| | Point of feed | Centre | - |
| | Number laterals per zone | 4 | - |
| | Lateral spacing | 0.3 | m |
| | Lateral length | 2.1 (either side of centre feed point) | m |
| | Number of holes per lateral | 5 | - |
| | Hole size | 3 | mm |
| | Hole spacing | 0.3 | m |
| | Submain (header) pipe size | DN25 PN12 uPVC | - |
| Mainline pipework detail | Length of mainline | 100 | m |
| | Mainline pipe size | DN40 PE100 | m |
| | Indexing valve required | Yes | - |
| Suitable pump type | | Davey D42 or equivalent | - |

## Appendix 1.6 Construction Materials

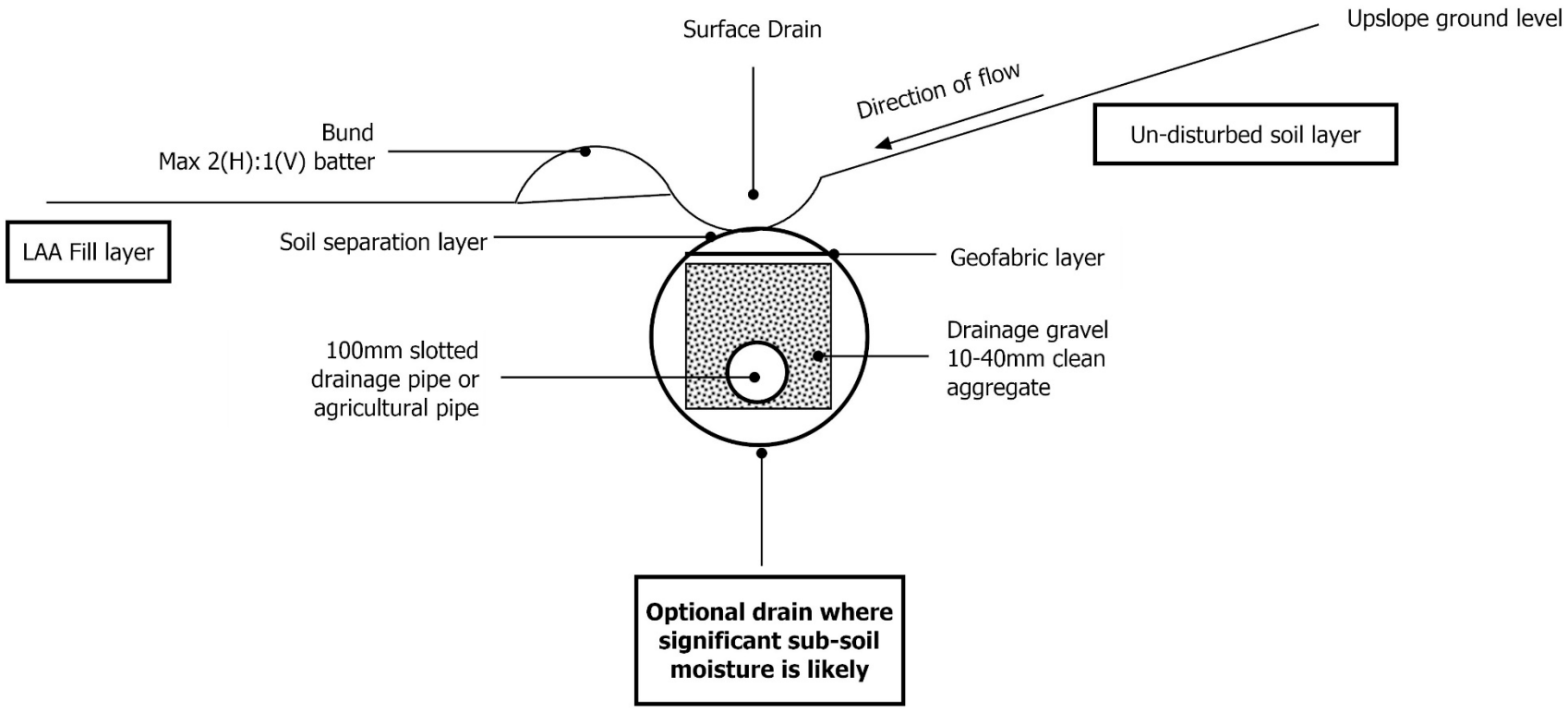
| Material | AS1547 Reference | Details |
|---|---|---|
| Gravel absorption bed | N3.3.3 | - Depth: 300mm<br>- Size: 20mm washed drainage aggregate |
| Internal filter sand specifications | N3.3.2 | - Depth: 400mm minimum<br>- Effective Size: 0.25 to 1.0mm<br>- Coefficient of Uniformity: < 4<br>- Fines: <3% (smaller than 0.074mm) as per AS1547:2012 |
| Topsoil cover | N3.3.6 | - Depth over side/end batters: 100 to 150mm<br>- Depth over gravel distribution bed: 300mm |
| Turf | N3.3.6 | - Suitable grass cover to be established immediately on completion of construction. Grass to be maintained until established. |

## Appendix 1.7 Construction Techniques

| Element | AS1547 Reference | Details |
|---|---|---|
| Site protection and preparation | N3.1<br>N3.2 | - The location of the mound must be protected from vehicular movement to minimise compaction.<br>- The site shall be cleared of vegetation and backfilled to natural ground level.<br>- The area in the mound perimeter shall be scarified to a minimum depth of 200mm extending at least 1m beyond the mound perimeter and 2m downslope. |
| Pipework including LPED dosing manifold | M10.2<br>M10.3<br>M13<br>N3.3.4 | - Pipes and fittings must:<br>- Be rated to withstand 150% of the shut-off head of the pump.<br>- Be semi-flexible and robust.<br>- Be permanently buried and fixed.<br>- Comply with AS4129 (fittings for polyethylene pipes), AS4130 (polyethylene pipes for pressure applications) and AS1477 (PVC pipes & fittings for pressure applications).<br>- Buried pipework must be marked by using underground marking tape to AS2648 or indicated by signage such as 'Sewage effluent pipework installed below, DO NOT DIG'.<br>- All surface boxes shall be provided with lilac-coloured lids to indicate their use with treated effluent.<br>- LPED manifold design and construction:<br>- The pressurised dosing manifold shall consist of 25mm PVC pipe PN12 with 3mm holes drilled (and deburred) at the nominated centres facing upward. Each LPED lateral shall be fitted with a 90mm slotted PVC or agricultural pipe. Note: the squirt height must be tested prior to covering with the outer pipe. |
| Flush points | Best practice | - Placed approx. ¼ and ¾ along the bed. Each point is to extend to the base of the mound. Construct from 50mm PVC pipe slotted along length and wrapped with geotextile fabric and fitted with a cap. |
| Mound alignment | N2.1 | - On slopes, the system shall be extended along the contour (the 'toe' of the mound parallel to the contour) to control the linear loading rate. Where experience shows the linear loading rate is inadequate to prevent breakout of effluent occurring from time to time, then the mound shall be designed with or extended to incorporate a toe extension that will increase the available surface area of the parent soil for soakage. |
| Filter | M10.3(a) | - A fit-for-purpose 120mesh filter must be installed into the main supply line. The filter is located at the treatment tank and is designed to minimise effluent entrained |

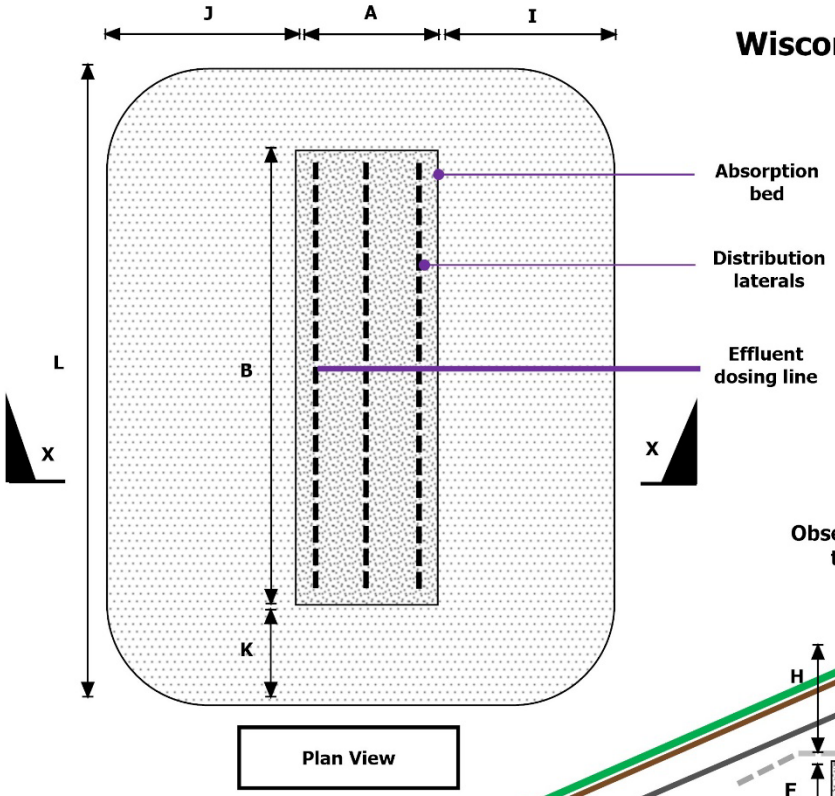
| Element | AS1547 Reference | Details |
|---|---|---|
| | | particles travelling to the emitters. The filter must be capable of manual or automatic cleaning. |
| Upslope surface water controls | M9.3 | - Construct surface water and/or subsurface diversion drains upslope of the irrigation area where there is potential for water impacts. Refer to Appendix A below for drawing details. |
| Marking | M13 | - The presence of buried pipes shall:<br>- Be indicated, for example, using underground marking tape to AS/NZS 2648.1; or<br>- Be indicated by signage, prominently displayed with the words: 'Sewage effluent pipework installed below. DO NOT DIG.' |
| LAA design compliance | M7.2<br>T5.2.2 | - Alteration to the design of the land application area must be approved by the designer. |
| Pre-commissioning and Commissioning checks | 6.2.5<br>N3.3.5<br>N4 | - Pre-commissioning tests shall include:<br>- Filling the pump chamber and starting the pump.<br>- Checking the LPED manifold to ensure uniformity in distribution (+15% variation).<br>- Checking the pipework for leaks.<br>- Testing the high-water level alarm.<br>- The on-site system shall be inspected, checked and commissioned according to 6.2.5 |

## Upslope Diversion Drain Cross Section




| | | | |
|---|---|---|---|
| **TITLE:** Upslope Diversion & Subsoil Drain Typical Design | **DRAWING NO:** DWG.017.01 | **REV:** A |  |
| **CLIENT:** | **Sheet:** 1 of 1 | **Drawn:** SJ | |
| **PROJECT:** | **Scale:** NTS | **Checked:** BAA | |

# Wisconsin Mound - Flat Site

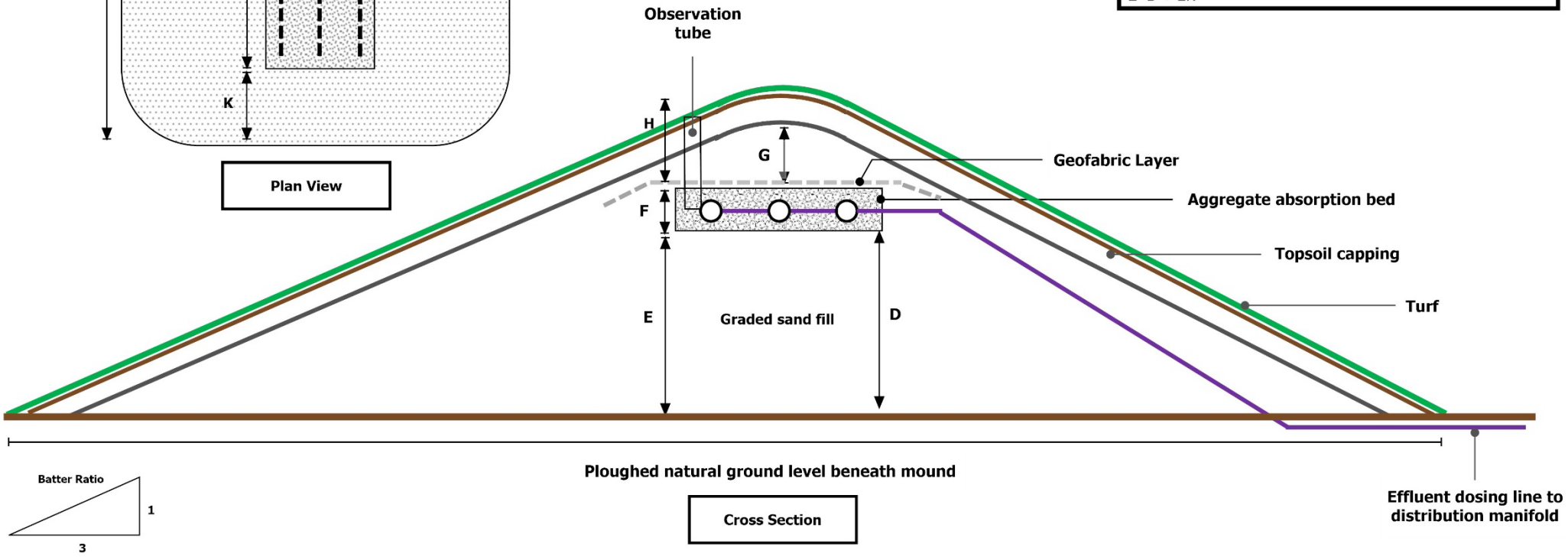



Plan View

## Legend

**Typical dimensions**

**A** 1200 to 2000mm
**B** 6 to 8 times A
**D** 600mm
**E** 600mm on flat ground
**F** 225mm
**G** 300mm
**H** 450mm
**I** Determined by ground slope and 1:3 batter
**J** 2000mm minimum on sloping ground (= I on flat ground)
**K** Determined by height of finished mound and 1:3 batter
**L** B + 2K



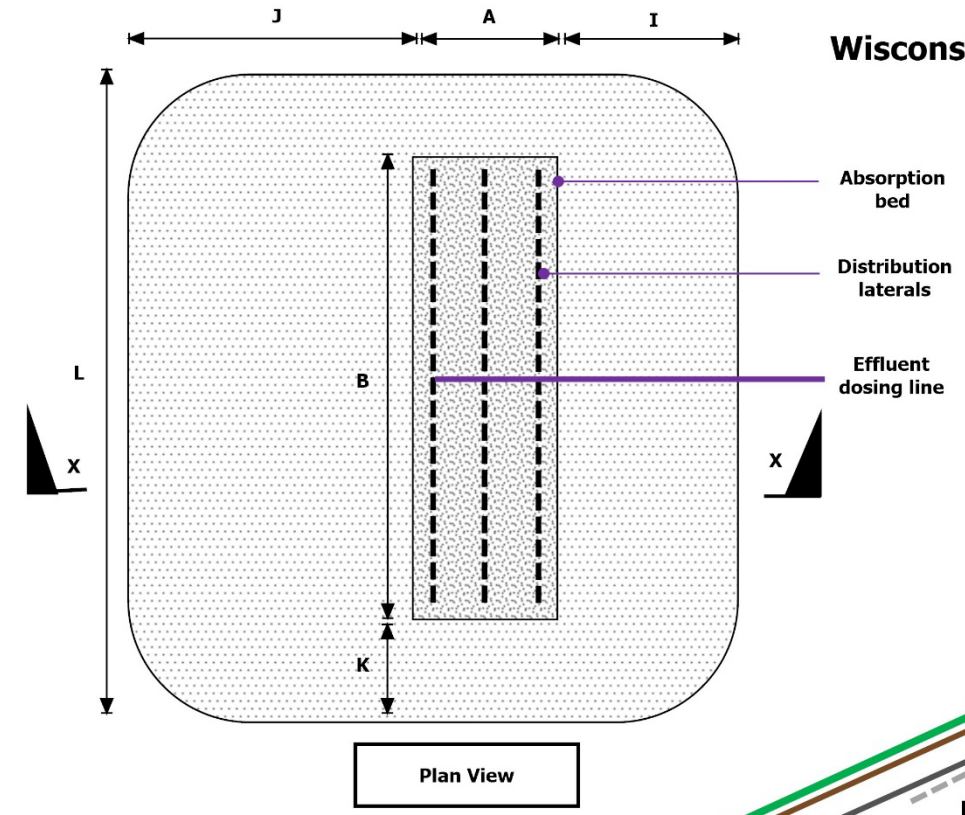

Cross Section

| | | | |
|---|---|---|---|
| **TITLE:** Wisconsin Mound - flat site | **DRAWING NO:** DWG005.01 | **REV:** A | |
| **CLIENT:** Generic | **Sheet: 1 of 1** | **Drawn:** AW | |
| **DATE:** 24/11/2021 | **Scale: NTS** | **Checked:** SJ | |



DECENTRALISED WATER AUSTRALIA

# Wisconsin Mound - Sloping Site

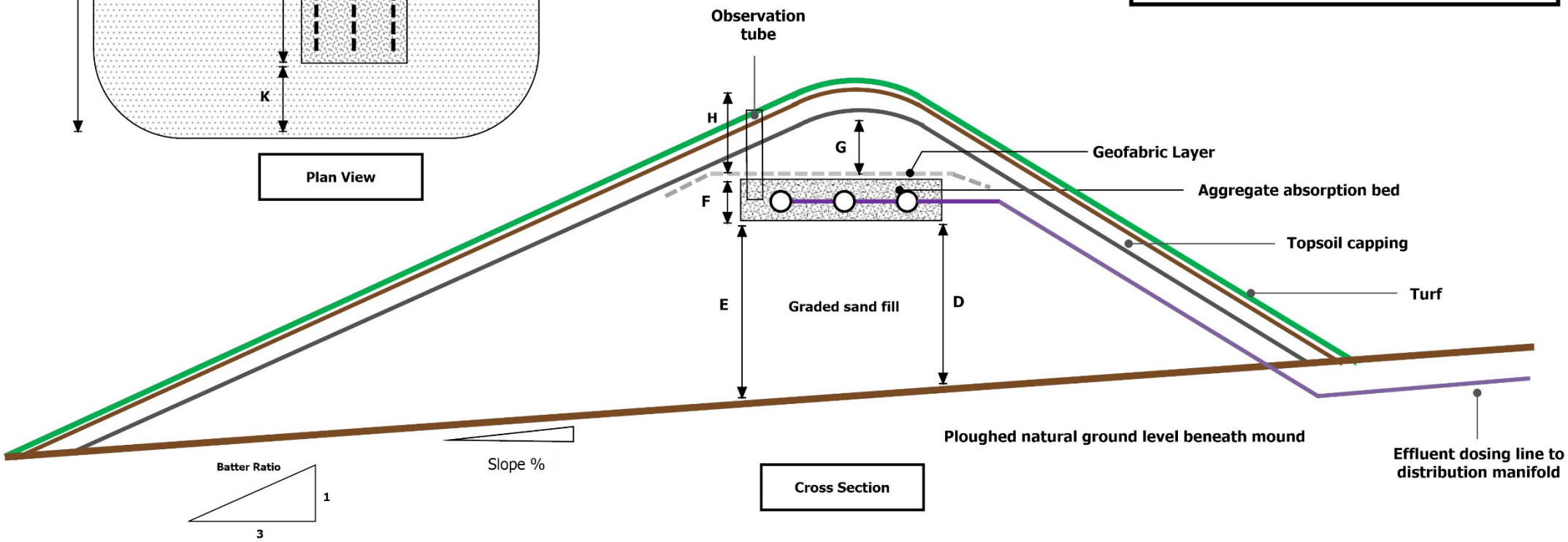



Plan View

## Legend

**Typical dimensions**

- **A** 1200 to 2000mm
- **B** 6 to 8 times A
- **D** 600mm
- **E** >600mm on sloping ground
- **F** 225mm
- **G** 300mm
- **H** 450mm
- **I** Determined by ground slope and 1:3 batter
- **J** 2000mm minimum on sloping ground
- **K** Determined by height of finished mound and 1:3 batter
- **L** B + 2K




Cross Section

| | | | |
|---|---|---|---|
| **TITLE:** Wisconsin Mound - sloping site | **DRAWING NO:** DWG004.01 | **REV:** A |  |
| **CLIENT:** Generic | **Sheet: 1 of 1** | **Drawn:** AW | |
| **DATE:** 24/11/2021 | **Scale: NTS** | **Checked:** SJ | |

# Appendix 2 Site and Soil Assessment Information

## Sheet 1 - Soil Sampling Schedule and Results of pH, EC and Emerson Aggregate Test Analysis

| Site Address | Sample Name | Sample Depth (mm) | Texture Class | EAT [1] | Rating [2] | $pH_f$ [3] | $pH_{1:5}$ [4] | Rating | $EC_{1:5}$ (dS/m) | ECe (dS/m) [5] | Rating | Other analysis [6] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 203 Tooheys Road, Bushells Ridge | TP1/1 | 500 | SL | No result | No rating | | 5.45 | Strongly acid | 0.023 | 0.25 | Non-saline | |
| | TP1/2 | 600 | MC | 3(1) | Low | | 5.56 | Moderately acid | 0.067 | 0.47 | Non-saline | |
| | TP1/3 | 650 | LC | 3(1) | Low | | 5.95 | Moderately acid | 0.055 | 0.44 | Non-saline | |
| | TP1/4 | 800 | MC | 3(2) | Low | | 5.35 | Strongly acid | 0.094 | 0.66 | Non-saline | |
| | TP1/5 | 900 | LC | 3(1) | Low | | 5.58 | Moderately acid | 0.058 | 0.46 | Non-saline | |
| | | | | | | | | | | | | |
| | Composite TP | - | - | - | - | | 5.87 | Moderately acid | 0.07 | - | Non-saline | |

**Notes: (also refer Interpretation Sheet 1)**

[1] The modified Emerson Aggregate Test (EAT) provides an indication of soil susceptibility to dispersion.

[2] Ratings describe the likely hazard associated with land application of treated wastewater.

[3] pH measured in the field using Raupac Indicator.

[4] pH and EC are measured on 1:5 soil:water suspensions using a calibrated hand-held pH/EC/temp meter.

[5] Electrical conductivity of the saturated extract (Ece) = $EC_{1:5}$(µS/cm) x MF / 1000. Units are dS/m. MF is a soil texture multiplication factor.

[6] External laboratories used for the following analyses, if indicated:

- CEC (Cation exchange capacity)
- Psorb (Phosphorus sorption capacity)
- Bray Phosphorus
- Organic carbon
- Total nitrogen

# Interpretation Sheet 1 - pH, EC & Emerson Aggregate Class

**Interpretation of Soil pH** (1:5 Soil:Water)
(rating based on Hazelton & Murphy (2016))

| pH | Rating |
|---|---|
| 0.00 to 4.50 | Extremely acid |
| 4.51 to 5.00 | Very strongly acid |
| 5.01 to 5.50 | Strongly acid |
| 5.51 to 6.00 | Moderately acid |
| 6.01 to 6.50 | Slightly acid |
| 6.51 to 7.30 | Neutral |
| 7.31 to 7.80 | Mildly alkaline |
| 7.81 to 8.40 | Moderately alkaline |
| 8.41 to 9.00 | Strongly alkaline |
| 9.01 to 14.00 | Very strongly alkaline |

preferred range

**Interpretation of ECe** (1:5 Soil:Water)
(rating based on Hazelton & Murphy (2016))

| Ece (dS/m) | Rating |
|---|---|
| 0.00 to 2.00 | Non-saline |
| 2.01 to 4.00 | Slightly saline |
| 4.01 to 8.00 | Moderately saline |
| 8.01 to 16.00 | Highly saline |
| 16.00 up | Extremely saline |

increasing hazard

**Interpretation of Emerson Aggregate Class**
(rating describes likelihood of dispersion)

| EAT Class | Rating |
|---|---|
| 1 | High |
| 2(1) | Mod |
| 2(2) | Mod |
| 2(3) | High |
| 2(4) | High |
| 3(1) | Low |
| 3(2) | Low |
| 3(3) | Mod |
| 3(4) | Mod |
| 4 | Low |
| 5 | Low |
| 6 | Low |
| 7 | Low |
| 8 | Low |

**Multiplier Factors for Calculating ECe**
(taken from Hazelton & Murphy (2016))

| Texture Class | Applicable Soil Textures | MF |
|---|---|---|
| S | Sand, loamy sand, clayey sand | 23 |
| SL | sandy loam, fine sandy loam | 14 |
| L | loam, loam fine sandy, silty loam | 9.5 |
| CL | clay loam, sandy clay loam | 8.6 |
| LC | light clay | 8.6 |
| MC | medium clay | 7.5 |
| HC | heavy clay | 5.8 |

## Results of External Laboratory Analysis

| Site Name | Sample Name | | CEC (cmol/kg)) | Rating | Ca (mg/kg) | Rating | Mg (mg/kg) | Rating | Na (mg/kg) | Rating | K (mg/kg) | Rating | ESP (%) | Rating | P-sorp. (mg/kg) | Rating | Bray P (mg/kg) | Rating | Total Nitrogen (%) | Rating | Organic Carbon (%) | Rating |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 203 Tooheys Road, Bushells Ridge | TP Composite | | 29.0 | H | 5586 | VH | 90 | L | 69 | L | 12 | VL | 1.0 | NS | 132 | M | - | n/a | - | n/a | - | n/a |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |

# Interpretation Sheet 2 - CEC, P-Sorption, Bray P, Organic carbon, Total nitrogen

**Interpretation of CEC**

(rating based on Hazelton & Murphy (1992))

| Rating | CEC (me/100g) | Ca (mg/kg) | Mg (mg/kg) | Na (mg/kg) | K (mg/kg) |
|---|---|---|---|---|---|
| VL | 0.00 to 6.00 | 0.00 to 400.00 | 0.00 to 36.50 | 0.00 to 23.00 | 0.00 to 78.20 |
| L | 6.01 to 12.00 | 400.01 to 1000.00 | 36.51 to 121.50 | 23.01 to 69.00 | 78.21 to 117.00 |
| M | 12.01 to 25.00 | 1000.01 to 2000.00 | 121.51 to 365.00 | 69.01 to 161.00 | 117.01 to 274.00 |
| H | 25.01 to 40.00 | 2000.01 to 4000.00 | 365.01 to 972.00 | 161.01 to 460.00 | 274.01 to 782.00 |
| VH | 40.01 up | 4000.01 up | 972.01 up | 460.01 up | 782.01 up |

VL=very low, L=low, M=medium, H=high, VH=very high

**Interpretation of ESP**

(rating based on Hazelton & Murphy (1992))

| Rating | ESP (%) | Description |
|---|---|---|
| NS | 0.00 to 6.00 | Non-sodic |
| S | 6.01 to 15.00 | Sodic |
| SS | 15.01 to 25.00 | Strongly sodic |
| VSS | 25.01 up | Very strongly sodic |

↓ increasing hazard

**Interpretation of Phosphorus Sorption Capacity**

(rating based on Hazelton & Murphy (1992))

| Rating | P-sorption (mg/kg) | Description |
|---|---|---|
| L | 0.00 to 125.00 | Low |
| M | 125.01 to 250.00 | Medium |
| MH | 250.01 to 400.00 | Medium-High |
| H | 400.01 to 600.00 | High |
| VH | 600.01 up | Very high |

↑ increasing hazard

**Interpretation of Bray Phosphorus**

(rating based on Hazelton & Murphy (1992))

| Rating | Bray P (mg/kg) | Description |
|---|---|---|
| VL | 0.00 to 5.00 | Very Low |
| L | 5.01 to 10.00 | Low |
| M | 10.01 to 17.00 | Moderate |
| H | 17.01 to 25.00 | High |
| VH | 25.01 up | Very high |

**Interpretation of Soil Nitrogen (TN)**

(rating based on Hazelton & Murphy (1992))

| Rating | TN (%) | Description |
|---|---|---|
| VL | 0.000 to 0.050 | Very Low |
| L | 0.051 to 0.150 | Low |
| M | 0.151 to 0.250 | Medium |
| H | 0.251 to 0.500 | High |
| VH | 0.501 up | Very high |

**Interpretation of Soil Organic Carbon (OC)**

(rating based on Hazelton & Murphy (1992))

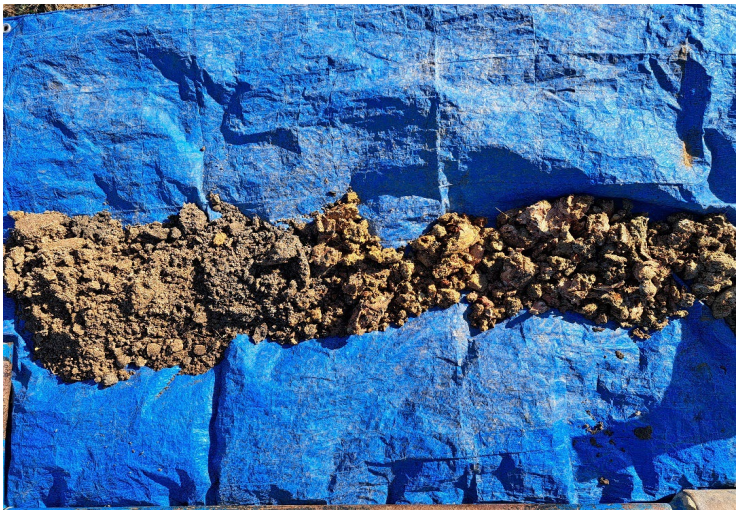
| Rating | OC (%) | Description |
|---|---|---|
| VL | 0.00 to 1.50 | Very Low |
| L | 1.51 to 2.00 | Low |
| M | 2.01 to 3.00 | Medium |
| H | 3.01 to 5.00 | High |
| VH | 5.01 up | Very high |

# Soil Bore Log

| | | | | | |
|---|---|---|---|---|---|
| **Client** | Fulton Hogan | **Test Pit No** | | **1** | |
| **LGA** | Central Coast Council | **Topography** | | | |
| **Site Address** | 203 Tooheys Road, Bushells Ridge | **Geology** | | | |
| **Logged by** | SJ | **Soil Type** | Gorokan | | |
| **Date** | 10/08/2022 | **Slope** | | **Aspect** | |
| **Project** | 0634 | **Drainage** | | **Exposure** | |
| **Excavation method** | Hand Auger and shovel | **Surface condition** | | **Surface** | |

## PROFILE DESCRIPTION

| Depth (m) | Graphic Log | Sampling depth/name | Horizon | Texture | Structural Grade | Colour | Mottles | Coarse Fragments | Moisture Condition | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.1 | | 500mm | | SL | Weak | Brown | - | - | SM | Fill, |
| 0.2 | | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.4 | | | | | | | | | | |
| 0.5 | | | | | | | | | | |
| 0.6 | | 600mm | | MC | Strong | Orange | - | - | SM | Fill |
| | | 650mm | | LC | Moderate | Yellowish | | - | SM | |
| 0.7 | | 800mm | | MC | Strong | Off White | Orange | - | M | |
| 0.8 | | | | | | | | | | |
| 0.9 | | 900mm | | LC | Moderate | Yellowish | | | M | |
| 1.0 | | | Auger terminbated in LC | | | | | | | |
| 1.1 | | | | | | | | | | |
| 1.2 | | | | | | | | | | |
| 1.3 | | | | | | | | | | |
| 1.4 | | | | | | | | | | |
| 1.5 | | | | | | | | | | |
| 1.6 | | | | | | | | | | |
| 1.7 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.9 | | | | | | | | | | |
| 2.0 | | | | | | | | | | |



# Key to Soil Borelogs

## Symbols

| | | | |
|---|---|---|---|
| **W** | Watertable depth | ● | Sample collected |
| **X** | Depth of refusal | | |

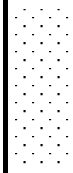
## Moisture conditions

| | | | |
|---|---|---|---|
| **D** | Dry | **VM** | Very moist |
| **SM** | Slightly moist | **W** | Wet / saturated |
| **M** | Moist | | |

## Coarse Fragments

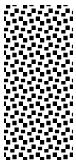
| | | | |
|---|---|---|---|
| **VF** | Very few <2% | **M** | Many 20 - 50% |
| **F** | Few 2 - 10% | **A** | Abundant 50 - 90% |
| **C** | Common 10 - 20% | **P** | Profuse >90% |

## Graphic Log and Textures

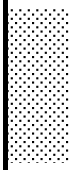


S - Sand
LS - Loamy sand
CS - Clayey sand

CL - Clay loam
SCL - Sandy clay loam
SiCL - Silty clay loam

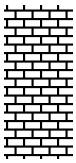


Gravel (G)

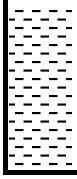


SL - Sandy loam

LC - Light clay
SC - Sandy clay



Parent material (stiff)



L - Loam
LFS - Loam fine sandy
SiL - Silty loam

MC - Medium clay
HC - Heavy clay

Parent material (weathered)

NSW SOIL AND LAND INFORMATION SYSTEM

# Soil Profile Report

## SITE DETAILS

| | |
|---|---|
| Site Location: | Profile 94 |
| Profile Details: | Soil Landscapes of the Lake Macquarie 1:100 000 Sheet Survey (1000419), Profile 94, collected from a batter by Dr Linda Henderson on 03 February, 1993 |
| Map Reference: | MGA Grid Reference: Zone 56, 357905E, 6333340N. 9131 GOSFORD (1:100000) map sheet. |
| Physiography: | hillcrest in low hills under dry sclerophyll forest on sandstone-quartz, siltstone/mudstone lithology and used for timber/scrub/unused. Slope 2.0% (estimated), elevation 40.0 m. Surface condition is hard set, profile is imperfectly drained, erosion hazard is high, and no salting evident |
| Vegetation/Land Use: | limited clearing at the site, used for timber/scrub/unused, with timber/scrub/unused in the general area |
| Surface Condition: | hard set when described, expected to be hard set when dry, ground cover is 100% |
| Erosion/Land Degradation: | high; sheet erosion at site is minor, stable; scald erosion at site is stable; no salting evident |
| Soil Hydrology: | profile is slowly permeable and imperfectly drained, no free water, run on is none and runoff is low |
| Soil Type: | Soloth (Solod) (GSG), Dy3.41 (PPF) |
| Base of observation: | |
| Profile Field Notes: | |

## SOIL DESCRIPTION

**Layer 0**

0.00 - 0.00 m

| | | |
|---|---|---|
| **Layer 1** | Horizon: A1 | |
| 0.00 - 0.05 m | Texture: | sandy loam |
| | Colour: | dark yellowish brown (dark brown) (10YR 3/4) [moist] with no recorded mottles |
| | Structure: | weak pedality (granular, 5 - 10 mm, fabric is rough-faced peds) |
| | Coarse Fragments: | common (10-20%), as parent material, dispersed, reoriented, weakly weathered, sub-angular, gravel (6-20 mm), |
| | Soil fauna: | Activity is nil |
| | Cracks/Macropores: | Cracks are nil, macropores are nil |
| | Moisture/Consistence: | dry, disruptive test result was moderately weak force, shearing test result was brittle, |

| | | |
|---|---|---|
| | Field chemical tests: | Field pH is 6.0 (Not recorded), |
| | Sample taken: | disturbed |
| | Lower Boundary: | smooth clear (20-50 mm) boundary to ... |
| **Layer 2** | Horizon: A2 | |
| 0.05 - 0.10 m | Texture: | light sandy clay loam |
| | Colour: | brown (dull yellowish brown) (10YR 5/3) [moist] or very pale brown (dull yellow orange) (10YR 7/3) [dry] with no recorded mottles |
| | Structure: | massive (fabric is earthy) |
| | Coarse Fragments: | few (2-10%), as parent material, dispersed, reoriented, weakly weathered, sub-angular, fine gravel (2-6 mm), |
| | Soil fauna: | Activity is nil |
| | Cracks/Macropores: | Cracks are nil, macropores are nil |
| | Moisture/Consistence: | dry, disruptive test result was very weak force, shearing test result was brittle, |
| | Field chemical tests: | Field pH is 6.0 (Not recorded), |
| | Sample taken: | disturbed |
| | Lower Boundary: | smooth abrupt (5-20 mm) boundary to ... |
| **Layer 3** | Horizon: B2 | |
| 0.10 - 0.45 m | Texture: | silty clay |
| | Colour: | yellow (bright yellowish brown) (10YR 7/6) [moist] with 10% - 20% distinct weathered orange mottles |
| | Structure: | strong pedality (angular blocky, 5 - 10 mm, also angular blocky, 20 - 50 mm, fabric is smooth-faced peds) |
| | Soil fauna: | Activity is nil |
| | Cracks/Macropores: | Cracks are nil, macropores are nil |
| | Moisture/Consistence: | dry, disruptive test result was moderately strong force, shearing test result was no change, |
| | Field chemical tests: | Field pH is 5.5 (Not recorded), |
| | Sample taken: | disturbed |
| | Lower Boundary: | smooth gradual (50-100 mm) boundary to ... |
| **Layer 4** | Horizon: B3 | |
| 0.45 - 0.75 m | Texture: | silty clay |
| | Colour: | pale brown (2.5Y 8/4) [moist] with 2% - 10% faint weathered yellow mottles |
| | Structure: | moderate pedality (angular blocky, 10 - 20 mm, also angular blocky, 50 - 100 mm, fabric is smooth-faced peds) |
| | Soil fauna: | Activity is nil |
| | Cracks/Macropores: | Cracks are nil, macropores are nil |
| | Moisture/Consistence: | dry, disruptive test result was moderately strong force, shearing test result was no change, |
| | Field chemical tests: | Field pH is 5.5 (Not recorded), |
| | Sample taken: | disturbed |

## LABORATORY TESTS

---

**Sample Code: SCO/93/1/36(1) Upper bound: 0.00 Lower bound: 0.05**

| Name | Value | Unit of measure |
|---|---|---|
| 15F1_CA [Exchangeable Ca - 0.01M (AgTU)+, no pretreatment] | 2.2 | cmol/kg |
| 15F1_K [Exchangeable K - 0.01M (AgTU)+, no pretreatment] | 0.2 | cmol/kg |
| 15F1_MG [Exchangeable Mg - 0.01M (AgTU)+, no pretreatment] | 0.4 | cmol/kg |
| 15F1_NA [Exchangeable Na - 0.01M (AgTU)+, no pretreatment] | 0.1 | cmol/kg |
| 15F2_AL [Exchangeable Al - 0.01 M AgTU+] | 0.0 | cmol/kg |
| 15F3_CEC [Cation exchange capacity - 0.01 M AgTU+] | 5.3 | cmol/kg |
| 3A1 [EC of 1:5 soil/water extract] | 0.04 | dS/m |
| 4A1 [pH of 1:5 soil/water suspension] | 5.4 | pH |
| 4B2 [pH of 1:5 soil/0.01M CaCl2 extract - (meth N4A1)] | 4.5 | pH |
| 504.02_FC [Field Capacity, SWC pressure plate] | 22.9 | |
| 504.02_PWP [Permanent Wilt Point, SWC pressure plate] | 6.9 | |
| 514.99 [Dispersion percentage] | 44 | % |
| 517.99_CL [PSA clay - hydrometer] | 12 | % |
| 517.99_CS [PSA coarse sand - hydrometer] | 33 | % |
| 517.99_FS [PSA fine sand - hydrometer] | 32 | % |
| 517.99_GR [PSA gravel - hydrometer] | 9 | % |
| 517.99_ZL [PSA silty loam - hydrometer] | 14 | % |
| 518.99 [Volume expansion] | 2 | |
| 550.01 [Unified Soil Classification System (lab)] | SC | |
| 6A1 [Organic carbon - Walkley & Black] | 1.65 | % |
| 9E1 [Fluoride-extractable P (Bray 1-P) - manual colour] | 3 | mg/kg |
| 9I1 [Phosphate sorption index] | 242 | |

**Sample Code: SCO/93/1/37(1) Upper bound: 0.05 Lower bound: 0.10**

| Name | Value | Unit of measure |
|---|---|---|
| 15F1_CA [Exchangeable Ca - 0.01M (AgTU)+, no pretreatment] | 0.3 | cmol/kg |
| 15F1_K [Exchangeable K - 0.01M (AgTU)+, no pretreatment] | 0.1 | cmol/kg |
| 15F1_MG [Exchangeable Mg - 0.01M (AgTU)+, no pretreatment] | 0.6 | cmol/kg |
| 15F1_NA [Exchangeable Na - 0.01M (AgTU)+, no pretreatment] | 0.2 | cmol/kg |
| 15F2_AL [Exchangeable Al - 0.01 M AgTU+] | 0.0 | cmol/kg |
| 15F3_CEC [Cation exchange capacity - 0.01 M AgTU+] | 3.6 | cmol/kg |
| 3A1 [EC of 1:5 soil/water extract] | 0.19 | dS/m |
| 4A1 [pH of 1:5 soil/water suspension] | 4.8 | pH |
| 4B2 [pH of 1:5 soil/0.01M CaCl2 extract - (meth N4A1)] | 4.3 | pH |
| 504.02_FC [Field Capacity, SWC pressure plate] | 14.4 | |
| 504.02_PWP [Permanent Wilt Point, SWC pressure plate] | 4.1 | |
| 513.98 [Emerson aggregate test SCS method] | 3(1) | |
| 514.99 [Dispersion percentage] | 62 | % |
| 517.99_CL [PSA clay - hydrometer] | 10 | % |
| 517.99_CS [PSA coarse sand - hydrometer] | 42 | % |
| 517.99_FS [PSA fine sand - hydrometer] | 34 | % |

| | | |
|---|---|---|
| 517.99_GR [PSA gravel - hydrometer] | 3 | % |
| 517.99_ZL [PSA silty loam - hydrometer] | 11 | % |
| 518.99 [Volume expansion] | 0 | |
| 550.01 [Unified Soil Classification System (lab)] | SC | |
| 6A1 [Organic carbon - Walkley & Black] | 1.04 | % |
| 9E1 [Fluoride-extractable P (Bray 1-P) - manual colour] | 2 | mg/kg |
| 9I1 [Phosphate sorption index] | 188 | |

**Sample Code: SCO/93/1/38(1) Upper bound: 0.10 Lower bound: 0.45**

| Name | Value | Unit of measure |
|---|---|---|
| 15F1_CA [Exchangeable Ca - 0.01M (AgTU)+, no pretreatment] | 1.5 | cmol/kg |
| 15F1_K [Exchangeable K - 0.01M (AgTU)+, no pretreatment] | 0.2 | cmol/kg |
| 15F1_MG [Exchangeable Mg - 0.01M (AgTU)+, no pretreatment] | 1.2 | cmol/kg |
| 15F1_NA [Exchangeable Na - 0.01M (AgTU)+, no pretreatment] | 0.2 | cmol/kg |
| 15F2_AL [Exchangeable Al - 0.01 M AgTU+] | 1.7 | cmol/kg |
| 15F3_CEC [Cation exchange capacity - 0.01 M AgTU+] | 21.9 | cmol/kg |
| 3A1 [EC of 1:5 soil/water extract] | 0.07 | dS/m |
| 4A1 [pH of 1:5 soil/water suspension] | 4.7 | pH |
| 4B2 [pH of 1:5 soil/0.01M CaCl2 extract - (meth N4A1)] | 3.8 | pH |
| 504.02_FC [Field Capacity, SWC pressure plate] | 40.9 | |
| 504.02_PWP [Permanent Wilt Point, SWC pressure plate] | 23.4 | |
| 513.98 [Emerson aggregate test SCS method] | 6 | |
| 514.99 [Dispersion percentage] | 17 | % |
| 517.99_CL [PSA clay - hydrometer] | 66 | % |
| 517.99_CS [PSA coarse sand - hydrometer] | 3 | % |
| 517.99_FS [PSA fine sand - hydrometer] | 11 | % |
| 517.99_GR [PSA gravel - hydrometer] | 1 | % |
| 517.99_ZL [PSA silty loam - hydrometer] | 19 | % |
| 518.99 [Volume expansion] | 10 | |
| 550.01 [Unified Soil Classification System (lab)] | CH | |
| 6A1 [Organic carbon - Walkley & Black] | 0.42 | % |
| 9E1 [Fluoride-extractable P (Bray 1-P) - manual colour] | 2 | mg/kg |
| 9I1 [Phosphate sorption index] | 729 | |

**Sample Code: SCO/93/1/39(1) Upper bound: 0.45 Lower bound: 0.75**

| Name | Value | Unit of measure |
|---|---|---|
| 15F1_CA [Exchangeable Ca - 0.01M (AgTU)+, no pretreatment] | 0.3 | cmol/kg |
| 15F1_K [Exchangeable K - 0.01M (AgTU)+, no pretreatment] | 0.3 | cmol/kg |
| 15F1_MG [Exchangeable Mg - 0.01M (AgTU)+, no pretreatment] | 1.2 | cmol/kg |
| 15F1_NA [Exchangeable Na - 0.01M (AgTU)+, no pretreatment] | 0.2 | cmol/kg |
| 15F2_AL [Exchangeable Al - 0.01 M AgTU+] | 5.5 | cmol/kg |
| 15F3_CEC [Cation exchange capacity - 0.01 M AgTU+] | 20.7 | cmol/kg |

| | | |
|---|---|---|
| 3A1 [EC of 1:5 soil/water extract] | 0.05 | dS/m |
| 4A1 [pH of 1:5 soil/water suspension] | 4.6 | pH |
| 4B2 [pH of 1:5 soil/0.01M CaCl2 extract - (meth N4A1)] | 3.7 | pH |
| 504.02_FC [Field Capacity, SWC pressure plate] | 36.7 | |
| 504.02_PWP [Permanent Wilt Point, SWC pressure plate] | 20.8 | |
| 513.98 [Emerson aggregate test SCS method] | 6 | |
| 514.99 [Dispersion percentage] | 11 | % |
| 517.99_CL [PSA clay - hydrometer] | 65 | % |
| 517.99_CS [PSA coarse sand - hydrometer] | 1 | % |
| 517.99_FS [PSA fine sand - hydrometer] | 14 | % |
| 517.99_GR [PSA gravel - hydrometer] | 0 | % |
| 517.99_ZL [PSA silty loam - hydrometer] | 20 | % |
| 518.99 [Volume expansion] | 10 | |
| 550.01 [Unified Soil Classification System (lab)] | CH | |
| 6A1 [Organic carbon - Walkley & Black] | 0.24 | % |
| 9E1 [Fluoride-extractable P (Bray 1-P) - manual colour] | 1 | mg/kg |
| 9I1 [Phosphate sorption index] | 601 | |

For information on laboratory test data and units of measure, please see: Soil survey standard test methods

Report generated on 08/09/2022 at 11:02 AM

**To contact us, email:** soils@environment.nsw.gov.au

SESL AUSTRALIA
Environment & Soil Sciences

# Soil Chemistry Profile

## Mehlich 3 - Multi-nutrient Extractant

**Sample Drop Off:** 16 Chilvers Road, Thornleigh NSW 2120
**Mailing Address:** PO Box 357, Pennant Hills NSW 1715
**Tel:** 1300 30 40 80
**Fax:** 1300 64 46 89
**Em:** info@sesl.com.au
**Web:** www.sesl.com.au

| Batch N°: 63404 | Sample N°: 3 | Date Received: 22/8/22 | Report Status: Final |
|---|---|---|---|

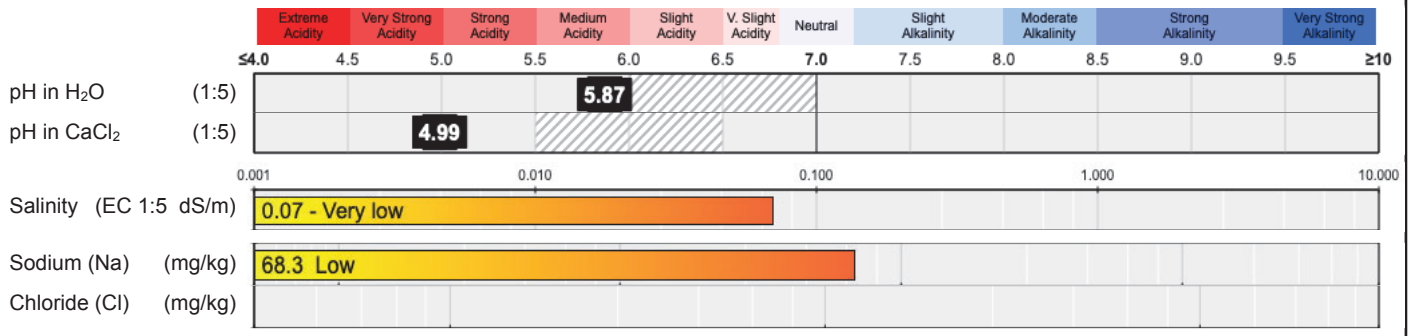
| | | | |
|---|---|---|---|
| Client Name: | **Decentralised Water Consulting** | Project Name: | **On-site sewage management land capability soil testing** |
| | | SESL Quote N°: | **Q11946** |
| Client Contact: | **Andrew Weekes** | Sample Name: | **0634** |
| Client Order N°: | | Description: | **Soil** |
| Address: | **2/ 12 Channel Rd**<br>**Mayfield West NSW 2304** | Test Type: | **PSI_Curve_5, ECEC_M3** |

## RECOMMENDATIONS

Analysed by SESL Australia Pty Ltd NATA #15633

Results only requested.

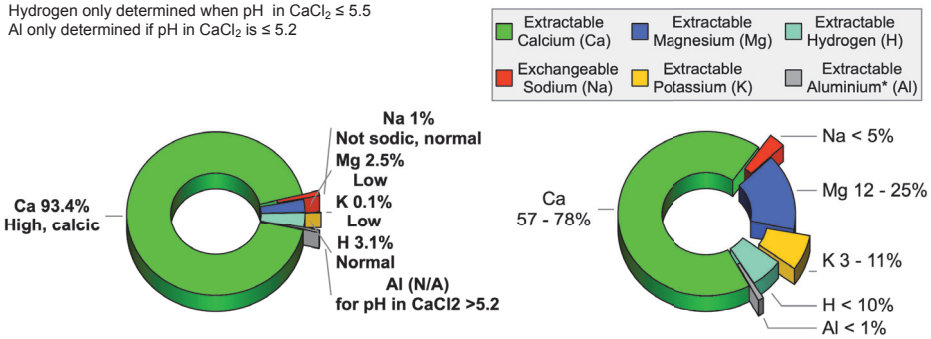
## pH and ELECTRICAL CONDUCTIVITY




## CATION BALANCE

### EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in $CaCl_2$ ≤ 5.5
Al only determined if pH in $CaCl_2$ is ≤ 5.2




ACTUAL IDEAL

### EFFECTIVE CATION EXCHANGE CAPACITY (eCEC) (cmol(+)/kg)


### CATION RATIOS

| Ratio | Result | Target Range |
|---|---|---|
| **Ca:Mg** | **37.2** | 4.1 – 6.0 |
| Comment: Potential magnesium | | |
| **Mg:K** | **25.1** | 2.6 – 5.0 |
| Comment: Potential Potassium deficiency | | |
| **K/(Ca+Mg)** | **0** | < 0.07 |
| Comment: Acceptable | | |
| **K:Na** | **0.1** | N/A |

**EXCHANGEABLE CATIONS** (cmol(+)/kg)

| Na: | K: | Ca: | Mg: | H: | Al: |
|---|---|---|---|---|---|
| 0.3 | 0.03 | 27.93 | 0.75 | 0.93 | 0.01 |

eCEC does not include correction for soluble salts as standard. Where exchangeable calcium exceeds 80 % of eCEC and/or salinity exceeds 0.75 dS/m, alternative methods are recommended to determine true eCEC.

The units of eCEC *cmol(+)/kg* are the SI unit and are equivalent to *meq/100g*.

# Soil Chemistry Profile

## Mehlich 3 - Multi-nutrient Extractant

SESL AUSTRALIA
Environment & Soil Sciences

**Sample Drop Off:** 16 Chilvers Road, Thornleigh NSW 2120
**Mailing Address:** PO Box 357, Pennant Hills NSW 1715
**Tel:** 1300 30 40 80
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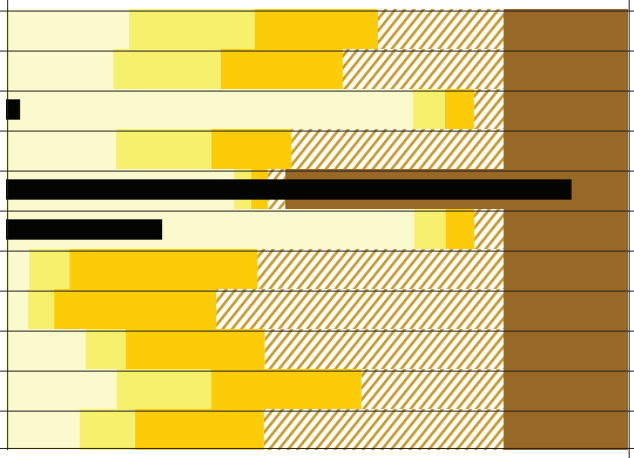
**Em:** info@sesl.com.au
**Web:** www.sesl.com.au

**Batch N°: 63404** | **Sample N°: 3** | **Date Received: 22/8/22** | **Report Status: Final**

## PLANT AVAILABLE NUTRIENTS

**EFFECTIVE AMELIORATION DEPTH (mm):** ◉ 100 ○ 150 ○ 200 **DESIRED FERTILITY CLASS:** ○ Low ◉ Moderate ○ High

| Major Nutrients | Unit | Result | Very Low / Low / Marginal / Adequate / High | Result (g/sqm) | Desirable (g/sqm) | Adjustment (g/sqm) |
|---|---|---|---|---|---|---|
| Nitrate-N ($NO_3$) | mg N/kg | - | | - | 4 | Did not test |
| Phosphorus (P) | mg P/kg | - | | - | 8.4 | Did not test |
| Potassium (K) | mg/kg | 10.9 | | 1.4 | 51.6 | 50.2 |
| Sulfur (S) | mg S/kg | - | | - | 9 | 9 |
| Calcium (Ca) | mg/kg | 5600 | | 744.8 | 367.5 | Drawdown |
| Magnesium (Mg) | mg/kg | 91 | | 12.1 | 38.4 | 26.3 |
| Iron (Fe) | mg/kg | - | | - | 73.4 | Did not test |
| Manganese (Mn) | mg/kg | - | | - | 5.9 | Did not test |
| Zinc (Zn) | mg/kg | - | | - | 0.7 | Did not test |
| Copper (Cu) | mg/kg | - | | - | 0.8 | Did not test |
| Boron (B) | mg/kg | - | | - | 0.4 | Did not test |



**Explanation of graph ranges:**

**Very Low** — Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90 %.

**Low** — Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90 %.

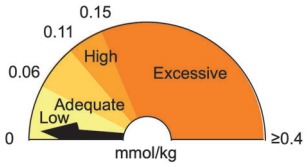
**Marginal** — Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60 %.

**Adequate** — Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30 %.

**High** — The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2 %.

**NOTES:** Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.
**Drawdown:** The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.
• g/sqm measurements are based on soil bulk density of 1.33 tonne/m$^3$ and effective amelioration depth.

### Phosphorus Saturation Index




<0.01

**Low.** Plant response to applied P is likely.

### Exchangeable Acidity

| | |
|---|---|
| Adams-Evans Buffer pH (BpH): | **7.9** |
| Sum of Base Cations (cmol(+)/kg): | **29** |
| Eff. Cation Exch. Capacity (eCEC): | **29.9** |
| Base Saturation (%): | **96.99** |
| Exchangeable Acidity (cmol(+)/kg): | **0.93** |
| Exchangeable Acidity (%): | **3.11** |

### Lime Application Rate (g/sqm)

| | |
|---|---|
| – to achieve pH 6.0: | **57** |
| – to neutralise Al: | **1** |

### Calculated Gypsum Application Rate (CGAR)

(g/sqm) to achieve 67.5 % exch. Ca: **0**

*The CGAR is corrected for the selected effective amelioration depth (100 mm) and any Lime addition to achieve pH 6.0.*

## PHYSICAL DESCRIPTION

| | | | | | |
|---|---|---|---|---|---|
| Texture: | - | Munsell Colour: | - | Organic Carbon (OC %): | - |
| Estimated clay content: | - | Structure Size: | - | Organic Matter (OM %): | - |
| Tactually gravelly: | - | Structural Organisation: | - | Est. Field Capacity (% water): | - |
| Tactually organic: | - | Structural Unit: | - | Est. Permanent Wilting Point (% water): | - |
| Calculated $EC_{SE}$ (dS/m): | - | Potential infiltration rate: | - | Est. Plant Available Water (% water): | - |
| **Requires EC and Soil Texture result.** | | Est. Permeability Class (mm/hr): | - | Est. Plant Available Water (mm/m): | - |
| | | Additional comments: | | | |

Date Report Generated 7/09/2022

**Consultant: Neena Goundar**

**Authorised Signatory: Simon Leake**

**METHOD REFERENCES:**
pH (1:5 $H_2O$) - SESL CM0002; Rayment & Lyons 4A1-2011
pH (1:5 $CaCl_2$) - SESL CM0002; Rayment & Lyons 4B4-2011
EC (1:5) - SESL CM0001; Rayment & Lyons 3A1-2011
Chloride - Rayment & Lyons 5A2a-2011
Nitrate - Rayment & Lyons 7B1a-2011
Aluminium - SESL CM0007; Rayment & Lyons 15A1-2011
P, K, S, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - SESL CM0007; Rayment & Lyons 18F1-2011
Buffer pH and Hydrogen - SSSA Methods of Soil Analysis 2007, Pt 3, Ch 17; Adams-Evans (1962)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure* - "Murphy" (1991), Colour- "Munsell" (2000))

*Structure analysed in the laboratory is conducted on a disturbed sample, therefore is only a representation of the macro-structures that may be present in the field, which provide an indication of the soil physical characteristics and behaviours that may exist.

# Appendix 3 Design Calculations

# Wisconsin Mound Sizing Sheet

| | |
|---|---|
| **Project** | 634 |
| **Address** | 203 Tooheys Rd, Bushells Ridge |
| **Date** | 17/04/23 |

Input Cells
Calculation
Output

| Notes | Site Data | Symbol | Value | |
|---|---|---|---|---|
| | Daily wastewater load (L/day) | W | 1000 | |
| | Effluent Quality (P = primary, S = secondary) | Q | Secondary | |
| | Soil texture (topsoil) | | 4 Clay loam | |
| 1 | Soil depth to limiting layer (m) | SD | 0.50 | |
| 2 | Natural slope across basal area (%) | NS | 4.0 | |
| 3 | Natural slope in radians (rad) | a | **0.0** | |
| 4 | Recommended basal loading rate (mm/day) | BLR | 24.0 | |
| 5 | Recommended linear loading rate (L/m/day) | LLR | 70.0 | |
| 6 | Recommended minimum separation from limiting layer (m) | SLL | **0.6** | |
| 7 | Sand loading rate at gravel-sand interface (mm/day) | SLR | **50.0** | |
| | **Calculations** | **Symbol** | **Formula** | **Value** |
| 8 | Recommended mound batter slope (H:V) (e.g. 3, 2.5) | BS | nominated | 3.00 |
| | Batter slope in radians (rad) | f | | **0.32** |
| | Gravel bed dimensions: | | | |
| | Length (m) | B | W / LLR | **14.29** |
| | Width (m) | A | LLR / SLR | **1.40** |
| | Thickness (m) | F | nominated | 0.30 |
| 9 | Minimum capping over gravel at the edges (m) | G | nominated | 0.15 |
| 10 | Topsoil cover all over (m) | C | nominated | 0.10 |
| 11 | Recommended minimum sand depth (upslope) (m) | $D_u$ | SLL - SD; min. 0.6 for primary effluent (0.4 for secondary) | **0.40** |
| | Downslope mound fill depth (m) | $D_d$ | $D_u$ + (NS ´ A) | **0.46** |
| | Fill depth at centre of gravel bed (m) | $D_c$ | ($D_u$ + $D_d$) / 2 | **0.43** |
| 12 | Theoretical capping depth at centre of peaked mound (m) | $P_1$ | G + [(A/2) / BS] | **0.38** |
| | Acceptable minimum capping depth for a slightly rounded crest | P | nominated | 0.30 |
| | Total mound height for a perfectly peaked mound (m) | $H_1$ | $D_c$ + $P_1$ + F | **1.11** |
| | Total mound height with minimum capping depth (m) | H | $D_c$ + P + F | **1.03** |
| 13 | Upslope mound width, from geometry (m) | $I_g$ | geometric calculation | **2.28** |
| 14 | Upslope mound width, from hydraulics (m) | $I_h$ | If NS=0, $I_h$=(LLR/BLR-A)/2, IF NS>0, calc. I from geometry | **n/a** |
| 15 | Upslope mound width - larger of $I_g$ and $I_h$ (m) | I | | **2.28** |
| | Endslope mound width, from geometry (m) | K | BS ´ ($D_c$ + F + G) | **2.63** |
| 16 | Downslope mound width, from geometry (m) | $J_g$ | | **3.09** |
| 17 | Minimum downslope mound width, from hydraulics (m) | $J_h$ | If NS=0, $J_h$=$I_h$ If NS>0, $J_h$=(LLR / BLR) - A | **1.52** |
| 18 | Downslope mound width - larger of $J_g$ and $J_{h\ (m)}$ | J | | **3.09** |
| | **Mound Dimensions (all in m)** | | | |
| | **Absorption Bed Dimensions** | | | |
| | Absorption bed width: | A | | **1.4** |
| | Absorption bed length: | B | | **14.3** |
| | Absorption bed thickness: | F | | **0.3** |
| | Absorption bed area: | | | **20.0** |
| | **Mound Dimensions** | | | **50.0** |
| | Basal width: | W | I + A + J | **6.8** |
| | Basal length: | L | B + ( 2 ´ K) | **19.6** |
| | Total height: | H | $D_c$ + P + F | **1.0** |
| | Basal area: | m2 | | **132.3** |
| | | | | |
| | Upslope mound width: | I | | **2.3** |
| | Downslope mound width: | J | | **3.1** |
| | Endslope mound width: | K | | **2.6** |

# Nutrient Balance

| | |
|---|---|
| **Project** | 634 |
| **Address** | 203 Tooheys Rd, Bushells Ridge |
| **Date** | 17/04/23 |

| LAND APPLICATION AREA REQUIRED BASED ON THE MOST LIMITING OF PHOSPHORUS OR NITROGEN | 759 | $m^2$ |
|---|---|---|

## INPUT DATA

### Wastewater Loading

| | | |
|---|---|---|
| Hydraulic Load | 1000 | L/Day |
| Effluent N Concentration | 35 | mg/L |
| % Lost to Soil Processes (Geary & Gardner 1996) | 0.2 | Decimal |
| Total N Loss to Soil | 7000 | mg/day |
| Remaining N Load after soil loss | 28000 | mg/day |
| Effluent P Concentration | 12 | mg/L |
| Design Life of System | 50 | yrs |

### Nutrient Crop Uptake

| | | | | | |
|---|---|---|---|---|---|
| Crop N Uptake | 250 | kg/ha/yr | which equals | 68 | $mg/m^2/day$ |
| Crop P Uptake | 30 | kg/ha/yr | which equals | 8 | $mg/m^2/day$ |

### Phosphorus Sorption

| | | | | | |
|---|---|---|---|---|---|
| P-sorption result | 132 | mg/kg | which equals | 1848 | kg/ha |
| Bulk Density | 1.4 | $g/cm^2$ | | | |
| Depth of Soil | 1 | m | Fill to be imported to achieve this | | |
| % of Predicted P-sorp. | 0.75 | Decimal | | | |

## NUTRIENT BALANCE BASED ON ANNUAL CROP UPTAKE RATES

### Minimum Area required with zero buffer

| | | |
|---|---|---|
| Nitrogen | 409 | $m^2$ |
| Phosphorus | 759 | $m^2$ |

### Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)

| | | |
|---|---|---|
| Nominated LAA Size | 130 | $m^2$ |
| Nominated LAA Width | 14 | m |
| Predicted N Export from LAA | 7.0 | kg/year |
| Predicted P Export from LAA | 3.6 | kg/year |
| Phosphorus Longevity for LAA | 5 | Years |
| Minimum Buffer Required for excess nutrient | 629 | $m^2$ |
| Downslope buffer length (based on LAA width) | 45 | m |

## PHOSPHORUS BALANCE

### STEP 1: Using the nominated LAA Size

| | | | | | | |
|---|---|---|---|---|---|---|
| Nominated LAA Size | 130 | $m^2$ | | | | |
| Daily P Load | 0.012 | kg/day | → | Phosphorus generated over life of system | 219.0 | kg |
| Daily Uptake | 0.0011 | kg/day | → | Phosphorus vegetative uptake for life of system | 0.150 | $kg/m^2$ |
| Measured p-sorption capacity | 0.1848 | $kg/m^2$ | | | | |
| Assumed p-sorption capacity | 0.139 | $kg/m^2$ | → | Phosphorus adsorbed in 50 years | 0.139 | $kg/m^2$ |
| Site P-sorption capacity | 18.02 | kg | → | Desired Annual P Application Rate | 0.750 | kg/year |
| | | | | which equals | 0.00206 | kg/day |
| P-load to be sorbed | 3.99 | kg/year | | | | |

SMARTER ADAPTIVE SOLUTIONS

DECENTRALISED WATER AUSTRALIA

enquiries@decentralisedwater.com.au

(02) 4962 2067

www.decentralisedwater.com.au


# APPENDIX E

## STAKEHOLDER ENGAGEMENT

Stephen Long
40 Gardiner Street, Rutherford, NSW, 2320
Tel: +61 411 219 914
Email: Stephen.long@fultonhogan.com.au

6 April 2023

Bushell's Ridge Residents

Dear Neighbour

**Fulton Hogan's Toohey Road, Bushell's Ridge Asphalt Plant – Application for Upgrades to Plant and Facilities and increase production capacity**

Please find herein information regarding Fulton Hogan's plans to lodge a development application regarding the asphalt plant at Toohey Road, Bushells Ridge. As a nearby neighbour to the Fulton Hogan plant, we welcome your feedback regarding our plans to lodge an application or you can also direct any comments or concerns directly to Council.

**The Project**

The project primarily involves the following:

- Addition of two hot mix asphalt load out bins to the existing plant
- Addition of 5 aggregate storage bins
- Addition of a new processed Reclaimed Asphalt Pavement (RAP) area
- Increasing the production cap from 100,000t/a to 400,000t/a
- Increasing RAP processing and storage caps from 20,000t/a to 99,000t/a
- Altering the approved site office, amenities and laboratory facilities
- Addition of storm water tanks, LPG tanks, hydrocarbon tanks, other ancillary site equipment
- Other minor amendments

The proposed works are outlined on the Attached Plans of Development. Refer to **Attachment 1**.

The project will not require any extension to the existing development footprint, clearing of native vegetation or bulk earthworks. The development application will include technical environmental studies to demonstrate that the proposal complies with the relevant environmental limits regarding dust, noise, odour and other emissions. Furthermore, the application will also include studies to demonstrate that the traffic will be appropriately managed to maintain the safety and efficiency of the road network.

Fulton Hogan implements strict environmental controls at the plant to minimise environmental impacts on the local environment.

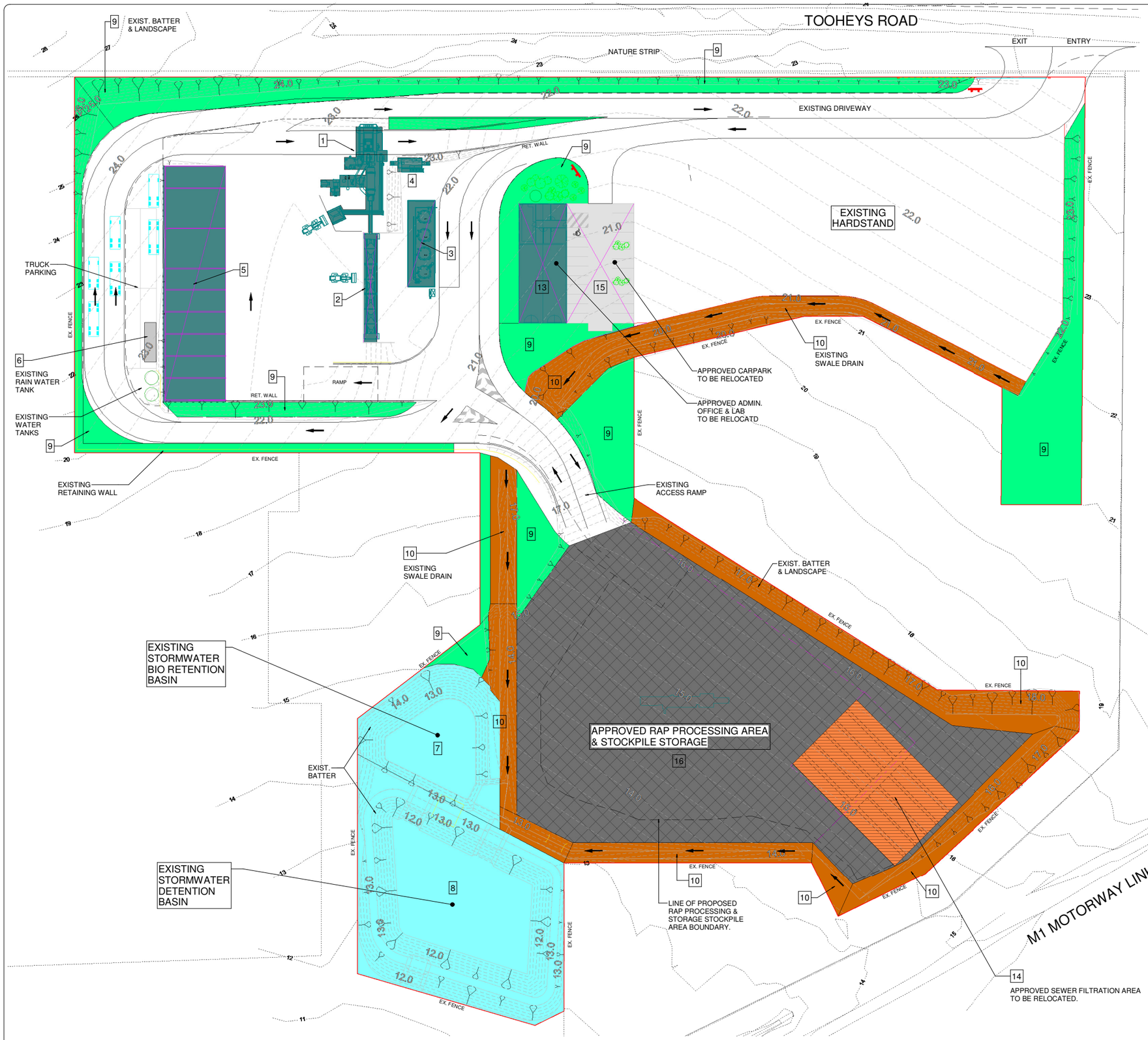
Please let me know if you have any concerns or comments regarding our plans to lodge an application or regarding our site in general by contacting me on the abovementioned contact details.

Yours faithfully,

**Stephen Long**

Regional Manager Infrastructure Services – Northern NSW

**Attachment 1 – Plans of Development**




SITE PLAN - APPROVED CONDITIONS TO BE RELOCATED
1 : 500

| BUILDING AREAS - EXISTING / APPROVED | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.9% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 92 m² | 0.5% |
| 3 | EXISTING TANK FARM | | Yes | 150 m² | 0.7% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 4.6% |
| 6 | EXISTING RAINWATER TANK ( 70kL ) | | Yes | 28 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 4.8% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 12.4% |
| 9 | EXISTING LANDSCAPE | | No | 4507 m² | 22.4% |
| 10 | EXISTING SWALE DRAIN | | No | 3130 m² | 15.5% |
| 13 | APPROVED ADMINISTRATION BUILDING | TO BE RELOCATED | Yes | 360 m² | 1.8% |
| 14 | APPROVED SEWER FILTRATION AREA | TO BE RELOCATED | No | 810 m² | 4.0% |
| 15 | APPROVED CARPARK | TO BE RELOCATED | Yes | 516 m² | 2.6% |
| 16 | APPROVED RAP PROCESSING AREA | TO BE MODIFIED | Yes | 5927 m² | 29.4% |
| | | | | 20140 m² | 100.0% |

| EXISTING APPROVED SITE PERMEABILITY SCHEDULE | | |
|---|---|---|
| SITE PERMEABILITY | Area | SITE % |
| IMPERVIOUS | 8219 m² | 41% |
| PERVIOUS | 11921 m² | 59% |
| | 20140 m² | 100% |

| SITE AREA |
|---|
| 34809 m² |

## SITE LEGEND

- EXISTING BUILDING
- EXISTING PAVEMENT
- EXISTING LANDSCAPE
- EXISTING SWALE DRAIN
- EXISTING RETENTION BASIN
- EXISTING MATERIAL STORAGE AREA

| Rev | Description | Date |
|---|---|---|
| J | ISSUED FOR INFORMATION | 23-02-23 |
| H | ISSUED FOR INFORMATION | 03-02-23 |
| G | ISSUED FOR APPROVAL | 23-12-22 |
| F | ISSUED FOR APPROVAL | 21-12-22 |
| E | ISSUED FOR APPROVAL | 01-12-22 |
| D | ISSUED FOR INFORMATION | 29-11-22 |
| C | ISSUED FOR INFORMATION | 03-10-22 |
| B | ISSUED FOR INFORMATION | 21-09-22 |
| A | ISSUED FOR INFORMATION | 19-09-22 |

CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

SITE PLANS
APPROVED CONDITIONS TO BE RELOCATED

ISSUED FOR
APPROVAL

| | |
|---|---|
| DRAWN B & C | PLOT DATE 23-02-23 |
| DESIGNED D.J.D. | SCALE As indicated |
| APPROVED | |
| DRG No. TP01 | REV. J |

A1 AT 100% FULL SIZE.
A3 AT 50%

## SITE LEGEND

- EXISTING BUILDING
- EXISTING PAVEMENT
- EXISTING LANDSCAPE
- EXISTING SWALE DRAIN
- EXISTING RETENTION BASIN
- PROPOSED NEW BUILDING / STRUCTURE
- PROPOSED MATERIAL STORAGE AREA
- PROPOSED / MODIFIED LANDSCAPE

PROJECT NORTH


| BUILDING AREAS - PROPOSED WORKS | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.6% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 92 m² | 0.3% |
| 3 | EXISTING TANK FARM | | Yes | 150 m² | 0.4% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 2.7% |
| 6 | EXISTING RAINWATER TANK ( 70kL ) | | Yes | 28 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 2.9% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 7.4% |
| 9 | EXISTING LANDSCAPE | | No | 4062 m² | 12.0% |
| 10 | EXISTING SWALE DRAIN | | No | 3330 m² | 9.8% |
| 11 | EXISTING PAVEMENT | | Yes | 10100 m² | 29.8% |
| 12 | EXISTING HARDSTAND | | Yes | 1731 m² | 5.1% |
| 20 | PROPOSED ASPHALT PLANT ADDITIONS | REFER DRG. TP04. | Yes | 67 m² | 0.2% |
| 21 | PROPOSED TANK FARM EXTENSION | 60kL BITUMEN TANK. 3.3kL ADBLUE TANK | Yes | 63 m² | 0.2% |
| 22 | PROPOSED STORAGE BUNKER | REFER DRG. TP05. | Yes | 268 m² | 0.8% |
| 23 | PROPOSED ADMINISTRATION BUILDING | REFER DRG. TP03. | Yes | 343 m² | 1.0% |
| 24 | PROPOSED PRODUCTION LAB | REFER DRG. TP03. | Yes | 152 m² | 0.4% |
| 25 | PROPOSED ABLUTION BLOCK 1 & CRIB RM. | REFER DRG. TP03. | Yes | 63 m² | 0.2% |
| 26 | PROPOSED CHEMICAL STORAGE | | Yes | 9 m² | 0.0% |
| 27 | PROPOSED DECKING | | Yes | 151 m² | 0.4% |
| 28 | PROPOSED ABLUTION BLOCK 2 | | Yes | 8 m² | 0.0% |
| 29 | PROPOSED CARPARK ACCESS WAY | <varies> | Yes | 264 m² | 0.8% |
| 30 | PROPOSED FOOTPATH | | Yes | 126 m² | 0.4% |
| 31 | PROPOSED HARDSTAND | | Yes | 216 m² | 0.6% |
| 32 | PROPOSED LPG STORAGE | | Yes | 28 m² | 0.1% |
| 33 | PROPOSED RAP PROCESSING AREA | | Yes | 4515 m² | 13.3% |
| 34 | PROPOSED PROCESSED RAP STORAGE | | Yes | 1888 m² | 5.6% |
| 35 | PROPOSED SEWER FILTRATION AREA | TO BE RELOCATED | No | 100 m² | 0.3% |
| 36 | PROPOSED LANDSCAPE | TO LOCAL COUNCIL REQUIREMENTS | No | 1439 m² | 4.2% |
| 37 | PROPOSED WATER TANK | | Yes | 21 m² | 0.1% |
| 38 | PROPOSED ABLUTION BLOCK 2 | | Yes | 7 m² | 0.0% |
| 40 | RUBBISH ENCLOSURE | | Yes | 20 m² | 0.1% |
| | | | | 33861 m² | 100.0% |

| PROPOSED SITE PERMEABILITY SCHEDULE | | |
|---|---|---|
| SITE PERMEABILITY | Area | SITE % |
| IMPERVIOUS | 21457 m² | 63.4% |
| PERVIOUS | 12404 m² | 36.6% |
| | 33861 m² | 100.0% |

| SITE AREA |
|---|
| 34809 m² |

NOTE -

1. STORAGE BUNKERS ARE CONCEPT ONLY . DIMENSIONS MY CHANGE SUBJECT TO DETAILED DESIGN.
1. ALL LANDSCAPE AREAS ARE TO BE PLANTED IN ACCORDANCE WITH THE LOCAL COUNCIL SPECIFICATIONS AND PERMIT REQUIREMENTS.
2. SITE AREAS TO BE GENERALLY GRADED TOWARDS EXISTING SWALE DRAINS FOR WATER COLLECTION.
3. REFER TRUCK TURNING CIRCLE DRAWINGS FOR TRUCK SWEEP PATHS ON DRG. TP10 & TP11.

## SITE PLAN - PROPOSED WORKS

1 : 500

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| M | ISSUED FOR INFORMATION | 23-02-23 |
| L | COORDS ADDED. ISSUED FOR INFORMATION | 20-02-23 |
| K | ISSUED FOR INFORMATION | 07-02-23 |
| J | ISSUED FOR INFORMATION | 03-02-23 |
| H | ISSUED FOR APPROVAL | 23-12-22 |
| G | ISSUED FOR APPROVAL | 21-12-22 |
| F | ISSUED FOR APPROVAL | 07-12-22 |
| E | ISSUED FOR APPROVAL | 01-12-22 |
| D | ISSUED FOR INFORMATION | 29-11-22 |

CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

SITE PLAN
PROPOSED WORKS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 23-02-23 |
| DESIGNED D.J.D. | SCALE As indicated |
| APPROVED | |
| DRG No. TP02 | REV. M |

A1 AT 100% FULL SIZE.
A3 AT 50%

31 December 2022

Attention: Peter Draper
Natural Resource Management Project Officer

NSW Crown Lands
PO Box 2185
Dangar, NSW 2309

PO Box 1563
Warriewood
NSW 2102

ABN 45 162 835 083

Dear Peter,

**BUSHELLS RIDGE ASPHALT PLANT– ENVIRONMENTAL IMPACT STATEMENT PREPARATION AND CONSULTATION FOR PROPOSED DESIGNATED DEVELOPMENT**

Fulton Hogan Industries Pty Ltd (Fulton Hogan) owns and operates the Bushells Ridge Asphalt Plant (the 'site' or 'asphalt plant') at 203 Tooheys Road, Bushells Ridge, New South Wales. A location map has been included for reference (Attachment A).

The asphalt plant operates 24 hours a day, seven days a week, and was previously approved under development consent (DA 1511/2016) by Central Coast Council (Council) on 9 April 2018, permitting the asphalt plant to:

- Produce up to 100,000 tonnes per annum (tpa) of asphalt.
- Process 20,000 tpa of reclaimed asphalt pavement (RAP).

Fulton Hogan is seeking approval for enhanced operations at the site through a designated development application under Part 4, Division 4.10 of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act).

Fulton Hogan propose to:

- Remove the current asphalt production limit of 100,000 tpa and increase production to a maximum of 400,000 tpa.
- Increase the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the site.

The Central Coast Regional Plan 2036 and the Hunter Regional Plan 2036 forecasts significant growth in their respective populations, as well as major commercial, health infrastructure, and transport infrastructure developments. Many of these major infrastructure projects will be reliant on asphalt.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to other potentially more environmentally sensitive locations will be avoided.

The project was issued with the Secretary's Environmental Assessment Requirements (SEARs) by the NSW Department of Planning and Environment (DPE) on 31 August 2022 (Attachment B). Element has reviewed the letter from Crown Lands dated 8 August 2022, and are currently in

discussion with Council to work towards transferring the section of Tooheys Road directly adjacent to and impacted by the development into Council's control.

In accordance with the SEARs, Fulton Hogan are seeking any further and additional comments of matters for consideration in the preparation of an Environmental Impact Statement (EIS) for the project.

Fulton Hogan has engaged Element Environment Pty Ltd (Element) to prepare the EIS and co-ordinate a range of technical studies including traffic, acoustics and air quality. On behalf of Fulton Hogan and as part of the EIS preparation, we initiate consultation regarding the project via this letter, and Fulton Hogan will take into consideration any response that is received.

If you or your colleagues have any questions or would like to discuss the project in more detail, please feel free to contact me on **0455 666 006** or luke@elementenvironment.com.au.

Similarly, if your organisation has any additional requirements beyond those previously stipulated to DPE which it would like to be considered in the EIS, please provide written response to this correspondence accordingly.

Alternatively, if your organisation has no comments or concerns and are satisfied to await the exhibition of the EIS (to be further notified when dates are determined), we would appreciate a response to this effect.

We are hoping to gather all responses to the project by **10 February 2023**.

Thank you for your interest in this letter – we look forward to hearing from you soon.

Kind Regards

Luke Farrell
**Principal Environmental Scientist**

0455 666 006
luke@elementenvironment.com.au

## Jacob Vickers

**From:** Peter Draper <peter.draper@crownland.nsw.gov.au>
**Sent:** Tuesday, 31 January 2023 5:43 PM
**To:** Jacob Vickers
**Subject:** RE: Bushells Ridge Asphalt Plant - Consultation
**Attachments:** Re: Request for Input: Asphalt Plant Expansion – 203 Tooheys Road, Bushells Ridge (Lot 10 DP 834953) – SEAR 1714

Hi Jacob,
Previous comments provided by the Department in relation to *Request for Input: Asphalt Plant Expansion – 203 Tooheys Road, Bushells Ridge (Lot 10 DP 834953) – SEAR 1714* are still relevant (see attached submission to Planning NSW).

No further comments.

Regards,
Peter

**Peter Draper**
**Group Leader Property Management - Hunter Area**
Crown Lands | Department of Planning and Environment
**T 02 4937 9311** | **E** peter.draper@crownland.nsw.gov.au
516 High Street | Maitland NSW 2320
PO Box 2185 Dangar NSW 2309
www.dpie.nsw.gov.au

*The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.*

---

**From:** Jacob Vickers <jacob@elementenvironment.com.au>
**Sent:** Tuesday, 31 January 2023 5:06 PM
**To:** Lands-Water CL Enquiries Mailbox <cl.enquiries@crownland.nsw.gov.au>; Peter Draper <peter.draper@crownland.nsw.gov.au>
**Cc:** Luke Farrell <luke@elementenvironment.com.au>; PR184 <PR184@elementenvironment.com.au>
**Subject:** FW: Bushells Ridge Asphalt Plant - Consultation

Hi Peter,

I have not heard back regarding the below. If Crown Lands is interested in submitting a response, I have extended the response due date to 10 February 2023.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

elementenvironment.com.au | Follow us on LinkedIn

Collaborate | Innovate | Solve



---

**From:** Jacob Vickers
**Sent:** Tuesday, December 13, 2022 1:40 PM
**To:** Peter.draper@crownland.nsw.gov.au
**Cc:** PR184 <PR184@elementenvironment.com.au>; Luke Farrell <luke@elementenvironment.com.au>
**Subject:** Bushells Ridge Asphalt Plant - Consultation

Hi Peter,

Element Environment Pty Ltd has been engaged by Fulton Hogan Industries Pty Ltd to prepare an environmental impact statement (EIS) to support a designated development application for enhanced operations at their Bushells Ridge Asphalt Plant. Please find the attached consultation letter seeking comment on matters for consideration in the preparation of the EIS.

Please get in contact if you have any questions.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

elementenvironment.com.au | Follow us on LinkedIn

Collaborate | Innovate | Solve

Element acknowledges the Traditional Owners of Country throughout Australia. We pay our respects to Elders past and present.
This email is confidential and may contain legally privileged information. If you are not the intended recipient, you must not disclose or use the information in it. If you have received this email in error, please notify us immediately by return email and delete the email and any related attachments.

Please consider the environment before printing this email.

31 January 2023

NSW Environment and Heritage
Locked Bag 5022,
Parramatta, NSW 2124

PO Box 1563
Warriewood
NSW 2102

ABN 45 162 835 083

To whom it may concern,

**BUSHELLS RIDGE ASPHALT PLANT– ENVIRONMENTAL IMPACT STATEMENT PREPARATION AND CONSULTATION FOR PROPOSED DESIGNATED DEVELOPMENT**

Fulton Hogan Industries Pty Ltd (Fulton Hogan) owns and operates the Bushells Ridge Asphalt Plant (the 'site' or 'asphalt plant') at 203 Tooheys Road, Bushells Ridge, New South Wales. A location map has been included for reference (Attachment A).

The asphalt plant operates 24 hours a day, seven days a week, and was previously approved under development consent (DA 1511/2016) by Central Coast Council (Council) on 9 April 2018, permitting the asphalt plant to:

- Produce up to 100,000 tonnes per annum (tpa) of asphalt.
- Process 20,000 tpa of reclaimed asphalt pavement (RAP).

Fulton Hogan is seeking approval for enhanced operations at the site through a designated development application under Part 4, Division 4.10 of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act).

Fulton Hogan propose to:

- Remove the current asphalt production limit of 100,000 tpa and increase production to a maximum of 400,000 tpa.
- Increase the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the site.

The Central Coast Regional Plan 2036 and the Hunter Regional Plan 2036 forecasts significant growth in their respective populations, as well as major commercial, health infrastructure, and transport infrastructure developments. Many of these major infrastructure projects will be reliant on asphalt.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to other potentially more environmentally sensitive locations will be avoided.

The project was issued with the Secretary's Environmental Assessment Requirements (SEARs) by the NSW Department of Planning and Environment (DPE) on 31 August 2022 (Attachment B). In accordance with the SEARs, Fulton Hogan are seeking any comments on matters for consideration in the preparation of an Environmental Impact Statement (EIS) for the project.

Fulton Hogan has engaged Element Environment Pty Ltd (Element) to prepare the EIS and co-ordinate a range of technical studies including traffic, acoustics and air quality. On behalf of Fulton Hogan and as part of the EIS preparation, we initiate consultation regarding the project via this letter, and Fulton Hogan will take into consideration any response that is received.

If you or your colleagues have any questions or would like to discuss the project in more detail, please feel free to contact me on **0455 666 006** or luke@elementenvironment.com.au.

Similarly, if your organisation has any additional requirements beyond those previously stipulated to DPE which it would like to be considered in the EIS, please provide written response to this correspondence accordingly.

Alternatively, if your organisation has no comments or concerns and are satisfied to await the exhibition of the EIS (to be further notified when dates are determined), we would appreciate a response to this effect.

We are hoping to gather all responses to the project by **10 February 2023**.

Thank you for your interest in this letter – we look forward to hearing from you soon.

Kind Regards

Luke Farrell
**Principal Environmental Scientist**

0455 666 006
luke@elementenvironment.com.au

## Jacob Vickers

**From:** Colleen Klingberg <Colleen.Klingberg@environment.nsw.gov.au>
**Sent:** Friday, 10 February 2023 9:53 AM
**To:** Jacob Vickers
**Cc:** Luke Farrell; PR184
**Subject:** Heritage NSW Reply - DOC23/79366 - RE: Bushells Ridge Asphalt Plant - Consultation

Dear Jacob

Thank you for advising of your upcoming project
Unfortunately, at this time, Heritage NSW are unable to accommodate meetings or providing comment outside the formal process.

Heritage NSW will await the formal submission of documentation via the Major Projects Portal to provide comments.

Regards

Colleen

**Colleen Klingberg**
Assistant Program Coordinator, Assessments
Environment and Heritage - Heritage NSW
**Department of Planning and Environment**

T 02 9873 8566 **E** colleen.klingberg@environment.nsw.gov.au

Locked bag 5020
Parramatta NSW 2124

**Working days** Monday to Friday, 09:00am - 05:00pm


Website Facebook Instagram LinkedIn

I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

Please consider the environment before printing this email.

---

**From:** Jacob Vickers <jacob@elementenvironment.com.au>
**Sent:** Friday, 3 February 2023 1:00 PM
**To:** OEH HD Heritage Mailbox <HERITAGEMailbox@environment.nsw.gov.au>
**Cc:** Luke Farrell <luke@elementenvironment.com.au>; PR184 <PR184@elementenvironment.com.au>
**Subject:** FW: Bushells Ridge Asphalt Plant - Consultation

To whom it may concern,

I have not heard back regarding the below. If NSW Environment and Heritage is interested in submitting a response, the response period has been extended to 10 February 2023.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

elementenvironment.com.au | Follow us on LinkedIn



---

**From:** Jacob Vickers
**Sent:** Tuesday, December 13, 2022 1:40 PM
**To:** 'info@environment.nsw.gov.au' <info@environment.nsw.gov.au>
**Cc:** PR184 <PR184@elementenvironment.com.au>; Luke Farrell <luke@elementenvironment.com.au>
**Subject:** Bushells Ridge Asphalt Plant - Consultation

To whom it may concern,

Element Environment Pty Ltd has been engaged by Fulton Hogan Industries Pty Ltd to prepare an environmental impact statement (EIS) to support a designated development application for enhanced operations at their Bushells Ridge Asphalt Plant. Please find the attached consultation letter seeking comment on matters for consideration in the preparation of the EIS.

Please get in contact if you have any questions.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

elementenvironment.com.au | Follow us on LinkedIn

---

13 December 2022

Attention: Dr Cameron Jennings
Senior Operations Officer, Regulatory Operations Metro

NSW Environment Protection Authority
PO Box 488G
Newcastle, NSW 2300

PO Box 1563
Warriewood
NSW 2102

ABN 45 162 835 083

Dear Cameron,

**BUSHELLS RIDGE ASPHALT PLANT– ENVIRONMENTAL IMPACT STATEMENT PREPARATION AND CONSULTATION FOR PROPOSED DESIGNATED DEVELOPMENT**

Fulton Hogan Industries Pty Ltd (Fulton Hogan) owns and operates the Bushells Ridge Asphalt Plant (the 'site' or 'asphalt plant') at 203 Tooheys Road, Bushells Ridge, New South Wales. A location map has been included for reference (Attachment A).

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- Process 20,000 tpa of reclaimed asphalt pavement (RAP).

Fulton Hogan is seeking approval for enhanced operations at the site through a designated development application under Part 4, Division 4.10 of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act).

Fulton Hogan propose to:

- Remove the current asphalt production limit of 100,000 tpa and increase production to a maximum of 400,000 tpa.
- Increase the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the site.

The Central Coast Regional Plan 2036 and the Hunter Regional Plan 2036 forecasts significant growth in their respective populations, as well as major commercial, health infrastructure, and transport infrastructure developments. Many of these major infrastructure projects will be reliant on asphalt.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to other potentially more environmentally sensitive locations will be avoided.

The project was issued with the Secretary's Environmental Assessment Requirements (SEARs) by the NSW Department of Planning and Environment (DPE) on 31 August 2022 (Attachment B). In accordance with the SEARs, Fulton Hogan are seeking any further and additional comments

of matters for consideration in the preparation of an Environmental Impact Statement (EIS) for the project.

Fulton Hogan has engaged Element Environment Pty Ltd (Element) to prepare the EIS and co-ordinate a range of technical studies including traffic, acoustics and air quality. On behalf of Fulton Hogan and as part of the EIS preparation, we initiate consultation regarding the project via this letter, and Fulton Hogan will take into consideration any response that is received.

If you or your colleagues have any questions or would like to discuss the project in more detail, please feel free to contact me on **0455 666 006** or luke@elementenvironment.com.au.

Similarly, if your organisation has any additional requirements beyond those previously stipulated to DPE which it would like to be considered in the EIS, please provide written response to this correspondence accordingly.

Alternatively, if your organisation has no comments or concerns and are satisfied to await the exhibition of the EIS (to be further notified when dates are determined), we would appreciate a response to this effect.

We are hoping to gather all responses to the project by **16 January 2023**.

Thank you for your interest in this letter – we look forward to hearing from you soon.

Kind Regards

Luke Farrell
**Principal Environmental Scientist**

0455 666 006
luke@elementenvironment.com.au

DOC22/1109763-01

Mr Luke Farrell
Principal Environmental Scientist
Element Environment Pty Ltd
PO Box 1563
WARRIEWOOD NSW 2102

By email: luke@elementenvironment.com.au

15 December 2022

Dear Mr Farrell

**Proposed Development – Fulton Hogan Industries Pty Ltd – Bushells Ridge Asphalt Plant**

I refer to your letter to the Environment Protection Authority (EPA) dated 13 December 2022, inviting our feedback on a proposed development intending to increase the operating scale of an asphalt plant located at 203 Tooheys Road, Bushells Ridge, New South Wales which is operated by Fulton Hogan Industries Pty Ltd (the Proposal).

The EPA understand an environmental impact statement (EIS) is yet to be prepared for the proposal. As such the EPA have no comment at this stage

If you have any questions about this matter, please contact Sean Joyce on (02) 4908 6897.

Yours sincerely,

**KAREN GALLAGHER**
**Unit Head Regulatory Operations Metro North**
**Environment Protection Authority**

Phone 131 555
Phone 02 9995 5555
(from outside NSW)

TTY 133 677, then
ask for 131 155

Locked Bag 5022
PARRAMATTA
NSW 2124

6 Parramatta Square
10 Darcy Street
PARRAMATTA
NSW 2150

info@epa.nsw.gov.au
www.epa.nsw.gov.au
ABN 43 692 285 758

13 December 2022

Fire and Rescue NSW
1 Amarina Avenue
Greenacre, NSW 2190

PO Box 1563
Warriewood
NSW 2102

ABN 45 162 835 083

To whom it may concern,

**BUSHELLS RIDGE ASPHALT PLANT– ENVIRONMENTAL IMPACT STATEMENT PREPARATION AND CONSULTATION FOR PROPOSED DESIGNATED DEVELOPMENT**

Fulton Hogan Industries Pty Ltd (Fulton Hogan) owns and operates the Bushells Ridge Asphalt Plant (the 'site' or 'asphalt plant') at 203 Tooheys Road, Bushells Ridge, New South Wales. A location map has been included for reference (Attachment A).

The asphalt plant operates 24 hours a day, seven days a week, and was previously approved under development consent (DA 1511/2016) by Central Coast Council (Council) on 9 April 2018, permitting the asphalt plant to:

- Produce up to 100,000 tonnes per annum (tpa) of asphalt.
- Process 20,000 tpa of reclaimed asphalt pavement (RAP).

Fulton Hogan is seeking approval for enhanced operations at the site through a designated development application under Part 4, Division 4.10 of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act).

Fulton Hogan propose to:

- Remove the current asphalt production limit of 100,000 tpa and increase production to a maximum of 400,000 tpa.
- Increase the current importation and processing limit of RAP from 20,000 tpa to 99,000 tpa.
- Re-configure and improve existing ancillary infrastructure at the site.

The Central Coast Regional Plan 2036 and the Hunter Regional Plan 2036 forecasts significant growth in their respective populations, as well as major commercial, health infrastructure, and transport infrastructure developments. Many of these major infrastructure projects will be reliant on asphalt.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to other potentially more environmentally sensitive locations will be avoided.

The project was issued with the Secretary's Environmental Assessment Requirements (SEARs) by the NSW Department of Planning and Environment (DPE) on 31 August 2022 (Attachment B). In accordance with the SEARs, Fulton Hogan are seeking any comments on matters for consideration in the preparation of an Environmental Impact Statement (EIS) for the project.

Fulton Hogan has engaged Element Environment Pty Ltd (Element) to prepare the EIS and co-ordinate a range of technical studies including traffic, acoustics and air quality. On behalf of Fulton Hogan and as part of the EIS preparation, we initiate consultation regarding the project via this letter, and Fulton Hogan will take into consideration any response that is received.

If you or your colleagues have any questions or would like to discuss the project in more detail, please feel free to contact me on **0455 666 006** or luke@elementenvironment.com.au.

Similarly, if your organisation has any additional requirements beyond those previously stipulated to DPE which it would like to be considered in the EIS, please provide written response to this correspondence accordingly.

Alternatively, if your organisation has no comments or concerns and are satisfied to await the exhibition of the EIS (to be further notified when dates are determined), we would appreciate a response to this effect.

We are hoping to gather all responses to the project by **16 January 2023**.

Thank you for your interest in this letter – we look forward to hearing from you soon.

Kind Regards

Luke Farrell
**Principal Environmental Scientist**

0455 666 006
luke@elementenvironment.com.au

## Jacob Vickers

**From:** Operational Liaison <OpsLiaison@fire.nsw.gov.au>
**Sent:** Thursday, 15 December 2022 10:34 AM
**To:** Jacob Vickers
**Cc:** Fire Safety; Luke Farrell; PR184
**Subject:** RE: Bushells Ridge Asphalt Plant - Consultation

Hi Jacob,

I provide the below information further to our phone discussion regarding your intention to consult with FRNSW on the preparation of the Environmental Impact Statement (EIS) for the Bushells Ridge Asphalt Plan.

FRNSW will review and provide specific, formal comment and recommendations on the finalised EIS. In the meantime, I can provide you with some general, publicly available information that may be of assistance.

- Access for fire brigade vehicles and firefighters is a FRNSW guideline document that may be used to ensure the provision of safe, efficient, and effective access for fire brigade vehicles to any premises and allow firefighters to rapidly intervene when a fire or other emergency incident occurs.
- HIPAP No. 1 - Industry Emergency Planning Guidelines can assist an operator of a facility in the establishment of an emergency plan that provides for the protection of people and the environment in the event of an incident or accident.
- Emergency services information package and tactical fire plans is a FRNSW guideline document that may be used to develop an Emergency Services Information Package (ESIP). The ESIP provides firefighters with site specific information that allows them to develop and implement effective strategies and tactics to manage a fire or other emergency incident.

When FRNSW are presented with a large, unique, or complex facility that may present special or unique problems of firefighting and emergency management we may recommend that a Fire Safety Study (FSS) be developed in accordance with HIPAP No. 2 - Fire Safety Study Guidelines. The objective of the FSS is to ensure that the proposed fire prevention, detection, protection and firefighting measures are appropriate for the specific fire hazard and adequate to meet the extent of potential fires for the subject development.

Thanks,
Aaron

NSW GOVERNMENT | FIRE + RESCUE

**A/ INSPECTOR AARON ROSS**
**Team Leader Fire Safety**
**Operational Liaison and Special Hazards Unit | Fire and Rescue NSW**

T: +61 457 438 760 E: OpsLiaison@fire.nsw.gov.au
1 Amarina Ave, Greenacre, NSW 2190 | Locked Bag 12, Greenacre, NSW, 2190

**From:** Jacob Vickers <jacob@elementenvironment.com.au>
**Sent:** Wednesday, 14 December 2022 8:52 AM
**To:** Fire Safety <FireSafety@fire.nsw.gov.au>
**Cc:** Luke Farrell <luke@elementenvironment.com.au>; PR184 <PR184@elementenvironment.com.au>
**Subject:** RE: Bushells Ridge Asphalt Plant - Consultation



Hi David,

Thanks for getting back to me. Just to clarify, we are not seeking a written report or a fire safety study from FRNSW. This is simply a consultation on behalf of Fulton Hogan to give FRNSW an opportunity to comment on matters to be included in the EIS. We invite FRNSW to raise any issues with the development, and any issues raised will be addressed in the EIS. However any response is at the discretion of FRNSW.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

elementenvironment.com.au | Follow us on LinkedIn

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**From:** Fire Safety <FireSafety@fire.nsw.gov.au>
**Sent:** Wednesday, 14 December 2022 7:18 AM
**To:** Jacob Vickers <jacob@elementenvironment.com.au>
**Cc:** Luke Farrell <luke@elementenvironment.com.au>; PR184 <PR184@elementenvironment.com.au>
**Subject:** RE: Bushells Ridge Asphalt Plant - Consultation

Good morning Jacob

If you wish for FRNSW to provide comment you will need to complete a written report application.

Further information and the form can be found using the link below:

https://www.fire.nsw.gov.au/page.php?id=9156

Please note you should submit all relevant documents with the application as we will not keep the below email on file.

Thanks

**David Shield**
**Administrative Support Officer**
**CSD Admin & Project Services | Fire and Rescue NSW**

T: (02) 9742 7434
E: firesafety@fire.nsw.gov.au
A: 1 Amarina Ave, Greenacre, NSW, 2190
Locked Bag 12, Greenacre, NSW, 2190


**PREPARED FOR ANYTHING.**



**From:** Jacob Vickers <jacob@elementenvironment.com.au>
**Sent:** Tuesday, 13 December 2022 1:36 PM
**To:** Info <Info@fire.nsw.gov.au>
**Cc:** PR184 <PR184@elementenvironment.com.au>; Luke Farrell <luke@elementenvironment.com.au>
**Subject:** Bushells Ridge Asphalt Plant - Consultation



To whom it may concern,

Element Environment Pty Ltd has been engaged by Fulton Hogan Industries Pty Ltd to prepare an environmental impact statement (EIS) to support a designated development application for enhanced operations at their Bushells Ridge Asphalt Plant. Please find the attached consultation letter seeking comment on matters for consideration in the preparation of the EIS.

Please get in contact if you have any questions.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

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31 December 2022

Attention: Court Walsh
Development Services Case Officer

Transport for NSW
231 Elizabeth Street
Sydney, NSW 2000

PO Box 1563
Warriewood
NSW 2102

ABN 45 162 835 083

Dear Court,

**BUSHELLS RIDGE ASPHALT PLANT– ENVIRONMENTAL IMPACT STATEMENT PREPARATION AND CONSULTATION FOR PROPOSED DESIGNATED DEVELOPMENT**

Fulton Hogan Industries Pty Ltd (Fulton Hogan) owns and operates the Bushells Ridge Asphalt Plant (the 'site' or 'asphalt plant') at 203 Tooheys Road, Bushells Ridge, New South Wales. A location map has been included for reference (Attachment A).

The asphalt plant operates 24 hours a day, seven days a week, and was previously approved under development consent (DA 1511/2016) by Central Coast Council (Council) on 9 April 2018, permitting the asphalt plant to:

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- Process 20,000 tpa of reclaimed asphalt pavement (RAP).

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Fulton Hogan propose to:

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- Re-configure and improve existing ancillary infrastructure at the site.

The Central Coast Regional Plan 2036 and the Hunter Regional Plan 2036 forecasts significant growth in their respective populations, as well as major commercial, health infrastructure, and transport infrastructure developments. Many of these major infrastructure projects will be reliant on asphalt.

Fulton Hogan propose to meet part of the increased forecast demand in asphalt in the Hunter and Central Coast regions by maximising the production capacity of the existing asphalt plant rather than establish a new greenfield development in an alternate location. In continuing asphalt production on a site already established for this purpose, close to the source of demand, the requirement for relocation to other potentially more environmentally sensitive locations will be avoided.

The project was issued with the Secretary's Environmental Assessment Requirements (SEARs) by the NSW Department of Planning and Environment (DPE) on 31 August 2022 (Attachment B). In accordance with the SEARs, Fulton Hogan are seeking any further and additional comments

of matters for consideration in the preparation of an Environmental Impact Statement (EIS) for the project.

Fulton Hogan has engaged Element Environment Pty Ltd (Element) to prepare the EIS and co-ordinate a range of technical studies including traffic, acoustics and air quality. On behalf of Fulton Hogan and as part of the EIS preparation, we initiate consultation regarding the project via this letter, and Fulton Hogan will take into consideration any response that is received.

If you or your colleagues have any questions or would like to discuss the project in more detail, please feel free to contact me on **0455 666 006** or luke@elementenvironment.com.au.

Similarly, if your organisation has any additional requirements beyond those previously stipulated to DPE which it would like to be considered in the EIS, please provide written response to this correspondence accordingly.

Alternatively, if your organisation has no comments or concerns and are satisfied to await the exhibition of the EIS (to be further notified when dates are determined), we would appreciate a response to this effect.

We are hoping to gather all responses to the project by **10 February 2023**.

Thank you for your interest in this letter – we look forward to hearing from you soon.

Kind Regards

Luke Farrell
**Principal Environmental Scientist**

0455 666 006
luke@elementenvironment.com.au

## Jacob Vickers

**From:** Timothy Chapman <Timothy.CHAPMAN@transport.nsw.gov.au>
**Sent:** Thursday, 2 February 2023 4:19 PM
**To:** Jacob Vickers
**Cc:** Court Walsh
**Subject:** RE: Bushells Ridge Asphalt Plant - Consultation
**Attachments:** NTH22_00482_01 - 20220809 - TfNSW Response - SEARs Advice for Asphalt Plant Expansion - 203 Tooheys Road, Bushells Ridge.pdf

Hi Jacob

Thank you for your request. TfNSW has no further requirements than those submitted in our SEARs response letter dated 9 August 2022 (attached) .
Any questions please call.

Regards

**Tim Chapman**
Development Services Case Officer
Development Services
Regional and Outer Metropolitan
**Transport for NSW**

**M** 0412274356 **E** timothy.chapman@transport.nsw.gov.au

6 Stewart Avenue, Newcastle West 2302

I work flexibly. Unless it suits you, I don't expect you to read or respond to my emails outside of your normal work hours.

Transport for NSW

I recognise and acknowledge that modern New South Wales is an overlay on Aboriginal land and that many of the transport routes of today follow songlines Aboriginal people have followed for tens of thousands of years. I pay my respects to the Aboriginal people of NSW and Elders past and present.

Please consider the environment before printing this email.

**From:** Jacob Vickers <jacob@elementenvironment.com.au>
**Sent:** Tuesday, 31 January 2023 5:13 PM
**To:** Development North <Development.North@transport.nsw.gov.au>
**Cc:** PR184 <PR184@elementenvironment.com.au>; Luke Farrell <luke@elementenvironment.com.au>
**Subject:** FW: Bushells Ridge Asphalt Plant - Consultation



Hi Court,

I have not heard back regarding the below. If TfNSW is interested in submitting a response, the response has been extended to 10 February 2023.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

elementenvironment.com.au | Follow us on LinkedIn

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**From:** Jacob Vickers
**Sent:** Tuesday, December 13, 2022 1:37 PM
**To:** development.north@transport.nsw.gov.au
**Cc:** PR184 <PR184@elementenvironment.com.au>; Luke Farrell <luke@elementenvironment.com.au>
**Subject:** Bushells Ridge Asphalt Plant - Consultation

Hi Court,

Element Environment Pty Ltd has been engaged by Fulton Hogan Industries Pty Ltd to prepare an environmental impact statement (EIS) to support a designated development application for enhanced operations at their Bushells Ridge Asphalt Plant. Please find the attached consultation letter seeking comment on matters for consideration in the preparation of the EIS.

Please get in contact if you have any questions.

Kind regards,

**Jacob Vickers**
Environmental consultant
Planning and Environment
0481 203 334 | jacob@elementenvironment.com.au

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# APPENDIX F

## NOISE IMPACT ASSESSMENT REPORT

# BUSHELLS RIDGE ASPHALT PLANT

## Noise Impact Assessment

**Prepared for:**

Fulton Hogan c/ Element Environment Pty Ltd

**SLR Ref: 610.16808-R01**
**Version No: -v3.0**
**April 2023**

# PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
10 Kings Road
New Lambton NSW 2305 Australia
T: +61 2 4037 3200
E: newcastleau@slrconsulting.com www.slrconsulting.com

# BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Fulton Hogan c/ Element Environment Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

# DOCUMENT CONTROL

| Reference | Date | Prepared | Checked | Authorised |
|---|---|---|---|---|
| 610.16808-R01-v3.0 | 20 April 2023 | Jonathan Caine | Martin Davenport | Martin Davenport |
| 610.16808-R01-v2.0 | 23 February 2023 | Jonathan Caine | Martin Davenport | Martin Davenport |
| 610.16808-R01-v1.0 | 31 January 2023 | Jonathan Caine | Martin Davenport | Martin Davenport |
| | | | | |
| | | | | |
| | | | | |

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# DOCUMENT REFERENCES

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## FIGURES



## APPENDICES

# 1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Element Environment Pty Ltd on behalf of Fulton Hogan Industries Pty Ltd to undertake a Noise and Vibration Impact Assessment (NVIA) relating to the construction and operation of upgrades to the Bushells Ridge Asphalt Plant (the project) located at 203 Tooheys Road, Bushells Ridge NSW (the 'project').

A previous report, *Noise and Vibration Impact Assessment* was prepared by SLR (refer to SLR report 610.16808-R02 *Noise and Vibration Assessment* dated 7 December 2016) (previous NVIA) relating to the initial development of the site, originally with production capacity of more than 150 tonnes per day of asphalt or 100,000 tonnes per year. The noise monitoring results detailed in the previous NVIA have been utilised to establish ambient noise levels within the study area prior to the development of the Bushells Ridge Asphalt Plant site.

This NVIA has been prepared with reference to Australian Standards AS 1055:2018 *Acoustics - Description and Measurement of Environmental Noise* and in accordance with the NSW Environment Protection Authority (EPA) *Noise Policy for Industry* (NPfI), *Interim Construction Noise Guideline* (ICNG) and the *Road Noise Policy* (RNP).

This report uses specialist technology. An explanation of common terms is provided in **Appendix A.**

# 2 Project Description

The project would allow the asphalt plant to produce up to 400,000 tonnes of asphalt per year and process up to 99,000 tonnes per year of reclaimed asphalt pavement (RAP). An overview of the proposed project is provided in **Figure 1**.

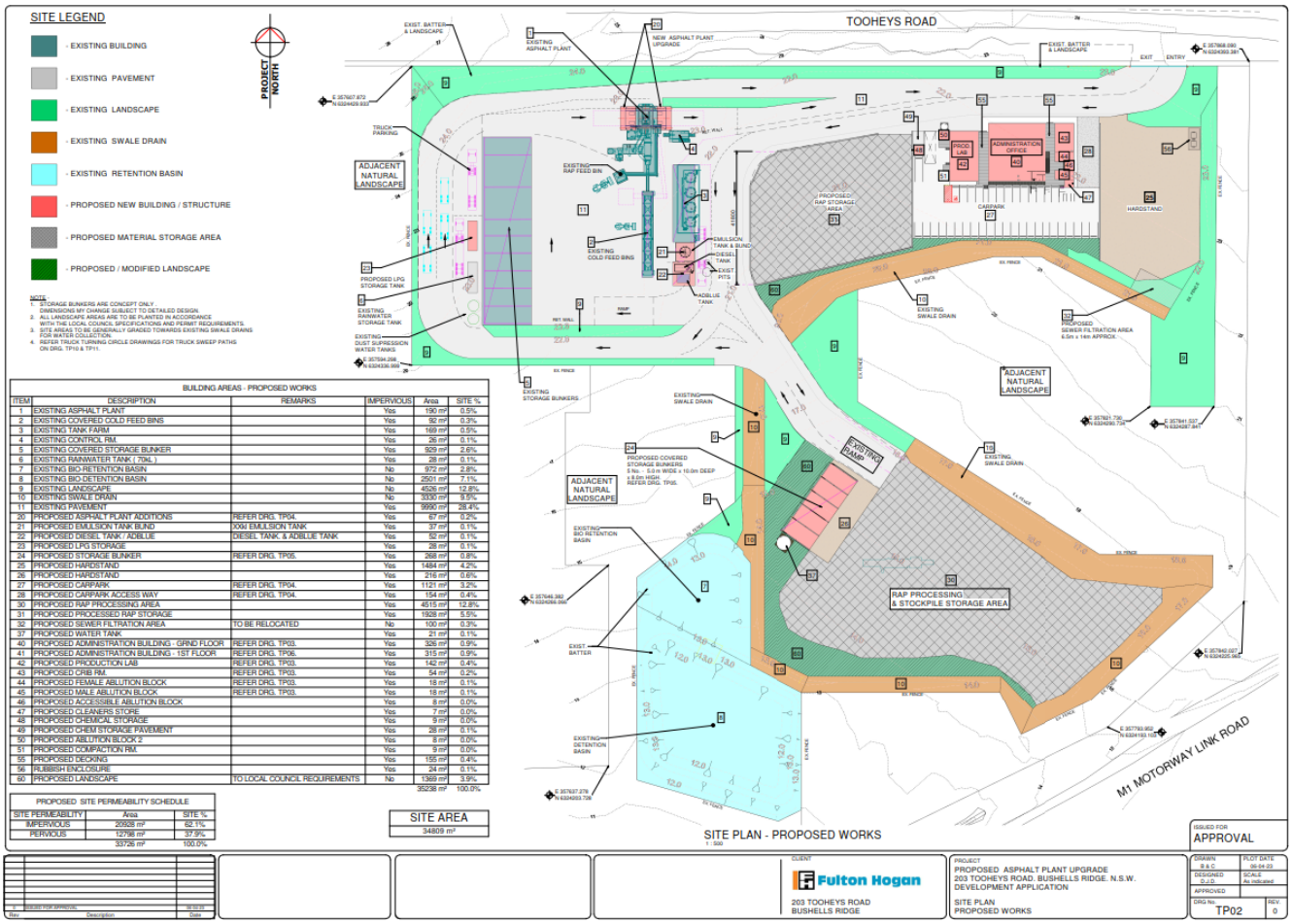
It is expected that the construction activities during the project would include the following activities:

- Installation of additional hot storage bins and associated equipment to the existing asphalt plant.
- Re-configuration and improvement of existing ancillary infrastructure, including:
    - Alteration of the existing office, parking, workshop and laboratory.
    - Construction of a new processed RAP stockpile area.
    - Construction of an additional enclosed bulk material storage area.
    - Establishment of additional hazardous substance/dangerous goods storage areas.
    - Installation of an additional rainwater tank.

Construction upgrades to the plant would occur during standard construction hours during times when the asphalt plant is not operational.

The project would continue to operate 24 hours, 7 days a week.

**Figure 1 Site Development Plan**




Source: Element Environment

## 2.1 Project Overview and Identification of Noise Sensitive Receivers

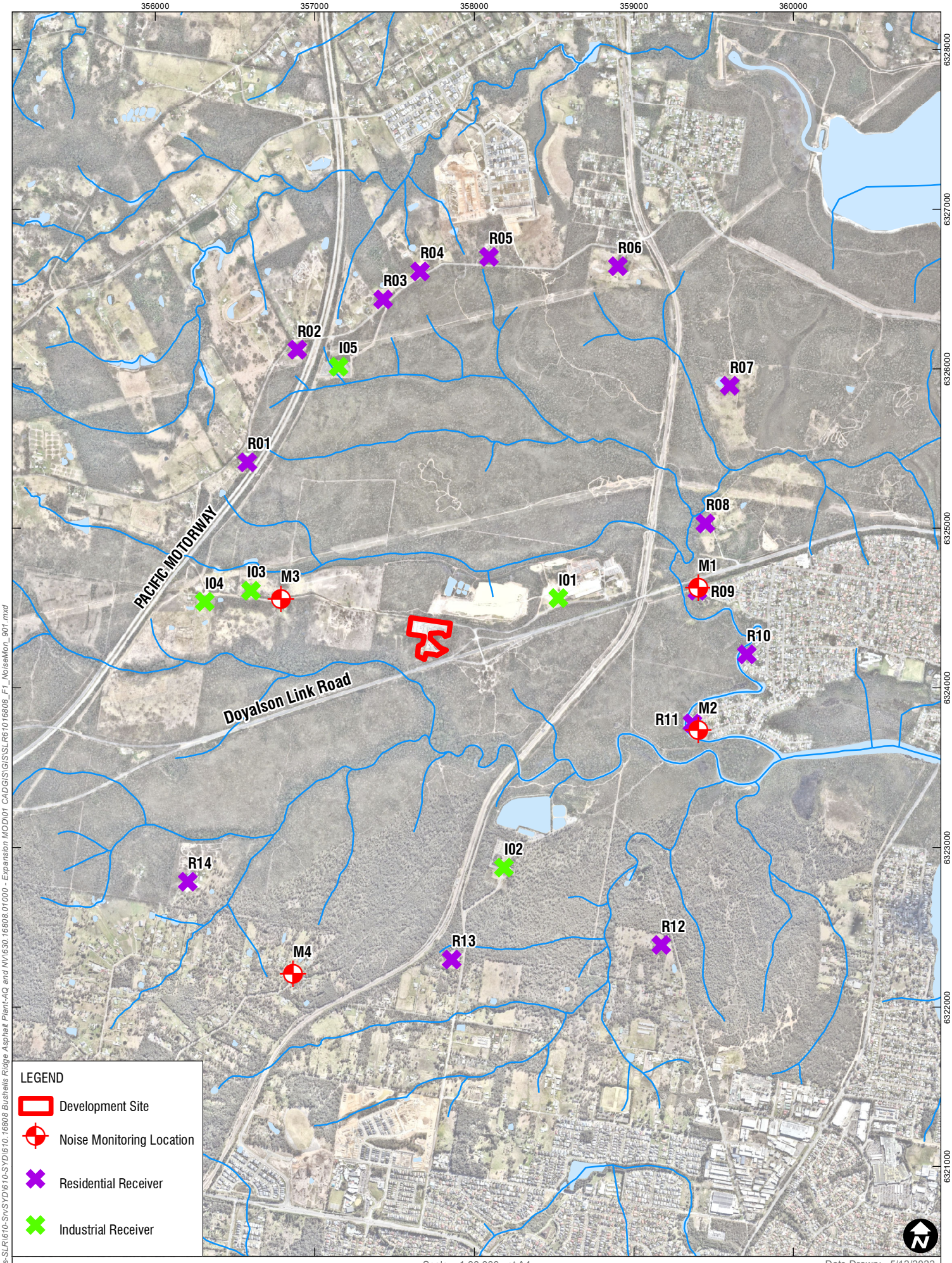
Based on available aerial images, the nearest residential and industrial receptors that have the potential to be impacted by noise emissions during the construction and operation of the project have been identified for investigation in this assessment. The locations of the nearest sensitive receptors are shown in **Table 1** and **Figure 2**.

**Table 1 Identified Sensitive Receptors and Relative Distance from Site**

| Receiver ID | Address | Distance from Site (km) |
|---|---|---|
| **Residential Receptors** | | |
| R01 | 245 Bushells Ridge Road, Kiar | 1.7 |
| R02 | 325 Bushells Ridge Road, Kiar | 2.0 |
| R03 | 388 Bushells Ridge Road, Wyee | 2.2 |
| R04 | 416 Bushells Ridge Road, Wyee | 2.3 |
| R05 | 450 Bushells Ridge Road, Wyee | 2.5 |
| R06 | 555 Bushells Ridge Road, Bushells Ridge | 2.6 |

| Receiver ID | Address | Distance from Site (km) |
|---|---|---|
| R07 | 740 Thompson Vale Road, Doyalson | 2.4 |
| R08 | 315 Thompson Vale Road, Doyalson | 1.8 |
| R09 | 11 Waterhen Close, Blue Haven | 1.7 |
| R10 | 40 Turner Close, Blue Haven | 1.9 |
| R11 | 107 Birdwood Drive, Blue Haven | 1.6 |
| R12 | 120 Arizona Road, Charmhaven | 2.4 |
| R13 | 152 Hiawatha Road, Woongarrah | 2.0 |
| R14 | 350A Bruce Crescent, Wallarah | 2.1 |
| **Industrial Receptors** | | |
| I01 | 288 Tooheys Road, Bushells Ridge | 0.7 |
| I02 | 107-135 Mona Road, Charmhaven | 1.6 |
| I03 | 106 Tooheys Road, Bushells Ridge | 1.3 |
| I04 | 77 Tooheys Road, Bushells Ridge | 1.6 |
| I05 | 369 Bushells Ridge Road, Bushells Ridge | 1.9 |

The previous NVIA assessment conducted noise monitoring at locations representative of the nearest residential receivers to the project. The project site, locality, nearest noise sensitive receivers (**Table 1**) and monitoring locations used in the previous NVIA are shown in **Figure 2**.




Scale: 1:30,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 5/12/2022
Project Number: 610.16808

Data Source: NearMap Aerial Photo Aug 2022

SLR

**Site Locality and Nearest Receivers**

**FIGURE 2**

\\au.slr.local\corporate\Projects-SLR\610-SrvSYD\610-SYD\610.16808 Bushells Ridge Asphalt Plant-AQ and NV\630.16808.01000 - Expansion MOD\01 CAD\GIS\GIS\SLR6116808_F1_NoiseMon_901.mxd

# 3 Statutory Requirements

The NVIA for the project has been guided by the Planning Secretary's Environmental Assessment Requirements (SEARs) together with the EPA's recommended Environmental Assessment Requirements. The requirements relevant to noise and vibration are provided in **Table 2** together with the relevant section of the NVIA indicating where the requirements have been addressed.

**Table 2 Noise and Vibration Impact Assessment Requirements**

| Environmental Assessment Requirement | Addressed in Section |
|---|---|
| As part of the EIS assessment the following matters must also be addressed:<br>**Noise and vibration** - including: | |
| - a description of all potential noise and vibration sources during construction and operation, including road traffic noise | **Section 7** |
| - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines | |
| - a description and appraisal of noise and vibration mitigation and monitoring measures. | **Section 7.7** |
| **Environmental Protection Authority Requirement** | **Addressed in Section** |
| - Identify all noise sources or potential sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as the transport of goods and raw materials. | **Section 7.1.1 and 7.6** |
| - Specify the times of operation for all phases of the development and for all noise producing activities. | **Section 7.1.1 and 7.6** |
| - For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks. | **Section 4.2** |

# 4 Impact Assessment Procedures

## 4.1 Operational Noise Levels

### 4.1.1 Environment Protection Licence Requirements

The requirements of the current Environmental Protection Licence 21239 are reproduced below:

> *"**L3 Noise Limits***
>
> *L3.1 Noise emissions from the Premises must be in compliance with the requirements of the NSW EPA's Industrial Noise Policy"*

These requirements will be applied in the development of the Project Noise Trigger Levels (PNTL) for the project and applied in the assessment conducted.

### 4.1.2 Project Noise Trigger Levels

The EPA has regulatory responsibility for the control of noise from "scheduled premises" under the *Protection of the Environment Operations Act, 1997*. In implementing the NPfI, the EPA has two broad objectives:

- Controlling intrusive noise levels in the short term; and
- Maintaining noise amenity levels for particular land uses over the medium to long-term.

In general terms, the NPfI sets out procedures for establishing the project intrusive noise level $L_{Aeq(15minute)}$ and project amenity noise level $L_{Aeq(period)}$, with a view determining the lower (that is, the more stringent) being the Project Noise Trigger Level (PNTL), NPfI Section 2.2 states:

> *The project intrusiveness noise level aims to protect against significant changes in noise levels, whilst the project amenity noise level seeks to protect against cumulative noise impacts from industry and maintain amenity for particular land uses. Applying the most stringent requirement as the project noise trigger level ensures that both intrusive noise is limited and amenity is protected and that no single industry can unacceptably change the noise level of an area.*

For assessing intrusiveness, the existing background noise generally needs to be measured. The intrusiveness trigger level essentially means that the equivalent continuous noise level (LAeq) of the source should not be more than 5 dBA above the measured (or default) Rating Background Level (RBL).

The amenity assessment is based on amenity noise levels specific to the land use and associated activities. The project amenity noise levels are shown in **Table 3** and relate only to industrial-type noise and do not include road, rail or community-related noise. Based on the NPfI land use descriptions and the background noise levels residences surrounding the project have been classified according to **Table 3** below.

**Table 3 Surrounding Receiver Recommended Amenity Level**

| Type of Receiver | Example Location | Noise Amenity Area | Time of Day | Recommended Amenity $L_{Aeq(period)}$ Noise Level, dBA |
|---|---|---|---|---|
| Residential | Blue Haven (Waterhen Close and Bridwood Drive) | Suburban | Day | 55 |
| | | | Evening | 45 |
| | | | Night | 40 |
| | Wallarah (Bruce Crescent) | Rural | Day | 50 |
| | | | Evening | 45 |
| | | | Night | 40 |
| Industrial | Tooheys Rd | All | When in use | 70 |

Note: Daytime 7.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 7.00 am, On Sundays and Public Holidays, Daytime 8.00 am -6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
The $L_{Aeq}$ index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

It should be noted that the isolated residential receivers on Tooheys Road are in an area defined as an industrial zone (IN1) on the Central Coast Local Environment Plan 2022, and as such the industrial amenity level applies to these receivers.

### 4.1.3 Sleep Disturbance

The project is proposed to operate during the night-time period and as such it is appropriate to consider the potential for sleep disturbance at the closest residential receivers.

In addition to the PNTLs, NPfI provides guidance in relation to the assessment of sleep disturbance. Specifically, the NPfI states:

*Where the subject development/premises night-time noise levels at a residential location exceed:*

- LAeq(15minute) 40 dBA or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAFmax 52 dBA or the prevailing RBL plus 15 dB, whichever is the greater,

*a detailed maximum noise level assessment should be undertaken.*

Where those sleep disturbance trigger levels are not met, it is appropriate to consider any effect of the noise with regard to:

- The extent to which the maximum noise level exceeds the rating background noise level.
- How often high noise events will occur.
- The distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the subject development.
- Whether there are times of day when there is a clear change in the noise environment (such as during early-morning shoulder periods).
- Current scientific literature available at the time of the assessment regarding the impact of maximum noise level events at night.

It may also be appropriate to consider other published research including the NSW *Road Noise Policy* which contains additional guidance relating to potential sleep disturbance impacts.

## 4.2 Road Traffic Noise

**Table 4** presents the RNP criteria for residential land uses affected by additional traffic on public roads as a result of a development. Noise levels provided in **Table 4** are external noise levels and refer only to road traffic noise; they do not include ambient noise from other sources.

**Table 4 Road Traffic Noise Assessment Noise Criteria for Residential Land Uses**

| Road Category | Type of project/land use | Assessment criteria – dBA | |
|---|---|---|---|
| | | Day (7 am–10 pm) | Night (10 pm–7 am) |
| Freeway/ arterial/ sub-arterial roads | Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments | $L_{Aeq(15hour)}$ 60 (external) | $L_{Aeq(9hour)}$ 55 (external) |

In addition to the assessment criteria presented in **Table 4** any increase in the traffic noise level at a location due to a traffic generating development must be considered. Residences experiencing increases in total traffic noise level above the relative increase criteria should also be considered for mitigation. **Table 5** shows relative increase criteria for residential land uses.

**Table 5 Relative Increase Criteria for Residential Land Uses**

| Road Category | Type of project/land use | Assessment criteria – dBA | |
|---|---|---|---|
| | | Day (7 am–10 pm) | Night (10 pm–7 am) |
| Freeway/arterial/ sub-arterial roads and transitways | New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road | Existing traffic $L_{Aeq(15hour)}$ + 12 dB (external) | Existing traffic $L_{Aeq(9hour)}$+ 12 dB (external) |

In **Table 5** the 'existing' traffic noise level refers to the level from all road categories which would occur for the relevant 'no build' option.

Section 3.4 of the RNP also states:

> *Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary objective is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria.*
>
> *In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.*
>
> *For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.*

## 4.3 Construction Noise

The NSW Environment Protection Authority's (EPA's) Interim Construction Noise Guideline (ICNG) sets out noise management levels for residential and other noise-sensitive receivers and outlines how they are to be applied. The policy suggests restricting the hours of construction for activities that generate noise at residences above the 'highly affected' noise management level. A summary of the noise management levels from the ICNG is contained in **Table 7**.

**Table 6 Construction Noise Management at Residential Receivers**

| Time of Day | Noise Management Level $L_{Aeq(15minute)}$[1] | How to Apply |
|---|---|---|
| Recommended standard hours Monday to Friday | Noise Affected RBL[2] + 10 dBA | The noise affected level represents the point above which there may be some community reaction to noise. |

| Time of Day | Noise Management Level $L_{Aeq(15minute)}$[1] | How to Apply |
|---|---|---|
| 7am to 6pm<br>Saturday 8am to 1pm<br>No work Sundays or public holidays | | • Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.<br>• The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details. |
| | Highly Noise Affected<br>75 dBA | The highly noise affected level represents the point above which there may be strong community reaction to noise.<br>• Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:<br>1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences.<br>2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times. |
| Outside recommended standard hours | Noise Affected<br>RBL[2] + 5 dBA | A strong justification would typically be required for works outside the recommended standard hours.<br>• The proponent should apply all feasible and reasonable work practices to meet the noise affected level.<br>• Where all feasible and reasonable practices have been applied and noise is more than 5 dBA above the noise affected level, the proponent should negotiate with the community.<br>• For guidance on negotiating agreements see section 7.2.2 of the ICNG. |

Note 1: Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise-affected residence.

Note 2: RBL: Rating Background Level, as defined in the NSW Noise Policy for Industry (EPA, 2017).

### Other Noise Sensitive Receivers

The ICNG explains that due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining management levels is separated into two categories:

- Industrial premises: external $L_{Aeq(15minute)}$ 75 dBA; and
- Offices, retail outlets: external $L_{Aeq(15minute)}$ 70 dBA.

# 5 Existing Meteorology and Noise Environment

## 5.1 Existing Acoustical Ambient Environment

In order to establish relevant PNTLs for the project, the results of noise monitoring conducted for the previous NVIA in October and November 2016 were used. Given the existing industry and increase in traffic counts in the area it is likely background noise levels have increased. Therefore, the use of measured 2016 RBLs are considered to provide a conservative assessment.

The results of the noise monitoring are reproduced in and **Table 7** with noise monitoring locations shown in **Figure 2**.

**Table 7 Unattended Noise Monitoring Results Summary**

| Monitoring Location | Period[2] | Measured $L_{Aeq(period)}$ | Rating Background Noise Level $L_{A90}$ |
|---|---|---|---|
| M1 – 12 Waterhen Close, Blue Haven | Day | 59 | 50 |
| | Evening | 58 | 50 |
| | Night | 55 | 35 |
| M2 – 115 Bridwood Drive, Blue Haven | Day | 51 | 33 |
| | Evening | 48 | 33 |
| | Night | 45 | 30 |
| M3 – Tooheys Road, Bushells Ridge | Day | 47 | 36 |
| | Evening | 46 | 38 |
| | Night | 45 | 35 |
| M4 – 500 Bruce Crescent, Wallarah | Day | 51 | 41 |
| | Evening | 51 | 41 |
| | Night | 51 | 42 |

Note 1: Estimated LAeq levels in the absence of Bushells Ridge Asphalt Plant operations.

Note 2: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

## 5.2 Meteorological Environment

In general terms, NPfI Fact Sheet D sets out procedures for establishing noise enhancing weather conditions, where two options are available to consider meteorological effects, as follows:

1. *Adopt the **noise-enhancing meteorological conditions** for all assessment periods for noise impact assessment purposes without an assessment of how often these conditions occur - a conservative approach that considers source-to-receiver wind vectors for all receivers and F class temperature inversions with wind speeds up to 2 m/s at night.*

*or*

2. *Determine the **significance** of noise-enhancing conditions. This involves assessing the significance of temperature inversions (F and G class stability categories) for the night-time period and the significance of light winds up to and including 3 m/s for all assessment periods during stability categories other than E, F or G. Significance is based on a threshold of occurrence of 30% determined in accordance with the provisions in this policy. Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment.*

NPfI Fact Sheet D also contains several important notes, and in particular states:

> *Noise limits derived for consents and licences will apply under the meteorological conditions used in the environmental assessment process, that is, standard or noise-enhancing meteorological conditions. For 'very noise-enhancing meteorological conditions' (see glossary) a limit is set based on the limit derived under standard or noise-enhancing conditions (whichever is adopted in the assessment) plus 5 dB. In this way a development is subject to noise limits under all meteorological conditions.*
>
> *It should be noted that noise limit conditions will include the wind speed (scalar quantity without direction) under which noise limits will apply.*

To provide a conservative approach the standard and noise enhancing meteorological conditions (NPfI Table D1), have been adopted and are presented in **Table 8**.

### Table 8 NPfI Table D1 Standard and Noise Enhancing Meteorological Conditions

| Meteorological Conditions | Meteorological Parameters |
|---|---|
| Standard | Day/evening/night: stability categories A-D with wind speed up to 0.5 m/s at 10 m AGL |
| Noise-enhancing | Day/evening: stability categories A-D with light winds (up to 3 m/s at 10 m AGL)<br>Night-time: stability categories A-D with light winds (up to 3 m/s at 10 m AGL) and/or stability category F with winds up to 2 m/s at 10m AGL |

Notes: m/s = metres per second, m = metres, AGL = above ground level

Where a range of conditions is nominated, the meteorological condition delivering the highest predicted noise level should be adopted for assessment purposes. However, feasible and reasonable noise limits in consents and licences derived from this process would apply under the full range of meteorological conditions nominated under standard or noise-enhancing conditions as relevant. All wind speeds are referenced to 10m AGL. Stability categories are based on the Pasquill-Gifford stability classification scheme.

The adopted NPfI standard and noise enhancing meteorological conditions are further defined for noise modelling purposes in **Table 9**.

**Table 9 Meteorological Parameters Considered for Noise Predictions**

| Period | Meteorological Conditions | Air Temperature (°C) | Relative Humidity (%) | Wind Speed (m/s) (Source to receiver) | Stability Category |
|---|---|---|---|---|---|
| All | Standard | 10 | 80 | 0 | D Class |
| | Noise enhancing | 10 | 80 | 2 | F Class |

# 6 Project Specific Noise Criteria

## 6.1 Operational Noise Criteria

The PNTLs for the project have been established with reference to the NPfI outlined in **Section 4.1.2** of this report and ambient noise levels shown in **Section 5.1**.

The resulting PNTL for the nearest noise sensitive receivers to the project are contained within **Table 10**.

**Table 10 Operational Project Noise Trigger Levels**

| Monitoring Location (Representative Receivers) | Area Type | Period | Recommended Amenity Noise Level $L_{Aeq(period)}$ | Measured Noise Level (dBA) | | Project Noise Trigger Levels dBA $L_{Aeq(15minute)}$ | |
|---|---|---|---|---|---|---|---|
| | | | | RBL[1] | $L_{Aeq(period)}$ | Intrusiveness | Amenity[2,3] |
| M1 (R09) | Suburban | Day | 55 | 50 | 59 | 55 | **53** |
| | | Evening | 45 | 50 | 58[6] | 55 | **46** |
| | | Night | 40 | 35 | 55[6] | **40** | 43 |
| M2 (R05, R07, R08 R10, R11, R12, R14) | Suburban | Day | 55 | 35 (33 actual)[4] | 51 | **40** | 53 |
| | | Evening | 45 | 33 | 48 | **38** | 43 |
| | | Night | 40 | 30 | 45 | **35** | 38 |
| M3 (R01, R02, R03, R04) | Rural | Day | 50 | 36 | 47 | **41** | 48 |
| | | Evening | 45 | 36 (38 actual)[5] | 46 | **41** | 43 |
| | | Night | 40 | 35 | 45 | 40 | **38** |
| M4 (R06, R13) | Rural | Day | 50 | 41 | 51 | **46** | 48 |
| | | Evening | 45 | 41 | 51 | 46 | **43** |
| | | Night | 40 | 41 (42 actual)[5] | 51 | 46 | **38** |
| Industrial receivers (I01, I02, I03[7], I04[7] I05) | - | When in use | 70 | N/A | N/A | N/A | **68** |

1. RBL = Rating Background Level

2. The recommended amenity noise levels have been reduced by 5 dB to give the project amenity noise levels due to other sources of industrial noise being present in the area, as outlined in the NPfI.
3. The project amenity noise levels have been converted to a 15 minute level by adding 3 dB, as outlined in the NPfI.
4. The NPfI minimum RBL value has been used due to the measured RBL being lower than the minimum value.
5. RBL reduced to match the daytime/evening RBL, as outlined in the NPfI.
6. The measured LAeq noise level was dominated by existing road traffic noise and exceeds the recommended amenity noise level by 10 dB or more, therefore, the 'high traffic project amenity noise level' is the existing LAeq(traffic) noise level minus 15 dB, as outlined in the NPfI.
7. An area defined as an industrial zone on a local environment plan; for isolated residences within an industrial zone the industrial amenity level would usually apply. (NPfI Table 2.2 notes)

# 7 Noise Impact Assessment

A computer noise model was used to predict operational noise emissions from the project. The operational noise modelling was undertaken using the CONCAWE algorithms within SoundPLAN v8.2 software. The CONCAWE noise prediction algorithms as implemented within the SoundPLAN software are commonly used and accepted by the EPA and DPE for the assessment of industrial noise in NSW. Furthermore the meteorological category used within the CONCAWE algorithm is assessed in accordance with Pasquill and Turner Stability Categories and aligns with the 'standard' and 'noise enhancing' NPfI meteorological conditions. The six meteorological categories used within the CONCAWE algorithm based on Pasquil Stability Category and vector wind speeds are shown in **Table 11**.

**Table 11 CONCAWE Meteorological Category**

| Meteorological Category | Pasquill Stability Category | | |
|---|---|---|---|
| | A, B | C, D, E | F, G |
| 1 | V[1]< -3.0 | - | - |
| 2 | -3.0 < V < -0.5 | V < - 3.0 | - |
| 3 | -0.5 < V < +0.5 | -3.0 < V < -0.5 | V < -3.0 |
| 4 | +0.5 < V < +3 | -0.5 < V < 0.5 | -3.0 < V < -0.5 |
| 5 | V > 3 | 0.5 < V < +3 | -0.5 < V < +0.5 |
| 6 | - | V> +3 | +0.5 < V < +3 |

Note 1: V = wind speed in m/s with a negative value meaning wind from receiver to source and a positive value meaning wind from the source to receiver.

A three-dimensional digital terrain map including topographic information was used in the modelling process, together with noise source data and shielding by barriers and/or adjacent buildings to predict noise levels at the nearest potentially affected receivers.

## 7.1 Operational Noise Assessment

### 7.1.1 Acoustically Significant Sources and Operational Scenario

Sound power levels of acoustically significant plant and equipment proposed for use on the asphalt plant have been obtained from an SLR database of similar equipment.

Other assumptions incorporated into the noise model include the following:

- All acoustically significant plant and equipment operate simultaneously over a 15 minute period.

- 7 trucks per 15 minute period (28 per hour) entering and transferring material at the site. Trucks have been modelled as travelling at 10 km/h along internal access routes.
- Heavy vehicle movements through the site were modelled on two paths. The first path as entering the site from the site entry on Tooheys Rd, following the internal access routes around the western side of the site, approaching the Hot Storage Bins and finally proceeding along the access route to the exit. The second path enters the site similarly before turning into the RAP Storage yard before proceeding along access routes to exit the site. The trucks volumes modelled on site were split evenly between these paths.

The model assumes the sound power levels and plant and equipment in operation as summarised in the **Table 12**. A tick (✓) indicates that the equipment is in operation during the relevant period. A cross (×) indicates that the equipment is not in operation during the relevant period. Where there is a number in brackets following a tick, this represents the number of items of the equipment that has been considered in the noise model during the relevant period.

### Table 12 Operational Scenario

| Plant and Equipment | Sound Power Level $L_{Aeq}$ | All Times |
|---|---|---|
| Asphalt Plant | 110 | ✓ |
| Asphalt Plant Upgrade (additional bins) | 106 | ✓ |
| RAP Crusher | 114 | ✓ |
| Truck Loading at Asphalt Plant | 106 | ✓ |
| Generator | 95 | ✓ |
| Truck manoeuvring onsite (driving to asphalt plant and RAP storage) | 102 | ✓(7) |
| Front End Loader | 105 | ✓(3) |
| Grinder | 104 | ✓ |
| Water Tanker | 102 | ✓ |

## 7.2 Predicted Operational Noise Levels

Noise emission levels were predicted from the proposed development for the operational scenario detailed in **Table 12**. Predicted noise levels at the nearest noise sensitive receivers and industrial receiver locations are provided in **Table 13**.

### Table 13 Predicted Noise Levels

| Receiver | Predicted Noise Level dBA | | PNTL $L_{Aeq(15minute)}$ dBA | | |
|---|---|---|---|---|---|
| | Standard Weather Condition | Noise Enhancing Weather Condition | Day | Evening | Night |
| R01 | 29 | 34 | 41 | 41 | 38 |
| R02 | 28 | 33 | 41 | 41 | 38 |
| R03 | 27 | 32 | 41 | 41 | 38 |
| R04 | 26 | 31 | 41 | 41 | 38 |
| R05 | 23 | 28 | 40 | 38 | 35 |
| R06 | 24 | 29 | 46 | 43 | 38 |
| R07 | 25 | 30 | 40 | 38 | 35 |
| R08 | 29 | 34 | 40 | 38 | 35 |
| R09 | 30 | 35 | 53 | 46 | 40 |
| R10 | 28 | 34 | 40 | 38 | 35 |
| R11 | 30 | 35 | 40 | 38 | 35 |
| R12 | 25 | 31 | 40 | 38 | 35 |
| R14 | 28 | 33 | 40 | 38 | 35 |
| R13 | 28 | 33 | 46 | 43 | 38 |
| I01 | 40 | 44 | 68 when in use | | |
| I02 | 32 | 37 | 68 when in use | | |
| I03 | 36 | 41 | 68 when in use | | |
| I04 | 32 | 37 | 68 when in use | | |
| I05 | 29 | 35 | 68 when in use | | |

It can be seen in **Table 13** that noise predictions indicate that noise emissions from the project would comply with PNTLs at all residential and industrial receivers. Outer envelope $L_{Aeq(15minute)}$ noise emission levels under noise-enhancing meteorological conditions are provided in **Appendix B**.

It should be noted that the noise model conservatively assumes that all plant and equipment would be operating simultaneously for a 15 minute period. As such noise levels are likely to be lower than those shown in **Table 13**. Notwithstanding, it is recommended best practice noise mitigation and management strategies at the project be implemented such as:

- An awareness and understanding of noise issues and the use of quiet work practices will be included in Site inductions for all staff, contractors and visitors to the Site. Specific mention of the following items will be included:
  - Site specific noise management measures to be followed.
  - Locations of nearby noise sensitive receivers.

- The simultaneous use of multiple items of significant noise generating equipment will be avoided wherever possible, scheduling operations so they are used separately rather than concurrently.
- The noisiest activities will be scheduled to the least noise sensitive times of the day (i.e. not during the night-time period) where practicable.
- All machinery and plant will be maintained and operated in a proper and efficient manner to minimise noise generation.
- Switch off plant and equipment when not in use and avoid excessive idling.
- Maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not operational until fully repaired.

## 7.3 Modifying Factor Corrections Assessment

A low frequency noise analysis was conducted at the nearest most potentially affected residential receiver (R01). The analysis comprised a comparison of the predicted intrusive $L_{Ceq(15minute)}$ noise level against the corresponding intrusive $L_{Aeq(15minute)}$ noise level under noise enhancing conditions. The resulting C and A weighted predicted intrusive noise level difference did not exceed 15 dB and as such no modifying factor correction for low-frequency noise is triggered for the project. Furthermore, noise sources at the project are not predicted to generate tonal or intermittent noise characteristics and no modifying factor for annoying characteristics is applicable.

## 7.4 Sleep Disturbance

In assessing sleep disturbance, typical $L_{Amax}$ noise levels of acoustically significant plant and equipment to be used during the night-time operations were used as input to the computer model and are presented in **Table 14**.

**Table 14 $L_{Amax}$ SWLs**

| Plant and Equipment | Data Source | Typical SWL $L_{Amax}$ |
|---|---|---|
| Asphalt Plant | SLR Database | 113 dBA |
| Crusher | SLR Database | 116 dBA |
| Truck (clunk etc) | SLR Database | 120 dBA |
| Front End Loader | SLR Database | 120 dBA |

The predicted highest $L_{Amax}$ noise levels for every receiver at the nearest residential receivers are compared against the sleep disturbance noise level are shown in **Table 15**.

**Table 15 Predicted Sleep Disturbance Noise Levels**

| Receiver | Predicted Noise Level dBA | | | | Sleep Disturbance Noise Trigger Level dBA | |
|---|---|---|---|---|---|---|
| | Standard Weather Conditions | | Noise Enhancing Weather Conditions | | | |
| | $L_{Aeq(15minute)}$ | $L_{Amax}$ | $L_{Aeq(15minute)}$ | $L_{Amax}$ | $L_{Aeq(15minute)}$ | $L_{Amax}$ |
| R01 | 31 | 37 | 36 | 42 | 40 | 52 |
| R02 | 28 | 34 | 33 | 39 | 40 | 52 |

| Receiver | Predicted Noise Level dBA | | | | Sleep Disturbance Noise Trigger Level dBA | |
|---|---|---|---|---|---|---|
| | Standard Weather Conditions | | Noise Enhancing Weather Conditions | | | |
| | $L_{Aeq(15minute)}$ | $L_{Amax}$ | $L_{Aeq(15minute)}$ | $L_{Amax}$ | $L_{Aeq(15minute)}$ | $L_{Amax}$ |
| R03 | 27 | 33 | 32 | 38 | 40 | 52 |
| R04 | 26 | 32 | 31 | 37 | 40 | 52 |
| R05 | 23 | 30 | 28 | 36 | 40 | 52 |
| R06 | 24 | 30 | 29 | 35 | 46 | 56 |
| R07 | 25 | 31 | 30 | 36 | 40 | 52 |
| R08 | 29 | 35 | 34 | 41 | 40 | 52 |
| R09 | 30 | 36 | 35 | 41 | 40 | 52 |
| R10 | 28 | 33 | 33 | 39 | 40 | 52 |
| R11 | 30 | 36 | 35 | 41 | 40 | 52 |
| R12 | 25 | 31 | 31 | 36 | 40 | 52 |
| R13 | 28 | 33 | 33 | 38 | 46 | 56 |
| R14 | 28 | 33 | 33 | 38 | 40 | 52 |

As shown in **Table 15** the $L_{Amax}$ noise levels are predicted to be significantly below the sleep disturbance noise trigger level and are unlikely to cause awakening reactions. Therefore, in accordance with the NPfI methodology for assessing sleep disturbance outlined in Section 4.1.2, no further assessment is required.

## 7.5 Road Traffic Noise Assessment

The criteria for Road Traffic Noise Assessments as required by the RNP are detailed in **Section 4.2.**

The project is expected to generate road traffic movements on the Sydney/Newcastle M1 Motorway and Doyalson Link Road of up to 216 movements per day consisting of 40 light vehicle movements and 176 heavy vehicle movements.

Existing traffic volumes on the Doyalson Link Road and the Sydney Newcastle Motorway in the vicinity of the project are in excess of 19,000 and 47,000 vehicles per day, respectively. The corresponding increase in road traffic noise due to additional traffic generated by the project is calculated to be less than 0.2 dB on both roads. As the predicted increase is significantly less than 2 dB, according to the RNP, this is unlikely to be discernible and would not trigger the consideration of mitigation.

## 7.6 Construction Noise

The indicative acoustically significant plant and equipment to be used during construction of the project is listed in **Table 16**. Noise levels have been obtained from an SLR database of similar plant and equipment.

**Table 16 Construction Equipment SWLs**

| Equipment | Sound Power Level dBA |
|---|---|
| Mobile Crane | 107 |

| Equipment | Sound Power Level dBA |
|---|---|
| Excavator | 105 |
| Concrete Truck | 105 |
| Graders | 105 |
| Asphalt Pavers | 104 |
| Bobcat | 104 |
| Scrapers | 103 |
| Delivery Truck | 102 |
| Ratchet Gun | 99 |
| Drill | 96 |
| Saw | 92 |

Predicted construction noise levels under noise enhancing conditions at the nearest noise sensitive receivers are shown in **Table 17**.

### Table 17 Predicted Construction Noise Levels

| Receiver ID (Type) | $L_{Aeq(15minute)}$ dBA Noise Level | Standard Hours Daytime NML – $L_{Aeq(15minute)}$ dBA | Exceedance of NML $L_{Aeq(15minute)}$ dBA |
|---|---|---|---|
| R01 | 34 | 46 | - |
| R02 | 31 | 46 | - |
| R03 | 30 | 46 | - |
| R04 | 28 | 46 | - |
| R05 | 28 | 45 | - |
| R06 | 26 | 51 | - |
| R07 | 28 | 45 | - |
| R08 | 32 | 45 | - |
| R09 | 33 | 60 | - |
| R10 | 31 | 45 | - |
| R11 | 32 | 45 | - |
| R12 | 28 | 45 | - |
| R13 | 30 | 51 | - |
| R14 | 30 | 45 | - |
| I01 | 42 | 75 | - |
| I02 | 33 | 75 | - |
| I03 | 37 | 75 | - |
| I04 | 34 | 75 | - |
| I05 | 32 | 75 | - |

**Table 17** shows that all receivers, are below the relevant NMLs. Notwithstanding, the following recommendations are made with the aim of minimising construction noise impacts at nearby noise sensitive receivers.

- An important aspect of the mitigation of noise impacts during all construction phases will be adherence to the standard daytime construction hours:
  - Monday to Friday 7 am – 6 pm;
  - Saturday 8 am – 1 pm; and
  - No work Sundays or Public Holidays.
- Noisy plant operating simultaneously to be avoided wherever possible.
- Maintenance work on all construction plant will be carried out away from noise sensitive areas and confined to standard daytime construction hours, where practicable.
- Site noisy equipment behind structures that act as barriers or at the greatest distance from the noise-sensitive area or orient the equipment so that noise emissions are directed away from any sensitive areas.
- Keep equipment well maintained.
- Employ "quiet" practices when operating equipment (e.g. positioning and unloading of trucks in appropriate areas).

### 7.6.1 Construction Traffic Impact

The construction of the expansion of the asphalt plant is expected to generate significantly less traffic than when operations resume. As the impact of traffic from operations, assessed in **Section 7.5**, is expected to be negligible it follows that the increase in road traffic noise due to construction on the surrounding road network is expected to be similarly negligible.

## 7.7 Vibration Impact Assessment

The effects of vibration can be divided into three categories:

- Those in which the occupants of buildings are disturbed (**human comfort**). People can sometimes perceive vibration impacts when vibration generating works are located close to occupied buildings. Vibration from earthworks tends to be intermittent in nature and the EPA's *Assessing Vibration: a technical guideline* (2006) provides criteria for intermittent vibration based on the Vibration Dose Value (VDV), as shown in **Table 18**. While the operational activities of the project are generally not expected to result in continuous or impulsive vibration impacts, criteria are provided in **Table 19**.
- Those where building contents may be affected (**building contents**). People perceive vibration at levels well below those likely to cause damage to building contents. For most receivers, the human comfort vibration criteria are the most stringent and it is generally not necessary to set separate criteria for vibration effects on typical building contents. Exceptions to this can occur when vibration sensitive equipment, such as electron microscopes or medical imaging equipment, are in buildings near to construction works. No such equipment has been identified or is likely to be used in the project area.

- Those where the integrity of the building may be compromised (**structural/cosmetic damage**). If vibration from construction works is sufficiently high it can cause cosmetic damage to elements of affected buildings. Industry standard cosmetic damage vibration limits are specified in British Standard BS 7385 and German Standard DIN 4150. The limits are shown in **Table 20**..

### Table 18 Human Comfort Vibration – Vibration Dose Values for Intermittent Vibration

| Building Type | Assessment Period | Vibration Dose Value[1] ($m/s^{1.75}$) | |
|---|---|---|---|
| | | Preferred | Maximum |
| Critical working areas (eg operating theatres or laboratories) | Day or night-time | 0.10 | 0.20 |
| Residential | Daytime | 0.20 | 0.40 |
| | Night-time | 0.13 | 0.26 |
| Offices, schools, educational institutions and places of worship | Day or night-time | 0.40 | 0.80 |
| Workshops | Day or night-time | 0.80 | 1.60 |

Note 1: The VDV accumulates vibration energy over the daytime and night-time assessment periods, and is dependent on the level of vibration as well as the duration.

### Table 19 Human Comfort Vibration – Preferred and Maximum Weighted Root Mean Square Values for Continuous and Impulsive Vibration Acceleration ($m/s^2$) 1–80 Hz

| Location | Assessment period | Preferred values | | Maximum values | |
|---|---|---|---|---|---|
| | | z-axis | x- and y-axis | z-axis | x- and y-axis |
| **Continuous vibration** | | | | | |
| Critical working areas[1] | Day or night-time | 0.0050 | 0.0036 | 0.010 | 0.0072 |
| Residential | Daytime | 0.010 | 0.0071 | 0.020 | 0.014 |
| | Night-time | 0.007 | 0.005 | 0.014 | 0.010 |
| Offices, schools, educational institutions and places of worship | Day or night-time | 0.020 | 0.014 | 0.040 | 0.028 |
| Workshops | Day or night-time | 0.04 | 0.029 | 0.080 | 0.058 |
| **Impulsive vibration** | | | | | |
| Critical working areas[1] | Day or night-time | 0.0050 | 0.0036 | 0.010 | 0.0072 |
| Residential | Daytime | 0.30 | 0.21 | 0.60 | 0.42 |
| | Night-time | 0.10 | 0.071 | 0.20 | 0.14 |
| Offices, schools, educational institutions and places of worship | Day or night-time | 0.64 | 0.46 | 1.28 | 0.92 |
| Workshops | Day or night-time | 0.64 | 0.46 | 1.28 | 0.92 |

Note 1: Such as operating theatres or precision laboratories where sensitive operations are occurring. No such areas have been identified in the study area.

**Table 20 Cosmetic Damage – BS 7385 Transient Vibration Values for Minimal Risk of Damage**

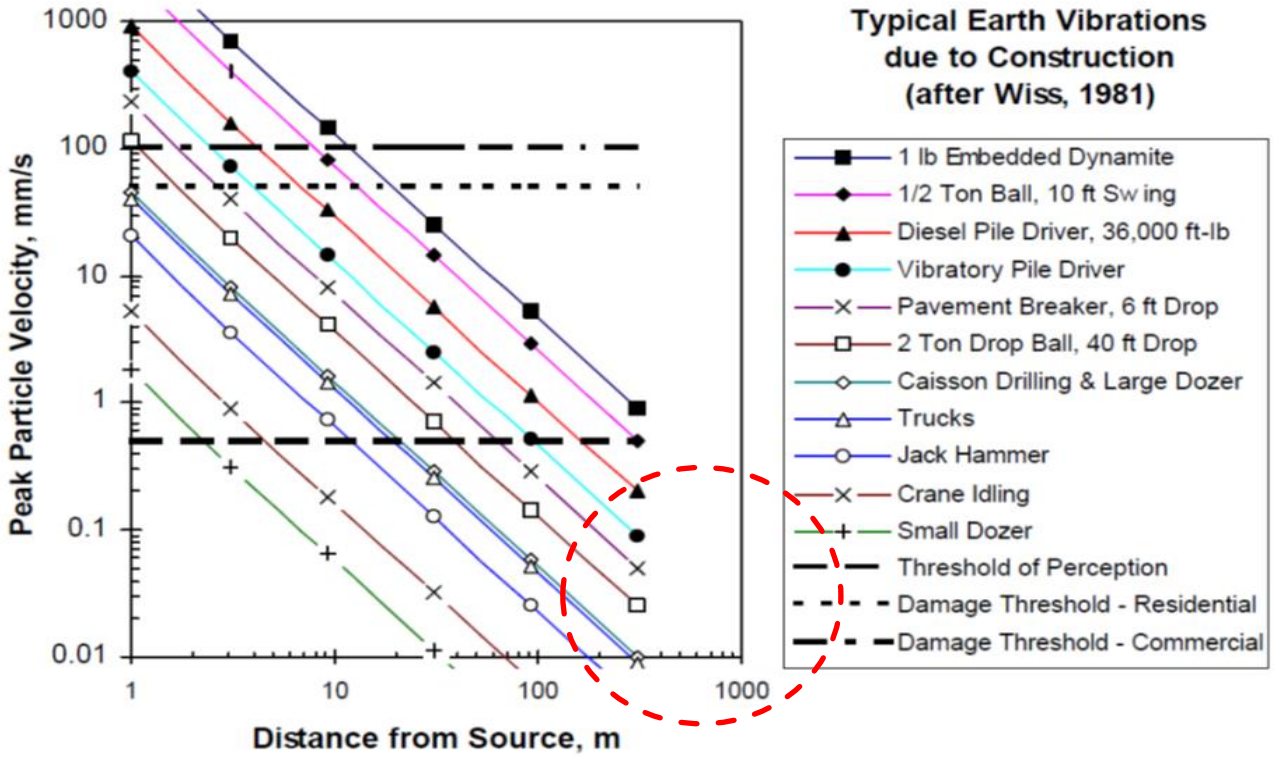
| Group | Type of Building | Peak Component Particle Velocity in Frequency Range of Predominant Pulse | |
|---|---|---|---|
| | | 4 Hz to 15 Hz | 15 Hz and Above |
| 1 | Reinforced or framed structures. Industrial and heavy commercial buildings | 50 mm/s at 4 Hz and above | |
| 2 | Unreinforced or light framed structures. Residential or light commercial type buildings | 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz | 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above |

Note 1: Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values may need to be reduced by up to 50%.

The main vibration generating equipment to be used at the site will include trucks, a crane, an excavator, front end loaders, a bobcat and crushers during operation and construction of the project.

The amplitude of vibrations from equipment diminishes with distance from the source. This attenuation of vibration is due to both geometrical spreading and dissipation of energy within the ground. *Construction Vibrations and Their Impact on Vibration-Sensitive Facilities* (Amick & Gendreau, ASCE, 2000) provides a model of vibration as a function of distance as developed by Wiss (1981) and shown in **Figure 3**.

**Figure 3 Construction Vibrations as a Function of Distance, after Wiss (1981)**



The nearest structure to the project is separated by a distance of approximately 720 m from the project boundary. Given the type of vibration generating equipment to be used at the site, vibration levels from the project are predicted to be below the criteria for "minimal risk of cosmetic building damage" at the nearest structures. The red circle in **Figure 3** indicates the likely Peak Particle Velocity values at the nearest structures that are expected from the proposed plant and equipment.

In summary, vibration is readily expected to meet the identified project criteria cosmetic building damage and is likely to be largely imperceptible at neighbouring industrial facilities and would not exceed the human comfort criterion.

Furthermore, given the nearest residential receivers are located more than 1 km from the project, vibration levels are predicted to be significantly below any damage risk criterion and would not be perceptible.

# 8 Conclusion

SLR has conducted a NVIA for the proposed upgrade to the Bushells Ridge Asphalt Plant located at 203 Tooheys Road Bushells Ridge NSW. The objectives for the NVIA were to assess the potential noise and vibration impacts of the project at the nearest noise sensitive receivers.

The project is expected to comply with the PNTLs at all receivers during all NPfI defined periods under both standard and noise enhancing weather conditions. Notwithstanding, best practice noise mitigation and management strategies have been recommended to be implemented with a view to minimising any potential impacts.

Predicted increases in road traffic noise on the surrounding road network from the project are significantly less than 2 dB and is unlikely to be discernible.

Construction noise levels are predicted to be below the relevant noise management levels at all receivers.

Vibration levels from construction and operation of the project are predicted to be significantly below the relevant criteria for cosmetic damage criteria, human comfort and human perception at all receivers.

# Appendix A:

## Acoustic Terminology

## 1. Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that 'noise' often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2 x $10^{-5}$ Pa.

## 2. 'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

| Sound Pressure Level (dBA) | Typical Source | Subjective Evaluation |
|---|---|---|
| 130 | Threshold of pain | Intolerable |
| 120 | Heavy rock concert | Extremely noisy |
| 110 | Grinding on steel | |
| 100 | Loud car horn at 3 m | Very noisy |
| 90 | Construction site with pneumatic hammering | |
| 80 | Kerbside of busy street | Loud |
| 70 | Loud radio or television | |
| 60 | Department store | Moderate to quiet |
| 50 | General Office | |
| 40 | Inside private office | Quiet to very quiet |
| 30 | Inside bedroom | |
| 20 | Recording studio | Almost silent |

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

## 3. Sound Power Level

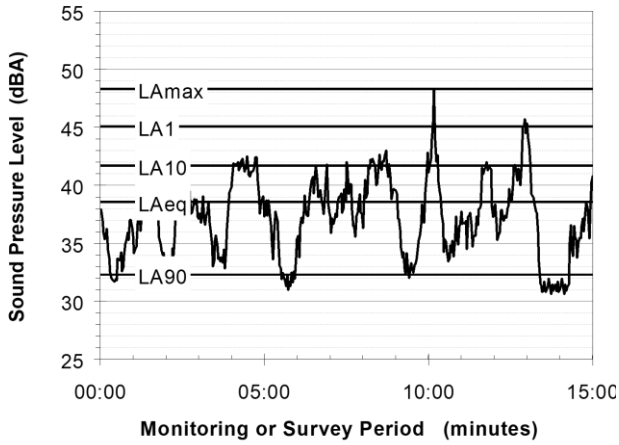
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit $10^{-12}$ W.

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

## 4. Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.




Of particular relevance, are:

LA1 The noise level exceeded for 1% of the 15 minute interval.

LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

LAeq The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

## 5. Frequency Analysis

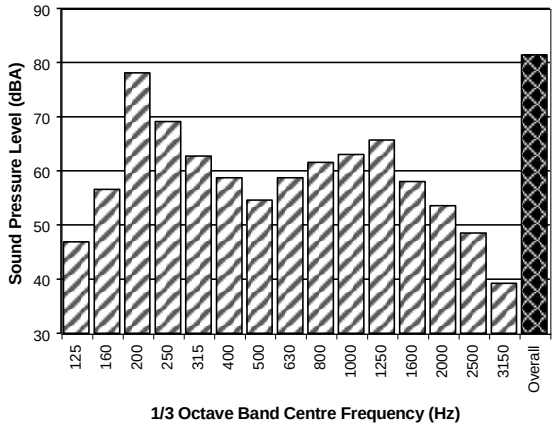
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.




## 6. Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- **Tonality** - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- **Impulsiveness** - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- **Intermittency** - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- **Low Frequency Noise** - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

## 7. Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V, expressed in mm/s can be converted to decibels by the formula 20 log (V/Vo), where Vo is the reference level ($10^{-9}$ m/s). Care is required in this regard, as other reference levels may be used.

## 8. Human Perception of Vibration

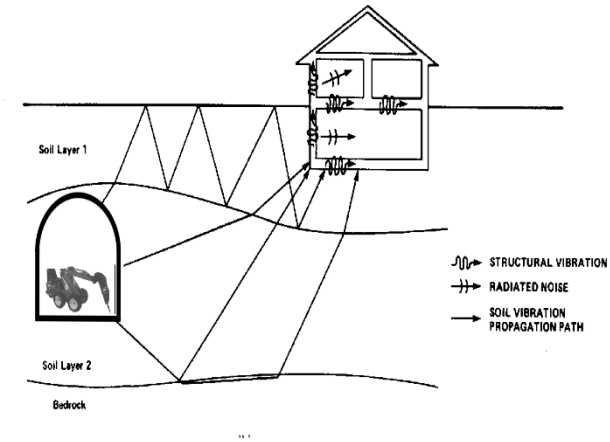
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

## 9. Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

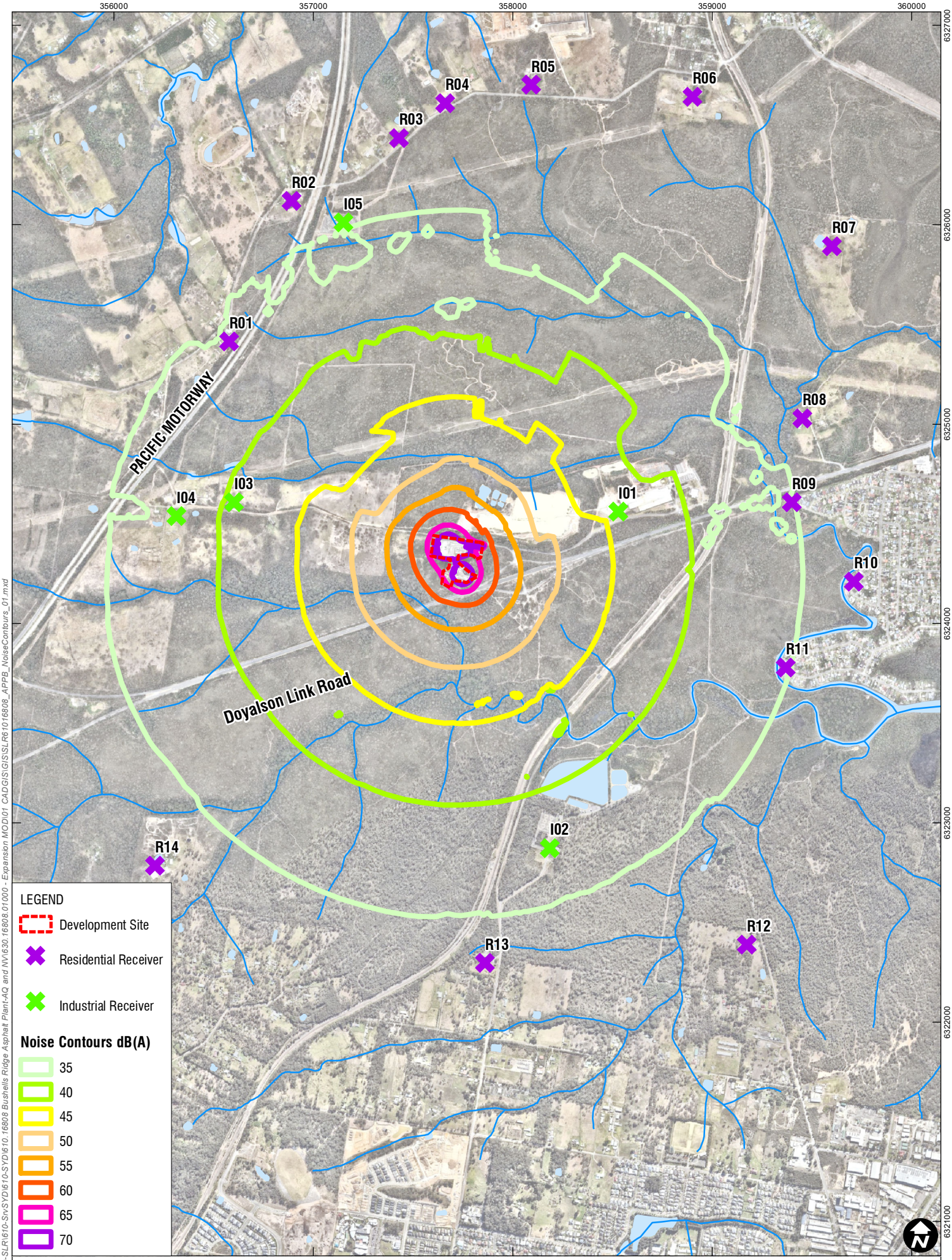
The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.




The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.

# Appendix B:

## Outer Envelope Noise Emission Contours




Scale: 1:24,000 at A4
Coordinate System: GDA2020 MGA Zone 56

Date Drawn: 2/12/2022
Project Number: 610.16808

Data Source: NearMap Aerial Photo Aug 2022

SLR

**Outer Envelope Noise Contours dB(A)**

**APPENDIX B**

\\au.slr.local\corporate\Projects-SLR\610-SrvSYD\610-SYD\610.16808 Bushells Ridge Asphalt Plant-AQ and NV\630.16808.01000 - Expansion MOD\01 CAD\GIS\GIS\SLR610.16808_APPB_NoiseContours_01.mxd

# Appendix C:

## Plant and Equipment Spectral Sound Power Levels

| Sound Power Level 1/1 Octave dBA | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | dBA |
|---|---|---|---|---|---|---|---|---|---|
| **Operational Plant and Equipment** | | | | | | | | | |
| Water Truck | 77 | 89 | 81 | 91 | 94 | 98 | 97 | 88 | 102 |
| Transfer Truck | 84 | 88 | 92 | 95 | 98 | 96 | 91 | 86 | 102 |
| Truck Loading at Asphalt Plant | 94 | 86 | 94 | 98 | 102 | 100 | 95 | 88 | 106 |
| Grinder | 72 | 81 | 86 | 93 | 98 | 95 | 95 | 100 | 104 |
| Asphalt Plant including additional bins | 65 | 86 | 94 | 102 | 109 | 106 | 102 | 86 | 112 |
| Generator | 72 | 82 | 90 | 89 | 87 | 87 | 79 | 74 | 95 |
| Crusher | 99 | 103 | 103 | 110 | 108 | 105 | 100 | 91 | 114 |
| Front End Loader | 89 | 91 | 98 | 97 | 99 | 98 | 95 | 84 | 105 |
| Trucks Export/Import | 84 | 88 | 92 | 95 | 98 | 96 | 91 | 86 | 102 |
| **Construction Plant and Equipment** | | | | | | | | | |
| Mobile Crane | 90 | 88 | 90 | 99 | 103 | 102 | 95 | 86 | 107 |
| Excavator | 87 | 95 | 97 | 100 | 100 | 97 | 87 | 79 | 105 |
| Concrete Truck | 83 | 94 | 95 | 99 | 99 | 99 | 90 | 82 | 105 |
| Graders | 82 | 97 | 94 | 97 | 99 | 100 | 96 | 86 | 105 |
| Pavers | 80 | 89 | 92 | 97 | 99 | 99 | 91 | 83 | 104 |
| Bobcat | 88 | 90 | 97 | 96 | 98 | 97 | 94 | 83 | 104 |
| Scrapers | 74 | 91 | 92 | 96 | 98 | 97 | 90 | 83 | 103 |
| Delivery Trucks | 84 | 88 | 92 | 95 | 98 | 96 | 91 | 86 | 102 |

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# APPENDIX G

## AIR QUALITY IMPACT ASSESSMENT REPORT

# AIR QUALITY IMPACT AND GREENHOUSE GAS ASSESSMENT
# BUSHELLS RIDGE ASPHALT PLANT

Element Environment Pty Ltd

27 April 2023

Job Number 22081465

Prepared by
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# Air Quality Impact and Greenhouse Gas Assessment Bushells Ridge Asphalt Plant

**DOCUMENT CONTROL**

| Report Version | Date | Prepared by | Reviewed by |
|---|---|---|---|
| DRAFT - 001 | 03/02/2023 | E Aragnou | K Trahair (CAQP) |
| DRAFT - 002 | 13/02/2023 | E Aragnou | |
| FINAL - 001 | 17/02/2023 | E Aragnou | |
| FINAL - 002 | 23/02/2023 | E Aragnou | |
| FINAL - 003 | 28/02/2023 | E Aragnou | |
| FINAL - 004 | 27/04/2023 | E Aragnou | |

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# 1 INTRODUCTION

Todoroski Air Sciences has prepared this report for Element Environment Pty Ltd on behalf of Fulton Hogan for the proposed enhanced operations of the Bushells Ridge Asphalt Plant on Lot 10 DP 834953 at 203 Tooheys Road, Bushells Ridge New South Wales (NSW) (hereafter referred to as the Project).

The existing approved operations include producing up to 100,000 tonnes per annum (tpa) of asphalt and importing and processing a maximum of 20,000tpa of reclaimed asphalt product (RAP). The Project is seeking to increase the maximum annual production rate of asphalt to 400,000tpa and RAP importation and processing to 99,000tpa, as well as improve the existing ancillary infrastructure at the site.

The report presents an assessment of potential air quality impacts and greenhouse gas emissions associated with the Project. This air quality impact assessment has been prepared in general accordance with the New South Wales (NSW) Environment Protection Authority (EPA) document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2022a**).

To assess the potential air quality impacts associated with the Project, this report comprises:

- A background to the Project and description of the proposed operations;
- A review of the existing meteorological and air quality environment surrounding the site;
- A description of the dispersion modelling approach and emission estimation used to assess potential air quality impacts;
- Presentation of the predicted results and discussion of the potential air quality impacts and associated mitigation and management measures; and,
- An assessment of the potential greenhouse gas emissions.

# 2 PROJECT SETTING

The Project site is located approximately 42.6 kilometres (km) southwest of Newcastle in the Central Coast local government area (LGA). The area surrounding the site is predominately comprised of rural agricultural land with scattered dwellings and the adjacent Lutum quarry, brick manufacturing and landscape supplies facility.

The proposed Wallarah 2 Coal Mine is located west of the site on Tooheys Road. The mine was granted consent in 2019 and will extract up to 5 million tpa of thermal coal by underground longwall methods over 28 years. A review of the mine's conceptual layout indicates that key infrastructure will be located along Tooheys Road to the west of the asphalt plant. Such infrastructure will include stockpiles, a coal conveyor system, water and gas management facilities, workshop, and offices.

**Figure 2-1** presents the location of the Project with reference to the assessment receptor locations considered in this assessment.

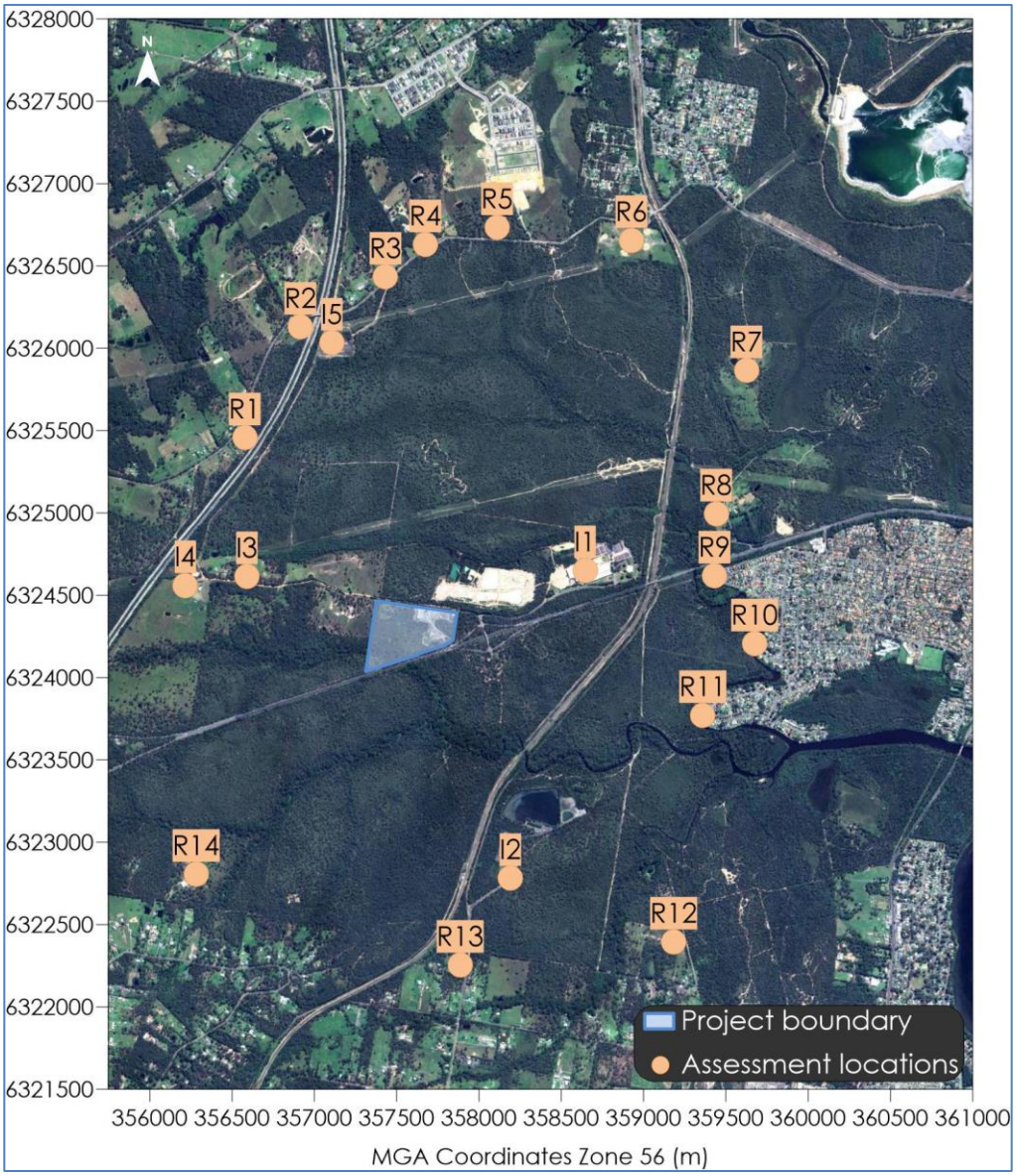


**Figure 2-1: Project setting and assessment locations**

**Table 2-1** identifies each of the assessment receptor locations.

**Table 2-1: Assessment receptor locations**

| Assessment receptor location ID | Easting (m) | Northing (m) | Description | Approximate distance from Project (km) | Address |
|---|---|---|---|---|---|
| R1 | 356577 | 6325457 | Residential | 1.7 | 245 Bushells Ridge Road Kiar |
| R2 | 356915 | 6326129 | Residential | 2.0 | 325 Bushells Ridge Road Kiar |
| R3 | 357432 | 6326433 | Residential | 2.2 | 388 Bushells Ridge Road Wyee |
| R4 | 357674 | 6326630 | Residential | 2.3 | 416 Bushells Ridge Road Wyee |
| R5 | 358110 | 6326734 | Residential | 2.5 | 450 Bushells Ridge Road Wyee |
| R6 | 358926 | 6326656 | Residential | 2.6 | 555 Bushells Ridge Road Bushells Ridge |
| R7 | 359625 | 6325865 | Residential | 2.4 | 740 Thompson Vale Road Doyalson |
| R8 | 359441 | 6324995 | Residential | 1.8 | 315 Thompson Vale Road Doyalson |
| R9 | 359431 | 6324618 | Residential | 1.7 | 11 Waterhen Close Blue Haven |
| R10 | 359675 | 6324206 | Residential | 1.9 | 40 Turner Close Blue Haven |
| R11 | 359360 | 6323771 | Residential | 1.6 | 107 Birdwood Drive Blue Haven |
| R12 | 359183 | 6322395 | Residential | 2.4 | 120 Arizona Road Charmhaven |
| R13 | 357886 | 6322254 | Residential | 2.0 | 152 Haiwatha Road Woongarrah |
| R14 | 356281 | 6322806 | Residential | 2.1 | 350A Bruce Crescent Wallarah |
| I1 | 358645 | 6324650 | Industrial | 0.7 | 288 Tooheys Road Bushells Ridge |
| I2 | 358191 | 6322781 | Industrial | 1.4 | 107-135 Mona Road Charmhaven |
| I3 | 356590 | 6324614 | Industrial | 1.3 | 106 Tooheys Road Bushells Ridge |
| I4 | 356216 | 6324560 | Industrial | 1.6 | 77 Tooheys Road Bushells Ridge |
| I5 | 357106 | 6326033 | Industrial | 1.9 | 369 Bushells Ridge Road Bushells Ridge |

**Figure 2-2** presents a pseudo three-dimensional visualisation of the topography in the general vicinity of the Project. The area surrounding the Project site can be characterised as relatively flat with elevated areas to the northwest.

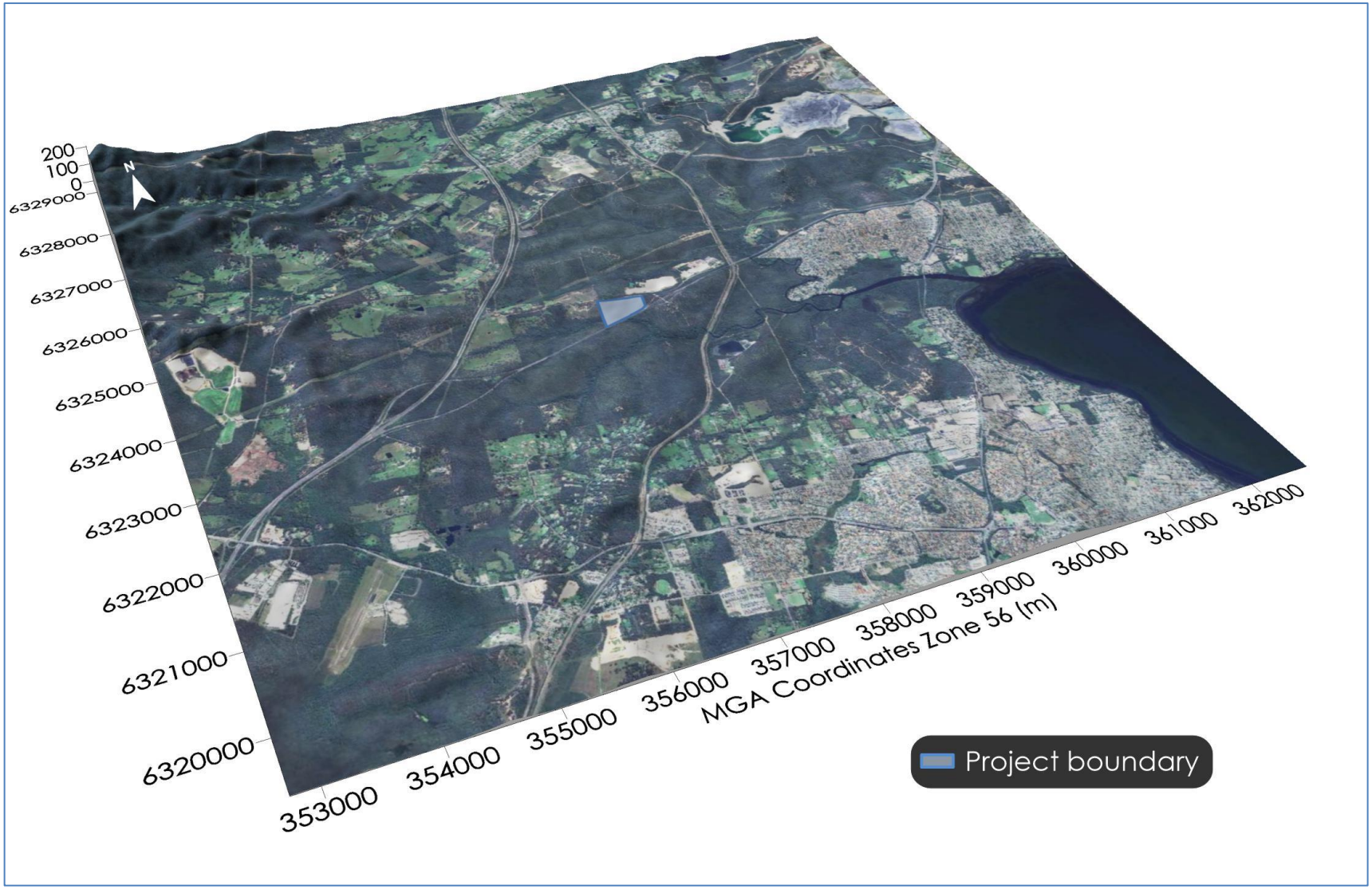


**Figure 2-2: Representative visualisation of topography in the area surrounding the Project**

# 3 PROJECT DESCRIPTION

## 3.1 Existing activities

Fulton Hogan currently operate the asphalt plant which produces up to 100,000tpa of asphalt and processes up to 20,000tpa of RAP material. Raw materials are delivered to the site via road registered trucks.

Aggregate material delivered onsite is stockpiled in covered storage bays, where it is loaded into a cold feeder by front end loaders for processing. RAP material is loaded by a front-end loader into a feeder where the material is crushed and screened and then stockpiled onsite for use in asphalt production.

Product material is loaded directly onto trucks from the plant load out point. All loads are covered prior to leaving the site and dispatch via Toohey's Road.

The site has approval to operate 24 hours a day, 7 days a week.

## 3.2 Proposed activities

The Project does not propose to change the existing development footprint, current operating hours, or processing activities.

The Project seeks to increase its annual production rate of asphalt and RAP from 100,000tpa and 20,000tpa to 400,000tpa and 99,000tpa, respectively, as well as improve the existing ancillary infrastructure at the site. **Table 3-1** presents a comparison between the existing and proposed production rates.

**Table 3-1: Existing and proposed production rates**

| Activity | Existing | Proposed |
|---|---|---|
| Asphalt production (tpa) | 100,000 | 400,000 |
| RAP production (tpa) | 20,000 | 99,000 |

An additional designated processed RAP stockpile area is proposed to be established in the northern section of the site to allow for the storage of processed RAP material, with a maximum stockpile height of 10m. Unprocessed RAP will also be processed in the existing RAP processing area in the southern portion of the site, with unprocessed RAP also stored in stockpiles up to 10m in height. An enclosed three-sided bulk material storage bunker to house the additional raw material supply is proposed to be constructed in the southern section of the site. The Project also involves:

- the relocation of the administration and laboratory building;
- the option for LPG gas as a duel fuel option for operating the asphalt plant;
- two additional load out product storage bins; and,
- other minor additions or modifications.

**Figure 3-1** presents an indicative site layout of the Project.

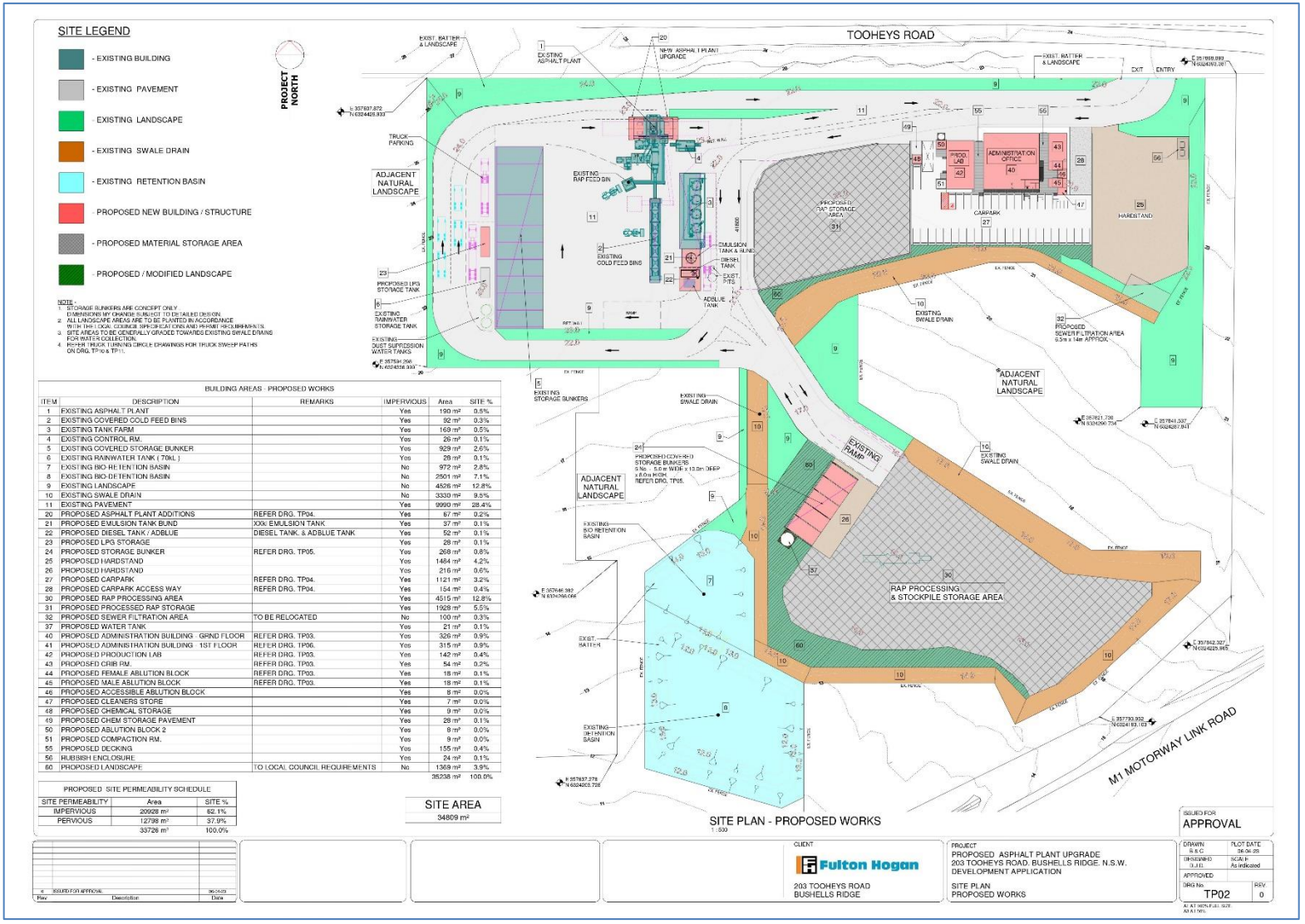


**Figure 3-1: Indicative site layout**

# 4 STUDY REQUIREMENTS

The purpose of this report is to provide an assessment of the likely effects on air quality which may arise from the Project. The assessment presented in this report addresses planning and regulatory agency requirements, as set out below.

## 4.1 Secretary's Environmental Assessment Requirements

In preparing this Air Quality Impact Assessment, the Secretary's Environmental Assessment Requirements (SEARs) 1714 issued for the Project in August 2022 have been addressed and the key matters raised for consideration in the Air Quality Impact Assessment are outlined in **Table 4-1** along with a reference to where the requirements are addressed in the report.

**Table 4-1: Secretary's Environmental Assessment Requirements (SEAR Number 1714)**

| Aspect | Requirement | Section |
|---|---|---|
| Air Quality and Odour | A description of all potential sources of air and odour emissions during construction and operation | 7.4 |
| | An air quality impact assessment in accordance with relevant Environment Protection Authority guidelines | This report |
| | A description and appraisal of air quality impact mitigation and monitoring measures. | 9 |

## 4.2 NSW EPA

This Air Quality Impact Assessment has been prepared in general accordance with the NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2022a**) and the specific requirements outlined therein as well as the SEARs requested by the NSW EPA as outlined in **Table 4-2**.

**Table 4-2: NSW EPA agency comments for air quality (SEAR Number SSD-10866203)**

| Aspect | Requirement | Section |
|---|---|---|
| The proposal | Identify all sources or potential sources of air emissions from the development.<br>*Note: emissions can be classed as either:*<br>• *point (e.g. emissions from stack or vent) or*<br>• *fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).* | 7.4 & Appendix B |
| | Provide details of the project that are essential for predicting and assessing air impacts including:<br>a) the quantities and physio-chemical parameters (e.g. concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored;<br>b) an outline of procedures for handling, transport, production and storage<br>c) the management of solid, liquid and gaseous waste streams with potential to generate emissions to air | 7.4 & Appendix B |
| The location | Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models. | 2 |
| | Describe surrounding buildings that may affect plume dispersion | 7.4 |
| | Provide and analyse site representative data on following meteorological parameters:<br>a) temperature and humidity<br>b) rainfall, evaporation and cloud cover<br>c) wind speed and direction<br>d) atmospheric stability class | 5.1, 5.2, 7.2 & Appendix A |

| Aspect | Requirement | Section |
|---|---|---|
| | e) mixing height (the height that emissions will be ultimately mixed in the atmosphere)<br>f) katabatic air drainage (if applicable)<br>g) air re-circulation. | |
| The environmental issues | Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data. This description should include the following parameters: Particulate matter (deposited dust, Total Suspected Particulates [TSP], PM10 - particulate matter with an aerodynamic diameter up to 10 micrometres, and PM2.5 -particulate matter with an aerodynamic diameter up to 2.5 micrometres), odour, and relevant gases from fuel use and other relevant activities on-site. | 5 & Appendix A |
| | • Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.<br>• Estimate the resulting ground level concentrations of all pollutants. Where necessary (eg. potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.<br>• Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.<br>• Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.<br>• For potentially odorous emissions provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.<br>*Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.*<br>• Reference should be made to Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2016); Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC, 2007); Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006); and Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC, 2006). | 6, 7.4, 8 & 10 |
| | Outline specifications of pollution control equipment (including manufacturer's performance guarantees where available) and management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes. | 9 & Appendix B |

# 5 EXISTING ENVIRONMENT

This section describes the existing environment including the climate and ambient air quality in the area surrounding the Project.

## 5.1 Local climatic conditions

Long-term climatic data from the closest Bureau of Meteorology (BoM) weather station at Norah Head AWS (Site No. 061366) were analysed to characterise the local climate in the proximity of the Project. Norah Head AWS is located approximately 12.5km southeast of the Project.

**Table 5-1** and **Figure 5-1** present a summary of data from the Norah Head AWS collected over a 15 to 28 year period for the various meteorological parameters.

The data indicate that January is the hottest month with a mean maximum temperature of 26.3 degrees Celsius (ºC) and July is the coldest month with a mean minimum temperature of 9.9ºC.

Rainfall is higher during the first half of the year, with an annual average rainfall of 1,163.9 millimetres (mm) over 97.9 days. The data indicate that June is the wettest month with an average rainfall of 150.4mm over 10 days and September is the driest month with an average rainfall of 61.5mm over 7.2 days.

Relative humidity levels exhibit limited variability over the day and seasonally. Mean 9am relative humidity ranges from 63% in August to 78% in February. Mean 3pm relative humidity levels range from 56% in August to 72% in February.

Wind speeds exhibit seasonal variations with lower wind speed records for 9am and higher observations for 3pm conditions. Mean 9am wind speeds range from 15.5 kilometres per hour (km/h) in July and August to 19.9km/h in November. Mean 3pm wind speeds range from 19.1km/h in July to 28.6km/h in November.

**Table 5-1: Monthly climate statistics summary – Norah Head AWS**

| Parameter | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Ann. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Temperature** | | | | | | | | | | | | | |
| Mean max. temp. (ºC) | 26.3 | 26.1 | 25.2 | 23.2 | 20.4 | 18.0 | 17.5 | 18.9 | 21.2 | 22.8 | 23.9 | 25.1 | 22.4 |
| Mean min. temp. (ºC) | 19.8 | 20.0 | 18.9 | 16.1 | 13.1 | 11.0 | 9.9 | 10.5 | 12.8 | 14.9 | 16.8 | 18.5 | 15.2 |
| **Rainfall** | | | | | | | | | | | | | |
| Rainfall (mm) | 80.6 | 122.8 | 136.5 | 120.9 | 124.1 | 150.4 | 90.9 | 69.2 | 61.5 | 63.9 | 94.1 | 70.4 | 1163.9 |
| No. of rain days (≥1mm) | 8.0 | 9.0 | 10.0 | 8.8 | 8.7 | 10.0 | 7.6 | 5.9 | 7.2 | 7.0 | 8.4 | 7.3 | 97.9 |
| **9am conditions** | | | | | | | | | | | | | |
| Mean temp. (ºC) | 22.3 | 22.4 | 21.1 | 19.3 | 16.2 | 13.7 | 12.8 | 14.5 | 17.2 | 19.3 | 20.0 | 21.6 | 18.4 |
| Mean R.H. (%) | 76.0 | 78.0 | 76.0 | 71.0 | 72.0 | 72.0 | 69.0 | 63.0 | 64.0 | 65.0 | 72.0 | 72.0 | 71.0 |
| Mean W.S. (km/h) | 18.5 | 18.0 | 17.8 | 16.0 | 15.8 | 16.4 | 15.5 | 15.5 | 16.1 | 18.0 | 19.9 | 18.6 | 17.2 |
| **3pm conditions** | | | | | | | | | | | | | |
| Mean temp. (ºC) | 24.0 | 24.2 | 23.3 | 21.2 | 18.9 | 16.7 | 16.1 | 17.4 | 19.0 | 20.3 | 21.5 | 23.1 | 20.5 |
| Mean R.H. (%) | 70.0 | 72.0 | 69.0 | 65.0 | 64.0 | 63.0 | 59.0 | 56.0 | 60.0 | 64.0 | 68.0 | 68.0 | 65.0 |
| Mean W.S. (km/h) | 27.5 | 26.8 | 26.0 | 24.1 | 20.8 | 19.3 | 19.1 | 21.8 | 26.0 | 27.0 | 28.6 | 28.3 | 24.6 |

Source: **Bureau of Meteorology, 2022**

R.H. – Relative Humidity, W.S. – wind speed

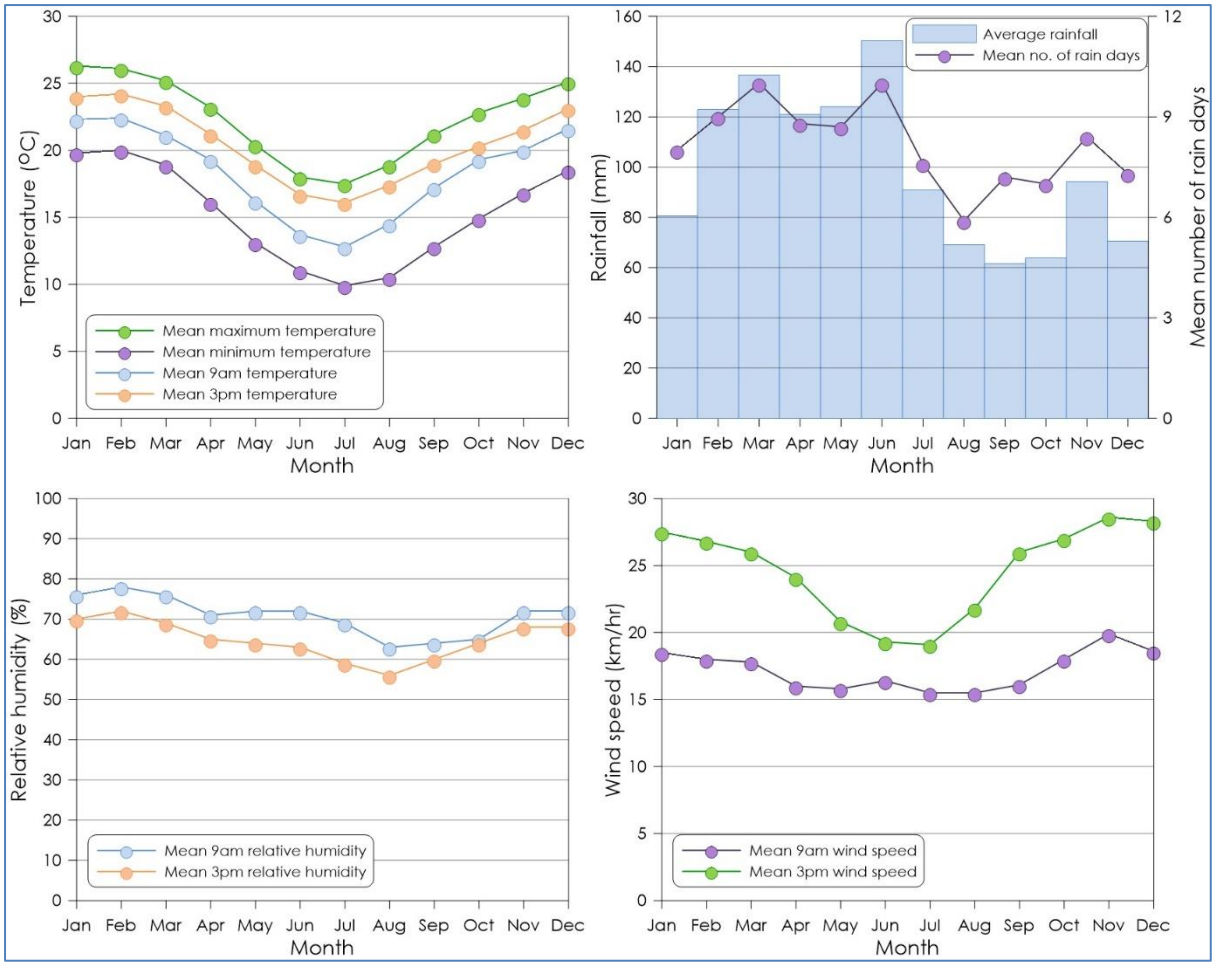


**Figure 5-1: Monthly climate statistics summary – Norah Head AWS**

## 5.2 Local meteorological conditions

Annual and seasonal windroses for the Norah Head AWS during the 2021 calendar period are presented in **Figure 5-2**.

The 2021 calendar year was selected as the meteorological year for the dispersion modelling based on an analysis of data trends in meteorological data recorded for the area as outlined in **Appendix A**.

Analysis of the annual windrose shows that the wind directions are variable with generally lower wind speeds from the southwest to north-northwest (clockwise) and generally higher wind speeds from the other directions. In summer, winds from the south and northeast are most frequent. In autumn, the highest proportion of winds originate from the west. During winter, winds are generally light and range from the southwest to the north (clockwise). The spring windrose shows a similar distribution pattern as the annual windrose.

As described in **Section 2**, the local topography of the land surrounding the Project site is generally flat and the development of katabatic winds are unlikely.

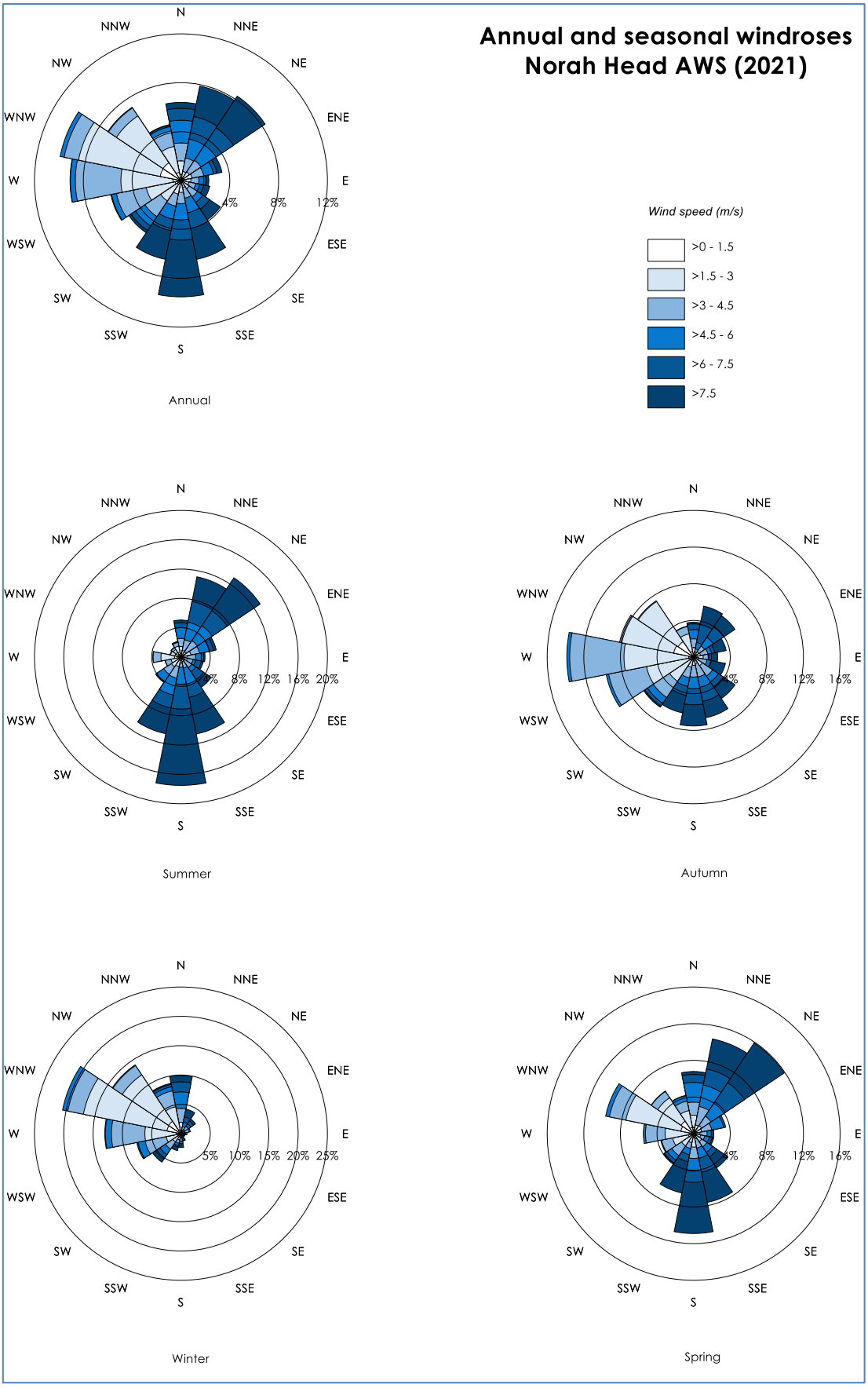


**Figure 5-2 : Annual and seasonal windroses – Norah Head AWS (2021)**

## 5.3 Local air quality monitoring

The main sources of air pollutants in the area are emissions from surrounding industrial and commercial operations and from other anthropogenic activities such as wood heaters and motor vehicle exhaust.

Ambient air quality monitoring data from the Project site are not available. Therefore, the available data from the nearest air quality monitor operated by the NSW Department of Planning and Environment (DPE) at Wyong was used to characterise the background levels for the Project site. The Wyong monitor is located approximately 8.5km southwest from the Project site.

### 5.3.1 $PM_{10}$ monitoring

A summary of the available $PM_{10}$ data for the Wyong monitoring station from 2017 to 2021 are presented in **Table 5-2**. Recorded 24-hour average $PM_{10}$ concentrations are presented in **Figure 5-3**. The 2017 to 2021 period coincides with the period analysed to determine the meteorological year for the dispersion modelling as outlined in **Appendix A**.

A review of **Table 5-2** indicates that the annual average $PM_{10}$ concentrations at the Wyong monitoring station were below the relevant criterion of 25µg/m³ for all years of the review period.

The maximum 24-hour average $PM_{10}$ concentrations were found to exceed the relevant criterion of 50µg/m³ from 2017 to 2020.

Anomalously high $PM_{10}$ concentrations recorded in November 2018, December 2019 and January 2020 in **Figure 5-3** are attributed to regional dust storm events, wildfires and the drought period (**NSW DPIE 2019 & NSW DPIE 2020**).

**Table 5-2: Summary of $PM_{10}$ levels from Wyong monitoring station (µg/m³)**

| Year | Wyong | Criterion |
|---|---|---|
| | Annual average | |
| 2017 | 16.1 | **25** |
| 2018 | 18.0 | **25** |
| 2019 | 21.1 | **25** |
| 2020 | 15.9 | **25** |
| 2021 | 13.5 | **25** |
| **Year** | **Maximum 24-hour average** | **Criterion** |
| 2017 | **63.4** | **50** |
| 2018 | **138.3** | **50** |
| 2019 | **128.4** | **50** |
| 2020 | **90.5** | **50** |
| 2021 | 44.9 | **50** |

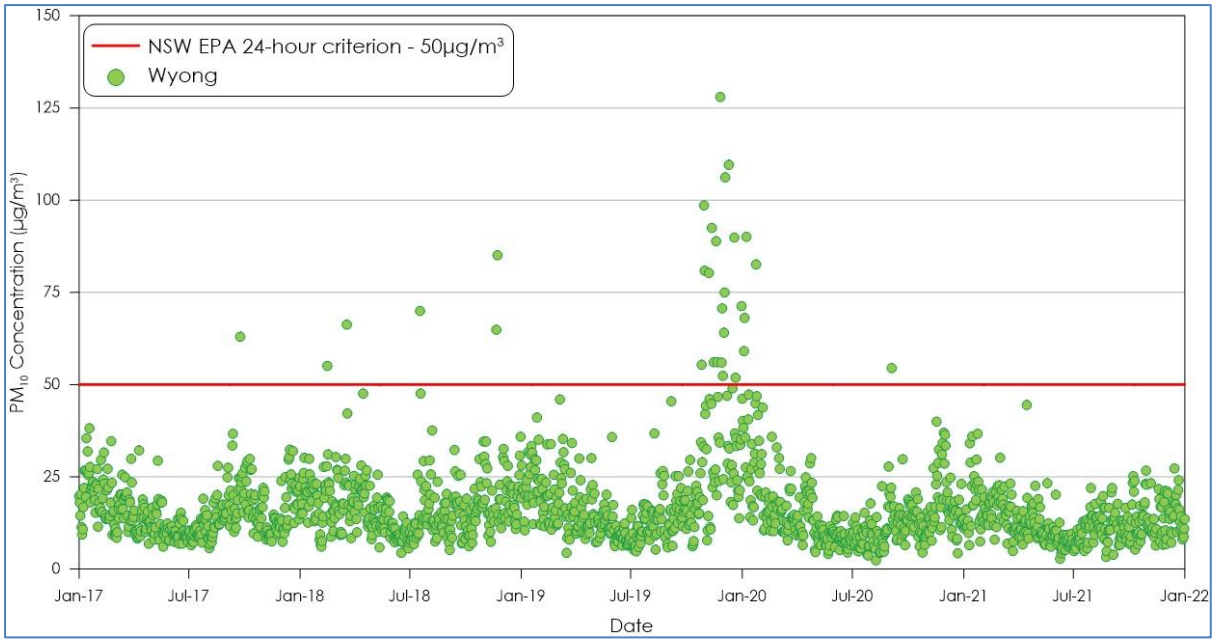


**Figure 5-3: 24-hour average $PM_{10}$ concentrations**

### 5.3.2 $PM_{2.5}$ monitoring

A summary of the available $PM_{2.5}$ data for the Wyong monitoring station from 2017 to 2021 are presented in **Table 5-3**. Recorded 24-hour average $PM_{2.5}$ concentrations are presented in **Figure 5-4**.

**Table 5-3** indicates that the annual average $PM_{2.5}$ concentrations were above the relevant criterion of 8µg/m³ during 2019.

The maximum 24-hour average $PM_{2.5}$ concentrations were found to exceed the relevant criterion of 25µg/m³ on occasion during 2017, 2019 and 2020. Similar to the $PM_{10}$ monitoring data, the mass bushfires affecting NSW in 2019 and 2020 are seen in the $PM_{2.5}$ monitoring data in **Figure 5-4**.

**Table 5-3: Summary of $PM_{2.5}$ levels from Wyong monitoring station (µg/m³)**

| Year | Wyong | Criterion |
|---|---|---|
| | Annual average | |
| 2017 | 5.8 | **8** |
| 2018 | 6.8 | **8** |
| 2019 | **10.5** | **8** |
| 2020 | 5.6 | **8** |
| 2021 | 4.7 | **8** |
| **Year** | **Maximum 24-hour average** | **Criterion** |
| 2017 | **27.2** | **25** |
| 2018 | 18.1 | **25** |
| 2019 | **202.1** | **25** |
| 2020 | **63.9** | **25** |
| 2021 | 14.8 | **25** |

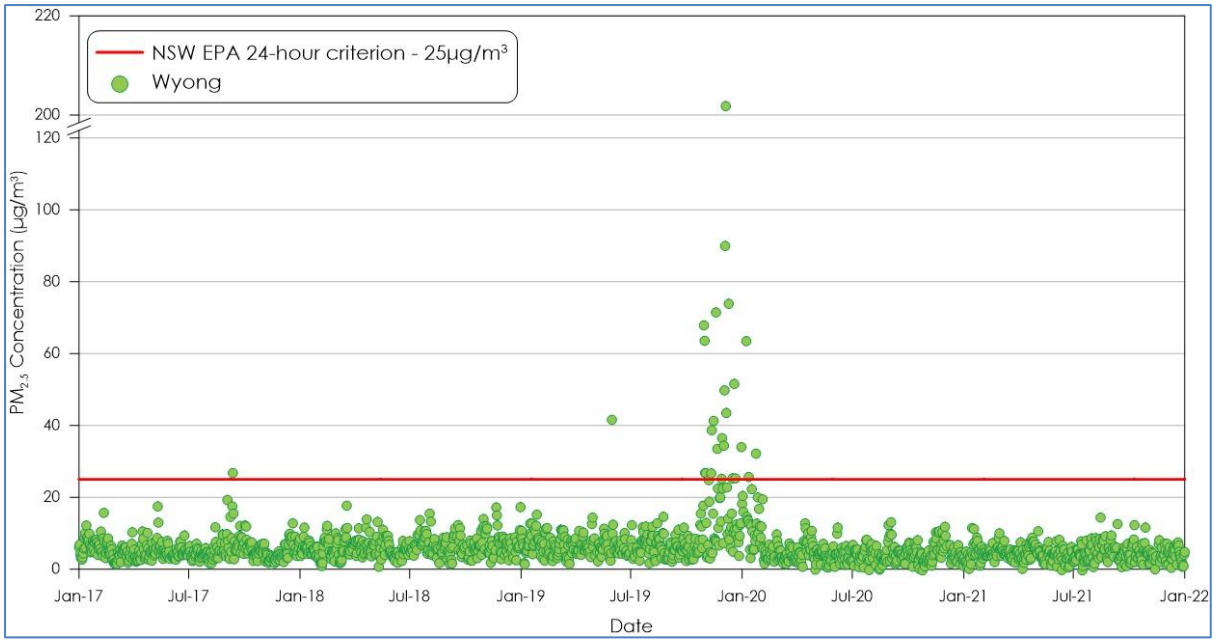


**Figure 5-4: 24-hour average $PM_{2.5}$ concentrations**

### 5.3.3 $SO_2$ monitoring

**Figure 5-5** and presents the daily maximum 1-hour average and daily 24-hour average $SO_2$ monitoring data from the Wyong monitoring site. The data show that the levels were well below the 1-hour average and 24-hour average $SO_2$ criteria of 286 µg/m$^3$ and 57µg/m$^3$, respectively.

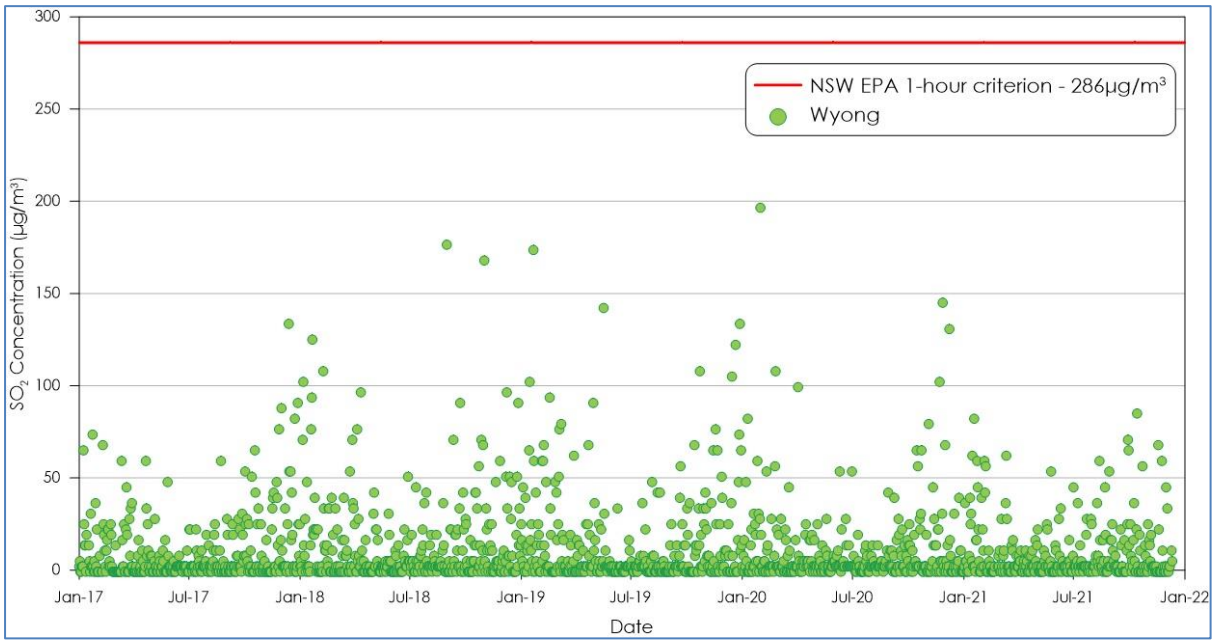


**Figure 5-5: 1-hour average $SO_2$ concentrations**

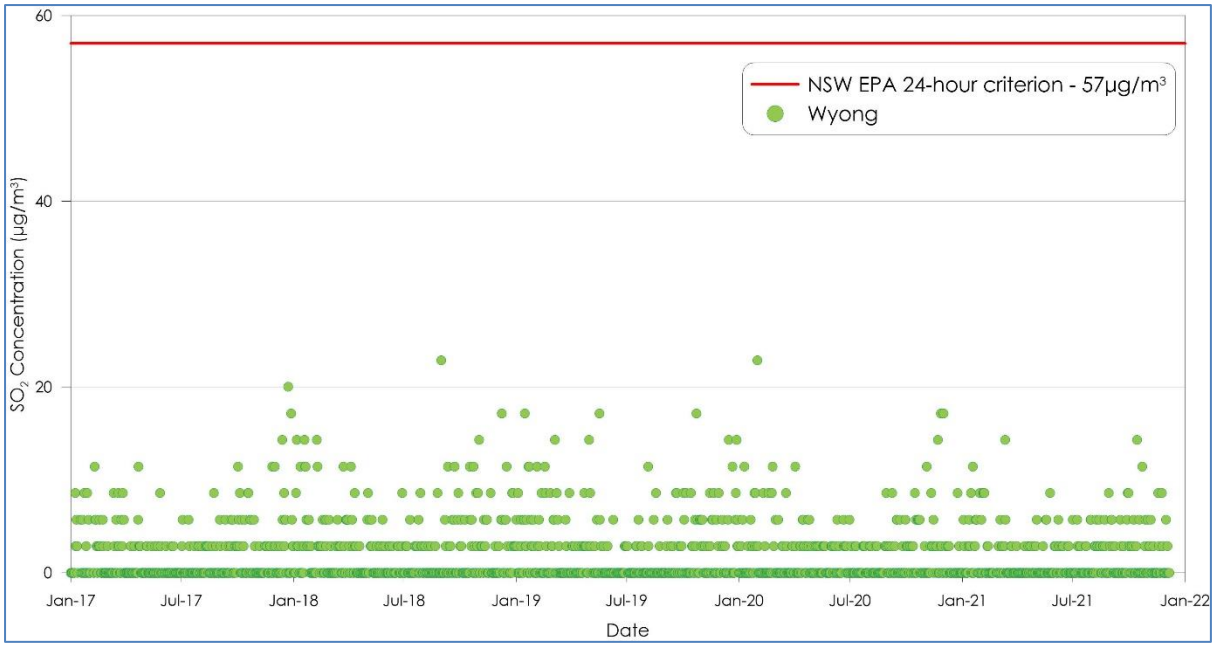


**Figure 5-6: 24-hour average $SO_2$ concentrations**

### 5.3.4 $NO_2$ monitoring

**Figure 5-7** presents the daily maximum 1-hour average $NO_2$ monitoring data from the Wyong monitoring site. The monitoring data recorded are well below the relevant criterion of 164µg/m³. A seasonal trend can be seen in the $NO_2$ monitoring data at the stations with elevated $NO_2$ levels occurring in the cooler months.

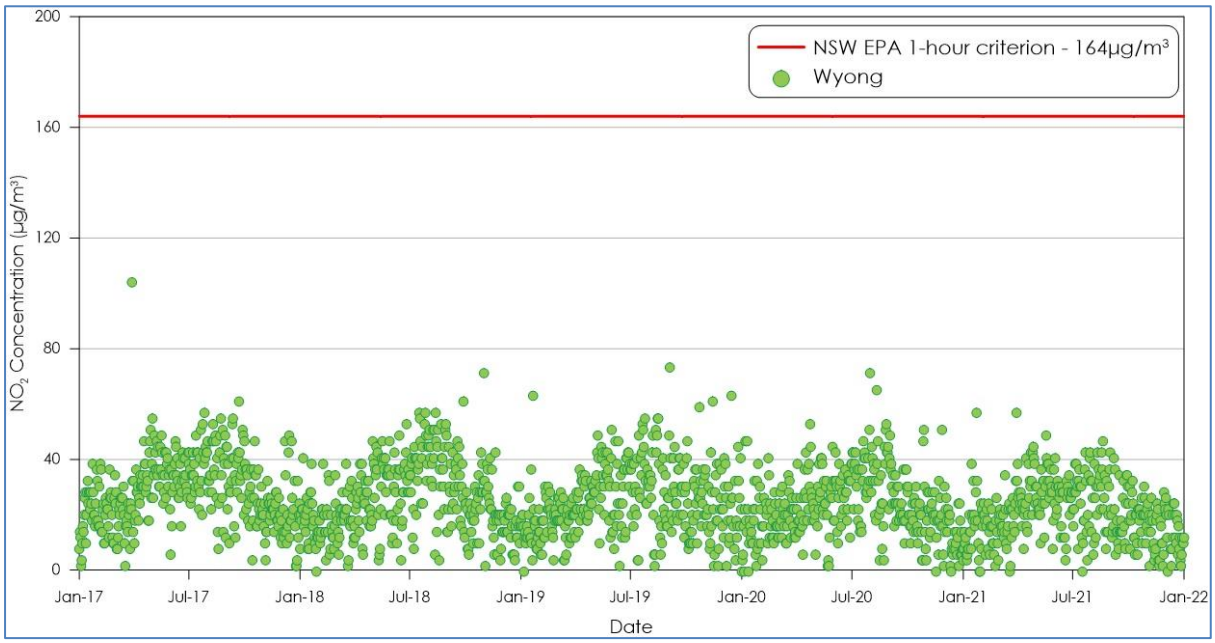


**Figure 5-7: 1-hour average $NO_2$ concentrations**

### 5.3.5 CO monitoring

**Figure 5-8** presents the available daily maximum rolling 8-hour average CO monitoring data from the nearest CO monitoring station at Wyong. The monitoring data recorded are well below the relevant criterion of 10mg/m$^3$.

The 2019 and 2020 bushfires can be seen affecting the CO concentrations at the monitor.

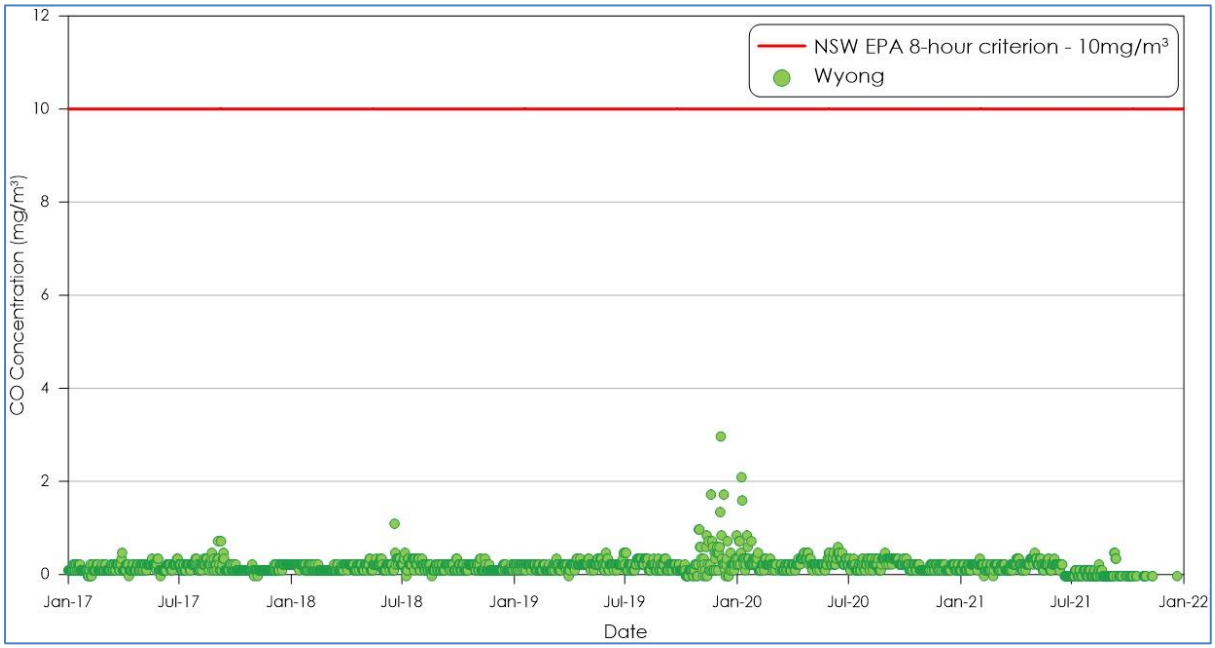


**Figure 5-8: Rolling 8-hour average CO concentrations**

### 5.3.6 Estimated background levels

As outlined above, there are no readily available site-specific monitoring data, and therefore the background air quality levels from the closest DPE monitoring station at Wyong for the 2021 calendar year were used to represent background levels for the Project. Monitoring data from 2021 was selected to quantity background levels for the Project as it corresponds to the meteorological modelling year as outlined in **Appendix A**.

In the absence of available data, estimates of the annual average background TSP and deposited dust concentrations can be determined from a relationship between $PM_{10,}$ TSP and deposited dust concentrations and the measured $PM_{10}$ levels. This relationship assumes that an annual average $PM_{10}$ concentration of 25µg/m$^3$ corresponds to an annual average TSP concentration of 90µg/m$^3$ and an annual average dust deposition value of 4g/m$^2$/month. These relationships are based on the NSW EPA air quality impact criteria as outlined in **Table 6-1**.

For the 24-hour average $PM_{10}$ and $PM_{2.5}$, the Wyong monitoring data for the contemporaneous modelling period (the 2021 calendar year) have been applied.

Applying this relationship with the measured annual average $PM_{10}$ concentration of 13.5µg/m$^3$ indicates an approximate annual average TSP concentration and deposition value of 48.5µg/m$^3$ and 2.2g/m$^2$/month, respectively.

The background air quality levels applied in this assessment are summarised in **Table 5-4**.

**Table 5-4: Summary of background levels**

| Pollutant | Background level | Units |
|---|---|---|
| Annual average TSP | 48.5 | µg/m³ |
| 24-hour average $PM_{10}$ | Daily varying | µg/m³ |
| Annual average $PM_{10}$ | 13.5 | µg/m³ |
| 24-hour average $PM_{2.5}$ | Daily varying | µg/m³ |
| Annual average $PM_{2.5}$ | 4.7 | µg/m³ |
| Annual average deposited dust | 2.2 | g/m²/month |
| Maximum 1-hour average $NO_2$ | 57.4 | µg/m³ |
| Annual average $NO_2$ | 5.9 | µg/m³ |
| Maximum 1-hour average $SO_2$ | 85.8 | µg/m³ |
| Maximum 24-hour average $SO_2$ | 14.3 | µg/m³ |
| Maximum 8-hour average CO | 742 | µg/m³ |

# 6 AIR QUALITY CRITERIA

Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to air quality. The sub-sections below identify the applicable air quality criteria and regulations.

## 6.1 Air pollutants

**Table 6-1** summarises the air quality goals that are relevant to this assessment as outlined in the NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2022a**).

The air quality goals for key pollutants relate to the total pollutant burden in the air and not just the contribution from the Project. Consideration of background pollutant levels needs to be made when using these goals to assess potential impacts.

Relevant pollutants assessed for the Project include dust emissions (i.e. TSP, $PM_{10}$, $PM_{2.5}$ and deposited dust) which would primarily arise from activities associated with the handling of aggregate and RAP, vehicle movements and wind erosion at the asphalt plant and RAP facility. The other pollutants assessed would arise from the operation of the asphalt plant and be emitted via the associated exhaust stack.

**Table 6-1: NSW EPA air quality impact assessment criteria**

| Pollutant | Averaging period | Criterion | Assessment location | Assessment percentile |
|---|---|---|---|---|
| TSP | Annual | 90 µg/m³ | Receptor | 100th |
| $PM_{10}$ | Annual | 25 µg/m³ | Receptor | 100th |
| | 24 hour | 50 µg/m³ | Receptor | 100th |
| $PM_{2.5}$ | Annual | 8 µg/m³ | Receptor | 100th |
| | 24 hour | 25 µg/m³ | Receptor | 100th |
| Deposited dust | Annual | 2 g/m²/month | Receptor | 100th |
| | | 4 g/m²/month | Receptor | 100th |
| $SO_2$ | 1 hour | 286 µg/m³ | Receptor | 100th |
| | 24 hour | 57 µg/m³ | Receptor | 100th |
| $NO_2$ | 1 hour | 164 µg/m³ | Receptor | 100th |
| | Annual | 31 µg/m³ | Receptor | 100th |
| CO | 15 minute | 100,000 µg/m³ | Receptor | 100th |
| | 1 hour | 30,000 µg/m³ | Receptor | 100th |
| | 8 hour | 10,000 µg/m³ | Receptor | 100th |
| Lead | Annual | 0.5 µg/m³ | Receptor | 100th |
| Arsenic | 1 hour | 0.09 µg/m³ | Boundary | 99.9th |
| Beryllium | 1 hour | 0.004 µg/m³ | Boundary | 99.9th |
| Cadmium | 1 hour | 0.018 µg/m³ | Boundary | 99.9th |
| Chromium (VI) | 1 hour | 0.09 µg/m³ | Boundary | 99.9th |
| Copper | 1 hour | 3.7 µg/m³ | Boundary | 99.9th |
| Manganese | 1 hour | 18 µg/m³ | Boundary | 99.9th |
| Mercury | 1 hour | 0.18 µg/m³ | Boundary | 99.9th |
| Nickel | 1 hour | 0.18 µg/m³ | Boundary | 99.9th |
| Zinc | 1 hour | 90 µg/m³ | Boundary | 99.9th |
| Acetone | 1 hour | 22,000 µg/m³ | Boundary | 99.9th |
| Acetaldehyde | 1 hour | 42 µg/m³ | Boundary | 99.9th |
| Benzene | 1 hour | 29 µg/m³ | Boundary | 99.9th |
| Formaldehyde | 1 hour | 20 µg/m³ | Boundary | 99.9th |
| Toluene | 1 hour | 360 µg/m³ | Boundary | 99.9th |
| Xylene | 1 hour | 190 µg/m³ | Boundary | 99.9th |
| PAH (total) | 1 hour | 0.4 µg/m³ | Boundary | 99.9th |

Source: **NSW EPA, 2022a**

µg/m³ = micrograms per cubic metre

g/m²/month = grams per square metre per month

## 6.2 Odour

### 6.2.1 Introduction

Odour in a regulatory context needs to be considered in two similar, but different ways depending on the situation.

NSW legislation (NSW *Protection of the Environment Operations Act 1997)* prohibits emissions that cause offensive odour to occur at any off-site receptor. Offensive odour is evaluated in the field by authorised officers, who are obliged to consider the odour in the context of its receiving environment, frequency, duration, character and so on and to determine whether the odour would interfere with the comfort and repose of the normal person unreasonably. In this context, the concept of offensive odour is applied to operational facilities and relates to actual emissions in the air.

However, in the approval and planning process for proposed new operations or modifications to existing projects, no actual odour exists, and it is necessary to consider hypothetical odour. In this context, odour concentrations are used and are defined in odour units. The number of odour units represents the number of times that the odour would need to be diluted to reach a level that is just detectable to the human nose. Thus, by definition, odour less than one odour unit (1 OU), would not be detectable to most people.

The range of a person's ability to detect odour varies greatly in the population, as does their sensitivity to the type of odour. The wide-ranging response in how any particular odour is perceived by any individual poses specific challenges in the assessment of odour impacts and the application of specific air quality goals related to odour. The T*echnical framework – Assessment and management of odour from stationary sources in NSW* (**NSW DEC, 2006**) sets out a framework specifically to deal with such issues.

It needs to be noted that the term odour refers to complex mixtures of odours, and not "pure" odour arising from a single chemical. Odour from a single, known chemical very rarely occurs (when it does, it is best to consider that specific chemical in terms of its concentration in the air). In most situations odour will be comprised of a cocktail of many substances which is referred to as a complex mixture of odour, or more simply odour.

For activities with potential to release significant odour it may be necessary to predict the likely odour impact that may arise. This is done by using air dispersion modelling which can calculate the level of dilution of odours emitted from the source at the point to where odour reaches surrounding receptors. This approach allows the air dispersion model to produce results in terms of odour units.

The NSW criteria for acceptable levels of odour range from 2 to 7 OU, with the more stringent 2 OU criteria applicable to densely populated urban areas and the 7 OU criteria applicable to sparsely populated rural areas, as outlined below.

### 6.2.2 Complex Mixtures of Odorous Air Pollutants

**Table 6-2** presents the assessment criteria as outlined in the NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (**NSW EPA, 2022a**). This criterion has been refined to take into account population densities of specific areas and is based on a 99$^{th}$ percentile of dispersion model predictions calculated as 1-second averages (nose-response time).

**Table 6-2: Impact assessment criteria for complex mixtures of odorous air pollutants (nose-response-time average, 99th percentile)**

| Population of affected community | Impact assessment criteria for complex mixtures of odorous air pollutants (OU) |
|---|---|
| Urban (≥~2000) and/or schools and hospitals | 2.0 |
| ~500 | 3.0 |
| ~125 | 4.0 |
| ~30 | 5.0 |
| ~10 | 6.0 |
| Single rural residence (≤~2) | 7.0 |

Source: NSW EPA, 2022a

The NSW odour goals are based on the risk of odour impact within the general population of a given area. In sparsely populated areas the criteria assume there is a lower risk that some individuals within the community would find the odour unacceptable, hence higher criteria apply. For the purpose of this assessment, the most stringent odour criterion of 2 OU has adopted to assess against potential odour impacts due to the operation of the Project.

### 6.2.3 Peak-to-mean factors

Peak-to-mean factors are applied to account for any odour fluctuation above and below the mean odour level of the 1-hour averaging time. The criteria in **Table 6-3** are compared with modelled results that include peaking factors to account for the time-averaging limitations of air dispersion models. The peak-to-mean factors developed by **Katestone Scientific Pty Ltd (1995, 1998)** for NSW EPA are applied to convert the modelled (1-hour) averaging time to 1-second peak concentrations which are appropriate.

A summary of the NSW EPA peak-to-mean values is provided in **Table 6-3**.

**Table 6-3: Peak-to-mean values**

| Source Type | Pasquill-Gifford stability class | Near field P/M 60* | Far field P/M 60* |
|---|---|---|---|
| Area | A, B, C, D | 2.5 | 2.5 |
| | E, F | 2.3 | 1.9 |
| Line | A-F | 6 | 6 |
| Surface point | A, B, C | 12 | 4 |
| | D, E, F | 25 | 7 |
| Tall wake-free point | A, B, C | 17 | 3 |
| | D, E, F | 35 | 6 |
| Wake-affected point | A-F | 2.3 | 2.3 |
| Volume | A-F | 2.3 | 2.3 |

*Ratio of peak 1-second average concentrations

# 7 DISPERSION MODELLING APPROACH

## 7.1 Introduction

The following sections are included to provide the reader with an understanding of the model and modelling approach applied for the assessment. The CALPUFF is an advanced air dispersion model which can deal with the effects of complex local terrain on the dispersion meteorology over the modelling domain in a three-dimensional, hourly varying time step.

The model was setup in general accord with the methods provided in the NSW EPA document *Generic Guidance and Optimum Model Setting for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'* (**TRC**, **2011**).

## 7.2 Modelling methodology

Modelling was undertaken using a combination of the CALPUFF Modelling System and The Air Pollution Model (TAPM). The CALPUFF Modelling System includes three main components: CALMET, CALPUFF and CALPOST and a large set of pre-processing programs designed to interface the model to standard, routinely available meteorological and geophysical datasets.

### 7.2.1 Meteorological modelling

The TAPM model was applied to the available data to generate a three-dimensional upper air data file for use in CALMET. The centre of analysis for the TAPM modelling used is 33deg 12min south and 151deg 28min east. The simulation involved an outer grid of 30km, with three nested grids of 10km, 3km and 1km with 35 vertical grid levels.

The CALMET domain was run on a domain of 10 x 10km with a 0.1km grid resolution. The available meteorological data for January 2021 to December 2021 from three surrounding weather stations at BoM Cooranbong (Lake Macquarie) AWS, BoM Norah Head BoM AWS, and DPE Wyong stations were included in the simulation.

### 7.2.2 Meteorological modelling evaluation

The outputs of the CALMET modelling are evaluated using visual analysis of the wind fields and extract data. **Figure 7-1** presents a visualisation of the wind field generated by CALMET for a single hour of the modelling period (i.e. example only). The wind fields follow the terrain well and indicate the simulation produces realistic fine scale flow fields (such as terrain forced flows) in surrounding areas.

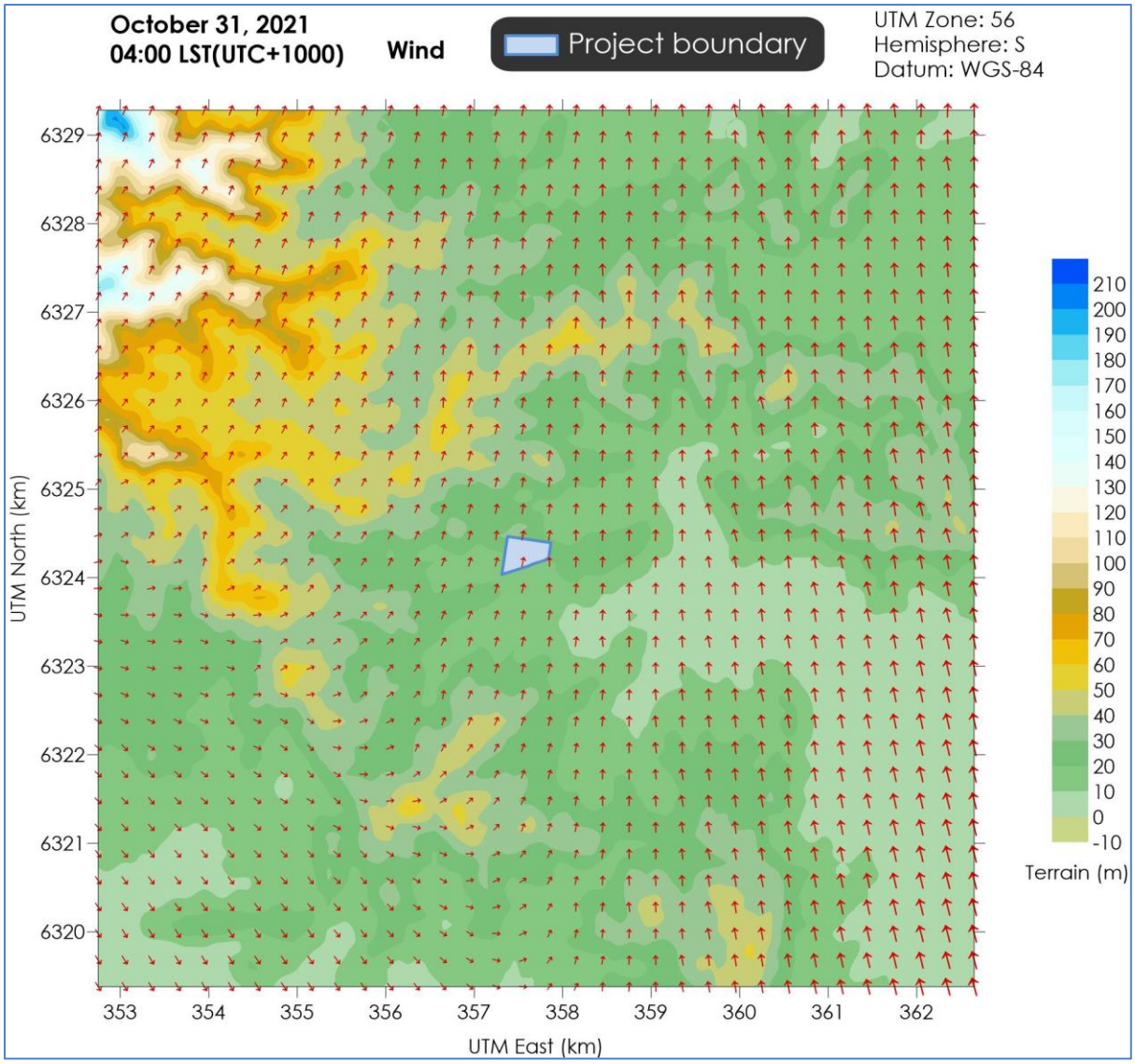


**Figure 7-1: Representative 1-hour average snapshot of wind field for the Project**

CALMET generated meteorological data were extracted from a point within the CALMET domain and are graphically represented in **Figure 7-2** and **Figure 7-3**.

**Figure 7-2** presents the annual and seasonal windroses from the CALMET data. Overall, the windroses generated in the CALMET modelling reflect the expected wind distribution patterns of the area as determined based on the available measured data and the expected terrain effects on the prevailing winds as discussed in **Section 5.2**.

**Figure 7-3** includes graphs of the temperature, wind speed, mixing height and stability classification over the modelling period and shows sensible trends considered to be representative of the area.

In conclusion, the CALMET generated meteorological data area considered suitable for use in the air dispersion modelling for the Project.

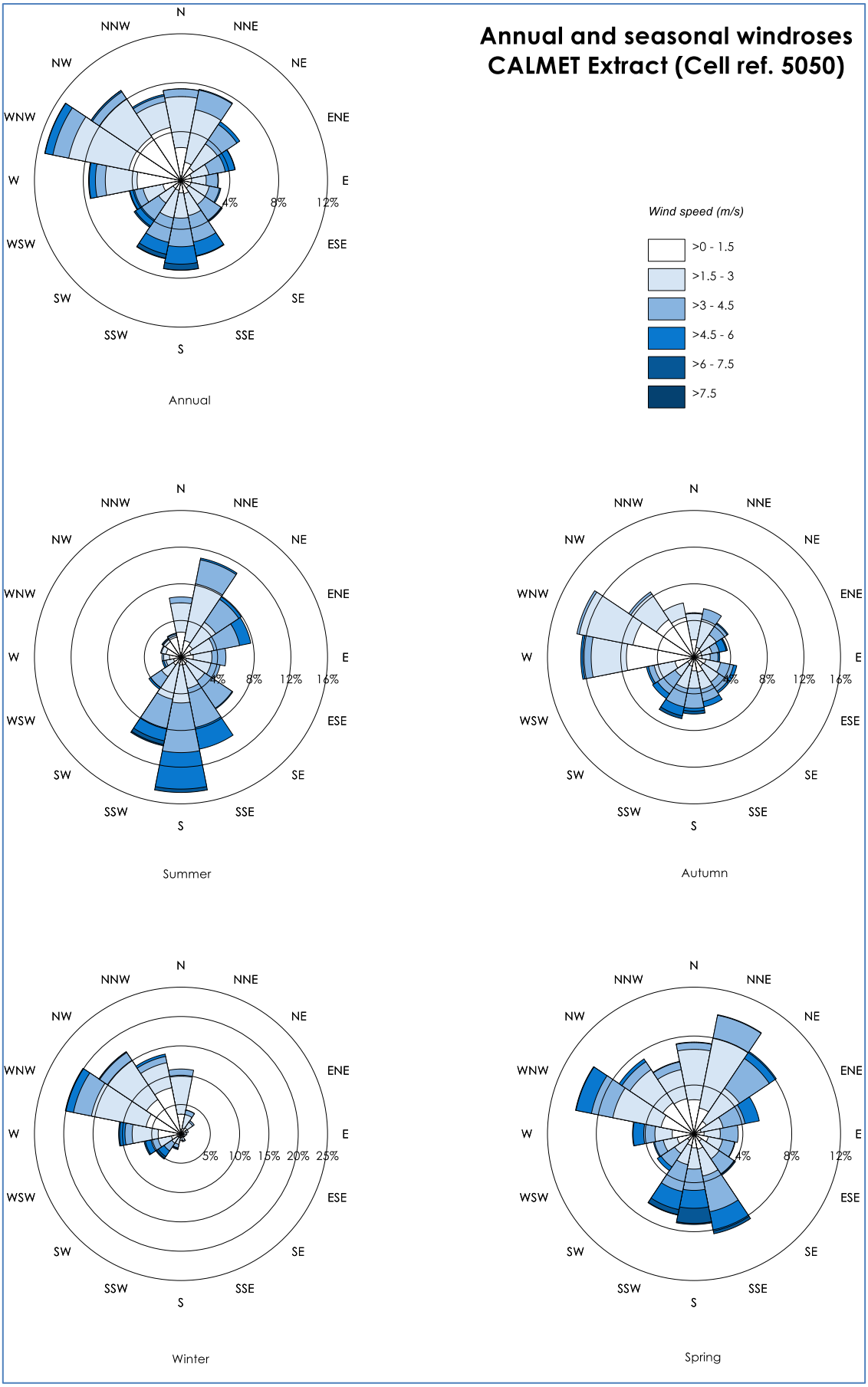


**Figure 7-2: Annual and seasonal windroses from CALMET (Cell ref 5050)**

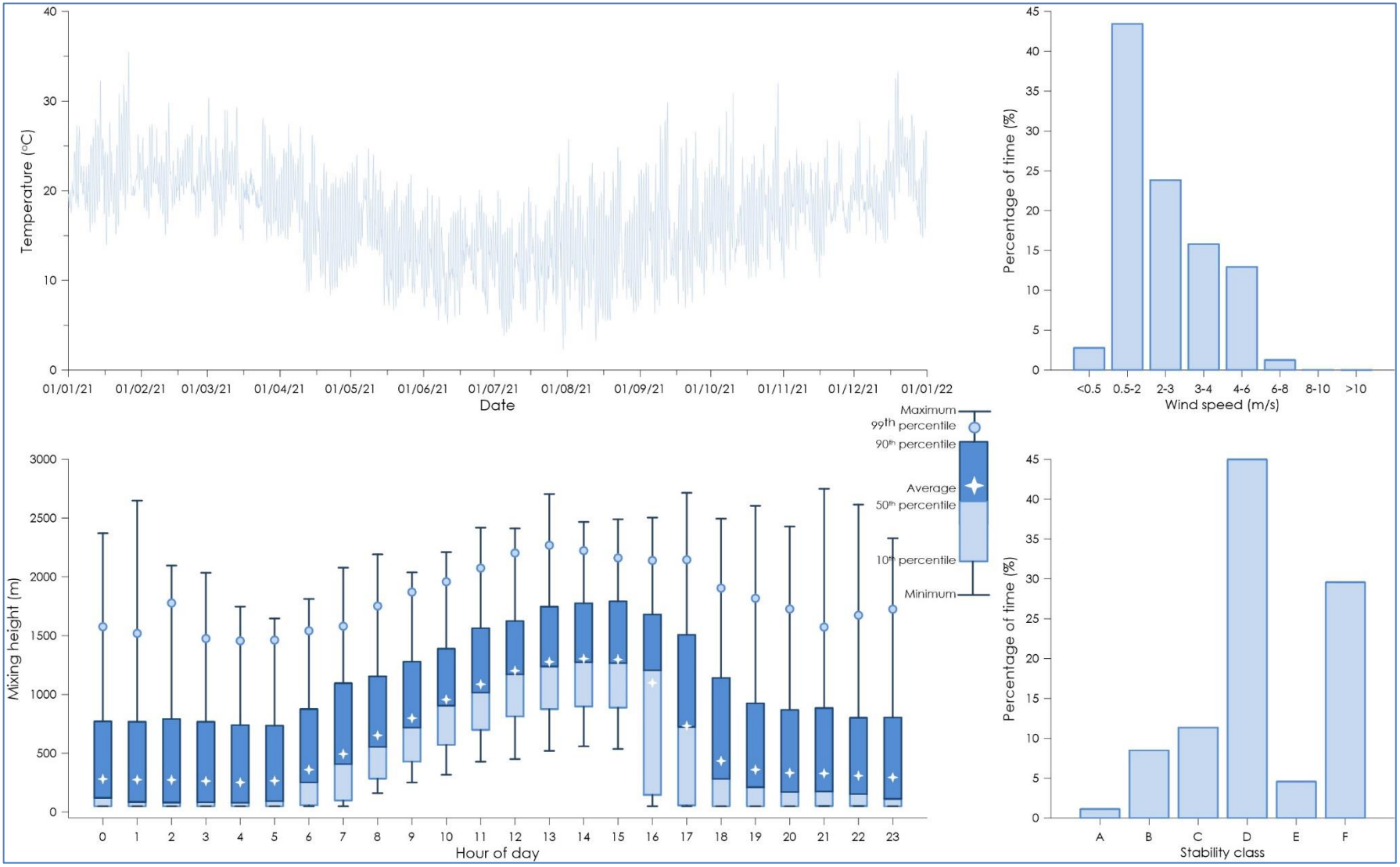


**Figure 7-3: Meteorological analysis of CALMET (Cell Ref 5050)**

## 7.3 Dispersion modelling

The CALPUFF dispersion model, in conjunction with a CALMET generated meteorological data file, was applied to provide predictions of the ground level concentrations of potential pollutant concentrations associated with the operation of the Project.

Dust emissions from each operational activity of the Project were represented by a series of volume sources and were included in the CALPUFF model via an hourly varying emission file. Meteorological conditions associated with dust generation (such as wind speed) and levels of dust generating activity were considered in calculating the hourly varying emission rate for each source. It should be noted that as a conservative measure, the effect of the precipitation rate (rainfall) in reducing dust emissions has not been considered in this assessment.

Emissions from the asphalt plant stack exhaust have been modelled as a point source with parameters outlined in the following section. Other odour emission sources at the asphalt plant have been modelled as a volume source representing the truck waiting to be tarped and as a pseudo-stack source representing loading the truck with asphalt with a low efflux velocity.

## 7.4 Emission estimation

### 7.4.1 Construction emissions

The construction of associated infrastructure for the Project has the potential to generate dust emissions.

Potential construction dust emissions will be primarily generated due to material handling, vehicle movements and windblown dust generated from exposed areas and stockpiles. Exhaust emissions from the operation of construction vehicles and plant will also generate emissions.

The potential particulate impacts due to these activities are difficult to accurately quantify on any given day due to the short sporadic periods of dust generating activity which may occur over the construction time frame. The sources of dust are temporary in nature and will only occur during the construction period which is estimated to be short-lived.

The total amount of dust generated from the construction process is unlikely to be significant given the nature of the activities. Given that the activities would occur for a limited period, no significant or prolonged effect at any off-site receptor is predicted to arise.

To ensure dust generation is controlled during the construction activities and the potential for off-site impacts is reduced, appropriate (operational and physical) mitigation measures will be implemented as necessary. These mitigation measures are outlined in **Table 7-1**.

**Table 7-1: Summary of potential mitigation measures during construction phase**

| Activity | Mitigation measure |
|---|---|
| Communications | Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary.<br>This may be the environment manager/engineer or the site manager. |
| Dust management | Assess activities during adverse weather conditions and modify as required |
| | Minimise exposed surfaces. |

| Activity | Mitigation measure |
|---|---|
| Site Management | Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Any complaints, investigation details and actions will be recorded in a log book. |
| | Make the complaints log available to the local authority when asked. |
| | Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book. |
| Monitoring | Undertake daily visual monitoring for dust beyond the boundary and weekly inspection of equipment and recording results. |
| | Carry out regular site inspections |
| | Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. |
| Site layout | Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. |
| | Fully enclose specific operations through solid screens, tarps or barriers where there is a high potential for dust production and the site is active for an extensive period. |
| | Avoid site runoff of water or mud. |
| | Keep site fencing, barriers and scaffolding clean using wet methods. |
| | Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below. |
| | Cover, seed or fence spoil stockpiles to prevent wind whipping. |
| | Use of dust suppressants, place spoil stockpiles in sheltered areas away from wind. |
| Operating vehicle/machinery and sustainable travel | Ensure all vehicles switch off engines when stationary - no idling vehicles. |
| | Vehicles and equipment to be maintained per manufacturers specification. |
| | Limit vehicle speed onsite. |
| Operations | Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. |
| | Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. |
| | Use enclosed chutes and conveyors and covered skips. |
| | Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. |
| | Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. |
| Waste management | Do not burn waste materials. |

### 7.4.2 Operational dust emission estimation

The main dust generating activities associated with operation of the Project are identified as the loading/unloading of material, vehicles travelling on-site and off-site, crushing and screening processes, and windblown dust from stockpiles. The on-site plant and equipment also have the potential to generate particulate emissions from the diesel exhaust.

Dust emission estimates have been calculated by analysing the various types of dust generating activities taking place and utilising suitable emissions sourced from both locally developed and United States Environmental Protection Agency (US EPA) developed documentation.

Average and peak scenarios have been assessed for the different activities associated with the Project to represent potential annual average and 24-hour average impacts, respectively.

The average scenario to assess annual average dust impacts is based on the proposed annual tonnages of 400,000tpa of asphalt produced at the site, and 99,000tpa of RAP processed at the RAP facility. The peak scenario is based on the maximum operating hourly throughput rate of material for the asphalt plant and the RAP facility, that is, 140 tonnes per hour (tph) for the asphalt plant and 200tph for the RAP facility. The maximum hourly capacity for each activity is assumed to apply for every hour of the modelling period (i.e., 8760 hours).

The Project proposes to have 11 and four RAP stockpiles in the southern and northern sections of the site, respectively. The dimensions for one RAP stockpile are estimated to be 10m in height and 10m in radius, resulting in a total surface area of approximately 758 square meters ($m^2$) based on a conical profile. The total surface area of stockpiled RAP material is approximately 1.1ha, which has been assessed for wind erosion impacts.

A summary of the estimated TSP, $PM_{10}$ and $PM_{2.5}$ emissions is presented in **Table 7-2**. Detailed calculations of the dust emission estimates are provided in **Appendix B**.

**Table 7-2: Summary of estimated dust emissions for the Project (kg/year)**

| Activity | Dust emissions | | |
|---|---|---|---|
| | TSP | $PM_{10}$ | $PM_{2.5}$ |
| Average scenario – annual average impacts | 7,405 | 2,190 | 643 |
| Peak scenario – 24-hour average impacts | 54,869 | 14,274 | 2,710 |

### 7.4.3 Nearby operations

In addition to the estimated dust emissions from the Project, other nearby operations have been included in the modelling to assess the potential for cumulative dust effects.

The Lutum quarry is located approximately 80m north of the Project site and has approval to extract materials at a maximum rate of 100,000tpa. Estimated dust emissions from the Lutum facility are based on assumed operations and are conservative, likely overestimating the actual impacts.

The Wallarah 2 Coal Mine is located west of the Project site. The site was granted approval to operate in 2018, however operations are yet to commence. Dust emissions from the Wallarah site are based on the *Wallarah 2 Coal Project - Air Quality and Greenhouse Gas Assessment* (**PAEHolmes, 2012**) report.

**Table 7-3** summarises the dust emission estimates for the Lutum quarry and the Wallarah 2 Coal Mine.

**Table 7-3: Summary of estimated annual dust emissions from nearby operations (kg/year)**

| Operation | TSP emission | $PM_{10}$ emission | $PM_{2.5}$ emission |
|---|---|---|---|
| Lutum quarry | 6,090 | 2,590 | 370 |
| Wallarah 2 Coal Mine | 68,119 | 33,884 | 5,084 |

It is to be noted that receptors R1, R2 and I3 will be acquired by the Wallarah 2 Coal Mine when the site operates. As such cumulative impacts for these receptors have not been assessed when the mine is operating.

### 7.4.4 Other pollutant emission estimation

Stack emissions have been estimated using the maximum throughput rate of the asphalt plant (140tph) with emission factors sourced from the AP42 batch mix asphalt plants and the NPI emission estimation manual for hot mix asphalt plants.

The modelled emissions rates for each pollutant are summarised in **Table 7-4**. The emission rates for the plant stack exhaust are constant throughout the entire modelling period.

**Table 7-4: Modelled emission rates for the Project (g/s)**

| Pollutant | Emission rate |
|---|---|
| $PM_{10}$ | 0.2 |
| $PM_{2.5}$ | 0.1 |
| CO | 1.4 |
| $NO_X$ | 2.3 |
| $SO_2$ | 1.7 |
| Arsenic | 1.3E-05 |
| Beryllium | 4.3E-06 |
| Cadmium | 1.6E-05 |
| Chromium (VI) | 1.8E-05 |
| Copper | 7.0E-05 |
| Lead | 1.4E-05 |
| Manganese | 1.9E-04 |
| Mercury | 8.9E-06 |
| Nickel | 8.2E-05 |
| Zinc | 1.3E-04 |
| Acetone | 1.6E-02 |
| Acetaldehyde | 2.5E-02 |
| Benzene | 8.8E-03 |
| Formaldehyde | 6.2E-02 |
| Toluene | 1.8E-02 |
| Xylene | 5.3E-02 |
| Polycyclic Aromatic Hydrocarbons (PAH) (total) | 4.3E-03 |

**Table 7-5** presents the applicable standards of concentration for non-scheduled activities as per the *Protection of the Environment Operations (Clean Air) Regulation 2022 (POEO)* (**NSW Government, 2022**). The comparison indicates that the modelled stack emissions comply with the applicable concentration standards.

**Table 7-5: Comparison of applicable POEO standards of concentration with modelled in-stack concentrations (mg/m³)**

| Pollutant | Standard of concentration for non-schedule activity – Group C | Asphalt plant stack exhaust |
|---|---|---|
| Solid particles | 100 | 18.9 |

Modelled stack parameters for the Project are outlined in **Table 7-6**.

**Table 7-6: Modelled stack parameters**

| Parameter | Variable | Unit |
|---|---|---|
| Stack height | 12.2 | m |
| Coordinates (x,y) | 357675 | 6324397 |
| Stack diameter | 1.0 | m |
| Exit velocity | 16.9 | m/s |

| Parameter | Variable | Unit |
|---|---|---|
| Exit temperature | 355 | K |

The model has included consideration of potential "building" wake effects on air dispersion that arise due to the effect of winds passing over the buildings at the Project site using the Building Profile Input Program (BPIP) and the PRIME building wake algorithm. The asphalt plant and the nearby storage bunker areas have been considered in this assessment for potential building downwash.

### 7.4.5 Odour emission estimation

Odour emissions from the Project have the potential to arise from a range of sources associated with the asphalt plant.

During operations of the asphalt plant odour emissions would arise from loading asphalt to the truck, the truck waiting to be tarped once it has been loaded with asphalt and from the asphalt plant stack exhaust.

Odour emissions for the plant stack exhaust and loading asphalt to the truck were estimated based on a review of the *Bushells Ridge Asphalt Plant Air Quality and Greenhouse Gas Impact Assessment* (**SLR, 2016**) report for the Project site. The emission rates for these sources have been scaled according to the proposed maximum hourly throughput rate of 140tph for the Project. The truck tarping odour emission rate was estimated based on a review of a similar type of asphalt batching operation from the *Cameron Park Asphalt Remodelling* (**PAEHolmes, 2011**).

A summary of the odour emission rates for these sources applied is outlined in **Table 7-7**.

**Table 7-7: Summary of odour emission rates for the Project**

| Location | Source | Odour emission rate (ou.m³/s) |
|---|---|---|
| Asphalt plant | [1]Loading asphalt to the truck | 1,400 |
| | [2]Truck waiting to be tarped | 1,080 |
| | [1]Plant stack exhaust | 4,817 |

Source: [1] SLR, 2016, [2]PAEHolmes, 2011

For the purposes of this assessment, it is assumed that the odour is emitted from the identified odour sources continuously for the whole modelling period.

# 8 DISPERSION MODELLING RESULTS

This section presents the predicted air quality levels which may arise from air emissions generated by the Project.

## 8.1 Dust concentrations

The dispersion model predictions presented in this section include those for the operation of the Project in isolation (incremental impact) and the operation of the Project with consideration of other sources (total impact). The results show the predicted:

- Maximum 24-hour average $PM_{2.5}$ and $PM_{10}$ concentrations;
- Annual average $PM_{2.5,}$ $PM_{10}$ and TSP concentrations; and,
- Annual average dust (insoluble solids) deposition rates.

It is important to note that when assessing impacts per the maximum 24-hour average levels, these predictions are based on the highest predicted 24-hour average concentrations which were modelled at each point within the modelling domain for the worst day (i.e. a 24-hour period) during the one year long modelling period. The predictions thus do not represent just one particular day, but a combination of all of the worst-case days at every point. Thus, the extent of the predicted impacts is a large overestimation of what would actually occur on any single day.

Associated isopleth diagrams of the dispersion modelling results are presented in **Appendix C**.

The total (cumulative) impact is defined as the operation of the Project combined with the Lutum quarry, the Wallarah 2 Coal Mine and the estimated ambient background levels outlined in **Section 5.3.6**.

**Table 8-1** presents the predicted incremental and cumulative particulate dispersion modelling results at each of the assessed receptor locations.

The predicted incremental and cumulative results indicate that all receptors are predicted to experience levels below the relevant criteria.

**Table 8-1: Dust dispersion modelling results for assessment locations**

| Receptor ID | Incremental maximum concentrations | | | | | | Cumulative (BG plus Lutum quarry excluding Wallarah 2 Coal Mine) | | | | Cumulative (BG plus Lutum quarry including Wallarah 2 Coal Mine) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $PM_{2.5}$ | | $PM_{10}$ | | TSP | DD[1] | $PM_{2.5}$ | $PM_{10}$ | TSP | DD[1] | $PM_{2.5}$ | $PM_{10}$ | TSP | DD[1] |
| | (µg/m³) | | (µg/m³) | | (µg/m³) | (g/m²/month) | (µg/m³) | (µg/m³) | (µg/m³) | (g/m²/month) | (µg/m³) | (µg/m³) | (µg/m³) | (g/m²/month) |
| | 24-hour average | Annual average | 24-hour average | Annual average | Annual average | Annual average | Annual average | | | | Annual average | | | |
| | Air quality impact criteria | | | | | | Air quality impact criteria | | | | Air quality impact criteria | | | |
| | - | - | - | - | - | 2 | 8 | 25 | 90 | 4 | 8 | 25 | 90 | 4 |
| R1 | 0.4 | <0.1 | 1.9 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.8 | 13.8 | 48.9 | 2.3 |
| R2 | 0.4 | <0.1 | 1.6 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.7 | 13.7 | 48.7 | 2.2 |
| R3 | 0.3 | <0.1 | 1.3 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.7 | 13.6 | 48.7 | 2.2 |
| R4 | 0.3 | <0.1 | 1.2 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.7 | 13.6 | 48.7 | 2.2 |
| R5 | 0.3 | <0.1 | 1.0 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.7 | 13.6 | 48.6 | 2.2 |
| R6 | 0.2 | <0.1 | 0.9 | <0.1 | <0.1 | <0.1 | 4.7 | 13.5 | 48.6 | 2.2 | 4.7 | 13.6 | 48.6 | 2.2 |
| R7 | 0.4 | <0.1 | 1.9 | <0.1 | <0.1 | <0.1 | 4.7 | 13.5 | 48.6 | 2.2 | 4.7 | 13.6 | 48.6 | 2.2 |
| R8 | 0.8 | <0.1 | 4.0 | <0.1 | 0.1 | <0.1 | 4.7 | 13.6 | 48.7 | 2.2 | 4.7 | 13.6 | 48.7 | 2.2 |
| R9 | 0.8 | <0.1 | 3.8 | <0.1 | 0.2 | <0.1 | 4.7 | 13.6 | 48.8 | 2.2 | 4.7 | 13.7 | 48.8 | 2.2 |
| R10 | 0.5 | <0.1 | 2.2 | <0.1 | 0.1 | <0.1 | 4.7 | 13.6 | 48.7 | 2.2 | 4.7 | 13.7 | 48.8 | 2.2 |
| R11 | 0.8 | <0.1 | 3.8 | 0.1 | 0.2 | <0.1 | 4.7 | 13.7 | 48.8 | 2.2 | 4.8 | 13.7 | 48.9 | 2.2 |
| R12 | 0.4 | <0.1 | 1.7 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.7 | 13.6 | 48.7 | 2.2 |
| R13 | 0.6 | <0.1 | 2.8 | <0.1 | 0.1 | <0.1 | 4.7 | 13.6 | 48.7 | 2.2 | 4.7 | 13.7 | 48.8 | 2.2 |
| R14 | 0.3 | <0.1 | 1.2 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.8 | 13.8 | 49.0 | 2.2 |
| I1 | 2.6 | <0.1 | 12.6 | 0.2 | 0.5 | <0.1 | 4.9 | 14.2 | 50.0 | 2.3 | 4.9 | 14.3 | 50.1 | 2.3 |
| I2 | 1.1 | <0.1 | 4.5 | 0.1 | 0.2 | <0.1 | 4.7 | 13.6 | 48.8 | 2.2 | 4.8 | 13.7 | 48.9 | 2.2 |
| I3[2] | 1.1 | <0.1 | 5.4 | <0.1 | 0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | - | - | - | - |
| I4[2] | 0.6 | <0.1 | 3.1 | <0.1 | <0.1 | <0.1 | 4.7 | 13.5 | 48.6 | 2.2 | - | - | - | - |
| I5 | 0.5 | <0.1 | 1.9 | <0.1 | <0.1 | <0.1 | 4.7 | 13.6 | 48.6 | 2.2 | 4.7 | 13.7 | 48.7 | 2.2 |

[1]Deposited dust [2]Receptor not assessed for cumulative impacts when the Wallarah 2 Coal Mine is operating

## 8.2 Assessment of Cumulative 24-hour average $PM_{2.5}$ and $PM_{10}$ Concentrations

The incremental results for 24-hour average $PM_{2.5}$ and $PM_{10}$ concentrations are below the relevant cumulative criteria for the assessed peak 24-hour scenario.

When assessing the cumulative 24-hour average impacts based on model predictions an assessment of cumulative 24-hour average $PM_{2.5}$ and $PM_{10}$ impacts was undertaken in accordance with Section 11.2 of the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA**, **2022a**). A "Level 2 assessment - Contemporaneous impact and background approach" was applied to assess potential impacts for $PM_{2.5}$ and $PM_{10}$. The Level 2 assessment involves matching one year of ambient air quality monitoring data with the corresponding Project only level predicted using the same day's weather data to account for the spatial and temporal variation in background levels on a given day.

**Table 8-2** provides a summary of the findings from the Level 2 assessments for the most impacted receptor (I1) for both $PM_{2.5}$ and $PM_{10}$.

The results in **Table 8-2** indicate that the Project does not increase the number of days above the 24-hour average criterion at the assessed receptor for $PM_{2.5}$ and $PM_{10}$. Based on this result it can be inferred that the Project does not increase the number of days above the 24-hour average $PM_{2.5}$ and $PM_{10}$ criterion at any of the receptor locations surrounding the Project.

Detailed tables of the contemporaneous assessment results for the most impacted receptor at I1 are provided in **Appendix D**.

**Table 8-2: NSW EPA contemporaneous assessment - maximum number of additional days above 24-hour average criterion**

| Receptor ID | $PM_{2.5}$ | $PM_{10}$ |
|---|---|---|
| I1 | 0 | 0 |

Time series plots of the predicted cumulative 24-hour average $PM_{2.5}$ and $PM_{10}$ concentrations for the most impacted receptor I1 are presented in **Figure 8-1** and **Figure 8-2**.

The orange bars in the figures represent the contribution from the Project and the blue bars represent the applied background levels.

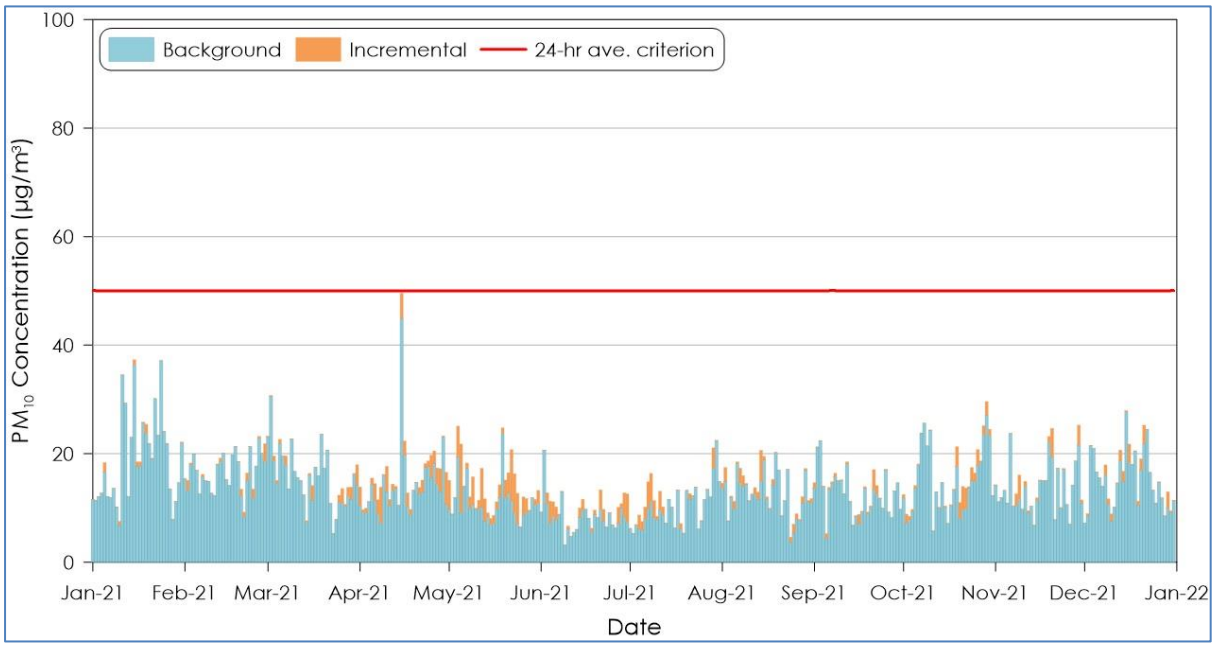


**Figure 8-1: Time series plots of predicted cumulative 24-hour average $PM_{10}$ concentrations for I1**

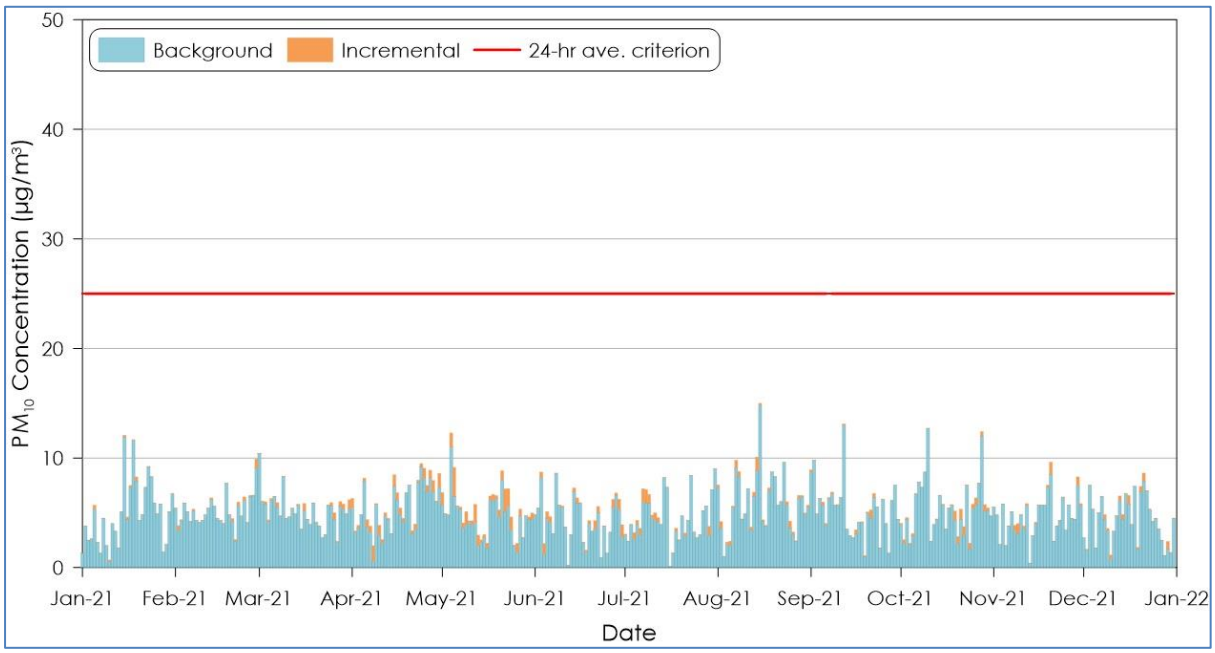


**Figure 8-2: Time series plots of predicted cumulative 24-hour average $PM_{2.5}$ concentrations for I1**

## 8.3 Other pollutants

**Table 8-3** presents the predicted maximum impact at the worst affected assessment location or location beyond the site boundary receptor from asphalt plant exhaust stack emissions. Isopleth diagrams of the predicted impact for selected pollutants are presented in **Appendix C**.

The results indicate the maximum contribution from the Project at the most impacted receptor locations would be below the relevant criteria for each of the assessed pollutants.

**Table 8-3: Predicted maximum impact at the worst affected receptor (µg/m³)**

| Pollutant | Averaging period | Assessment location | Incremental impact | Receptor ID | Background | Total impact | Criteria |
|---|---|---|---|---|---|---|---|
| $NO_2$ | 1 hour | Receptor | 27.5 | R2 | 57.4 | 84.9 | 164 |
| | Annual | Receptor | 0.2 | I1 | 5.9 | 6.1 | 31 |
| $SO_2$ | 1 hour | Receptor | 40.6 | R2 | 85.8 | 126.4 | 286 |
| | 24 hour | Receptor | 5.6 | I2 | 14.3 | 19.9 | 57 |
| CO | 15 minute | Receptor | 44.2 | R2 | 1,484 | 1,528 | 100,000 |
| | 1 hour | Receptor | 33.5 | R2 | 1,125 | 1,158 | 30,000 |
| | 8 hour | Receptor | 13.3 | I2 | 742 | 755 | 10,000 |
| Lead | Annual | Receptor | 0.000002 | I1 | - | 0.000002 | 0.5 |
| Arsenic | 1 hour | Boundary | 0.001 | - | - | 0.001 | 0.09 |
| Beryllium | 1 hour | Boundary | 0.0004 | - | - | 0.0004 | 0.004 |
| Cadmium | 1 hour | Boundary | 0.001 | - | - | 0.001 | 0.018 |
| Chromium (VI) | 1 hour | Boundary | 0.002 | - | - | 0.002 | 0.09 |
| Copper | 1 hour | Boundary | 0.006 | - | - | 0.01 | 3.7 |
| Manganese | 1 hour | Boundary | 0.02 | - | - | 0.02 | 18 |
| Mercury | 1 hour | Boundary | 0.0008 | - | - | 0.0008 | 0.18 |
| Nickel | 1 hour | Boundary | 0.007 | - | - | 0.01 | 0.18 |
| Zinc | 1 hour | Boundary | 0.01 | - | - | 0.01 | 90 |
| Acetone | 1 hour | Boundary | 1.4 | - | - | 1.4 | 22,000 |
| Acetaldehyde | 1 hour | Boundary | 2.2 | - | - | 2.2 | 42 |
| Benzene | 1 hour | Boundary | 0.8 | - | - | 0.8 | 29 |
| Formaldehyde | 1 hour | Boundary | 5.4 | - | - | 5.4 | 20 |
| Toluene | 1 hour | Boundary | 1.6 | - | - | 1.6 | 360 |
| Xylene | 1 hour | Boundary | 4.6 | - | - | 4.6 | 190 |
| PAH (total) | 1 hour | Boundary | 0.4 | - | - | 0.37 | 0.4 |

## 8.4 Odour

The spatial distribution of the dispersion modelling predictions for the Project is presented as an isopleth diagram showing the 99th percentile nose-response ground level odour concentrations in **Appendix C**.

**Table 8-4** presents the discrete dispersion modelling results at each of the assessment locations. As discussed in **Section 6.2.2**, an odour criterion of 2 OU has been adopted to assess against potential odour impacts. The results indicate that odour levels due to the Project will be well below the applicable criteria at all assessment locations, with the highest odour impact of 0.2 OU occurring at I1.

**Table 8-4: 99th percentile nose-response average ground level odour concentrations – Incremental impact**

| Assessment location ID | Predicted level (OU) | Odour assessment criterion (OU) |
|---|---|---|
| R1 | <0.1 | 2 |
| R2 | <0.1 | 2 |
| R3 | <0.1 | 2 |
| R4 | <0.1 | 2 |
| R5 | <0.1 | 2 |
| R6 | <0.1 | 2 |
| R7 | <0.1 | 2 |
| R8 | <0.1 | 2 |
| R9 | <0.1 | 2 |
| R10 | <0.1 | 2 |
| R11 | <0.1 | 2 |
| R12 | <0.1 | 2 |
| R13 | <0.1 | 2 |
| R14 | <0.1 | 2 |
| I1 | 0.2 | 2 |
| I2 | 0.1 | 2 |
| I3 | 0.1 | 2 |
| I4 | <0.1 | 2 |
| I5 | <0.1 | 2 |

# 9 MITIGATION AND MANAGEMENT

The proposed operations at the Project have the potential to generate dust, exhaust stack and odour emissions. Although the modelling finds the Project complies with the relevant limits, to minimise impacts on the surrounding environment and at the receptor locations, it is recommended that, where practical, the following dust mitigation measures be utilised.

**Table 9-1** outlines potential operational dust mitigation measures for the Project, where practical.

**Table 9-1: Operational dust and odour mitigation measures, where practical**

| Source | Mitigation Measure |
|---|---|
| General | Activities to be assessed during adverse weather conditions and modified as required (e.g. cease activity where reasonable levels of dust cannot be maintained using the available means). |
| | Weather forecast to be checked on a daily basis prior to undertaking RAP processing. |
| | Engines of on-site vehicles and plant to be switched off when not in use. |
| | Vehicles and plant are to be fitted with pollution reduction devices where practicable. |
| | Vehicles are to be maintained and serviced according to manufacturer's specifications. |
| | Visual monitoring of activities is to be undertaken to identify dust generation. |
| | Maintain an odour complaint logbook and in the event of a complaint conduct an immediate investigation of any odour sources, together with appropriate actions to eliminate any identified excessive odour, or air quality. |
| | Ensure stack exhaust controls are operating as per manufacturers specifications |
| | Monitor stockpile/bays to avoid spilling once at capacity. |
| | Training provided to site personnel on appropriate air quality practices. |
| Exposed areas/stockpiles | The extent of exposed surfaces and stockpiles is to be kept to a minimum. |
| | Stockpiles to be monitored and dampened with water as far as is practicable if dust emissions are visible. |
| | The RAP stockpile storage to not exceed the maximum stockpile height of 10m. |
| Material handling | Reduce drop heights from loading and handling equipment where practical. |
| | Dampen material when excessively dusty during handling. |
| Hauling activities | Spills on trafficked areas to be cleaned immediately. |
| | Driveways and hardstand areas to be swept/cleaned regularly as required etc. |
| | Vehicle traffic is to be restricted to designated routes. |
| | Co-ordinate the delivery schedule to avoid a queue of the incoming or outgoing trucks for extended periods of time. |
| | Speed limits are to be enforced. |
| | Vehicle loads are to be covered when travelling off-site. |
| | Sweeper unit to be regularly deployed to the operational site to sweep/clean internal roads periodically to prevent any tracking of fine debris. |
| | Travel distances are minimised due to the design of the site. |

The site currently employs several air quality management measures through an Environmental Management Plan (EMP). The EMP outlines the measures to manage dust emissions at the site and includes aspects such as key performance indicators, monitoring methods, response mechanisms, compliance reporting and complaints management. The EMP would adhere to the NSW EPA document *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (**NSW EPA, 2022b**).

The air emission controls applied at the site would be regularly assessed to ensure they are working effectively and required modification or adjustments to the air emission control measures would be revised on a regular basis and documented in the EMP.

# 10 GREENHOUSE GAS ASSESSMENT

The National Greenhouse Accounts (NGA) Factors document published by the Department of the Environment and Energy defines three scopes (Scope 1, 2 and 3) for different emission categories based on whether the emissions generated are from "direct" or "indirect" sources.

Scope 1 emissions encompass the direct sources from the Project defined as:

> "*...from sources within the boundary of an organisation as a result of that organisation's activities*" (**Department of Climate Change, Energy, the Environment and Water, 2022a**).

Scope 2 and 3 emissions occur due to the indirect sources from the Project as:

> "*...emissions generated in the wider economy as a consequence of an organisation's activities but which are physically produced by the activities of another organisation*" (**Department of Climate Change, Energy, the Environment and Water, 2022a**).

For the purpose of this assessment, emissions generated in Scope 1 and Scope 3 defined above provide a suitable approximation of the total GHG emissions generated from the Project.

Scope 3 emissions can be a significant component of the total emissions inventory; however, these emissions are often not directly controlled by the operation. These emissions are understood to be considered in the Scope 1 emissions from other various organisations related to the Project.

Scope 3 emissions also arise from a number of various other sources indirectly associated with the operation of the Project such as emissions generated by employees travelling to and from the site. The relatively minor individual contributions that are difficult to accurately quantify due to the diversity and nature of the sources, have not been considered further in this assessment.

## 10.1 Emission sources

Scope 1 GHG emission sources identified from the operation of the Project are the on-site combustion of diesel fuel and combustion of natural gas consumption.

Scope 3 emissions have been identified as resulting from the purchase of diesel and natural gas for use on-site and the transport of product material.

Estimated quantities of materials that have the potential to emit GHG emissions associated with Scope 1 emissions for the Project have been summarised in **Table 10-1** below. These estimates are based on a conservative upper limit of the assumed maximum production of the Project. The assessment provides a reasonable worst-case approximation of the potential GHG emissions for the purpose of this assessment.

Table 10-1: Summary of annual quantities of materials estimated for the Project

| Type | Project | Units |
|---|---|---|
| Diesel | 3,641 | kL |
| LPG | 133,000 | GJ |

Note: Mt = million tonnes, kL = kilolitres, t = tonne and MWh = megawatt hour

The quantity of diesel fuel required to transport the materials for the Project to and from site has been estimated based on an approximate return travel distance of 80km. **Table 10-2** summarises the estimated travel distance calculations.

Table 10-2: Estimated travel distance

| Facility | Return distance (km) | Amount of material transported (tpa) | Payload (t) | Estimated travel distance (km) |
|---|---|---|---|---|
| Asphalt | 80 | 400,000* | 25 | 1,280,000 |

*Inclusive of 99,000tpa of RAP material used for producing asphalt

To estimate the consumption of diesel fuel required for transport activities, the average fuel consumption of 53.1L/100km for articulated trucks is applied (**ABS, 2022**).

## 10.2 Emission factors

To quantify the amount of carbon dioxide equivalent ($CO_2$-e) material generated from the Project, emission factors obtained from the NGA Factors (**Department of Climate Change, Energy, the Environment and Water, 2022b**) are summarised in **Table 10-3**.

Table 10-3: Summary of emission factors

| Type | Energy content factor | Emission factor | | | Units | Scope |
|---|---|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_2O$ | | |
| Diesel | 38.6 | 69.9 | 0.1 | 0.2 | kg $CO_2$-e/GJ | 1 |
| | | 17.3 | - | - | | 3 |
| LPG | 25.7 | 60.2 | 0.2 | 0.2 | kg $CO_2$-e/GJ | 1 |
| | | 20.2 | - | - | | 3 |

Note: $CO_2$ = Carbon Dioxide, $CH_4$ = Methane and $N_2O$ = Nitrous Oxide

## 10.3 Summary of greenhouse gas emissions

**Table 10-4** summarises the estimated annual $CO_2$-e emissions due to the Project.

**Table 10-4: Summary of $CO_2$-e emissions for the Project (t $CO_2$-e)**

| Type | Scope 1 | Scope 3 |
|---|---|---|
| Diesel | 9,866 | 2,431 |
| LPG | 8,060 | 2,687 |
| Transport of product | - | 1,842 |
| **Total** | **17,926** | **6,960** |

## 10.4 Contribution of greenhouse gas emissions

**Table 10-5** summarises the emissions associated with the Project based on Scopes 1 and 3.

**Table 10-5: Summary of $CO_2$-e emissions per scope (kt $CO_2$-e)**

| Period | Scope 1 | Scope 3 |
|---|---|---|
| Annual | **17,926** | **6,960** |

The estimated annual greenhouse emissions for Australia for the year to June 2022 was 486.9 million tonnes of carbon dioxide equivalent (Mt $CO_2$-e) (**Department of Climate Change, Energy, the Environment and Water, 2022b**). In comparison, the estimated annual average greenhouse emission for the Project is 0.025Mt $CO_2$-e (Scope 1 and Scope 3). Therefore, the annual contribution of greenhouse emissions from the Project in comparison to the Australian greenhouse emissions for the 2022 period is estimated to be approximately 0.005 per cent (%).

At a state level, the estimated greenhouse emissions for NSW in the 2019 period was 136.6Mt $CO_2$-e (**Department of Climate Change, Energy, the Environment and Water, 2022b**). The annual contribution of greenhouse emissions from the Project in comparison to the NSW greenhouse emissions for the 2019 period is estimated to be approximately 0.018%.

The estimated GHG emissions generated in Scope 1 and Scope 3 are based on approximated quantities of materials and where applicable, generic emission factors. Therefore, the estimated emissions for the Project are considered conservative.

## 10.5 Greenhouse gas management

The Project would also utilise various mitigation measures to minimise the overall generation of GHG emissions. Some examples of GHG mitigation and management practices that would be applied during construction and operation of the Project include:

- Investigating ways to reduce energy consumption throughout the life of the Project and reviewing energy efficient alternatives;
- Regular maintenance of equipment and plant;
- Ensure plant and equipment are fitted with appropriate controls;
- Ensure plant and equipment are switched off when not in use;
- Monitoring the consumption of fuel and regularly maintaining diesel powered equipment to ensure operational efficiency;
- Monitoring the total site LPG consumption and investigating avenues to minimise consumption; and,
- Source consumable materials from environmentally sustainable sources.

# 11 SUMMARY AND CONCLUSIONS

This report has assessed the potential air quality impacts associated with the Project.

Air dispersion modelling was used to predict the potential for off-site dust, odour and other air pollutant impacts in the surrounding area due to the operation of the Project. The estimated air emissions applied in the modelling are likely to be conservative and would overestimate the actual impacts in reality.

It is predicted that all the assessed air pollutants generated by the operation of the Project would comply with the relevant assessment criteria at the relevant receptor and boundary locations and therefore would not lead to any unacceptable level of environmental nuisance / harm or impact in the surrounding area, and would not result in a significant change to regional air pollution levels.

Nevertheless, the site would apply appropriate air quality management measures to minimise air emissions from the site where practical. Overall, the assessment demonstrates that the Project can operate without causing any significant air quality impacts in the surrounding environment.

A conservative greenhouse gas assessment of the Project has been completed. The estimated annual average greenhouse emission is 0.025Mt $CO_2$-e material (Scope 1 and 3), which is calculated to be approximately 0.018% of the Australian greenhouse emissions and approximately 0.018% of the NSW greenhouse emissions for the 2022 and 2019 periods, respectively.

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# Appendix A

## *Selection of Meteorological Year*

## Selection of meteorological year

A statistical analysis of the latest five contiguous years of meteorological data from the nearest BoM weather station with suitable available data, Norah Head AWS weather station, is presented in **Table A-1**.

The standard deviation of the latest five years of meteorological data spanning 2017 to 2021 was analysed against the available measured wind speed, temperature and relative humidity. The analysis indicates that 2018 dataset is closest to the mean for wind speed and 2021 is closest for temperature and relative humidity. On the basis of a score weighting analysis, 2021 was found to be most representative.

**Table A-1: Statistical analysis results for Norah Head AWS**

| Year | Wind speed | Temperature | Relative humidity | Score |
|---|---|---|---|---|
| 2017 | 0.8 | 0.6 | 4.8 | 6.9 |
| 2018 | 0.5 | 0.8 | 3.9 | 5.7 |
| 2019 | 0.9 | 0.7 | 3.1 | 5.6 |
| 2020 | 0.8 | 0.5 | 3.8 | 5.8 |
| 2021 | 0.7 | 0.4 | 2.6 | 4.4 |

**Figure A-1** shows the frequency distributions for wind speed, wind direction, temperature and relative humidity for the 2021 year compared with the mean of the 2017 to 2021 data set. The 2021 year data appear to be reasonably well aligned with the mean data.

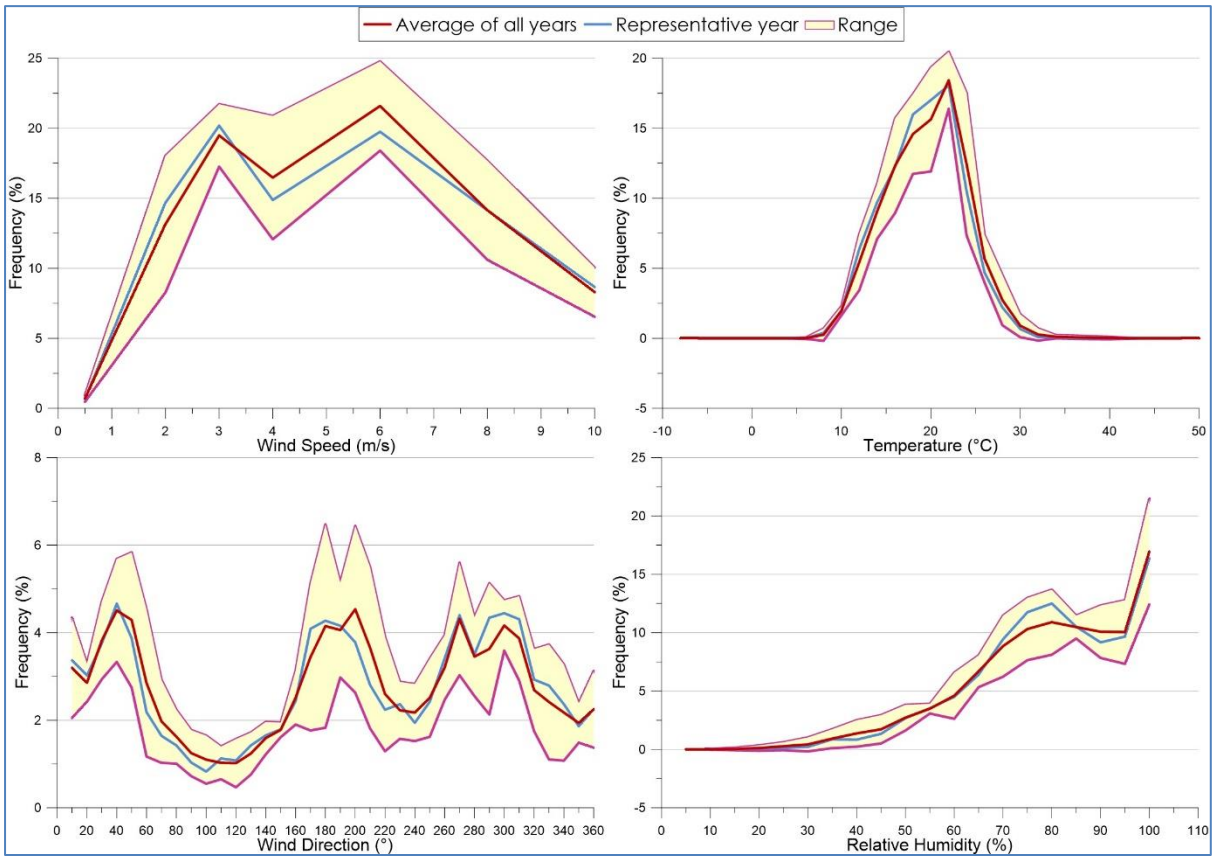



**Figure A-1: Frequency distributions for wind speed, wind direction, temperature and relative humidity**

# Appendix B

## *Emission Calculations*

**Emission Calculation**

The dust emissions from the Project have been estimated from the operational description of the proposed activities provided by the Proponent and have been combined with emissions factor equations and utilising suitable emission and load factors that relate to the quantity of dust emitted from particular activities based on intensity, the prevailing meteorological conditions and composition of the material being handled. Site specific variables including vehicle kilometres travelled (VKT) and stockpile areas are based on the indicative site layout plans provided (refer to **Figure 3-1**).

Emission factors and associated controls have been sourced from:

- United States (US) EPA AP42 Emission Factors (**US EPA, 1985 and Updates**);
- Office of Environment and Heritage document, "NSW Coal Mining Benchmarking Study: Best Practise Measures for Reducing Non-Road Diesel Exhaust Emissions, Final Report" (**NSW EPA, 2015**).

The emission factor equations used for each dust generating activity are outlined in **Table B-1** below. A detailed dust emission inventory for the different scenarios is presented in **Table B-2** to **Table B-3.**

Specific control factors applied for dust emissions estimates include the following:

- Wind erosion from stockpiles – 50% control for watering;
- Hauling on unsealed surfaces – 40% control for sweeping; and,
- Storage material bunkers – 30% control for enclosure.

**Table B-1: Emission factor equations**

| Exhaust emissions | Emission factor equation | | |
|---|---|---|---|
| | TSP | $PM_{10}$ | $PM_{2.5}$ |
| Loading / emplacing material | $EF = 0.74 \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} / \frac{M}{2}^{1.4}\right)\ kg/tonne$ | $EF = 0.35 \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} / \frac{M}{2}^{1.4}\right)\ kg/tonne$ | $EF = 0.053 \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} / \frac{M}{2}^{1.4}\right)\ kg/tonne$ |
| Hauling on sealed surfaces | $EF = 3.23 \times s.L.^{0.91} \times (1.1023 \times W)^{1.02}\ kg/VKt$ | $EF = 0.62 \times s.L.^{0.91} \times (1.1023 \times W)^{1.02}\ kg/VKT$ | $EF = 0.15 \times s.L.^{0.91} \times (1.1023 \times W)^{1.02}\ kg/VKT$ |
| Hauling on unsealed surfaces | $EF = \left(\frac{0.4536}{1.6093}\right) \times 4.9 \times (s/12)^{0.7} \times (1.1023 \times M/3)^{0.45}\ kg/VKt$ | $EF = \left(\frac{0.4536}{1.6093}\right) \times 1.5 \times (s/12)^{0.9} \times (1.1023 \times M/3)^{0.45}\ kg/VKT$ | $EF = \left(\frac{0.4536}{1.6093}\right) \times 0.15 \times (s/12)^{0.9} \times (1.1023 \times M/3)^{0.45}\ kg/VKT$ |
| Crushing (controlled) | $0.0006\ kg/tonne$ | $0.00027\ kg/tonne$ | $0.00005\ kg/tonne$ |
| Screening (controlled) | $EF = 0.0011\ kg/$tonne | $EF = 0.00037\ kg/$tonne | $EF = 0.000025\ kg/tonne$ |
| Conveying | $EF = 850\ kg/ha/year$ | $0.5 \times TSP$ | $0.075 \times TSP$ |
| Wind erosion on stockpiles | $EF = 850\ kg/ha/year$ | $0.5 \times TSP$ | $0.075 \times TSP$ |

EF = emission factor, U = wind speed (m/s), M = moisture content (%), s = silt content (%), s.L. = silt loading (g/m$^2$), W = average weight of vehicle (tonne), VKT = vehicle kilometres travelled (km), S = vehicle speed (km/hr)

**Table B-2: Dust Emissions Inventory – Average**

| Activity - AVERAGE | TSP emission (kg/y) | PM10 emission (kg/y) | PM25 emission (kg/y) | Intensity | Units | Emission Factor - TSP | Emission Factor - PM10 | Emission Factor - PM25 | Units | Var. 1 | Units | Var. 2 | Units | Var. 3 - TSP | Var. 3 - PM10 | Var. 3 - PM25 | Units | Var. 4 | Units | Var. 5 | Units | Var. 6 | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling RAP onto the site (paved) | 485 | 93 | 23 | 99,000 | t/yr | 0.00816 | 0.00157 | 0.00038 | kg/t | 25 | t/load | 0.7 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Hauling RAP onto the site (unpaved) | 442 | 113 | 11 | 99,000 | t/yr | 0.007 | 0.002 | 0.000 | kg/t | 25 | t/load | 0.1 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Unloading material at RAP stockpiles | 30 | 14 | 2 | 99,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| FEL loading RAP material at stockpile | 30 | 14 | 2 | 99,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| FEL unloading RAP material to hopper | 30 | 14 | 2 | 99,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Crushing RAP material (controlled) | 59 | 27 | 5 | 99,000 | t/yr | 0.001 | 0.000 | 0.00005 | kg/t | | | | | | | | | | | | | | |
| Conveying RAP material to screen | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Screening RAP material (controlled) | 109 | 37 | 2 | 99,000 | t/yr | 0.0011 | 0.00037 | 0.000025 | kg/t | | | | | | | | | | | | | | |
| Conveying RAP material to stockpile | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| FEL loading RAP material to dumptruck | 30 | 14 | 2 | 99,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Dumptruck hauling RAP material to storage area (unpaved) | 442 | 113 | 11 | 99,000 | t/yr | 0.007 | 0.002 | 0.000 | kg/t | 25 | t/load | 0.1 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Dumptruck hauling RAP material to storage area (paved) | 359 | 69 | 17 | 99,000 | t/yr | 0.00605 | 0.00116 | 0.00028 | kg/t | 25 | t/load | 0.5 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Dumptruck unloading RAP material to storage area | 30 | 14 | 2 | 99,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| FEL loading RAP material to dumptruck | 30 | 14 | 2 | 99,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Dumptruck hauling RAP material to cold feeder at asphalt plant (paved) | 201 | 39 | 9 | 99,000 | t/yr | 0.00339 | 0.00065 | 0.00016 | kg/t | 25 | t/load | 0.3 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Dumptruck unloading RAP material to feeder | 30 | 14 | 2 | 99,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Conveying RAP material to asphalt plant | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Hauling raw material onsite (paved) | 719 | 138 | 33 | 400,000 | t/yr | 0.00299 | 0.00057 | 0.00014 | kg/t | 25 | t/load | 0.3 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Hauling raw material onsite (unpaved) | 410 | 105 | 11 | 400,000 | t/yr | 0.002 | 0.000 | 0.000 | kg/t | 25 | t/load | 0.02 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Unloading raw material to storage bay | 85 | 40 | 6 | 400,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | 30 | % C |
| FEL loading raw material from storage bay to dumptruck | 121 | 57 | 9 | 400,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Hauling raw material to asphalt plant storage area (unpaved) | 820 | 211 | 21 | 400,000 | t/yr | 0.003 | 0.001 | 0.000 | kg/t | 25 | t/load | 0.04 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Hauling raw material to asphalt plant storage area (paved) | 791 | 152 | 37 | 400,000 | t/yr | 0.00330 | 0.00063 | 0.00015 | kg/t | 25 | t/load | 0.3 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Unloading raw material to storage bay | 85 | 40 | 6 | 400,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | 30 | % C |
| FEL loading raw material to feeder | 121 | 57 | 9 | 400,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Conveying raw material to asphalt plant | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Conveying processed asphalt to dispatch truck | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Unloading processed asphalt to dispatch truck | 3 | 2 | 0.2 | 400,000 | t/yr | 0.00001 | 0.00000 | 0.00000 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 80.0 | M.C. | | | | | | | | | | |
| Hauling asphalt offsite (paved) | 1,114 | 214 | 52 | 400,000 | t/yr | 0.00464 | 0.00089 | 0.00022 | kg/t | 25 | t/load | 0.4 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Wind erosion - RAP stockpiles | 484 | 242 | 36 | 1.1 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | 50 | % C |
| Exhaust emissions | 340 | 340 | 329 | | | | | | | | | | | | | | | | | | | | |
| **Total emissions (kg/yr.)** | **7,405** | **2,190** | **643** | | | | | | | | | | | | | | | | | | | | |

**Table B-3: Dust Emissions Inventory – Peak**

| Activity - PEAK | TSP emission (kg/y) | PM10 emission (kg/y) | PM25 emission (kg/y) | Intensity | Units | Emission Factor - TSP | Emission Factor - PM10 | Emission Factor - PM25 | Units | Var. 1 | Units | Var. 2 | Units | Var. 3 - TSP | Var. 3 - PM10 | Var. 3 - PM25 | Units | Var. 4 | Units | Var. 5 | Units | Var. 6 | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling RAP onto the site (paved) | 8,577 | 1,646 | 398 | 1,752,000 | t/yr | 0.00816 | 0.00157 | 0.00038 | kg/t | 25 | t/load | 0.7 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Hauling RAP onto the site (unpaved) | 7,814 | 2,008 | 201 | 1,752,000 | t/yr | 0.007 | 0.002 | 0.000 | kg/t | 25 | t/load | 0.1 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Unloading material at RAP stockpiles | 531 | 251 | 38 | 1,752,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| FEL loading RAP material at stockpile | 531 | 251 | 38 | 1,752,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| FEL unloading RAP material to hopper | 531 | 251 | 38 | 1,752,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Crushing RAP material (controlled) | 1,051 | 473 | 88 | 1,752,000 | t/yr | 0.001 | 0.000 | 0.00005 | kg/t | | | | | | | | | | | | | | |
| Conveying RAP material to screen | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Screening RAP material (controlled) | 1,927 | 648 | 44 | 1,752,000 | t/yr | 0.0011 | 0.00037 | 0.000025 | kg/t | | | | | | | | | | | | | | |
| Conveying RAP material to stockpile | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| FEL loading RAP material to dumptruck | 531 | 251 | 38 | 1,752,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Dumptruck hauling RAP material to storage area (unpaved) | 7,814 | 2,008 | 201 | 1,752,000 | t/yr | 0.007 | 0.002 | 0.000 | kg/t | 25 | t/load | 0.1 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Dumptruck hauling RAP material to storage area (paved) | 6,356 | 1,220 | 295 | 1,752,000 | t/yr | 0.00605 | 0.00116 | 0.00028 | kg/t | 25 | t/load | 0.5 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Dumptruck unloading RAP material to storage area | 531 | 251 | 38 | 1,752,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| FEL loading RAP material to dumptruck | 531 | 251 | 38 | 1,752,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Dumptruck hauling RAP material to cold feeder at asphalt plant (paved) | 3,563 | 684 | 165 | 1,752,000 | t/yr | 0.00339 | 0.00065 | 0.00016 | kg/t | 25 | t/load | 0.3 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Dumptruck unloading RAP material to feeder | 531 | 251 | 38 | 1,752,000 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Conveying RAP material to asphalt plant | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Hauling raw material onsite (paved) | 2,203 | 423 | 102 | 1,226,400 | t/yr | 0.00299 | 0.00057 | 0.00014 | kg/t | 25 | t/load | 0.3 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Hauling raw material onsite (unpaved) | 1,258 | 323 | 32 | 1,226,400 | t/yr | 0.002 | 0.000 | 0.000 | kg/t | 25 | t/load | 0.02 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Unloading raw material to storage bay | 260 | 123 | 19 | 1,226,400 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | 30 | % C |
| FEL loading raw material from storage bay to dumptruck | 372 | 176 | 27 | 1,226,400 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Hauling raw material to asphalt plant storage area (unpaved) | 2,515 | 646 | 65 | 1,226,400 | t/yr | 0.003 | 0.001 | 0.000 | kg/t | 25 | t/load | 0.04 | km/rt | 2.1 | 0.5 | 0.05 | kg/VKT | 5 | S.C | 28 | Ave GMV (tonnes) | 40 | % C |
| Hauling raw material to asphalt plant storage area (paved) | 2,425 | 466 | 113 | 1,226,400 | t/yr | 0.00330 | 0.00063 | 0.00015 | kg/t | 25 | t/load | 0.3 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Unloading raw material to storage bay | 260 | 123 | 19 | 1,226,400 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | 30 | % C |
| FEL loading raw material to feeder | 372 | 176 | 27 | 1,226,400 | t/yr | 0.00030 | 0.00014 | 0.00002 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 6.0 | M.C. | | | | | | | | | | |
| Conveying raw material to asphalt plant | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Conveying processed asphalt to dispatch truck | 1 | 0.5 | 0.1 | 0.001 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | | |
| Unloading processed asphalt to dispatch truck | 10 | 5 | 0.7 | 1,226,400 | t/yr | 0.00001 | 0.00000 | 0.00000 | kg/t | 1.19 | ave ws (ws/2.2)^1.3 (m/s) | 80.0 | M.C. | | | | | | | | | | |
| Hauling asphalt offsite (paved) | 3,416 | 656 | 159 | 1,226,400 | t/yr | 0.00464 | 0.00089 | 0.00022 | kg/t | 25 | t/load | 0.4 | km/rt | 0.2902 | 0.0557 | 0.0135 | kg/VKT | 3 | S.L. | 28 | Ave GMV (tonnes) | 40 | % C |
| Wind erosion - RAP stockpiles | 484 | 242 | 36 | 1.1 | ha | 850 | 425 | 64 | kg/ha/yr | | | | | | | | | | | | | 50 | % C |
| Exhaust emissions | 467 | 467 | 453 | | | | | | | | | | | | | | | | | | | | |
| **Total emissions (kg/yr.)** | **54,869** | **14,274** | **2,710** | | | | | | | | | | | | | | | | | | | | |

# Appendix C

## *Isopleth Diagrams*

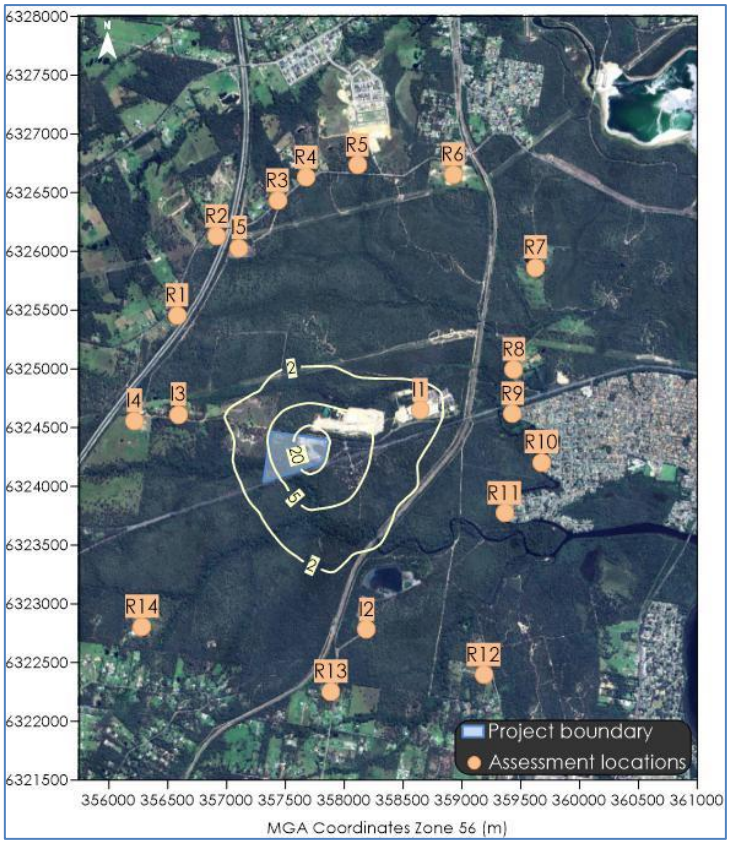



**Figure C-1: Predicted incremental maximum 24-hour average $PM_{2.5}$ concentrations (µg/m³)**

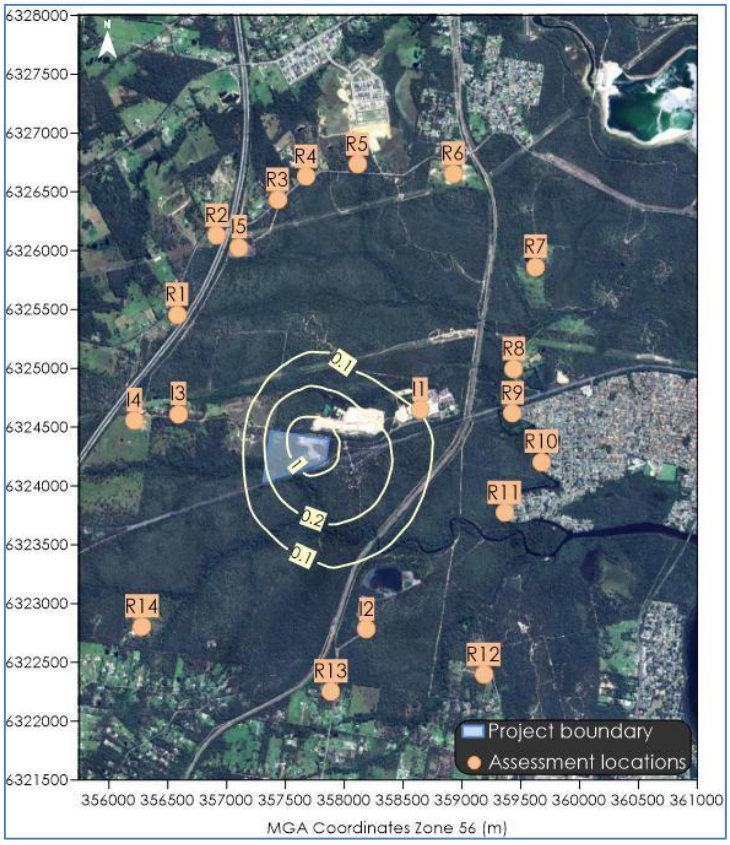



**Figure C-2: Predicted incremental annual average $PM_{2.5}$ concentrations (µg/m³)**

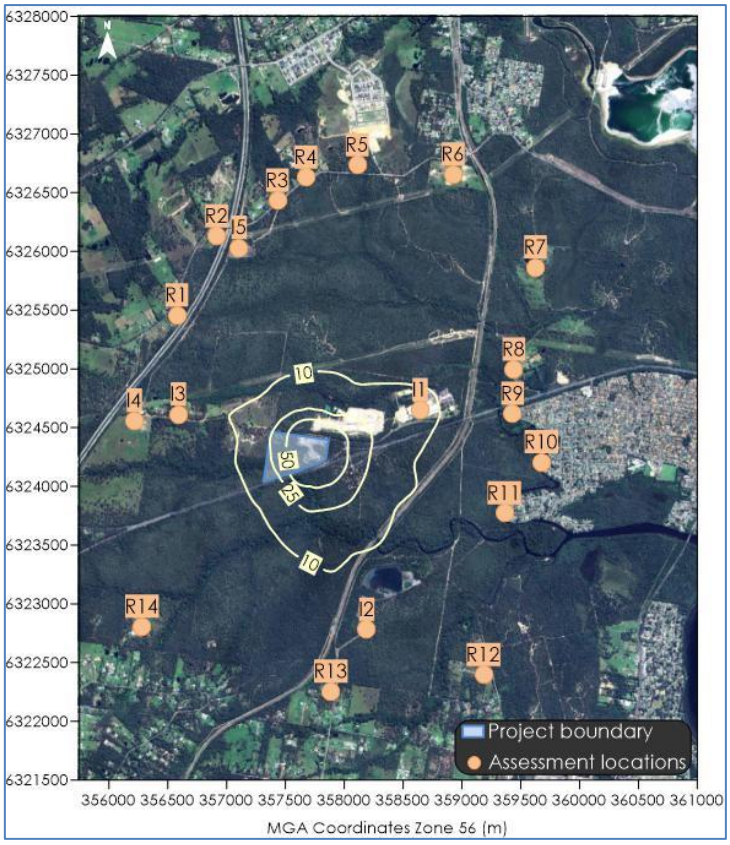



**Figure C-3: Predicted incremental maximum 24-hour average $PM_{10}$ concentrations (µg/m³)**

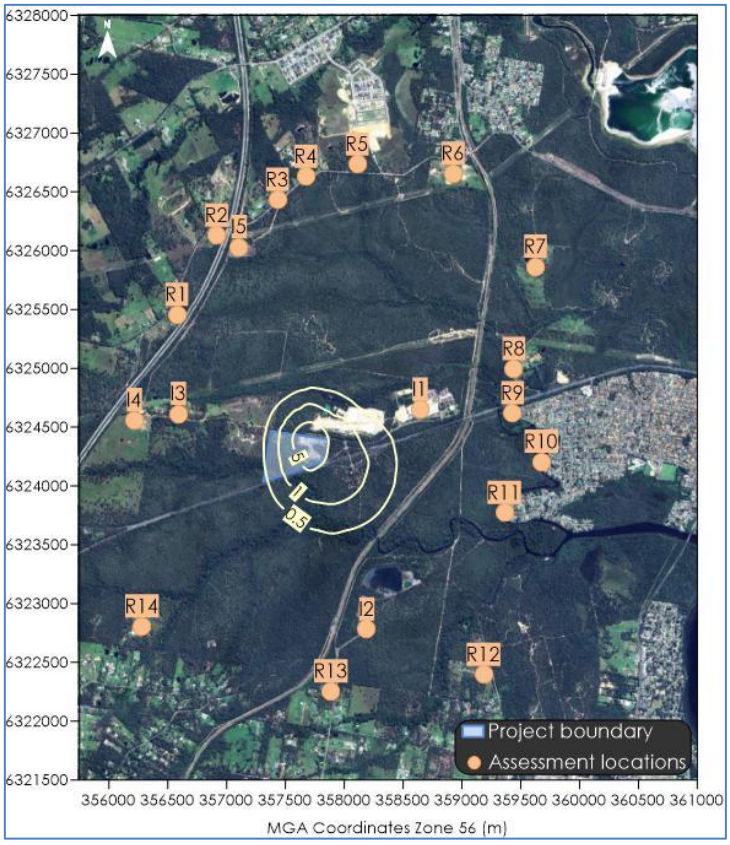



**Figure C-4: Predicted incremental annual average $PM_{10}$ concentrations (µg/m³)**

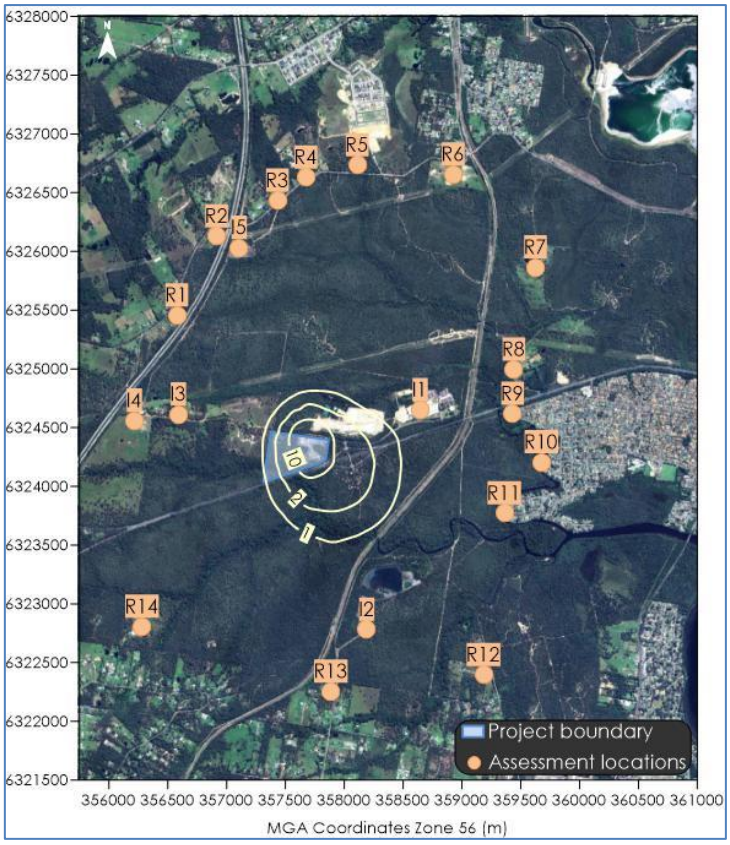



**Figure C-5: Predicted incremental annual average TSP concentrations (µg/m³)**

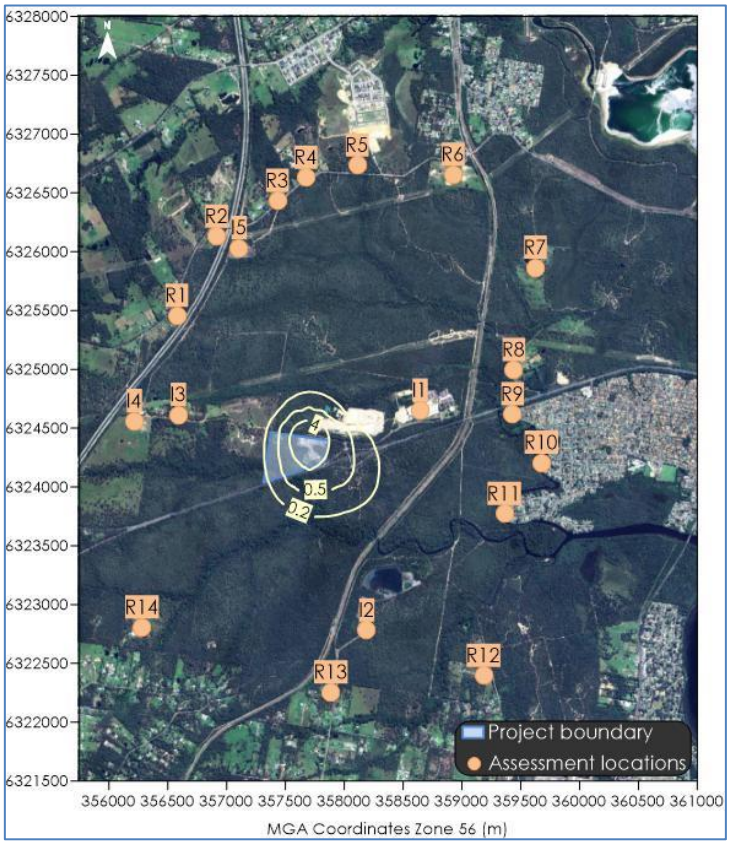



**Figure C-6: Predicted incremental annual average dust deposition levels (g/m²/month)**

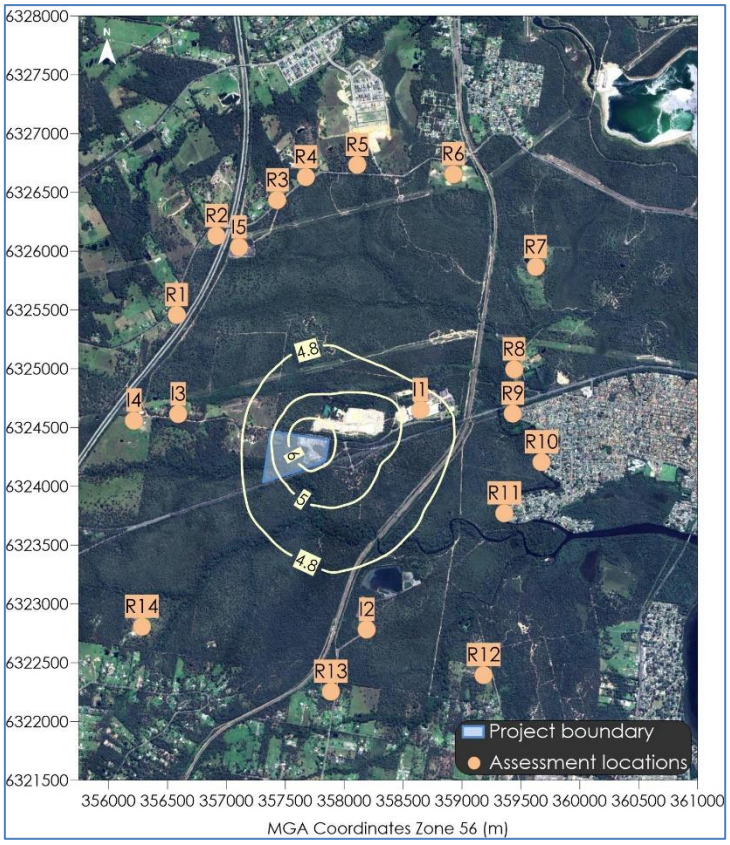



**Figure C-7: Predicted cumulative annual average $PM_{2.5}$ concentrations (µg/m³) – excluding Wallarah 2 Coal Mine**

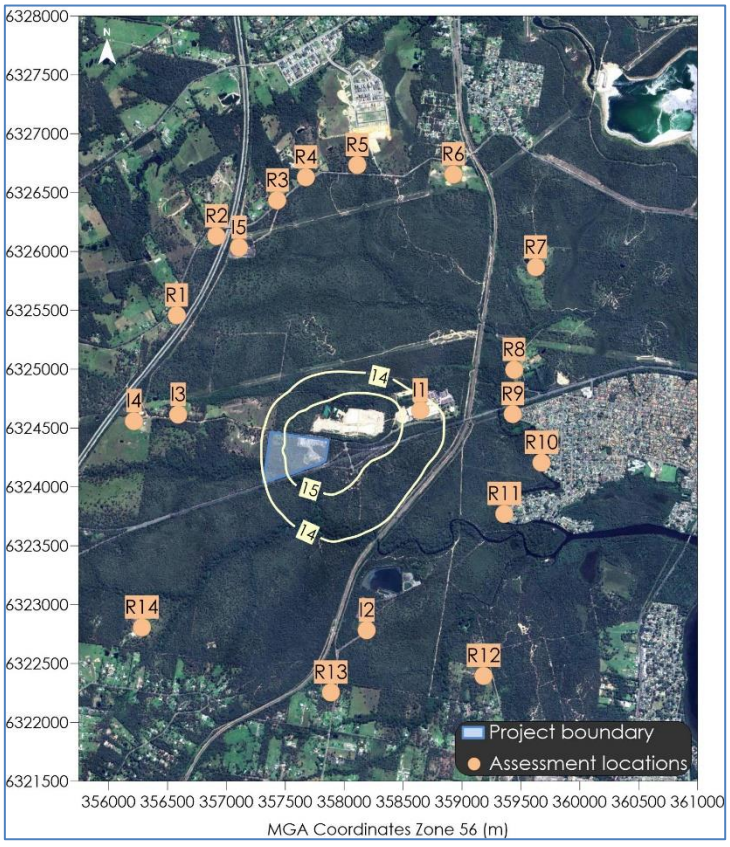



**Figure C-8: Predicted cumulative annual average $PM_{10}$ concentrations (µg/m³) – excluding Wallarah 2 Coal Mine**

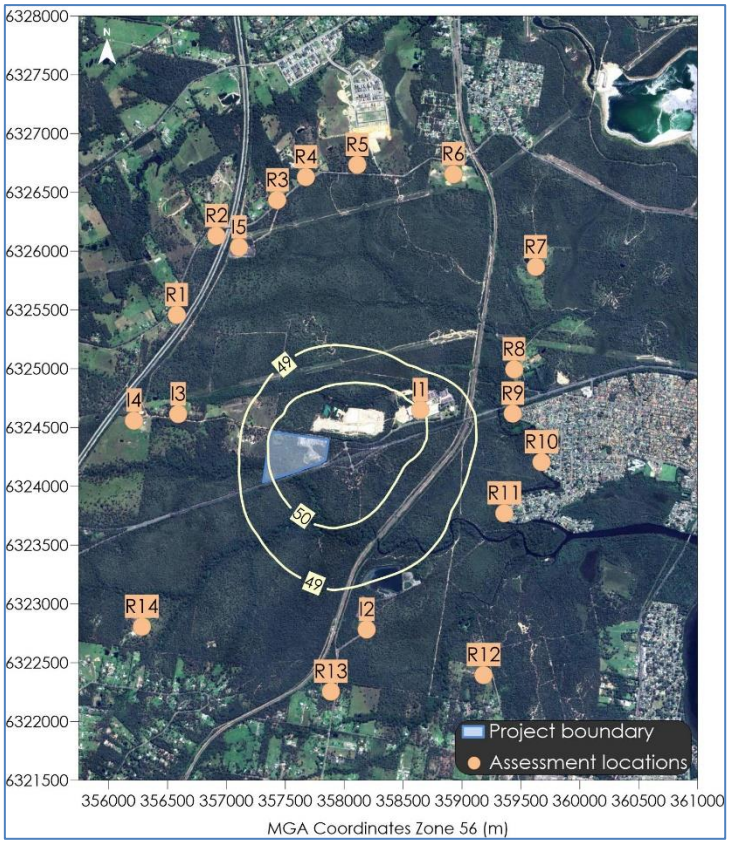



**Figure C-9: Predicted cumulative annual average TSP concentrations (µg/m³) – excluding Wallarah 2 Coal Mine**

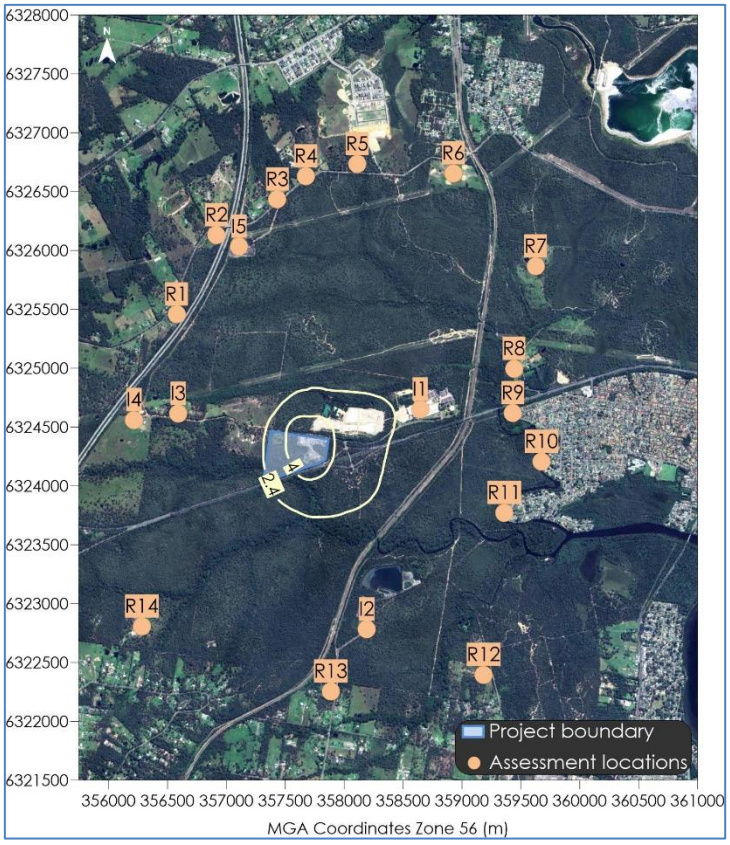



**Figure C-10: Predicted cumulative annual average dust deposition levels (g/m²/month) – excluding Wallarah 2 Coal Mine**

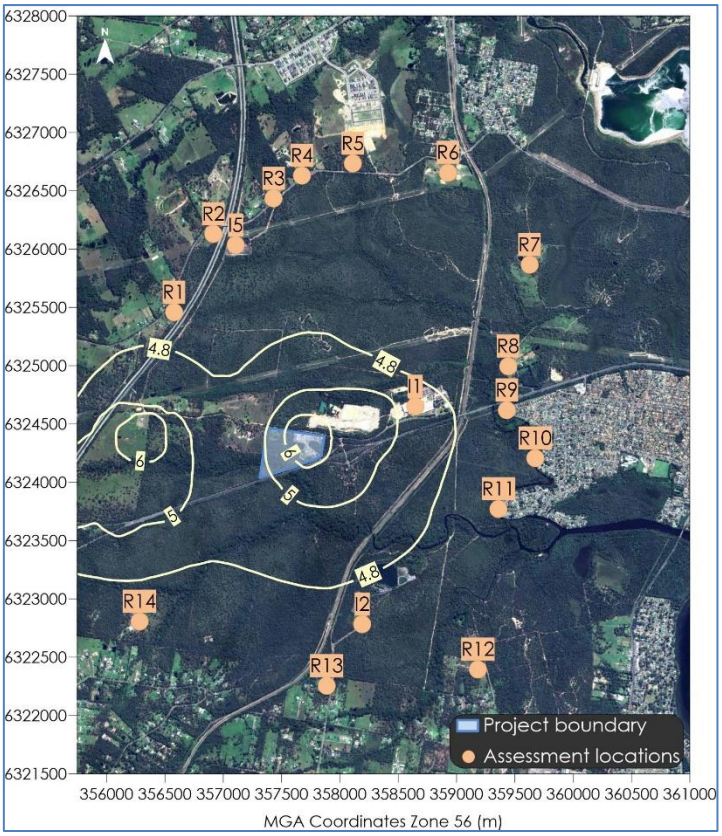



**Figure C-7: Predicted cumulative annual average $PM_{2.5}$ concentrations (µg/m³) – including Wallarah 2 Coal Mine**

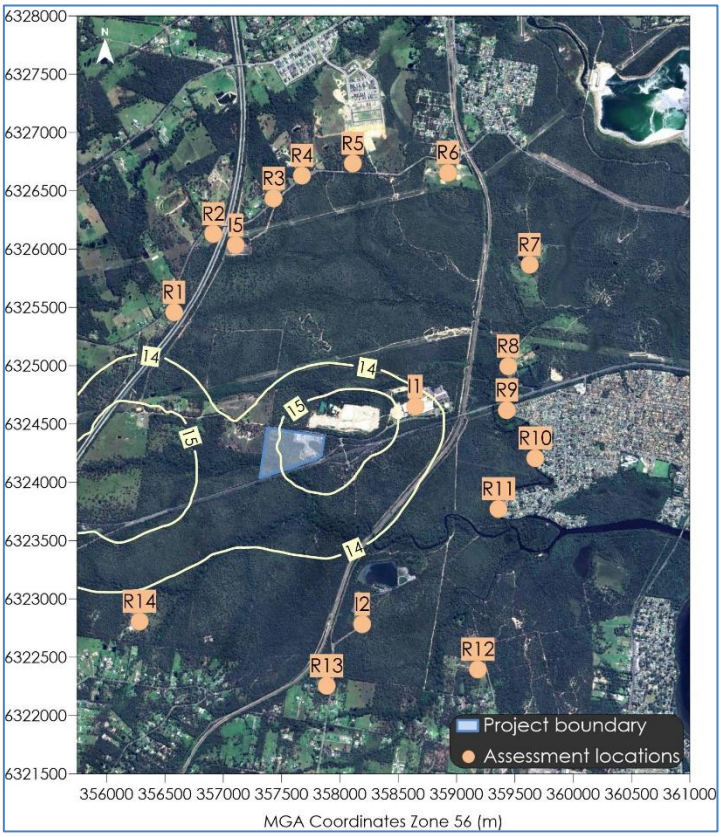



**Figure C-8: Predicted cumulative annual average $PM_{10}$ concentrations (µg/m³) – including Wallarah 2 Coal Mine**

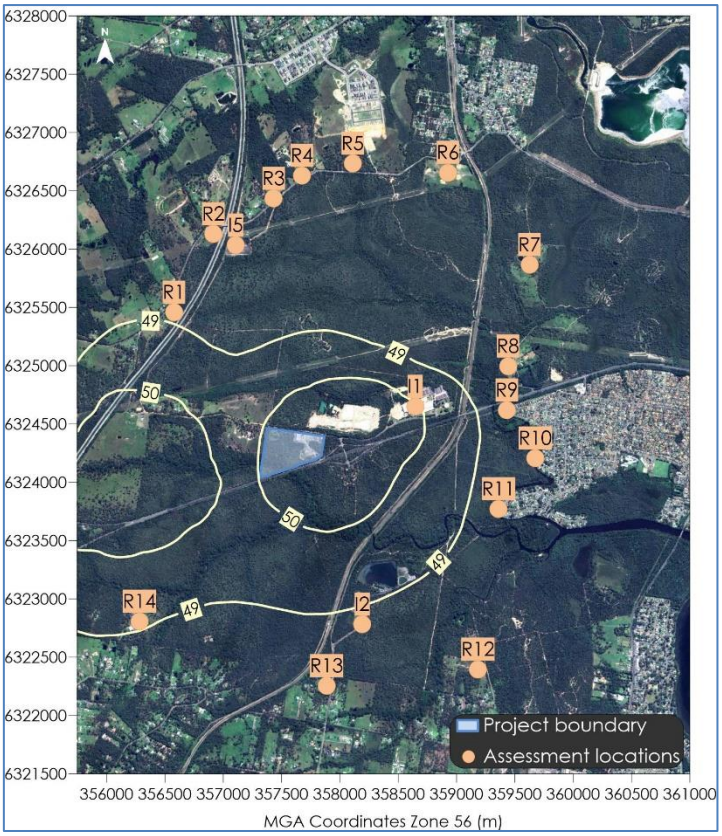



**Figure C-9: Predicted cumulative annual average TSP concentrations (µg/m³) – including Wallarah 2 Coal Mine**

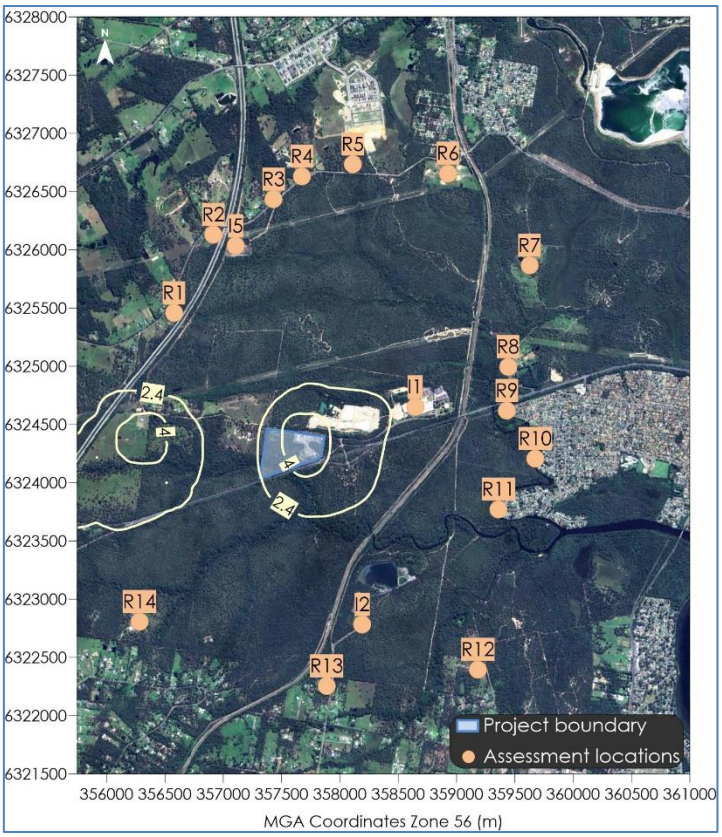



**Figure C-10: Predicted cumulative annual average dust deposition levels (g/m²/month) – including Wallarah 2 Coal Mine**

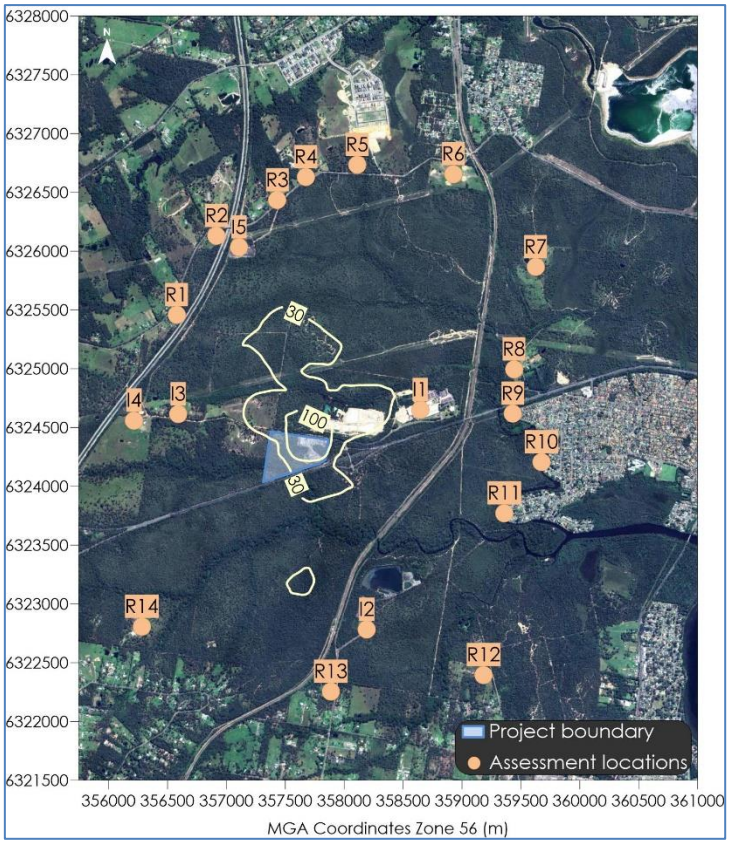



**Figure C-11: Predicted incremental maximum 1-hour average $NO_2$ concentrations due to the Project**

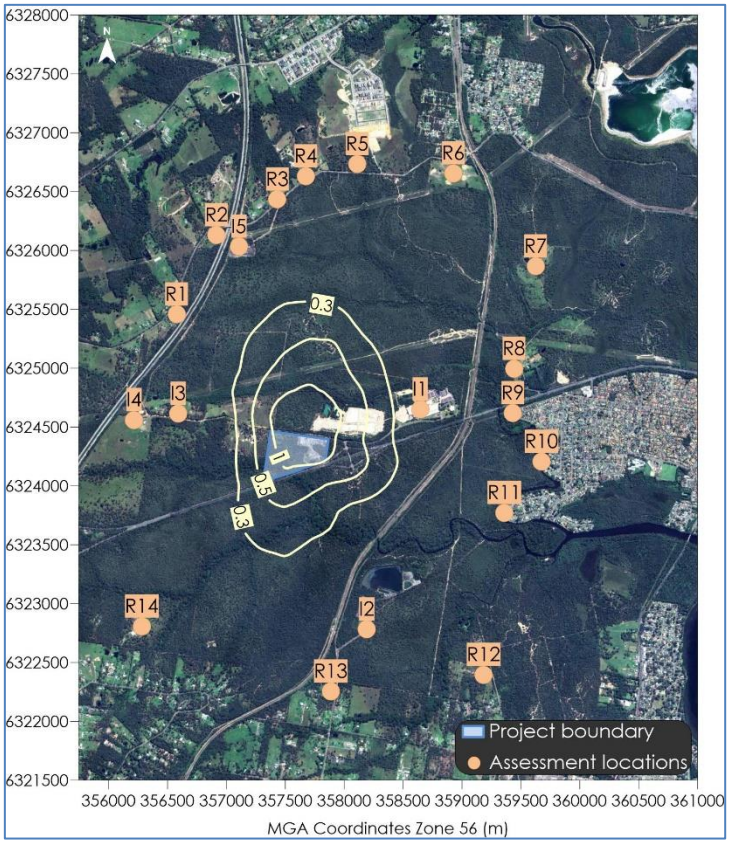



**Figure C-12: Predicted incremental annual average $NO_2$ concentrations due to the Project**

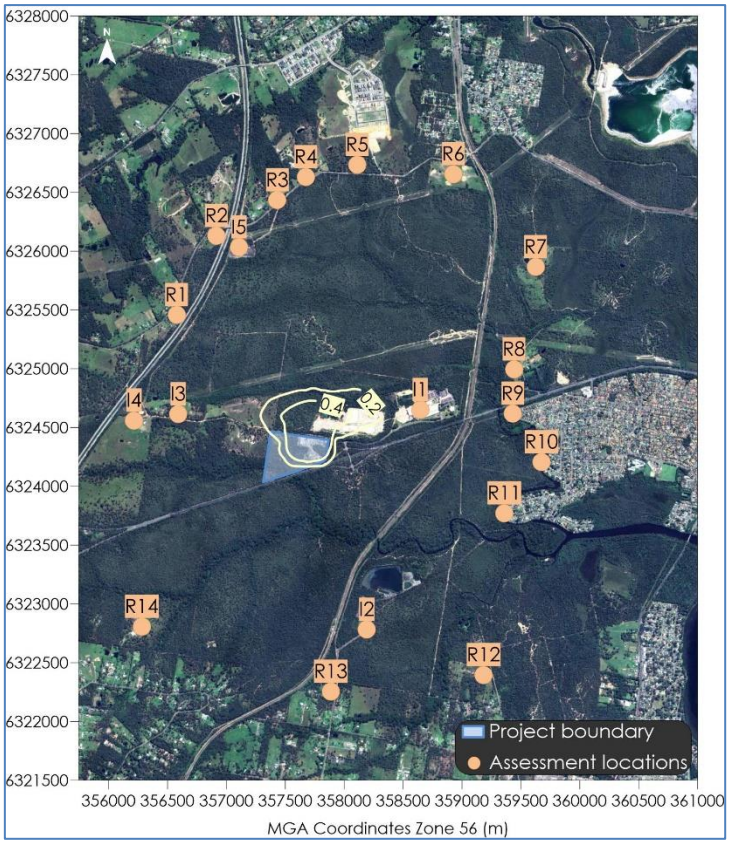



**Figure C-13: Predicted incremental 99.9th percentile 1-hour average Benzene concentrations due to the Project**

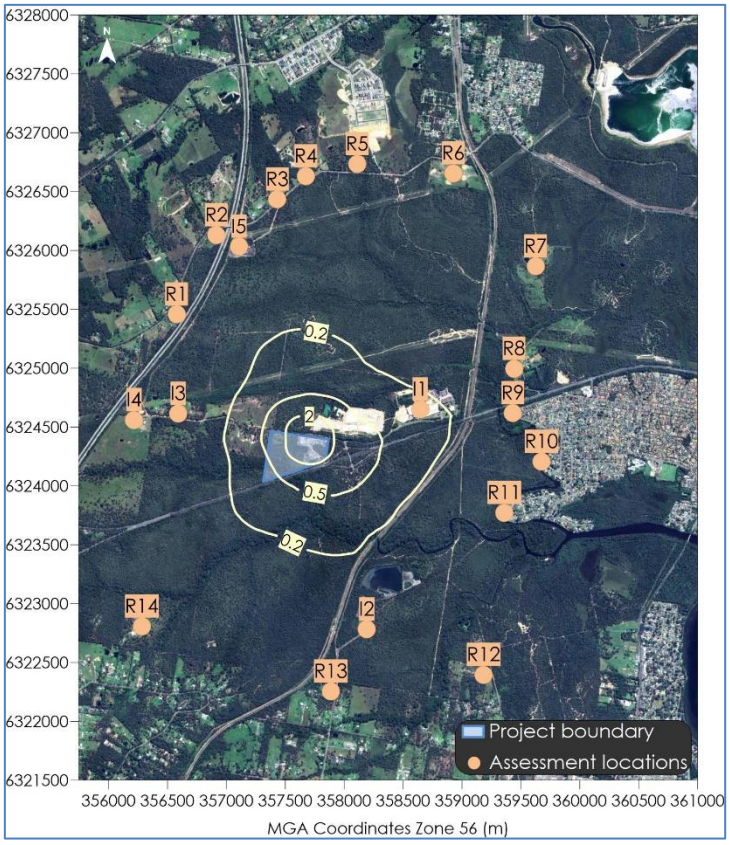



**Figure C-14: Predicted incremental 99th percentile nose-response average ground level odour concentrations**

# Appendix D

## *Further detail regarding 24-hour $PM_{2.5}$ and $PM_{10}$ analysis*

**Further detail regarding 24-hour average $PM_{2.5}$ and $PM_{10}$ analysis**

The analysis below provides a cumulative 24-hour $PM_{2.5}$ and $PM_{10}$ impact assessment in accordance with the NSW EPA Approved Methods; refer to the worked example on Page 51 to 52 of the Approved Methods.

The background level is the ambient level at the Wyong monitoring station.

The predicted increment is the predicted level to occur at the receptor due to the Project.

The total is the sum of the background level and the predicted level. The totals may have minor discrepancies due to rounding.

**Table D-1** shows the predicted maximum 24-hour average $PM_{10}$ cumulative levels at receptor I1.

**Table D-2** shows the predicted maximum 24-hour average $PM_{2.5}$ cumulative levels at receptor I1.

The left half of the table examines the cumulative impact during the periods of highest background levels and the right half of the table examines the cumulative impact during the periods of highest contribution from the project.

Any value above the $PM_{2.5}$ criterion of 25µg/m$^3$ or above the $PM_{10}$ criterion of 50µg/m$^3$ is in **bold red.**

**Table D-1: Cumulative 24-hour average $PM_{10}$ concentration (µg/m³) – I1**

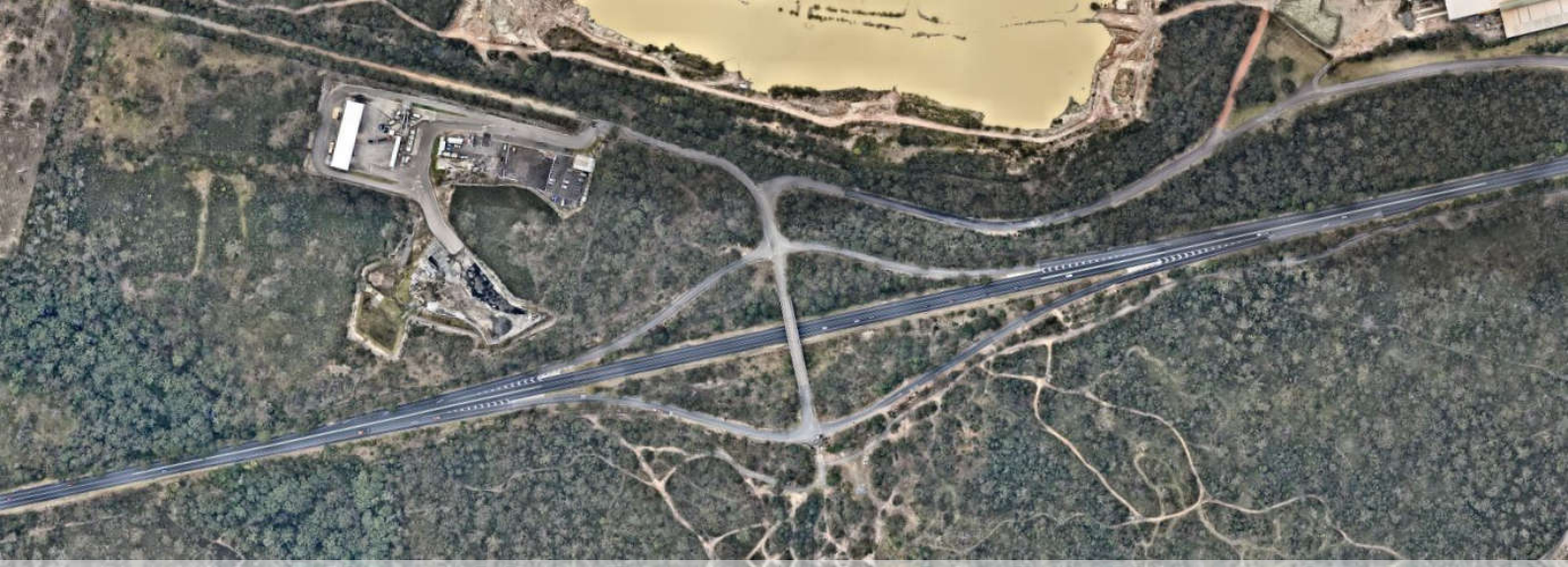
| Ranked by Highest to Lowest Background Concentrations | | | | Ranked by Highest to Lowest Predicted Incremental Concentration | | | |
|---|---|---|---|---|---|---|---|
| Date | Measured background level | Predicted increment | Total cumulative 24-hr average level | Date | Measured background level | Predicted increment | Total cumulative 24-hr average level |
| 15/04/2021 | 44.9 | 4.7 | 49.6 | 5/05/2021 | 9.1 | 12.6 | 21.7 |
| 24/01/2021 | 37.1 | 0.0 | 37.1 | 22/05/2021 | 11.3 | 9.4 | 20.7 |
| 15/01/2021 | 36.4 | 0.9 | 37.3 | 23/05/2021 | 9.1 | 7.2 | 16.3 |
| 11/01/2021 | 34.5 | 0.0 | 34.5 | 12/05/2021 | 10.2 | 7.1 | 17.3 |
| 2/03/2021 | 30.6 | 0.1 | 30.7 | 8/04/2021 | 7.1 | 6.7 | 13.8 |
| 22/01/2021 | 30.1 | 0.0 | 30.1 | 30/04/2021 | 10.7 | 5.9 | 16.6 |
| 12/01/2021 | 29.3 | 0.0 | 29.3 | 14/08/2021 | 14.8 | 5.8 | 20.6 |
| 15/12/2021 | 27.7 | 0.2 | 27.9 | 24/05/2021 | 7.0 | 5.7 | 12.7 |
| 29/10/2021 | 27.1 | 2.5 | 29.6 | 4/05/2021 | 19.4 | 5.7 | 25.1 |
| 18/01/2021 | 25.6 | 0.2 | 25.8 | 30/06/2021 | 7.3 | 5.3 | 12.6 |

**Table D-2: Cumulative 24-hour average $PM_{2.5}$ concentration (µg/m³) – I1**

| Ranked by Highest to Lowest Background Concentrations | | | | Ranked by Highest to Lowest Predicted Incremental Concentration | | | |
|---|---|---|---|---|---|---|---|
| Date | Measured background level | Predicted increment | Total cumulative 24-hr average level | Date | Measured background level | Predicted increment | Total cumulative 24-hr average level |
| 15/08/2021 | 14.8 | 0.2 | 11.8 | 5/05/2021 | 6.5 | 2.6 | 14.2 |
| 12/09/2021 | 13.0 | 0.1 | 11.5 | 22/05/2021 | 5.1 | 2.1 | 13.5 |
| 10/10/2021 | 12.7 | 0.0 | 12.1 | 23/05/2021 | 5.6 | 1.6 | 13.7 |
| 28/10/2021 | 12.0 | 0.4 | 13.1 | 12/05/2021 | 4.2 | 1.6 | 14.3 |
| 15/01/2021 | 11.9 | 0.2 | 16.8 | 8/04/2021 | 0.5 | 1.5 | 18.1 |
| 18/01/2021 | 11.6 | 0.1 | 12.2 | 30/04/2021 | 7.3 | 1.3 | 13.4 |
| 4/05/2021 | 11.0 | 1.3 | 13.2 | 4/05/2021 | 11.0 | 1.3 | 13.2 |
| 1/03/2021 | 10.4 | 0.0 | 13.6 | 14/08/2021 | 8.8 | 1.3 | 14.9 |
| 2/09/2021 | 9.8 | 0.0 | 10.2 | 8/07/2021 | 5.9 | 1.2 | 11.4 |
| 23/08/2021 | 9.6 | 0.0 | 6.9 | 24/05/2021 | 3.4 | 1.2 | 8.1 |


# APPENDIX H

## TRAFFIC IMPACT ASSESSMENT REPORT



# TRAFFIC AND PARKING IMPACT ASSESSMENT OF UPGRADE TO EXISTING ASPHALT PLANT AT 203 TOOHEYS ROAD, BUSHELLS RIDGE


**Address: Shop 7, 720 Old Princes Highway Sutherland NSW 2232**
**Postal: P.O Box 66 Sutherland NSW 1499**

**Telephone: +61 2 9521 7199**
**Web: www.mclarentraffic.com.au**
**Email: admin@mclarentraffic.com.au**

**Division of RAMTRANS Australia ABN: 45067491678 RPEQ: 19457**


**Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness**

**Development Type:** **Proposed Asphalt Plant**

**Site Address:** **203 Tooheys Road, Bushells Ridge**

**Prepared for:** **Fulton Hogan**

**Document reference:** **220467.01FB**

| Status | Issue | Prepared By | Checked By | Date |
|---|---|---|---|---|
| Draft | A | MM | LS | 16 November 2022 |
| Draft | B | LS | | 13 January 2023 |
| Draft | C | LS/SI | | 17 February 2023 |
| Final | A | LS | | 17 February 2023 |
| Final | B | LS | | 22 June 2023 |

# TABLE OF CONTENTS

# 1 INTRODUCTION

*M^CLaren Traffic Engineering (MTE)* was commissioned by *Fulton Hogan* to provide a Traffic and Parking Impact Assessment for the upgrade of the existing Asphalt Plant at 203 Tooheys Road, Bushells Ridge.

The existing site currently operates as an asphalt plant, as approved under Development Consent DA1511/2016, by Central Coast Council. The existing site is approved to produce up to 100,000 tonnes per annum (tpa) of asphalt and processes up to 20,000 tpa of reclaimed asphalt pavement (RAP).

## *1.1 Description and Scale of Development*

The proposed development, shown in **Annexure A** involves the intensification of the existing Asphalt Plant to facilitate an increased capacity of production for up to a maximum of 400,000 tpa of asphalt which will include processing of up to 99,000 tpa of reclaimed asphalt pavement (RAP) as part of this 400,000 tpa of material. A brief description of the facility's operations are outlined below that relate to traffic and parking.

- An increase in total imports and exports of 300,000 tpa of asphalt to a total of 400,000 tpa of asphalt;
    - This increase includes an increase in the limit of importing of RAP by 79,000 tpa to a total of up to 99,000 tpa of RAP, which is used 100% within the asphalt manufacturing;
- Provision of 36 on-site car parking spaces including one (1) disabled-accessible space;
- Export and import of material are completed using an average truck capacity of 32 tonnes using a variety of vehicle types as per the following:
    - 6.4 length Small Rigid Vehicle (SRV);
    - 8.8m length Medium Rigid Vehicle (MRV);
    - 12.5m length Heavy Rigid Vehicle (HRV)
    - 20m Articulated Vehicle (AV);
    - 19m Truck and Dog Combinations (T&D);
    - 25/26m length B-doubles.

The plant will continue to operate 24 hours a day, 7 days a week and will accommodate up to 35 site-based staff at any one time. The expected ranges of staffing to be on site are detailed in **Table 1**.

**TABLE 1: STAFFING RANGES**

| Staff Type | Day Shift (8am – 5pm) | Night Shift (6pm – 6am) / Weekends |
|---|---|---|
| **Site Based** | **–** | **–** |
| Office | 15 – 26 | 0 – 2 |
| Lab | 2 – 4 | 0 – 2 |
| Plant / Site | 3 – 5 | 2 – 5 |
| **Non-Site Based** | **–** | **–** |
| Truck Drivers | 5 – 5 | 5 – 5 |
| Road Crews | 10 – 20 | 10 – 20 |

### *1.2 State Environmental Planning Policy (Transport and Infrastructure) 2021*

The proposed development does qualify as a development with relevant size and/or capacity under Clause 2.122 of the State Environmental Planning Policy (Transport and Infrastructure) 2021. Accordingly, formal referral to the Transport for NSW is necessary and it is expected that Central Coast Council officers will refer this proposal accordingly.

### *1.3 Environmental Assessment Requirements*

The proposed expansion to the asphalt plant is classified as both "designated" and "integrated" development under Part 4 of the Environmental Planning and Assessment Act 1979. Accordingly, the NSW Department of Planning & Environment has issued Secretary's Environmental Assessment Requirements (SEARs) for the development proposal.

The traffic and transport related items within SEARs provided by the Department of Planning and Environment that are relevant to this report are listed in **Table 2**, which also provides the relevant section in which the information can be found.

**TABLE 2: SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS**

| Requirement | Relevant Section |
|---|---|
| Details of road transport routes and access to the site | **Section 1.5** |
| Road traffic predictions for the development during construction and operation | **Section 4.4 & 4.6** |
| Swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site | **N/A(1)** |
| An assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development | **Section 4** |

Note: 1 - To be completed by others / outside of the scope of this report

### *1.4 Transport For NSW Responses to SEARs*

The traffic and transport related responses to the above SEARs was provided from TfNSW in their letter dated 9 August 2022 which is reproduced in **Annexure B** for reference. This Traffic Report has been prepared in accordance with Austroads Guide to Traffic Management Part 12, complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments 2002, as adopted by TfNSW.

The traffic and transport related items within this letter that TfNSW recommend should be detailed within a Traffic Impact Assessment are listed in **Table 3**, which also provides the relevant section in which the information can be found.

## TABLE 3: TFNSW REQUIREMENTS

| Requirement | Relevant Section |
|---|---|
| A map of the surrounding road network identifying the site access, nearby accesses, intersections, relevant traffic route/s and connections to the classified (State) road network. | **Section 1.5** |
| Assessment of all relevant vehicular traffic routes and intersections to / from the subject properties. | **Section 2 & 4** |
| Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network. | **Section 2.3** |
| The anticipated additional vehicular traffic generated from construction, operational and decommissioning stages of the project. | **Section 4** |
| The distribution on the road network of the trips generated by the project. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation. | **Section 4.2.1** |
| Detailed assessment of all vehicular transport routes, relevant intersections and connections to the classified (State) road network for access to / from the proposed development site/s (including any ancillary sites). | **Section 2 & 4** |
| Assessment of Over Size Over Mass (OSOM) and heavy vehicle routes for all components associated with the asphalt plant, including swept path analysis for the largest design vehicle/s accessing the site, and turning, at relevant intersections along the classified (State) road network. | **N/A** – existing routes and vehicles used. No over-size vehicles proposed. Swept path assessment of site access completed by others. |
| Consideration of the traffic impacts on existing and proposed intersections, including access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during construction, operational and decommissioning stages. | **Section 4** |
| • Vehicle types to be considered:<br>o Commuter (employee and contractor) light vehicles and pool vehicles,<br>o Heavy vehicles,<br>o Over size and over mass (OSOM) vehicles. | **Section 4** |
| Consideration of cumulative impacts to identify and assess the implications of any projects that will potentially be occurring simultaneously | **NA – No over-size vehicles proposed** |

| | |
|---|---|
| with the scheduling of any OSOM movements along the proposed OSOM routes.<br>The assessment should consider the following:<br>o The cumulative impacts from traffic generated from the construction workforces in terms of the routes, access, AM/PM peaks where there is overlap with other projects.<br>o The cumulative impacts of heavy vehicle movements in terms of AM/PM peaks and routes where there is an overlap with other projects.<br>o Cumulative impacts and consideration in relation to the timing of movements of OSOMs where other projects will be utilising the same routes as proposed for this development.<br>o Any potential for future expansion of the subject development and the potential impacts any such expansion would have on the development, the broader road network and the AM/PM peaks. It should be noted, any future expansion beyond the scope of the subject application, will require additional applications and approvals.<br>o Strategies to manage the risk of damage to public road assets where accelerated deterioration of the road pavement occurs during construction and/or operation. | |
| An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for each relevant intersection along the identified transport route/s, including connections to the classified (State) road network. | **N/A**[(1)] |
| Identify the necessary road network infrastructure upgrades that are required to cater for, and mitigate, the impact of project related traffic on both the local and classified road network for the development (for instance, road widening and/or intersection treatments).<br>Strategic (2D) design drawings for any proposed road upgrades and the site access should be prepared to support the TIA and demonstrate the scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure.<br>All proposed works must be:<br>o Designed in accordance with Austroads Guidelines, Australian Standards and TfNSW Supplements<br>o Appropriately designed for the existing posted speed limit. | **Section 4.5** – No upgrades necessary |

| | |
|---|---|
| o To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.<br>o To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.<br>o Submitted with the EIS and TIA.<br><br>For any roadwork deemed necessary on the classified (State) road, the developer will be required to enter into a Works Authorisation Deed (WAD) or other suitable agreement as required by TfNSW. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website. | |
| Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:<br>o Current traffic counts and 10 year traffic growth projections<br>o With and without development scenarios<br>o 95th percentile back of queue lengths<br>o Delays and level of service on all legs for the relevant intersections<br>o Electronic data for TfNSW review. | **Sections 2.3 & 4** |
| Relevant swept paths analysis for the largest design vehicle accessing the site | **N/A – completed by others** |
| Impacts on public transport (public and school bus routes consideration for alternative transport modes such as walking and cycling or carpooling and shuttle buses during construction. | **Section 3.2** (bicycles);<br>No accessible public transport available |
| Details of any Traffic Management Plan (TMP) proposed to address the construction, operation and decommissioning phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017.<br>It is recommended that any TMP include, but not necessarily limited to, the following;<br>o A map of the primary transport route/s highlighting critical locations.<br>o An induction process for vehicle operators and regular toolbox meetings.<br>o Procedures for travel through residential areas, school zones and/or bus route/s.<br>o any proposed temporary measures such a Traffic Guidance Scheme (TGS) | **N/A**[(1)] |

| | |
|---|---|
| o A Driver Code of Conduct for heavy vehicle operators.<br>o A complaint resolution and disciplinary procedure.<br>o Community consultation measures proposed for peak periods.<br>o Work, health and safety requirements under the Work Health and Safety Regulation 2017. | |
| A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056. | **Section 3.4.1** |
| Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines. | **N/A(1)** |

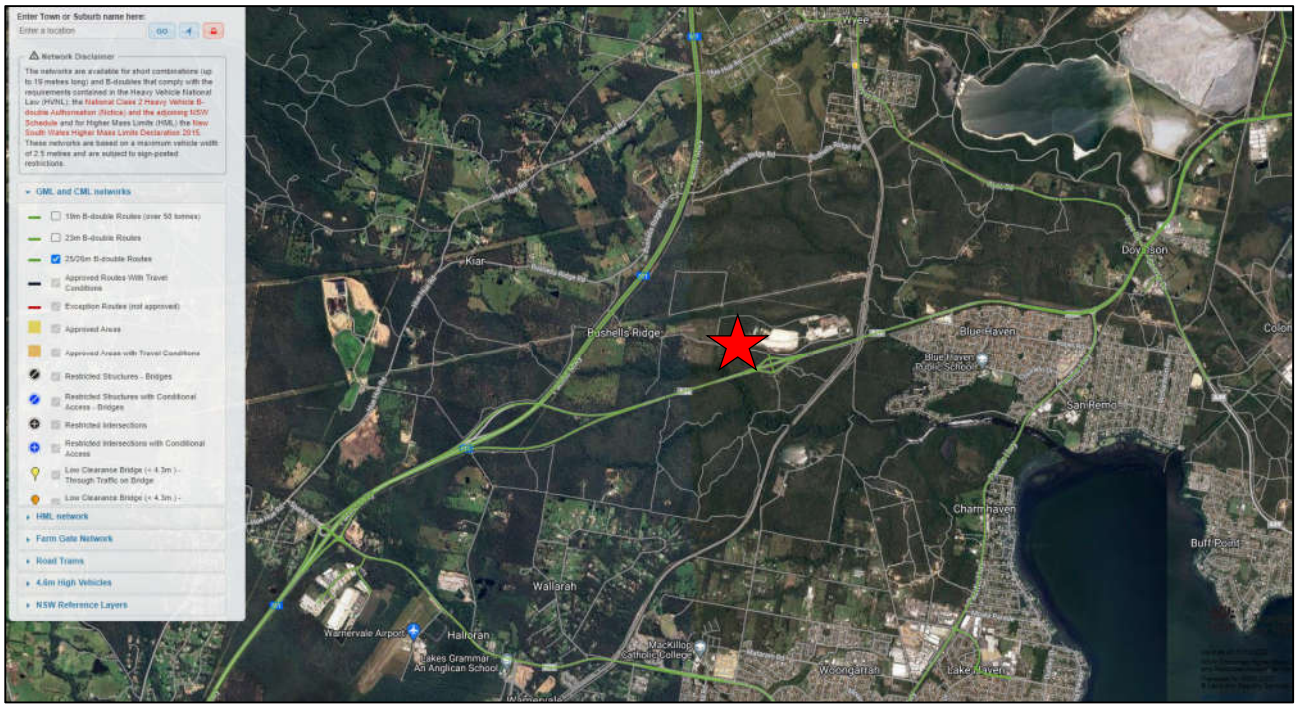
Note: 1 - To be completed by others / outside of the scope of this report

## *1.5 Site Location & Description*

The site comprises an existing Asphalt Plant located at 203 Tooheys Road, Bushells Ridge, which provides existing vehicle access to the site via Tooheys Road. The subject site is surrounded by existing quarry facilities to the east, with vacant land mostly surrounding the site.

The subject site is well connected to the State Road network, with the Pacific Motorway located to the west of the site and the Pacific Highway located to the east of the site. Tooheys Road connects to the Motorway Link Road which connects to both Pacific Motorway and Pacific Highway. There are no available public transport modes of transport within close proximity to the site, nor will any public transport routes be impacted by the proposal. All haulage routes to the site will be via Tooheys Road via the interchange at the Motorway Link Road.

The existing approved B-double routes within close proximity to the site are shown in **Figure 1** below.



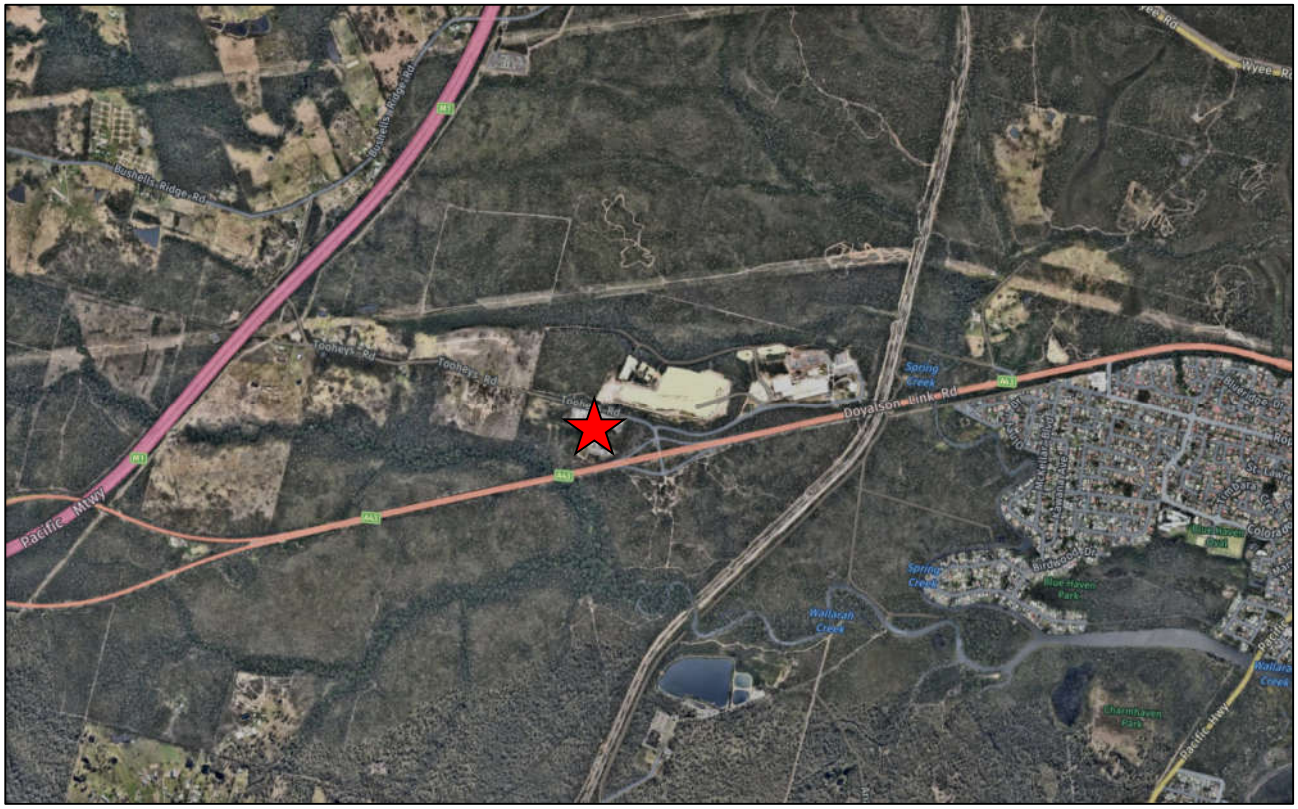

**Site Location**

**FIGURE 1: EXISTING APPROVED 26M B-DOUBLE ROUTES**

As shown above, the Motorway Link Road, Pacific Motorway and Pacific Highway are all existing approved B-double routes and it is important to note that Tooheys Road connects to the existing approved B-double routes at the interchange with the Motorway Link Road.

## *1.6 Site Context*

The site location is shown on aerial imagery and a map in **Figure 2** & **Figure 3** respectively.




**Site Location**

**FIGURE 2: SITE CONTEXT – AERIAL PHOTO**


**Site Location**

**FIGURE 3: SITE CONTEXT – STREET MAP**

## 2 EXISTING TRAFFIC AND PARKING CONDITIONS

### *2.1 Road Hierarchy*

The Motorway Link Road has the following characteristics within close proximity to the site:

- TfNSW Classified STATE Main Road (No. 675);
- Approximately 14m in width facilitating traffic flow lane in each direction;
- Signposted 100km/h carriageway.

Pacific Motorway has the following characteristics within close proximity to the site:

- TfNSW Classified STATE Motorway (No. 6003)
- Approximately 45m in width facilitating two traffic flow lanes in each direction to the north of the Motorway Link Road and three traffic flow lanes in each direction to the south of the Motorway Link Road;
- Signposted 110km/h carriageway.

Pacific Highway has the following characteristics within close proximity to the site:

- TfNSW Classified STATE Highway (No. 10);
- Approximately 17m in width (including a hatched median strip) facilitating two lanes northbound and one lane southbound;
- Signposted 70km/h carriageway.

Tooheys Road has the following characteristics within close proximity to the site:

- Unclassified LOCAL Road (Crown land).
- Approximately 8m in width with 200m of sealed pavement on the eastern side of the existing driveway with the remainder unpaved road to the west of the driveway, facilitating two-way passing;
- No speed limit signposted - 50km/h applies.

### *2.2 Existing Traffic Management*

- Stop controlled intersection with Tooheys Road / Motorway Link Road eastbound off-ramp;
- Stop controlled intersection with Tooheys Road / Motorway Link Road westbound off-ramp;
- Priority controlled intersection of Pacific Motorway / Motorway Link Road.

## *2.3 Existing Traffic Environment*

### 2.3.1 Tooheys Road

Bi-directional automatic traffic count surveys were undertaken over 7 consecutive days between 25 July to 1 August 2022 inclusive, to establish the existing traffic volumes currently utilising Tooheys Road along the site frontage. The complete survey results are provided in **Annexure C** and are summarised in **Table 4**.

**TABLE 4: TOOHEYS ROAD ALONG THE SITE FRONTAGE AVERAGE DAILY TRAFFIC AND PEAK HOUR TRAFFIC**

| Travel Direction | 5 Day Average | 7 Day Average | Weekday Peak Hour | | 85th Percentile Speed |
|---|---|---|---|---|---|
| | | | AM (8am to 9am) | PM (4pm to 5pm) | |
| **Eastbound** | 171 | 134 | 13 | 14 | 46.1 |
| **Westbound** | 169 | 132 | 13 | 11 | 47.8 |
| **Total** | **340** | **266** | **26** | **25** | **-** |

The peak hourly traffic flows along Tooheys Road are minor, in the order of 25 - 26 vehicles during the morning and evening peak hours. The proportion of heavy vehicle traffic currently utilising Tooheys Road is in the order of 21.1% of total traffic volumes.

### 2.3.2 Tooheys Road / On-off Ramps

Turning movement traffic surveys were conducted at the intersections of Tooheys Road / Motorway Link Road on/off ramps from 7:00am to 9:30am and 3:30pm to 6:00pm on Tuesday 26 July 2022 representing a typical operating weekday. The full survey results are shown in **Annexure C** for reference.

### 2.3.3 Existing Road Performance

The performance of the surrounding intersections under the existing traffic conditions has been assessed using SIDRA INTERSECTION 9.1, **Table 5** summarises the resultant intersection performance data, with full SIDRA results reproduced in **Annexure D** for reference.

## TABLE 5: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.1)

| Intersection | Peak Hour | Degree of Saturation[1] | Average Delay[2] (sec/veh) | Level of Service[3][4] | Control Type | Worst Movement | 95th Percentile Queue |
|---|---|---|---|---|---|---|---|
| ***EXISTING PERFORMANCE*** | | | | | | | |
| Tooheys Road / Motorway Link (North Side) | AM | 0.01 | 2.9 (Worst: 10.1) | **NA** (Worst: A) | Give Way | LT from Off-Ramp | 0 veh (0.1m) Overpass Bridge (South) |
| | PM | 0.01 | 4.8 (Worst: 10.6) | **NA** (Worst: A) | | LT from Off-Ramp | 0 veh (0.4m) Overpass Bridge (South) |
| Tooheys Road / Motorway Link (South Side) | AM | 0.01 | 8 (Worst: 10.2) | **NA** (Worst: A) | Give Way | RT from Off-Ramp | 0 veh (0.3m) Off-Ramp |
| | PM | 0.01 | 7.2 (Worst: 8) | **NA** (Worst: A) | | RT from Off-Ramp | 0 veh (0.2m) On-Ramp |

**Notes:**

(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown, the relevant intersections are currently performing at a good level of efficiency, with a level of service “A” conditions for the worst turning movements in both the AM & PM peak hour periods. The worst movement level of service “A” performance is characterised by low approach delays and spare capacity.

# 3 PARKING ASSESSMENT

## *3.1 Car Parking Requirement*

Reference is made to the Central Coast Council *Development Control Plan* (DCP) *2022: Section 2.13 Transport and Parking* which does not outline any parking rates applicable to Asphalt Plants and as such to provide a conservative assessment, parking will be provided at a rate of 1 space per staff member of the maximum staff expected to be on site at any one time. Given that the start / finish times of the daytime staff do not correspond with those finish / start times of the nighttime staff, there is not expected to be an overlap in parking demand. The largest number of on-site staff expected at any one time is 35 staff. Whilst there are other non-site based staff that will be associated with the operations of the site such as truck drivers and road crews, these staff are not proposed to be parking on the subject site.

Whilst it is noted that the Councils DCP 2022 does include parking rates for industrial developments, it is considered that these rates are inappropriate as they rely on the input of floor area which does not accurately reflect the extent of an Asphalt Plants works.

Based on the above the conservative provision of car parking is outlined in **Table 6**.

**TABLE 6: CAR PARKING REQUIREMENT ON FIRST PRINCIPLES**

| Land Use | Scale | Rate | Parking Requirement |
|---|---|---|---|
| Asphalt Plan | 20 Staff | 1 space per on-site staff | 35 |

As shown above the proposed development has been conservatively estimated to demand **35** car parking spaces. The proposed development provides **36** car parking spaces exceeding with the estimated car parking demand by **1** space.

## *3.2 Bicycle & Motorcycle Parking Requirements*

Reference is made to the Central Coast Council *DCP 2022: Section 2.13 Transport and Parking* which outlines the following bicycle and motorcycle requirements for industrial developments:

> *Bicycle*
>
> *Industrial - 1 space per 1000m$^2$ GFA*
>
> *Motorcycle*
>
> *Parking is to be provided at a ratio of at least 1 motorcycle space per 50 car spaces.*

Based upon Council's rates above, the development requires one (1) motorcycle space. The proposed development provides three (3) motorcycle parking spaces, exceeding the DCP's minimum requirements.

In relation to bicycle provisions, employees of the site will have to utilise the Motorway Link Road in order to access the site, which prohibits cyclists. It is therefore considered that the requirement of bicycle spaces is unnecessary.

### *3.3 Accessible Parking*

Section 2.13.3.7 of Central Coast Council DCP 2022 requires the provision of accessible car parking to be provided in accordance with the Building Code of Australia, which is generally 1-2% of the total parking provided. Therefore, the proposed development requires the provision of one (1) accessible parking space. The site provides one (1) accessible car parking space, complying with this requirement.

### *3.4 Car Park Design & Compliance*

The car parking layout as depicted in **Annexure A,** has been assessed to achieve the relevant clauses and objectives of *AS2890.1:2004*, *AS2890.2:2018* and *AS2890.6:2022*. Any variances from standards are addressed in the following subsections including required changes, if any.

The proposed car parking and vehicular access design achieves the following:

- 17.5m wide two-way driveway facilitating access to Tooheys Road;
- Minimum 6.2m wide parking aisle;
- Minimum 6.1m width circulation roadway width between high obstructions;
- Minimum 5.4m long, 2.5m wide car parking spaces;
- Minimum 5.4m long, 2.4m width accessible space with adjacent associated 5.4m long, 2.4m wide shared space;
- 1m blind aisle extension;
- Lab vehicle parking space with dimensions of 3.5m width and 9.0m length, suitable for an MRV.
- Minimum headroom of 2.2m for general circulation of car parking areas and 2.5m headroom clearance provided over accessible parking areas.

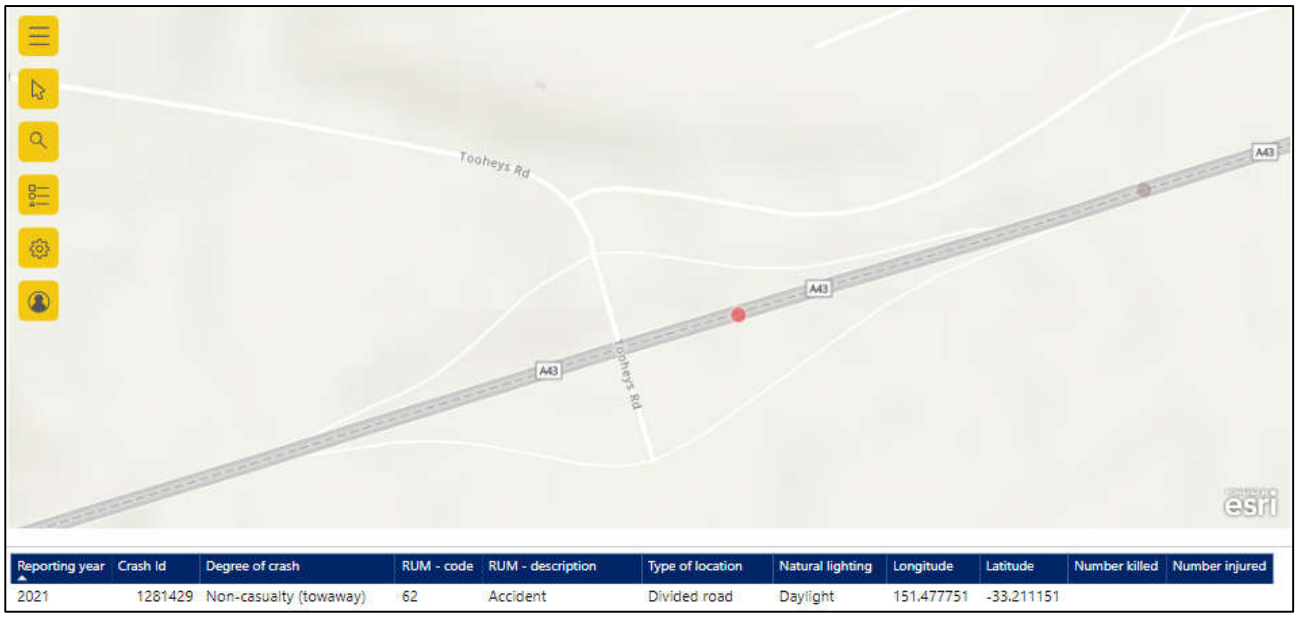
Whilst the plans have been assessed to comply with the relevant standards, subject to any variations detailed below, it is usual and expected that a design certificate be required at the Construction Certificate stage to account for any changes following the development application.

There are no proposed Over Size Over Mass (OSOM) vehicles proposed as part of the development.

It is considered highly unlikely that any on-site queueing of vehicles associated with the site will result in queues extending back onto Tooheys Road when appropriate internal management of truck arrivals is implemented.

### 3.4.1 Historical Crash Data

Reference is made to the TfNSW Centre for Road Safety website which provides 5-years crash statistics between 2017 to 2021. The reviewed intersections and roadways include the interchange of Tooheys Road, Tooheys Road interchange with the Motorway Link and the Motorway Link. The crash statistics are reproduced in **Figure 4**, which indicate that there is no historical cluster of crash data that required further investigation as part of this proposal.




| Reporting year | Crash Id | Degree of crash | RUM - code | RUM - description | Type of location | Natural lighting | Longitude | Latitude | Number killed | Number injured |
|---|---|---|---|---|---|---|---|---|---|---|
| 2021 | 1281429 | Non-casualty (towaway) | 62 | Accident | Divided road | Daylight | 151.477751 | -33.211151 | | |

**FIGURE 4: CRASH DATA STATISTICS FROM TFNSW CENTRE FOR ROAD SAFETY**

# 4 TRAFFIC ASSESSMENT

## *4.1 Traffic Generation*

Typically, the RTA Guide to Traffic Generating Developments 2002 (RTA Guide) is used to forecast future development traffic generation, however the RTA Guide does not specify trip generation rates for Asphalt Plants. Accordingly, the future development traffic has been estimated based on a first principles approach.

### 4.1.1 Imported and Exported Material - Average

The traffic generation related to the export of the site following the proposed expansion has been calculated as follows:

- 400,000 tpa imported;
- 400,000 tpa exported;
- All trucks either import or export material only. That is, any trucks that import raw material or RAP to the site are not used for exporting asphalt and vice versa;
- 288 operating days;
- 1,389 tonnes both imported and exported per day;
- Truck capacity, average of 32 tonnes. This average applies to both import and export vehicles;
- Number of inbound laden trucks per day = $\frac{\frac{1{,}389t}{day}}{\frac{32t}{truck}} = 44\ laden\ inbound\ trucks\ /\ day$
- Number of outbound laden trucks per day = $\frac{\frac{1{,}389t}{day}}{\frac{32t}{truck}} = 44\ laden\ outbound\ trucks\ /\ day$
- Total number of trucks per day = 44 + 44 = 88 trucks;
- Average Number of truck movements per day = 88 x 2 = 176 trucks movements per day (88 inbound, 88 outbound).

Based on the first principals approach, the site will generate an average of 176 truck movements per day (88 inbound, 88 outbound).

The distribution of laden vehicles has been based on a comparison site at Doyalson. This daily distribution is summarised in **Figure 5**.

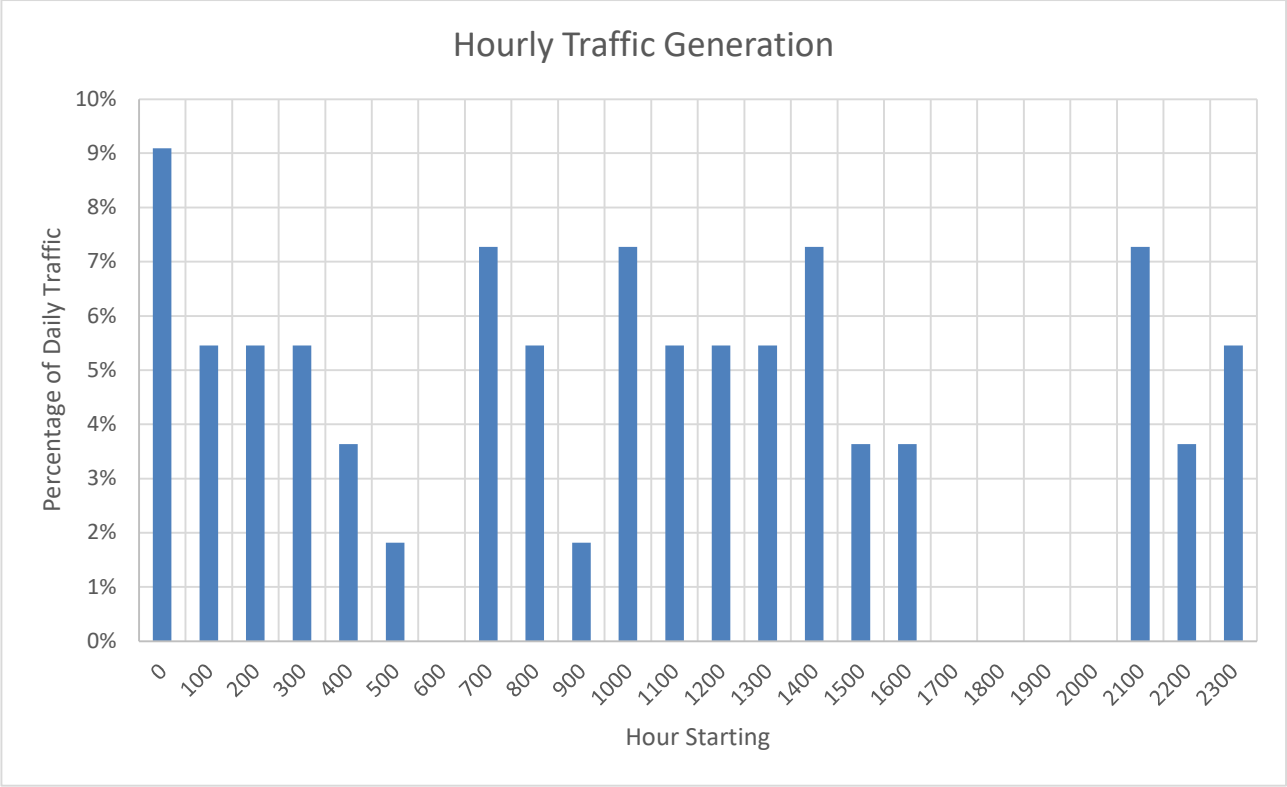



**FIGURE 5: HOURLY PROFILE**

The impact of the site on the surrounding road network must be considered with reference to the peak commuter hours of 7:00am – 10:00am and 4:00pm – 7:00pm in the morning and afternoon respectively.

During the peak AM commuter hours of 7:00am - 8:00am, the Doyalson site generated 7.3% of its daily vehicle trips (arrival and departures).

During the peak commuter hours of 4:00-5:00pm, the plant is likely to generate some 3.6% of arriving / departing vehicles.

Therefore, the peak truck generation can be considered to typically occur during the 7:00-8:00am time period, equating to 13 truck movements on an average day. During the 4:00-5:00pm period, there is likely to be 7 truck movements associated with importing or exporting material / asphalt.

### 4.1.2 Staff Traffic Generation

Typically, operational staff for the Asphalt Plant will arrive outside of the peak period for import and export of material.

To provide a conservative assessment it is assumed that all daytime on--site staff will arrive and depart within the peak hour periods. This equates to 35 peak hour vehicle trips in the AM peak hour period (35 inbound) and 35 peak hour vehicle trips in the PM peak hour period (35 outbound).
As the finish of the day shift (5pm) occurs one hour before the start of the night shift (6pm), it is reasonable to expect that the on-site night shift staff will arrive during the same peak

hour period as the day-shift staff leave. With up to nine (9) on-site night time staff considered to arrive within the one hour, this equate to nine (9) vehicles trips inbound during the PM peak period.

### 4.1.3 Traffic Generation Summary

The daily vehicle trips estimated for the site to generate is 88 (44 in; 44 out) staff vehicular movements and 176 (88 in; 88 out) heavy vehicle movements, resulting in a total of 264 daily vehicle trips.

The estimated peak hour heavy vehicle and staff movements during the commuter peak hour periods is summarised in **Table 7** below, noting that the truck movements are based upon averages.

**TABLE 7: AVERAGE FORECAST PEAK HOUR TRAFFIC GENERATION**

| Type | Average Peak Hour Generation |
|---|---|
| **Heavy Vehicles (7-8am)** | 7 inbound, 6 outbound |
| **Staff (AM Peak Period)** | 35 inbound |
| **AM Peak Hour Total** | **42 in, 6 out** |
| **Heavy Vehicles (4-5pm)** | 3 inbound, 4 outbound |
| **Staff (PM Peak Period)** | 9 inbound, 35 outbound |
| **PM Peak Hour Total** | **12 in, 39 out** |

Therefore, the average peak morning hour traffic generation is 48 peak hour movements (42 in, 6 out). The average evening peak hour will generate 51 vehicle trips (12 in, 39 out).

**Table 7**, outlines the estimated traffic generation of the site based upon average rates, but there will be days where the traffic will vary from the average, with some days having lower peak hour traffic generation than that outlined in **Table 5** and some days having higher traffic generation rates than that outlined in **Table 5**. To ensure a conservative traffic impact assessment, the following maximum peak hour traffic generation will be adopted as outlined within **Table 8** below, although it should be noted the below is highly conservative, as the maximum peak hour traffic generation of heavy vehicles typically occurs outside of peak commuter periods (overnight).

**TABLE 8: MAXIMUM FORECAST PEAK HOUR TRAFFIC GENERATION**

| Type | Average Peak Hour Generation |
|---|---|
| **Heavy Vehicles** | 28 inbound, 28 outbound |
| **Staff (AM Peak Period)** | 35 inbound |
| **AM Peak Hour Total** | **63 in, 28 out** |
| **Heavy Vehicles** | 28 inbound, 28 outbound |
| **Staff (PM Peak Period)** | 9 inbound, 35 outbound |
| **PM Peak Hour Total** | **37 in, 63 out** |

To ensure a conservative assessment, no discount will be made to existing traffic flows gathered as outlined in **Section 2.3**, that is the existing site is already operating and hence gathered traffic volumes would already account for associated staff and some heavy vehicle traffic associated with the existing operation of the site.

### *4.2 Traffic Generation of Nearby Developments*

#### 4.2.1 Wallarah 2 Coal Project

The section of Tooheys Road that is accessed by the subject site is also only accessed by some additional properties to the west of the site which currently contain 3 – 4 low-density residential dwellings and one site approved to be used with the Wallarah 2 Coal Mine, which is a State Significant Development approved on 16 January 2018. Based on recent aerial imagery it is considered likely that the development is not currently operational, such that the additional traffic expected to be generated by the approved development should be considered as part of this application.

Reference is made to the *Wallarah 2 Coal Project Environmental Impact Statement April 2013 Appendix Q Traffic and Transport Impact Assessment* prepared by Parsons Brinckerhoff Australia Pty Ltd dated 27 February 2013 (hereinafter referred to as "Parsons Traffic Report") which was a report submitted with the application for the Wallarah 2 Coal project which has since been approved. Appropriate excerpts from the Parsons Traffic Report are reproduced in **Annexure E**, with a summary of the key traffic volumes detailed below.

**TABLE 9: WALLARAH 2 COAL PROJECT TRAFFIC VOLUMES**

| Period of Traffic Occurrence | Vehicle Classification | Peak Hourly Trips | Daily Trips |
|---|---|---|---|
| Construction of Tooheys Road Surface Facilities | Light vehicle | Staff: 270 (270 in [AM peak hour] or 270 out [PM peak hour]) | 720 (360 in; 360 out) |
| | | Light deliveries: 12 (6 in; 6 out) | |
| | Heavy vehicle | 8 (4 in; 4 out) | 80 (40 in; 40 out) |
| Construction of drift | Light vehicle | 10 (10 in or 10 out) | 60 (30 in; 30 out) |
| | Heavy vehicle | - | - |
| Operation of Tooheys Road site | Light vehicles | 15 (15 in [6am-7am] or 15 out [3pm-4pm]) | 42 (21 in; 21 out) |
| | Heavy Vehicles | 20 (10 in; 10 out) | 200 (100 in; 100 out) |

For the purposes of this assessment, the operational traffic volumes of the Tooheys Road site of the Wallarah 2 Coal Project will be assessed.

### *4.3 Traffic Assignment*

Considering the context of the site and the available arterial routes to and from the site, it is assumed that all heavy vehicles travelling to and from the site will utilise the Motorway Link Road to connect to the Pacific Motorway to the west to travel to / from the south and north, and the Pacific Highway to the east to travel north and south. It is estimated that the inbound / outbound trucks will be evenly split between eastbound and westbound directions of travel (i.e. 50% eastbound / 50% westbound).

The details within the Parsons Traffic Report regarding the distribution of traffic associated with the Wallarah 2 Coal Mine development at the assessed intersections is unclear. It is considered reasonable to assess this additional traffic as also being evenly split between eastbound and westbound directions.

### *4.4 Traffic Impact*

The traffic generation outlined in **Table 8** above has been added to the existing traffic volumes recorded. SIDRA INTERSECTION 9.1 was used to assess the intersections performance. An additional future scenario has also been assessed with the additional traffic of both the future asphalt plant and Wallarah 2 Coal Mine traffic added onto the existing traffic volumes recorded. The purpose of this assessment is to compare the existing intersection operations to both these future traffic scenarios under the increased traffic load. The results of this assessment are shown in **Table 10**.

## TABLE 10: FUTURE INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.1)

| Intersection | Peak Hour | Degree of Saturation[1] | Average Delay[2] (sec/veh) | Level of Service[3][4] | Control Type | Worst Movement | 95th Percentile Queue |
|---|---|---|---|---|---|---|---|
| ***EXISTING PERFORMANCE*** | | | | | | | |
| Tooheys Road / Motorway Link (North Side) | AM | 0.01 | 2.9 (Worst: 10.1) | **NA** (Worst: A) | Give Way | LT from Off-Ramp | 0 veh (0.1m) Overpass Bridge (South) |
| | PM | 0.01 | 4.8 (Worst: 10.6) | **NA** (Worst: A) | | LT from Off-Ramp | 0 veh (0.4m) Overpass Bridge (South) |
| Tooheys Road / Motorway Link (South Side) | AM | 0.01 | 8 (Worst: 10.2) | **NA** (Worst: A) | Give Way | RT from Off-Ramp | 0 veh (0.3m) Off-Ramp |
| | PM | 0.01 | 7.2 (Worst: 8) | **NA** (Worst: A) | | RT from Off-Ramp | 0 veh (0.2m) On-Ramp |
| ***FUTURE PERFORMANCE WITH PROPOSED DEVELOPMENT TRAFFIC ADDED*** | | | | | | | |
| Tooheys Road / Motorway Link (North Side) | AM | 0.04 | 4.2 (Worst: 10.2) | **NA** (Worst: A) | Give Way | LT from Off-Ramp | 0.1 veh (1.3m) Off-Ramp |
| | PM | 0.05 | 4.2 (Worst: 11.4) | **NA** (Worst: A) | | LT from Off-Ramp | 0.1 veh (1.3m) Off-Ramp |
| Tooheys Road / Motorway Link (South Side) | AM | 0.05 | 8.4 (Worst: 9.5) | **NA** (Worst: A) | Give Way | T from Off-Ramp | 0.2 veh (1.5m) Off-Ramp |
| | PM | 0.04 | 7.7 (Worst: 9.9) | **NA** (Worst: A) | | RT from Off-Ramp | 0.1 veh (1.2m) On-Ramp |
| ***FUTURE PERFORMANCE WITH PROPOSED DEVELOPMENT + COAL MINE TRAFFIC ADDED*** | | | | | | | |
| Tooheys Road / Motorway Link (North Side) | AM | 0.05 | 4.3 (Worst: 10.2) | **NA** (Worst: A) | Give Way | LT from Off-Ramp | 0.2 veh (1.7m) Off-Ramp |
| | PM | 0.07 | 4.2 (Worst: 11.6) | **NA** (Worst: A) | | LT from Off-Ramp | 0.1 veh (1.6m) Off-Ramp |
| Tooheys Road / Motorway Link (South Side) | AM | 0.06 | 8.5 (Worst: 9.5) | **NA** (Worst: A) | Give Way | T from Off-Ramp | 0.2 veh (2m) Off-Ramp |
| | PM | 0.04 | 7.7 (Worst: 10.3) | **NA** (Worst: A) | | RT from Off-Ramp | 0.1 veh (1.5m) On-Ramp |

**Notes:**

(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown above, the interchange intersections will maintain acceptable performance with the addition of traffic generated from the addition of either the asphalt plant traffic only or traffic associated with both the asphalt plant and Wallarah 2 Coal Mine development. The SIDRA movement summaries are provided in **Annexure D** for reference.

The interchange currently accommodates B-Doubles, therefore no works are required at the interchange to facilitate the turning of heavy vehicles.

It is reiterated that the assessment above is highly conservative, as it adopts the maximum peak hour traffic generated by the site which will not overlap with the commuter peak hour periods.

## *4.5 Mitigation Measures*

### 4.5.1 Tooheys Road / Interchange

The proposed expansion to the asphalt plant is forecast to generate up to 264 daily movements and 51 peak hour vehicle trips based upon the average case. The worst case maximum traffic generation within a single peak hour period is forecast to be 100 vehicle trips, although will not occur on a daily basis, nor will it overlap with the commuter peak hour periods and will be a rare event based upon probability.

The addition of 264 daily vehicle movements on the Motorway Link Road (average), or 51 to 100 peak hour vehicle trips (average / maximum) is a low increase and most likely within the daily and peak hourly fluctuation of the classified road.

Tooheys Road from the interchange to the subject site driveway operates as two lanes two-way and hence has sufficient capacity to accommodate the traffic volume increase generated by the expansion of the asphalt plan.

Hence, no upgrades to the Tooheys Road interchange are required as part of the proposed expansion to the asphalt plant.

## *4.6 Construction Traffic Impact*

The construction of the expansion of the asphalt plant is expected to be limited as there are no significant proposed construction works associated with the development. Any construction works is likely to generate less peak hour traffic than that assessed within **Section 4**.

## 5 CONCLUSION

The proposed asphalt plant and ancillary development at 203 Tooheys Road, Bushells Ridge, as shown in **Annexure A**, is supported with respect to on-site traffic circulation and parking as well as external traffic flow efficiency and road safety. The following outcomes of the traffic and parking impact assessment are relevant to note:

- Based on the forecast maximum of 35 staff members on site at any one time, the site is required to provide 35 car parking spaces. The proposed site plan details 36 car parking spaces, which adequately meets the anticipated car parking demand for the site.

- The parking areas of the site have been assessed against the relevant sections of *AS2890.1:2004*, *AS2890.2:2018* and *AS2890.6:2022* and have been found to satisfy the objectives of each standard with any acceptable variances have been outlined in **Section 3.4**.

- The peak traffic generation (one hour) is in the range of 51 peak hour movements based upon averages and an anticipated maximum of 100 peak hour vehicle trips which is highly conservative, as it assumes overlapping of staff and heavy vehicle traffic, whereas in practice this would not be expected to occur. The maximum heavy vehicle peak hour traffic generated by the site is not expected to overlap with commuter periods on the surrounding road network.

- The assessed intersections will maintain acceptable performance with the addition of traffic generated from the asphalt plant in addition to the existing recorded traffic volumes. An additional future traffic scenario has been assessed with the existing traffic volumes, the traffic generation estimated for the asphalt plant and the estimated traffic generation of the Wallarah 2 Coal Mine added together. The assessed intersections will also maintain acceptable performance under this additional scenario.

- Construction generated traffic will be minimal and will have a lower traffic impact on the surrounding road network compared to the assessment provided in **Section 4**.

- No upgrades to the Tooheys Road interchange or Tooheys Road are required as part of the proposed expansion to the asphalt plant


**ANNEXURE A: PROPOSED PLAN**

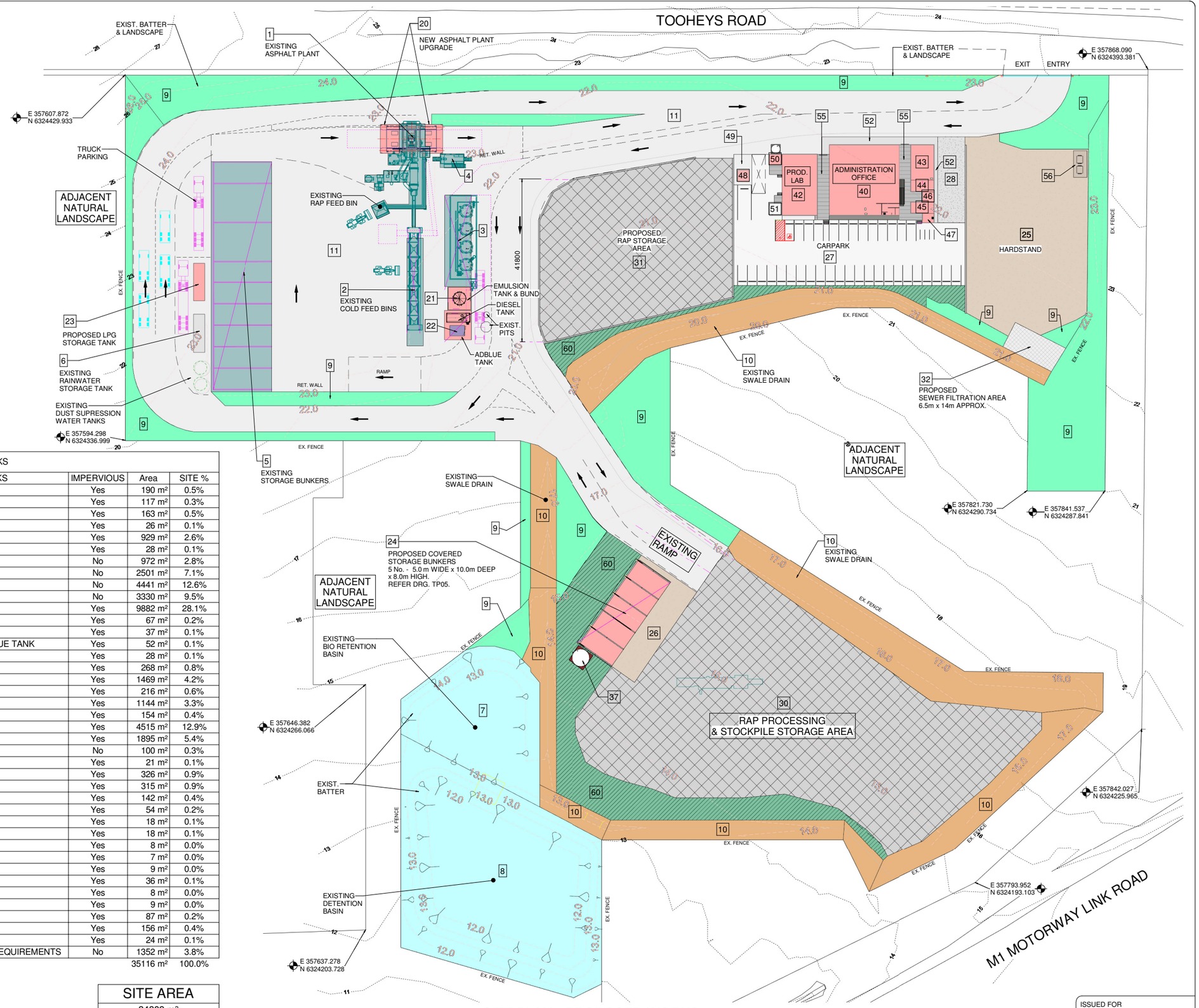
**(1 SHEETS)**

## SITE LEGEND

- EXISTING BUILDING
- EXISTING PAVEMENT
- EXISTING LANDSCAPE
- EXISTING SWALE DRAIN
- EXISTING RETENTION BASIN
- PROPOSED NEW BUILDING / STRUCTURE
- PROPOSED MATERIAL STORAGE AREA
- PROPOSED / MODIFIED LANDSCAPE

PROJECT NORTH

NOTE -
1. STORAGE BUNKERS ARE CONCEPT ONLY . DIMENSIONS MY CHANGE SUBJECT TO DETAILED DESIGN.
2. ALL LANDSCAPE AREAS ARE TO BE PLANTED IN ACCORDANCE WITH THE LOCAL COUNCIL SPECIFICATIONS AND PERMIT REQUIREMENTS.
3. SITE AREAS TO BE GENERALLY GRADED TOWARDS EXISTING SWALE DRAINS FOR WATER COLLECTION.
4. REFER TRUCK TURNING CIRCLE DRAWINGS FOR TRUCK SWEEP PATHS ON DRG. TP10 & TP11.




SITE PLAN - PROPOSED WORKS
1 : 500

| BUILDING AREAS - PROPOSED WORKS | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.5% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 117 m² | 0.3% |
| 3 | EXISTING TANK FARM | | Yes | 163 m² | 0.5% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 2.6% |
| 6 | EXISTING RAINWATER TANK ( 70kL ) | | Yes | 28 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 2.8% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 7.1% |
| 9 | EXISTING LANDSCAPE | | No | 4441 m² | 12.6% |
| 10 | EXISTING SWALE DRAIN | | No | 3330 m² | 9.5% |
| 11 | EXISTING ASPHALT PAVEMENT | | Yes | 9882 m² | 28.1% |
| 20 | PROPOSED ASPHALT PLANT ADDITIONS | REFER DRG. TP04. | Yes | 67 m² | 0.2% |
| 21 | PROPOSED EMULSION TANK BUND | XXkl EMULSION TANK | Yes | 37 m² | 0.1% |
| 22 | PROPOSED DIESEL TANK / ADBLUE | DIESEL TANK. & ADBLUE TANK | Yes | 52 m² | 0.1% |
| 23 | PROPOSED LPG STORAGE | | Yes | 28 m² | 0.1% |
| 24 | PROPOSED STORAGE BUNKER | REFER DRG. TP05. | Yes | 268 m² | 0.8% |
| 25 | PROPOSED HARDSTAND | | Yes | 1469 m² | 4.2% |
| 26 | PROPOSED HARDSTAND | | Yes | 216 m² | 0.6% |
| 27 | PROPOSED CARPARK | REFER DRG. TP04. | Yes | 1144 m² | 3.3% |
| 28 | PROPOSED CARPARK ACCESS WAY | REFER DRG. TP04. | Yes | 154 m² | 0.4% |
| 30 | PROPOSED RAP PROCESSING AREA | | Yes | 4515 m² | 12.9% |
| 31 | PROPOSED PROCESSED RAP STORAGE | | Yes | 1895 m² | 5.4% |
| 32 | PROPOSED SEWER FILTRATION AREA | TO BE RELOCATED | No | 100 m² | 0.3% |
| 37 | PROPOSED WATER TANK | | Yes | 21 m² | 0.1% |
| 40 | PROPOSED ADMINISTRATION BUILDING - GRND FLOOR | REFER DRG. TP03. | Yes | 326 m² | 0.9% |
| 41 | PROPOSED ADMINISTRATION BUILDING - 1ST FLOOR | REFER DRG. TP06. | Yes | 315 m² | 0.9% |
| 42 | PROPOSED PRODUCTION LAB | REFER DRG. TP03. | Yes | 142 m² | 0.4% |
| 43 | PROPOSED CRIB RM. | REFER DRG. TP03. | Yes | 54 m² | 0.2% |
| 44 | PROPOSED FEMALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 45 | PROPOSED MALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 46 | PROPOSED ACCESSIBLE ABLUTION BLOCK | | Yes | 8 m² | 0.0% |
| 47 | PROPOSED CLEANERS STORE | | Yes | 7 m² | 0.0% |
| 48 | PROPOSED CHEMICAL STORAGE | | Yes | 9 m² | 0.0% |
| 49 | PROPOSED CHEM STORAGE PAVEMENT | | Yes | 36 m² | 0.1% |
| 50 | PROPOSED ABLUTION BLOCK 2 | | Yes | 8 m² | 0.0% |
| 51 | PROPOSED COMPACTION RM. | | Yes | 9 m² | 0.0% |
| 52 | PROPOSED FOOTPATH | | Yes | 87 m² | 0.2% |
| 55 | PROPOSED DECKING | | Yes | 156 m² | 0.4% |
| 56 | RUBBISH ENCLOSURE | | Yes | 24 m² | 0.1% |
| 60 | PROPOSED LANDSCAPE | TO LOCAL COUNCIL REQUIREMENTS | No | 1352 m² | 3.8% |
| | | | | 35116 m² | 100.0% |

| PROPOSED SITE PERMEABILITY SCHEDULE | | |
|---|---|---|
| SITE PERMEABILITY | Area | SITE % |
| IMPERVIOUS | 20931 m² | 62.4% |
| PERVIOUS | 12588 m² | 37.6% |
| | 33519 m² | 100.0% |

| SITE AREA |
|---|
| 34809 m² |

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 15-06-23 |

ISSUED FOR
APPROVAL

CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE. N.S.W.

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

SITE PLAN
PROPOSED WORKS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 15-06-23 |
| DESIGNED F.H. | SCALE As indicated |
| APPROVED | |
| DRG No. TP02 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%


**ANNEXURE B: TFNSW LETTER**

**(4 SHEETS)**

Transport for NSW

9 August 2022

File No: NTH22/00482/01
Your Ref: SEAR 1714

Department of Planning & Environment
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

**Attention: Zoe Halpin**

**SEARS: 1714**
**SEARS ADVICE – ASPHALT PLANT EXPANSION, 203 TOOHEYS ROAD, BUSHELLS RIDGE (LOT: 10 DP: 834954)**

I refer to the request by the Department of Planning and Environment (DPE) dated 236 July 2022 seeking input from Transport for NSW (TfNSW) to the Secretary's Environmental Assessment Requirements (SEARs) for the abovementioned development proposal.

TfNSW key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with the *Future Transport Strategy 2056*.

TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and Roads and Maritime Guide to Traffic Generating Developments.

The TIA should be tailored to the scope of the proposed development and include, but not be limited to, the following:

- A map of the surrounding road network identifying the site access, nearby accesses, intersections, relevant traffic route/s and connections to the classified (State) road network.

- Assessment of all relevant vehicular traffic routes and intersections to / from the subject properties.

- Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network.

- The anticipated additional vehicular traffic generated from construction, operational and decommissioning stages of the project.

- The distribution on the road network of the trips generated by the project. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.

- Detailed assessment of all vehicular transport routes, relevant intersections and connections to the classified (State) road network for access to / from the proposed development site/s (including any ancillary sites).

- Assessment of Over Size Over Mass (OSOM) and heavy vehicle routes for all components associated with the asphalt plant, including swept path analysis for the largest design vehicle/s accessing the site, and turning, at relevant intersections along the classified (State) road network.

- Consideration of the traffic impacts on existing and proposed intersections, including access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during construction, operational and decommissioning stages.

- Vehicle types to be considered:
  - Commuter (employee and contractor) light vehicles and pool vehicles,
  - Heavy vehicles,
  - Over size and over mass (OSOM) vehicles.

- Consideration of cumulative impacts to identify and assess the implications of any projects that will potentially be occurring simultaneously with the scheduling of any OSOM movements along the proposed OSOM routes.
  The assessment should consider the following:
  - The cumulative impacts from traffic generated from the construction workforces in terms of the routes, access, AM/PM peaks where there is overlap with other projects.
  - The cumulative impacts of heavy vehicle movements in terms of AM/PM peaks and routes where there is an overlap with other projects.
  - Cumulative impacts and consideration in relation to the timing of movements of OSOMs where other projects will be utilising the same routes as proposed for this development.
  - Any potential for future expansion of the subject development and the potential impacts any such expansion would have on the development, the broader road network and the AM/PM peaks. It should be noted, any future expansion beyond the scope of the subject application, will require additional applications and approvals.
  - Strategies to manage the risk of damage to public road assets where accelerated deterioration of the road pavement occurs during construction and/or operation.

- An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for each relevant intersection along the identified transport route/s, including connections to the classified (State) road network.

- Identify the necessary road network infrastructure upgrades that are required to cater for, and mitigate, the impact of project related traffic on both the local and classified road network for the development (for instance, road widening and/or intersection treatments).

  Strategic (2D) design drawings for any proposed road upgrades and the site access should be prepared to support the TIA and demonstrate the scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure.
  All proposed works must be:
  - Designed in accordance with Austroads Guidelines, Australian Standards and TfNSW Supplements
  - Appropriately designed for the existing posted speed limit.
  - To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.
  - To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions.
  - Submitted with the EIS and TIA.

  For any roadwork deemed necessary on the classified (State) road, the developer will be required to enter into a Works Authorisation Deed (WAD) or other suitable agreement as required by TfNSW. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website.

- Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:
  - Current traffic counts and 10 year traffic growth projections
  - With and without development scenarios
  - 95th percentile back of queue lengths
  - Delays and level of service on all legs for the relevant intersections
  - Electronic data for TfNSW review.

- Relevant swept paths analysis for the largest design vehicle accessing the site.

- Impacts on public transport (public and school bus routes consideration for alternative transport modes such as walking and cycling or carpooling and shuttle buses during construction.

- Details of any Traffic Management Plan (TMP) proposed to address the construction, operation and decommissioning phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017.

  It is recommended that any TMP include, but not necessarily limited to, the following;
  - A map of the primary transport route/s highlighting critical locations.
  - An induction process for vehicle operators and regular toolbox meetings.
  - Procedures for travel through residential areas, school zones and/or bus route/s.
  - any proposed temporary measures such a Traffic Guidance Scheme (TGS)
  - A Driver Code of Conduct for heavy vehicle operators.
  - A complaint resolution and disciplinary procedure.
  - Community consultation measures proposed for peak periods.
  - Work, health and safety requirements under the Work Health and Safety Regulation 2017.

- A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.

- Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.

Should you require further information please contact Court Walsh, Development Services Case Officer, on 1300 207 783 or 0488 631 890 or by emailing development.north@transport.nsw.gov.au.

Yours sincerely

K. Leonard

**Kate Leonard**
A/ Team Leader Development Services
North Region | Community & Place
Regional & Outer Metropolitan


**ANNEXURE C: TRAFFIC SURVEYS**

**(3 SHEETS)**

# TRANS TRAFFIC SURVEY

trafficsurvey.com.au

## TURNING MOVEMENT SURVEY

**Intersection of Motorway Link and Tooheys Rd, Wallarah**

| | | | | | | |
|---|---|---|---|---|---|---|
| GPS | -33.212174, 151.477013 | | | | | |
| Date:- | Tue 26/07/22 | North: | Tooheys Rd | Survey | AM: | 7:00 AM-9:30 AM |
| Weather:- | Fine | East:- | Motorway Link | | PM: | 3:30 PM-6:00 PM |
| Suburban:- | Wallarah | South | N/A | Traffic | AM: | 7:45 AM-8:45 AM |
| Customer:- | McLaren | West:- | Motorway Link | | PM: | 3:45 PM-4:45 PM |

*All Vehicles*

| Time | | th Approach Tooheys | | | Approach Motorway | | | Approach Motorway | | | Hourly Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period En | U | R | L | U | R | WB | U | EB | L | Hour | Peak |
| 7:00 | 7:15 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 9 | |
| 7:15 | 7:30 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 10 | |
| 7:30 | 7:45 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | |
| 7:45 | 8:00 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 16 | Peak |
| 8:00 | 8:15 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 15 | |
| 8:15 | 8:30 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 11 | |
| 8:30 | 8:45 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 11 | |
| 8:45 | 9:00 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | | |
| 9:00 | 9:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 9:15 | 9:30 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | | |
| 15:30 | 15:45 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 17 | |
| 15:45 | 16:00 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 18 | Peak |
| 16:00 | 16:15 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 17 | |
| 16:15 | 16:30 | 1 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 16 | |
| 16:30 | 16:45 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 13 | |
| 16:45 | 17:00 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 12 | |
| 17:00 | 17:15 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | |
| 17:15 | 17:30 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | | |
| 17:30 | 17:45 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | | |
| 17:45 | 18:00 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | | |

| Peak Time | | th Approach Tooheys | | | Approach Motorway | | | Approach Motorway | | | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period En | U | R | L | U | R | WB | U | EB | L | total |
| 7:45 | 8:45 | 0 | 9 | 0 | 0 | 4 | 3 | 0 | 0 | 0 | 16 |
| 15:45 | 16:45 | 1 | 7 | 0 | 0 | 7 | 3 | 0 | 0 | 0 | 18 |

# TRANS TRAFFIC SURVEY

trafficsurvey.com.au

## TURNING MOVEMENT SURVEY

**Intersection of Motorway Link and Tooheys Rd, Bushells Ridge**

| | | | | | |
|---|---|---|---|---|---|
| GPS | -33.2167742,151.4765522 | | | | |
| Date: | Tue 26/07/22 | North: | Tooheys Rd | Survey | AM: 7:00 AM-9:30 AM |
| Weather: | Fine | East: | Motorway Link | | PM: 3:30 PM-6:00 PM |
| Suburb: | Bushells Ridge | South: | Tooheys Rd | Traffic | AM: 7:45 AM-8:45 AM |
| Custom: | McLaren | West: | Motorway Link | | PM: 3:30 PM-4:30 PM |

*All Vehicles*

| Time | | North Approach Tooheys Rd | | | | East Approach Motorway Link | | | | South Approach Tooheys Rd | | | | West Approach Motorway Link | | | | Hourly Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eriod Sta | Period En | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L | Hour | Peak |
| 7:00 | 7:15 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 15 | |
| 7:15 | 7:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 14 | |
| 7:30 | 7:45 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 15 | |
| 7:45 | 8:00 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | Peak |
| 8:00 | 8:15 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 18 | Peak |
| 8:15 | 8:30 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 16 | |
| 8:30 | 8:45 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 15 | |
| 8:45 | 9:00 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | | |
| 9:00 | 9:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 9:15 | 9:30 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | | |
| 15:30 | 15:45 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 33 | Peak |
| 15:45 | 16:00 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 3 | 1 | 32 | |
| 16:00 | 16:15 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 32 | |
| 16:15 | 16:30 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 2 | 29 | |
| 16:30 | 16:45 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 24 | |
| 16:45 | 17:00 | 0 | 0 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 27 | |
| 17:00 | 17:15 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | |
| 17:15 | 17:30 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | | |
| 17:30 | 17:45 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | | |
| 17:45 | 18:00 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 | | |

| Peak Time | | North Approach Tooheys Rd | | | | East Approach Motorway Link | | | | South Approach Tooheys Rd | | | | West Approach Motorway Link | | | | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eriod Sta | Period En | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L | total |
| 7:45 | 8:45 | 0 | 0 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 2 | 18 |
| 15:30 | 16:30 | 0 | 0 | 4 | 7 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 0 | 0 | 3 | 4 | 5 | 33 |

# TRANS TRAFFIC SURVEY

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## AUTOMATIC COUNT SUMMARY

| | | | |
|---|---|---|---|
| **Street Name :** | Tooheys Rd | **Location :** | North of Freeway Ramp |
| **Suburb :** | Bushells Ridge | **Start Date :** | 00:00 Mon 25/July/2022 |
| **Machine ID:** | SC99VRNZ | **Finish Date :** | 00:00 Mon 01/August/2022 |
| **Site ID:** | 2121 | **Speed Zone :** | 50 km/h |
| **Prepared By :** | Vo Son Binh | **Email:** | binh@trafficsurvey.com.au |

| GPS information | | Lat 33° 12' 36.34 South<br>Long 151° 28' 33.85 East | Direction of Travel | | |
|---|---|---|---|---|---|
| | | | **Both directions** | **Westbound** | **Eastbound** |
| **Traffic Volume :** | | Weekdays Average | 340 | 169 | 171 |
| **(Vehicles/Day)** | | 7 Day Average | 266 | 132 | 134 |
| **Weekday** | **AM** | 08:00 | 25 | 13 | 13 |
| **Peak hour start** | **PM** | 16:00 | 24 | 11 | 14 |
| **Speeds :** | | 85th Percentile | 46.8 | 47.8 | 46.1 |
| **(Km/Hr)** | | Average | 42.9 | 43.7 | 42.2 |
| **Classification % :** | | Light Vehicles up to 5.5m | 78.9% | 78.5% | 78.2% |

## Location

| | |
|---|---|
| **GPS Information** | Load Google Map (internet required) |
| (Latitude, Longitude) | -33.210095, 151.476070 |


Speed Data | Speed Graph | Speed Bin
Volume Data | Volume Graph | Classification


**ANNEXURE D: SIDRA RESULTS**

**(12 SHEETS)**

# MOVEMENT SUMMARY

## Site: 101 [(ExAM) Tooheys Road / Motorway Link - Northern Side (Site Folder: Existing)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Existing AM Peak Period
Tooheys Road / Doyalson Link Road (Northern Side)
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Overpass Bridge (South) | | | | | | | | | | | | | | | |
| 2 | T1 | All MCs | 4 | 75.0 | 4 | 75.0 | 0.004 | 0.0 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 0.02 | 57.2 |
| 3 | R2 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.004 | 5.7 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 0.02 | 54.5 |
| Approach | | | 5 | 60.0 | 5 | 60.0 | 0.004 | 1.1 | NA | 0.0 | 0.1 | 0.02 | 0.13 | 0.02 | 56.7 |
| North: Tooheys Road (N) | | | | | | | | | | | | | | | |
| 7 | L2 | All MCs | 3 | 66.7 | 3 | 66.7 | 0.009 | 6.3 | LOS A | 0.0 | 0.0 | 0.00 | 0.14 | 0.00 | 53.3 |
| 8 | T1 | All MCs | 9 | 66.7 | 9 | 66.7 | 0.009 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.14 | 0.00 | 58.7 |
| Approach | | | 13 | 66.7 | 13 | 66.7 | 0.009 | 1.6 | NA | 0.0 | 0.0 | 0.00 | 0.14 | 0.00 | 57.2 |
| West: Off-Ramp | | | | | | | | | | | | | | | |
| 10 | L2 | All MCs | 2 | 50.0 | 2 | 50.0 | 0.004 | 10.1 | LOS A | 0.0 | 0.1 | 0.05 | 1.02 | 0.05 | 49.4 |
| 11 | T1 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.004 | 7.7 | LOS A | 0.0 | 0.1 | 0.05 | 1.02 | 0.05 | 51.3 |
| 12 | R2 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.004 | 7.5 | LOS A | 0.0 | 0.1 | 0.05 | 1.02 | 0.05 | 50.9 |
| Approach | | | 4 | 25.0 | 4 | 25.0 | 0.004 | 8.9 | LOS A | 0.0 | 0.1 | 0.05 | 1.02 | 0.05 | 50.2 |
| All Vehicles | | | 22 | 57.1 | 22 | 57.1 | 0.009 | 2.9 | NA | 0.0 | 0.1 | 0.02 | 0.31 | 0.02 | 55.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(ExPM) Tooheys Road / Motorway Link - Northern Side (Site Folder: Existing)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Existing PM Peak Period
Tooheys Road / Doyalson Link Road (Northern Side)
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Overpass Bridge (South) | | | | | | | | | | | | | | | |
| 2 | T1 | All MCs | 8 | 25.0 | 8 | 25.0 | 0.006 | 0.0 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 0.02 | 58.5 |
| 3 | R2 | All MCs | 2 | 0.0 | 2 | 0.0 | 0.006 | 5.7 | LOS A | 0.0 | 0.1 | 0.02 | 0.13 | 0.02 | 55.7 |
| Approach | | | 11 | 20.0 | 11 | 20.0 | 0.006 | 1.1 | NA | 0.0 | 0.1 | 0.02 | 0.13 | 0.02 | 57.9 |
| North: Tooheys Road (N) | | | | | | | | | | | | | | | |
| 7 | L2 | All MCs | 7 | 14.3 | 7 | 14.3 | 0.007 | 5.7 | LOS A | 0.0 | 0.0 | 0.00 | 0.37 | 0.00 | 53.7 |
| 8 | T1 | All MCs | 4 | 25.0 | 4 | 25.0 | 0.007 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.37 | 0.00 | 56.6 |
| Approach | | | 12 | 18.2 | 12 | 18.2 | 0.007 | 3.6 | NA | 0.0 | 0.0 | 0.00 | 0.37 | 0.00 | 54.7 |
| West: Off-Ramp | | | | | | | | | | | | | | | |
| 10 | L2 | All MCs | 5 | 60.0 | 5 | 60.0 | 0.012 | 10.6 | LOS A | 0.0 | 0.4 | 0.06 | 1.01 | 0.06 | 49.0 |
| 11 | T1 | All MCs | 4 | 0.0 | 4 | 0.0 | 0.012 | 7.7 | LOS A | 0.0 | 0.4 | 0.06 | 1.01 | 0.06 | 51.3 |
| 12 | R2 | All MCs | 3 | 0.0 | 3 | 0.0 | 0.012 | 7.5 | LOS A | 0.0 | 0.4 | 0.06 | 1.01 | 0.06 | 50.9 |
| Approach | | | 13 | 25.0 | 13 | 25.0 | 0.012 | 8.9 | LOS A | 0.0 | 0.4 | 0.06 | 1.01 | 0.06 | 50.2 |
| All Vehicles | | | 35 | 21.2 | 35 | 21.2 | 0.012 | 4.8 | NA | 0.0 | 0.4 | 0.03 | 0.53 | 0.03 | 53.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(ExAM) Tooheys Road / Motorway Link - Southern Side (Site Folder: Existing)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Existing AM Peak Period
Tooheys Road / Motorway Link - Southern Side
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Off-Ramp (E) | | | | | | | | | | | | | | | |
| 5 | T1 | All MCs | 3 | 33.3 | 3 | 33.3 | 0.008 | 9.3 | LOS A | 0.0 | 0.3 | 0.06 | 1.06 | 0.06 | 50.0 |
| 6 | R2 | All MCs | 4 | 75.0 | 4 | 75.0 | 0.008 | 10.2 | LOS A | 0.0 | 0.3 | 0.06 | 1.06 | 0.06 | 47.8 |
| Approach | | | 7 | 57.1 | 7 | 57.1 | 0.008 | 9.8 | LOS A | 0.0 | 0.3 | 0.06 | 1.06 | 0.06 | 48.8 |
| North: Overpass Bridge (North) | | | | | | | | | | | | | | | |
| 9 | R2 | All MCs | 9 | 66.7 | 9 | 66.7 | 0.008 | 6.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.62 | 0.00 | 49.4 |
| Approach | | | 9 | 66.7 | 9 | 66.7 | 0.008 | 6.5 | NA | 0.0 | 0.0 | 0.00 | 0.62 | 0.00 | 49.4 |
| All Vehicles | | | 17 | 62.5 | 17 | 62.5 | 0.008 | 8.0 | NA | 0.0 | 0.3 | 0.03 | 0.81 | 0.03 | 49.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(ExPM) Tooheys Road / Motorway Link - Southern Side (Site Folder: Existing)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Existing PM Peak Period
Tooheys Road / Motorway Link - Southern Side
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: On-Ramp | | | | | | | | | | | | | | | |
| 5 | T1 | All MCs | 3 | 0.0 | 3 | 0.0 | 0.009 | 7.7 | LOS A | 0.0 | 0.2 | 0.05 | 1.00 | 0.05 | 51.4 |
| 6 | R2 | All MCs | 7 | 14.3 | 7 | 14.3 | 0.009 | 8.0 | LOS A | 0.0 | 0.2 | 0.05 | 1.00 | 0.05 | 50.3 |
| Approach | | | 11 | 10.0 | 11 | 10.0 | 0.009 | 7.9 | LOS A | 0.0 | 0.2 | 0.05 | 1.00 | 0.05 | 50.6 |
| North: Overpass Bridge (North) | | | | | | | | | | | | | | | |
| 9 | R2 | All MCs | 7 | 42.9 | 7 | 42.9 | 0.005 | 6.2 | LOS A | 0.0 | 0.0 | 0.00 | 0.63 | 0.00 | 50.4 |
| Approach | | | 7 | 42.9 | 7 | 42.9 | 0.005 | 6.2 | NA | 0.0 | 0.0 | 0.00 | 0.63 | 0.00 | 50.4 |
| All Vehicles | | | 18 | 23.5 | 18 | 23.5 | 0.009 | 7.2 | NA | 0.0 | 0.2 | 0.03 | 0.85 | 0.03 | 50.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuAM) Tooheys Road / Motorway Link - Northern Side - Ex + Proposal (Site Folder: Existing + Proposal)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future AM Peak Period - Existing plus Proposal
Tooheys Road / Doyalson Link Road (Northern Side)
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Overpass Bridge (South) | | | | | | | | | | | | | | | |
| 2 | T1 | All MCs | 38 | 47.2 | 38 | 47.2 | 0.026 | 0.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.02 | 0.01 | 59.7 |
| 3 | R2 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.026 | 5.7 | LOS A | 0.0 | 0.1 | 0.01 | 0.02 | 0.01 | 56.7 |
| Approach | | | 39 | 45.9 | 39 | 45.9 | 0.026 | 0.2 | NA | 0.0 | 0.1 | 0.01 | 0.02 | 0.01 | 59.6 |
| North: Tooheys Road (N) | | | | | | | | | | | | | | | |
| 7 | L2 | All MCs | 18 | 94.1 | 18 | 94.1 | 0.036 | 6.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.24 | 0.00 | 52.1 |
| 8 | T1 | All MCs | 24 | 87.0 | 24 | 87.0 | 0.036 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.24 | 0.00 | 58.6 |
| Approach | | | 42 | 90.0 | 42 | 90.0 | 0.036 | 2.8 | NA | 0.0 | 0.0 | 0.00 | 0.24 | 0.00 | 55.7 |
| West: Off-Ramp | | | | | | | | | | | | | | | |
| 10 | L2 | All MCs | 35 | 45.5 | 35 | 45.5 | 0.033 | 10.2 | LOS A | 0.1 | 1.3 | 0.15 | 0.96 | 0.15 | 49.4 |
| 11 | T1 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.033 | 8.2 | LOS A | 0.1 | 1.3 | 0.15 | 0.96 | 0.15 | 51.1 |
| 12 | R2 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.033 | 7.9 | LOS A | 0.1 | 1.3 | 0.15 | 0.96 | 0.15 | 50.7 |
| Approach | | | 37 | 42.9 | 37 | 42.9 | 0.033 | 10.1 | LOS A | 0.1 | 1.3 | 0.15 | 0.96 | 0.15 | 49.5 |
| All Vehicles | | | 118 | 60.7 | 118 | 60.7 | 0.036 | 4.2 | NA | 0.1 | 1.3 | 0.05 | 0.39 | 0.05 | 54.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuPM) Tooheys Road / Motorway Link - Northern Side - Ex + Proposal (Site Folder: Existing + Proposal)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future PM Peak Period - Existing plus Proposal
Tooheys Road / Doyalson Link Road (Northern Side)
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Overpass Bridge (South) | | | | | | | | | | | | | | | |
| 2 | T1 | All MCs | 28 | 59.3 | 28 | 59.3 | 0.021 | 0.0 | LOS A | 0.0 | 0.1 | 0.03 | 0.05 | 0.03 | 59.0 |
| 3 | R2 | All MCs | 2 | 0.0 | 2 | 0.0 | 0.021 | 6.0 | LOS A | 0.0 | 0.1 | 0.03 | 0.05 | 0.03 | 56.1 |
| Approach | | | 31 | 55.2 | 31 | 55.2 | 0.021 | 0.4 | NA | 0.0 | 0.1 | 0.03 | 0.05 | 0.03 | 58.8 |
| North: Tooheys Road (N) | | | | | | | | | | | | | | | |
| 7 | L2 | All MCs | 40 | 39.5 | 40 | 39.5 | 0.052 | 6.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.30 | 0.00 | 53.2 |
| 8 | T1 | All MCs | 38 | 41.7 | 38 | 41.7 | 0.052 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.30 | 0.00 | 57.2 |
| Approach | | | 78 | 40.5 | 78 | 40.5 | 0.052 | 3.1 | NA | 0.0 | 0.0 | 0.00 | 0.30 | 0.00 | 55.1 |
| West: Off-Ramp | | | | | | | | | | | | | | | |
| 10 | L2 | All MCs | 24 | 73.9 | 24 | 73.9 | 0.032 | 11.4 | LOS A | 0.1 | 1.3 | 0.14 | 0.98 | 0.14 | 48.4 |
| 11 | T1 | All MCs | 4 | 0.0 | 4 | 0.0 | 0.032 | 8.3 | LOS A | 0.1 | 1.3 | 0.14 | 0.98 | 0.14 | 51.2 |
| 12 | R2 | All MCs | 3 | 0.0 | 3 | 0.0 | 0.032 | 7.9 | LOS A | 0.1 | 1.3 | 0.14 | 0.98 | 0.14 | 50.8 |
| Approach | | | 32 | 56.7 | 32 | 56.7 | 0.032 | 10.6 | LOS A | 0.1 | 1.3 | 0.14 | 0.98 | 0.14 | 49.0 |
| All Vehicles | | | 140 | 47.4 | 140 | 47.4 | 0.052 | 4.2 | NA | 0.1 | 1.3 | 0.04 | 0.40 | 0.04 | 54.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuAM) Tooheys Road / Motorway Link - Southern Side - Ex + Proposal (Site Folder: Existing + Proposal)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future AM Peak Period - Existing plus Proposal
Tooheys Road / Motorway Link - Southern Side
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Off-Ramp (E) | | | | | | | | | | | | | | | |
| 5 | T1 | All MCs | 3 | 33.3 | 3 | 33.3 | 0.046 | 9.5 | LOS A | 0.2 | 1.5 | 0.12 | 0.97 | 0.12 | 50.1 |
| 6 | R2 | All MCs | 38 | 47.2 | 38 | 47.2 | 0.046 | 9.4 | LOS A | 0.2 | 1.5 | 0.12 | 0.97 | 0.12 | 49.0 |
| Approach | | | 41 | 46.2 | 41 | 46.2 | 0.046 | 9.4 | LOS A | 0.2 | 1.5 | 0.12 | 0.97 | 0.12 | 49.1 |
| North: Overpass Bridge (North) | | | | | | | | | | | | | | | |
| 9 | R2 | All MCs | 24 | 87.0 | 24 | 87.0 | 0.021 | 6.8 | LOS A | 0.0 | 0.0 | 0.00 | 0.62 | 0.00 | 48.6 |
| Approach | | | 24 | 87.0 | 24 | 87.0 | 0.021 | 6.8 | NA | 0.0 | 0.0 | 0.00 | 0.62 | 0.00 | 48.6 |
| All Vehicles | | | 65 | 61.3 | 65 | 61.3 | 0.046 | 8.4 | NA | 0.2 | 1.5 | 0.07 | 0.84 | 0.07 | 48.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuPM) Tooheys Road / Motorway Link - Southern Side - Ex + Proposal (Site Folder: Existing + Proposal)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future PM Peak Period - Existing plus Proposal
Tooheys Road / Motorway Link - Southern Side
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: On-Ramp | | | | | | | | | | | | | | | |
| 5 | T1 | All MCs | 3 | 0.0 | 3 | 0.0 | 0.036 | 7.8 | LOS A | 0.1 | 1.2 | 0.15 | 0.95 | 0.15 | 51.3 |
| 6 | R2 | All MCs | 27 | 57.7 | 27 | 57.7 | 0.036 | 9.9 | LOS A | 0.1 | 1.2 | 0.15 | 0.95 | 0.15 | 48.5 |
| Approach | | | 31 | 51.7 | 31 | 51.7 | 0.036 | 9.6 | LOS A | 0.1 | 1.2 | 0.15 | 0.95 | 0.15 | 48.8 |
| North: Overpass Bridge (North) | | | | | | | | | | | | | | | |
| 9 | R2 | All MCs | 41 | 43.6 | 41 | 43.6 | 0.029 | 6.2 | LOS A | 0.0 | 0.0 | 0.00 | 0.63 | 0.00 | 50.4 |
| Approach | | | 41 | 43.6 | 41 | 43.6 | 0.029 | 6.2 | NA | 0.0 | 0.0 | 0.00 | 0.63 | 0.00 | 50.4 |
| All Vehicles | | | 72 | 47.1 | 72 | 47.1 | 0.036 | 7.7 | NA | 0.1 | 1.2 | 0.06 | 0.76 | 0.06 | 49.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuAM) Tooheys Road / Motorway Link - Northern Side - Ex + Proposal + Wallarah Coal (Site Folder: Existing + Proposal + Wallarah Coal Operation)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future AM Peak Period - Existing plus Proposal Plus Wallarah Coal
Tooheys Road / Doyalson Link Road (Northern Side)
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Overpass Bridge (South) | | | | | | | | | | | | | | | |
| 2 | T1 | All MCs | 52 | 44.9 | 52 | 44.9 | 0.035 | 0.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 59.8 |
| 3 | R2 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.035 | 5.7 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 56.8 |
| Approach | | | 53 | 44.0 | 53 | 44.0 | 0.035 | 0.1 | NA | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 59.7 |
| North: Tooheys Road (N) | | | | | | | | | | | | | | | |
| 7 | L2 | All MCs | 23 | 95.5 | 23 | 95.5 | 0.045 | 6.7 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 0.00 | 52.0 |
| 8 | T1 | All MCs | 29 | 89.3 | 29 | 89.3 | 0.045 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.25 | 0.00 | 58.6 |
| Approach | | | 53 | 92.0 | 53 | 92.0 | 0.045 | 2.9 | NA | 0.0 | 0.0 | 0.00 | 0.25 | 0.00 | 55.5 |
| West: Off-Ramp | | | | | | | | | | | | | | | |
| 10 | L2 | All MCs | 47 | 44.4 | 47 | 44.4 | 0.045 | 10.2 | LOS A | 0.2 | 1.7 | 0.18 | 0.95 | 0.18 | 49.4 |
| 11 | T1 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.045 | 8.3 | LOS A | 0.2 | 1.7 | 0.18 | 0.95 | 0.18 | 51.1 |
| 12 | R2 | All MCs | 1 | 0.0 | 1 | 0.0 | 0.045 | 8.1 | LOS A | 0.2 | 1.7 | 0.18 | 0.95 | 0.18 | 50.7 |
| Approach | | | 49 | 42.6 | 49 | 42.6 | 0.045 | 10.2 | LOS A | 0.2 | 1.7 | 0.18 | 0.95 | 0.18 | 49.5 |
| All Vehicles | | | 155 | 59.9 | 155 | 59.9 | 0.045 | 4.3 | NA | 0.2 | 1.7 | 0.06 | 0.39 | 0.06 | 54.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuPM) Tooheys Road / Motorway Link - Northern Side - Ex + Proposal + Wallarah Coal Operation (Site Folder: Existing + Proposal + Wallarah Coal Operation)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future PM Peak Period - Existing plus Proposal plus Wallarah Coal
Tooheys Road / Doyalson Link Road (Northern Side)
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Overpass Bridge (South) | | | | | | | | | | | | | | | |
| 2 | T1 | All MCs | 34 | 65.6 | 34 | 65.6 | 0.026 | 0.0 | LOS A | 0.0 | 0.1 | 0.03 | 0.04 | 0.03 | 59.0 |
| 3 | R2 | All MCs | 2 | 0.0 | 2 | 0.0 | 0.026 | 6.1 | LOS A | 0.0 | 0.1 | 0.03 | 0.04 | 0.03 | 56.1 |
| Approach | | | 36 | 61.8 | 36 | 61.8 | 0.026 | 0.4 | NA | 0.0 | 0.1 | 0.03 | 0.04 | 0.03 | 58.9 |
| North: Tooheys Road (N) | | | | | | | | | | | | | | | |
| 7 | L2 | All MCs | 53 | 40.0 | 53 | 40.0 | 0.070 | 6.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.29 | 0.00 | 53.3 |
| 8 | T1 | All MCs | 52 | 40.8 | 52 | 40.8 | 0.070 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.29 | 0.00 | 57.3 |
| Approach | | | 104 | 40.4 | 104 | 40.4 | 0.070 | 3.1 | NA | 0.0 | 0.0 | 0.00 | 0.29 | 0.00 | 55.2 |
| West: Off-Ramp | | | | | | | | | | | | | | | |
| 10 | L2 | All MCs | 29 | 78.6 | 29 | 78.6 | 0.038 | 11.6 | LOS A | 0.1 | 1.6 | 0.16 | 0.98 | 0.16 | 48.3 |
| 11 | T1 | All MCs | 4 | 0.0 | 4 | 0.0 | 0.038 | 8.5 | LOS A | 0.1 | 1.6 | 0.16 | 0.98 | 0.16 | 51.2 |
| 12 | R2 | All MCs | 3 | 0.0 | 3 | 0.0 | 0.038 | 8.1 | LOS A | 0.1 | 1.6 | 0.16 | 0.98 | 0.16 | 50.8 |
| Approach | | | 37 | 62.9 | 37 | 62.9 | 0.038 | 11.0 | LOS A | 0.1 | 1.6 | 0.16 | 0.98 | 0.16 | 48.8 |
| All Vehicles | | | 177 | 49.4 | 177 | 49.4 | 0.070 | 4.2 | NA | 0.1 | 1.6 | 0.04 | 0.38 | 0.04 | 54.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuAM) Tooheys Road / Motorway Link - Southern Side - Ex + Proposal + Wallarah Coal Operation (Site Folder: Existing + Proposal + Wallarah Coal Operation)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future AM Peak Period - Existing plus Proposal plus Wallarah Coal
Tooheys Road / Motorway Link - Southern Side
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Off-Ramp (E) | | | | | | | | | | | | | | | |
| 5 | T1 | All MCs | 3 | 33.3 | 3 | 33.3 | 0.062 | 9.5 | LOS A | 0.2 | 2.0 | 0.13 | 0.95 | 0.13 | 50.1 |
| 6 | R2 | All MCs | 52 | 44.9 | 52 | 44.9 | 0.062 | 9.3 | LOS A | 0.2 | 2.0 | 0.13 | 0.95 | 0.13 | 49.1 |
| Approach | | | 55 | 44.2 | 55 | 44.2 | 0.062 | 9.3 | LOS A | 0.2 | 2.0 | 0.13 | 0.95 | 0.13 | 49.1 |
| North: Overpass Bridge (North) | | | | | | | | | | | | | | | |
| 9 | R2 | All MCs | 29 | 89.3 | 29 | 89.3 | 0.026 | 6.8 | LOS A | 0.0 | 0.0 | 0.00 | 0.62 | 0.00 | 48.5 |
| Approach | | | 29 | 89.3 | 29 | 89.3 | 0.026 | 6.8 | NA | 0.0 | 0.0 | 0.00 | 0.62 | 0.00 | 48.5 |
| All Vehicles | | | 84 | 60.0 | 84 | 60.0 | 0.062 | 8.5 | NA | 0.2 | 2.0 | 0.09 | 0.84 | 0.09 | 48.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: 101 [(FuPM) Tooheys Road / Motorway Link - Southern Side - Ex + Proposal + Wallarah Coal (Site Folder: Existing + Proposal + Wallarah Coal Operation)]

**Output produced by SIDRA INTERSECTION Version: 9.1.3.210**

Future PM Peak Period - Existing plus Proposal plus Wallarah Coal
Tooheys Road / Motorway Link - Southern Side
Job No. 220973
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] m | Prop. Que | Eff. Stop Rate | Aver. No. of Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: On-Ramp | | | | | | | | | | | | | | | |
| 5 | T1 | All MCs | 3 | 0.0 | 3 | 0.0 | 0.044 | 7.9 | LOS A | 0.1 | 1.5 | 0.18 | 0.94 | 0.18 | 51.2 |
| 6 | R2 | All MCs | 33 | 64.5 | 33 | 64.5 | 0.044 | 10.3 | LOS A | 0.1 | 1.5 | 0.18 | 0.94 | 0.18 | 48.2 |
| Approach | | | 36 | 58.8 | 36 | 58.8 | 0.044 | 10.0 | LOS A | 0.1 | 1.5 | 0.18 | 0.94 | 0.18 | 48.4 |
| North: Overpass Bridge (North) | | | | | | | | | | | | | | | |
| 9 | R2 | All MCs | 55 | 42.3 | 55 | 42.3 | 0.038 | 6.2 | LOS A | 0.0 | 0.0 | 0.00 | 0.63 | 0.00 | 50.5 |
| Approach | | | 55 | 42.3 | 55 | 42.3 | 0.038 | 6.2 | NA | 0.0 | 0.0 | 0.00 | 0.63 | 0.00 | 50.5 |
| All Vehicles | | | 91 | 48.8 | 91 | 48.8 | 0.044 | 7.7 | NA | 0.1 | 1.5 | 0.07 | 0.75 | 0.07 | 49.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.


**ANNEXURE E: PARSONS TRAFFIC REPORT EXCERPTS**

**(4 SHEETS)**

# Executive summary

A traffic and transport impact assessment was undertaken by Parsons Brinckerhoff for the Wallarah 2 Coal Project (Project). This report provides an assessment of the impacts on the surrounding road network as a result of the increased traffic associated with the construction and operational activities as along with the associated road safety implications.

**Traffic generation and distribution**

All produced coal is anticipated to be transported by rail, via a new rail loop to be constructed to the north of the Project. Therefore, road-based traffic movements would mainly be associated with:

- Construction workforce.
- Construction deliveries.
- Operational workforce.
- Deliveries and service vehicles once the mine is in operation.

The construction of the Tooheys Road Site and Buttonderry Site in 2015 is expected to generate up to 270 one-way trips per peak hour arriving and departing the sites during the shift change hours. Up to 20 two-way construction vehicle trips per hour would access the sites throughout the day, for delivering construction material, equipment, and concrete.

The operation of the Tooheys Road Site and Buttonderry Site in 2025 is expected to generate up to 105 one-way trips per peak hour associated with mine employees arriving and departing the sites during the shift change hours. There would be up to 20 service delivery trips per hour accessing the sites throughout the day.

The construction of the Western Ventilation Shaft in 2026 is expected to generate up to 25 one-way trips per peak hour associated with mine employees arriving before the work shift and departing after the work shift. Up to four two-way construction vehicle trips per hour would access the site throughout the day, for delivering construction material, equipment, and concrete. The continuous operation of the Tooheys Road site and Buttonderry site in 2026 was assumed to generate the same number of traffic trips as it would in 2025.

**Table 5.1** **Estimated construction vehicle trips per day at the Tooheys Road Site and Buttonderry Site during peak construction activities in the second year of construction (2015)**

| Site | Vehicle type | Vehicles/day | Vehicle trips/day (2-way) |
|---|---|---|---|
| Tooheys Road | Light (employees – construction for surface facilities) | 270 | 540 |
| | Light (employees – drift construction) | 30 | 60 |
| | Light (deliveries) | 60 | 120 |
| | Rigid truck | 20 | 40 |
| | Articulated truck | 20 | 40 |
| | **Total** | **400** | **800** |
| Buttonderry | Light (employees – construction for surface facilities) | 120 | 240 |
| | Light (employees – shaft construction) | 30 | 60 |
| | Light (deliveries) | 40 | 80 |
| | Rigid truck | 10 | 20 |
| | Articulated truck | 20 | 40 |
| | **Total** | **220** | **440** |

Source: WACJV (2 April 2012)

**Table 5.3 Estimated hourly construction vehicle trips at the Tooheys Road Site (2015)**

| Working hours | Direction of traffic | Trip type | Time | Contributors |
|---|---|---|---|---|
| Between 7.00 am and 6.00 pm (construction of surface facilities) | Inbound traffic | Construction employee trip (light vehicles) | 6.00 am to 7.00 am | ▪ 270 construction employee trips by light vehicles at the start of their work |
| | Inbound and outbound traffic | Construction vehicle trip (heavy vehicles) | Throughout the day between 7.00 am and 6.00 pm | ▪ six inbound and six outbound trips per hour for delivery by light vehicles throughout the day<br>▪ four inbound and four outbound heavy vehicle trips per hour throughout the day |
| | Outbound traffic | Construction employee trip (light vehicles) | 6.00 pm to 7.00 pm | ▪ 270 construction employee trips by light vehicles at the end of their work |
| Three working shifts per day (drift construction) | Inbound traffic | Construction employee trip (light vehicles) | 5.00 am to 6.00 am | ▪ 10 drift construction employee trips by light vehicles at the start of the day shift |
| | Outbound traffic | Construction employee trip (light vehicles) | 6.00 am to 7.00 am | ▪ 10 drift construction employee trips by light vehicles at the end of the night shift |
| | Inbound traffic | Construction employee trip (light vehicles) | 1.00 pm to 2.00 pm | ▪ 10 drift construction employee trips by light vehicles at the start of the afternoon shift |
| | Outbound traffic | Construction employee trip (light vehicles) | 2.00 pm to 3.00 pm | ▪ 10 drift construction employee trips by light vehicles at the end of the day shift |
| | Inbound traffic | Construction employee trip (light vehicles) | 9.00 pm to 10.00 pm | ▪ 10 drift construction employee trips by light vehicles at the start of the night shift |
| | Outbound traffic | Construction employee trip (light vehicles) | 10.00 pm to 11.00 pm | ▪ 10 drift construction employee trips by light vehicles at the end of the afternoon shift |

Source: WACJV (27 April 2012)

**Table 5.7 Inbound and outbound trips for operation at the Tooheys Road Site**

| Time | Employee type | Direction of traffic | Contributors |
|---|---|---|---|
| 5.00 am to 6.00 am | Day shift mine operation employee (light vehicles) | Inbound traffic | 15 day shift mine operation employee trips at the start of the their day shift |
| 7.00 am to 8.00 am | Night shift mine operation employee (light vehicles) | Outbound traffic | three night shift mine operation employee trips after the end of the night shift |
| Throughout the day between 7.00 am and 5.00 pm | Contractors for delivery of materials and services (heavy vehicles) | Inbound and outbound traffic | 10 delivery and service vehicle trips per hour arriving and 10 delivery and service vehicle trips departing the site throughout the day |
| 1.00 pm to 2.00 pm | Afternoon shift mine operation employee (light vehicles) | Inbound traffic | three afternoon shift mine operation employee trips at the start of the their afternoon shift |
| 3.00 pm to 4.00 pm | Day shift mine operation employee (light vehicles) | Outbound traffic | 15 day shift mine operation employee trips after the end of the day shift |
| 9.00 pm to 10.00 pm | Night shift mine operation employee (light vehicles) | Inbound traffic | three night shift mine operation employee trips at the start of the their night shift |
| 11.00 pm to 12.00 am (the next day) | Afternoon shift mine operation employee (light vehicles) | Outbound traffic | three afternoon shift mine operation employee trips after the end of the afternoon shift |

Source: WACJV (2 April 2012)


# APPENDIX I

## PRELIMINARY HAZARD ANALYSIS REPORT

# PRELIMINARY HAZARD ASSESSMENT

**Bushells Ridge Asphalt Plant**
**203 Tooheys Rd**
**Bushells Ridge NSW 2259**

**Prepared for:**

Element Environment Pty Ltd
PO Box 1563
Warriewood NSW 2101

**SLR Ref: 610.31151-R01**
**Version No: -v1.1**
**April 2023**

# PREPARED BY

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# BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Element Environment Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

# DOCUMENT CONTROL

| Reference | Date | Prepared | Checked | Authorised |
|---|---|---|---|---|
| 610.31151-R01-v1.1 | 30 April 2023 | Craig Simpson | Jordan Harley | Craig Simpson |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Element Environment Pty Limited (Element) to undertake a Preliminary Hazard Analysis to accompany a designated development application for the enhanced operations at Fulton Hogan's Bushells Ridge Asphalt Plant (the project) located 203 Tooheys Road Bushells Ridge NSW 2259.

This report addresses the Project in relation to Hazards & Risk in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021 (the SEPP).

This involves a two-stage process consisting of

**Stage 1 – Preliminary Risk Screening (PRS)**

Under the SEPP, the PRS stage assesses the storage and transport of specific dangerous goods classes that have the potential for significant, off-site effects. Specifically, this stage involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site with respect to storage depot locations as well as transported to and from the site.

In the current project, the Preliminary Risk Screening was undertaken by Element.

**Stage 2 – Preliminary Hazard Analysis (PHA)**

If screening thresholds for the identified dangerous goods are exceeded, the SEPP requires a Preliminary Hazard Analysis (PHA) to be undertaken.

The PHA determines the level of risk to people, property, the environment and surrounds, taking into account the implementation of controls.

- If the risk levels exceed the criteria of acceptability and/or if the controls are assessed as inadequate, or unable to be readily controlled, then the development is classified as "hazardous industry".
- Where it is unable to prevent offensive impacts on the surrounding land users, the development is classified as "offensive industry".

This Preliminary Hazard Analysis forms part of the supporting documentation in accordance with the Project's SEARs requirements for a Preliminary Hazard Analysis.

In the current project, the Preliminary Hazard Assessment was undertaken by SLR and based on information provided by Element.

The Preliminary Hazard Analysis has found that the main dangerous goods potential hazards associated with the Bushells Ridge Asphalt Plant enhancement were the following:

- LPG (storage and transport)
- Diesel (storage and transport)
- Biodiesel (storage and transport)
- Heating of combustible materials during production operations

# EXECUTIVE SUMMARY

The residual risks associated with these hazards once controls are implemented were rated as Tolerable (i.e. the risk is acceptably low).

The risk of biophysical damage outside the Site is considered unlikely based on the engineering and design controls that will be in place. It should be noted that a corridor of land through the site is zoned as C2 Environmental Conservation. Therefore the onsite controls will also protect the biophysical environment of this corridor of land on the site.

It is the conclusion of this Preliminary Hazard Analysis that the proposed development (including Bushells Ridge Asphalt Plant enhancement) would be identified as a suitable development for the area, with suitable engineering controls, operational controls and management controls in place. These controls area standard industry practice and readily implemented as part of safety engineering.

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# DOCUMENT REFERENCES

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## TABLES



## FIGURES



## APPENDICES

# 1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Element Environment Pty Limited (Element) to undertake a Preliminary Hazard Analysis to accompany a designated development application for the enhanced operations at Fulton Hogan's Bushells Ridge Asphalt Plant (the project) located 203 Tooheys Road Bushells Ridge NSW 2259.

This report addresses the Project in relation to Hazards & Risk in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021 (the SEPP).

This involves a two-stage process:

**Stage 1 – Preliminary Risk Screening (PRS)**

Under the SEPP, the PRS stage assesses the storage and transport of specific dangerous goods classes that have the potential for significant, off-site effects. Specifically, this stage involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site with respect to storage depot locations as well as transported to and from the site.

For the current project, the Preliminary Risk Screening was undertaken by Element.

**Stage 2 – Preliminary Hazard Analysis (PHA)**

If screening thresholds for the identified dangerous goods are exceeded, the SEPP requires a Preliminary Hazard Analysis (PHA) to be undertaken.

The PHA determines the level of risk to people, property, the environment and surrounds, taking into account the implementation of controls.

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- Where it is unable to prevent offensive impacts on the surrounding land users, the development is classified as "offensive industry".

This Preliminary Hazard Analysis forms part of the supporting documentation in accordance with the Project's SEARs requirements for a Preliminary Hazard Analysis.

The Preliminary Hazard Analysis was prepared in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' (HIPAP 6) and Multi-Level Risk Assessment (MLRA).

HIPAP 6 provides guidance on the general approach recommended for hazard analysis. The objective of hazard analysis is to develop a comprehensive understanding of the hazards and risks associated with an operation or facility and of the adequacy of safeguards. The hazard analysis process may include qualitative and quantitative methods. Consideration should include:

- the nature and quantities of hazardous materials stored and processed on the site;
- the type of plant and equipment in use;
- the adequacy of proposed technical, operational and organisational safeguards;

- the surrounding land uses or likely future land uses; and
- the interactions of these factors.

The MLRA provides guidance on the criteria for using the results of the screening, classification and prioritisation steps to determine which of three levels of further analysis is appropriate.

Level 1 is an essentially qualitative approach based on comprehensive hazard identification to demonstrate that the activity does not pose a significant off-site risk.

Level 2 supplements the qualitative analysis by sufficiently quantifying the main risk contributors to show that risk criteria will not be exceeded.

Level 3 is a full quantitative analysis.

The MLRA guidance states a Level 1 qualitative assessment may suffice provided all or most of the following conditions are met:

- screening and risk classification and prioritisation indicate there are no major off-site consequences and societal risk is negligible;
- the necessary technical and management safeguards are well understood and readily implemented; and
- there are no sensitive surrounding land uses.

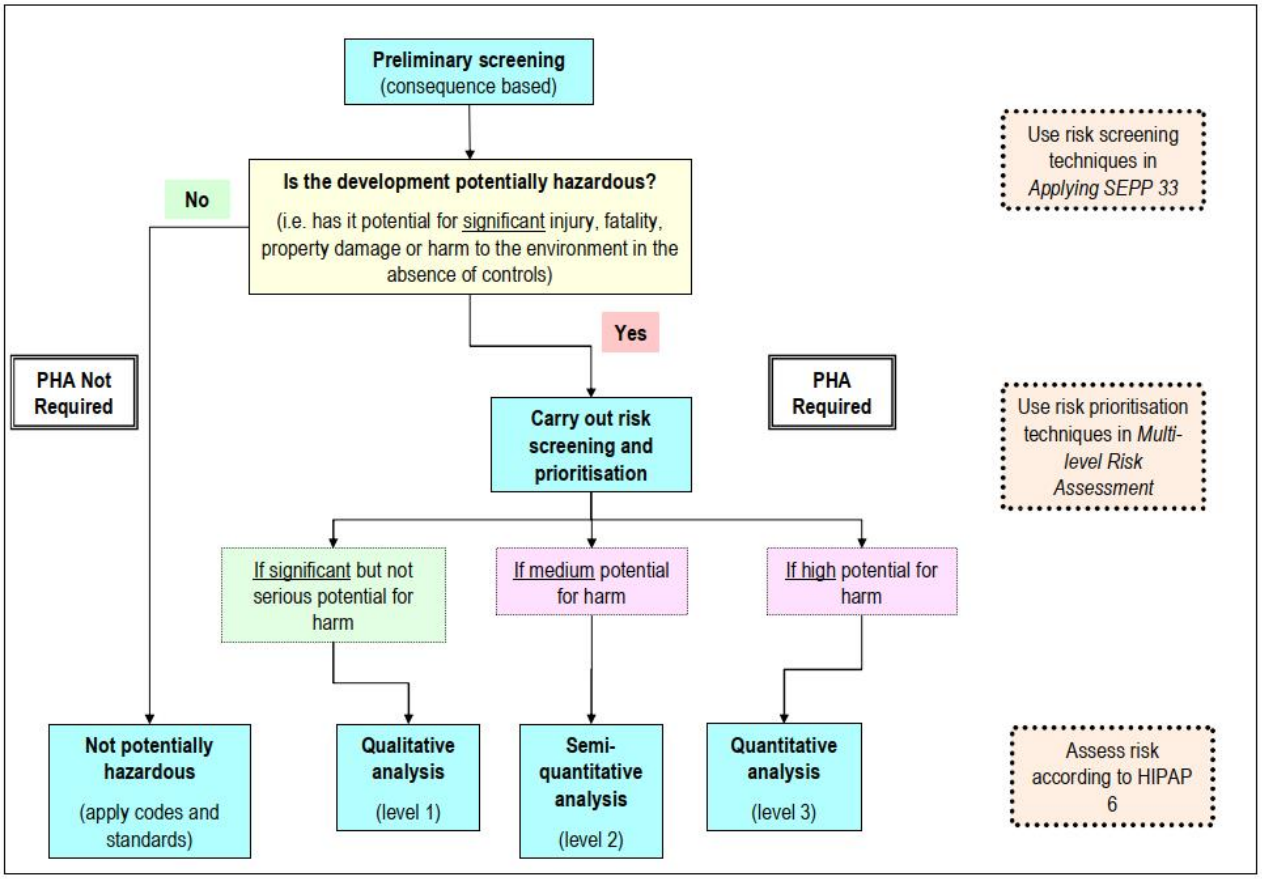
The current Preliminary Hazard Analysis study for the Project met the MLRA criteria for a Level 1 assessment as the activity does not pose a significant off-site risk and the necessary technical and management safeguards are well understood and readily implemented.

It further states the following three stages are used in the assessment process:

- preliminary screening
- risk classification and prioritisation
- risk analysis and assessment.

The overall MLRA approach can be seen in Figure 1 below.

## Figure 1 The Multi-Level Risk Assessment Approach*




(* Source Planning NSW, 2011a Multi-Level Risk Assessment, New South Wales Government, figure 3)

The Preliminary Hazard Analysis should estimate the cumulative risks from the existing and proposed development. To determine the level of risk to people, property and the environment at the proposed location and in the presence of controls.

If the risk levels exceed the criteria of acceptability and/or if the controls are assessed as inadequate, or unable to be readily controlled, then the development is classified as 'hazardous industry'. Where it is unable to prevent offensive impacts on the surrounding land users, the development is classified as 'offensive industry'.

A development may also be considered potentially hazardous with respect to the transport of dangerous goods. A proposed development may be potentially hazardous if the number of generated traffic movements (for significant quantities of hazardous materials entering or leaving the site) is above the cumulative annual or peak weekly vehicle movements. Applying SEPP 33: Hazardous and Offensive Development Application Guidelines (NSW Department of Planning, 2011), outlines the screening thresholds for transportation.

This report presents information pertaining to the Preliminary Hazard Analysis for the Project.

# 2 Project Description

The located Asphalt Plant is located at 203 Tooheys Road, Bushells Ridge NSW 2259 and comprises the property title Lot number 10 / DP 834953 in the Central Coast Council area. Under the Central Coast Local Area Plan 2022, the land is zoned IN1 General Industrial with a corridor of land through the site zoned as C2 Environmental Conservation.

The site location and details of zoning map have been set out in Figure 2 Site Location and Surroundings and Figure 3 Land Zoning Extract (over page).

The project involves the enhanced operations at Fulton Hogan's Bushells Ridge Asphalt Plant. SLR was advised by Element that the project will introduce the additional items listed below.

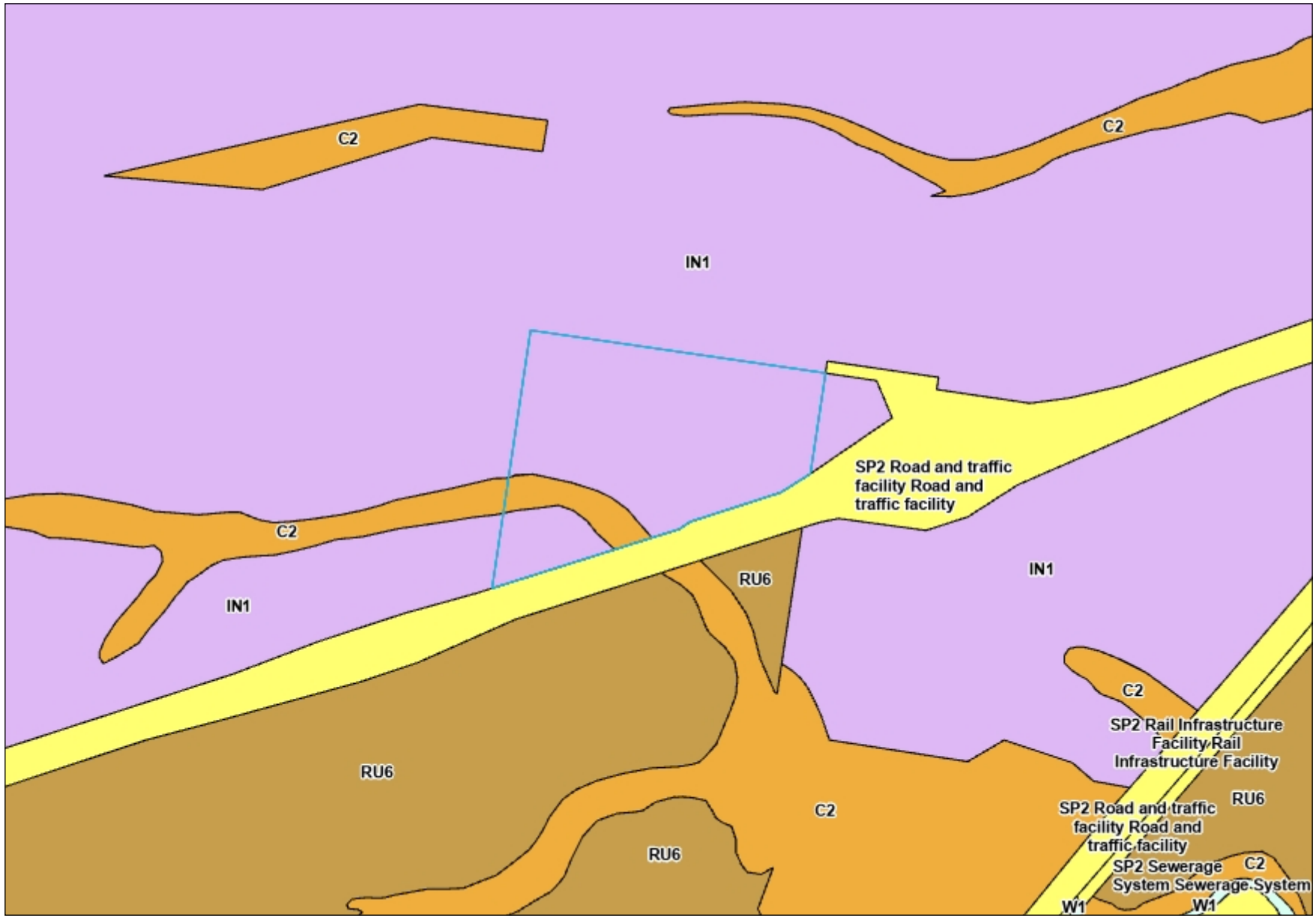
- An intermediate bulk container bunded storage area will be established to the east of the asphalt plant (this is the bunded area to the west of the office mentioned – item 21 on the site plan).
- A 3,300 L tank to store AdBlue (diesel exhaust fluid). The tank will be housed inside the existing intermediate bulk container bunded storage area.
- An additional 60,000 L bitumen tank to be installed adjacent to the existing bitumen tank.
- A 10,000 L self bunded bio-diesel tank, housed within a dedicated bunded storage area to the west of the asphalt plant (this will be to the west of the existing asphalt plant to the north of the RAP feed bin).
- Above ground tanks to the rear of the existing bulk material storage bays to store an estimated 35,000 L of liquid petroleum gas (LPG). The LPG storage area will be approximately 15 m long and 8 m wide.

The site plan including details of the proposed site changes, as supplied by Element, has been set out in Figure 4 (over page).

Figure 2 Site Location and Surroundings

Online Mapping

# Figure 3 Land Zoning Extract




Legend

2022 - Land Zoning Map

- B1
- B2
- B3
- B4
- B5
- B6
- B7
- C1
- C2
- C3
- C4
- DM
- IN1
- IN2
- IN4
- R1
- R2
- R3
- R5
- RE1
- RE2
- RU1
- RU2
- RU3
- RU5
- RU6
- SP1
- SP2
- SP3
- UL
- W1
- W2

Local Government Area

Central Coast Suburbs

239.7 0 119.86 239.7 Metres

# Figure 4 Site Plan & Layout Changes

## SITE LEGEND

- EXISTING BUILDING
- EXISTING PAVEMENT
- EXISTING LANDSCAPE
- EXISTING SWALE DRAIN
- EXISTING RETENTION BASIN
- PROPOSED NEW BUILDING / STRUCTURE
- PROPOSED MATERIAL STORAGE AREA
- PROPOSED / MODIFIED LANDSCAPE

PROJECT NORTH

NOTE -
1. STORAGE BUNKERS ARE CONCEPT ONLY . DIMENSIONS MY CHANGE SUBJECT TO DETAILED DESIGN.
2. ALL LANDSCAPE AREAS ARE TO BE PLANTED IN ACCORDANCE WITH THE LOCAL COUNCIL SPECIFICATIONS AND PERMIT REQUIREMENTS.
3. SITE AREAS TO BE GENERALLY GRADED TOWARDS EXISTING SWALE DRAINS FOR WATER COLLECTION.
4. REFER TRUCK TURNING CIRCLE DRAWINGS FOR TRUCK SWEEP PATHS ON DRG. TP10 & TP11.

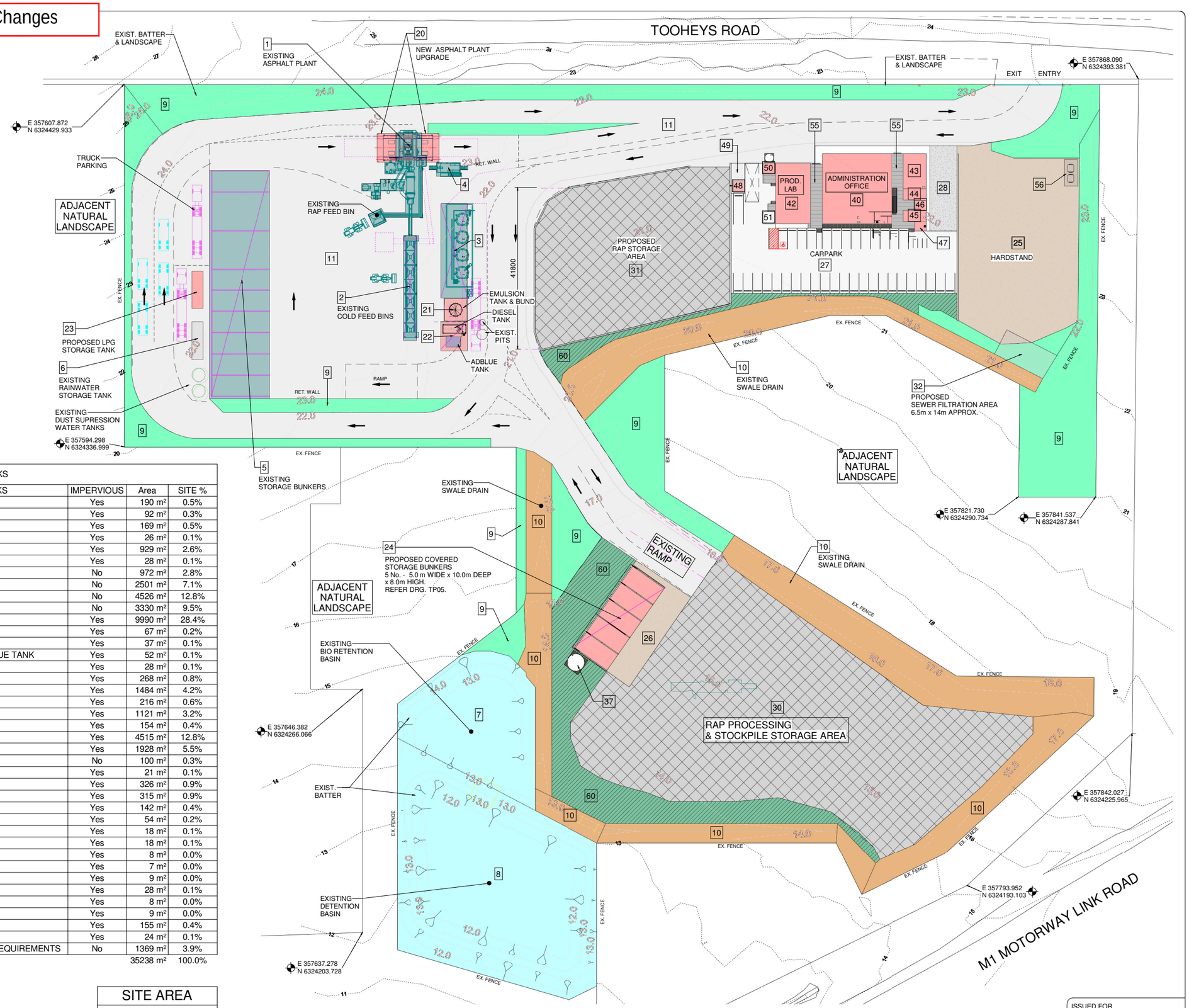
BUILDING AREAS - PROPOSED WORKS

| ITEM | DESCRIPTION | REMARKS | IMPERVIOUS | Area | SITE % |
|---|---|---|---|---|---|
| 1 | EXISTING ASPHALT PLANT | | Yes | 190 m² | 0.5% |
| 2 | EXISTING COVERED COLD FEED BINS | | Yes | 92 m² | 0.3% |
| 3 | EXISTING TANK FARM | | Yes | 169 m² | 0.5% |
| 4 | EXISTING CONTROL RM. | | Yes | 26 m² | 0.1% |
| 5 | EXISTING COVERED STORAGE BUNKER | | Yes | 929 m² | 2.6% |
| 6 | EXISTING RAINWATER TANK ( 70kL ) | | Yes | 28 m² | 0.1% |
| 7 | EXISTING BIO-RETENTION BASIN | | No | 972 m² | 2.8% |
| 8 | EXISTING BIO-DETENTION BASIN | | No | 2501 m² | 7.1% |
| 9 | EXISTING LANDSCAPE | | No | 4526 m² | 12.8% |
| 10 | EXISTING SWALE DRAIN | | No | 3330 m² | 9.5% |
| 11 | EXISTING PAVEMENT | | Yes | 9990 m² | 28.4% |
| 20 | PROPOSED ASPHALT PLANT ADDITIONS | REFER DRG. TP04. | Yes | 67 m² | 0.2% |
| 21 | PROPOSED EMULSION TANK BUND | XXkl EMULSION TANK | Yes | 37 m² | 0.1% |
| 22 | PROPOSED DIESEL TANK / ADBLUE | DIESEL TANK. & ADBLUE TANK | Yes | 52 m² | 0.1% |
| 23 | PROPOSED LPG STORAGE | | Yes | 28 m² | 0.1% |
| 24 | PROPOSED STORAGE BUNKER | REFER DRG. TP05. | Yes | 268 m² | 0.8% |
| 25 | PROPOSED HARDSTAND | | Yes | 1484 m² | 4.2% |
| 26 | PROPOSED HARDSTAND | | Yes | 216 m² | 0.6% |
| 27 | PROPOSED CARPARK | REFER DRG. TP04. | Yes | 1121 m² | 3.2% |
| 28 | PROPOSED CARPARK ACCESS WAY | REFER DRG. TP04. | Yes | 154 m² | 0.4% |
| 30 | PROPOSED RAP PROCESSING AREA | | Yes | 4515 m² | 12.8% |
| 31 | PROPOSED PROCESSED RAP STORAGE | | Yes | 1928 m² | 5.5% |
| 32 | PROPOSED SEWER FILTRATION AREA | TO BE RELOCATED | No | 100 m² | 0.3% |
| 37 | PROPOSED WATER TANK | | Yes | 21 m² | 0.1% |
| 40 | PROPOSED ADMINISTRATION BUILDING - GRND FLOOR | REFER DRG. TP03. | Yes | 326 m² | 0.9% |
| 41 | PROPOSED ADMINISTRATION BUILDING - 1ST FLOOR | REFER DRG. TP06. | Yes | 315 m² | 0.9% |
| 42 | PROPOSED PRODUCTION LAB | REFER DRG. TP03. | Yes | 142 m² | 0.4% |
| 43 | PROPOSED CRIB RM. | REFER DRG. TP03. | Yes | 54 m² | 0.2% |
| 44 | PROPOSED FEMALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 45 | PROPOSED MALE ABLUTION BLOCK | REFER DRG. TP03. | Yes | 18 m² | 0.1% |
| 46 | PROPOSED ACCESSIBLE ABLUTION BLOCK | | Yes | 8 m² | 0.0% |
| 47 | PROPOSED CLEANERS STORE | | Yes | 7 m² | 0.0% |
| 48 | PROPOSED CHEMICAL STORAGE | | Yes | 9 m² | 0.0% |
| 49 | PROPOSED CHEM STORAGE PAVEMENT | | Yes | 28 m² | 0.1% |
| 50 | PROPOSED ABLUTION BLOCK 2 | | Yes | 8 m² | 0.0% |
| 51 | PROPOSED COMPACTION RM. | | Yes | 9 m² | 0.0% |
| 55 | PROPOSED DECKING | | Yes | 155 m² | 0.4% |
| 56 | RUBBISH ENCLOSURE | | Yes | 24 m² | 0.1% |
| 60 | PROPOSED LANDSCAPE | TO LOCAL COUNCIL REQUIREMENTS | No | 1369 m² | 3.9% |
| | | | | 35238 m² | 100.0% |

PROPOSED SITE PERMEABILITY SCHEDULE

| SITE PERMEABILITY | Area | SITE % |
|---|---|---|
| IMPERVIOUS | 20928 m² | 62.1% |
| PERVIOUS | 12798 m² | 37.9% |
| | 33726 m² | 100.0% |

| SITE AREA |
|---|
| 34809 m² |




SITE PLAN - PROPOSED WORKS
1 : 500

ISSUED FOR
APPROVAL

| Rev | Description | Date |
|---|---|---|
| 0 | ISSUED FOR APPROVAL | 06-04-23 |

CLIENT
Fulton Hogan
203 TOOHEYS ROAD
BUSHELLS RIDGE

PROJECT
PROPOSED ASPHALT PLANT UPGRADE
203 TOOHEYS ROAD. BUSHELLS RIDGE. N.S.W.
DEVELOPMENT APPLICATION

SITE PLAN
PROPOSED WORKS

| | |
|---|---|
| DRAWN B & C | PLOT DATE 06-04-23 |
| DESIGNED D.J.D. | SCALE As indicated |
| APPROVED | |
| DRG No. TP02 | REV. 0 |

A1 AT 100% FULL SIZE.
A3 AT 50%

## 2.1 Process Undertaken on Site

The process undertaken on site consist of hot mix asphalt production. Set out below is a generic description of the operations of a typical batch mix hot asphalt plant. The information quoted below was obtained from the US EPA (2023).

*Hot mix asphalt (HMA) paving materials are a mixture of size-graded, high quality aggregate (which can include reclaimed asphalt pavement [RAP]), and liquid asphalt cement, which is heated and mixed in measured quantities to produce HMA. Aggregate and RAP (if used) constitute over 92 percent by weight of the total mixture. Aside from the amount and grade of asphalt cement used, mix characteristics are determined by the relative amounts and types of aggregate and RAP used. A certain percentage of fine aggregate (less than 74 micrometres [Fm] in physical diameter) is required for the production of good quality HMA.*

*Batch Mix Plants*

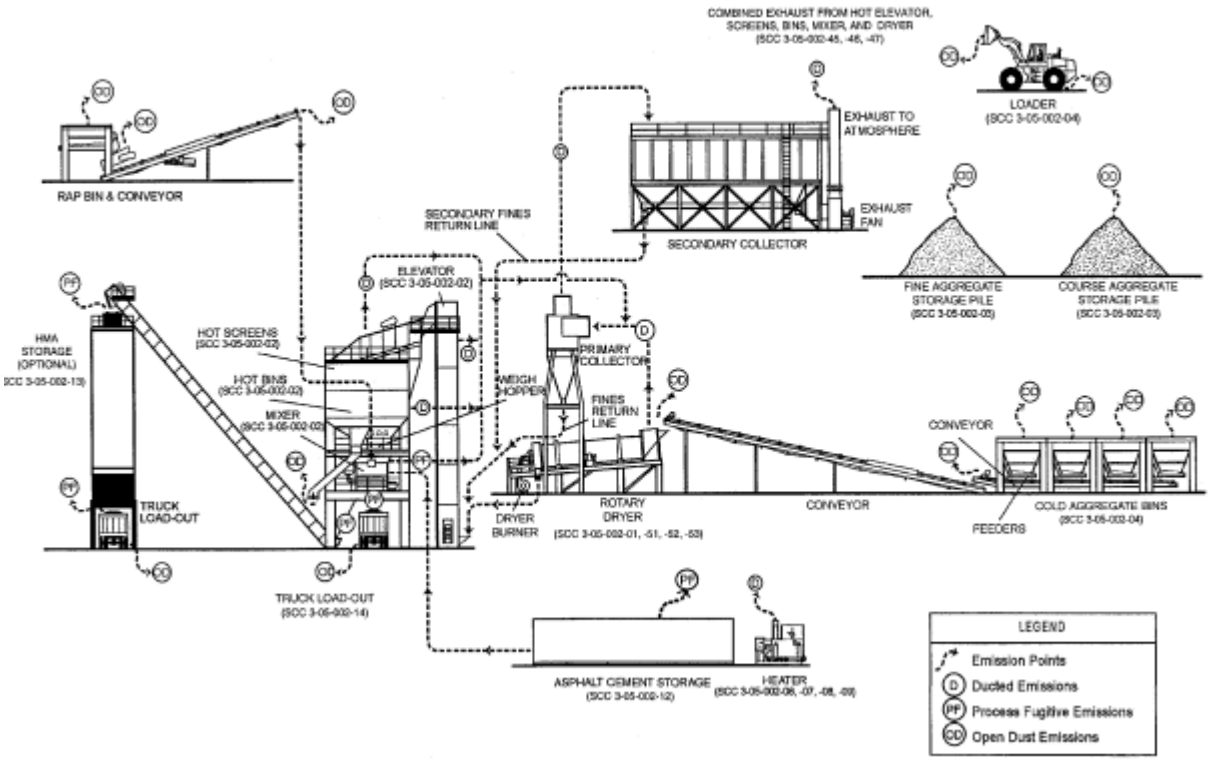
Figure 5 *shows the batch mix HMA production process. Raw aggregate normally is stockpiled near the production unit. The bulk aggregate moisture content typically stabilizes between 3 to 5 percent by weight.*

*Processing begins as the aggregate is hauled from the storage piles and is placed in the appropriate hoppers of the cold feed unit. The material is metered from the hoppers onto a conveyer belt and is transported into a rotary dryer (typically gas- or oil-fired). Dryers are equipped with flights designed to shower the aggregate inside the drum to promote drying efficiency.*

*As the hot aggregate leaves the dryer, it drops into a bucket elevator and is transferred to a set of vibrating screens, where it is classified into as many as four different grades (sizes) and is dropped into individual "hot" bins according to size. At newer facilities, RAP also may be transferred to a separate heated storage bin. To control aggregate size distribution in the final batch mix, the operator opens various hot bins over a weigh hopper until the desired mix and weight are obtained. Concurrent with the aggregate being weighed, liquid asphalt cement is pumped from a heated storage tank to an asphalt bucket, where it is weighed to achieve the desired aggregate-to-asphalt cement ratio in the final mix.*

*The aggregate from the weigh hopper is dropped into the mixer (pug mill) and dry-mixed for 6 to 10 seconds. The liquid asphalt is then dropped into the pug mill where it is mixed for an additional period of time. At older plants, RAP typically is conveyed directly to the pug mill from storage hoppers and combined with the hot aggregate. Total mixing time usually is less than 60 seconds. Then the hot mix is conveyed to a hot storage silo or is dropped directly into a truck and hauled to the job site.*

**Figure 5 General process flow diagram for batch mix asphalt plants (Source US EPA, 2023)**




## 2.2 Nearest Receivers

Based on SLR's previous study of the site (SLR Ref 610.16808-R01 v2.0), the nearest residential and industrial receptors that were identified have been listed in Table 1 below.

The industrial receptors identified in the study were the following:

- the offices of the Charmhaven Sewage Treatment Plant (I1) located 1.4 km to the south-southeast
- a gas compressor station (I2) operated by Jemena located 1.9 km to the north-northwest
- the proposed Wallarah 2 Project site (I3) located 2.1 km to the west
- the administration building of the Boral site (I4) located 650 m to the east-northeast

**Table 1 Location of the Identified Sensitive Receptors**

| ID | Easting (m) | Northing (m) | Distance from Site (km) |
|---|---|---|---|
| **Residential Receptors** | | | |
| R1 | 356,590 | 6,324,614 | 1.3 |
| R2 | 356,216 | 6,324,560 | 1.6 |
| R3 | 356,577 | 6,325,457 | 1.7 |
| R4 | 356,915 | 6,326,129 | 2.0 |
| R5 | 357,432 | 6,326,433 | 2.2 |
| R6 | 357,674 | 6,326,630 | 2.3 |
| R7 | 358,110 | 6,326,734 | 2.5 |
| R8 | 358,926 | 6,326,656 | 2.6 |
| R9 | 359,625 | 6,325,865 | 2.4 |
| R10 | 359,441 | 6,324,995 | 1.8 |
| R11 | 359,431 | 6,324,618 | 1.7 |
| R12 | 359,675 | 6,324,206 | 1.9 |
| R13 | 359,360 | 6,323,771 | 1.6 |
| R14 | 359,183 | 6,322,395 | 2.4 |
| R15 | 357,886 | 6,322,254 | 2.0 |
| R16 | 356,281 | 6,322,806 | 2.1 |
| **Industrial Receptors** | | | |
| I1 | 358,191 | 6,322,781 | 1.4 |
| I2 | 357,106 | 6,326,033 | 1.9 |
| I3 | 355,860 | 6,323,964 | 2.1 |
| I4 | 358,645 | 6,324,650 | 0.7 |

# 3 PRELIMINARY RISK SCREENING

Preliminary risk screening of the proposed Project is required under SEPP 33 to determine the need for a Preliminary Hazard Analysis. The preliminary screening assesses the storage of specific dangerous goods classes that have the potential for significant, off-site effects. Specifically, the assessment involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site with respect to storage depot locations as well as transported to and from the site.

With regards to the Preliminary Risk Screening, the following information and conclusions were provided by Element. Their Preliminary Risk Screening report has been set out in full in Appendix A.

# 4 PRELIMINARY RISK SCREENING CONCLUSIONS

The Element report reviewed and applied the requirements of SEPP 33 in order to determine whether the policy applies to the Project.

The SEPP 33 screenings for storage of dangerous goods indicate that the development may be classified as a hazardous or offensive industry indicating a more detailed assessment of the hazards listed below be undertaken in the following Preliminary Hazard Analysis.

The following dangerous goods storage are considered potentially hazardous at the site as set out below:

- Liquid Petroleum Gas (LPG)

# 5 FURTHER COMMENTS FROM SLR

The following materials are stored in significant volumes in above ground tanks. The storage volumes are below the SEPP 33 Screening Thresholds and therefore unlikely to be considered potentially hazardous. However, given the given the production process involves the heating of potentially combustible materials, the hazards associated with the production and storage indicate a more detailed assessment of the hazards be undertaken in the following Preliminary Hazard Analysis.

Further comments from SLR on these storages have been set out below to a complete picture of hazards on the site.

## 5.1 Diesel

The diesel storage consists of an outdoor above ground tank with a capacity of 55,000 L of diesel. The diesel storge tank is located in a bunded area, shared with a bitumen tank, adjacent to the asphalt plant.

Diesel fuel to be stored on site, is not classed as a Dangerous Goods, but is classed as a C1 Combustible Liquid, provided no flammable liquids are stored with the diesel.

SLR has been advised by the client that no flammable liquids will be stored with the diesel. Therefore, in the proposed development diesel will be classed as a C1 Combustible Liquid.

Note that C1 combustible liquids are not a dangerous good under UN (United Nations) classification. However, they are defined as dangerous goods under NSW workplace legislation. Where dangerous goods are used or stored in volumes greater than the manifest quantities specified in schedule 11 of the Work Health and Safety Regulation 2017, Safework NSW must be notified, which will include manifests and lodgement an emergency plan to Fire and Rescue NSW. Further advice on these requirements should be sort from Safework NSW.

It should be noted that the Protection of the Environment Operations Act 1997, Schedule 1, Clause 9(1) indicates that ‘petroleum products storage’, which would include diesel fuel storage, is a Scheduled Activity. Capacity to store greater than 2,000 tonnes require an environment protection licence under the Protection of the Environment Operations Act 1997 (POEO Act), from the NSW Environmental Protection Authority (EPA).

The proposed inventory of diesel, and classification is provided in below.

**Table 2 Classification of Diesel in Storage***

| Substance | Hazardous Class | Packing Group | Combustible Liquid Class | Total Storage on Site | Manifest Quantity | SEPP 33 Threshold Findings |
|---|---|---|---|---|---|---|
| Diesel | Not applicable | n/a | C1 | 55,000 litres | 100,000 kg or litres | Safework NSW notification not required |
| | | | | Equivalent to 46.2 tonnes | 2,000 tonnes | Environmental Protection Licence under (POEO Act) not required from NSW EPA |

The diesel storge tank is located in a bunded area adjacent to the asphalt plant. The bitumen tank is also located in this bunded area.

## 5.2 Biodiesel

Biodiesel is classed as a combustible liquid C1. As such the storage and handling must comply with AS 1940:2017 *The Storage and Handling of flammable and combustible liquids.*

The biodiesel storage consists of an outdoor above ground tank with a capacity of 10,000 L. The biodiesel storge tank is located in a bunded area to the west of the asphalt plant.

## 5.3 Bitumen

The bitumen storage consists of an outdoor above ground tanks with a capacity of 150,000 L. This is comprised of an existing 90,000 L storage and the addition of a 60,000 L bitumen tank to be installed adjacent to the existing bitumen tank.

As previously stated, the bitumen storage tank is located in a bunded area, shared with a diesel tank, adjacent to the asphalt plant.

## 5.4 Hazard Associated with Heating Combustible Materials

Hot mix asphalt production requires potentially combustible materials to be heated during production. As such there is the potential hazard associated with heating combustible materials.

Therefore, the development may be classified as a potentially hazardous or offensive industry indicating a more detailed assessment of the hazards associated with heating combustible materials be undertaken in the following Preliminary Hazard Analysis.

# 6 PRELIMARY HAZARD ANALYSIS

A Preliminary Hazard Analysis must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011). The Preliminary Hazard Analysis should estimate the cumulative risks from the existing and proposed development.

Where SEPP 33 identifies a development as potentially hazardous and/or offensive, developments are required to undertake a Preliminary Hazard Analysis to determine the level of risk to people, property and the environment at the proposed location and in the presence of controls.

The purpose of the Preliminary Hazard Analysis is to assess whether the proposed development impacts on the current surrounding land uses and/or if the development is offensive or hazardous, thereby posing an unacceptable risk to the surrounding community or if the proposed development may be potentially subject to hazards or risks from existing development in the surrounding area.

In the context of the current report as stated previously (Section 2) the proposed development comprises involves the enhanced operations at Fulton Hogan's Bushells Ridge Asphalt Plant.

## 6.1 Hazard Identification

The hazard analysis and quantified risk assessment approach developed and recommended in HIPAP relies on a systematic and analytical approach to the identification and analysis of hazards and the quantification of off-site risks to assess risk tolerability and land use safety implications. HIPAP advocates a merit-based approach, the level and extent of analysis must be appropriate to the hazards present and therefore, need only progress to the extent necessary for the particular case.

### 6.1.1 Methodology

The procedures adopted by this study for assessing hazardous impacts involve the following steps:

Step 1: Hazard identification;

Step 2: Hazard analysis (consequence and probability estimations); and

Step 3: Risk evaluation and assessment against specific criteria.

The following sections of the report discuss the hazard identification and analysis process as prescribed in HIPAP.

### 6.1.2 Hazard Identification

This is the first step in the risk assessment. It involves the identification of all theoretically possible hazardous events as the basis for further quantification and analysis. This does not in any way imply that the hazard identified or the theoretically possible impact will occur in practice. Essentially, it identifies the particular characteristics and nature of hazards to be further evaluated in order to quantify potential risks.

To identify hazards, a survey of operations was carried out to isolate the events which are outside normal operating conditions and which have the potential to impact outside the boundaries of the site. These events do not include occurrences that are a normal part of the operation cycles of the site but rather the atypical and abnormal.

### 6.1.3 Hazard analysis

After a review of the events identified in the hazard identification stage and the prevention/protection measures incorporated into the design of the site, any events which are considered to have the potential to result in impacts off-site or which have the potential to escalate to larger incidents are carried to the next stage of analysis.

### 6.1.4 Consequence Estimation

This aspect involves the analysis and modelling of the credible events carried forward from the hazard identification process in order to quantify their impacts outside the boundaries of the site. These events typically include explosion, fire fume, dispersion/propagation and stormwater contamination and their potential effects on people and/or damage to property.

### 6.1.5 Probability Likelihood Estimation

Where necessary, the likelihood of incidents quantified as a result of Section 6.1.4 are determined by adopting probability and likelihood factors derived from published data.

### 6.1.6 Risk Evaluation and Assessment

The risk analysis includes the consequences of each hazardous event and the frequencies of each initiating failure. The results of consequence calculations (radiation and overpressure contours, and toxic exposure levels) together with the probabilities and likelihood's estimated are then compared against the accepted criteria, as specified by the HIPAP series applicable for the site. Whether it is considered necessary to conduct the predictions would depend on the probabilities and likelihood estimated and if the risk criteria are exceeded.

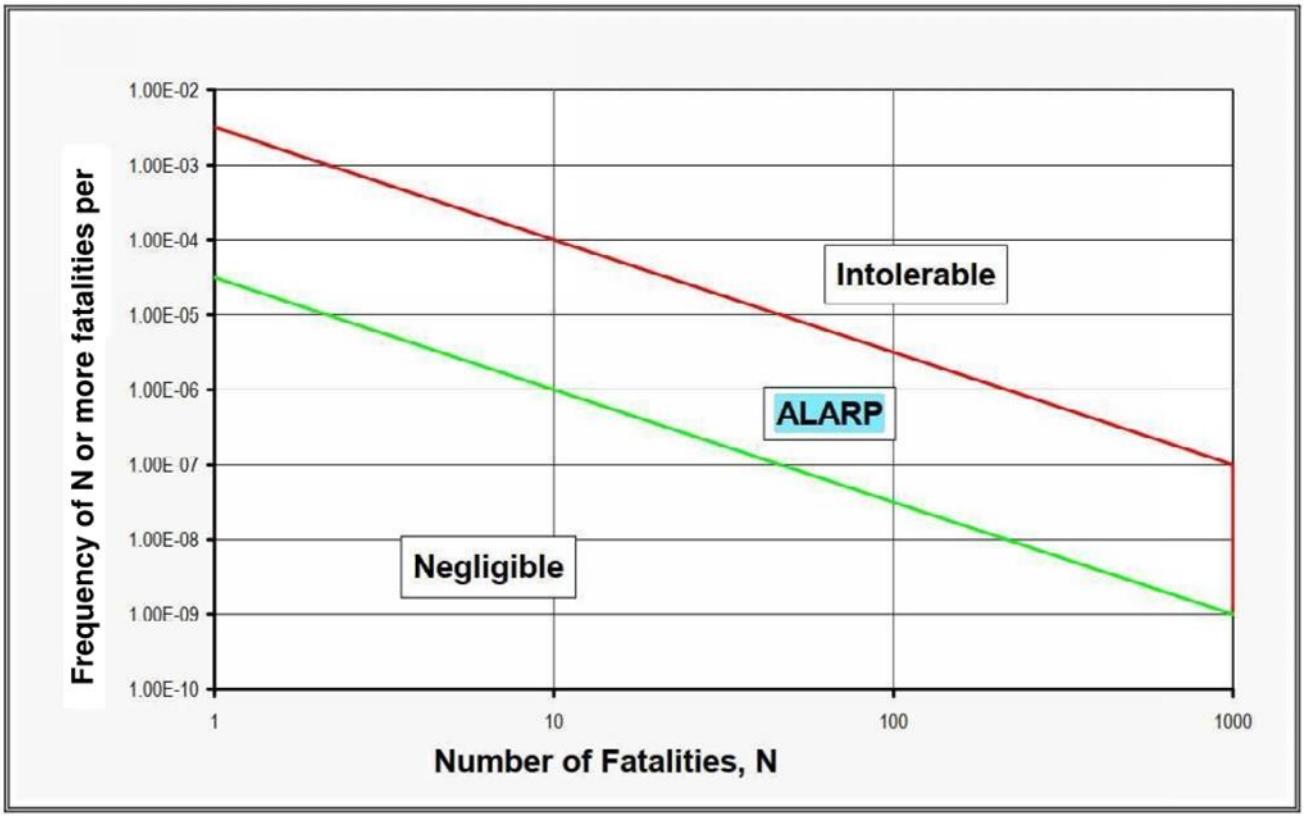
### 6.1.7 Risk Criteria

As part of the MLRA, hazards are identified and the risk from the hazards estimated. Risk criteria take into consideration surrounding land uses, and the category of risk. They encompass such elements as injury/ irritation, individual and societal risk of fatality, property damage and harm to the biophysical environment. Criteria may be expressed in qualitative or quantitative terms. (Planning NSW, 2011a) A key concept in the risk criteria is that societal risks should be "as low as reasonably practical", known as the ALARP principle.

ALARP is a principle that may be applied in relation to the degree of risk reduction that may be sought from a particular activity. It has been described by the UK Health and Safety Executive (HSE) in the following terms: 'In weighing the costs of extra safety measures the principle of reasonable practicability (ALARP) applies in such a way that the higher or more unacceptable a risk is, the more, proportionately, an employer is expected to spend to reduce it'.

The indicative societal risk criteria reflect these regions as three societal risk bands: negligible, ALARP and intolerable, as shown in the example below in Figure 6.

**Figure 6 Indicative Societal Risk Criteria**




(* Source Planning NSW, HIPAP 4, New South Wales Government, figure 3)

Below the negligible line, provided other individual criteria are met, societal risk is not considered significant. Above the intolerable level, an activity is considered undesirable, even if individual risk criteria are met. Within the ALARP region, the emphasis is on reducing risks as far as possible towards the negligible line. Provided other quantitative and qualitative criteria are met, the risks from the activity would be considered tolerable in the ALARP region.

The risk assessment in the current study was based on hazard identification, consequence assessment and likelihood assessment, to create an overall risk assessment. Descriptors for the qualitative risk assessment at the various levels of consequence of a particular event, and the likelihood (or probability) of such an event occurring are presented in Table 3 and Table 4.

**Table 3 Qualitative Likelihood Rating**

| Level | Descriptor | Description |
|---|---|---|
| A | Almost certain | Is expected to occur in most circumstances |
| B | Likely | Will probably occur in most circumstances |
| C | Possible | Could occur |
| D | Unlikely | Could occur but not expected |
| E | Rare | Conceivable, but only in exceptional circumstances |

### Table 4 Qualitative Consequence Rating

| Level | Descriptor | People | Environment | Asset / Production |
|---|---|---|---|---|
| 5 | Catastrophic | Multiple fatality | Extreme environmental harm, eg. widespread catastrophic impact | More than $5M ($5 million) loss or production delay |
| 4 | Major | Permanent total disabilities, single fatality | Major environmental harm, eg. Widespread substantial impact | $1M to $5M loss or production delay |
| 3 | Moderate | Major injury or health effects, eg. major lost workday case/permanent disability | Serious environmental harm, eg. widespread and significant impact | $500k ($500k thousand) to $1M loss or production delay |
| 2 | Minor | Minor injury or health effects, eg. restricted work or minor lost workday case | Material environmental harm, eg. localised and significant impact | $50k to $500k loss or production delay |
| 1 | Insignificant | Slight injury or health effects, eg. first aid/minor medical treatment level | Minimal environmental harm, eg. interference or likely interference to an environmental value | Less than $50k loss or production delay |

The risk ratings are defined as the following:

- Tolerable – The risk is acceptably low
- ALARP – As Low As Reasonably Practical, the risk has been reduced to as low a level as possible and all feasible controls and mitigation strategies are implemented.
- Intolerable - The risk cannot be reduced to an acceptable level with residual impacts likely to have significant impact on the local environment or stakeholders. Intolerable risk would preclude the development of the Project.

Th risk rating matrix has been set out below in Table 5.

### Table 5 Risk Rating Matrix

| | | | Risk Rating | | |
|---|---|---|---|---|---|
| **Likelihood** | | | **Consequence** | | |
| | **Insignificant** | **Minor** | **Moderate** | **Major** | **Catastrophic** |
| **Almost certain** | ALARP | ALARP | Intolerable | Intolerable | Intolerable |
| **Likely** | Tolerable | ALARP | ALARP | Intolerable | Intolerable |
| **Possible** | Tolerable | Tolerable | ALARP | ALARP | Intolerable |
| **Unlikely** | Tolerable | Tolerable | Tolerable | ALARP | ALARP |
| **Rare** | Tolerable | Tolerable | Tolerable | Tolerable | ALARP |

In assessing the tolerability of risk from potentially hazardous development, the relevant general principles set out in HIPAP 6 are:

- the avoidance of all avoidable risks;
- the risk from a major hazard should be reduced wherever practicable, even where the likelihood of exposure is low;
- the effects of significant events should, wherever possible be contained within the site boundary; and
- where the risk from an existing installation is already high, further development should not pose any incremental risk.

### 6.1.8 Risk of Property Damage and Accident Propagation

The siting of an installation must account for the potential for propagation of an accident causing a "domino" effect on adjoining premises. This risk would be expected within an industrial estate where siting of hazardous materials on one site may potentially cause hazardous materials on an adjoining premises to further develop the size of the accident.

In the current study, the risk of property damage and accident propagation to adjoining property outside the Site is considered unlikely. Based on the significant distances between the sites and the nearest sensitive receivers.

### 6.1.9 Criteria for Risk Assessment to the Biophysical Environment

The siting of potentially hazardous developments also needs to consider the risk from accidental releases into the biophysical environment.

The suggested criteria for sensitive environmental areas relate to the potential effects of an accidental release or emission on the long-term viability of the ecosystem or any species within it and are expressed as follows:

- Industrial developments should not be sited in proximity to sensitive natural environmental areas where the effects or consequences of the more likely accidental emissions may threaten the long-term viability of the ecosystem or any species within it; and
- Industrial developments should not be sited in proximity to sensitive natural environmental areas where the likelihood or probability of impacts that may threaten the long-term viability of the ecosystem or any species within it is not substantially lower than the existing background level threat to the ecosystem.

In the current study, the risk of biophysical damage outside the Site is considered unlikely based on the engineering and design controls that will be in place.

It should be noted that a corridor of land through the site zoned as C2 Environmental Conservation. Therefore the onsite controls will also need to protect the biophysical environment of this corridor of land on the site.

## 6.2 Potential Hazardous Incidents Identified for Further Discussion

Following a review of surrounding land use a series of potentially hazardous events or scenarios were considered to identify if further comprehensive qualitative analysis is required. Each event or scenario shall be discussed in detail.

The following dangerous goods storage and transport listed below exceeded SEPP 33 Preliminary Risk Screening as such required more comprehensive analysis:

- Liquid Petroleum Gas (LPG)

The following dangerous goods storage and transport listed below did not exceeded SEPP 33 Preliminary Risk Screening. However, they have been included in the comprehensive analysis given the significant volumes in above ground tanks and the heated aspects of the production process.

- Diesel
- Bitumen
- Biodiesel

The following other hazards also required more comprehensive analysis.

- Heating of combustible materials during the operations of the development

The Hazard Identification Word Diagram listing hazards considered can be found in Table 7.

It should be noted that the technical and management safeguards required are standard industry practice and readily implemented as part of safety engineering.

### 6.2.1 Incident Scenarios and Control Measures

The control measures, provided below, are designed to maintain and contain the risks within the boundaries of the site and reduce the risk to areas outside the boundaries. The technical and management safeguards required are self-evident and readily implemented as part of plant safety engineering. Following these safeguards, including codes and standards will ensure the risk level is ALARP and that the Project design meets the principles of:

- the avoidance of all avoidable risks;
- the risk from a major hazard should be reduced wherever practicable, even where the likelihood of exposure is low;
- the effects of significant events should, wherever possible be contained within the site boundary; and
- where the risk from an existing installation is already high, further development should not pose any incremental risk.

#### 6.2.1.1 Storage Separation Distances

Regarding storage tanks, besides the engineering controls, a significant control measure is based on separation distances between storage tanks and “protected places”. Protected places are defined in Australian Standards (such as AS 1940:2017, section 1.4.56) and are essentially places where people live, work or gather and storage facilities for dangerous goods. Protected places can be within or outside the property boundary. Separation distances are set out in the Australian Standards however in some cases the prescribed separation distances may be modified by other regulations.

Regarding the LPG storage tank, AS/NZ 1596: 2014 *The Storing and Handling of LP Gas*, sets out the following separation distances for the location of above ground storage tanks. Based on a 50,000 L tank, the minimum distance from the tank to a public space is 10m. The minimum distance from the tank to a protected place is

17m. The relevant definition of a "*protected place*" being "*A factory, office, workshop, store, warehouse or building where people are employed, except a building used for the storage and handling of LP gas*."

As summary of the applicable minimum separation distances between dangerous goods storage and onsite protected places has been set out in Table 6.

**Table 6 Separation requirements, minimum distances to onsite protected places[1]**

| Tank | Volume (Litres) | Minimum separation distances to protected places (metres) |
|---|---|---|
| LPG | 35,000 L | 16m[2] |
| Diesel | 55,000 L | 5.5m[3] |
| Biodiesel | 10,000 L | 3m[3] |

Note: 1 = Protected Places as defined in Australian Standards; 2 = Source AS/NZ 1596:2016; 3 = Source AS1940:2017

#### 6.2.1.2 Bitumen and Diesel Tank Storages

The site design is such that the bitumen storage tank is located in a bunded area, shared with a diesel tank, adjacent to the asphalt plant.

SLR has been advised by Fulton Hogen that their tank design criteria has taken into account the risks associated with these storages and the relevant Australian Standards as well as other guidance. This ensures the proximity of these tanks to each other does not pose an undue hazard.

SLR has provided further comment:

"*The separation distances described in AS.1940 should not be read in isolation but defined in conjunction with other applicable Australian/NZ standards to prevent an uncontrolled catastrophic event, namely fire or explosion occurring where humans are operating. To this end our responsibility to them is to identify and control vapour release points, control of system temperatures, eliminate all ignition sources through design, using the below Australian standards as a guide we can identify and eliminate these hazards*."

**Reference Standards Used**

*AS/ NZS 60079.0 Explosive Atmospheres –Equipment –General Requirements (Reference 3)*

*AS60079.10.1 2009 Classification of Areas Electrical Apparatus for Explosive Gas Atmospheres Part 10 – Explosive gas atmospheres*

*AS1940 8.2.9 Earthing and Bonding "Means shall be provided to dissipate static electricity during transfer operations in accordance with AS1020. The bonding system shall be connected to earth with a resistance less than 10. From AS1940 8.2.9 Earthing and Bonding "Means shall be provided to dissipate static electricity during transfer operations in accordance with AS1020.*

*AS.3000 2018 Australian Wiring Rules*

*AS 1768:2021 - Lightning protection*

*AS.1020-1995 The control of undesirable Static Electricity "All fittings shall be antistatic to AS1020 requirements and shall be electrically bonded."*

*Deborah Gayen PTY LTD. Export on the Hazardous Area Classification of the Mile end Asphalt Facility for Fulton Hogan*

*In the design of Fulton Hogan's production facilities, due consideration has been given to vapour release, disposal of this vapour, flash points of contained liquids Diesel and Bitumen, AS.3000 wiring rules, earthing for static elimination and 60079 parts 0 and 10 classification of hazardous areas.*

*The bitumen tanks are insulated and not bare steel as in AS.1940 calculations so inter tank temperatures will not surpass the mid 40deg C range, well under the flashpoints for Diesel or Bitumen.*

*The tanks have been designed to operate at atmospheric pressures to avoid vapour build up and are at the very lowest risk hierarchy when considering compliant electrical installation , earthing to avoid static, and vapour elimination. The Bitumen tank is insulated so at no point in the design chain can flashpoint of either product to be reached or adjacent tanks overheat each other. If vapour is generated at higher temperatures, the dissipation rate is faster than the build-up under low pressure, further reducing the possibility of LEL being reached.*

#### 6.2.1.3 Handling of Potentially Combustible Materials at Elevated Temperatures

The technical and management safeguards required for handling of potentially combustible materials at elevated temperatures are self-evident and readily implemented as part of plant safety engineering.

SLR was advised by Element the following:

*In regard to risk associated with bitumen use, bitumen will be handled at elevated temperatures, however will not be handled at temperatures above its flashpoint of 300˚C. The maximum temperature bitumen will be heated to is 200˚C and will normally be stored and pumped at 165 ˚C. Electrical heating for bitumen will be provided, which will be equipped with industry standard safeguards to prevent abnormal high temperature excursions such as heater power limitation and high temperature shutdown. Hot oil will not be used for the project.*

*As bitumen will not be heated above its flashpoint, there is no risk of combustion.*

#### 6.2.1.4 General

The hazard assessment conducted in the current report are based on the following:

- LPG tank installation conforming with AS/NZ 1596:2014
- Diesel tank installation and Biodiesel tank installation conforming with AS 1940:2017.
- Other storages, such as bitumen, conform with all relevant standards and regulations.

Major incidents possible at the site along with potential outcomes, consequences and control measures and residual risk after the implementation of control measures have been outlined in the Hazard Identification Word Diagram can be found in Table 7.

## Table 7 Summary of Potential Major Incident Scenarios & Residual Risk after Implementation of Controls

| Hazard / Incident | Scenario | Likely Consequences | Controls | Likelihood | Consequence | Residual Risk |
|---|---|---|---|---|---|---|
| **LPG** | | | | | | |
| LPG release – storage tank failure | Sudden release of LPG | Potential for moderate, short term impacts downwind from a release. Some medical treatment may be required in a worst case scenario<br><br>Localised evacuation of site may be required | LPG storage to conform with AS/NZ 1596:2014 The Storing and Handling of LP Gas<br><br>Periodic vessel inspection and system maintenance | Rare | Moderate | Tolerable |
| LPG release – pipe leak (corrosion) | Small LPG leak | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | LPG storage to conform with AS/NZ 1596:2014 The Storing and Handling of LP Gas<br><br>Periodic vessel inspection and system maintenance. | Rare | Minor | Tolerable |
| LPG Release – Pipework Flange/weld failure | Small LPG leak | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | LPG storage to conform with AS/NZ 1596:2014 The Storing and Handling of LP Gas<br><br>Periodic vessel inspection and system maintenance. | Rare | Minor | Tolerable |

| Hazard / Incident | Scenario | Likely Consequences | Controls | Likelihood | Consequence | Residual Risk |
|---|---|---|---|---|---|---|
| LPG Release - Maintenance Operations | Maintenance error or accident | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | All maintenance work on equipment carried out by competent personnel | Unlikely | Minor | Tolerable |
| LPG Release – car / mechanical impact on pipe/vessel | Impact causes pipe rupture or leak | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | Protection of LPG storage to conform with AS/NZ 1596:2014 The Storing and Handling of LP Gas<br><br>Pipe work separated from normal operations or protected where possible. For example with bollards and exclusion zones. | Unlikely | Minor | Tolerable |
| LPG Release – during bulk delivery | Problems with bulk delivery of LPG. Range from minor leak and isolation to major leak. | Some potential for minor, short term off site impacts downwind from a release.<br>Some medical treatment may be required in a worst case scenario<br>Localised evacuation of site may be required | LPG storage to conform with AS/NZ 1596:2014 The Storing and Handling of LP Gas<br><br>Industry standard delivery procedures followed.<br><br>Regular condition inspections of fill point. | Unlikely | Minor to Moderate | Tolerable |

| Hazard / Incident | Scenario | Likely Consequences | Controls | Likelihood | Consequence | Residual Risk |
|---|---|---|---|---|---|---|
| LPG Release – Fire Impact (external) | Fire starts off site, moves on site and impinges on LPG tank. | Potential for fire to spread, LPG may be released and act as accelerant.<br><br>Potential for downwind irritation from smoke plume.<br><br>Localised radiant heat effects | Facility has appropriate fire control systems in pace.<br>Emergency evacuation plans in place. | Rare | Major | Tolerable |
| Site Fire | Fire starts in another section of the site and impinges on LPG storage tank | Potential for fire to spread, oxygen may be released and act as accelerant.<br><br>Potential for downwind irritation from smoke plume.<br>Localised radiant heat effects | Facility has appropriate fire control systems in pace.<br><br>Emergency evacuation plans in place. | Rare | Major | Tolerable |
| **Diesel & Biodiesel** | | | | | | |
| Diesel / Biodiesel release – storage tank failure | Sudden release of Diesel / Biodiesel | Potential for moderate, short term to medium term impacts from a release.<br>Some medical treatment may be required in a worst case scenario.<br><br>Localised evacuation of site may be required | Diesel / Biodiesel storage to conform with AS 1940:2017 The Storing and Handling of Flammable and Combustible Liquids and the other relevant standards listed above in section 6.2.1.2<br><br>Bunding in place to limit spread. | Rare | Moderate | Tolerable |

| Hazard / Incident | Scenario | Likely Consequences | Controls | Likelihood | Consequence | Residual Risk |
|---|---|---|---|---|---|---|
| | | | Periodic vessel inspection and system maintenance | | | |
| Diesel / Biodiesel release – pipe leak (corrosion) | Small Diesel / Biodiesel leak | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | Diesel / Biodiesel storage to conform with AS 1940:2017 The Storing and Handling of Flammable and Combustible Liquids and the other relevant standards listed above in section 6.2.1.2<br><br>Bunding in place to limit spread.<br><br>Periodic vessel inspection and system maintenance. | Rare | Minor | Tolerable |
| Diesel / Biodiesel Release – Pipework Flange/weld failure | Small Diesel / Biodiesel leak | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | Diesel / Biodiesel storage to conform with AS 1940:2017 The Storing and Handling of Flammable and Combustible Liquids and the other relevant standards listed above in section 6.2.1.2<br><br>Bunding in place to limit spread.<br><br>Periodic vessel inspection and system maintenance. | Rare | Minor | Tolerable |

| Hazard / Incident | Scenario | Likely Consequences | Controls | Likelihood | Consequence | Residual Risk |
|---|---|---|---|---|---|---|
| Diesel / Biodiesel Release - Maintenance Operations | Maintenance error or accident | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | All maintenance work on equipment carried out by competent personnel | Unlikely | Minor | Tolerable |
| Diesel / Biodiesel Release – car / mechanical impact on pipe/vessel | Impact causes pipe rupture or leak | Minor leak/plant shutdown and isolation<br><br>Minor irritation/injury to staff in close proximity.<br><br>No off site impacts expected | Diesel / Biodiesel storage to conform with AS 1940:2017 The Storing and Handling of Flammable and Combustible Liquids and the other relevant standards listed above in section 6.2.1.2<br><br>Pipe work separated from normal operations or protected where possible. For example with bollards and exclusion zones. | Unlikely | Minor | Tolerable |
| Diesel / Biodiesel Release – during bulk delivery | Problems with bulk delivery of Diesel / Biodiesel. Range from minor leak and isolation to major leak. | Some potential for minor, short term off site impacts from a release.<br><br>Some medical treatment may be required in a worst case scenario<br>Localised evacuation of site may be required | Diesel / Biodiesel storage to conform with AS 1940:2017 The Storing and Handling of Flammable and Combustible Liquids and the other relevant standards listed above in section 6.2.1.2 | Unlikely | Minor to Moderate | Tolerable |

| Hazard / Incident | Scenario | Likely Consequences | Controls | Likelihood | Consequence | Residual Risk |
|---|---|---|---|---|---|---|
| | | | Industry standard delivery procedures followed.<br><br>Regular condition inspections of fill point. | | | |
| Diesel / Biodiesel Release – Fire Impact (external) | Fire starts off site, moves on site and impinges on Diesel / Biodiesel tank. | Potential for fire to spread, Diesel / Biodiesel may be released and act as accelerant.<br><br>Potential for downwind irritation from smoke plume.<br><br>Localised radiant heat effects | Facility has appropriate fire control systems in pace.<br><br>Emergency evacuation plans in place. | Rare | Major | Tolerable |

# 7 CONCLUSIONS

The Preliminary Hazard Analysis has found that the main dangerous goods potential hazards associated with the Bushells Ridge Asphalt Plant enhancement were the following:

- LPG (storage and transport)
- Diesel (storage and transport)
- Biodiesel (storage and transport)
- Heating of combustible materials during production operations

The residual risks associated with these hazards once controls are implemented were rated as Tolerable (i.e. the risk is acceptably low).

The risk of biophysical damage outside the Site is considered unlikely based on the engineering and design controls that will be in place. It should be noted that a corridor of land through the site is zoned as C2 Environmental Conservation. Therefore the onsite controls will also protect the biophysical environment of this corridor of land on the site.

It is the conclusion of this Preliminary Hazard Analysis that the proposed development (including Bushells Ridge Asphalt Plant enhancement) would be identified as a suitable development for the area, with suitable engineering controls, operational controls and management controls in place. These controls area standard industry practice and readily implemented as part of safety engineering.

# 8 REFERENCES

AS/NZ 1596:2014 *The Storing and Handling of LP Gas*

AS 1940:2017 *The Storing and Handling of Flammable and Combustible Liquids*

Commonwealth Government, 2020, *Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG Number 7.7).

Department of Planning NSW, 2011, *Applying SEPP 33* - Hazardous and Offensive Development Application Guidelines.

Element, 2022 *Preliminary screening check for hazardous and offensive development – Bushells Ridge Asphalt Plant* Element Environment Pty Limited

Planning NSW, 2011a *Multi-Level Risk Assessment*, New South Wales Government

Planning NSW, 2011b *Hazard Analysis* – Hazardous Industry Planning Advisory Paper No 6, New South Wales Government

US EPA, 2023 *Air Emissions Factors and Quantification, AP-42: Compilation of Air Emissions Factors*, Chapter 11 Mineral Products Industry, 11.1 Hot Mix Asphalt Plants, United Sates Environmental Protection Agency, (https://www.epa.gov/sites/default/files/2020-10/documents/c11s01.pdf , accessed 22/01/23)

# 9 Feedback

At SLR, we are committed to delivering professional quality service to our clients. We are constantly looking for ways to improve the quality of our deliverables and our service to our clients. Client feedback is a valuable tool in helping us prioritise services and resources according to our client needs.

To achieve this, your feedback on the team's performance, deliverables and service are valuable and SLR welcome all feedback via https://www.slrconsulting.com/en/feedback. We recognise the value of your time and we will make a $10 donation to our 2022 Charity Partner – Lifeline, for every completed form.

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# APPENDIX J

## BUSHFIRE HAZARD ASSESSMENT REPORT

peterson bushfire.

expert consulting services

# Bushfire Assessment

## Bushells Ridge Asphalt Plant

**203 Tooheys Road,**
**Bushells Ridge**

**Element Environment Pty Ltd**

**28 April 2023**

**(Ref: 22084)**


report by
david peterson

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BPAD LEVEL 3 ACCREDITED PRACTITIONER
ABN 28 607 444 833

# Contents

# 1 Introduction

| | | | |
|---|---|---|---|
| **Street or property name:** | 203 Tooheys Road | | |
| **Suburb, town or locality:** | Bushells Ridge | **Postcode:** | 2259 |
| **Lot/DP no:** | Lot 10 DP 834953 | | |
| **Local Government Area:** | Central Coast | | |
| **Type of development:** | Industrial | | |

## 1.1 Background

Element Environment, on behalf of Fulton Hogan, commissioned Peterson Bushfire to prepare a Bushfire Assessment Report to assess proposed additions to an existing asphalt plant in Bushells Ridge which is located on 'bushfire prone land'. This report presents the assessment and recommendations to ensure compliance with the relevant bushfire protection legislation and policy. It has been prepared by a consultant accredited by the Fire Protection Association of Australia's BPAD scheme (Accreditation No. BPD-L3-18882).

## 1.2 Location and description of subject land

The subject land is a single lot approximately 16 hectares in size located in bushland between the Pacific Motorway and Blue Haven on the Central Coast. The location of the subject land is shown on Figure 1.

The existing asphalt plant is located within the eastern portion of the subject land. The remainder of the property supports regenerating bushland.

## 1.3 Proposal

The proposed additions consist of:

- New administration precinct:
    - Administration buildings
    - Production lab
    - Crib rooms
    - Ablution block
    - Covered area
    - Car park, footpath and landscaping

- Additions to asphalt plant:
    - Upgrade to plant
    - Tank farm extension
    - LPG storage
- RAP processing and stockpile area
    - Storage bunkers
    - Hardstand

Figure 2 includes a development site plan showing the location and extent of the above.


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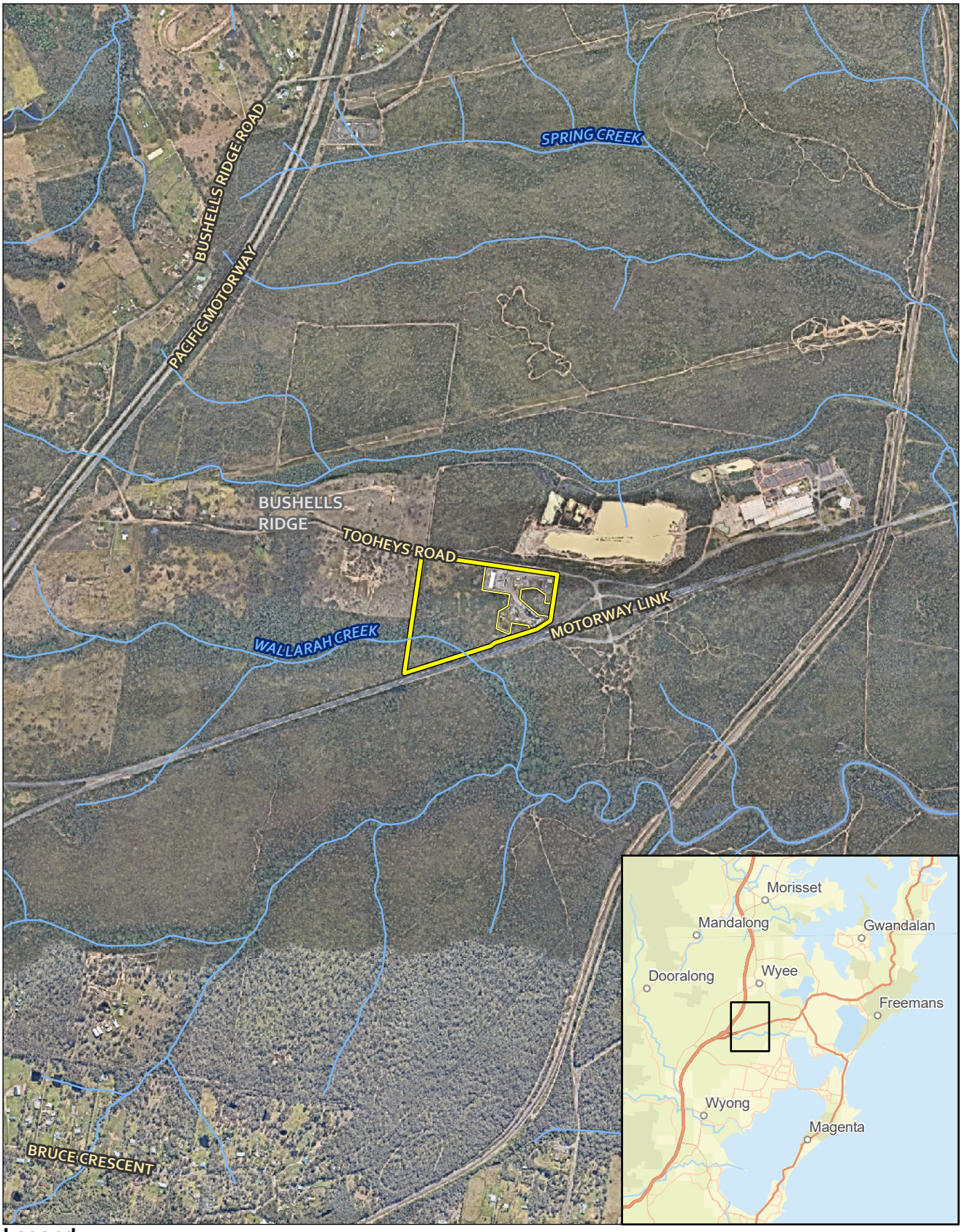


**Legend**

- Watercourse
- Subject Land
- Development Area

N

DKGIS

Date: 24/01/2023

0 125 250 500

Metres

**Figure 1: Location of the Subject Land**

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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Legend

- Subject Land
- Development Area
- Cadastre

N

DKGIS

Date: 27/04/2023

0 20 40 80

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

**Figure 2: The Proposal**

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### 1.4 Assessment requirements

The subject land is identified as bushfire prone land as shown by the bushfire prone land mapping on Figure 3. Development proposals on bushfire prone land are to comply with the NSW Rural Fire Service (RFS) document *Planning for Bush Fire Protection 2019* (RFS 2019), referred to within this report as 'PBP'.

The development does not involve habitable uses (Class 1, 2 or 3) or Special Fire Protection Purpose (SFPP) development as defined by PBP. Section 8.3 of PBP prescribes the assessment methodology and bushfire protection measures for other uses that do not involve a habitable dwelling or SFPP development. These other uses are buildings of Class 5-8 under the National Construction Code (NCC) and include commercial, retail, and industrial uses. As stated within Section 8.3.1 of PBP, the NCC does not provide for any bushfire specific performance requirements for these types of uses. As such, the Asset Protection Zones (APZ) and Bushfire Attack Levels (BAL) do not apply as deemed-to-satisfy provisions for bushfire protection. However, Section 8.3.10 refers to compliance with the aim and objectives of PBP, which requires appropriate hazard separation to prevent fire spread to buildings in addition to the provisions listed below.

The following objectives are also to be applied in relation to access, water supply and services, and emergency and evacuation planning:

1. Provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
2. Provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;
3. Provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
4. Provide for the storage of hazardous materials away from the hazard wherever possible.


**Legend**

- Watercourse
- Subject Land
- Development Area
- Cadastre
- **Bushfire Prone Land**
- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Vegetation Buffer

N

DKGIS

Date: 24/01/2023

0 100 200 400

Metres

**Figure 3: Bushfire Prone Land**

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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# 2 Bushfire hazard

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as APZ location and dimension. This section provides a detailed account of the vegetation communities (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard that may affect bushfire behaviour.

The subject land and bushfire hazard were inspected on 16th June 2022. Photographs are included in Appendix A.

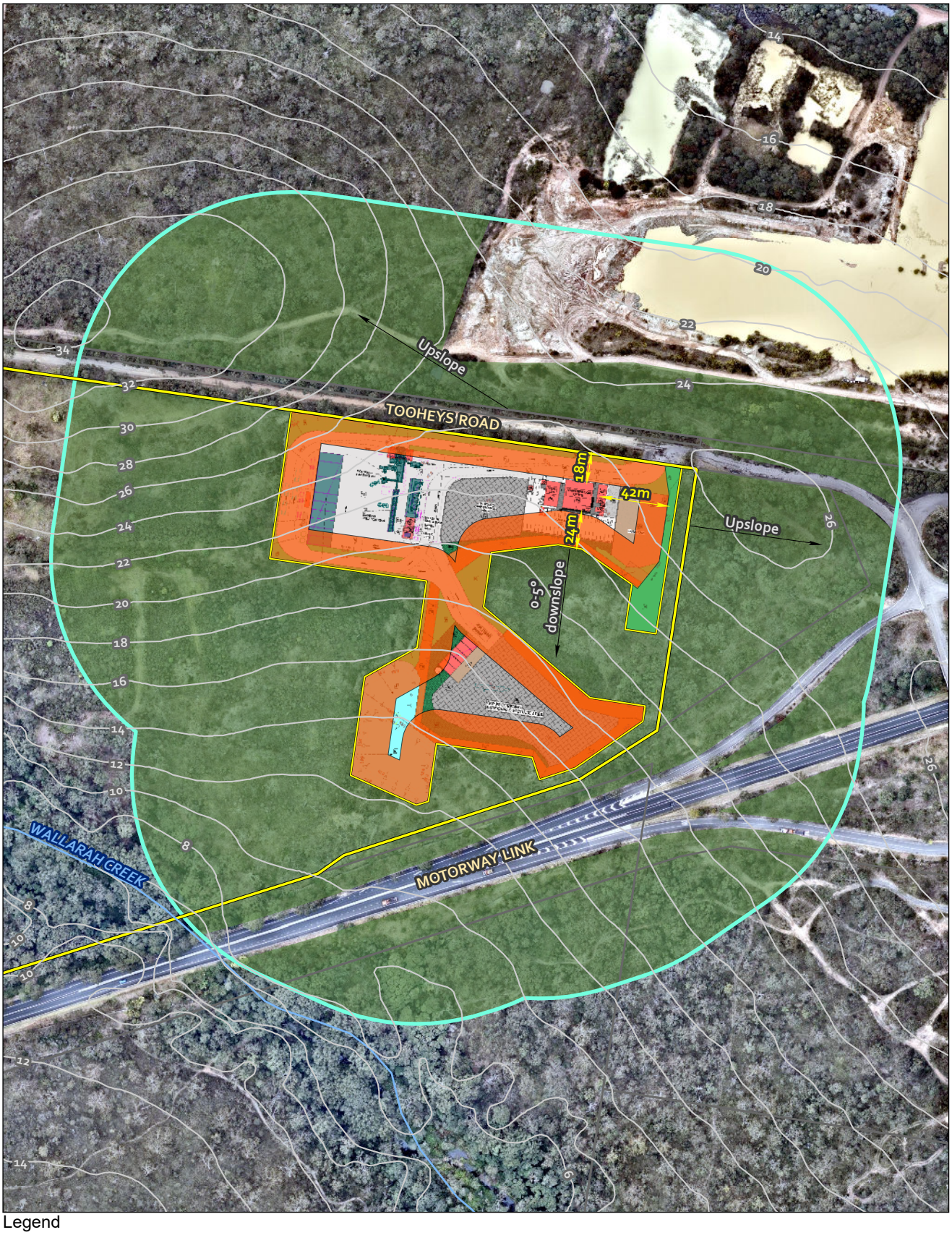
## 2.1 Predominant vegetation

The 'predominant vegetation' influencing fire behaviour approaching the proposed development has been assessed in accordance with the methodology specified by PBP. The vegetation within the 140 m assessment area measured from the asphalt plant operational footprint is mapped on Figure 4. The vegetation consists predominantly of dry sclerophyll forest.

## 2.2 Effective slope

The 'effective slope' influencing fire behaviour has been assessed in accordance with the methodology specified within PBP. This is conducted by measuring the slope that would most significantly influence fire behaviour where the hazard has been identified within 100 m of the proposed development.

The effective slope was measured using a 2 m contour layer as shown on Figure 4. The effective slopes under the identified hazards are within the PBP slope class of 'upslope/flat' to the east, north and west, and 'downslope 0-5 degrees' to the south as indicated on Figure 4.




Legend

- Contour - 2m
- Watercourse
- Subject Land
- Development Area
- Cadastre
- Vegetation Assessment Area

**Vegetation Formation**

- Forest

**Bushfire Attack Level (BAL)**

- BAL - Flame Zone

N

DKGIS

Date: 27/04/2023

0 25 50 100

Metres

**Figure 4: Bushfire Hazard Analysis**

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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# 3 Bushfire protection measures

PBP requires the assessment of a suite of bushfire protection measures that in total provide an adequate level of protection for development proposals on bushfire prone land. The measures required to be assessed for the proposed modification are listed in Table 1 below and are discussed in detail in the remainder of this section.

**Table 1: PBP bushfire protection measures for developments other than dwellings and SFPP**

| Objectives (PBP Section 8.3.1) | Measures |
|---|---|
| 1. Access | • Access to public road<br>• Adequacy of internal property roads<br>• Defendable space - providing fire-fighter access between buildings and the hazard. |
| 2. Emergency and evacuation arrangements | • Bushfire Emergency Management and Evacuation Plan<br>• Adequacy of internal property roads |
| 3. Water supply and other utilities | • Water supply for fire-fighting including provisions for hydrants or static water supplies.<br>• Ensuring installation of electricity and gas supplies do not contribute to the risk of fire to a building. |
| 4. Hazardous materials | • Appropriate storage of hazardous materials away from bushfire hazards. |

## 3.1 Access

### *3.1.1 Public road access*

The existing public road access is Tooheys Road which provides access to the Doyalson Link Road 300 m to the east. The Doyalson Link Road is the primary collector road in the locality and provides access between residential areas to the east and the Pacific Motorway to the west.

The existing public road access is adequate for the proposal for the purpose of facilitating emergency response and evacuation. Alternate options of access are available.

### *3.1.2 Internal property road*

By nature of the design for industrial use, the existing internal access road complies with the acceptable solutions for property access roads in bushfire prone areas. The road allows trucks to pass each other and provide perimeter access to all sides of the facility as shown by the layout on Figure 2. The existing internal property road is deemed to be adequate for the proposed development. Additional provisions for bushfire protection are not required.

### *3.1.3 Defendable space*

For habitable development types such as dwellings, the application of a bushfire hazard building setback (i.e. APZ) is related to the vulnerability of an asset, typically in terms of combustibility of external materials or the nature of the occupants. The resulting APZ dimension would stipulate a building construction standard (i.e. Bushfire Attack Level – BAL) under Australian Standard *AS 3959-2018 Construction of buildings in bushfire-prone areas*.

As the land use does not include a dwelling or habitable building, PBP does not prescribe an APZ dimension, however an objective of PBP is to ensure appropriate hazard separation to prevent fire spread to buildings.

PBP also requires the consideration of a managed hazard-separation area for fire-fighting purposes referred to as ‘defendable space’. A defendable space is an area between the building and the bushfire hazard that provides an environment in which fire-fighters can undertake property protection after the passage of a bushfire with some level of safety. The defendable space dimension is defined by the ability to gain access around an asset and conduct defensive fire-fighting operations.

The proposed buildings in the administration precinct have been located to ensure a defendable space that prevents buildings from being impacted from Bushfire Attack Level BAL-FZ. Figure 4 shows the BAL-FZ area and the defendable space that will be available to the proposed buildings.

The additions to the asphalt plant and RAP processing and storage area do not require separation from the hazard to prevent BAL-FZ affectation. Notwithstanding, the proposed additions in these areas will have a defendable space that exceeds 15 m in all instances which includes truck access.

The defendable space is existing and complies with the standards of an Inner Protection Area (IPA) as described by Appendix A4.1.1 of PBP. Additional vegetation management works are not required.

The proposed landscaping will be situated at least 10 m away from the proposed buildings in the administration precinct and will therefore comply with the standard of an IPA.

## 3.2 Emergency and evacuation

A 'Bushfire Emergency Management and Evacuation Plan' is typically prepared for facilities within bushfire prone areas depending on the level of bushfire risk. A plan is prepared in accordance with the NSW Rural Fire Service document 'A Guide to Developing a Bushfire Emergency Management and Evacuation Plan' (RFS 2014).

Due to the exposure to bushfire prone vegetation in all directions, the preparation of a 'Bushfire Emergency Management and Evacuation Plan', or update to an existing plan, is recommended.

## 3.3 Water supply and other utilities

### *3.3.1 Water supply*

The asphalt plant benefits from existing rainwater tanks and dust suppression tanks (refer to photographs in Appendix A) which are equipped for use by fire-fighters. An additional water supply for bushfire protection is not required.

### *3.3.2 Electricity supply*

The vegetation clearance distances to any overhead powerline within the subject land are to comply with *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee 2005).

### *3.3.3 Gas supply*

Any gas services are to be installed and maintained in accordance with Australian Standard *AS/NZS 1596-2014 The storage and handling of LP gas*.

## 3.4 Hazardous materials

The storage of hazardous materials, such as LPG tanks, is done so within the confines of the asphalt plant which is surrounded by defendable space comprising of the internal access road and hardstand areas. As aspects of the plant will have a minimum defendable space of at least 15 m.

# 4 Conclusion and recommendations

The proposed additions to the Bushells Ridge Asphalt Plant consists of an administration precinct and minor additions to upgrade the plant operations. Proposed buildings within the administration precinct will be located to avoid BAL-FZ and the other proposed additions to the plant will have a defendable space of at least 15 m.

The existing cleared and managed areas associated with the facility will provide an adequate defendable space for the development. Additional vegetation management is not required.

As stated within Section 8.3.1 of PBP, the NCC does not provide for any bushfire specific performance requirements for the type of development or use proposed. As such, the APZ and building construction requirements (i.e. Bushfire Attack Levels – BALs) of PBP and AS 3959-2018 do not apply as deemed-to-satisfy provisions for bushfire protection.

However, PBP requires an assessment of the proposed modification against four objectives as listed in Table 3 below. This assessment concludes that all four objectives are satisfied with the adoption of the recommendations listed following Table 3.

**Table 3: Compliance with PBP Section 8.3.1 objectives**

| Objectives (PBP Section 8.3.1) | Compliance statement |
|---|---|
| Provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation | Section 4.1 demonstrates compliance.<br>• Adequate access provided to the surrounding public road system.<br>• Existing internal road complies.<br>• Adequate defendable space provided that ensures compliant hazard separation. |
| Provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development | Section 4.2 demonstrates compliance.<br>• The assessment recommends the preparation of a 'Bushfire Emergency Management and Evacuation Plan'. |

| Objectives (PBP Section 8.3.1) | Compliance statement |
|---|---|
| Provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building | Section 4.3 demonstrates compliance.<br>• Existing static water supply adequate.<br>• Vegetation clearance to electrical supply recommended.<br>• Compliant installation of gas supplies recommended. |
| Provide for the storage of hazardous materials away from the hazard wherever possible | Section 4.4 demonstrates compliance.<br>Storage within the confines of the plant will ensure adequate separation from bushfire hazards. |

The following recommendations were made within this report:

1. A 'Bushfire Emergency Management and Evacuation Plan' is to be prepared in accordance with the NSW Rural Fire Service document 'A Guide to Developing a Bushfire Emergency Management and Evacuation Plan' (RFS 2014).
2. The vegetation clearance distances to any overhead powerline within the subject land are to comply with *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee 2005).
3. Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2014 The storage and handling of LP gas*.

In the author's professional opinion, with the adoption of the above recommendations, the proposed development will comply with *Planning for Bush Fire Protection 2019* (PBP).

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# References

Industry Safety Steering Committee. 2005. *ISSC 3 Guideline for Managing Vegetation Near Power Lines*. (updated from Energy Australia. 2002. *Network Standard NS 179 (Vegetation Safety Clearances)).*

NSW Rural Fire Service (RFS). 2014. *A Guide to Developing a Bushfire Emergency Management and Evacuation Plan*. State of New South Wales through the NSW Rural Fire Service.

NSW Rural Fire Service (RFS). 2019. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers*. State of New South Wales through the NSW Rural Fire Service.

Standards Australia. 2014. *The storage and handling of LP Gas*, AS/NZS 1596-2014, Standards Australia International Ltd, Sydney.

Standards Australia. 2018. *Construction of buildings in bushfire-prone areas*, AS 3959, Standards Australia International Ltd, Sydney.

# Appendix A - Photographs

**Photograph 1: Location of proposed administration precinct**

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**Photograph 2: Existing plant subject to improvements**

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**Photograph 3: RAP processing and storage area**

**Photograph 4: Existing static water supply**

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