Appendix I

Air Quality Impact Assessment

MARINUS LINK

Marinus Link – Tasmania Component: Air Quality Impact Assessment

Prepared for:

Tetra Tech Coffey Pty Ltd

November 2024

FINAL

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Glossary

Term	Definition
µg	micrograms
µg/m^3	micrograms per cubic metre
°C	degrees Celsius
ha	hectare
km	kilometre
kV	kilovolt
m	metre
m/s	metres per second
m^2	square metres
m^3	cubic metres
mm	millimetres
MW	Megawatt
t	tonne
Nomenclature	**Definition**
PM_{10}	particulate matter with a diameter less than 10 micrometres
$PM_{2.5}$	particulate matter with a diameter less than 2.5 micrometres
TSP	Total suspended particulates
Abbreviations	**Definition**
Acid sulfate soils	ASS
AHD	Australian Height Datum
Air NEPM	*National Environment Protection (Ambient Air Quality) Measure*
Air Quality EPP	*Environment Protection Policy (Air Quality) 2004*
AQA	Air quality assessment
AWS	Automatic weather station
BoM	Bureau of Meteorology
CDMP	Construction Dust Management Plan
EIS	Environmental Impact Statement
EPA Tasmania	Environment Protection Authority Tasmania
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
EMPC Act	*Environmental Management and Pollution Control Act 1994*
HDV	Heavy Duty Vehicle
HDD	Horizontal direction drilling
HVAC	High voltage alternating current
HVDC	High voltage direct current
IAQM	Institute of Air Quality Management (UK)
LUPA Act	*Land Use Planning and Approvals Act 1993*
NEM	National Electricity Market
NEPC	National Environment Protection Council
NPI	National Pollutant Inventory database

EXECUTIVE SUMMARY

Katestone Environmental Pty Ltd (Katestone) was commissioned by Tetra Tech Coffey Pty Ltd (Tetra Tech Coffey) to complete an air quality assessment (AQA) of the Tasmania component of the Marinus Link project (the project).

The project is a proposed 1500 megawatt (MW) high voltage direct current (HVDC) electricity interconnector between Heybridge in northwest Tasmania and the Latrobe Valley in Victoria. The project would provide a second link between the Tasmanian renewable energy resources and the Victorian electricity grids enabling efficient energy trade, transmission and distribution from a diverse range of generation sources to where it is most needed and will increase energy capacity and security across the National Electricity Market (NEM).

Once operational, the operation and maintenance activities associated with the project will not generate significant emissions to air. Decommissioning air quality impacts will be assessed prior to decommissioning in accordance with the regulations at the time and in agreement with landowners or land managers and Environment Protection Authority Tasmania (EPA Tasmania). Therefore, detailed assessment of impacts during operation and decommissioning has not been carried out.

The assessment has focused on the potential impacts of dust emissions during construction, including the dismantling of existing lines. A risk assessment approach has been used, based on the method detailed by the United Kingdom's Institute of Air Quality Management (IAQM).

The assessment has shown that, without mitigation, the preliminary risk of impacts (in terms of both health effects and nuisance) at nearby sensitive receptors associated with the construction of the proposed Heybridge converter station is low. Even with a low risk of impacts, dust mitigation measures should be applied during construction to minimise emissions and the potential for impact. With the implementation of standard mitigation measures the residual risk reduces to negligible.

Based on these findings it is concluded that the project will pose minimal risk for human health and, therefore, a quantitative assessment using dispersion modelling is not required to verify National Environment Protection (Ambient Air Quality) Measure (NEPM) compliance for PM_{10}, $PM_{2.5}$ and combustion gases.

The outcomes of the risk assessment have provided the basis for the application of the following Environmental Performance Requirements (EPR) for the project.

- EPR AQ01: Develop and implement a construction dust management plan.
- EPR AQ02: Develop and implement measures to manage emissions to air during operations.

Key mitigation measures presented should be incorporated in order to ensure that construction activities comply with the environmental performance requirements (EPRs).

1. INTRODUCTION

The proposed Marinus Link (the project) comprises a high voltage direct current (HVDC) electricity interconnector between Tasmania and Victoria, to allow for the continued trading and distribution of electricity within the National Electricity Market (NEM).

The project was referred to the Australian Minister for the Environment 5 October 2021. On 4 November 2021, a delegate of the Minister for the Environment determined that the proposed action is a controlled action as it has the potential to have a significant impact on the environment and requires assessment and approval under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act) before it can proceed. The delegate determined that the appropriate level of assessment under the EPBC Act is an environmental impact statement (EIS).

In July 2022 a delegate of the Director of the Environment Protection Authority Tasmania determined that the project be subject to environmental impact assessment by the Board of the Environment Protection Authority (the Board) under the Environmental Management and Pollution Control Act 1994 (Tas) (EMPCA).

On 12 December 2021, the former Victorian Minister for Planning under the Environment Effects Act 1978 (Vic) (EE Act) determined that the project requires an environment effects statement (EES) under the EE Act, to describe the project's effects on the environment to inform statutory decision making.

As the project is proposed to be located within three jurisdictions, the Tasmanian Environment Protection Authority (Tasmanian EPA), Victorian Department of Transport and Planning (DTP), and Australian Department of Climate Change, Energy, Environment and Water (DCCEEW) have agreed to coordinate the administration and documentation of the three assessment processes. Two EISs are being prepared to address the Tasmanian EPA requirements for the Heybridge converter station and shore crossing. A separate EIS/EES is being prepared to address the requirements of DTP and DCCEEW.

This report has been prepared by Katestone Environmental Pty Ltd (Katestone) for the Tasmanian jurisdiction as part of the two EISs being prepared for the project.

1.1 Purpose of this report

Katestone was commissioned by Tetra Tech Coffey Pty Ltd (Tetra Tech Coffey) to conduct an air quality assessment (AQA) for the project. The AQA of the project has been separated into two reports to address the individual state components and legislative requirements.

The project's AQA comprise of the following components:

- Marinus Link Victorian component; and
- Marinus Link Tasmania component (the subject of this AQA).

The objectives of the AQA of the Tasmania component of the project are to:

- Compile an inventory of the material and vehicle movement associated with earthworks, construction and trackout expected to be generated from construction at Heybridge
- Determine the sensitivity of the environment surrounding the area of disturbance associated with construction
- Calculate and overall risk of the project based on the dust emissions magnitude and the sensitivity of the surrounding area
- Propose strategies manage and reduce the initial dust risk associated with construction of the project.

1.2 Project overview

The project is a proposed 1500 megawatt (MW) HVDC electricity interconnector between Heybridge in North West Tasmania and the Latrobe Valley in Victoria (Figure 1). The project is proposed to provide a second link between the Tasmanian renewable energy resources and the Victorian electricity grids enabling efficient energy trade, transmission and distribution from a diverse range of generation sources to where it is most needed, and will increase energy capacity and security across the NEM.

Marinus Link Pty Ltd (MLPL) is the proponent for the project and is a wholly owned subsidiary of Tasmanian Networks Pty Ltd (TasNetworks). TasNetworks is owned by the State of Tasmania and owns, operates and maintains the electricity transmission and distribution network in Tasmania.

Tasmania has significant renewable energy resource potential, particularly hydroelectric power and wind energy. The potential size of the resource exceeds both the Tasmanian demand and the capacity of the existing Basslink interconnector between Tasmania and Victoria. The growth in renewable energy generation in mainland states and territories participating in the NEM, coupled with the retiring of baseload coal-fired generators, is reducing the availability of dispatchable generation that is available on demand.

Tasmania's existing and potential renewable resources are a valuable source of dispatchable generation that could benefit electricity supply in the NEM. The project will allow for the continued trading, transmission and distribution of electricity within the NEM. It will also manage the risk to Tasmania of a single interconnector across Bass Strait and complement existing and future interconnectors on mainland Australia. The project is expected to facilitate the reduction in greenhouse gas emissions at a state and national level.

Interconnectors are a key feature of the future energy landscape. They allow power to flow between different regions to enable the efficient transfer of electricity from renewable energy zones to where the electricity is needed. Interconnectors can increase the resilience of the NEM and make energy more secure, affordable and sustainable for customers. Interconnectors are common around the world including in Australia. They play a critical role in supporting Australia's transition to a clean energy future.

1.3 Assessment context

Once operational, the operation and maintenance activities associated with the project will not generate significant emissions to air. During the construction phase of the project there will be potential for emissions to be released into the air. Diligent management will be important to ensure emissions are minimised. Thus, the focus of this report is upon the potential for emissions during the construction phase, presenting a construction dust risk assessment of the project. The potential for emissions during decommissioning has also been considered.

The report is structured as follows:

- Assessed guidelines are summarised in Section 2
- Legislative requirements are summarised in Section 3
- The project is described in Section 4
- Considerations for assessing air quality are detailed in Section 5
- The risk assessment methodology is described in Section 6
- Potential cumulative effects are discussed in Section 6.3
- The existing environment is characterised in Section 7
- Outcomes of the risk assessment, including preliminary risk, mitigation measures, and residual risk are detailed in Section 8
- Conclusions are specified in Section 8.4.

LEGEND

- Landfall
- Converter station
- HVDC subsea cable
- Underground HVDC cable
- Cable option not progressing

MARINUS LINK

SCALE 1:1,500,000
PAGE SIZE: A4
PROJECTION: GDA2020 MGA Zone 55

0 15 30 km

SOURCE
Proposed route from Tetra Tech Coffey.
Imagery from ESRI Online.

MARINUS LINK PTY LTD

MARINUS LINK
EIS/EES

FIGURE 1

Project Overview

TETRA TECH COFFEY

DATE: 08.05.24 PROJECT: 754-MELEN215878ML FILE: 215878ML_R06_F01-01_GIS

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2. ASSESSMENT GUIDELINES

This section outlines the assessment guidelines relevant to AQA and the linkages to other technical studies completed for the project. Two separate EISs are being prepared to address the EIS guidelines published by EPA Tasmania for the Heybridge converter station and shore crossing.

2.1 Tasmania

EPA Tasmania has published two sets of guidelines (September 2022) for the preparation of an EIS for the Marinus Link converter station and shore crossing. A separate set of guidelines have been prepared for each of these project components:

- *Environmental Impact Statement Guidelines Marinus Link Pty Ltd Converter Station for Marinus Link, September 2022,* Environment Protection Authority Tasmania (Tas converter station EIS guidelines)
- *Environmental Impact Statement Guidelines Marinus Link Pty Ltd Shore Crossing for Marinus Link, September 2022,* Environment Protection Authority Tasmania (Tas shore crossing EIS guidelines)

The sections relevant to the AQA assessment are outlined in Table 1.

Table 1 Assessment guidelines

Guideline section	Assessment requirement	Relevant report section
Tasmania		

EIS Guidelines
 	
Heybridge shore crossing for Marinus Link
Section 6.7*
 	
Converter Station for Marinus Link
Section 6.5*
	Discuss potential impacts of the proposal on local air quality, particularly during construction, and provide evidence that the activity would not cause environmental nuisance or harm, including the following:
	• Identify, describe and show on a site map all sensitive receptors that could potentially be affected by dust and particulate matter emissions.
	• Identify and map all possible sources of air emissions including dust and particulate matter from the site, particularly that associated with the proposed construction. This includes emissions generated from:
	  ○ Upgrading or building of roads;
	  ○ On-site and off-site vehicle and vessel movements
	  ○ Use of generators;
	  ○ Site ground preparation, vegetation clearance, trenching, or general disturbance;
	  ○ Infrastructure construction (e.g., HDD pad construction);
	  ○ HDD of shore crossing cables from the Heybridge launch pad.
	• Provide the details of equipment used on the site.
	• Discuss potential impact of fugitive dust and particulate matter emissions from the proposed activity on the environment and the likelihood for the activity to cause environmental nuisance or harm. The discussion should consider:
		Section 4
		
		Section 5
		
		Section 6
		
		Section 8
		
		Section 9

Guideline section	Assessment requirement	Relevant report section
	○ Land uses in the vicinity of the activity; ○ Terrain and local climatic conditions, especially the direction and strength of prevailing winds and rainfall; ○ Special consideration of the environmental impact of the activity during adverse meteorological conditions; ○ The potential for cumulative impact with the proposed converter station. • Provide information about proposed management measures to be implemented to avoid or mitigate potential impact of emissions to air during various phases of the project including construction, commissioning, and operation, especially during adverse meteorological conditions. This may include but not be limited to watering or sealing of roads, covering of truck loads, reduced vehicle speed, road surfacing or maintenance details, enclosures, water sprays, windbreaks, and revegetation or stabilisation. Evidence of application of accepted modern technology for reduction of unavoidable emissions to the greatest extent practicable should be provided. Legislative and policy requirements - *Environment Protection Policy (Air Quality) 2004* (Air EPP) Tasmania, specifically: • Part 3 Environmental Values Clause 6 • Part 4 Managing point sources of air pollution Clause 9 • Part 5 Managing diffuse sources of air pollution Clause 16	

* The requirements are the same for the Heybridge shore crossing and Converter Station guidelines

2.2 Linkages to other reports

This report is informed by or informs the technical studies outlined in Table 2.

Table 2 Relevant technical studies linkages

Technical studies	Relevance to this assessment
Climate change	Data from this report have informed the existing environment, meteorological and climate sections of this report.
Terrestrial ecology	The locations where state significant fauna have been recorded, inform the risk assessment of ecological receptors.
Contaminated land and acid sulfate soils	Data from this has informed the section regarding the management of odour in the AQA.

3. REGULATORY FRAMEWORK AND POLICY CONTEXT

3.1 Legislation

The following legislation is relevant to air quality in Tasmania:

- *National Environment Protection (Ambient Air Quality) Measure* (National Environment Protection Council (NEPC), 2021) (Air NEPM)
- *Environment Protection Policy (Air Quality) 2004* (Air EPP)
- *EPA Board Statement – Update to Air Pollutant Design Criteria used in the Environmental Impact Assessment Process (January 2022)*
- *Director Determination – Design Criteria for Supplementary Air Pollutants (January 2022)*.

The National Environment Protection Council (NEPC) defines national ambient air quality standards and goals in consultation, and with agreement from all Australian state and territory governments. These were first published in 1998, in the Air NEPM. The Air NEPM sets national standards for the six key air pollutants to which most Australians are exposed: carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide, lead, and particulates (PM_{10} and $PM_{2.5}$). The Air NEPM air quality standards are health-based.

The Air Quality EPP defines environmental values to be protected, air quality standards and management requirements for sources of air contaminants. The Air Quality EPP adopts the Air NEPM standards for ambient air quality. In January 2022, the Air Quality EPP Design Criteria, Schedule 2 were updated and Design Criteria for supplementary air pollutants were listed. Where pollutant concentrations are below the designated standards, the environmental risk can be considered acceptable.

There are no assessment criteria provided for the protection of amenity impacts due to deposited dust in the Air NEPM or Air Quality EPP. However, in keeping with Clauses 9 and 16 of the Air Quality EPP, point and diffuse sources of air pollution, that have the potential to cause material or serious environmental harm or an environmental nuisance, should be managed in such a manner as not to prejudice the achievement of the environmental values in the Air Quality EPP.

The Air NEPM standards and Air Quality EPP design criteria for particulate matter are shown in Table 3.

Table 3 NEPM air quality standards and Air Quality EPP design criteria

Pollutant	Averaging period	Value
PM_{10}	24-hour average	50 µg/m³
	Annual	25 µg/m³
$PM_{2.5}$	24-hour average	25 µg/m³
	Annual	8 µg/m³

4. PROJECT DESCRIPTION

4.1 Overview

The project is proposed to be implemented as two 750 MW circuits to meet transmission network operation requirements in Tasmania and Victoria. Each 750 MW circuit will comprise two power cables and a fibre-optic communications cable bundled together in Bass Strait and laid in a horizontal arrangement on land. The two 750MW circuits will be installed in two stages with the western circuit being laid first as part of stage one, and the easter cable in stage two.

The key project components for each 750 MW circuit are, from south to north are:

- HVAC switching station and HVAC-HVDC converter station at Heybridge in Tasmania. This is where the project will connect to the North West Tasmania transmission network being augmented and upgraded by the North West Transmission Developments (NWTD).
- Shore crossing in Tasmania adjacent to the converter station
- Subsea cable across Bass Strait from Heybridge in Tasmania to Waratah Bay in Victoria.

In Tasmania, a converter station is proposed to be located at Heybridge near Burnie. The converter station would facilitate the connection of the project to the Tasmanian transmission network. There will be two subsea cable landfalls at Heybridge with the cables extending from the converter station across Bass Strait to Waratah Bay in Victoria. The preferred option for shore crossings is horizontal directional drilling (HDD) to about 10 m water depth where the cables would then be trenched, where geotechnical conditions permit.

Approximately 255 kilometres (km) of subsea HVDC cable would be laid across Bass Strait. The preferred technology for the project is two 750 megawatt (MW) symmetrical monopoles using ±320 kV, cross-linked polyethylene insulated cables and voltage source converter technology. Each symmetrical monopole is proposed to comprise two identical size power cables and a fibre-optic communications cable bundled together. The cable bundles for each circuit will transition from approximately 300m apart at the HDD (offshore) exit to 2km apart in offshore waters.

This assessment is focused on the Tasmanian terrestrial and shore crossing section of the project. This report will inform the two EISs being prepared to assess the project's potential environmental effects in accordance with the legislative requirements of the Tasmanian governments (Figure 2).

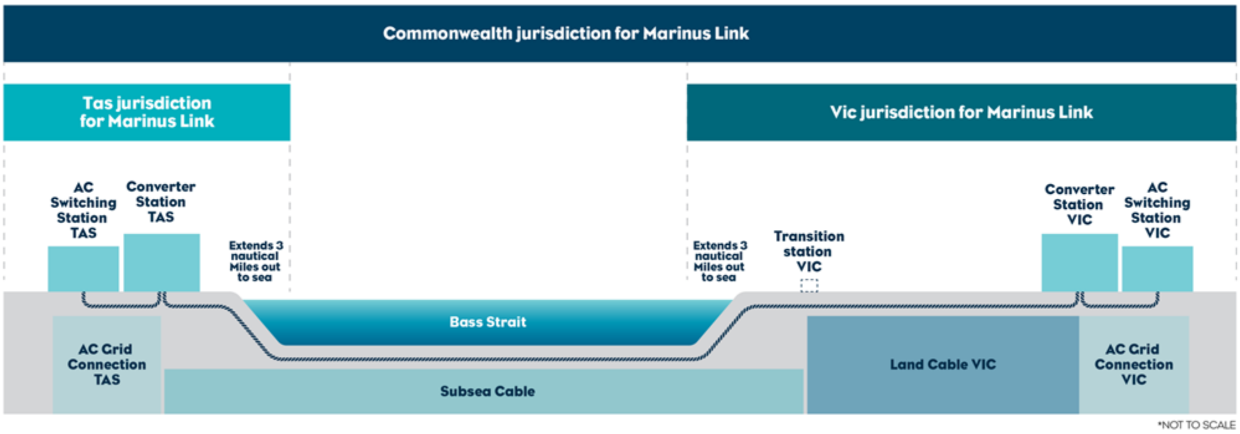

Figure 2 **Project components considered under applicable jurisdictions (Marinus Link Pty Ltd 2022, Consultation Plan).**

The project is proposed to be constructed in two stages over approximately five years following the award of works contracts to construct the project. On this basis, stage 1 of the project is expected to be operational by 2030, with Stage 2 to follow, with final timing to be determined by market demand. The project will be designed for an operational life of at least 40 years.

The construction of the Heybridge converter, switching station and shore crossing are the only components of the project within Tasmania. The site layout, consisting of the Heybridge converter and switching station, is provided in Figure 3. The construction activities associated with the Heybridge site will occur within the site boundary.

The key activities relevant to the impact assessment for the Tasmanian component include:

- Vegetation and topsoil or subsoil clearing and stockpiling (with associated wind erosion)
- Construction and upgrading of roads and access tracks and other temporary infrastructure
- Excavation and levelling, where required
- Construction of the switching and converter station
- Vegetation clearing for the shore crossing adjacent to the Heybridge converter station.

After construction and commissioning, temporary workplaces may be rehabilitated and revegetated depending on the wishes of landowners and the pre-construction level of vegetation.

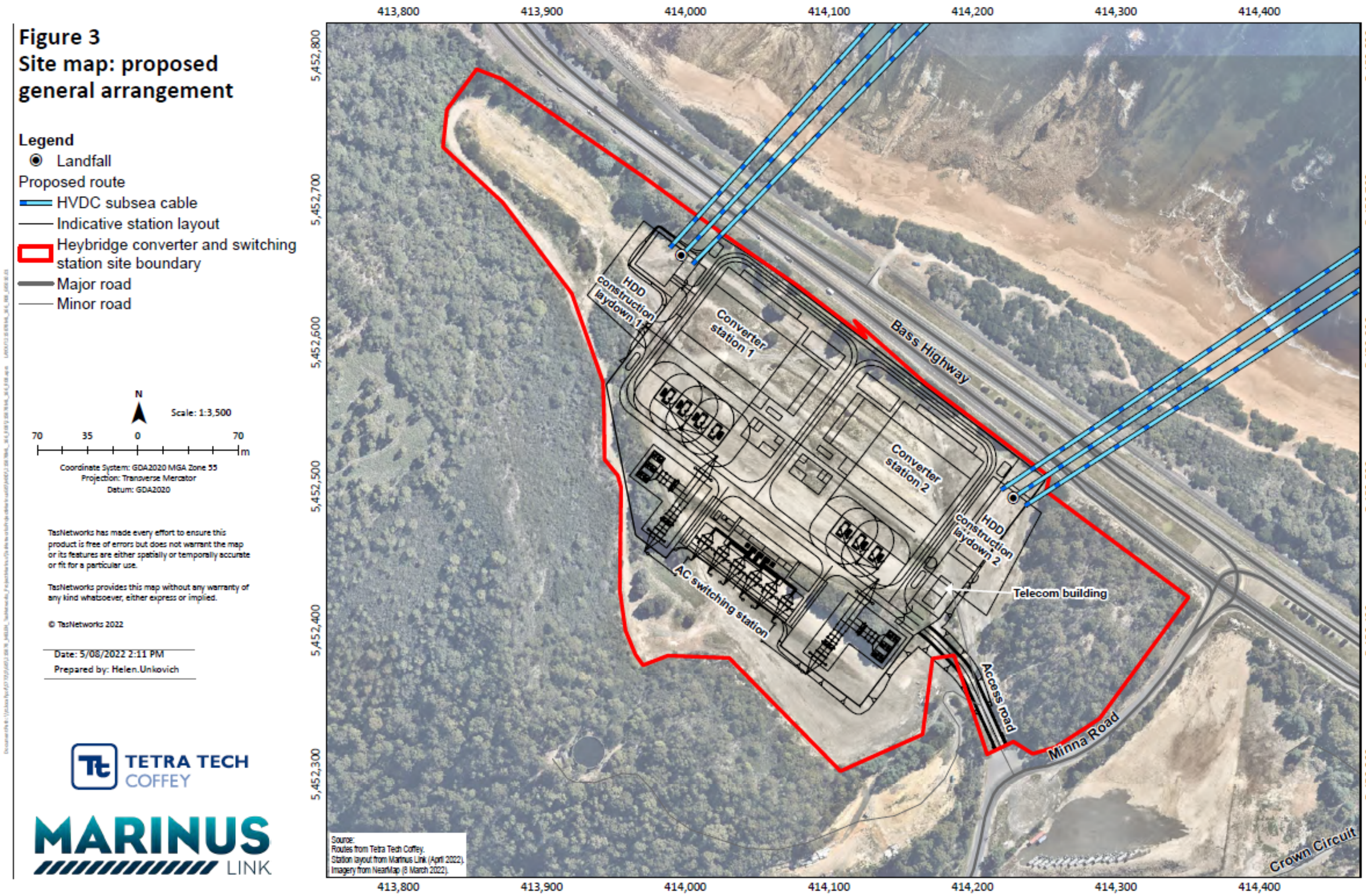

Figure 3 Heybridge site layout

4.2 Construction

4.2.1 Process

Construction activities for the shore crossing will be continuous over 24 hours / 7 days a week to ensure borehole stability. Three bore holes will be drilled from each pad by HDD and only one can be completed at a time.

Work associated with access tracks, easement clearing, and earthworks associated with the trenching for the cable trench are likely to be the most significant in terms of emissions of dust to air. Subsequent stages, including construction of the proposed converter station at Heybridge are likely to involve predominantly non-dusty materials such as pre-mixed concrete and steel. Rehabilitation works may result in emissions of dust also, as this typically involves tasks such as the redistribution of stockpiled material and dozing.

Key activities during the construction phase that will generate emissions to air include:

- Land clearing for the construction work associated with the converter station
- HDD associated with the Heybridge shore crossing
- Earthworks and surface preparation required for the construction and upgrading of the access road to the Heybridge site.

The project will source construction material from international and local manufacturers.

After construction and commissioning, temporary workplaces may be rehabilitated and revegetated depending on the wishes of landowners and the pre-construction level of vegetation.

4.2.2 Construction equipment

Potential equipment required for construction activities are listed in Table 4.

Table 4 List of potential equipment required for construction

Construction activity	Equipment
HDD pads	Drilling rig
Converter station and trenching	Medium and heavy rigid trucks
	Agitator trucks
	Light vehicles
Converter station	Wheeled and tracked excavators
	Piling rig
	Elevated work platforms
	Spider crane
	1500 kVA diesel generators

4.3 Operations

Operation and maintenance activities include:

- Occasional operation of two 1500 kVA backup diesel generators with above ground fuel storage of 5000 L.
- Routine inspections of the Heybridge converter station's equipment and infrastructure including scheduled minor and major outages for repairs and servicing, via light vehicles.
- Maintenance of access tracks using light vehicles.

4.4 Decommissioning

The operational lifespan of the project is a minimum 40 years. At this time the project will be either decommissioned or upgraded to extend its operational lifespan.

Decommissioning will be planned and carried out in accordance with regulatory requirements at the time. A decommissioning plan in accordance with approvals conditions will be prepared prior to planned end of service and decommissioning of the project.

Requirements at the time will determine the scope of decommissioning activities and impacts. The key objective of decommissioning is to leave a safe, stable and non-polluting environment.

In the event that the project is decommissioned, all above-ground infrastructure will be removed, the site rehabilitated.

Decommissioning activities required to meet the objective will include, as a minimum, removal of above ground buildings and structures. Remediation of any contamination and reinstatement and rehabilitation of the site will be undertaken to provide a self-supporting landform suitable for the end land use.

Decommissioning and demolition of project infrastructure will implement the waste management hierarchy principles being avoid, minimise, reuse, recycle and appropriately dispose. Waste management will accord with applicable legislation at the time.

Decommissioning activities may include recovery of land and subsea cables. The conduits and shore crossing ducts would be left in-situ as removal would cause significant environmental impact. Subsea cables be recovered by water jetting or removal of rock mattresses or armouring to free the cables from the seabed.

A decommissioning plan will be prepared to outline how activities would be undertaken and potential impacts managed.

5. CONSIDERATIONS FOR ASSESSING AIR QUALITY

5.1 Key air emissions

Construction activities with the potential for the generation of dust emissions include:

- Land clearing of the operational area for construction of the proposed converter station and switching station at Heybridge
- Excavation and stockpiling of topsoil associated with development of the converter station and switching station at Heybridge
- Earthmoving and surface preparation required for the construction and upgrading of roads and access tracks.

Dust emissions will occur due to the earthmoving activities involved in preparing these areas, including:

- Materials handling associated with excavation and dozing
- Wheel generated dust from material transport
- Wind erosion from stockpiled material and exposed ground.

The operation of the project will not result in significant emissions to air. The potential impacts of dust emissions during decommissioning will be assessed prior to decommissioning but are likely to be smaller in scale than construction. Therefore, emissions due to operations and decommissioning have not been assessed further. The key issue relating to air quality is emissions of dust due to construction activities.

In addition to the key pollutant of dust from the construction activities, the operation of vehicles, machinery, and stationary engines as part of the construction works will result in emissions of carbon monoxide, nitrogen oxides, hydrocarbons, volatile organic compounds and sulfur dioxide. The potential impacts associated with these combustion-generated pollutants are addressed in accordance with the IAQM guidance in section 6.1.

5.2 Odour

Odour may arise if the topsoil and subsoil removed during the construction phase of the project is contaminated. However, odour from contaminated soil is generally temporary in nature and dissipates after a few days. The Contaminated Land and Acid Sulfate Soils Impact Assessment (Tetra Tech Coffey, 2024) identifies potential sources of odour at the Heybridge site, and recommends that odours arising from contaminated soils and acid sulfate soils (ASS) can be managed through standard ASS management measures (e.g. neutralisation, odour suppressant application). Mitigation measures specific to odour are detailed in section 8.4. The assessment of impacts from the potential sources of odour are detailed in the Contaminated Land and Acid Sulfate Soils Impact Assessment (Tetra Tech Coffey, 2024). Therefore, odour has not been assessed further at this stage as part of the Heybridge Air Quality Impact Assessment.

5.3 Impacts of dust

The key potential emissions to air from the construction activities will be in the form of dust or particulate matter. Particulate matter is sub-divided into a number of metrics based on particle size. These metrics are total suspended particulates (TSP), PM_{10}, $PM_{2.5}$ and dust deposition rate:

- TSP refers to the total of all particles suspended in the air and is used as a metric of the potential for particulate matter to affect amenity

- PM_{10} is a subset of TSP and refers to particles suspended in the air with an aerodynamic diameter less than 10 µm
- $PM_{2.5}$ is a subset of TSP and PM_{10} and refers to particles suspended in the air with an aerodynamic diameter less than 2.5 µm
- Dust deposition refers to any dust that falls out of suspension in the atmosphere.

As described above, PM_{10} and $PM_{2.5}$ are both potential components of TSP, but the relative proportion of each within TSP is dependent on the nature of the dust source (e.g., handling of fine powders compared with handling of dry topsoil during earthworks).

Elevated concentrations of dust have the potential to cause adverse impacts on the amenity and health of people. Dust can affect communities in various ways, depending upon the source and size of particles present. Dust typically emitted as a result of construction activities is assessed in terms of dust deposition, total suspended particulates (TSP) and PM_{10}.

Dust from construction activities consists primarily of larger particles generated through the handling of rock and soil, as well as through wind erosion of stockpiles and exposed ground. Larger particles (measured as dust deposition) are mostly associated with dust nuisance or amenity impacts in residential areas, through settling or deposition of the particles. Elevated dust deposition rates can reduce public amenity, through soiling of clothes (drying on clothes lines), vehicles, buildings, and other surfaces.

Smaller particles such as PM_{10} can also be generated by the same construction activities. Elevated levels of PM_{10} have the potential to affect human health as these particles can be trapped in the nose, mouth, throat, or be drawn into the lungs.

Very fine particles such as $PM_{2.5}$ are mostly generated through combustion processes, and so will be emitted by the vehicle fleet and other construction equipment. Combustion of fuel in the vehicle fleet will also produce oxides of nitrogen, oxides of sulfur and carbon monoxide.

Some ecological habitats may also be sensitive to dust. This may be due to sensitivity to the direct impacts of dust deposition to aquatic ecosystems or on vegetation (by reducing photosynthesis or other processes), or indirect impacts on fauna. The timeframe over which construction activities occur, and the frequency of rainfall events are relevant to assess the risk posed to ecological receptors by construction activities.

The potential key air quality risks associated with the construction phase of the project are:

- Reduced public amenity due to dust soiling
- Health impacts due to elevated levels of PM_{10} and $PM_{2.5}$
- Harm to ecological receptors.

These risks are generally avoidable through the implementation of diligent dust management and controls.

6. ASSESSMENT METHOD

The potential impacts of dust emissions, during construction of the project, have been addressed using a risk-based methodology. This is appropriate due to the temporary nature of the proposed construction activities, and well-established mitigation measures that can be applied to minimise potential dust emissions. The Institute of Air Quality Management (IAQM) has published a risk assessment methodology, titled 'Guidance on the assessment of dust from demolition and construction' (Holman et al, 2016) (IAQM Methodology). Whilst it was drafted with the intention of application in the United Kingdom, the IAQM methodology is applicable and widely used in Australia. This IAQM methodology has been adopted to assess construction dust impacts and to inform the implementation of appropriate dust management measures.

The IAQM methodology considers the potential for impacts within 350 m of the boundary of construction works, or within 50 m of roads used by construction vehicles within 500 m of the site. The methodology follows a sequence of steps detailed in Section 6.1.

The construction dust risk assessment approach does not require a focus on individual specific receptors to be identified; instead, the numbers of different types of receptors within given distance bands of the construction works are counted.

The IAQM methodology explains that *"experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed"*. Those cases where quantitative assessment is required tend to be major construction projects in dense urban areas, such as large cities. Review of the IAQM and Katestone's professional judgement is that there is no risk of significant air quality impacts as a result of emissions from site machinery or traffic accessing the construction sites, thus these emissions are not considered further. Standard practice mitigation measures to reduce emissions from vehicles and machinery are, however, included in the site-specific mitigation recommended in section 8.1.3.

The potential for air quality impacts due to construction associated with the converter station and switching station at Heybridge within Tasmania has been assessed using the IAQM methodology, detailed below.

6.1 Detailed method

The risk assessment framework developed by the IAQM determines the level of risk based on the sensitivity of the area (i.e., the presence of sensitive receptors and the air quality in the area with respect to the air quality criteria) combined with the magnitude of change (i.e., the increase in predicated concentrations or deposition rates as a result of project activities).

Construction activities have been divided into four types by the IAQM to reflect their different potential impacts. These are:

- Demolition – any activities involved in the removal of an existing structure
- Earthworks – covers the processes of soil-stripping, ground levelling, excavation and landscaping
- Construction – any activities involving the provision of a new structure, its modification or refurbishment
- Trackout – the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the road network.

The assessment method considers three separate dust impacts, which are considered to be the key impacts of construction activities:

- Annoyance due to dust soiling

- The risk of health effect due to an increase in exposure to PM_{10}
- Harm to ecological receptors.

The assessment is used to define appropriate mitigation measures to ensure that there will be no significant effect.

The methodology involves the following steps:

STEP 1 is to screen the requirement for a more detailed assessment (with no further assessment required if there are no receptors within a certain distance of the works).

STEP 2 is to assess the risk of dust impacts. This is done separately for each of the four activities (demolition; earthworks; construction; and trackout) and takes account of the following factors:

- **STEP 2A**: The scale and nature of the works, which determines the potential dust emission magnitude
- **STEP 2B**: The sensitivity of the area
- **STEP 2C**: Combine the factors from STEP 2A and STEP 2B to give the risk of dust impacts.

Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four separate potential activities. Where there are low, medium or high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgement one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the emissions magnitude is small and there are no receptors near the activities.

STEP 3 is to determine the site-specific mitigation for each of the four potential activities in STEP 2. This will be based on the risk of dust impacts identified in STEP 2. Where a local authority has issued guidance on measures to be adopted at demolition or construction sites, these should also be considered.

STEP 4 is to examine the residual effects and to determine whether these are significant.

STEP 5 is to prepare the dust assessment report.

Each of the steps is described in more detail in the following sections:

6.1.1 Step 1: Screen the need for a detailed assessment

An assessment will normally be required where there is the following:

- A 'human receptor' within:
  - 350 m of the boundary of the site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- An 'ecological receptor' within:
  - 50 m of the boundary of the site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

6.1.2 Step 2: Assess the risk of dust impacts

6.1.2.1 *Step 2A – Define the potential dust emission magnitude*

The dust emission magnitude is based on the scale of the anticipated works as defined in Table 5.

Table 5 Magnitude of emissions by activity relevant to the project (IAQM, 2014)

Magnitude of emissions	Description
Demolition	
Large	Total building volume >50,000 m³, potentially dusty construction material (e.g., concrete), on-site crushing and screening, demolition activities >20 m above ground level
Medium	Total building volume 20,000 m³ – 50,000 m³, potentially dusty construction material, demolition activities 10-20 m above ground level
Small	Total building volume <20,000 m³, construction material with low potential for dust release (e.g., metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >10,000 m², potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes (t)
Medium	Total site area 2,500 m² – 10,000 m², moderately dusty soil type (e.g., silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 t – 100,000 t
Small	Total site area <2,500 m², soil type with large grain size (e.g., sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 t, earthworks during wetter months
Construction	
Large	Total building volume >100, 000 m³, on site concrete batching, sandblasting
Medium	Total building volume 25,000 m³ – 100,000 m³, potentially dusty construction material (e.g., concrete), on site concrete batching
Small	Total building volume <25,000 m³, construction material with low potential for dust release (e.g., metal cladding or timber).
Trackout	
Large	>50 HDV (>3.5 t) outward movements in any one day, potentially dusty surface material (e.g., high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5 t) outward movements in any one day, moderately dusty surface material (e.g., high clay content), unpaved road length 50 m – 100 m
Small	<10 HDV (>3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.
Tables notes: HDV = Heavy Duty Vehicle	

6.1.2.2 *Step 2B – Define the sensitivity of the area*

The sensitivity of the area considers a number of factors:

- The specific sensitivities of receptors in the area (see Table 6)

- The proximity and number of those receptors
- The local background concentration of PM_{10}
- Site-specific factors, such as whether there are natural shelters (e.g., trees) to reduce the risk of wind-blown dust.

The sensitivity of receptors to the effects of dust due to soiling, human health and ecological receptors are each considered. Table 6 provides a description of the range of sensitivities for an individual receptor associated with each impact category.

Table 6 Receptor sensitivity to dust effects (source)

Receptor sensitivity	Description
Dust Soiling Effects on People and Property	
High	• users can reasonably expect enjoyment of a high level of amenity; or • the appearance, aesthetics or value of their property would be diminished by soiling; and • the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.
Medium	• users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • the appearance, aesthetics or value of their property could be diminished by soiling; or • the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.
Low	• the enjoyment of amenity would not reasonably be expected; or • property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or • there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.
Human health effects of PM_{10}	
High	• locations where members of the public are exposed over a time period relevant to the air quality criteria for PM_{10} (in the case of the 24-hour criteria, a relevant location would be one where individuals may be exposed for eight hours or more in a day).
Medium	• locations where the people exposed are workers, and exposure is over a time period relevant to the air quality criteria for PM_{10} (in the case of the 24-hour criteria, a relevant location would be one where individuals may be exposed for eight hours or more in a day).
Low	• locations where human exposure is transient.
Ecological effects	
High	• locations with an international or national designation and the designated features may be affected by dust soiling; or • locations where there is a community of a particularly dust sensitive species.
Medium	• locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • locations with a national designation where the features may be affected by dust deposition.
Low	• locations with a local designation where the features may be affected by dust deposition.

Table 7, Table 8 and Table 9 show how the sensitivity of the area is determined for dust soiling, human health and ecosystem impacts, respectively. These tables take account of a number of factors that may influence the sensitivity of the area. When using these tables, it should be noted that distances are measured from the dust source, and as such a different area (and therefore, different number of receptors) may be affected by trackout than by on-site works. The highest level of sensitivity from each table should be recorded.

Table 7 Sensitivity of the area to dust soiling effects on people and property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 8 Sensitivity of the area to human health impacts

Receptor Sensitivity	Annual Mean PM_{10} concentration ($\mu g/m^3$) *	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>20	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	17.5 - 20	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	15 – 17.5	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<15	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>20	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	17.5 - 20	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	15 – 17.5	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<15	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table note: * IAQM criteria revised to reflect annual PM_{10} criteria relevant in Tasmania

Table 9 Sensitivity of the area to ecological impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

6.1.2.3 *Step 2C - Define the Risk of Impacts*

The dust emission magnitude determined at STEP 2A (Section 6.1.2.1) is combined with the sensitivity of the area determined at STEP 2B (Section 6.1.2.2) to determine the risk of impacts with no mitigation applied. The matrices in Table 10, Table 11 and Table 12 provide a method of assigning the level of risk for each activity. This is used to determine the level of mitigation that must be applied. Mitigation is discussed in STEP 3 (Section 8.1.3). For those cases where the risk category is 'negligible', no mitigation measures beyond those required by legislation are required.

Table 10 Risk of dust impacts – earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 11 Risk of dust impacts – construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 12 Risk of dust impacts – trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

6.1.3 Step 3: Site-specific mitigation

The IAQM recommends that the dust risk categories for each of the four activities determined in STEP 2C be used to define the appropriate, site-specific, mitigation measures to be adopted.

For almost all construction activity, the IAQM guideline notes that the aim should be to prevent significant effects on receptors through the use of effective mitigation and experience shows that this is normally possible.

The IAQM guidelines include appropriate mitigation measures that could be adopted for construction activities that are determined to have low, medium and high preliminary risk of adverse air quality impacts.

6.1.4 Step 4: Determine significant effects

Once the risk of dust impacts has been determined in STEP 2C and the appropriate dust mitigation measures have been identified in STEP 3, the final step is to determine whether there are significant effects arising from the construction phase of a proposed development.

6.1.5 Step 5: Dust assessment report

The IAQM recommends that the dust assessment report summarises the dust emission magnitude, the sensitivity of the area and the risk of impacts without mitigation. In addition, the report is to describe the mechanism for ensuring that the appropriate level of mitigation would be implemented.

6.2 Cumulative impacts

The EIS guidelines and EES scoping requirements both include requirements for the assessment of cumulative impacts. Cumulative impacts result from incremental impacts caused by multiple projects occurring at similar times and within proximity to each other.

To identify possible projects that could result in cumulative impacts, the International Finance Corporation (IFC) guidelines on cumulative impacts have been adopted. The IFC guidelines (IFC, 2013) define cumulative impacts as those that ‘result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.’

The approach for identifying projects for assessment of cumulative impacts considers:

- Temporal boundary: the timing of the relative construction, operation and decommissioning of other existing developments and/or approved developments that coincides (partially or entirely) with the project.
- Spatial boundary: the location, scale and nature of the other approved or committed projects are expected to occur in the same area of influence as the project. The area of influence is defined at the spatial extent of the impacts a project is expected to have.

Proposed and reasonably foreseeable projects were identified based on their potential to credibly contribute to cumulative impacts due their temporal and spatial boundaries. Projects were identified based on publicly available information at the time of assessment. The projects considered for cumulative impact assessment across Tasmania, Bass Strait and Victoria are:

- Delburn Windfarm
- Star of the South Offshore Windfarm
- Offshore wind development zone in Gippsland including Greater Gippsland Offshore Wind Project (BlueFloat Energy), Seadragon Project (Floatation Energy), Greater Eastern Offshore Wind (Corio Generation).
- Hazelwood Mine Rehabilitation Project
- Wooreen Energy Storage System
- North West Transmission Developments (NWTD)

- Guilford Windfarm
- Robbins Island Renewable Energy Park
- Jim's Plain Renewable Energy Park
- Robbins Island Road to Hampshire Transmission Line
- Bass Highway upgrades between Deloraine and Devonport
- Bass Highway upgrades between Cooee and Wynard
- Hellyer Windfarm
- Table Cape Luxury Resort
- Youngmans Road Quarry
- Port Latta Windfarm
- Port of Burnie Shiploader Upgrade
- Quaylink – Devonport East Redevelopment.

The projects relevant to this assessment have been determined based on there is potential for cumulative impacts to receptors. The North West Transmission Developments was assessed as relevant to this assessment due to their proximity to this project and its sensitive receptors. The cumulative assessment has considered the potential for activities associated with the projects to emit dust and the likelihood of cumulative impacts due to distance.

6.2.1 North West Transmission Developments

The NWTD project is a proposed development within the vicinity of the disturbance area associated with the construction of the Heybridge converter station. Construction is anticipated to commence in Q1 of 2025. The location of the NWTD project with relation to the converter station and the identified sensitive receptors is presented in Figure 4. The NWTD is a proposed overhead transmission line. Key site activities for dust include the construction of the facility and associated infrastructure and occasional vehicle operation along access tracks, with the greatest potential for dust impacts being attributable to the construction phase. Should construction of the NWTD project occur at the same time and dust emissions are not controlled, then there is the potential for cumulative impact. However, given that both projects propose to apply standard dust mitigation measures, cumulative impacts should not occur.

Where there are sites that could have a cumulative impact, the IAQM guidance recommends that the following additional mitigation measure is implemented:

"Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes".

Provided this liaison and coordination takes place, dust emission should be adequately managed such that there will be no significant cumulative impacts.

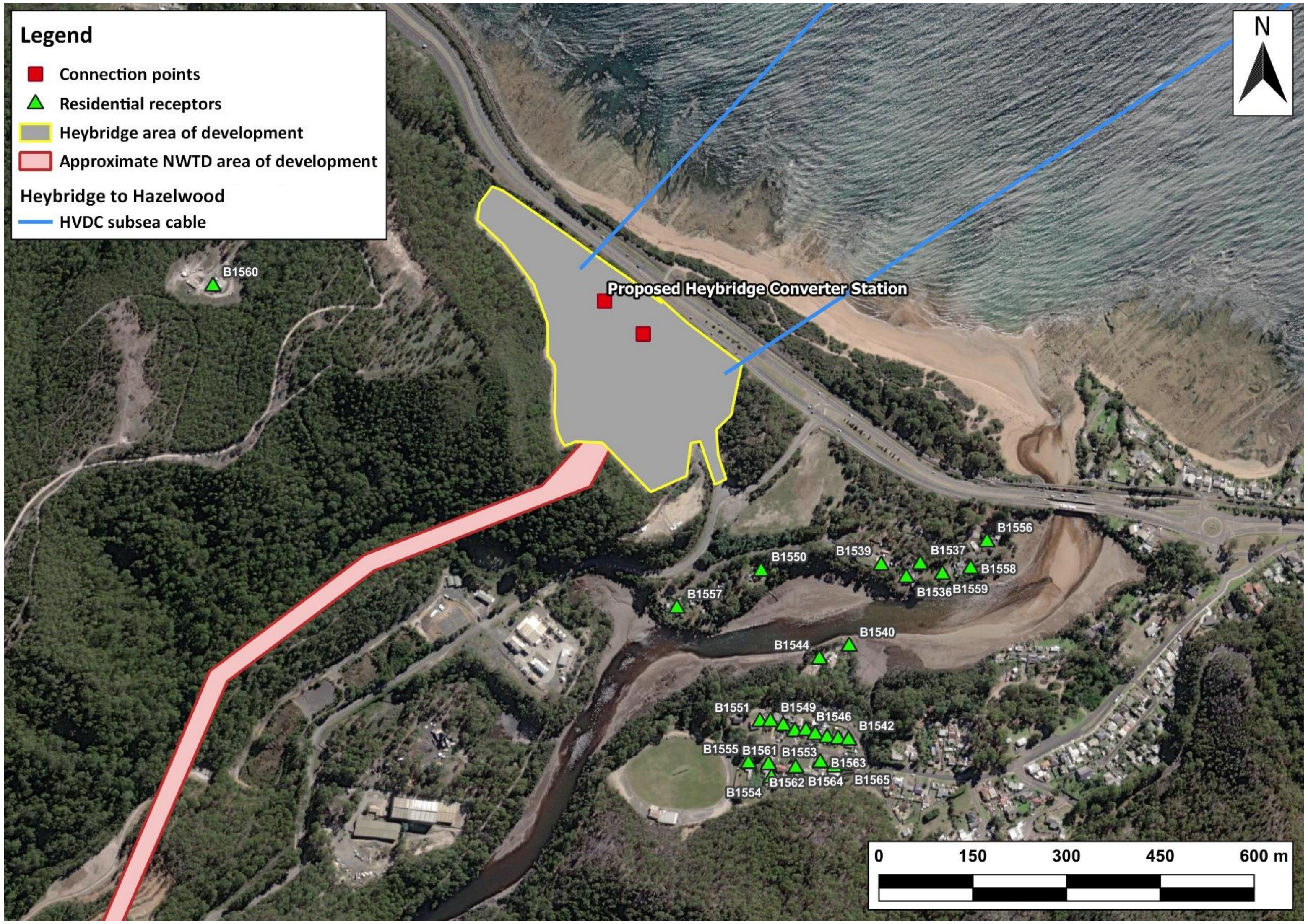

Figure 4 Location of the NWTD project with relation to the project and residential receptors

7. EXISTING ENVIRONMENT

7.1 Terrain

The key issue relating to air quality will be emissions of dust during construction of the converter station and switching station at Heybridge. The elevation of the project development area for the Heybridge connection point is approximately 12 m Australian Height Datum (AHD) (Figure 5). The project development area is in the coastal town of Heybridge with the Bass Strait the key terrain feature likely to play a large role in the predominant wind directions and wind speeds across the project area.

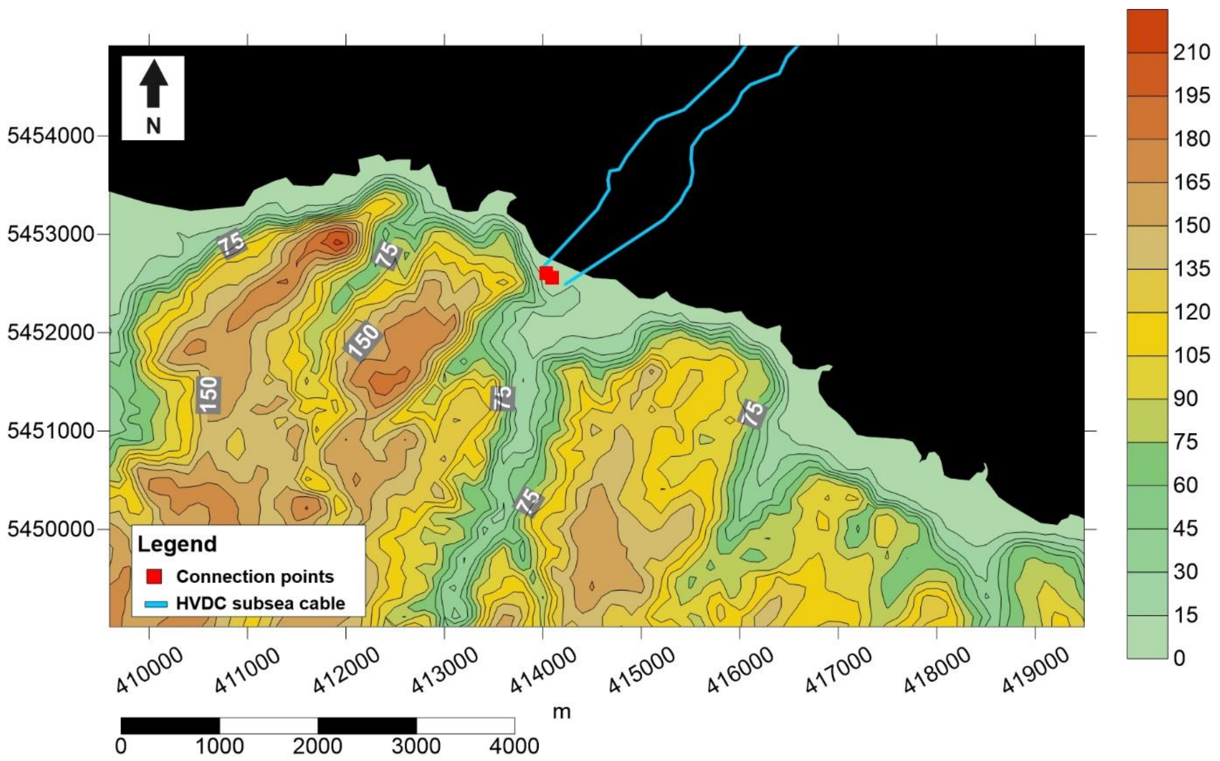

Figure 5 **Terrain across the project area**

7.2 Land use

Figure 6 presents a detailed overlay of Tasmanian Government 2019 land use classification data. The predominant land uses in the vicinity of the project include, but are not limited to, residential and farm infrastructure, other minimal use, and managed resource protection.

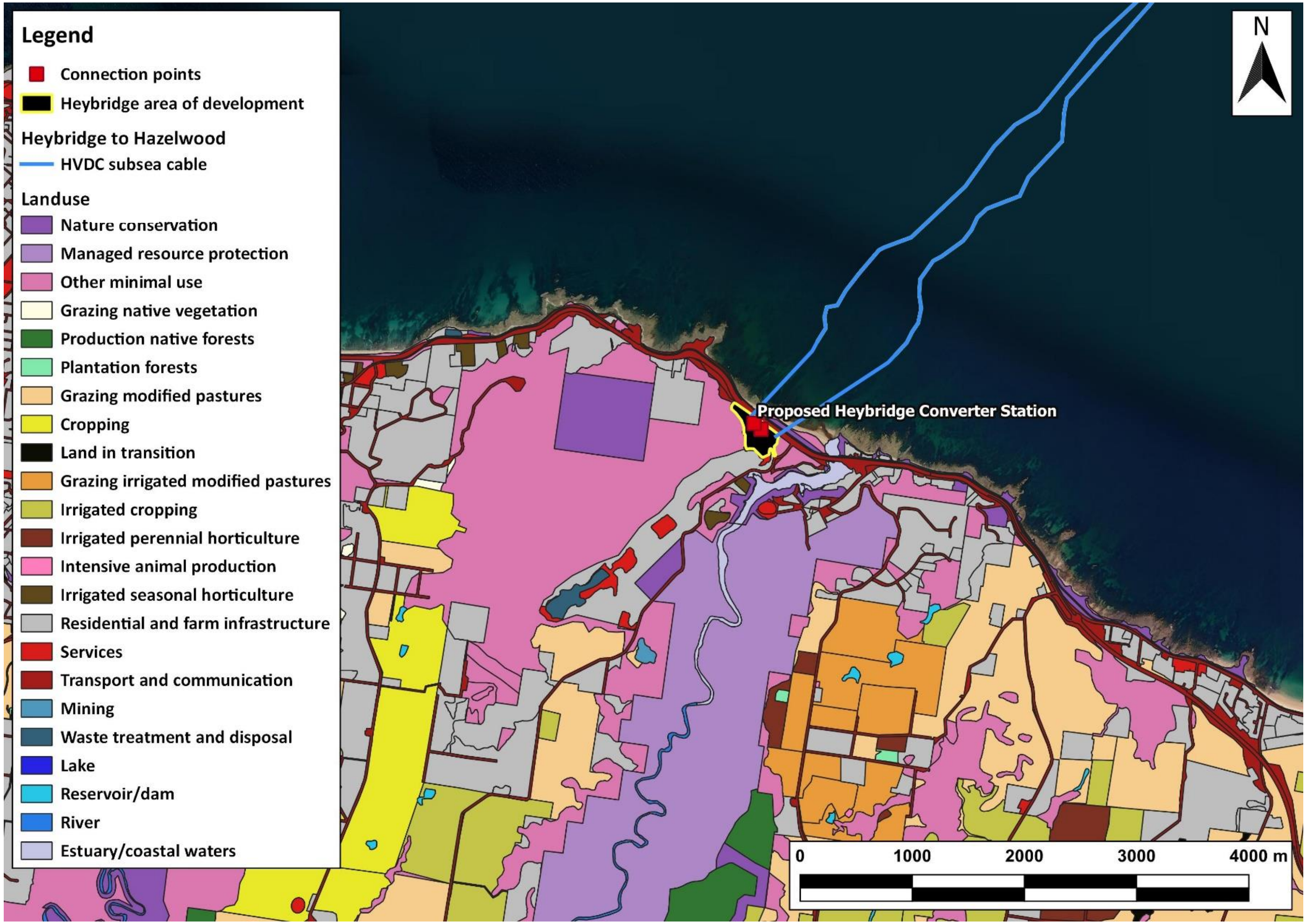

Figure 6 Land use data in the vicinity of the project (Planning Scheme)

7.3 Meteorology and climate

The local meteorological conditions are important in understanding the potential air quality impacts associated with a project as they dictate the direction of transport of dust, and where and when the higher concentrations are likely to occur. In general, it is under hot, dry and windy conditions where dust emissions have the highest potential to adversely impact on air quality away from their point of release. The meteorological parameters that may lead to these conditions are summarised in the following sections.

A summary of each Bureau of Meteorology (BoM) site considered for the existing meteorology summary is provided in Table 13. BoM sites located at Burnie (National Tidal Centre) NTC (automatic weather station (AWS) (from 1992 onwards) and Burnie (Park Grove) (from 2009 onwards) have been selected to characterise the meteorology at the Heybridge disturbance area. Figure 7 shows the location of available monitoring sites in the vicinity of the project. These sites are expected to be representative of meteorological conditions at the project site, due to their similar elevation and geographic location.

Table 13 BoM Monitoring Site summary

BOM Monitoring Site	State	Opened	Last Record	Distance from the project	Parameters	Climate Summary
Burnie NTC AWS	Tasmania	1992	Open	5.6 km NW	Temperature and meteorological data	Coastal site, 0 m AHD
Burnie (Park Grove)	Tasmania	2009	Open	8.4 km W	Rainfall	Coastal site, 99 m AHD

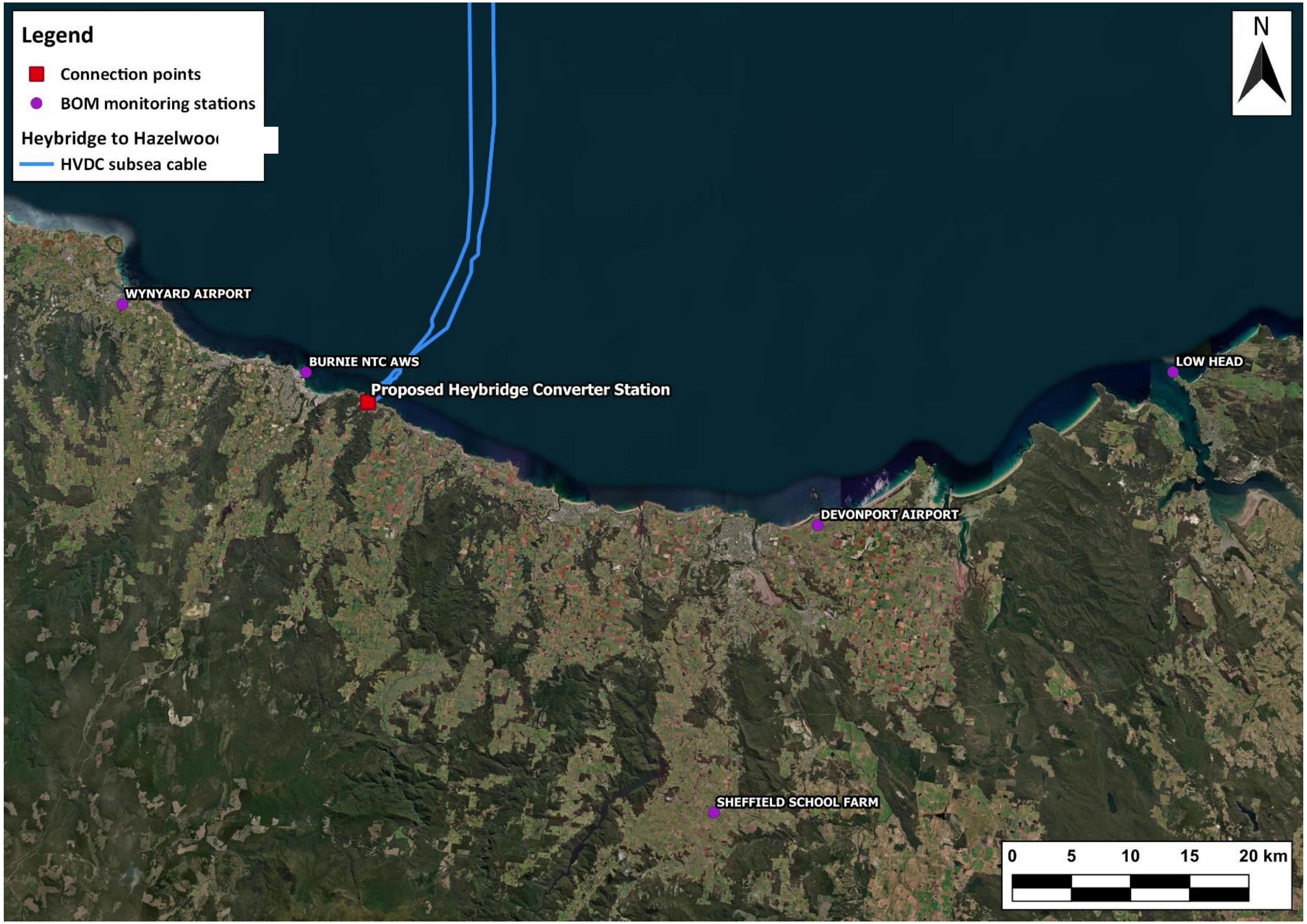

Figure 7 **BoM monitoring stations within the vicinity of the project**

7.3.1 Wind speed and wind direction

Wind speed and wind direction are important parameters for the transport and dispersion of air pollutants including dust. BoM site Burnie NTC AWS (2009 to 2022) has been selected to characterise the wind speed at the project site, due to the similar elevation, geographic location and the availability of hourly wind speed and wind direction data from these automatic weather stations.

The surface wind climate is driven by the large-scale circulation pattern of the atmosphere. The project is in the Southern Slopes region which is at the northern edge of the 'Roaring Forties' belt of westerly circulation (Grose, M. *et al.,* 2015), and so receives predominantly westerly winds.

The annual, seasonal, and diurnal distribution of winds based on the Burnie NTC AWS site are presented in Figure 8, Figure 9 and Figure 10, respectively. The winds recorded at the Burnie NTC AWS site are generally moderate to strong with an average wind speed of 4.36 m/s. Approximately 67% of winds are from the southwest to northwest directions with approximately 22% of winds from the southeast. The BoM Burnie NTC AWS recorded 0.6% calms (wind speed of 0 m/s) over the recording period.

There is a variation in both wind direction and wind speed throughout the seasons of the year. Autumn and winter are characterised by slightly lighter winds and an increased southerly component compared to spring and summer. There is a variation in both wind direction and wind speed during the day and night, with wind speeds increasing throughout the day to be at their strongest during the afternoon (midday to 6pm) and lightest overnight (midnight to 6am). Predominant westerlies and southerlies persist across all hours, with an increase in southeast winds during the day (6am to 6pm) with westerlies increasing overnight (6pm to 6am).

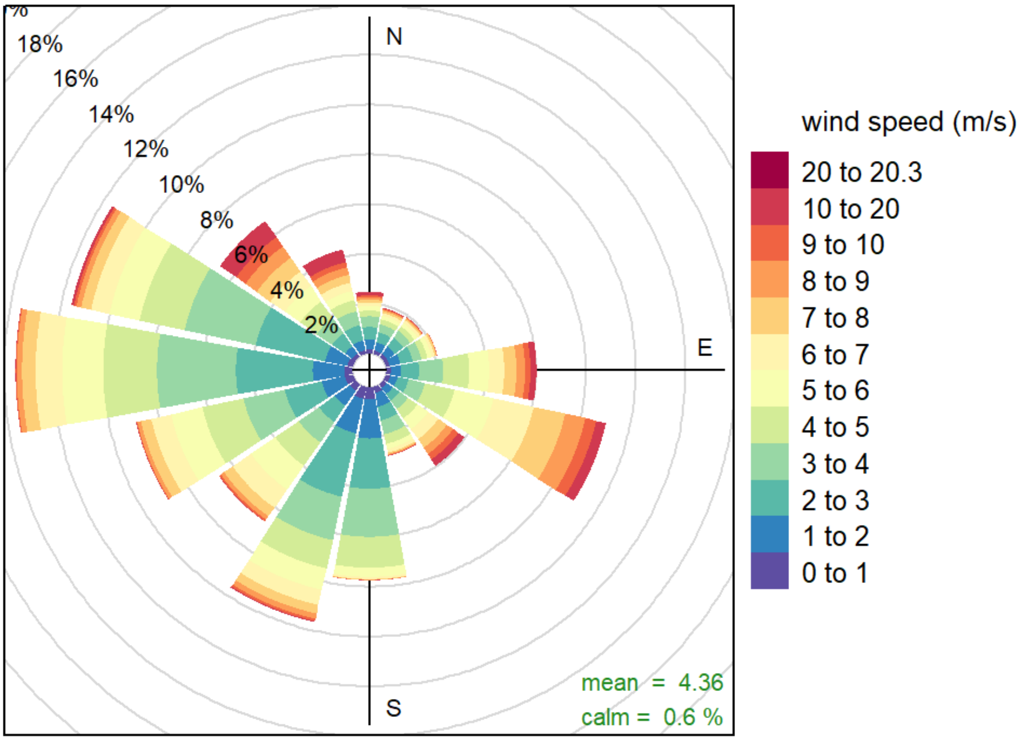

Figure 8 **Annual distribution of wind speed and wind direction derived from BoM Burnie NTC AWS (2009-2022)**

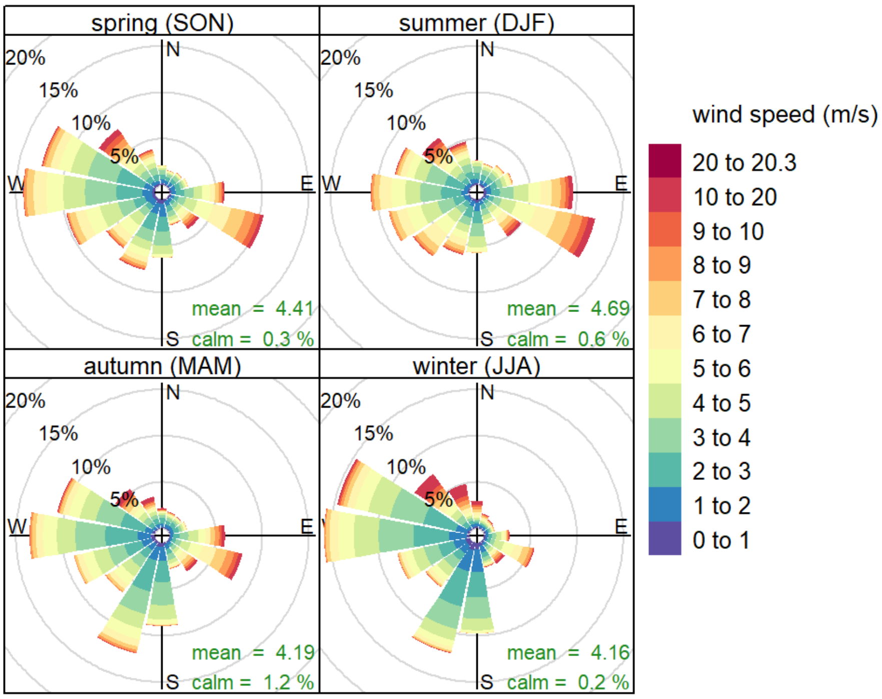

Figure 9 **Seasonal distribution of wind speed and wind direction for BoM Burnie NTC AWS (2009-2022)**

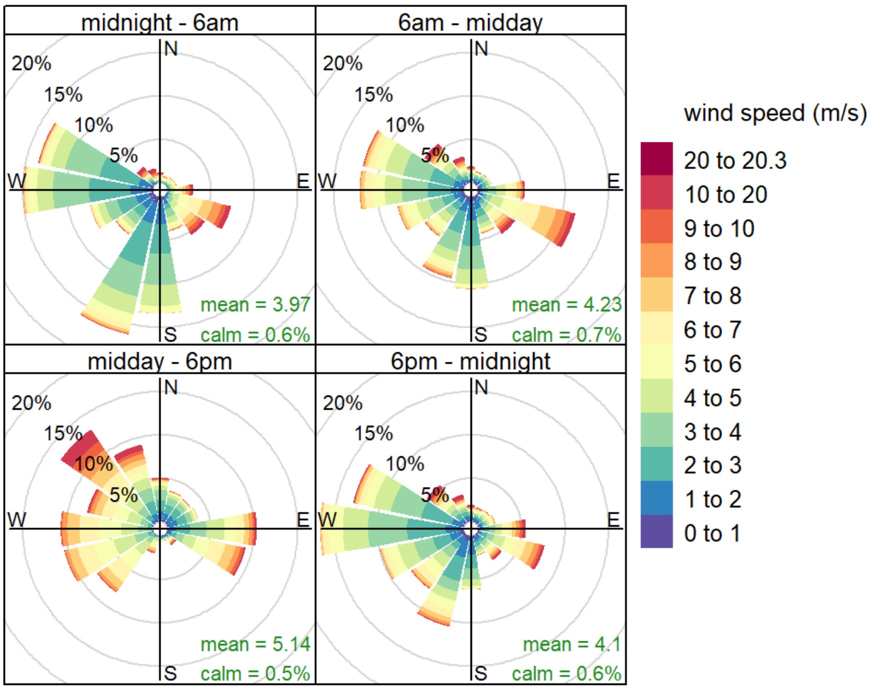

Figure 10 **Diurnal distribution of wind speed and wind direction for BoM Burnie NTC AWS (2009-2022)**

7.3.2 Temperature

The temperature at the site of the facility influences the convective movement of air in the lower atmosphere and, therefore, the rate of dispersion of dust from the site. In addition, temperature variations provide an indication of times during which dust emissions may increase.

Table 14 shows the minimum and maximum seasonal temperatures for BoM Burnie NTC AWS site.

Table 14 Maximum and minimum daily temperatures recorded at Burnie NTC AWS

Season	Maximum Temperature (°C)[1]	Minimum Temperature (°C)[1]
Autumn	26.6	3.5
Spring	25.8	3
Summer	31.5	7.1
Winter	18.6	2.1

Table notes:
[1] Maximum and minimum daily temperature obtained from http://www.bom.gov.au/climate/data/stations/

7.3.3 Rainfall

Rainfall reduces emissions of dust from construction activities and exposed ground. Figure 11 and Figure 12, show the annual and seasonal distributions of rainfall at Burnie (Park Grove) for the available data periods.

The annual total is the sum of validated months of rainfall data for each year. The annual average rainfall at this site for the monitoring period (available data) is 876 mm, with a maximum annual total of 1,411 mm and a minimum annual total of 221 mm.

At the Burnie (Park Grove) site, the winter period accounts for 35% of the mean annual rainfall while summer only accounts for 17%. The shoulder seasons of spring and autumn at this site account for 22% and 26%, respectively.

The mean total rainfall peaks during the winter months and is at its lowest during summer. This seasonal rainfall is characteristic of the oceanic climate, with the absence of a dry season and the distribution of rainfall across the year.

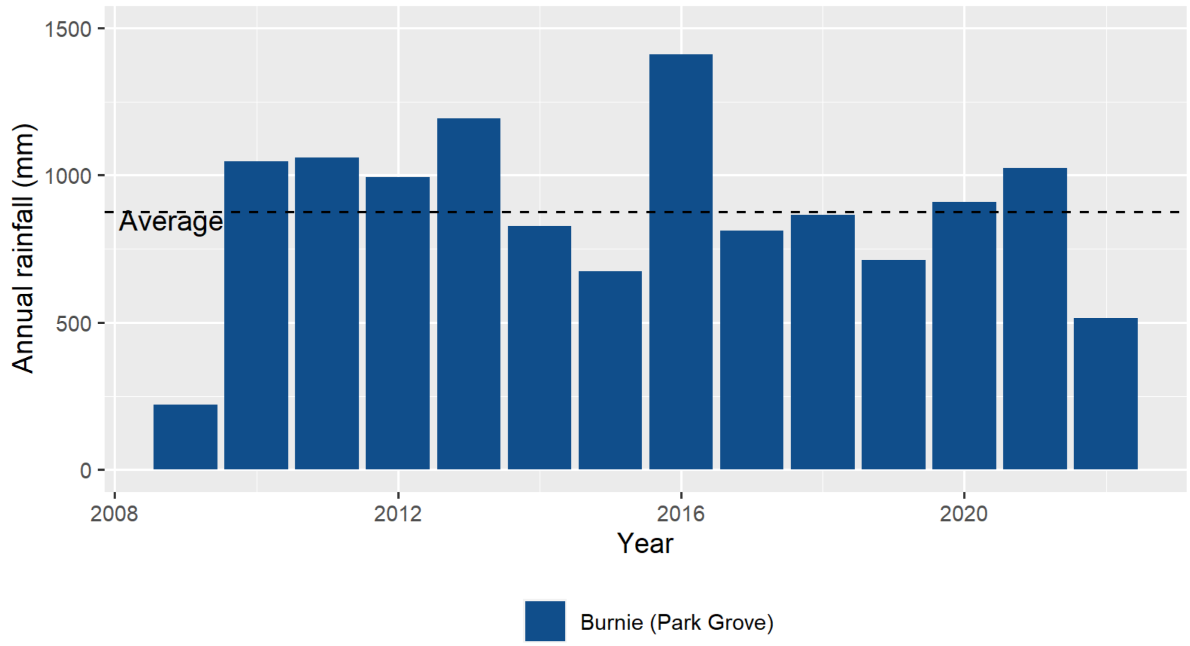

Figure 11 Annual total rainfall at Bom Burnie (Park Grove) (2009 - 2022)

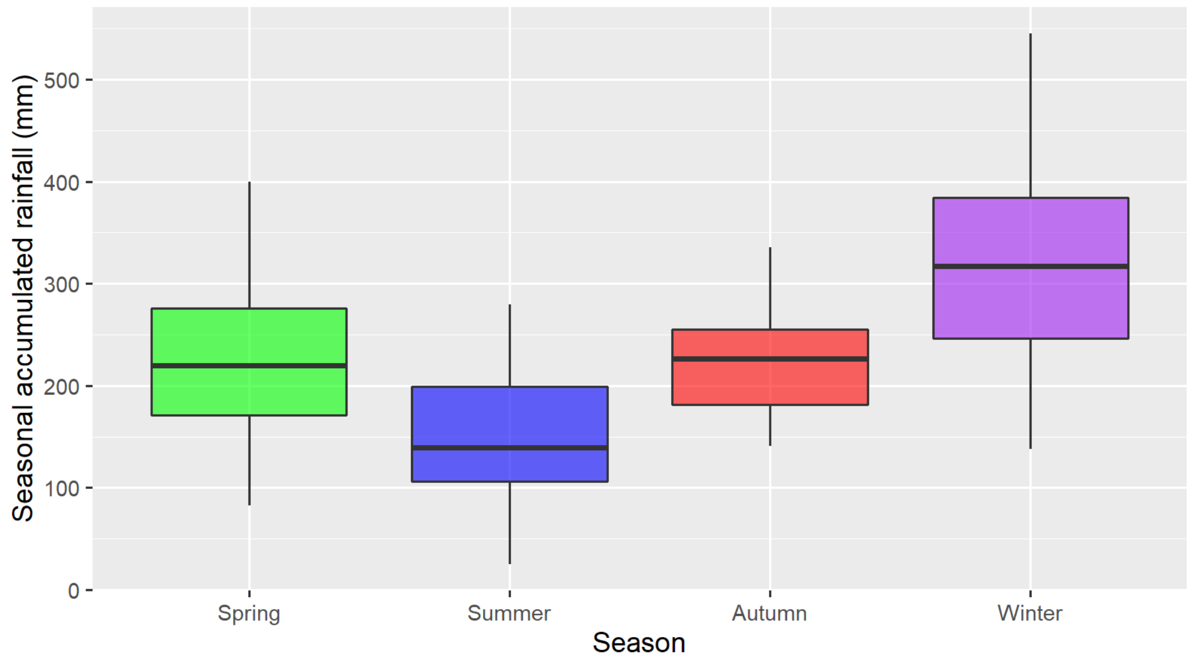

Figure 12 Season rainfall at the BoM Burnie (Park Grove) monitoring station (2009 – 2022)

7.4 Ambient air quality

7.4.1 Existing sources of dust and particulates

In Tasmania, smoke from burning wood in home heaters is the greatest source of particulates in the atmosphere. Other sources include dust blown by the wind from soil, vehicles driving over unsealed or dusty roads, dusts and fumes from chemical industrial processes, and smoke from planned burns (EPA Tasmania, 2013).

Existing waste treatment and disposal facilities near the proposal site include the Heybridge Asbestos Landfill, Heybridge East Waste Depot and the Heybridge Inert Waste Depot, all located between 1.9 and 2.2 km southwest of the proposal site, off from Minna Road and Devonshire Drive. There are no facilities within five km of the project that report particulate emissions to the National Pollutant Inventory. The nearest facility to the project is the Old Surrey Road Cheese Factory which is located approximately 5.6 km southwest. Given the distances between these facilities and the project, and the complex terrain, it is unlikely that they will significantly influence air quality in the vicinity of the project; their contributions will also largely be captured in the baseline air quality monitoring used in the assessment.

7.4.2 Existing ambient air quality

Existing ambient air quality has been quantified through a desktop assessment, based on EPA Tasmania-provided data. The location of the EPA Tasmania air monitoring stations with relevance to the project can be seen in Figure 13. A summary of the settings of these monitoring stations is provided in Table 15. These three sites monitor PM_{10} and $PM_{2.5}$ levels.

The Tasmanian EPA carries out air quality monitoring to determine its compliance with the National Environment Protection (Ambient Air Quality) Measure. At the present time, the EPA operates reference level air monitoring stations in Hobart, Launceston and Devonport, using Tapered Element Oscillation Microbalances (TEOM) and Low Volume Samplers. These are Australian Standard instruments that provide high quality data. EPA Tasmania also operates the Base Line Air Network of EPA Tasmania (BLANkET). The BLANkET network offers real time, indicative (non-reference) particulate monitoring using DRX DustTrak instruments. The BLANkET network data is compared against the reference monitor at Hobart in an attempt to validate the data. The BLANkET indicative data cannot be used to determine if an air quality standard has been exceeded, but provides a good indication of particulate concentrations and how they change over time.

Review of the EPA Tasmania air monitoring stations within 50 km of the project has been performed to determine which site is most representative of the conditions experienced at the Heybridge disturbance area. Emu River is the closest to the project, approximately 8.6 km southwest, in an area with little in the way of emission sources. The ambient background levels at the project site are expected to be low as a result of minimal nearby emission sources, hence the similar setting and proximity of Emu River means that it should be reasonably representative of conditions in Heybridge. A conservative approach has been taken where the highest ambient concentrations measured at Emu River in any year have been used to characterise ambient background concentrations for the assessment. It should be noted that monitoring at the Emu River site is conducted using real time, indicative (non-reference) particle monitoring as part of the BLANkET network.

Table 15 EPA Tasmania Monitoring Site summary

EPA Tasmania Monitoring Site	Distance from Project	Surrounding Environment
Emu River	8.6 km SW	Located in a grassland paddock. Emu River is approximately 6 km south of Burnie town centre.
West Ulverstone	16.8 km SE	Located near the Leven River approximately 2 km west of Ulverstone town centre.
Wynyard	23.6 km NW	Located within Wynyard residential area. Approximately 2 km southwest from the North Coast of Tasmania.
Devonport	34.1 km SE	The Devonport station is located approximately 1 km south of the residential centre of town.
Latrobe	41.3 km SE	The Latrobe station is located approximately 700 m east of the town centre
Sheffield	46 km SE	Located on agricultural land. Sheffield is approximately 1.5 km southeast of Sheffield town centre.

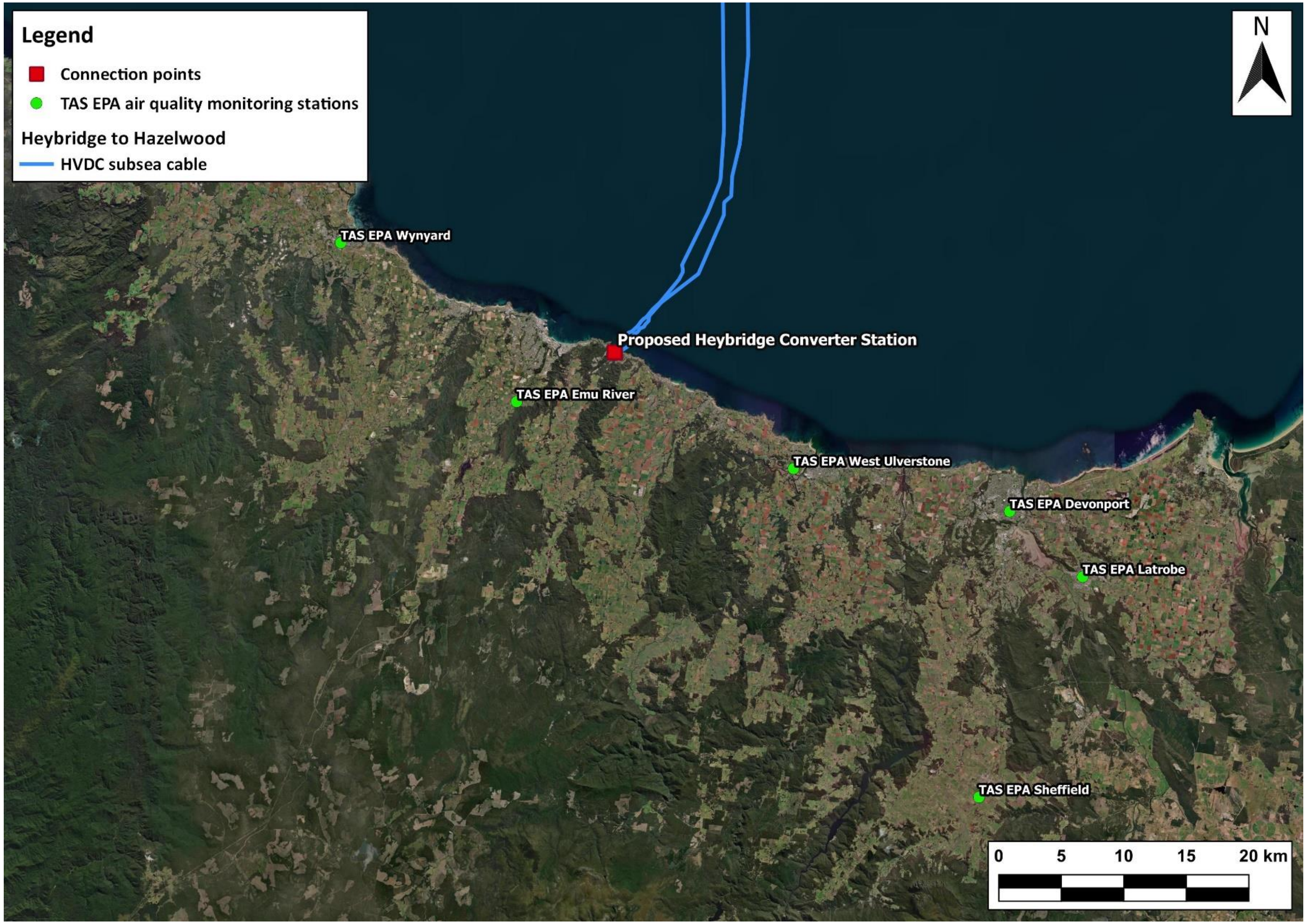

Figure 13 Location of EPA Tasmania dust monitoring station locations

Data recorded over the past five years (January 2015 to October 2020) have been analysed to understand likely ambient background concentrations of particulates in the vicinity of the Heybridge construction. Relevant PM_{10} statistics from data measured from January 2015 to October 2020 at the EPA Tasmania Emu River site are presented in Table 16, and relevant $PM_{2.5}$ statistics are presented in Table 17.

Advice from EPA Tasmania indicates that the elevated maximum 24-hour particulate levels in 2016 were due to bushfires, and hence these have been excluded from the summary of background particulate concentrations.

Table 16 Concentrations of PM_{10} at Emu River station from Jan 2015 to Oct 2020

Year	PM_{10} (µg/m³)			
	24-hour average (Maximum)	No. days above 50 µg/m³	24-hour average (70th percentile)	Annual average
2015	36.3	0	8.3	7.0
2016	236.2	3	9.3	8.9
2017	38.0	0	9.5	7.8
2018	34.4	0	9.2	8.0
2019	36.4	0	6.8	5.8
2020	68.5	1	6.2	5.5
Criteria	**50**	**-**	**-**	**25**

Table 17 Concentrations of $PM_{2.5}$ at Emu River station from Jan 2015 to Oct 2020

Year	$PM_{2.5}$ (µg/m³)			
	24-hour average (Maximum)	No. days above 25 µg/m³	24-hour average (70th percentile)	Annual average
2015	14.8	0	2.7	2.2
2016	206.4	3	2.5	3.1
2017	23.8	0	2.4	2.1
2018	18.6	0	2.3	2.1
2019	25.7	1	2.3	2.1
2020	62.0	4	2.4	2.7
Criteria	**25**	**-**	**-**	**8**

7.4.3 Summary of background particulate concentrations

Ambient levels of particulates used in the assessment are shown in Table 18. The ambient background concentrations selected to be representative of the project conditions highlight the low background levels in the vicinity of the project. The highest background concentration with relation to the criteria is annual average $PM_{2.5}$ which equates to 34% of the criteria. These ambient backgrounds are used to inform the human health impacts of additional dust.

Table 18 Ambient background concentrations

Pollutant	Averaging Period	Criteria (µg/m³)	Estimated ambient background concentration (µg/m³)	Source
PM_{10}	24-hour	50	9.5	EPA Tasmania Emu River, highest 70th percentile
	Annual	25	8.0	EPA Tasmania Emu River, highest Annual Average
$PM_{2.5}$	24-hour	25	2.7	EPA Tasmania Emu River, highest 70th percentile
	Annual	8	2.7	EPA Tasmania Emu River, highest Annual Average

7.5 Sensitive receptors

Tetra Tech Coffey has provided details of sensitive receptors within 1 km of the proposed Heybridge converter station and associated disturbance area at Heybridge for assessment purposes. Katestone has refined the list of sensitive receptors as per the specifics of the IAQM method, focussing on high sensitivity receptors within 500 m. As detailed in Table 19 and shown in Figure 14 there are 27 receptors centralised within the Heybridge township. The nearest property is approximately 157 m southeast of the nearest point of the project disturbance area.

No protected vegetation communities, flora or fauna species have been identified within 1 km of the proposed Heybridge disturbance area. Therefore, the potential for impacts upon ecological receptors is negligible.

Details of the identified receptors within 500m of the project indicate 26 receptors are located to the southeast of the project and one receptor is located to the northwest. The prevailing westerly winds determined from the Burnie NTC AWS analysis in 7.3.1, indicate the receptors to the southeast are downwind of the project for a greater proportion of time.

Table 19 Summary of residential receptors within 500 m of the project disturbance

Receptor ID	Easting (m)	Northing (m)	Distance from project (m)
B1536	414,516	5,452,163	329
B1537	414,538	5,452,184	339
B1539	414,476	5,452,183	284
B1540	414,425	5,452,053	332
B1542	414,424	5,451,903	462
B1543	414,407	5,451,905	453
B1544	414,377	5,452,033	325
B1545	414,370	5,451,912	431
B1546	414,356	5,451,918	420
B1547	414,338	5,451,917	416
B1549	414,299	5,451,933	390
B1550	414,284	5,452,173	158
B1551	414,282	5,451,932	387
B1552	414,319	5,451,926	401
B1553	414,389	5,451,907	443
B1554	414,301	5,451,843	478
B1555	414,264	5,451,866	450
B1556	414,645	5,452,220	429
B1557	414,149	5,452,114	191
B1558	414,619	5,452,177	416
B1559	414,574	5,452,168	378
B1560	413,407	5,452,630	436
B1561	414,296	5,451,864	457
B1562	414,339	5,451,858	472
B1563	414,379	5,451,867	476
B1564	414,401	5,451,860	491
B1565	414,417	5,451,863	495

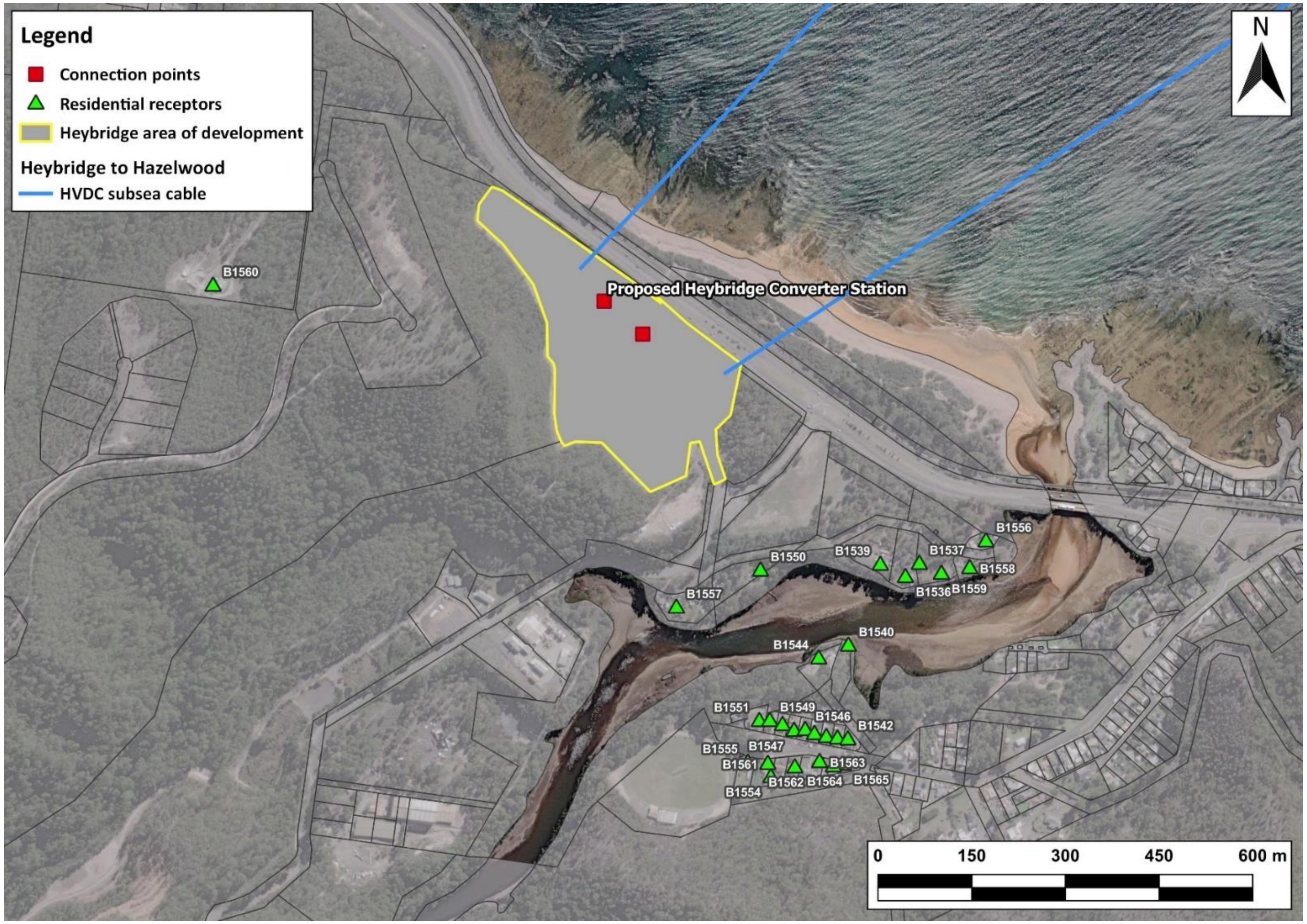

Figure 14 **Residential receptors within 500 m of the Heybridge area of development**

8. AIR QUALITY ASSESSMENT

8.1 Construction risk assessment

8.1.1 Step 1: Screening assessment

There are seven residential properties within 350 m of the proposed Heybridge converter station. Therefore, a detailed risk assessment is required for the proposed Heybridge converter station.

The receptors surrounding the proposed Heybridge development areas are presented in Figure 15.

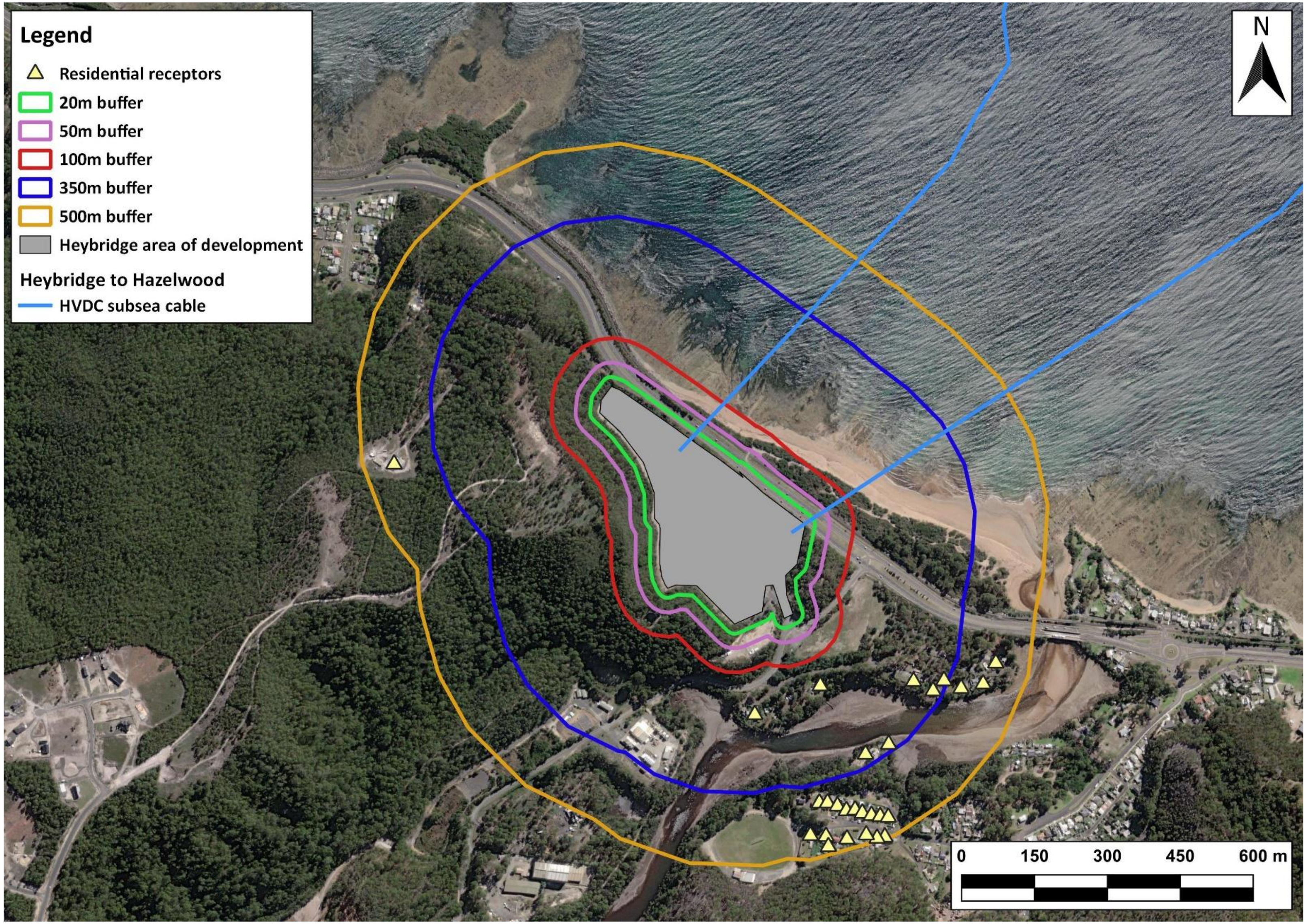

Figure 15 **Residential receptors near to the proposed Heybridge converter station construction**

8.1.2 Step 2: Risk of dust impacts

8.1.2.1 Proposed Heybridge converter station

8.1.2.1.1 Emission magnitude

The magnitude of emissions associated with earthworks, construction and trackout during the construction of the proposed Heybridge converter station is presented in Table 20. No demolition works are required.

Table 20 Magnitude of emissions by activity for the proposed Heybridge converter station

Magnitude of emissions	Key features of the project determining risk level
Earthworks	
Large	Total site area of approximately 57,930 m^2, with approximately 54,800 m^3 of aggregate moved for earthworks. Up to 13 heavy earth moving vehicles.
Construction	
Medium	Two converter station buildings with an approximate volume of 180,000 m^3 each and a portal frame switching station building with an approximate volume of 7,850 m^3. Buildings of standard sheet steel construction, with low potential for dust generation.
Trackout	
Medium	At most 13 heavy duty vehicles are expected per day. Access track around the switching station is approximately 200 m in length.

8.1.2.1.2 Sensitivity of the area

Table 21 presents the number of high sensitivity residential receptors within various distances of the Heybridge substation upgrade. Table 22 presents the sensitivity of the area based on the receptor counts, determined using the matrices in Table 7 and Table 8, taking the highest sensitivity rating based on any of the receptor counts. In this case, there are few receptors within any distance band of the works, thus the sensitivity of the area to dust deposition during earthworks, construction and trackout is low. For human health impacts, the sensitivity is low where the background annual mean PM_{10} concentration is below 15 µg/m^3 (a background concentration of 8.0 µg/m^3 has been used in this assessment – see Table 18) and there are fewer than 100 receptors within 20 m of the works. No ecological receptors have been identified within 500 m of the Heybridge converter station area of disturbance, the impacts to ecological receptors will be assessed within the Terrestrial ecology report (Entura, 2024).

Table 21 Proximity of receptors to the proposed Heybridge converter station

Proximity of receptors	Distance to the Heybridge converter station				
	<20 m	**<50 m**	**<100 m**	**<350 m**	**<500 m**
Number of receptors	0	0	0	7	27
Number of ecological receptors	0	0	0	0	0

Table 22 Sensitivity of the area surrounding the proposed Heybridge converter station

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Low	Low	Low
Human health impacts	Low	Low	Low

8.1.2.1.3 Risk of Impacts

Table 23 presents the preliminary risk due to construction of the proposed Heybridge converter station, which is 'low' for earthworks, construction and trackout principally due to the small number of receptors and the separation distance between the construction areas and surrounding residences.

Table 23 Preliminary risk due to construction of the proposed Heybridge converter station

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Low	Low	Low
Human health impacts	Low	Low	Low

8.1.3 Dust mitigation

The key potential emissions to air from the construction works will be in the form of dust or particulate matter. Particulate matter is sub-divided into a number of metrics based on particle size. Standard management practices proposed for the project have identified measures that will assist in managing contaminated soils.

Emissions controls have been determined from the risk assessment, which follows the UK's IAQM Methodology on the assessment of dust from demolition and construction (2014). The emission controls in the IAQM methodology are considered best practice and will meet the principles of the Air EPP (2004). These emission controls cover communication, complaint management, site management, waste management and operations (Refer to Appendix A, Table A1).

It will be the responsibility of the contractor to prepare the CDMP. The contractor should have regard to these dust mitigation measures when preparing the CDMP. It is the responsibility of the principal contractor to determine what is ultimately reasonable and feasible. The mitigation measures outlined should be adopted into the CDMP by the principal contractor to achieve the EPRs listed in Section 8.4.

8.1.4 Residual risk

The IAQM guidance is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. The mitigation measures set out in Table A1 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be 'not significant' and the overall residual risk as stated in Table 24.

The IAQM guidance does, however, recognise that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. During these events, short-term dust annoyance may occur, however, the scale of this will not normally be considered sufficient to change the conclusion that overall, the effects will be 'not significant'. The use of water and other mitigation measures may need to be increased during adverse weather conditions to minimise dust.

It is likely that dust emissions will be greater during the summer months, when temperatures are highest and there are fewer rainy days. The use of water and other mitigation measures during these months may need to be greater than during winter periods, particularly where construction activities are occurring near sensitive receptors.

Table 24 Overall residual risk for the Heybridge converter site

Potential impact	Earthworks	Construction	Trackout
Dust soiling effects	Negligible	Negligible	Negligible
Human health impacts	Negligible	Negligible	Negligible

8.2 Operations risk assessment

Assessment of the operational phase of the project identified three activities that could result in emissions to air.

- Occasional operation of two 1500 kVA backup diesel generators with above ground fuel storage of 5000 L.
- Routine inspections of the Heybridge converter station's equipment and infrastructure including scheduled minor and major outages for repairs and servicing, via light vehicles.
- Maintenance of access tracks using light vehicles.

The backup diesel generators will only operate in case of emergency and during routine testing and maintenance. With the nearest sensitive receptors being over 300 m away from the nearest generator, this occasional use of the generators and the associated emissions of combustion-related pollutants will not result in significant air quality impacts.

Routine inspections of the project alignment will occur quarterly, while planned outages will occur twice a year. The only relevant emissions to air from these activities will be from the small number of light vehicles accessing the converter station to carry out the maintenance works; tailpipe emissions and wheel generated dust from this small number of light vehicles will not result in significant air quality impacts.

Occasional maintenance of access tracks could generate some dust emissions, but these will be temporary in nature (hours or days) and will not result in significant dust impacts at nearby sensitive receptors.

Overall, it can be concluded that the operational phase of the project will not generate significant emissions to air and will not result in significant dust impacts at nearby sensitive receptors.

8.3 Decommissioning risk assessment

The operational lifespan of the project is a minimum 40 years. At this time the project will be either decommissioned or upgraded to extend its operational lifespan.

Decommissioning will be planned and carried out in accordance with regulatory and landowner or land manager requirements at the time. A decommissioning plan in accordance with approvals conditions will be prepared prior to planned end of service and decommissioning of the project.

Requirements at the time will determine the scope of decommissioning activities and impacts. The key objective of decommissioning is to leave a safe, stable and non-polluting environment, and minimise impacts during the removal of infrastructure.

In the event that the project is decommissioned, all above-ground infrastructure will be removed, and associated land returned to the previous land use or as agreed with the landowner or land manager.

Decommissioning activities required to meet the objective will include, as a minimum, removal of above ground buildings and structures. Remediation of any contamination and reinstatement and rehabilitation of the site will be undertaken to provide a self-supporting landform suitable for the end land use.

Decommissioning and demolition of project infrastructure will implement the waste management hierarchy principles being avoid, minimise, reuse, recycle and appropriately dispose. Waste management will accord with applicable legislation at the time.

Decommissioning activities may include recovery of land and subsea cables and removal of land cable joint pits. Recovery of land cables would involve opening the cable joint pits and pulling the land cables out of the conduits, spoiling them onto cable drums and transporting them to metal recyclers for recovery of component materials. The conduits and shore crossing ducts would be left in-situ as removal would cause significant environmental impact.

The concrete cable joint pits would be broken down to at least one metre below ground level and buried in-situ or excavated and removed. Subsea cables would be recovered by water jetting or removal of rock mattresses or armouring to free the cables from the seabed.

A decommissioning plan will be prepared to outline how activities will be undertaken and potential impacts managed.

8.4 Environmental performance requirements and mitigation measures

The following Environmental Performance Requirements (EPRs) and associated mitigation measures are proposed for the project to manage air quality risks and impacts (Table 25).

- AQ01: Develop and implement a construction dust management plan
- AQ02: Develop and implement measures to manage emissions to air during operations.

The singular site of construction for the Heybridge converter station, allows for effective implementation of mitigation measures when high dust generating activities like earthworks and access track construction occur. It is recommended that monitoring be focussed on the receptors to the east of the disturbance area, with at least three months of monitoring conducted prior to construction to establish baseline conditions.

A decommissioning plan will be prepared to outline how activities will be undertaken and potential impacts managed including due to dust and emissions addressing the items outlined in these air quality EPRs. The requirements for the decommissioning management plan are outlined in the EIS.

Table 25 Air Quality Mitigation Measures

MM ID	Mitigation Measures	Project Stage
EPR AQ01: Develop and implement a construction dust management plan **Mitigation measures**		Construction
MM AQ01	Prior to commencement of project works, develop a construction dust management plan that documents measures to avoid, minimise and mitigate dust emissions including: • Regular wetting down of exposed and disturbed areas including stockpiles, in dry and windy weather. • Adjust the intensity of construction activities based on observed dust levels and weather forecasts (MM AQ02). • Minimise the amount of materials stockpiled and position stockpiles away from proposal site boundary (where practicable). • Regularly inspect dust emissions (MM AQ02) and apply additional controls as necessary.	
MM AQ02	Conduct construction air quality monitoring in accordance with the requirements of the construction dust management plan (MM AQ01). This will include: • Daily monitoring of wind/weather forecasts and temperature and humidity using data from nearby automatic weather station and/or BOM. • Hourly monitoring of rainfall using data from nearby automatic weather station and/or BOM. • Daily monitoring of odour when odour generating works are being carried out, or when a complaint is made. • Daily visual surveillance to confirm effectiveness of dust control mitigation and that there are no visible dust emissions beyond the boundary of the proposal site. • Investigations as required in response to a complaint. This may require review of monitoring data, frequency, and effectiveness of mitigation.	
MM AQ03	Plant and equipment will be maintained in a proper and efficient manner. Visual inspections of emissions from plant will be carried out as part of pre-acceptance checks.	
MM AQ04	The following best-practice odour management measures will be implemented during relevant construction works: • The extent of opened and disturbed contaminated soil at any given time will be minimised. • Temporary coverings or odour supressing agents will be applied to excavated areas where appropriate. • Monitoring as outlined in AQ02.	
EPR AQ02: Develop and implement measures to manage emissions to air during operations **Mitigation measures**		
MM AQ03	As part of the OEMP, develop measures to avoid or minimise air quality impacts including: • Plant and equipment will be maintained in a proper and efficient manner. Visual inspections of emissions from plant will be carried out as part of pre-acceptance checks.	Operation

9. CONCLUSIONS

Katestone was commissioned by Tetra Tech Coffey to complete an AQA of the Tasmania component of the project.

Once operational, the operation and maintenance activities associated with the project will not generate significant emissions to air. Decommissioning air quality impacts will be assessed prior to decommissioning in accordance with the regulations at the time and in agreement with landowners or land managers and EPA Tasmania. Therefore, detailed assessment of impacts during operation and decommissioning has not been carried out.

The assessment has focused on the potential impacts of dust emissions during construction. A risk assessment approach has been used, based on the method detailed by the United Kingdom's IAQM.

The assessment has shown that, without mitigation, the preliminary risk (in terms of health effects and potential nuisance) of impacts at nearby sensitive receptors associated with the construction of the Heybridge converter station is low. Even with a low risk of impacts, best practice dust mitigation measures should still be applied during construction. With the implementation of standard mitigation measures the residual risk reduces to negligible.

Based on these findings it is concluded that project will have a low risk for human health and, therefore, a quantitative assessment using dispersion modelling is not required to verify NEPM compliance for PM_{10}, $PM_{2.5}$ and combustion gases.

The outcomes of the risk assessment have provided the basis for the application of the following EPRs for the project.

- EPR AQ01: Develop and implement a construction dust management plan
- EPR AQ02: Develop and implement measures to manage emissions to air during operations.

Key mitigation measures presented should be incorporated in order to ensure that construction activities comply with the EPRs.

10. REFERENCES

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APPENDIX A – TYPICAL SITE-SPECIFIC MITIGATION

Typical site-specific mitigation measures identified in the IAQM methodology are presented in Table A1.

Table A1 Recommended mitigation measures

Communications
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary or near active construction works. This may be the environment manager, engineer or site manager.
Display the head or regional office contact information.
Detail the mitigation measures to be applied, responsibilities for personnel on-site regarding dust management, and corrective procedures in the event of complaints or dust events.
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.
Make the complaints log available to the Local Authority when requested.
Record any exceptional incidents that cause dust or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
Monitoring
Undertake daily inspections to check for visible dust emissions and adjust controls if required to minimise dust emissions. Record results of inspection, corrective action, and residual emissions.
Carry out regular site inspections to monitor compliance with the CDMP.
Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Conduct dust deposition monitoring at selected sensitive receptors.
Preparing and maintaining the site
Plan site layout so that machinery and dust causing activities are located as far away from receptors as possible.
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.
Storing materials susceptible to dust (e.g., aggregate) in a way that minimises dust to mobilise e.g., covering or spraying stockpiles and use of enclosed storage facilities
Operating vehicles or machinery and sustainable travel
Ensure all on-road vehicles comply with relevant vehicle emission standards, where applicable.
Turn off vehicles, plant and equipment when not in use or 'throttle down' when used intermittently.
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
Impose and signpost a suitable maximum-speed-limit on unsurfaced haul roads and work areas.
Service vehicles, plant and equipment and operate in accordance with manufacturer's specifications to reduce emissions.
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) when proximate to sensitive receptors.
Ensure an adequate water supply on site for effective dust and particulate matter suppression and the

mitigation of its generation, using non-potable water where possible and appropriate.
Monitor severe weather, flood, damaging wind and storm warnings issued by Bureau of Meteorology and plan or defer activities, such as excavation works, to minimise risk of environmental harm, particularly dust, erosion, and sedimentation.
Waste management
No on-site burning of waste materials.
Measures specific to earthworks
Re-vegetate earthworks, including exposed areas and soil stockpiles to stabilise surfaces as soon as practicable.
Use hessian, mulches or tackifiers where it is not possible to re- vegetate or cover with topsoil, as soon as practicable.
Minimise the area where cover is removed or material disturbed, as much as practical.
Minimise the drop height when unloading material from haul trucks.
Measures specific to construction
Avoid scabbling (roughening of concrete surfaces) if possible.
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
Store bulk cement and other fine powder materials in enclosed silos or enclosed bunded areas to prevent windblown material and material washing offsite. Prevent overfilling during delivery to avoid spill.
Measures specific to trackout
Maintain access tracks to suitable standard
Where practical, ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. Record all inspections.
Apply water to unsealed access tracks, particularly during dry periods and where construction works are within 100 m of sensitive receptors