



Air Quality Management Plan

SMWSTCTP-AFJ-1NL-AH-PLN-000001 Revision 05

Sydney Metro West – Central Tunnelling Package



29 October 2023

[REDACTED]
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REF: 201208(B) AQMP REV5

Dear [REDACTED]

RE: Sydney Metro Central Tunnelling Package: Air Quality Management Plan (Rev 5)

I refer to Sydney Metro's (SM) submission of the following document required by Condition C1 of the Sydney Metro West Infrastructure Approval (SSI 10038). A previous version (Rev 1) of the document was endorsed by the Environmental Representative (ER) on 1 November 2021:

- Sydney Metro West, Central Tunnelling Package Air Quality Management Plan (SMWSTCTP-AFJ-1NL-AH-PLN-000001 Revision 05 dated 1 September 2023).

It is noted that:

- The Air Quality Management Plan (Rev 1) was prepared by Acciona Ferrovia Joint Venture (AFJV) to address the requirements of Condition C1 of the Infrastructure Approval, for Phase B1 or Civil Works as described in the Sydney Metro West Phasing Report. Revision (Rev 3) updated the document to also cover Phase B2: Tunnelling Works as described in the Phasing Report.
- . Version of the document (Rev 2) was has been reviewed and updated following comments from the ER.
- Sydney Metro has reviewed and commented on Revision 2 of the document.
- This version of the document (Rev 5) comprises minor amendments following an Annual Review by AFJV. Following the above reviews, the document is considered to contain information required by the Conditions of Approval (SSI 10038) in relation to the Air Quality Management Plan for Phase B2: Tunnelling Works.

Noting the above, as the approved Environmental Representative for the Metro West and as required by Conditions A30(d) and C1, the Air Quality Management Plan (Revision 5) is endorsed.

Yours sincerely

[REDACTED]

[REDACTED]

Environmental Representative – Sydney Metro West
CC: John Ieroklis, Matthew Marrinan, Ben Armstrong

DOCUMENT APPROVAL

	Prepared By	Reviewed By	Approved By
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Date:	1/9/23	11/9/23	11/9/23

REVISION HISTORY

Rev:	Date:	Pages:	By:	Description:
00	3/09/21	All	████	For submission to Sydney Metro
01	13/10/21	All	████	Response to comments
02	23/6/22	All	████	Revised to include Phase B2 for ER endorsement
03	25/7/22	All	████	Revised to address ER comments
04	7/3/23	Various	████	Updated to include EPL conditions and not include acoustic shed at Five Dock western construction site
05	1/09/23	7,15,26	████	Clarity on sustainability aspects

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GLOSSARY/ABBREVIATIONS

Abbreviations	Expanded text
AFJV	Acciona Ferrovia Joint Venture
AQMP	Air Quality Management Plan
AAQNEPM	National Environment Protection Measure for Ambient Air Quality Guidelines
BoM	Australian Government Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
DEC	Former Department of Environment and Conservation
DECC	Former NSW Department of Environment and Climate Change
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence under the POEO Act
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EWMS	Environmental Work Method Statements
GREP	NSW Government Resource Efficiency Policy
IAQM	UK Institute of Air Quality Management
LGA	Local government area
OEH	NSW Office of Environment and Heritage
OEM	Original equipment manufacturer
PIRMP	Pollution Incident Response Management Plan
PM	Particulate matter
PM ₁₀	Particulate matter (10 micrometres or less in diameter)
PM _{2.5}	Particulate matter (2.5 micrometres or less in diameter)
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
POEO Clean Air Regulation	<i>Protection of the Environment Operations (Clean Air) Regulation 2021</i>
REMMs	Revised Environmental Mitigation Measures
SWMP	Soil and Water Management Plan

1 INTRODUCTION

1.1 BACKGROUND

Sydney Metro is Australia's biggest public transport program. Services on the North West Metro Line between Rouse Hill and Chatswood started in May 2019. The Sydney Metro network also includes Sydney Metro City & Southwest, Sydney Metro West and Sydney Metro Western Sydney Airport.

Sydney Metro West is a new 24 kilometre metro line between Westmead and the Sydney CBD. This infrastructure investment will double the rail capacity of the Greater Parramatta to Sydney CBD corridor with a travel time target between the two centres of about 20 minutes.

The planning approvals and environmental impact assessment for Sydney Metro West has been split into a number of stages recognising the size of the project. This includes:

- Stage 1 – Concept and all major civil construction works including station excavation and tunnelling between Westmead and The Bays. Planning approval for this stage was granted in March 2021.
- Stage 2 – All major civil construction works including station excavation and tunnelling from The Bays to Sydney CBD
- Stage 3 – Tunnel fit-out, construction of stations, ancillary facilities and station precincts, and operation and maintenance of the Sydney Metro West line.

An Environmental Impact Statement (EIS) (Jacobs/Arcadis, 2020) for the Concept and Stage 1 (herein referred to as the Project) assessed the air quality impacts in response to the Secretary's Environmental Assessment Requirements issued by the Department of Planning, Industry and Environment (DPIE). The air quality impact assessment is included in Chapter 23 of the EIS. The Project was approved on 11 March 2021 (SSI 10038). An administrative modification (Modification 1) was approved on 28 July 2021, modification for Clyde stabling and maintenance facility (Modification 2) was approved 3 June 2022, administration modification (Modification 3) was approved 4 July 2022 and administration modification (Modification 4) was approved 22 December 2022.

1.2 SCOPE

The Air Quality Management Plan (AQMP) (Plan) forms part of the Construction Environmental Management Plan (CEMP). This Plan outlines how Acciona Ferrovial Joint Venture (AFJV) will comply with and implement the applicable environmental requirements for the Central Tunnelling Package (CTP) to manage air quality impacts during construction of the CTP civils construction phase B1 and tunnelling construction phase B2 (in accordance with the Sydney Metro Phasing Report).

This AQMP outlines how AFJV will comply with and implement the applicable elements from the following documents, collectively referred to herein as the 'Project requirements':

- NSW Minister for Planning and Public Spaces Conditions of Approval (CoA)
- Revised Environmental Mitigation Measures (REMMs)
- Sydney Metro Construction Environmental Management Framework (CEMF).

2 OBJECTIVES AND TARGETS

The key objective of this Plan is to ensure that impacts to air quality are minimised during construction of the CTP and that all works are undertaken in compliance with the Project requirements.

The air quality management objectives that will apply to the CTP are listed in Table 1.

TABLE 1 OBJECTIVES AND TARGETS

Objective	Target	Measurement Tool
Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable	1. Plant and equipment machinery employ effective exhaust emission controls.	Site environmental monitoring
Identify and control potential dust and air pollutant sources.	2. Dust and air pollutants not adversely impact surrounding sensitive receivers.	Site environmental monitoring
Ensure full compliance with the relevant legislative requirements, CoA and REMM	3. Compliance with all Project requirements with respect to air quality.	Compliance tracking reports

The project's air quality goals during construction are the first two targets depicted in Table 1.

The EIS identified specific construction performance outcomes for the Project; those relevant to the management of air quality are outlined in Table 2.

TABLE 2 AIR QUALITY PERFORMANCE OUTCOMES

Performance Outcome Requirement	Sydney Metro West Performance Outcomes	How stage 1 addressed performance outcomes
No specific air quality performance outcomes were identified by the EIS or Submissions report.	Air quality impacts are minimised during construction and operation.	Stage 1 includes a commitment to implementing best practice dust and odour management measures. Section 7 details all mitigation measures that will be implemented to achieve this performance outcome.

3 ENVIRONMENTAL REQUIREMENTS

3.1 RELEVANT LEGISLATION AND GUIDELINES

The relevant legislation to this Plan are:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Protection of the Environment Operations (Clean Air) Regulation 2021* (POEO Clean Air Regulation).

Additional guidelines and standards relating to the management of air quality include:

- Managing Urban Stormwater: Soils and Construction, Volume 1 (Landcom 2004) and Volume 2 (NSW Department of Environment and Climate Change (DECC) 2008) (the “Blue Book”)
- UK Institute of Air Quality Management, 2014, Guidance on the assessment of dust from demolition and construction, Version 1.1
- National Environment Protection Councils (NEPC) – National Environment Protection Measure (NEPM) for Ambient Air Quality Guidelines (AAQNEPM)
- AS 3580.1.1-2007 Methods of Sampling Analysis of Ambient Air. Part 1.1 Guide to Siting Air Monitoring Equipment
- AS 3580.10.1-2003 Methods of Sampling Analysis of Ambient Air. Determination of Particulate Matter – Deposited Matter - Gravimetric Method
- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW Environment Protection Authority (EPA) 2016) (EPA Approved Modelling and Assessment Methods)
- Air Quality Monitoring Criteria for Deposited Dust (NSW Department of Environment and Conservation (DEC) Guideline)
- NSW Government Resource Efficiency Policy (Office of Environment and Heritage (OEH) 2014) (GREP)
- EPA Approved Methods (DEC 2007).

3.1.1 INSTITUTE OF AIR QUALITY MANAGEMENT

Consistent with other recent large-scale Australian transport infrastructure projects, the potential for dust related impacts during construction was evaluated in the EIS using the risk-based assessment approach developed by the UK Institute of Air Quality Management (UK IAQM). The UK IAQM assessment approach is an evaluation of the risk of dust impacts during construction.

Section 23 of the EIS noted that the UK IAQM method results in a risk rating for each type of construction activity without mitigation. This risk rating is then used to determine what mitigation and management measures are required to effectively manage these risks.

The Projects impact classification and mitigation measures are largely determined by the IAQM Guideline. In addition, this AQMP has considered all relevant measures listed in the UK IAQM corresponding to the highest level of risk determined around each construction site.

3.2 PROJECT REQUIREMENTS

The Project requirements relevant to the development of this AQMP are listed in Table 3.

TABLE 3 COMPLIANCE TABLE - REQUIREMENTS FOR PREPARATION OF THIS PLAN

Project Planning Approval Conditions	
Condition of Approval	Where addressed

Project Planning Approval Conditions		
C1	Construction Environmental Management Plans (CEMPs) and CEMP Sub-Plans must be prepared in accordance with the Construction Environmental Management Framework (CEMF)	See below
Construction Environmental Management Framework		
13.2 (a)	Principal Contractors will develop and implement an Air Quality Management Plan which will include, as a minimum:	
	i. The air quality mitigation measures as detailed in the environmental approval documentation;	Section 6
	ii. The requirements of any approval and applicable licence conditions;	Section 6
	iii. Site Plans or maps indicating locations of sensitive receivers and key air quality / dust controls;	Environmental Control Maps (ECMs)
	iv. The responsibilities of key project personnel with respect to the implementation of the Plan;	Section 7.1
	v. Air quality and dust monitoring requirements;	Section 7.2
	vi. Compliance record generation and management.	Section 7.3

3.3 REVISED ENVIRONMENTAL MITIGATION MEASURES

Refer to **Appendix A** for all relevant REMMs.

3.4 LICENCES AND PERMITS

An Environmental Protection License (EPL) will apply for the Project; however no other licences or permits are required for the CTP for the management of air quality impacts.

4 EXISTING ENVIRONMENT

Known air quality constraints within and adjacent to the Project have been identified and documented in the following environmental assessment reports, which included detailed desk top studies and field investigations from the EIS Chapter 23 Air Quality.

The following chapters summarise the existing air quality environment and the likely CTP impacts as identified in the EIS.

4.1 CLIMATE AND METEOROLOGY

Meteorological conditions are important for determining the direction and rate at which air pollution would disperse. Dust generation is the main air quality risk during construction, and long-term climate data is useful for identifying periods throughout the year when conditions conducive to dust generation are most likely (such as warm and/or dry periods).

The EIS reviewed long-term records from the Bureau of Meteorology monitoring station at Parramatta North (the nearest weather station with long-term records) to understand meteorological conditions most common during peak day time construction periods.

The data indicates the Sydney metropolitan area experiences warm, wet summers, with average maximum temperatures of around 28 degrees Celsius. Months through winter are the coldest with average mean daily maximum temperatures of around 18 degrees Celsius. Months through winter were also measured to be the driest, with the lowest average monthly rainfall recorded in July (45 millimetres).

Conditions most likely to be associated with dust generation were measured in spring, with above average temperature conditions and average or below average rainfall.

4.2 AIR QUALITY LEVELS

As part of the EIS assessment, air quality data was sourced from NSW Government monitoring stations at Prospect, Parramatta North, Rozelle and Randwick. The data shows the existing concentrations of air pollutants were generally below the applicable air quality impact assessment criteria during the 2014 to 2018 reporting periods for sulfur dioxide, nitrogen dioxide and carbon monoxide. The exception is that on occasional days the 24-hour average concentration levels of:

- PM10 exceeded the 24-hour impact assessment criterion of 50 micrograms per cubic metre
- PM2.5 exceeded the 24-hour impact assessment criterion of 2.5 micrograms per cubic metre.

These occurrences are generally the result of natural events including dust storms, bushfires and sea spray arising from on-shore winds. Annually averaged PM10 concentrations generally complied with the 25 micrograms per cubic metre criterion, whereas annually averaged PM2.5 concentrations exceeded the eight micrograms per cubic metre criterion at the Prospect and Parramatta North monitoring stations.

During construction these NSW Government monitoring stations (especially Rozelle) remain a useful resource to check air quality in neighbouring suburbs.

4.3 LOCAL EMISSION SOURCES

Air quality in Sydney is influenced by a variety of different anthropogenic and natural sources. The Environment Protection Authority has investigated the relative contribution from different anthropogenic sources, including:

- Domestic activities (such as wood-fired home heaters and lawn mowing) are major contributors to the total emissions of PM10, PM2.5, carbon monoxide and volatile organic compounds
- Road traffic and off-road mobile equipment (such as construction Plant and boats) are major contributors to the total emissions of carbon monoxide and nitrogen dioxide, while making a

smaller but still significant contribution to total emissions of PM₁₀, PM_{2.5} and volatile organic compounds

- Industrial and commercial activities are major contributors to the total emissions of PM₁₀, while making a smaller but still significant contribution to total emissions of PM_{2.5}, nitrogen dioxide, and volatile organic compounds.

As described in the EIS, the Commonwealth Department of the Environment and Energy National Pollutant Inventory (for 2015) identified several air pollution sources close to Project which are likely to influence local air quality as follows:

- Petroleum and hydrocarbon distribution facilities at Rosehill/Camellia, Silverwater and Homebush West
- Waste treatment facilities at Camellia, Silverwater, Clyde and Homebush Bay
- Manufacturing of construction materials at Rosehill and Camellia
- Food and beverage manufacturing at Lidcombe, Northmead, Camellia, Ermington and Camperdown
- Other manufacturing or processing facilities at Rydalmere, Silverwater and Enfield
- Railway maintenance activities at Auburn.

4.4 SENSITIVE RECEIVERS

The CTP traverses a well-established urban environment that contains a wide range of sensitive receivers including residential properties, community facilities (such as schools, childcare centres, places of worship and medical facilities), recreational areas and commercial and retail premises. A number of these receivers are located immediately adjacent to CTP construction sites. Table 4 describes the details of the sensitive receivers located in the vicinity of each construction site. The specific locations of these sensitive receivers will be shown in the ECMs.

TABLE 4. SENSITIVE RECEIVERS

Construction site	Existing/surrounding environment	Activities that could result in impacts to Air Quality	Sensitive receivers (potential)
The Bays	The area immediately surrounding the Construction Site is mainly commercial/industrial, however, residential receivers are located on Roberts Street and Victoria Road.	<ul style="list-style-type: none"> ▪ Worksite establishment ▪ Earthworks ▪ Spoil handling, storage and transport ▪ Plant and vehicle movement and emissions ▪ Odour generated from exposed contaminated soils or materials 	<p>Residential receivers to the north at Mansfield Street, Rozelle (about 80 metres away), and to the west of Quirk Street, Hornsey Street and Lilyfield Road, Rozelle (over 150 metres away)</p> <p>Users of several parks (the closest on Robert Street about 100 metres to the north-east), as well as several educational facilities (more than 250 metres from the construction site), and places of worship, including C3 Church (immediately north of the construction site)</p> <p>Ecologically sensitive receivers associated with White Bay are located immediately adjacent to the construction site</p>
Five Dock	The area surrounding the construction site is a mixture of commercial, other sensitive and residential receivers, with the nearest receivers being close to the boundary of both the sites.	<ul style="list-style-type: none"> ▪ Worksite establishment ▪ Earthworks ▪ Spoil handling, storage and transport ▪ Plant and vehicle movement and emissions 	<p>Residential receivers surrounding the Five Dock construction sites, with commercial and retail receivers located along Great North Road.</p> <p>Numerous cafes and restaurants are located along Great North Road. These receivers can be especially susceptible to dust and air quality impacts.</p> <p>Medical facilities are located within the town centre immediately adjacent to both construction sites, as well as in the surrounding residential areas.</p> <p>St Albans Anglican Church and GGC Life Church are located immediately to the north of the western construction site, as well as the Five Dock-Drummoyne Uniting Church off Garfield Street about 100 metres to the south-west.</p> <p>Five Dock Public School, about 120 metres to the west of the western construction site off West Street.</p>

Construction site	Existing/surrounding environment	Activities that could result in impacts to Air Quality	Sensitive receivers (potential)
			<p>Five Dock Park located about 250 metres to the east of the eastern construction site.</p> <p>Sunshine Early Learning Centre located directly opposite the western site around 20 metres away from the boundary.</p>
Burwood	<p>The area surrounding the construction site is mostly residential and the nearest receivers are near the northern boundary of the northern construction site and the southern boundary of the southern Construction Site. Commercial receivers are also adjacent to the site, along Parramatta Road, and are of general retail use.</p>	<ul style="list-style-type: none"> ▪ Worksite establishment ▪ Earthworks ▪ Spoil handling, storage and transport ▪ Plant and vehicle movement and emissions 	<p>Residential receivers are located immediately to the north and west of the construction sites along Burton Street.</p> <p>Commercial, and retail receivers are located along Parramatta Road to the south.</p> <p>Concord Oval is located about 100 metres to the east of the construction site.</p> <p>Schools including MLC Junior School (about 250 metres south-west of the construction site), St Marys Catholic Primary School (about 250 metres west of the construction site).</p> <p>St Luke's Anglican Church is located opposite the northern construction site on Burton Street, and St Marys Catholic Parish Church is located about 300 metres to the west.</p> <p>A number of medical facilities are located along Burwood Road to the south, and Concord Private Hospital on Burwood Road about 300 metres to the north of the construction site.</p>
North Strathfield	<p>The area surrounding the Construction Site is generally suburban with a mixture of residential, commercial and educational receivers. The nearest receivers are opposite the site, across Queen Street. The</p>	<ul style="list-style-type: none"> ▪ Worksite establishment ▪ Earthworks ▪ Spoil handling, storage and transport ▪ Plant and vehicle movement and emissions 	<p>Commercial and retail receivers are located along Queen Street immediately to the east of the southern portion of the construction site.</p> <p>Residential receivers are located along Queen Street immediately east of the northern portion of the construction site.</p>

Construction site	Existing/surrounding environment	Activities that could result in impacts to Air Quality	Sensitive receivers (potential)
	commercial receivers adjacent to the Site are typically of retail use.		The McDonald College and Our Lady of the Assumption Catholic Primary School are both located about 80 metres to the west of the construction site and are separated by the T9 Train Line.
Sydney Olympic Park	The area surrounding the Sydney Olympic Park construction site is generally a mix of commercial, sport and entertainment receivers.	<ul style="list-style-type: none"> ▪ Worksite establishment ▪ Earthworks ▪ Spoil handling, storage and transport ▪ Plant and vehicle movement and emissions ▪ Odour generated from exposed contaminated soils or materials 	<p>Commercial receivers are located adjacent to the Sydney Olympic Park Construction site.</p> <p>The Pullman Hotel is located about 60 metres to the west of the site on the corner of Olympic Boulevard and Herb Elliot Avenue, along with two other hotels within 100 metres of the site.</p> <p>Residential receivers in medium and high-density residential dwellings are located about 200 metres to the east.</p> <p>Educational buildings including the Kirana College and the New South Wales Institute of Sport are located less than 50 metres to the south.</p> <p>Attendees at several open-air sporting venues that may be sensitive to dust impacts</p>

5 ENVIRONMENTAL ASPECTS AND IMPACTS

5.1 CONSTRUCTION ACTIVITIES

The air quality in the Project area is typical of an urban area within the Sydney metropolitan region. Land uses in the area are predominantly residential, business and retail centres, schools, parks playing fields and arterial roads.

Meteorological conditions are important for determining the direction and rate at which air pollution would disperse, and dust generation is the main air quality risk during construction. Wind speed and wind direction influence pollutant concentration and thus the air quality impacts from the construction of the Project. For example, grounded sources that do not travel up or down in the air, such as road traffic, tend to have the highest concentrations under low wind speed conditions. However, wind-blown dust will increase PM concentrations in the air with increasing wind speed.

Although wind direction varies slightly from year-to-year, due to the urban environment that surrounds the Project (i.e. temporary ancillary construction facilities will be fenced and much of the works will be underground); wind direction will not be a factor that greatly influences air quality management. Temporary localised stockpiles will be present next to the exhaust shaft opening, air supply shaft and within the cut and cover civil area.

Dust generation and gas emissions are the two primary emission pathways that could result in air quality impacts during construction.

5.1.1 DUST

Dust generation is the main air quality environmental risk during construction at construction sites. The construction activities that could result in dust emissions are identified in Table 5.

The volume of dust potentially generated during a typical workday would vary depending on the types of activities occurring at each construction site, the prevailing weather conditions (for example, dry windy conditions increase the potential for wind erosion) and the controls that are implemented to reduce these emissions.

5.1.2 GAS EMISSIONS

During construction there also will be construction related vehicles and machinery. Exhaust emitted from construction vehicles and machinery may reduce the air quality in the localised area but would be transient and temporary in nature. Given the high existing levels of vehicle use in urban areas surrounding the construction sites the exhaust emissions generated during construction would be temporary and would not significantly contribute to emissions in the local area.

Demolition of buildings and structures within the construction footprint can give rise to temporary wind-blown dust occurrences and also has potential to give rise to odours from any residual material contaminated with hydrocarbons. Handling of soils to minimise dust and odours would be undertaken as part of a remedial action Plan for the site (if required) in accordance with the construction Soil and Water Management Sub Plan would be temporary and not give rise to any long-term impacts.

5.2 ASPECTS AND POTENTIAL IMPACTS

Aspects and the potential for impacts have been considered in a risk assessment in Appendix C of the CEMP. The potential for impacts on air quality will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction may occur during work establishment, earthworks, spoil handling, storage and transport and due to plant and vehicle movement and emissions.

For those activities with residual environmental risks identified as 'high', the justification for accepting the residual risk was discussed with all attendees. For all activities in this category, work will be

temporary in nature and an Environmental Work Method Statement (EWMS) will be developed for that activity where other risk assessment strategies are not already in place. No activities were identified as having a high risk for impacts to air quality.

Over the course of the project alignment, the 11 kilometres from The Bays to Sydney Olympic Park, the majority of the project construction works will be underground. Air quality aspects will be contained in underground chambers. Any air exhausts from the tunnel construction goes through 'dust scrubbers' which is equipment designed to control emissions to the environment and provide safe working conditions.

The environmental aspects and potential impacts of CTP construction are summarised in Table 5.

TABLE 5 ASPECTS AND IMPACTS TABLE RELEVANT TO AIR QUALITY

Aspects	Potential Impacts
Worksite establishment	<p>The potential impacts related to overall management of air quality during worksite establishment include:</p> <ul style="list-style-type: none"> ▪ Dust generation due to: <ul style="list-style-type: none"> ○ Vegetation clearance, clearing and grubbing ○ Stockpiling of topsoil and mulched vegetation ○ Demolition of buildings and associated infrastructure (asbestos is not addressed in this Plan; refer to Occupational Hygiene Management Plan) ○ Wind erosion of exposed surfaces and stockpiles ○ Wheel-generated dust from vehicular traffic on unsealed roads and works site access points. ▪ Particulate matter (PM_{2.5}/PM₁₀) generation due to: <ul style="list-style-type: none"> ○ Operation of construction vehicles, plant and equipment ○ Dust generation activities set out above.
Excavation and earthworks	<p>The potential impacts related to overall management of air quality during earthworks include:</p> <ul style="list-style-type: none"> ▪ Dust generation due to: <ul style="list-style-type: none"> ○ Drilling ○ Operation of excavators, front end loaders, bulldozers, dump trucks and other plant on exposed surfaces ○ Tunnelling ○ Loading/unloading trucks with spoil and aggregate (including dust generation from within the acoustic sheds) ○ Wind erosion of exposed surfaces and stockpiles ○ Wheel-generated dust from vehicular traffic on unsealed roads and work site access points. ▪ Particulate matter (PM_{2.5}/PM₁₀) generation due to: <ul style="list-style-type: none"> ○ Operation of construction vehicles and plant ○ Dust generation activities set out above.

Aspects	Potential Impacts
Spoil handling, storage and transport	<p>The potential impacts related to overall management of air quality during spoil handling, storage and transport include:</p> <ul style="list-style-type: none"> ▪ Dust generation due to: <ul style="list-style-type: none"> ○ Spoil stockpiles ○ Spoil haulage (uncovered loads) ○ Wheel-generated dust from heavy vehicle movements around construction sites and along haulage routes ▪ Particulate matter (PM_{2.5}/PM₁₀) generation due to: <ul style="list-style-type: none"> ○ Operation of construction vehicles and plant ○ Dust generating activities set out above. <p>The potential for dust related impacts due to spoil handling at tunnel/station box sites is reduced as the majority of spoil handling will occur within acoustic sheds.</p>
Plant and vehicle movement and emissions	<p>The potential impacts related to overall management of air quality related to plant and vehicle movement and emissions include:</p> <ul style="list-style-type: none"> ▪ Dust generation (wheel generated) from: <ul style="list-style-type: none"> ○ Construction vehicles ○ Construction equipment, generators and other plant. ▪ Particulate matter (PM_{2.5}/PM₁₀) generation due to: <ul style="list-style-type: none"> ○ Operation of construction vehicles and plant, including idling vehicles and poorly maintained equipment ○ Dust generating activities set out above. <p>All vehicles used on site, for transporting materials to or from site, or for any other activities associated with the Project, would be maintained to avoid the emission of excessive air impurities in accordance with Part 5.8 of the <i>Protection of the Environment Operations Act 1997</i> and the Protection of the Environment Operations (Clean Air) Regulation 2021.</p>
Odour generated from exposed contaminated soils or materials	<p>The potential impacts related to overall management of air quality related to odour include:</p> <ul style="list-style-type: none"> ▪ Odour generation from: <ul style="list-style-type: none"> ○ Exposed contaminated material generally associated with hydrocarbons ○ Emissions from stationary plant or equipment
Air emissions from Acoustic Sheds	<p>The potential impacts related to dust and particulate matter emissions from Acoustic sheds include:</p> <ul style="list-style-type: none"> ▪ Dust generation due to: <ul style="list-style-type: none"> ○ Spoil stockpiles ○ Spoil haulage (uncovered loads) ○ Wheel-generated dust from heavy vehicle movements around construction sites and along haulage routes

Aspects	Potential Impacts
	<ul style="list-style-type: none"> ○ Operation of excavators, front end loaders, bulldozers, dump trucks and other plant on exposed surfaces ○ Loading/unloading trucks with spoil and aggregate ▪ Particulate matter (PM_{2.5}/PM₁₀) generation due to: <ul style="list-style-type: none"> ○ Operation of construction vehicles and plant ○ Dust generating activities set out above. <p>All appropriate air quality management measures would be implemented within Acoustic sheds to minimise generation of dust and particulate matter within sheds including haul road sweeping, dust suppression measures such as water carts and misters and the closure of roller doors where appropriate, to reduce the risk of this air pollution escaping the shed.</p>

Section 6 of this Plan provides mitigation and management measures that will be implemented to avoid or minimise air quality impacts during the delivery of the CTP.

6 ENVIRONMENTAL CONTROLS

6.1 MITIGATION AND MANAGEMENT MEASURES

Construction associated with the CTP has the potential to impact air quality within and adjacent to the construction footprint. In order to avoid, mitigate and/or minimise these potential impacts, a range of environmental requirements and control measures are identified in the various CSSI environmental assessment documents (including the EIS) and other guidance documents. Specific measures and requirements to address impacts on Air Quality are outlined in Table 6. With the implementation of these mitigation and management measures, it is expected there will be no recurring or major exceedances of air emission or air quality goals.

TABLE 6. AIR QUALITY MITIGATION MEASURES

Reference	Measure	When	Responsibility	Source
AQMM1	Wet-down exposed and disturbed areas including stockpiles, demolition work areas and cleared areas as required to minimise dust generation.	Construction	Site Supervisor	REMM AQ1
AQMM2	Implement appropriate methods to reduce potential dust generation (including movement of dust through openings of acoustic/spoil sheds) where reasonable and feasible through use of water, bonding or covering stockpiles and segregation of clean and dirty areas.	Construction	Site Supervisor Design Manager Construction Manager Environmental Manager	REMM AQ1
AQMM3	Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation.	Construction	Site Supervisor Environmental Manager	REMM AQ1
AQMM4	Expected unfavourable weather conditions will be communicated via daily pre-start and will be monitored, and communicated where necessary, throughout the day.	Construction	Site Supervisor Environmental Manager	REMM AQ1
AQMM5	Storage of materials that have the potential to result in dust generation will be: <ul style="list-style-type: none"> Minimised through construction planning and procurement / delivery timing Positioned away from sensitive receivers wherever possible Covered / bonded where reasonable and feasible. 	Construction	Project Engineers	REMM AQ1

Reference	Measure	When	Responsibility	Source
AQMM6	Undertaken formal and informal inspections of site to identify dust or odour emissions and apply additional controls as required.	Construction	Environmental Manager Construction Manager Site Supervisor	REMM AQ1
AQMM7	Record all dust complaints, identify causes, and take appropriate actions in accordance with hierarchy of controls (Eliminate, Substitute, Isolate (barrier), Engineer, Administration).	Construction	Environmental Manager Community and Stakeholder Engagement Manager	IAQM Overarching Community Communication Strategy Complaints Management Process
AQMM8	Include consideration of potential dust generation resulting in cumulative impact in coordination meetings with other CSSI, SSI and SSD sites.	Construction	Environmental Manager Project Managers Community and Stakeholder Engagement Manager	IAQM
AQMM9	Demolition activities will be planned and carried out with adequate dust suppression to minimise the potential for dust generation, e.g.: <ul style="list-style-type: none"> ▪ Considering weather conditions before works, ▪ Removing or wetting unconsolidated material with dust generating capacity before mechanical demolition ▪ Utilise misting sprays. 	Construction	Project Engineer	IAQM

Reference	Measure	When	Responsibility	Source
AQMM10	<p>Access roads within construction sites (including entry and exit points) will be maintained and managed to reduce dust generation. At the commencement of establishment of Project ancillary facilities, controls such as wheel washing systems and rumble grids will be installed at all site exits to minimise deposition of loose material on sealed surfaces outside Project construction sites.</p> <p>Road surfaces subject to any tracking of material by vehicles leaving the premises will be cleaned as required.</p>	Construction	Site Supervisor	IAQM EPL
AQMM11	Do not wash any unconsolidated material into external drains. Water used for dust suppression will be collected to prevent any uncontrolled discharge offsite which may result in environmental harm.	Construction	Site Supervisor	IAQM
AQMM12	Dust suppression and/or collection techniques will be used during cutting, grinding or sawing activities likely to generate dust in close proximity to sensitive receivers (e.g. vacuum extraction or water suppression or other engineered controls).	Construction	Site Supervisor	Best Practice
AQMM13	Loaded spoil haulage trucks and other Project-related heavy vehicles that enter and leave the construction site and are carrying materials with the potential to result in dust generation (including dry bulk material) should be covered at all times, except during unloading and loading, to prevent dust emissions during transport in accordance with relevant road regulations.	Construction	Site Supervisor Truck drivers	Best Practice
AQMM14	Acoustic/spoil sheds are to be constructed at The Bays, Five Dock eastern construction site and Burwood North. Opening of doors would be minimised to only that	Construction	Construction Manager Environmental Manager	Project Design Best Practice

Reference	Measure	When	Responsibility	Source
	required for access/egress to minimise potential dust impacts.			
AQMM15	Spoil conveyors will be designed as closed structures.	Design	Design Manager	Best Practice
AQMM16	Dust generation from tunnelling activities will be minimised through the implementation of a dust extraction and filtration system.	Construction	Construction Manager	Best Practice
AQMM17	Tunnel works are to have a dedicated dust collection and ventilation system.	Construction	Environment Manager Construction Manager	Best Practice
Odour				
AQMM18	In the event of uncovering material (liquid, solid or gas) with a noxious odour, or detection of nuisance odours, construction personnel will report the odour source to the Environment Manager for further investigation and implementation of any necessary management measures.	Construction	Site Supervisors Project Engineer Environmental Manager	Best Practice
AQMM19	The extent of opened and disturbed contaminated soil at any given time would be minimised.	Construction	Construction Manager	REMM AQ3
AQMM20	Temporary coverings or odour suppressing agents would be applied to excavated areas where appropriate.	Construction	Construction Manager	REMM AQ3
AQMM21	Opportunity to minimise haulage and delivery distances will be investigated and implemented where possible throughout construction.	Construction	Environmental Manager	Best Practice
Operating vehicles, Plant and machinery				
AQMM22	Plant and equipment would be maintained in accordance with original equipment manufacturer (OEM) requirements. Plant inspections will be undertaken as	Construction	Site Supervisor Plant Operators	REMM AQ2

Reference	Measure	When	Responsibility	Source
	part of pre-acceptance checks prior to being accepted for use.			
AQMM23	Relevant plant and equipment will be operated, inspected and maintained to maximise efficiency and comply with relevant emission standards. Engine idling will be minimised when Plant is stationary, and Plant will be switched off when not in use to reduce emissions.	Construction	Site Supervisor Plant Operators Environmental Manager	REMM AQ2
AQMM24	Opportunity for the use of mains electricity will be favoured over diesel or petrol- powered generators where practicable to reduce site emissions.	Construction	Project Engineers Commercial / Procurement team	REMM AQ2 Sustainability Management Plan

6.2 AIR QUALITY MANAGEMENT

Environmental Control Maps (ECMs) are prepared for each construction site and show the location of nearest sensitive land uses to each Project construction site. Erosion and Sediment Control Plans (ESCPs) will describe in detail the key air dust controls measures for dust generated as a result of wind-borne erosion, specific to each area.

Further details on ECMs and ESCPs can be found in the CEMP.

7 COMPLIANCE MANAGEMENT

7.1 PEOPLE, RESPONSIBILITIES AND COMMUNICATION

Refer to CEMP for full details on people, responsibilities and communication. No additional or specific people or resources are required to achieve the objectives and performance outcomes for air quality management. The Environment Manager, Construction Manager and Project Managers are accountable for the implementation of this management plan. The Sustainability Manager is responsible for all greenhouse gas related accounting and reporting in accordance with the Sustainability Management Plan.

Refer to CEMP for full details on the delivery of air quality management including:

- Environmental induction – for CTP specific air quality management
- Toolbox talks and awareness – for site specific air quality management actions and tasks
- Pre-starts – expected unfavourable weather conditions will be communicated via daily pre-start and will be monitored, and communicated where necessary, throughout the day.

7.2 MONITORING, INSPECTIONS AND AUDITS

Review and confirmation of the implementation of air quality management measures described in this document will be undertaken as part of the auditing and inspection regimes described in the CEMP.

Surface air quality monitoring will be undertaken in the form of visual and olfactory inspections supported by daily weather monitoring (using meteorological data) on a multi-fold basis:

1. weekly by Environment Advisors (or delegate), using set checklists
2. informally on a daily basis by the Site Supervisors
3. in response to complaints.

Aspects that will be considered during monitoring include:

- Controls appropriate to activities and meteorological conditions
- Inspect the work zones for potential dust emissions
- Inspect plant and construction vehicles exhaust emissions for potential excessive (smoky) emissions
- Inspect inside and outside working areas for odour
- Inspect internal haul routes and access gates areas for soil tracking and potential dust emissions.

Inspection outcomes will be recorded and actioned as described in Section 3.9.3 of the CEMP. The Environment Advisor will also keep records of any management measures implemented as a result of adverse, windy weather conditions.

In addition to the above monitoring, plant inspections will be undertaken on all plant and machinery prior to being accepted on site, to ensure the machinery is in appropriate condition and not generating excessive emissions. Further, plant prestart inspections will be undertaken daily to ensure the equipment is operating in accordance with OEM requirements.

Refer to the CEMP for more information on monitoring, inspections and audits.

7.3 REPORTING AND RECORDS

Refer to the CEMP for full details on reporting and record keeping requirements and processes.

In addition to any records listed in the CEMP, the following compliance records will be kept by AFJV:

- Records of weekly site inspections

- Records of site diaries
- Records of ER or Sydney Metro site inspection reports
- Records of daily pre-start plant inspections
- Records of any meteorological condition monitoring
- Records of any management measures implemented as a result of adverse, windy weather conditions
- Records of weekly environmental inspections including air quality and dust.

8 REVIEW AND IMPROVEMENT

8.1 CONTINUOUS IMPROVEMENT

The Air Quality Management Plan forms part of the CEMP. Refer to the CEMP for the process on continuous improvement and Plan update and amendment.

APPENDIX A OTHER CONDITIONS OF APPROVAL, REMMS AND CEMF REQUIREMENTS RELEVANT TO THIS PLAN

Minister's Conditions of Approval (11 March 2021) (SSI 10038)		
D1	All reasonably practicable measures must be implemented to minimise the emission of dust and other air pollutants during construction.	Section 6
Construction Environmental Management Framework		
13.2 (b)	Air quality and dust monitoring will involve the following as a minimum:	
	<ul style="list-style-type: none"> ▪ Meteorological conditions will be monitored and appropriate responses will be organised and undertaken periodically by the Principal Contractor; 	Section 7.2
	<ul style="list-style-type: none"> ▪ Regular visual monitoring of dust generation from work zones; and 	Section 7.2
	<ul style="list-style-type: none"> ▪ Monitoring emissions from plant and construction vehicles to ensure they have appropriate emission controls and are being maintained correctly. 	Section 7.2
13.2 (c)	The following compliance records will be kept by the Principal Contractor:	
	<ul style="list-style-type: none"> ▪ Records of any meteorological condition monitoring; 	Section 7.3
	<ul style="list-style-type: none"> ▪ Records of any management measures implemented as a result of adverse, windy weather conditions; and 	Section 7.3
	<ul style="list-style-type: none"> ▪ Records of air quality and dust inspections undertaken. 	Section 7.3
Revised Environmental Mitigation Measures		
AQ1	The following best-practice dust management measures would be implemented during all construction works: <ul style="list-style-type: none"> ▪ Regularly wet-down exposed and disturbed areas including stockpiles, especially during dry weather ▪ Adjust the intensity of activities based on measured and observed dust levels and weather forecasts ▪ Minimise the amount of materials stockpiled and position stockpiles away from surrounding receivers ▪ Regularly inspect dust emissions and apply additional controls as required ▪ Consider all relevant measures listed in the UK IAQM corresponding to the highest level of risk determined around each Stage 1 construction site. 	Section 6
AQ2	Plant and equipment would be maintained in a proper and efficient manner. Visual inspections of emissions from plant would be carried out as part of pre-acceptance checks.	Section 6
AQ3	The following best-practice odour management measures would be implemented during relevant construction works: <ul style="list-style-type: none"> ▪ The extent of opened and disturbed contaminated soil at any given time would be minimised 	Section 6

	<ul style="list-style-type: none"> Temporary coverings or odour suppressing agents would be applied to excavated areas where appropriate Regular monitoring would be conducted during excavation to verify that no offensive odours are detected beyond the site boundary. 	
WR2	A hazardous material survey would be completed for those buildings and structures suspected of containing hazardous or special waste materials (particularly asbestos) prior to their demolition. If hazardous waste or special waste (e.g. asbestos) is encountered, it would be handled and managed in accordance with relevant legislation, codes of practice and Australian standards.	Waste Management Plan
S7	In addition to mitigation measure S1, ongoing engagement would be undertaken with NSW Department of Education to continue to investigate feasible and reasonable mitigation measures related to construction traffic, pedestrian safety, construction noise and vibration, and air quality.	Overarching Community Communication Strategy
Environmental Protection Licence (EPL 21610)		
O3.1	All activities occurring at the premises must be carried out in a manner that will minimise the generation and prevents the emission of air pollution from the premises, as much as is reasonably practicable	Section 6
O3.2	The premises must be maintained in a condition which minimises the generation and prevents the emission of air pollution from the premises, as much as is reasonably practicable.	Section 6
O3.3	The licensee must implement all reasonable and feasible measures to demonstrate compliance with condition O3.1 and O3.2.	Section 6
O3.4	Trucks entering and leaving the premises that are carrying loads of material with the potential to generate dust must be covered at all times, except during loading and unloading.	Section 6
O4.8	<p>The licensee must ensure:</p> <ul style="list-style-type: none"> a) all vehicular access points to the premises are designed, constructed, maintained and stabilised to minimise vehicles tracking materials onto public roads and roads outside the premises as much as is reasonable and feasible; b) vehicle, motorised plant and equipment movements onto or off the premises minimise the deposition of any material onto the surface of roads outside of the premises; c) mud, splatter, dust and other material likely to fall from or be cast off the wheels, underside or body of any vehicle, trailer, motorised plant and equipment leaving the premises, is removed to the greatest extent practicable before it leaves the premises; and d) road surfaces subject to any tracking of material by vehicles leaving the premises must be cleaned as required to ensure compliance with a) and b) of this condition and condition L1.1 of this licence. 	Section 6