

AQUALAND PROJECTS PTY LTD



Air Quality Management Sub-Plan

Central Barangaroo, Hickson Road, Millers Point NSW

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1. Introduction

1.1 Background

EI Australia (EI) was engaged by Aqualand Projects Pty Ltd ('the client') to prepare an Air Quality Management Sub-Plan (AQMP) for Central Barangaroo, Hickson Road, Millers Point NSW ('the site').

The site is located within the local government area of City of Sydney Council (**Figure 1, Appendix A**). It comprises one cadastral allotment, identified as Lot 52 in Deposited Plan (DP) 1213772, covering an area of approximately 5.2 hectares (ha) (**Figure 2, Appendix A**). The site currently features a large concrete hardstand area/construction site that is occupied by temporary structures for site preparation works, machinery, materials and vehicle parking for site workers. Hoarding is currently erected around the site.

This plan is prepared in response to Conditions C24, C25 and C26 of the Development Consent issued by the Independent Planning Commission (Ref. SSD-39587022, dated 29 January 2025), which states:

AIR QUALITY MANAGEMENT SUB-PLAN

C24. Prior to the commencement of any earthwork or construction, the Applicant must submit to the satisfaction of the Certifier an Air Quality Management Sub-Plan (AQMP) for the development. The Sub-Plan must include, as a minimum, the following elements:

- (a) be prepared by a suitably qualified and experienced expert in accordance with the EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (the Approved Methods);*
- (b) relevant environmental criteria to be used in the day-to-day management of dust and volatile organic compounds (VOC/odour);*
- (c) mission statement;*
- (d) dust and VOCs/odour management strategies consisting of:*
 - (i) objectives and targets;*
 - (ii) risk assessment;*
 - (iii) suppression improvement plan;*
 - (iv) monitoring requirements including assigning responsibility (for all employees and contractors);*
 - (v) communication strategy; and*
 - (vi) system and performance review for continuous improvements.*

C25. The AQMP must detail management practices to be implemented for all dust and VOC/odour sources at the site. The AQMP must also detail the dust, odour, VOC and semi-volatile organic compounds (SVOC) monitoring program (eg. frequency, duration and method of monitoring) to be undertaken for the project.

C26. The Applicant must also develop and implement an appropriate comprehensive Reactive Air Quality and Odour Management Plan which will incorporate an Ambient Air Monitoring Program and Reactive Management Strategy to ensure that the assessment criteria are met during the works.

An air quality impact assessment (AQIA) was conducted by RSK Environment Limited (RSK) for a broader Central Barangaroo area, which is documented under the following report:

- RSK (2025) *Air Quality Impact Assessment*, Report 444953/AQ/04 (00), dated 6 March 2025.

The AQIA was prepared for the proposed Central Barangaroo early works DA-2, including bulk excavation, perimeter retention wall & site establishment Works, piling and hydrostatic slab etc. Potential air quality impacts associated with the construction of the proposed basement and buildings were not included in this AQIA.

With regards to Condition C24(a), the Approved Methods relate specifically to the assessment and modelling of air pollutants, and does not extend to the management or mitigation of these impacts, which is the purpose of this sub-plan. No modelling or assessment of pollutants was undertaken by EI, and any proposed mitigation measures are reliant on the conclusions and recommendations made by RSK (2025). Further discussion regarding the assessment is provided in **Section 4**.

1.2 Proposed Development

To date, two Early Works SSDAs have been determined as follows:

- SSD 39587022 Central Barangaroo Early Works – Hickson Road Interface (29 January 2025); and
- SSD 46922214 Central Barangaroo Early Works – Phase 2 (23 December 2025).

The approved SSDAs are proposed for the early works associated with the future mixed use development of Central Barangaroo (set out under MP06_0162). Specifically, the objective of the proposal is to undertake bulk excavation and site establishment works for the installation of the perimeter retention wall, and conduct remediation and archaeological investigations within the site. These works will enable the provision for a future basement, consistent with the parameters of the Concept Plan for Barangaroo under MP06_0162, and include:

- Establish the site and installation of temporary plant and machinery, including dewatering and bentonite slurry plant and ancillary services;
- Construction of perimeter retention wall, including any required excavation, associated rock anchors and PRW capping beam construction;
- Associated remediation and archaeological investigations in the area of excavation and works;
- Provision for future services;
- Associated “tie-in” works to Metro Interface Wall and the secant pile wall proposed by the applicant under SSD-39587022;
- De-stressing and removal of existing anchors supporting Sydney Metro pile wall;
- Bulk excavation for the provision of a future basement and associated rock anchors (including anchors to support the secant pile wall approved in SSD 39587022);
- Construction of foundation piling;
- Installation of waterproofing membrane;
- Construction of hydrostatic slab; and
- Structure and waterproofing for the Barangaroo Metro station southern entrance interface next to the existing Sydney Metro pile wall.

1.3 Purpose and Implementation

The purpose of this AQMP was to provide a general guide for the management of emissions that may result from generic construction activities occurring during redevelopment. This will be achieved by:

- Identification of the likely emissions which may impact air quality during redevelopment, and the air quality mitigation measures as determined by RSK (2025), with regards to air quality;
- Detail the site specific criteria defined by RSK (2025) for the likely emissions that may result from the construction activities, and outline the monitoring and performance measures to demonstrate compliance with the air quality requirements for the site; and
- Provide site staff with an increased level of understanding and awareness of all management issues associated with the air quality relevant for the works.

This AQMP forms part of the Construction Environmental Management Plan (CEMP) completed by Aqualand (2026), and should be read in conjunction with the CEMP. Further Job Safe Analysis (JSA's) and/or Safe Work Method Statements (SWMS) should be prepared for job specific situations which are not addressed by this plan.

This AQMP is to be adjusted as required by the builder/contractor prior to the commencement of works on site, particularly where the changes are made to the air quality conditions during construction. This includes any alterations made to the air quality assessment (RSK, 2025), the CEMP (Aqualand, 2026), or conditions of consent for the Early Works SSD 39587022 (Central Barangaroo) and SSD 46922214 (Central Barangaroo – Phase 2).

Where this plan conflicts with the requirements of the CEMP or any builder/contractors SWMS or Work Health and Safety (WHS) Policy then the SWMS's and WHS and their safety and environmental obligations of the builder/contractors shall override this CEMP.

1.4 Mission Statement

The mission statement for this AQMP was to ensure that impacts associated with air quality are managed to within permitted limits as defined by the RSK (2025) criteria, as far as practicable. This includes the implementation of best practice controls and procedures during construction, to maintain an acceptable level of ambient air quality while minimising the risk of dust and odour nuisance for users within and surrounding the site. This includes:

- Achieving compliance with relevant legislative requirements and conditions of approval;
- Minimising any emissions resulting from all plant, equipment and machinery used during construction; and
- Make recommendations for site-specific training and/or site inductions in line with industry best practice (where available).

1.5 Outline of AQMP

Specific sections of this AQMP have been included to address the conditions of development consent SSD 39587022 (Central Barangaroo- Hickson Road Interface) and SSD 46922214 (Central Barangaroo – Phase 2), as presented in **Table 1-1** below.

Table 1-1 Consent Conditions addressed by AQMP

Condition	Requirement	Section of AQMP
C24	Prior to the commencement of any earthwork or construction, the Applicant must submit to the satisfaction of the Certifier an Air Quality Management Sub-Plan (AQMP) for the development. The Sub-Plan must include, as a minimum, the following elements:	

Condition	Requirement	Section of AQMP
C24 (a)	An AQMP prepared by a suitably qualified and experienced expert in accordance with the EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (the Approved Methods).	This plan was prepared by a suitably trained and experienced environmental practitioner with over 6 years' experience in Contaminated Land Management, and was reviewed by a Certified Site Contamination Specialist, with the accreditation details provided in Document Control . The AQIA was undertaken in accordance with the approved methods.
C24 (b)	Relevant environmental criteria to be used in the day-to-day management of dust and volatile organic compounds (VOC/odour) ;	Criteria defined by RSK (2025). Values derived are provided in Table 5-1 and discussed in Section 5.3.3
C24 (c)	Mission Statement;	Section 1.4
C24 (d)	Dust and VOCs/odour management strategies consisting of: (i) objectives and targets; (ii) risk assessment; (iii) suppression improvement plan; (iv) monitoring requirements including assigning responsibility (for all employees and contractors); (v) communication strategy; and (vi) System and performance review for continuous improvements.	Objectives and targets in Section 6.1 Risk Assessment in Section 7 Suppression Improvements Plan in Section 7.5 Monitoring requirements in Section 6.3 Roles and Responsibilities in Section 6.2 Communication Strategy in Section 6.7 System & performance review in Section 6.9
C25	The AQMP must detail management practices to be implemented for all dust and VOC/odour sources at the site. The AQMP must also detail the dust, odour, VOC and semi-volatile organic compounds (SVOC) monitoring program (eg. frequency, duration and method of monitoring) to be undertaken for the project.	Management measures in Section 0 Monitoring in Section 6.3
C26	The Applicant must also develop and implement an appropriate comprehensive Reactive Air Quality and Odour Management Plan which will incorporate an Ambient Air Monitoring Program and Reactive Management Strategy to ensure that the assessment criteria are met during the works	See Section 6 Reactive Management Strategy in Section 6.4

2. Regulatory Framework

Legislation, guidelines and standards relevant to air quality management for the development are presented within **Table 2-1**.

Table 2-1 Regulatory Framework

Regulatory Document	Summary of Requirements
Legislation	
Protection of the Environment Operations Act 1997 (the POEO)	The objective of the POEO Act is to achieve the protection, restoration and enhancement of the quality of the environment. The POEO Act gives rise to the POEO (Clean Air) Regulation (2022).
Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act determines the category of development, and gives rise to state environmental planning policies (SEPP) developed to assist regulators with the protection of human and environmental health.
State Environmental Planning Policy (Planning Systems) 2021	SEPP facilitates the development or redevelopment of important sites of economic, environmental or social significance to the State, to encourage works to be approved for the benefit of the State.
Local Council Plans	State Environmental Planning Policy (Precincts—Eastern Harbour City) 2021.
Standards	
Standards Australia	All activities should adhere to: - AS2601: 2025 <i>The Demolition of Structures</i>; - AS2159:2009 <i>Piling Design and Installation</i>; - AS 3580 <i>Methods of Sampling Analysis of Ambient Air</i>, being: - Part 1.1 (2016) <i>Guide to Siting Air Monitoring Equipment</i>; - Part 10.1 (2016): <i>Determination of Particulate Matter - Deposited Matter (Gravimetric Method)</i>; and - Part 12.1 (2015): <i>Determination of light scattering – integrating nephelometer method</i>.
Guidelines	
National Environment Protection Measure for Ambient Air Quality (2016), 2021 Variation (NEPM-AAQ)	National Environment Protection Standards were determined in accordance with (set) monitoring protocol, to achieve ambient air quality that allows for the adequate protection of human health and well-being.
National Environment Protection (Air Toxics) Measure 2004	National Environment Protection Standards that provide a national framework for monitoring and assessing certain toxic air pollutants that may pose risks to human health and the environment.
National Environment Protection Measure (Diesel Vehicle Emissions) Measure (2001), 2009 Variation (NEPM-DVE)	National Environment Protection Standards to reduce emissions from diesel vehicles, by facilitating compliance with in-service emission standards from diesel vehicles.

Regulatory Document	Summary of Requirements
Other Relevant Guidelines	▪ EPA (2022a) <i>Approved Methods for the Sampling and Analysis of Air Pollutants in NSW</i>; ▪ EPA (2022b) <i>Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales</i> (the Approved Methods); ▪ Landcom (2004) <i>Managing Urban Stormwater: Soils and Construction</i> (the “Blue Book”). Of particular relevance was: ▸ Volume 1 (4th Edition); ▸ Volume 2A <i>Installation of Services</i>; and ▸ Volume 2C, <i>Unsealed Roads</i>.

3. Site Setting

3.1 Property Identification, Location, and Physical Setting

The site is situated within an area of mixed land use, including residential, commercial and recreational activities. A summary of the site setting is presented in **Table 3-1**.

Table 3-1 Site Setting Information

Attribute	Description
Street Address	Central Barangaroo, Hickson Road, Millers Point NSW.
Lot and DP	Lot 52 in DP 1213772
Site Area	5.2 ha (of the 22 ha Barangaroo Precinct)
Location Description	Located in Central Barangaroo, which forms part of the wider Barangaroo Precinct comprising a total area of 22 ha. The site is bounded by Barangaroo Reserve to the north, Hickson Road to the east, Barangaroo South to the south and the foreshore to the west
Local Government Area	City of Sydney Council
Current Zoning	B4 – Mixed Use and RE1 – Public Recreation (<i>State Environmental Planning Policy (Precincts—Eastern Harbour City) 2021</i>)
Topography	The site is generally flat and is located at an elevation of approximately 2 to 4 metres Australian Height Datum (mAHD).
Site Drainage	Site drainage is likely to be consistent with the general slope of the site. Any run off would be expected to flow into the stormwater pits, which discharge into the municipal stormwater system and to the closest surface water feature, Darling Harbour (immediately adjacent to the west of the site).
Surrounding Use	▪ North: Barangaroo Reserve and residential properties; ▪ East: Hickson Road, with High Street and residential properties beyond; ▪ South: Barangaroo South, comprising mixed use and recreational use; ▪ West: Darling Harbour.
Geology	According to the <i>1:100 000 Geological Survey of NSW (Sydney) Sheet 9130</i> (Edition 1) 1983 and numerous site investigations, the Barangaroo Central Site is underlain by man-made fill materials that have been placed over marine sands over Hawkesbury Sandstone.

3.2 Meteorological Conditions

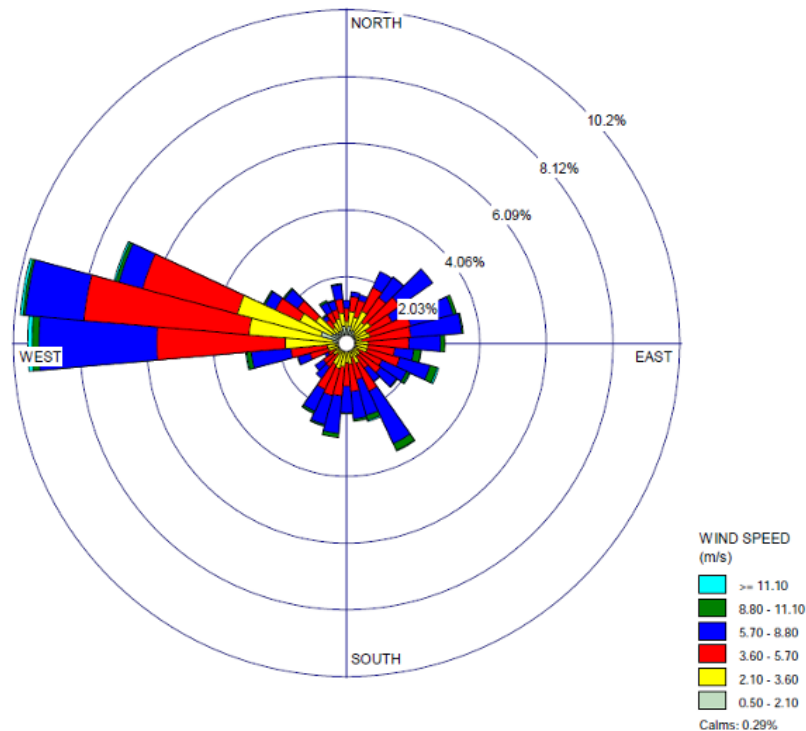
Meteorological conditions of the site are of fundamental importance to air quality as these conditions drive the release of emissions into the atmosphere, resulting in the occurrence of off-site impacts. In accordance with EPA (2016), the parameters of most importance are:

- Wind Direction and Speed, to determine the direction and speed at which the emissions are transported from the source(s) to the receptor; and
- Atmospheric conditions, such as rainfall, temperature and atmospheric turbulence.

3.2.1 Wind Conditions

The Bureau of Meteorology (BOM) collects meteorological data from various sites in the Sydney Basin. The AQIA (RSK, 2025) reviewed the data obtained from the Fort Denison BOM station, located approximately 2.2km to the north-east of Central Barangaroo site. Wind speed and wind direction data recorded during 2022 is presented in **Figure 3-1** below.

Figure 3-1 Fort Denison AWS (RSK, 2025)



3.2.2 Atmospheric Conditions

EI reviewed the statistical data obtained from the meteorological monitoring stations to the site, collected by BOM. The closest station to the site was Sydney Observatory Hill Station (Site ID 066214) situated approximately 0.7km to the east of the site. A summary of the meteorological conditions for the site are presented in **Table 3-2**.

Table 3-2 Generalised Atmospheric Conditions

Attribute	Description
Temperature	In general, the local climate comprised warm summers and mild winters. Mean temperatures range from 8.1° C to 16.4° C in July, and 18.8° C to 26.0° C in January. Annual average temperatures ranged from 13.8° C to 21.8° C. (Source: https://www.bom.gov.au/climate/averages/tables/cw_066062.shtml, latest available data 31 August 2020)
Rainfall	Rainfall occurred throughout the year, with wetter periods observed from January to March. The mean monthly rainfall recorded ranged from 68.1 mm in September to 133.1 mm in June, with an average annual rainfall of 1211.1 mm. (Source: https://www.bom.gov.au/climate/averages/tables/cw_066062.shtml, latest available data 31 August 2020)

3.3 Site Receptors

In accordance with EPA (2022), site receptors were defined as locations where people or things are, or would likely reside (i.e. residential housing areas, schools, offices or public space). Site receptors of greatest concern include those sensitive to environmental change, such as the very young, the elderly and the infirm. The closest sensitive receptors identified for the site are:

- The residential land users located:
 - 220m to the north;
 - 50m to the east; and
 - 200m to the south.
- Recreational and ecological users along the Foreshore (adjacent to the west), in Barangaroo Reserve (adjacent to the north) and Observatory Hill Park (150m east);
- Users of the Barangaroo South area and metro station, adjacent to the site; and
- The site worker any external work areas immediately adjacent to the site boundary during the development work.

4. Background Air Quality

4.1 Previous Investigation

RSK Environment Limited (RSK) completed an Air Quality Impact Assessment, as referenced in **Section 1.1**. The AQIA provided pertinent information regarding background air quality for the site, with the relevant findings presented in **Table 4-1**.

Table 4-1 Summary of RSK (2025) Air Quality Impact Assessment

Attribute	Description
Objective	The AQIA was conducted to accompany a SSDA for the proposed Central Barangaroo early works DA-2. This assessment was cumulative and addressed bulk excavation, site establishment works, installation of associated rock anchors and a perimeter retention wall, conduction of remediation and archaeological investigations within the site, and the operation of a water treatment plant. Note that potential air quality impacts associated with the construction of the proposed basement and buildings were not included in this AQIA.
Pollutants of Interest	Pollutants of interest under this AQIA were defined as chemicals that had been detected on the site in concentrations greater than relevant human health screening criteria. The pollutants assessed were: ▪ Nitrogen dioxide (NO₂); ▪ Particulate matter (TSP and PM10); ▪ VOCs (BTEX, naphthalene and phenol); ▪ Heavy metals (arsenic, cadmium, chromium VI, copper, lead, mercury, nickel, and zinc) attached to TSP; ▪ Benzo(a)pyrene; and ▪ Odour. Asbestos was not assessed in this AQIA. Management of asbestos encountered on the site would be in accordance with the site Asbestos Management Plan to be prepared for the works, which should include monitoring works.
Conclusions	The modelling results showed there were some exceedances of the EPA criteria predicted to occur for project contribution and cumulative 1 hour NO₂ and project contribution and cumulative 24 hour PM10. All other pollutants complied with the EPA assessment criteria. The exceedance was due to the worst-case scenarios and prior to the application of any mitigation measures. Mitigation measures were identified to reduce the impacts on local air quality to the acceptable levels. Soil contaminant concentrations identified in the Remedial Action Plan were used to predict concentrations of toxic air pollutants at receptor locations due to the excavation of contaminated soil. The predicted concentrations of all toxic air pollutants were well below the applicable impact assessment criteria. Odour impacts associated with the excavation of contaminated soil were assessed in a manner consistent with previous assessments at Barangaroo and the modelling study indicated that odour nuisance from the development was unlikely to be significant.

4.2 Existing Air Quality

Background air quality was determined by RSK (2025) using information obtained from the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) Cook and Phillip station, located approximately 1.5km to the southeast of the site.

Ambient pollution concentrations recorded between 2020 and 2022 at the Cook and Phillip station have been reviewed, with the latest year (i.e., 2022) monitoring data used to establish the existing local air quality. The reviewed data were tabulated in the RSK (2025) report and also shown in **Figure 4-1** below.

Figure 4-1 Ambient Pollutant Concentrations (RSK, 2025)

Pollutant	Averaging Period	Background Concentrations ($\mu\text{g}/\text{m}^3$)			Criteria ($\mu\text{g}/\text{m}^3$)
		2020	2021	2022	
TSP*	Annual Average	39.3	33.5	24.8	90
PM ₁₀	24 Hour Maximum	130.8	36.9	24.5	50
	Annual Average	15.7	13.4	9.9	25
NO ₂	1 Hour Maximum	94.3	96.4	82.0	164
	Annual Average	26.7	24.6	22.6	31
Ozone**	1 Hour Maximum	126.3	111.3	111.3	-
	Annual Average	27.8	25.7	25.7	-
*Ambient TSP concentrations are not monitored at Cook and Phillip. As PM₁₀ is a sub-component of TSP, the annual average concentration of PM₁₀ along with the TSP:PM₁₀ ratio can be used to calculate the expected background TSP concentration. A TSP:PM₁₀ ratio of 0.4 has been used for the calculation of the TSP concentration. This is a common ratio for dust in NSW and is considered appropriate in the absence of recently monitored data. **Not assessed, used to calculate NO₂ transformation.					

The data showed that monitored TSP, PM₁₀ or NO₂ concentrations were all below the relevant criteria during the last three years. Only one exceedance of the 24-hour maximum PM₁₀ criterion occurred in 2020 (130.8 $\mu\text{g}/\text{m}^3$), which is likely due to the high level of particulates in the summer of 2019-2020 caused by bushfires.

As there are no known recent ambient air quality measurement studies undertaken in the immediate vicinity of the site that may be used to define the background concentrations of VOC's, PAHs and Heavy Metals, no background concentrations in relation to these pollutants of interest have been included in the assessment.

During the preparation of this AQMP, EI also reviewed the air quality concentration data recorded at the Cook and Phillip station. No exceedances were reported on the latest data available (18 March 2026). The highest spikes are summarised below:

- PM_{2.5}: 26.5 $\mu\text{g}/\text{m}^3$, recorded 17 March 2026 at 2pm;
- PM₁₀: 39.0 $\mu\text{g}/\text{m}^3$, recorded 17 March 2026 at 2pm;
- NO₂: 2.6 parts per hundred million (pphm), recorded 17 March 2026 at 3pm; and
- CO₂: 0.2 ppm, recorded 5 March 2026.

5. Air Quality Impacts

5.1 Proposed Site Development Activities

With reference to **Section 1.2**, the development phase of works will involve:

- Site establishment and installation of temporary plant and machinery;
- Construction of perimeter retention wall;
- Associated remediation and archaeological investigations;
- Provision for future services;
- Associated “tie-in” works to Metro Interface Wall and the secant pile wall;
- De-stressing and removal of existing anchors supporting Sydney Metro pile wall;
- Bulk excavation for the provision of a future basement and associated rock anchors;
- Construction of foundation piling;
- Installation of waterproofing membrane;
- Construction of hydrostatic slab; and
- Structure and waterproofing for the Barangaroo Metro station southern entrance interface next to the existing Sydney Metro pile wall.

Activities of greatest concern to air quality to be completed for construction were identified as:

- Site preparation works, including removing current site structures (including pavements);
- Soil disturbance activities, including remediation and archaeological investigations, bulk excavation, drilling and/or piling, general earthworks, the installation of services;
- The importation and stockpiling of material (i.e. aggregate and soils) and uncovered loads;
- Cutting, grinding and sawing activities and the operation of concrete / asphalt agitators;
- Wind erosion in areas of exposed soil within an open environment; and
- The operation of mobile plant, including excavators, piling rigs and haulage trucks, including the use and idling of machinery and trucks and driving over unpaved surfaces.

5.2 Potential Impacts

A review of background air quality data (see **Section 4.2**) shows that monitored background particulate matter concentrations (i.e. TSP, PM₁₀ or NO₂) were generally below the relevant criteria, hence care should be taken to ensure the construction works do not intensify air quality impacts. In addition, care is required to minimise gaseous emissions where possible. Sources of dust and emissions from the site during construction may result in the following impacts:

- Dust emissions resulting from demolition works or from exposed soils generating dust;
- Human health impacts (i.e. breathing or eye irritation) resulting from the generation of particulate matter (dust) where elevated levels persist;
- Negative aesthetic impacts and reduced visibility due to increased particulate and dust;
- Poor working conditions due to health implications;
- Additional cleaning effort/costs leading to damage of personal property as a result of increased particulate in air and/or depositional dust;

- Erosion and/or loss of soils due to windborne loss;
- Gaseous / exhaust emissions associated with the combustion of fuel from plant, machinery and vehicles that may generate oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂) and trace amounts of non-combustible hydrocarbons such as semi-volatile organic compounds (SVOCs).

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, remediation, spoil handling, storage and transport and due to plant and vehicle movement and emissions. These are covered in more detail in the following sections. Overall, with the implementation of the control measures identified in **Section 7**, the likely impacts for air quality are expected to be minimal.

5.3 Contaminants Related to Air Quality

In accordance with a Remedial Works Plan EWDA-02 previously prepared for the site by EDP (Ref. S-04478.AQL.RWP_EWDA-02_Rev4, dated 6 March 2025), previous investigations had identified contamination within soil associated with total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), metals and asbestos-impacted fill material. In addition, the fill and natural profiles are anticipated to contain Acid Sulfate Soils (ASS) and will require treatment prior to offsite disposal. Remediation and validation works are to be conducted in accordance with the RWP (EDP, 2025), in order to make the site suitable for the proposed development. Site contamination is also to be managed according to the site-specific management plans to be prepared for the site (i.e., Asbestos Management Plan, Acid Sulfate Soil Management Plan etc).

In addition to the above contaminations, the primary air quality impact during site development stage is from dust, otherwise referred to as Particulate Matter (PM). There are three size fractions for PM, being:

- PM_{2.5} (i.e. being less than 2.5 microns in size), associated with fuel burning, industrial combustion and vehicle emissions;
- PM₁₀ (i.e. being less than 10 microns in size) associated with coarse grained dusts (i.e. road dust) and construction activities; and
- PM with aerodynamic diameter of 50 microns or less (Total Suspended Particulates – TSP).

During mechanical motion and earth movements, the vast majority of PM generated is between 2.5 microns and 50 microns in aerodynamic diameter. PM greater than 10 microns in aerodynamic diameter cannot pass into the human respiratory system; however, PM of this size fraction can result in nuisance to surrounding receptors as a result of dust deposition. Consequently, in relation to PM, two potential impacts from dust generation are considered:

- Ambient concentration of PM₁₀; and
- Dust deposition (as a nuisance issue).

Given the nature of the development works required, the activities associated with earthworks and construction of the below ground structures and the installation of foundations and services were considered to be the activities of greatest concern to the generation of PM.

5.3.1 Weather

Weather can have a large impact on air quality. With higher temperatures, and as wind speeds increase there will be a greater potential for dust generation to occur. Weather reporting should be provided to all site contractors on a daily basis, which would be based on BOM information for Sydney Observatory Hill Station, Fort Denison Station or Sydney Airport AMO Station. The

information would be delivered to all staff during toolbox / pre- start meetings, or where required, significant changes in conditions may be announced over the site radio. As stated in **Table 3-2**, the site was typically of a warm to moderate climate, with higher levels of rainfall occurring over the summer months. During periods of dry weather and in periods of high wind the likelihood of dust to be generated from onsite activities would increase, and additional controls may be required, or works may cease altogether.

5.3.2 Mobile Plant

It was considered that any mobile plant emissions generated through the combustion of fuel will be short term and minimal, in comparison to the emissions generated by vehicles travelling along the surrounding roadways. Given the short term and low level of emissions of these pollutants from the site during the construction works, fuel combustion contaminants, such as volatile organic compounds (VOCs) or Nitrogen Oxides (NOx) were unlikely to impact air quality.

Pre-start inspections should be completed on all mobile plant to ensure the equipment is well maintained and serviced so that vehicular emissions remain within relevant air quality guidelines and standards. Any equipment or vehicles seen to create excessive emissions should be either replaced or serviced. Given these conditions are met, the most significant issue related to mobile plant at the site would be the generation of dust resulting from driving along unpaved surfaces, and the haulage of soils (including loading and unloading). Consideration of the site receptors proximity to the site is required (**Section 3.3**) for the selection of internal haulage routes at the site.

5.3.3 Soil Contamination

The AQIA prepared by RSK (2025) conducted an assessment on a number of pollutants of interest which had been detected on the site in concentrations greater than relevant human health screening criteria. The modelling results showed there were some exceedances of the criteria predicted to occur for NO₂ and PM₁₀. All other pollutants complied with the assessment criteria. The exceedance was due to the worst-case scenarios and prior to the application of any mitigation measures.

Soil contaminant concentrations identified in the RWP were used to predict concentrations of toxic air pollutants due to the excavation of contaminated soil. The predicted concentrations of all toxic air pollutants were well below the applicable assessment criteria.

Odour impacts associated with the excavation of contaminated soil were also assessed and the modelling study indicated that odour nuisance from the development was unlikely to be significant.

5.4 Acceptance Limits for Air Quality

As stated in **Section 5.3**, the emissions of greatest concern for the site were related to the generation of dust from the development activities occurring onsite and individual VOC contaminants were not likely to be generated. An acceptable level of air quality will be achieved when:

- No complaints are received from nearby residents or local road users in relation to dust and sediment beyond the site boundary;
- No visible dust is identified at, or beyond the site boundary which has migrated from the site;
- No dust generated within the site has the potential to affect the site workers;
- Site workers and visitors during construction are made aware of the air quality requirements of the site and the existence of this AQMP;

- Relevant measures and procedures are implemented throughout the development phase of works; and
- Air quality meets the air quality goals and DEC's guidelines for dust as listed in **Table 5-1**;
- Effective communication is maintained with the Regulatory Authority, the NSW EPA and key stakeholders of the development.

A secondary effect resulting from the construction works may include the emissions of pollutants and/or odour levels generated from mobile plant and site remediation works. The levels of odour within the site shall be monitored using olfactory methods (i.e. through smell) as determined by the Project Manager, Site Supervisor and/or Environmental Consultant. The odour would be described as non-detectable, low, moderate or strong and an acceptable limit for the site will be achieved when:

- No detectable odour is identified at the site boundary; and/or
- No odours greater than moderate or strong are present onsite, or that have the potential to affect workers.

5.5 Acceptance Limits of Possible Pollutants

RSK (2025) predicted some exceedances of NO₂ and PM₁₀ to occur during development activities. The predicted concentrations of toxic air pollutants were well below the applicable assessment criteria and the odour impacts resulting from the excavation of contaminated soil were unlikely to be significant.

As such, the primary concern for air quality with regards to development works is considered to be dust deposition. The generation of VOCs from mobile plant, machinery or vehicles may react under the influence of sunlight, to generate nitrous oxide (NO₂) and/or photochemical smog. Impacts related to the generation of VOCs and toxic air pollutants from soil contamination would therefore be assessed where secondary effects are identified as a concern.

The assessment criteria for pollutants as recommended in RSK (2025) and also derived by EPA (2022) to be met by the site are presented in **Table 5-1** below.

Table 5-1 Criteria for Air Quality Pollutants

Pollutant and Averaging Period	Criteria (RSK, 2025; EPA, 2022)
Combustion Products and Dust	
Annual maximum increase dust ^a concentration	2 g/m ² /month ^b
Annual maximum total dust ^a concentrations	4 g/m ² /month ^c
Maximum 1 hour average carbon monoxide (CO) concentrations	30 mg/m ³
Maximum 8 hour average CO concentrations	10 mg/m ³
Maximum 1 hour average nitrous dioxide (NO ₂) concentrations	164 µg/m ³
Annual average NO ₂ concentrations	31 µg/m ³
Maximum 1 hour average SO ₂	286 µg/m ^{3d}
Maximum 24 hour average SO ₂ concentrations	57 µg/m ³
Maximum 24 hour average PM ₁₀ concentrations	50 µg/m ³
Annual average PM ₁₀ concentrations	25 µg/m ³
Maximum 24 hour average PM _{2.5} concentrations	25 µg/m ³

Pollutant and Averaging Period	Criteria (RSK, 2025; EPA, 2022)
Annual average PM _{2.5} concentrations	8 µg/m ³
Total Suspended Particulates (Annual)	90 µg/m ³
Soil Contaminants	
Arsenic - maximum 1 hour average	0.09 µg/m ³
Benzene - maximum 1 hour average	29 µg/m ³
Cadmium - maximum 1 hour average	0.018 µg/m ³
Chromium VI - maximum 1 hour average	0.09 µg/m ³
Copper (dust and mist) - maximum 1 hour average	18 µg/m ³
Ethylbenzene - maximum 1 hour average	8,000 µg/m ³
Lead - maximum annual average	0.5 µg/m ³
Mercury (organic) - maximum 1 hour average	0.18 µg/m ³
Naphthalene - maximum 1 hour average	440 µg/m ³
Nickel - maximum 1 hour average	0.18 µg/m ³
Phenol - maximum 1 hour average	20 µg/m ³
PAH (as benzo[a]pyrene) - maximum 1 hour average	0.4 µg/m ³
Toluene - maximum 1 hour average	360 µg/m ³
Xylenes - maximum 1 hour average	190 µg/m ³
Zinc (as zinc chloride fumes) - maximum 1 hour average	18 µg/m ³
Odour (complex odours)	2.0 OU/ m ³

Notes:

- a) dust is assessed as insoluble solids as defined by AS 3580.10.1-1991 (AM-19)
- b) maximum increase in deposited dust level
- c) maximum total deposited dust level
- d) applies to assessments prepared before 1 January 2025

6. Air Quality and Odour Management

6.1 Objective of Air Quality and Odour Management

Day to day management of air quality impacts resulting from construction activities will require management of dust, odour and VOC emissions generated onsite. This will occur through the implementation of mitigation measures at the site, and the performance will be determined by visual monitoring of boundary emissions. Continuous control of emissions at the source will assist with the sites compliance with the limits applicable to the site (**Section 5.3.3** and **6.3**). Conformance with these limits shall ensure, as far as possible, that construction activities may continue unimpeded, without impacting the surrounding air quality.

Specific air quality targets and performance criteria were established for the management of air quality during construction which was based on recommendations made by RSK (2025). These are summarised in **Table 6-1** below.

Table 6-1 Air Quality Targets

Impact requiring mitigation	Target	Monitoring and/or mitigation required
Dust	No visible dust leaving the site boundary	Daily visual inspections at: ▪ Boundary locations M1 to M4; ▪ In proximity to site works. See Section 6.3 .
Odour	No odours detected at the site boundary	
VOCs	No clearly visible exhaust emissions resulting from any machinery or mobile plant to be observed at or beyond the site boundary	
Particulate emissions (PM ₁₀)	Average daily PM ₁₀ emissions should not exceed 50 µg/m ³ over a 24 hr period	Passive dust deposition monitoring of PM ₁₀ to be completed monthly. See Section 6.3
Complaints	No complaints related to air quality, dust or odour to be received.	Additional monitoring of the emissions impacting the receiver at offsite locations. See Section 6.3

The performance of air quality for the construction works is ultimately the responsibility of all site workers, their visitors and subcontractors carrying out works at the site. The Project Manager holds overall responsibility for the sites conformance with the targets specified in **Table 6-1**.

Where triggers are, or could exceed the air quality criteria, site management must be informed, and contingency measures implemented. Should repetitive complaints or non-conformances are identified, additional monitoring may be required (i.e. boundary PM₁₀ monitoring and/or additional monitoring of VOCs and toxic air pollutants) and should this situation arise, advice from the Environmental Consultant shall be sought.

6.2 Roles and Responsibilities

The roles and responsibilities associated with the works are outlined in **Table 6-2**. The Project Manager will have the main responsibility for maintaining and implementing this AQMP. Responsibility for implementing certain components of the AQMP may be delegated to particular project staff and/or contractor(s) nominated to undertake those works.

Table 6-2 Summary of Responsibilities

Role	Brief Description of Responsibilities
Project Manager	- Ensure effective overall management of environmental performance during the site development. - Review this AQMP to ensure compliance with requirements. - Ensure the AQMP is implemented. - Undertake environmental reviews required by consent conditions and regulatory policies and legislation. - Undertake all community consultation and notifications associated with the works.
Site Supervisor	- Supervise the work activities and ensure all environmental controls are in place. - Monitor daily work routines so that environmental controls are established and maintained as per the AQMP and detailed mitigation measures. - Monitor daily work routines so that environmental protection requirements are communicated to all personnel and contractors under his/her control. - Where necessary stop work activities until adequate environmental safeguards have been implemented. - Identify areas of improvement and notify the head contractor. - Ensure environmental issues are communicated to all site staff.
Environmental Consultant	- Provide advice regarding the requirements of air quality for construction at the site; - Outline the monitoring requirements for air quality as required; - Assist with the investigation and resolution of any complaints received with regards to air quality; and - Assist with communicating the performance of air quality at the site to key stakeholders and regulators as required.
All site staff and contractors	All contractors must employ best practices in managing any air quality related impacts during site redevelopment. All contractors must also: - Ensure work instructions reflect the requirements of this AQMP and all requirements are implemented. - Ensure all required records/documentation are maintained and submitted to the head contractor. - Ensure training/induction of personnel is carried out and that staff operate in an environmentally responsible manner. - Undertake and report on all monitoring and inspections completed. - Report all environmental incidents and near misses.

6.3 Ambient Air Monitoring Requirements

6.3.1 Monitoring Locations

Routine visual monitoring of emissions will be required to mitigate any impacts that may result from the proposed activities. Monitoring will occur in locations both on and off site, depending on the target to be achieved, and includes:

- Visual inspections in close proximity to site works;

- At selected boundary locations (M1, M2, M3 and M4) (see **Table 6-3** and as presented in **Figure 2**); and
- Where a complaint has been received by the client, off-site locations may be selected to provide an indication of exposure or to identify background levels of influence.

The on-site boundary monitoring locations are summarised below in **Table 6-3**.

Table 6-3 Summary of Ambient Air Monitoring Locations

Location ID	Approx. coordinates #	Frequency and Type of Monitoring	Nearby Receptors
M1 Northern boundary	E: 333684.188 N: 6251947.692	Inspections for dust and odour (Daily) PM10 monitoring (monthly) PID monitoring (As required) Asbestos monitoring (As per AMP)	Residential (220m) Users of Barangaroo Reserve (adjacent)
M2 Eastern boundary	E: 333730.891 N: 6251821.972	Inspections for dust and odour (Daily) PM10 monitoring (monthly) PID monitoring (As required) Asbestos monitoring (As per AMP)	Residence (50m)
M3 Southern boundary	E: 333690.456 N: 6251674.418	Inspections for dust and odour (Daily) PM10 monitoring (monthly) PID monitoring (As required) Asbestos monitoring (As per AMP)	Residence (200m) Users of Barangaroo South (adjacent)
M4 Western boundary	E: 333633.770 N: 6251812.947	Inspections for dust and odour (Daily) PM10 monitoring (monthly) PID monitoring (As required) Asbestos monitoring (As per AMP)	Users of the foreshore (adjacent)
Background	E: 333651.482 N: 6252101.650	As required	Users of Barangaroo Reserve (adjacent)

Notes: # - Coordinates referenced from (GDA2020-MGA56)

6.3.2 Monitoring Frequency

The following monitoring is proposed during the construction activities. Other monitoring may be carried out on an as needs basis (e.g. a specific complaint). The type and frequency of monitoring is presented in **Table 6-4**.

Table 6-4 Ambient Air Quality Monitoring

Monitoring	Performance Indicator	Frequency
Weather – Meteorological data including daily rainfall, temperature and wind (direction and speed)	Delivery to site staff during toolbox meetings, announced over site radio where required. Parameters of interest are: ▪ Wind Speed and Direction to determine the site receptors up and down-wind of the site, and the likely risk; and	Daily

Monitoring	Performance Indicator	Frequency
	Temperature as well as rainfall to inform the extent of natural dust attenuation through watering, and if additional watering is necessary.	
Visual surveillance for dust emission and site inspection for visible dust deposits on surface / mud tracking off site	No dust emissions or sediment tracking beyond the site boundary and no incidents or complaints reported. Procedure for completing visual surveillance at the site is presented below. - A designated person on site will undertake the following visual checks near the site boundary at least once on each working day until the project works are completed. - If dust migration beyond the site boundary is observed, identify the source of the dust being generated at the source (e.g. wheel generated dust, excavators, stockpiles, wind erosion). - Inspect and report on watering of site surfaces (i.e. water cart activity and daily water usage rate), and/or where dust and sediment are seen beyond the site boundary. The weather conditions (Section 3.2) will also be recorded when a non-conformance is reported during a visual surveillance check. - Prepare a summary of the findings as part of an environmental inspection report. Non- conformance (e.g. excessive dust generation, dust/earth/ other materials leaving the site) will be reported immediately to the Project Manager or management.	Daily
Inspections to verify unusual odours	No unusual odour detected at boundary and no complaints received. <u>Additional monitoring (i.e., PID monitoring during the excavation of odorous soils or H₂S monitoring during the excavation of ASS) may be required if repetitive complaints or non-conformances are identified.</u>	Daily
Plant/equipment inspections including daily pre-start inspections	Inspections undertaken in line with operational requirements and regularly serviced, with inspection sheets maintained.	Daily / as required
Dust monitoring	No exceedance of monitoring trigger values listed in Table 6-6.	Monthly
Asbestos monitoring	Implement in accordance with the AMP to be prepared for the site	As required

6.3.3 Dust Sampling Methods

Dust methods are currently using dust fallout method suitable for construction site based on the Australian Standard AS3580.

The various sampling methods and method references are summarised in **Table 6-5**.

Table 6-5 Summary of methods and sources

Target Analyte	Media	Method reference
Particulate matter	Dust fallout filter (passive)	AS 3580

6.3.4 Monitoring Triggers

Trigger values are to protect both worker health and the surrounding sensitive receptors including local residents and recreational users.

The trigger values for occupational and non-occupational exposure for the primary on-site pollutants as outlined by the air quality assessment are outlined in **Table 6-6**.

Table 6-6 Summary of Trigger Values

Compound	Occupational (TWA) ($\mu\text{g}/\text{m}^3$) ¹	Non-occupational ($\mu\text{g}/\text{m}^3$) ²	HSL Res A/B ($\mu\text{g}/\text{m}^3$) ³	Monitoring Investigation Levels ($\mu\text{g}/\text{m}^3$) ⁴
Dust	-	4g/m ² /month ⁵	-	-

1 – Safework 2013

2 – US EPA Region 9 Regional Screening Levels (May 2016) – Lifetime Carcinogenic Risk 1×10^{-6} Residential Ambient Air

3 – NEMP (2013) HSL uses sand at 0 - <1 m

4 – NEPM (2004) Air Toxics 1 year average

5 – EPA (2022) Air Quality Monitoring Criteria for Deposited Dust

Any exceedances of the above level, a preliminary risk screening should be undertaken to assess the potential risk to the surrounding receptors.

6.4 Reactive Management Procedure

The potential dust (as PM₁₀) emissions were considered to be of primary concern during the construction activities (**Section 5.3**). Due to the elevated background concentrations identified, exceedances of the limits for PM₁₀ are possible. A reactive management procedure was developed using a three-stage approach, for pro-active management of dust. The procedure is as follows:

- 1. INVESTIGATE:** Site staff to identify the likely reasons for the elevated pollutant concentration and to formulate a contingency response should ACTION (Step 2) be reached. Action should be undertaken at this stage if deemed necessary;
- 2. ACTION:** Implement the measures formulated in **Section 7** and review their effectiveness; and
- 3. STOP WORK:** Where there is a high probability that an exceedance will occur, and the works will continue to generate excessive dust then all works should stop at this stage until the measured pollutant levels are below the action level.

Table 6-7 Reactive Management Procedure for Dust

Pollutant	Trigger Stage	Average Period	Trigger Value	Responsibility	Action Required
PM ₁₀	1				
	Investigate	1 hr	Visible dust / odour extending beyond boundary	Project Manager	Project Manager to contact Environmental Consultant and undertake review of possible dust sources operating during the average period.
		3 hr			Identify possible control measures for these activities, action taken if deemed necessary.
					Complete Environmental Incident / response Form.
	2				
	Action	1 hr	Visible dust / odour extending beyond boundary	Environmental Consultant	Environment Consultant to attend site and ensure implementation of the control actions identified in stage 1.
		3 hr			Effectiveness of control actions to be reviewed and escalate where appropriate. Identify long- term solutions to dust issues. Monitor as per Section 6.3
					Complete Environmental Response Form.
	3				
	Stop Work	1 hr	85 (µg/m ³)	Project Manager / Site Supervisor & Environmental Consultant	Targeted shut down of site activities until the measured pollutant levels are below the stated Action period trigger value.
		3 hr	80 (µg/m ³)		Complete Environmental Response Form.

6.5 Hours of Work

Construction activities were identified as the primary source of dust generated at the site, therefore the period of time when these activities are occurring would be of greatest risk to the sites receptors.

In accordance with the Conditions D3 to D10 of the development consent (SSD-39587022), hours of construction, including demolition, excavation and building works, and activities in the vicinity of the site generating noise associated with preparation for the commencement of work (e.g. loading and unloading of goods, transferring of tools etc) in connection with the proposed development, may only be carried out during the following hours:

- Monday to Friday, 7:00am to 6:00pm;
- Saturday, 7:00am to 5:00pm; and
- Sunday / Public Holidays, no work.

Activities may be undertaken outside of these hours if required by the Police or a public authority for the delivery of vehicles, plant or materials, or in an emergency to avoid the loss of

life, damage to property or to prevent environmental harm. Notification must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

Rock breaking, rock hammering, sheet piling, pile driving, similar activities, high noise emission appliances and those which are not listed in Groups G, C, D, E or F of Schedule 1 of the *City of Sydney Code of Practice for Construction Hours/Noise 1992* and Australian Standard 2436-2010 *Guide to Noise Control on Construction, Maintenance and Demolition Sites* is restricted to the following hours:

- Monday to Friday, 9:00am to 12:00pm and 2:00pm to 5:00pm; and
- Saturday, 9:00am to 12:00pm.

6.6 Induction and Training

All employees and contractors work on site will undergo an induction training relating to air quality management issues, prior to being authorised to work within the site. Specific information related to air quality to be included during induction/training will include:

- Information regarding the existence of this AQMP, and the requirements of consent, including the identification of site boundaries (**Figure 2**) and the site specific environmental measures required;
- Details of the potential sources and emissions of concern (**Section 5.2**) and information regarding typical activities that may impact air quality;
- Details of the mitigation measures for the typical site activities; and
- Incident response procedures, including details of the complaints handling process for the site.

Records of all training activities, including inductions, will be maintained by the Project Manager. These records shall include (but not be limited to):

- Details of the person being inducted, including their employer, the role and activities to be completed within the site and the time period of the works;
- Details of the person responsible for providing the training; and
- Where applicable, reference to the material presented, and a copy of the information provided.

6.7 Communication and Complaints

Effective communication between the Project Manager, Site Supervisor, sub-contractors, other members of the project team and external stakeholders is important to ensure effective implementation of the AQMP. Project communication can be categorised into internal and external communications.

6.7.1 Internal Communications

Communication on air quality issues within the project team will be maintained through the following channels:

- **Site inductions** – to be provided by the Project Manager or delegate.
- **Daily work briefings** – briefings by the Site Supervisor prior to work commencement each morning should highlight air quality issues and mitigation measures relevant to the day's works.

- **Weekly toolbox talks** – ongoing training is to be provided by Site Supervisor, nominated delegate or specialist, including issues such as potential sources and emissions of concern, incident response, and other matters as identified from time to time.
- **Emergency contact sheets** – to be located at the site compound, site entrance and other appropriate locations. The sheets will contain emergency contact numbers and other information such as evacuation maps.

6.7.2 External Communications

General

All consultation is to be managed by the Project Manager prior to and throughout the project. The consultation program will follow a project-specific procedure. The site contractor's responsibilities in regards to external communications will include:

- Ensure that appropriate signage is displayed in accordance with the Project Manager's directions and consent conditions.
- Answer initial enquiries and direct further communications to the Project Manager.
- Provide information to the Project Manager for communication to external bodies, include emergency notifications, records, details of complaints or enquiries, and advance notification of work activities of which the community should be advised.
- Undertake incident reporting in accordance with legal and contractual requirements.

Consultation with Community and Regulatory Authority

All community and stakeholder consultation are to be undertaken by the Project Manager in accordance with the consent conditions prior to and throughout the project. The Project Manager's consultation program will be managed through a project-specific procedure.

Complaints Handling

Community and stakeholder consultation are to be undertaken by the Project Manager prior to and throughout the project. This includes the handling of complaints.

The Project Manager will respond to complaints in accordance with a project-specific procedure. Should a complaint or enquiry be directed to the head contractor or other site personnel, these should be recorded and directed to the appropriate contact person at the Project Manager's office.

Incident Reporting

Immediately notify the Project Manager of any unexpected find, pollution incident or situation that may or has the potential to cause material harm to the environment. Evidence will be required that notification was made, in accordance with the POEO Act 1997. When requested by the Project Manager, the Site Supervisor is to provide an incident investigation report, including identification of the cause of the incident and corrective actions taken, in the form directed. The Project Manager will act as a contact in the event of complaints of dust emissions, and is responsible for informing all necessary stakeholders of information pertaining to air quality compliance for the site.

6.8 Document Control

Record keeping and reporting requirements may be undertaken by the site project manager and include relevant project team members and stakeholders. The record keeping will include:

- A copy of the complaints register for the month and details of how complaints were addressed and resolved;

- Identification of non-compliance with the conditions of the development consent that includes dust and odour, including a record of visual surveillance undertaken at the site;
- Details of additional measures to be implemented to address any noncompliance;
- Details relating to excavated volumes and types of soil disturbed within the site, including dates of excavation; and
- Details of any fill material imported into site.

6.9 Review and Update

This AQMP may be reviewed at any stage during the development to ensure that it addresses ongoing environmental issues and any changes in legislation, policies or guidelines. In particular, environmental incidents, non-conformance or environmental audit outcomes should be considered when undertaking a review, and may trigger a review of amendment.

Updating the AQMP is the responsibility of the Site Supervisor. Approval of the updated AQMP is the responsibility of the Project Manager.

7. Risk Assessment and Mitigation

This section identifies the risks and evaluates potential environmental impacts, which form the basis for mitigation measures and safeguards to be applied for the project. Where an environmental impact is identified, the most appropriate mitigation measure may depend on factors yet to be determined, such as scheduling, equipment and materials selection, and the construction procedures to be employed.

7.1 Risk Assessment

The assessment approach presented in **Figure 7-1** will be used to determine the level of risk for identified potential impacts from the proposed works.

Figure 7-1 Risk Assessment Matrix

Severity	How severe are potential adverse impacts on:			What is the likelihood (risk) of this level of severity?			
	Human-health	Environment	Construction Schedule and/or Project Costs	Very Likely	Likely	Un-Likely	Very Unlikely
Catastrophic	Death, life-threatening injuries, permanent disability/ill health	Catastrophic environmental incident, serious risk and/or damage to onsite or offsite receptors, regulatory involvement, significant onsite and offsite remediation, financial penalties enforced, legal action	Severe delays, significant cost increases, possible project termination	16	15	13	10
Major	Major illness or injury requiring surgery / hospitalisation	Major environmental incident, onsite and offsite contaminant migration, regulatory notification and remediation needed	Lengthy project delays / major cost increases	14	12	9	6
Moderate	Injury or illness requiring treatment and resulting in lost time	Moderate environmental incident, contained onsite, requires some remedial action	Moderate project delays and cost increases	11	8	5	3
Minor	Minor injury or exposure not requiring medical attention	Minor environmental incident, localised	Minor project delays / some additional costs	7	4	2	1

Following this risk assessment system, mitigation measures must be selected as required, with responsibility allocated and the details documented in the relevant table, as part of the ongoing review of the AQMP.

Table 7-1 Air Quality Management

Aspect	Impact	Risk of Impact	Mitigation Criteria or Management Measure	Risk After Mitigation / Management	Responsibility
Pre-construction					
Vehicle movement, remediation, earthworks, stockpile management and materials handling	Generation of dust, air pollution and toxic contaminants from activities and /or wind erosion.	4	Ensure all control equipment required is made available. Assess potential for activities to generate dust, in particular filling operations and vehicle movements, and determine appropriate dust suppression measures. Implement site specific management plans, including AMP and ASSMP etc.	1	Project Manager
Unexpected odours	Significant odours causing nuisance and / or health hazard.	2	Should odours be significant enough to cause nuisance at the site boundary then site management measures for odour control should be adopted.		
Construction					
All works	Release of dust.	7	Implement dust suppression measures appropriate to ensure no dust will migrate from the working area and/or site boundary. These may include use of water carts or dust suppression sprays and work restrictions during windy periods.	1	Project Manager
Operation of plant and equipment	Air pollution from emissions.	2	Ensure equipment and machinery is maintained and switched off when not in use.	1	Site Supervisor
Vehicle movement, handling and transport of soil	Dust generated from earthworks and foundation piling, including materials handling and wheel dust.	4	Cover all loads of excavated material and other erodible materials that are transported to or from the work site. Avoid or restrict dust generating activities during windy periods.	1	Site Supervisor to advise all during induction
Management of stockpiles, exposed areas and general site	Wind erosion of exposed surfaces and stockpiles.	4	Monitor all work areas, stockpiles and skip bins for dust and either wet or cover any affected areas. Minimise soil and vegetation disturbance, in order to minimise dust generation.	1	Site Supervisor
Works being performed	Public complaints regarding dust.	3	Signboard at entry will include contact for site management to be available for members of public after hours, 24 hrs a day, 7 days a week, for any comments and/or complaints, including emergencies.	1	Site Supervisor
Post-construction					
Site rehabilitation of	Wind erosion of exposed	2	Rehabilitate exposed surfaces as soon as feasible, either by	1	Project

Aspect	Impact	Risk of Impact	Mitigation Criteria or Management Measure	Risk After Mitigation / Management	Responsibility
exposed surfaces	surfaces and stockpiles.		revegetation, paving, or providing other covering, in accordance with the approved landscape plan.		Manager / Architect

7.2 Management Measures

Management measures to be implemented at the site with respect to air quality are summarised in **Table 7-2** below.

Table 7-2 Air Quality Management Measures

Action	Responsibility	Timing
For the general public, display the name and contact details of personnel responsible for air quality / environmental management of the site.	Project Manager	Duration of Works
Record all air quality complaints or incidents that generate dust, either on or off-site. Identify the cause(s) and take appropriate measures to reduce emissions in a timely manner. Detail the measures taken, and make the complaints log available to the regulatory authorities when requested.	Site Supervisor / Project Manager	Duration of Works
Perform visual surveillance daily where receptors (Section 3.3) are in close proximity. Take action to resolve any non-conformances and detail within the incidents log.	Site Supervisor	Duration of Works
Increase the frequency of visual surveillance in dry or windy conditions, or while activities with a high potential to generate dust occur.	Project Manager	Duration of Works
If dusty conditions are observed (i.e. 10 m/s average over a 10-minute period (35-40 km/h), stop or relocate activities until conditions improve	Project Manager / Site Supervisor	Duration of Works
Locate stockpile areas and haulage routes in areas to reduce the surface area exposed to prevailing winds where practical. In addition, existing or constructed wind breaks shall be used where practical.	Site Supervisor / Project Manager	Duration of Works
Inform site contractors of daily meteorological conditions as reported, as well as any significant changes that may occur throughout the day.	Site Supervisor	Duration of Works
Prepare and ensure all staff undergo site induction prior to commencing work onsite, and ensure all staff are suitably qualified and experienced for the works to be completed.	Project Manager	Duration of Works

7.3 Mitigation Measures

Mitigation measures to be implemented at the site with respect to air quality are provided in **Table 7-3** below.

Table 7-3 Air Quality Mitigation Measures

Action	Responsibility
Site Preparation and Bulk Excavation	
Erect solid screens or barriers along the site boundary fencing to screen works on site and limit dust migration.	Site Management
Use covered skip bins for all waste, and no burning of wastes is permitted.	
Entry and exit points to the site will be fitted with hardstand material and wheel wash facilities (where required) to limit the amount of material tracked offsite.	
Positioning of Stockpile areas shall be as far as reasonably practicable away from residential areas, places of public access and site boundaries.	

Action	Responsibility
Paved roads will be regularly swept and watered when necessary. Use water assisted road sweepers within the site access and roads surrounding the site to remove any material tracked from the site, as necessary.	
Operation of a water cart on exposed soil areas, unsealed roads and excavation / worked areas during bulk excavation. The water rate will be adjusted accordingly to minimise generation of visible dust and the number and size of the water carts shall be regularly reviewed by the Project Manager to ensure that adequate watering is taking place and dust is kept to a minimum. Care is to be exercised to limit the amount of water used to ensure run-off does not occur and leave the site.	Site Supervisor
Ensure effective water suppression is used during earthworks and soil disturbance activities. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	
Limit the extent of clearing of vegetation and topsoil to the designated footprint required for construction and appropriate staging of any clearing.	
Minimise the exposure of fill and excavated material to active work fronts.	
Ensure sediment and erosion mitigation measures are in place and effective to avoid sediment and stormwater runoff leaving the site.	All Staff
Minimise drop heights for material transport to prevent dust dispersal.	
Ensure all on-road vehicles comply with relevant vehicle emission standards, where applicable, and all vehicles switch off engines when stationary and safe to do so (no idling vehicles).	
Keep site fencing, barriers and scaffolding clean through rinsing with water.	
Cover, or fence stockpiles to prevent wind erosion where they are inactive for extended periods (i.e. for two weeks or more).	
Haulage and Mobile Plant Operations	
Watering of all unsealed internal roadways and haulage routes, as well as fill and bulk excavation areas. The water rate will be adjusted accordingly to minimise generation of visible dust.	
Modify work activities during periods of high winds and/or dry conditions by limiting soil disturbance activity.	
All vehicles on-site will be confined to a designated route with a speed limit of 20 km/hr enforced.	Site Management
Dirt, sand and other materials that have been tracked onto public roads beyond the site boundary will be cleaned using a road sweeper as soon as practicable, but at a frequency of no less than weekly during construction.	
Internal sealed roads that are part of the final design will be constructed first and used, as far as practicable, for construction-related traffic.	
Trips and trip distances will be controlled and reduced, for example by coordinating delivery and removal of materials to avoid unnecessary trips.	
Dirt tracked from the site from construction traffic will be managed using shaker grids and/ or wheel cleaning. If thorough washing can be achieved, wheel washing may be carried out without a specific device, e.g. washing using a tide/ hose.	All Staff
All trucks delivering fill or leaving the site with spoil material will have their load covered.	

Action	Responsibility
Construction Works	
Rehabilitate exposed surfaces as soon as feasible, either by revegetation, paving, or providing other covering. Rehabilitation is to be consistent with approved landscape plan.	Site Management
Construction activities shall be re-programmed so that work which could cause a nuisance or danger to people or property is carried out during periods of little wind.	
Ensure effective water suppression is used during earthworks and soil disturbance activities. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	All Staff
Only use cutting, grinding or sawing equipment that is fitted with, or in conjunction with suitable dust suppression techniques such as water sprays, exhaust ventilation etc. and avoid or restrict dust generating activities during windy periods.	
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period of time, or during dry windy weather conditions.	

7.4 Mitigation Measures for VOCs

Should volatile gases be identified as a concern, an investigation will be conducted to determine the source of the emissions, and to evaluate the appropriate mitigation measures to be implemented. These measures may include the following actions:

- Alteration in the works program to minimise the extent of disturbed open areas;
- Prompt removal and treatment of contaminated materials that have been exposed and are the source of the emissions;
- Use of fine mist sprays around the excavation area;
- Use of odour suppressants;
- Conducting the work in more favourable weather conditions;
- Use of alternate work practices to minimise the period of impact of the emissions;
- Use of additional features to control emissions from plant and equipment;
- Use of alternate work practices such as using modified equipment;
- Relocation of offending plant and equipment to less sensitive on-site areas;
- Reducing the number of plant and equipment items on-site;
- Covering the exposed areas or stockpiles; and
- Use of deodorants or masking agents.

7.5 Suppression Improvements Plan

Dust and emissions will be suppressed to the practical extent, and in addition to the mitigation and management measures detailed above, improvement measures are provided in **Table 7-4** below, for the mitigation of expected non-conformances.

Table 7-4 Suppression Improvements Plan

Trigger Action	Contingency Measure
Visible dust leaving the boundaries or where visual surveillance identifies a potential issue (Section 6.3)	▪ Apply dust suppression techniques (i.e. water; use of covers; stabilisation of stockpiles); ▪ Assess wind conditions and stop work if strong; ▪ Use of windbreaks, netting screens or semi-permeable fences; ▪ enclosing shielding or providing filters on plant likely to generate excessive quantities of dust (e.g. dust extractors, filters and collectors on drilling rigs); ▪ stopping or relocating construction activities during periods of consistently high wind, i.e. 10 m/s average over a 10-minute period (35-40 km/h) until the wind velocity stops; ▪ Water spraying will be undertaken; ▪ Speed limits on unsealed access tracks will be reduced to 10 km/h (or lower if required) to further limit dust travelling to the nearest site receptor.
Air quality complaints received for the project	Once complaint is received, conduct an investigation to verify the complaint, which includes: ▪ Review most recent dust monitoring results for locality and advise Environmental Consultant for further direction. Additional monitoring may be required, and should consider positioning of monitors at each of the site boundary's, for the collection of TSP and PM₁₀ (at least); ▪ Assess results against air quality goals and determine the need for corrective action; ▪ Discuss results with affected residents, and discuss an approach for corrective action. Action may include: ▸ Replanting or sealing completed works as soon as possible; ▸ If the project continues to receive complaints or non-conformances, further dust control measures are to be implemented such as wind fencing, matting or mulching.
Nuisance odour detected at or beyond the site boundary Complaint received	▪ Assess wind conditions and stop work if strong; ▪ Remove odour-generating material from site; ▪ Use of odour suppressants and vapour barriers; ▪ Enclosing shielding or providing filters on plant likely to generate excessive quantities of dust (e.g. dust extractors, filters and collectors on drilling rigs); ▪ Stopping or relocating construction activities during periods of consistently high wind, i.e. 10 m/s average over a 10-minute period (35-40 km/h) until the wind velocity stops.
Excessive smoke / vehicle emissions Complaint received	▪ Cease use of mobile plant; and ▪ Consult mechanic, and remove from site until resolved.
Additional asbestos or other air quality contaminants identified	▪ Stop work, and isolate the area from all foot and road traffic. Inform Site Supervisor and/or Project Manager and contact Environmental Consultant; ▪ Follow the Unexpected Finds Protocol developed for the site; and ▪ Do not proceed with works until advised by Environmental Consultant.

8. Statement of Limitations

This AQMP is based on published guidelines and regulations, as referenced throughout the document.

As a sub-plan, this AQMP has been prepared to describe practical measures to be implemented primarily in order to minimise any detrimental impact on the surrounding environment resulting from the site establishment, demolition, earthworks, construction and post-construction phases of the project.

While this AQMP provides overall guidance and direction for dust and odour management, a number of Work Method Statements will need to be prepared for use in site-specific situations.

This report was prepared for Aqualand Projects Pty Ltd and no responsibility is accepted for use of any part of this report in any other context or for any other purpose or by other third parties. This report does not purport to provide legal advice.

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References

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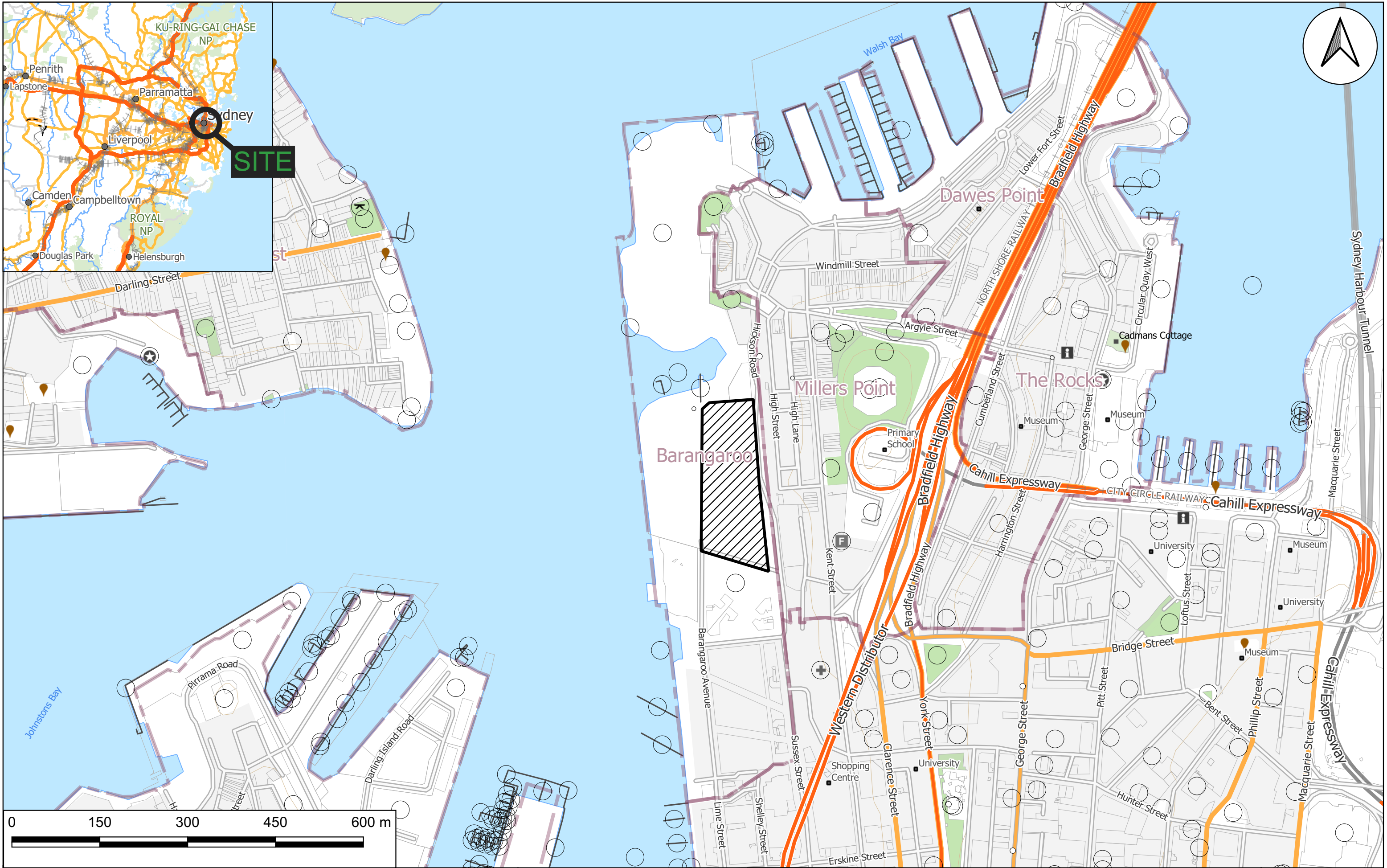
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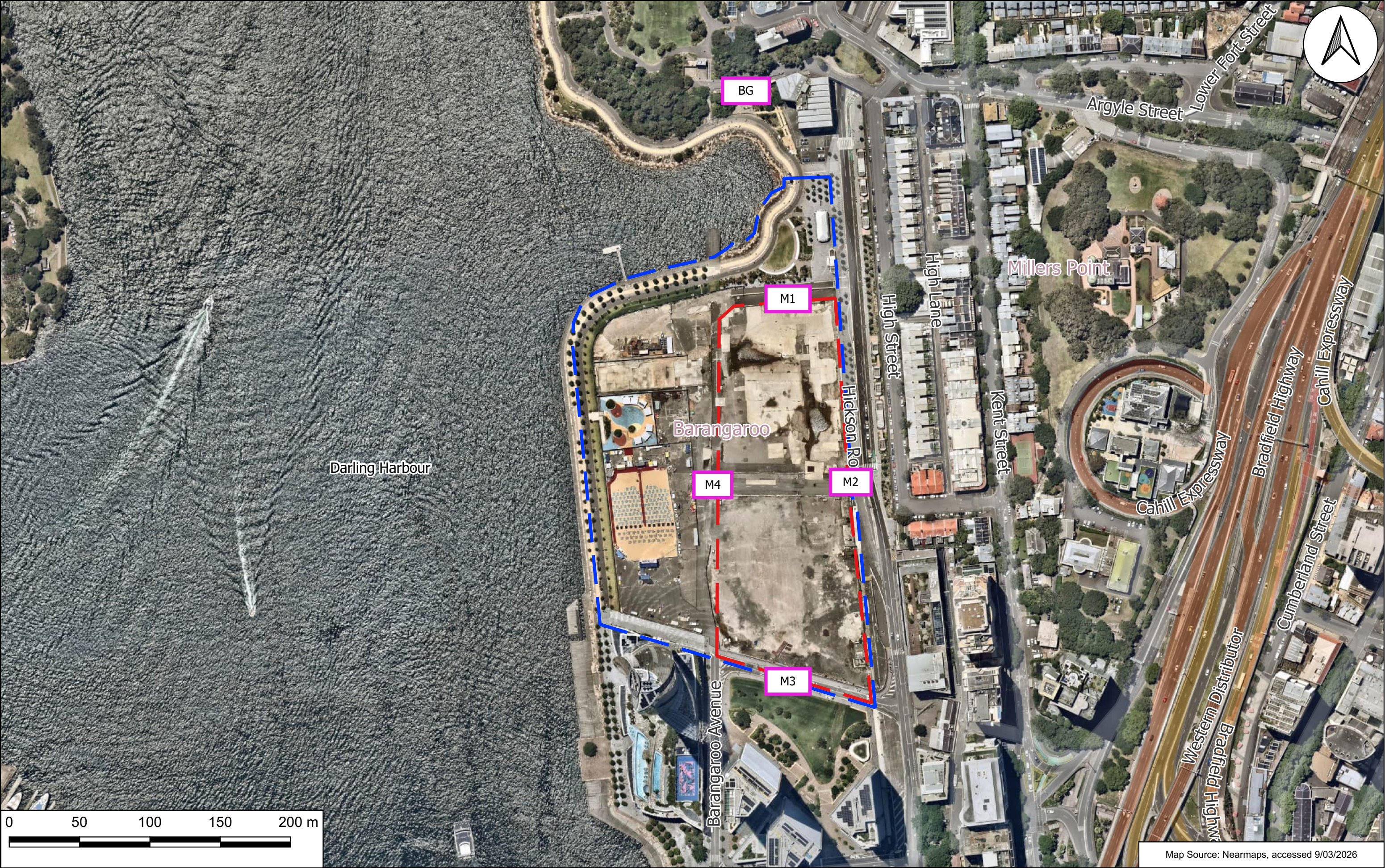
Abbreviations

AQMP	Air Quality Management Plan
AS	Australian Standard
CEMP	Construction Environmental Management Plan
DP	Deposited Plan
EPA	Environment Protection Authority (of New South Wales)
km	Kilometres
LGA	Local Government Area
m	Metres
mAHD	Metres Australian Height Datum
mBGL	Metres Below Ground Level
NO _x	Nitrous Oxide
NO ₂	Nitrous Dioxide
POEO	Protection of the Environment Operations
PM _{2.5}	Particulate matter (<2.5 microns) being a measure of dust.
PM ₁₀	Particulate matter (<10 microns) being a measure of dust.
SO ₂	Sulfur Dioxide
TSP	Total Suspended Particulate
VOC	Volatile Organic Compounds

Appendix A – Figures



LEGEND Note: All locations are approximate  Site Location		 Practical Solutions for Built Environments Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088		Aqualand Projects Pty Ltd Air Quality Management Plan Central Barangaroo, Hickson Road, Millers Point NSW Site Locality Plan		Figure: 1 Project: E27048.E21	
		Drawn: N.J.					
		Approved: L.W.					
		Date: 09/03/2026					



LEGEND Note: Areas are approximate Central Barangaroo Proposed Monitoring Location Site Outline	 Practical Solutions for Built Environments Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088	Drawn: N.J.	Aqualand Projects Pty Ltd Air Quality Management Plan Central Barangaroo, Hickson Road, Millers Point NSW Porposed Monitoring Location	Figure: 2