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# Appendix B7

## Construction Air Quality Management Sub-plan

M12 Motorway

November 2021

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# Document control

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|---|---|
| **File Name** | M12PPW-ADAP-ALL-EN-PLN-000018_CAQMP |
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# Approval and authorisation

| Plan reviewed by: | Plan reviewed by: |
|---|---|
| Suzette Graham<br>TfNSW Environment and Sustainability Manager | Deanne Forrest<br>TfNSW Project Director, M12 |
| 05.11.2021 | 8/11/2021 |
| | |

# Revision history

| Revision | Date | Description |
|---|---|---|
| A | 14/10/2020 | First draft for TfNSW review |
| B | 05/11/2020 | Response to TfNSW comments |
| C | 21/11/2020 | Response to TfNSW comments |
| D | 30/07/2021 | Updated with Final NSW and Commonwealth CoA |
| E | 07/09/2021 | Response to TfNSW and ER comments |
| F | 01/10/2021 | Close out of ER comments |
| G | 02/11/2021 | Response to comments received during consultation |

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## Appendices



## Figures



## Tables

# Glossary/ Abbreviations

| Term | Expanded text |
|---|---|
| AQI | Air quality index |
| AQMS | Air Quality Monitoring Station |
| ARSR | Amendment Report to the Submissions Report |
| AWS | Automatic Weather Station |
| BoM | Bureau of Meteorology |
| CAQMP | Construction Air Quality Management Sub-plan |
| CCLMP | Construction Contaminated Land Management Sub-plan |
| CSWMP | Construction Soil and Water Management Sub-plan |
| CWRMP | Construction Waste and Resources Management Sub-plan |
| CMS | Complaints Management System |
| CO | Carbon monoxide |
| CoA | Conditions of Approval |
| Construction | Includes all activities required to construct the CSSI as described in the documents listed in Condition A1, including commissioning trials of equipment and temporary use of any part of the CSSI, but excluding Low Impact Work which is carried out to complete prior to the approval of the CEMP, works approved under a Site Establishment Management Plan, demolition of acquired residential houses, structures and sheds, and works specified in Appendix B and approved under an environmental management plan(s) in accordance with Condition A24. |
| CSSI | Critical State Significant Infrastructure |
| DAWE | Commonwealth Department of Agriculture, Water and the Environment |
| DEC | Former Department of Environment and Conservation |
| DECC | Former Department of Environment and Climate Change |
| DECCW | Former Department of Environment, Climate Change and Water, now EES |
| DPIE | Department of Planning, Industry and Environment |
| EES | Environment, Energy and Science |
| EIS | Environmental Impact Statement |

| Term | Expanded text |
|---|---|
| EMS | Environmental Management System |
| Environmental Assessment Documentation | Collective reference to the M12 EIS, Submissions Report and Amendment Report and supplementary reports as detailed in NSW CoA A1. |
| Environmental Representative | A suitably qualified and experienced person independent of project design and construction personnel employed for the duration of construction. The principal point of advice in relation to all questions and complaints concerning environmental performance. |
| EPA | NSW Environment Protection Authority |
| EP&A Act | *NSW Environmental Planning and Assessment Act 1979* |
| EPBC Act | Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* |
| EPL | Environmental Protection Licence |
| EU | European Union |
| ER | Environmental Representative |
| ERG | Environmental Review Group |
| ESR | Environmental Site Representative |
| ESM | Environment and Sustainability Manager |
| EWMS | Environmental Work Method Statements |
| FCC | Fairfield City Council |
| km | Kilometres |
| LCC | Liverpool City Council |
| LGAs | Local Government Areas |
| MP | Monitoring Program |
| NEPC | National Environment Protection Council |
| NEPM | National Environment Protection Measure |
| $NO_2$ | Nitrogen dioxide |
| OCEMP | Overarching Construction Environmental Management Plan |
| OCS | Overarching Communication Strategy |
| OEH | NSW Office of Environment and Heritage, now part of EES |

| Term | Expanded text |
|---|---|
| Planning Secretary | Secretary of the NSW Department of Planning and Environment, or delegate |
| $PM_{10}$ | Particulate matter 10 micrometres or less in diameter |
| $PM_{2.5}$ | Particulate matter 2.5 micrometres or less in diameter |
| POEO Act | *Protection of Environment Operations Act 1997* |
| Primary CoA/REMM | CoA/REMM that are specific to the development of this Plan |
| QA | Quality Assurance |
| REMM | Revised Environmental Management Measure |
| SAP | Sensitive Area Plans |
| SEARs | Secretary's Environmental Assessment Requirements |
| Secondary CoA/REMM | CoA/REMM that are related to, but not specific to, the development of this Plan |
| SEMP | Site Establishment Management Plan |
| TfNSW | Transport for New South Wales (formerly Roads and Maritime Services (RMS)) |
| TSP | Total suspended solids |
| VOC | Volatile organic compound |
| Work | Any physical work to build or facilitate the building of the CSSI, including low impact work, environmental management measures and utility works.<br><br>However, it does not include activities that inform or enable detailed design of the CSSI and generate noise that is no more than 5 dB(A) above the rating background level at any sensitive receiver. |
| WSIA | Western Sydney International Airport |
| WSP | Western Sydney Parklands |

# 1 Introduction

## 1.1 Context

This Construction Air Quality Management Sub-plan (CAQMP or Plan) forms part of the Overarching Construction Environmental Management Plan (OCEMP) for the M12 Motorway (the Project).

This CAQMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the Revised Environmental Management Measures (REMMs) listed in the M12 Motorway Environmental Impact Statement (EIS), Amendment Report, and Amendment Report Submissions report (ARSR), all applicable legislation and Transport for New South Wales (TfNSW) Quality Assurance (QA) Specifications.

## 1.2 Background

Transport for New South Wales (TfNSW) is planning to construct and operate the M12 Motorway (the Project) to provide direct access between the Western Sydney International Airport (WSIA) at Badgerys Creek and Sydney's motorway network. The M12 Motorway will run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for about 16 kilometres (km) and is expected to be opened to traffic prior to opening of the WSIA.

The Project will be constructed in three separate stages under four separate construction contracts:

- M12 West (construct only contract) – between The Northern Road, Luddenham and about 250 metres east of Badgerys Creek
- M12 Central (construct only contract) – between about 500 metres west of South Creek and the Western Sydney Parklands at Duff Road, Cecil Park
- M12 East (construct only contract) Elizabeth Drive connections, south of Cecil Park
- M12 East (design and construct contract) – the M7/M12 interchange.

The Project is subject to an approval under Division 5.2 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) as Critical State Significant Infrastructure (CSSI). The Project is also a controlled action under Section 75 of *the Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), requiring a separate approval from the Australian Minister for the Environment.

An EIS was prepared to describe and assess the Project and recommend management measures to address impacts. The EIS was exhibited by the NSW Department of Planning, Industry and Environment (DPIE) for 34 days from 16 October 2019 to 18 November 2019 to give the community and stakeholders the opportunity to provide comment.

In accordance with Section 5.17 of the EP&A Act, the Planning Secretary requested TfNSW to provide a response to submissions. These were addressed within the Submission Report. Due to design developments since the exhibition of the EIS, an Amendment Report was developed to assess the impacts of these amendments. The Amendment Report was exhibited by DPIE for 14 days from 21 October 2020 to 4 November 2020. Following exhibition of the Amendment Report, an Amendment Report Submissions Report (ARSR) was developed in December 2020 to provide a response to submissions on the Amendment Report. Further, supplementary information was

provided via an amendment to the ARSR in March 2021. Collectively the EIS, Submission Report, Amendment Report, ARSR and ARSR amendment are herein referred to as Environmental Assessment Documentation.

Approval for the Project under the EP&A Act was granted by the Minister for Planning on 23 April 2021 (SSI 9364). Approval for the Project under the EPBC Act was granted by the Federal Minister for the Environment on 3 June 2021 (EPBC 2018/8286).

The EIS assessed the impacts of construction of the Project on air quality. As part of EIS development, a detailed Air Quality Assessment Report was prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Industry and Environment (DPIE) and the Commonwealth EIS Guidelines issued by the Commonwealth Department of the Water, Agriculture and Environment (DAWE). The air quality assessment was included in the EIS as Appendix P.

Further assessment of impacts on air quality was carried out subsequent to exhibition of the EIS and incorporated into the Amendment Report. The additional assessment considered impacts on air quality due to refinements in the Project design, including changes in the Project footprint and additional ancillary facilities and associated activities.

REMMs were provided within the Amendment Report and further updated in the ARSR. Where applicable, the REMMs from the ARSR have been included in this Plan. Further, design development has progressed, providing additional environmental assessment, and where relevant, this detail has been included within this Plan.

The detailed Project description is outlined in Section 2 of the OCEMP.

## 1.3 Scope of the Plan

The scope of this overarching CAQMP is to describe how the Construction Contractors propose to manage potential air quality impacts during construction of the Project. The Construction Contractor responsible for each section of the Project (M12 West, M12 Central, both M12 East (Elizabeth Drive connections) and M12 East (M7/M12 interchange) must use this CAQMP as the basis for their stage-specific CAQMP, considering relevant sensitive receivers and construction activities.

The SMART (Specific, Measurable, Achievable, Realistic and Timely) principles have been considered in the preparation of this CAQMP.

Operational air quality impacts and operation measures do not fall within the scope of this CAQMP and therefore are not included within the processes contained within this CAQMP.

## 1.4 Environmental Management Systems overview

The overarching Environmental Management System (EMS) for the Project is described in Section 3 of the OCEMP. The Construction Contractor delivering the Project will have an EMS consistent with the overarching EMS described in the OCEMP. The Construction Contractor will develop stage-specific CAQMPs in accordance with the OCEMP, the Environment Protection Licence (EPL) and their EMS.

This overarching CAQMP forms part of the environmental management framework for the Project, as described in Section 3 of the OCEMP.

The Construction Contractor will be required to develop, as part of their stage-specific CAQMPs, detailed procedures and, plans to address specific requirements of the CoA and REMMs identified in this overarching CAQMP. The purpose of these environmental management documents in regard to minimisation and management of impacts on air quality associated with the Project, is outlined in Section 7 of this CAQMP.

The Construction Contractor will ensure that management of air quality is carried out in accordance with this CAQMP and the Construction Contractor's stage-specific CAQMP. A copy of all CAQMPs will be kept on the Construction Contractor's premises for the duration of construction.

The CAQMP should be read in conjunction with the Sustainability Strategy. The Sustainability Strategy includes objectives and targets for the delivery of the Project commitments to sustainability and that are relevant and complementary to the management measures outlined in this CAQMP.

Management measures identified in this CAQMP may also be incorporated into site or activity specific Environmental Work Method Statements (EWMS). EWMS incorporate appropriate mitigation measures and controls and identify key procedures to be used concurrently with the EWMS. A EWMS template for use by the Construction Contractors is provided in Appendix A8 of the OCEMP. Appendix A8 also contains a template EWMS register and template EWMS training register.

EWMS will be prepared by the Construction Contractor's Environmental Site Representatives (ESR) and reviewed by the TfNSW Environment and Sustainability Manager (ESM) (or delegate) and independent Environmental Representative (ER) before the commencement of the construction activities to which they apply. Construction personnel undertaking a task governed by a EWMS will undertake the activity in accordance with the mitigation and management measures identified in the EWMS.

Used together, the OCEMP, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by TfNSW and its Construction Contractors.

### 1.4.1 CAQMP preparation, endorsement and approval

This overarching CAQMP has been prepared to satisfy the NSW CoA in relation to air quality management during construction of the Project, particularly NSW CoA C4(g).

This CAQMP will be reviewed by the TfNSW Project Director and the ESM (or delegate) and endorsed by the ER prior to submission to the Planning Secretary for approval. This CAQMP will be submitted for the approval of the Planning Secretary no later than one month before commencement of construction of the Project in accordance with NSW CoA C9.

This CAQMP includes a Construction Air Quality Monitoring Program (Appendix C). This Program is not required by the NSW CoA and doesn't require Planning Secretary approval. The Program will be reviewed by the TfNSW Project Director, ESM (or delegate) and the ER.

### 1.4.2 Interactions with other management plans and strategies

This Plan has the following interrelationships with other management plans and documents:

- Sensitive Area Plans (SAP) and Site Establishment Management Plan(s) (SEMP), which identify adjacent residential and other receivers. The SEMP include details of site-specific air quality management requirements
- Overarching Communication Strategy (OCS), which details procedures and processes for community notification, consultation and complaints management
- Construction Soil and Water Management Plan (CSWMP), which identifies procedures for minimising erosion within the construction footprint
- Construction Contaminated Land Management Plan (CCLMP), which identifies measures to manage identified areas of contamination and potential Acid Sulphate Soils that may generate offensive odours and/or gases
- Construction Flora and Fauna Management Plan (CFFMP) which identifies the management measures to minimise impacts to flora and fauna, including impacts from dust and emissions
- Construction Waste and Resources Management Plan (CWRMP), which identifies the appropriate storage, handling, treatment, reuse, recycling and/or disposal of construction waste material, that may generate offensive odours and/or gases
- The Sustainability Strategy sets out a framework covering energy management, workforce travel, resource use and procurement to minimise and manage greenhouse gas (GHG) emissions.

## 1.5 Consultation

### 1.5.1 Consultation for preparation of the CAQMP

The following government agencies and stakeholders have been consulted with during the development of this CAQMP, in accordance with NSW CoA C4(g):

- Penrith City Council
- Liverpool City Council
- Fairfield City Council.

In accordance with NSW CoA A5 (b), Table 1-1 provides a log of engagement or attempted engagement with the identified government agencies and stakeholders.

Table 1-1: Log of engagement with government agencies and stakeholders

| Agency | Date | Person Contacted | Comment | Consultation Status |
|---|---|---|---|---|
| Fairfield City Council | 6 October 2021 | FCC Representative | TfNSW emailed CAQMP to FCC requesting comment. | Open |
| | 8 October 2021 | TfNSW Representative | Response received from FCC requesting an extension for review of the CAQMP. | Open |
| | 8 October 2021 | FCC Representative | TfNSW accepted the request for an extended consultation period until the 29 October 2021. | Open |

| Agency | Date | Person Contacted | Comment | Consultation Status |
|---|---|---|---|---|
| | 26 October 2021 | TfNSW Representative | Response received from FCC via email (See Appendix A) accepting the CAQMP. Consultation closed | Closed |
| Penrith City Council | 6 October 2021 | PCC Representative | TfNSW emailed CAQMP to PCC requesting comment. | Open |
| | 21 October 2021 | PCC Representative | TfNSW followed up the PCC Representative via email. | Open |
| | 22 October 2021 | TfNSW Representative | Response received from PCC via email (See Appendix A) accepting the CAQMP. Consultation closed | Closed |
| Liverpool City Council | 6 October 2021 | LCC Representative | TfNSW emailed CAQMP to LCC requesting comment. | Open |
| | 21 October 2021 | LCC Representative | TfNSW followed up the LCC Representative via email and received no response. | Open |
| | 29 October 2021 | LCC Representative | LCC Representative notified that consultation has been closed. | Closed |

In accordance with NSW CoA C4 and A5, the consolidated evidence of consultation undertaken for the preparation of this CAQMP will be submitted to the Planning Secretary as part the document submission. The consolidated evidence of consultation includes:

- Documentation of the engagement with the parties identified above that occurred prior to submitting the document to the Planning Secretary for approval
- Log of the points of engagement or attempted engagement with the identified parties
- Documentation of the follow-up with the identified parties where engagement has not occurred to confirm that they do not wish to engage or have not attempted to engage after repeated invitations
- Outline of the issues raised by the identified parties and how they have been addressed (including cross references to the section or Sub-plan of the OCEMP where the issue has been addressed)
- Description of the outstanding issues raised by the identified parties and the reasons why they have not been addressed.

### 1.5.2 Ongoing consultation during construction

Ongoing consultation between TfNSW, Construction Contractors, stakeholders, the community and relevant agencies regarding the management of impacts on air quality will be undertaken during

the construction of the Project as required. The process for the consultation will be documented in the OCS.

# 2 Purpose and objectives

## 2.1 Purpose

The purpose of this CAQMP is to describe how each Construction Contractor will manage potential air quality impacts during construction of the Project.

## 2.2 Objectives

The key objective of this CAQMP is to ensure that air quality impacts to the local community and the built environment from construction of the Project are minimised. To aid in achieving this objective all CoA, REMMs and licence/permit requirements relevant to air quality are described, scheduled and assigned responsibility as outlined in the:

- Environmental Assessment Documentation
- NSW CoA granted to the Project on 23 April 2021
- TfNSW QA Specifications
- All relevant legislation and other requirements described in Section 3.1 of this Plan.

## 2.3 Targets

Targets for the management of air quality impacts during the Project include:

- Full compliance with the relevant legislative requirements, CoA and REMMs
- Manage complaints from the community and stakeholders in accordance with the complaints management process detailed in Section 8.3
- Manage potential air quality / dust impacts during the construction of the Project through the implementation of feasible and reasonable air quality management measures, such as those detailed in Section 7
- All construction personnel to be undergo site induction training which will include detail on best practise for air quality management
- Achieve compliance of mobile non-road diesel plant and equipment with the relevant United States Environmental Protection Agency, European Union (EU) standards or approved equivalent emission standards, where possible.

# 3 Environmental requirements

## 3.1 Relevant legislation and guidelines

### 3.1.1 Legislation

Legislation and regulations relevant to air quality management includes:

- *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 2010*
- *Protection of the Environment Operations (General) Regulation 2009*, Part 5.4 Air pollution
- *National Greenhouse and Energy Reporting Act 2007 (NGER Act)*.

Relevant provisions of the above legislation are identified in the register of legal requirements included in Appendix A1 of the OCEMP.

### 3.1.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this CAQMP, including the Construction Air Quality Monitoring Program provided in Appendix C, include:

- National Environment Protection Measure for Ambient Air Quality (AAQ NEPM) National Environment Protection Council (NEPC, 2016) National Environment Protection Measure for Air Toxics (Air Toxics NEPM) (NEPC, 2011)
- Australian Standard AS 3580.1.1-2007 Methods of Sampling Analysis of Ambient Air. Part 1.1 Guide to Siting Air Monitoring Equipment
- Australian Standard AS 3580.10.1-2016 Methods of Sampling Analysis of Ambient Air. Determination of Particulate Matter – Deposited Matter - Gravimetric Method
- *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* (NSW EPA, 2017)
- *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (Department of Environment and Conservation (DEC, 2005)
- *Air Emissions Inventory for the Greater Metropolitan Region in New South Wales* (EPA, 2012)
- *Guidance on the assessment of dust from demolition and construction Version 1.1* (UK IAQM, 2014)
- *Air Quality Monitoring in the Vicinity of Demolition and Construction Sites* (UK IAQM, 2018)
- *Technical Framework: Assessment and management of odour from stationary sources in NSW* (DEC, 2006)
- *Managing Urban Stormwater: Soils and Construction, Volume 1 (Landcom, 2004) and Volume 2* (Department of Environment and Climate Change (DECC), 2008) (the “Blue Book”)

- *Air Quality Monitoring Criteria for Deposited Dust* (DEC Guideline)
- *Government Resource Efficiency Policy* (NSW Office of Environment and Heritage (OEH, 2014)
- *Environmental Sustainability Strategy 2019-2023* (Roads and Maritime, 2021).

## 3.2 Minister's Conditions of Approval

The primary NSW CoA relevant to the development of this CAQMP are listed in Table 3-1 below. Secondary conditions relevant to this Plan have been listed in Appendix B. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-1: Primary NSW CoAs

| CoA No. | Condition Requirements | Applicability | | | Document Reference |
|---|---|---|---|---|---|
| | | M12 West | M12 Central | M12 East | |
| C4 | The following CEMP Sub-plans must be prepared in consultation with the relevant government and other agencies identified for each CEMP Sub-plan. Details of all information requested by an agency during consultation must be provided to the Planning Secretary as part of any submission of the relevant CEMP Sub-plan, including copies of all correspondence from those agencies as required by Condition A5.<br>(g) Air Quality and Odour - Relevant Council(s) | ✓ | ✓ | ✓ | Section 1.5.1 |
| C5 | The CEMP Sub-plans must state how: | | | | |
| | a) The environmental performance outcomes identified in the documents listed in Condition A1 will be achieved | ✓ | ✓ | ✓ | Section 2.3 |
| | b) The mitigation measures identified in the documents listed in Condition A1 will be implemented | ✓ | ✓ | ✓ | Section 3.2<br>Section 3.3 |
| | c) The relevant terms of this approval will be complied with | ✓ | ✓ | ✓ | Section 3.2<br>Appendix B |

| CoA No. | Condition Requirements | Applicability | | | Document Reference |
|---|---|---|---|---|---|
| | | M12 West | M12 Central | M12 East | |
| | d) Issues requiring management during construction (including cumulative impacts), as identified through ongoing environmental risk analysis, will be managed through SMART (Specific, Measurable, Achievable, Realistic and Timely) principles. | ✓ | ✓ | ✓ | Section 1.3 |
| E1 | In addition to the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1, all practicable measures must be implemented to minimise and manage the emission of dust and other air pollutants during the construction of the CSSI. | ✓ | ✓ | ✓ | Section 7 |

## 3.3 Revised Environmental Management Measures

The primary REMMs relevant to the development of this Plan are listed in Table 3-2 below. Secondary REMMs relevant to this Plan are listed in Appendix B. A cross reference is also included to indicate where the REMM is addressed in this Plan or other Project documents.

Table 3-2: Primary REMMs

| ID | Measure/Requirement | Timing | Applicability | | | CAQMP Reference |
|---|---|---|---|---|---|---|
| | | | M12 West | M12 Central | M12 East | |
| AQ01 | A Construction Air Quality Management Plan (CAQMP) will be developed and implemented for the project to manage potential air quality impacts associated with construction. The CAQMP will identify activities that may results in air quality impacts and associated mitigation measures to avoid or minimise these impacts.<br>The CAQMP will provide: | Prior to and during construction | ✓ | ✓ | ✓ | This Plan |
| | • Measures to minimise dust generation associated with earthworks and other activities that disturb the ground surface, stockpiles, and haulage routes | | ✓ | ✓ | ✓ | Table 7-1 |
| | • Measures to minimise emissions from machinery and vehicles associated with the project | | ✓ | ✓ | ✓ | Table 7-1 |
| | • Procedures for inspection, monitoring and addressing any impacts where required.<br>The CAQMP will be implemented for the duration of construction. | | ✓ | ✓ | ✓ | Section 8.5.1<br>Appendix C |

## 3.4 TfNSW QA Specifications

The TfNSW QA Specifications set out the minimum requirements for the detailed outcomes in terms of quality or performance expected in the finished product for construction projects and are relevant to various construction activities on work sites to minimise impacts to the environment.

The Construction Contractor will incorporate the appropriate M12 TfNSW QA Specifications into the stage-specific CAQMPs including the requirements from, but are not limited to:

- G36 – Environmental Protection
- G38 – Soil and Water Management (Soil and Water Management Plan)
- R272 – Automatic Weather Stations.

The specifications set out environmental protection requirements, including Hold Points that must be complied with by the Construction Contractors during construction of the Project. A Hold Point is a point beyond which a work process must not proceed without express written authorisation from TfNSW.

# 4 Existing environment

This section summarises the existing air quality conditions within and adjacent to the Project corridor, based on information contained in the Environmental Assessment Documentation. The information provided below comprises the baseline data used for the Construction Air Quality Monitoring Program (Appendix C). As referenced in the Amendment Report, it is considered that the baseline data obtained during the EIS is sufficiently comprehensive and that no further baseline data will be required to be collected by the Construction Contractors.

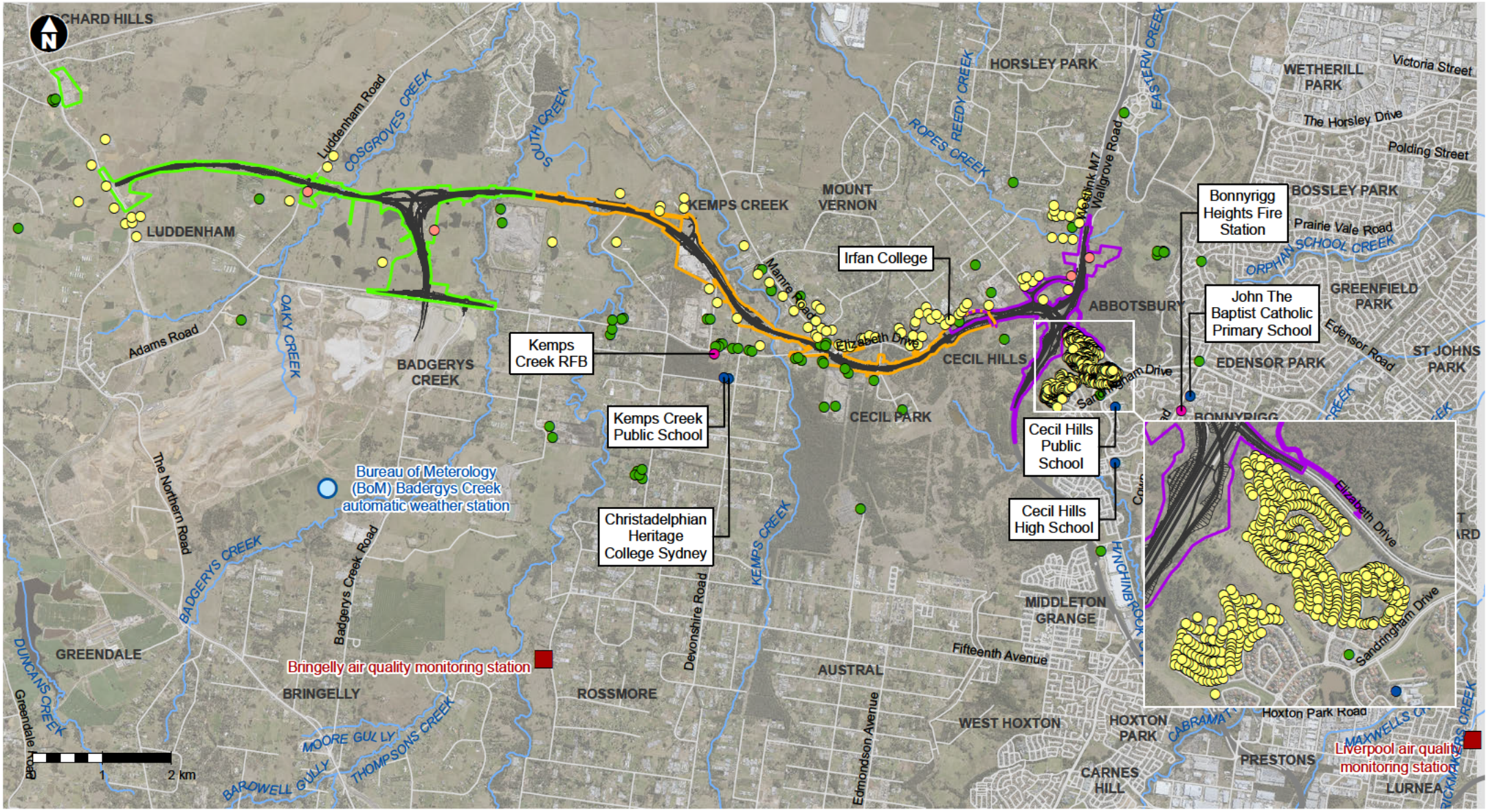
## 4.1 Surrounding receivers

The Project is situated within three local government areas (LGAs); Penrith to the north, Fairfield to the east and Liverpool to the south. The Project will traverse the following suburbs from east to west; Abbotsbury, Cecil Park, Cecil Hills, Mount Vernon, Kemps Creek, Badgerys Creek and Luddenham.

Generally, existing land uses near the Project are characterised by large rural and grazing properties at Luddenham to the west, transitioning to a mix of intensive agriculture (horticulture and animal production) and resources at Kemps Creek, and rural residential, commercial and parkland in Mount Vernon and Cecil Hills in the east.

The site of the WSIA at Badgerys Creek is located to the south of Elizabeth Drive on land that was previously used for agricultural (grazing) purposes, however, bulk earthworks for WSIA have now progressed. The Project will also pass through the Western Sydney Parklands (WSP) at its eastern extent. Sensitive receivers (locations where sensitive land uses take place, including residences, schools and hospitals) near the Project are shown in Figure 4-1.

The Construction Contractors will show the locations of the sensitive receivers on the updated stage-specific SAPs (refer to Appendix A6 of the OCEMP).




Project construction boundary (CA for West and Central, Jul 2021; ARSR for East, Dec 2020)

- M12 West
- M12 Central
- M12 East
- M12 Motorway (The Project)

- Existing motorway
- Existing road
- Waterways

Receivers

- Educational facility
- Emergency services
- Residential
- Receiver to be removed once construction commences
- Commercial

- OEH air quality monitoring location
- BoM automatic weather station

**Figure 4-1** Surrounding sensitive receivers

## 4.2 Climatic conditions

Long term mean climate data recorded at the Bureau of Meteorology (BoM) Badgerys Creek automatic weather station (AWS) (BoM station no. 067108) has been adopted to represent the climatic conditions at the Project. An average of key monthly climate data statistics from the Badgerys Creek AWS for the period 2014-2018 is provided in Table 4-1.

Table 4-1: Monthly climate data (Badgerys Creek AWS)

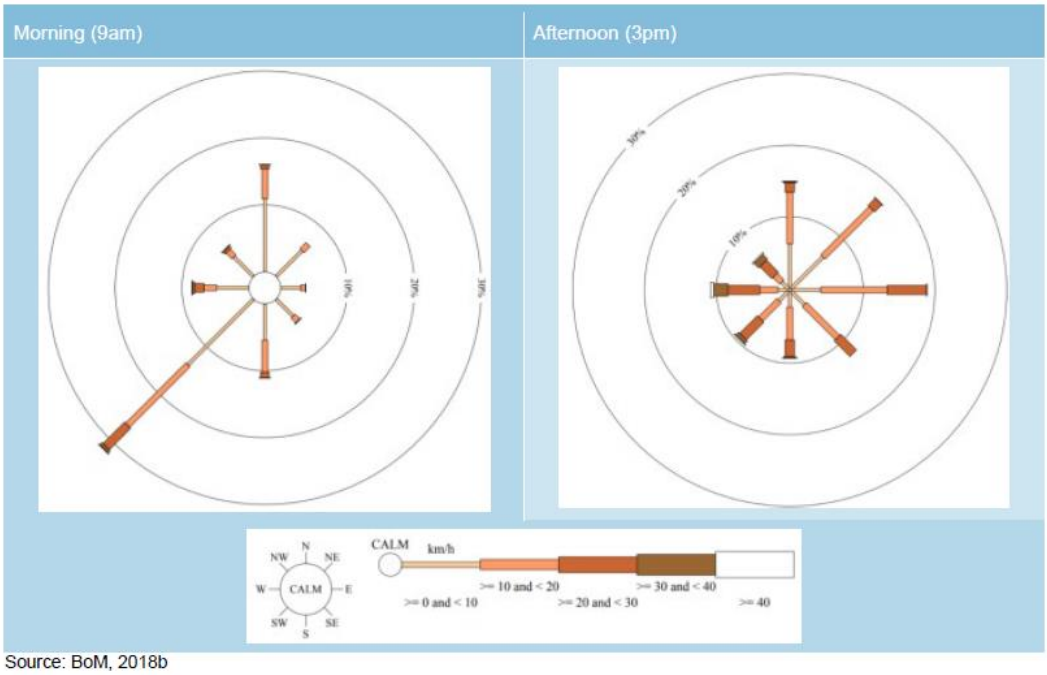
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean max. temperature (°C) | 30.1 | 28.1 | 26.9 | 24.1 | 20.8 | 17.8 | 17.4 | 19.2 | 22.6 | 24.9 | 26.4 | 28.5 |
| Mean min. temperature (°C) | 17.1 | 17.1 | 15.3 | 11.5 | 7.7 | 5.6 | 4.1 | 4.7 | 7.7 | 10.4 | 13.5 | 15.5 |
| Mean rainfall (mm) | 79.4 | 98.5 | 81.3 | 49.4 | 37.0 | 61.8 | 23.6 | 36.8 | 32.3 | 51.4 | 69.0 | 57.1 |
| Mean number of rain days (>1 mm) | 7.0 | 7.3 | 7.4 | 5.7 | 3.8 | 5.6 | 3.9 | 3.5 | 4.6 | 5.5 | 6.9 | 6.6 |

In general, the Project site experiences warm and wet summers (December to February) with mean daily maximum temperatures between 28 and 30 degrees Celsius. Early spring is the driest season, with average monthly rainfall from July to September around 31 millimetres per month. The average annual rainfall is 680.9 millimetres over an average of 67.8 rain days per year.

Climatic factors such as prolonged dry weather, combined with high winds and high evaporation, can increase the likelihood of dust particulate emissions. Local wind conditions, including speed and direction, can affect which receivers are most likely to be affected by dust emissions.

Meteorological data collected at Badgerys Creek AWS from 2014 to 2018 identified that average wind speeds are lowest during night time and early morning periods, increasing to around 2 metres per second at 9 am and further increasing to nearly 4 metres per second at 4 pm, before decreasing back below 2 metres per second at 9 pm. Winds blowing from the south-west and north are most common in the morning. Winds blowing from the north through to the south-east are prevalent in the afternoons. This indicates that receivers to the north-east and south of Project will be most likely to experience winds blowing from the direction of the Project during mornings; and receivers orientated to the south through to the north–west in the afternoons.

Figure 4-2 shows the long-term morning and afternoon wind conditions as presented in Section 8.2.3 of the EIS.




Source: BoM, 2018b

Figure 4-2: Long-term morning and afternoon wind conditions (Badgerys Creek AWS)

## 4.3 Local air quality

DPIE has developed a metric known as the 'Air Quality Index' (AQI). The AQI provides an indication of overall air quality by considering pollutant data measurements for ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulphur dioxide ($SO_2$) and $PM_{10}$, as well as visibility against criteria presented in the Variation to the National Environment Protection (Ambient Air Quality) Measure (NEPM) and DPIE standard for visibility.

### 4.3.1 Adopted Background concentrations

The nearest DPIE air quality monitoring stations (AQMS) to the Project are:

- Bringelly (approximately 4 km to the south)
- Liverpool (approximately 9 km to the south-east).

DPIE operates a state-wide air quality monitoring network which provides information on current and historical air quality. Background concentrations were established for the receiving environment for construction of the Project, based on the monitoring data collected by the Bringelly and Liverpool AQMS. The background values adopted are presented in Table 8-17 of the EIS and reproduced in Table 4-2.

Table 4-2: Adopted background concentrations

| Pollutant | Averaging time | Adopted background concentration | Justification |
|---|---|---|---|
| $PM_{10}$ | 24-hour | 38 µg/m$^3$ | Highest 2014 to 2018 95$^{th}$ per centile 24-hour averaged value recorded at Bringelly |
| | Annual | 21 µg/m$^3$ | Maximum 2014 to 2018 value recorded at Bringelly |
| $PM_{2.5}$ | 24-hour | 15 µg/m$^3$ | Highest 2014 to 2018 95$^{th}$ per centile 24-hour averaged value recorded at Bringelly |
| | Annual | 8.0 µg/m$^3$ | Maximum 2014 to 2018 value recorded at Bringelly |
| $NO_2$ | 1-hour | 74 µg/m$^3$ | Maximum 2014 to 2018 value recorded at Bringelly |
| | Annual | 12 µg/m$^3$ | Maximum 2014 to 2018 value recorded at Bringelly |
| CO | 1-hour | 3 mg/m$^3$ | Maximum 2014 to 2018 value recorded at Liverpool |
| | 8-hour | 2 mg/m$^3$ | Maximum 2014 to 2018 value recorded at Liverpool |

### 4.3.2 $PM_{10}$

Monitoring of these pollutants between 2014 and 2018 at both Bringelly and Liverpool AQMS indicate that the maximum 24-hour average $PM_{10}$ concentrations occasionally exceeded the

50 micrograms per cubic metre criterion (Table 5-1). The 95th per centile values (the value exceeded five per cent of the time) were about 88 per cent of the criterion or less.

Annually averaged $PM_{10}$ concentrations were found to vary between the two stations with the highest value of 24 micrograms per cubic metre recorded at the Liverpool station in 2018. This is still below the 25 micrograms per cubic metre impact assessment criterion. Values were found to typically range between 16 and 21 micrograms per cubic metre.

### 4.3.3 $PM_{2.5}$

Maximum 24-hour averaged $PM_{2.5}$ concentrations exhibited the same trend as $PM_{10}$, with the 25 micrograms per cubic metre assessment criterion occasionally being exceeded, but with the 95th per centile values well below.

Annually averaged $PM_{2.5}$ concentrations were always in exceedance of the 8 micrograms per cubic metre criterion at Liverpool AQMS, but were at or below this limit at the Bringelly AQMS, for all years between 2014 and 2018.

# 5 Air quality criteria

Air quality criteria are used to assess the potential for ambient air quality to give rise to adverse health or nuisance effects.

State air quality guidelines specified by the NSW EPA for the relevant pollutants are published in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2017) [hereafter 'Approved Methods']. The ground level air quality impact assessment criteria listed in Section 7 of the Approved Methods has been established by NSW EPA to achieve appropriate environmental outcomes and to minimise risks to human health. The criteria have been derived from a range of sources and are the defining ambient air quality criteria for NSW; these are therefore considered to be appropriate for this Project.

## 5.1 Particulate matter criteria

The Approved Methods provides air quality criteria based on several pollutant criteria and averaging periods from multiple sources, including the NEPM-AAQ (1998) and NERDDC (1988). Table 5-1 details the air quality monitoring criteria for particulate matter for construction of the Project.

Compliance criteria of particulate matter is related to a maximum 24-hour and annual average of $PM_{10}$ and $PM_{2.5}$ concentrations exceeding the micrograms per cubic metre criterion. This is based on the maximum background concentration and the 100$^{th}$ percentile to obtain the total impact average over 24 hours, as described in Section 4.3.

Management criteria is based on the UK IAQM *Air Quality Monitoring in the Vicinity of Demolition and Construction Sites* (2018) used as a basis to implement management measures during construction.

The 1-hour 'short-term' period has been adapted from the IAQM (2018) and although arbitrarily derived significantly greater concentrations than longer term (e.g. 24-hour average) air quality compliance criteria, it provides a reference point upon which the Construction Contractor must act immediately to minimise dust emissions. Should the '1-hour' trigger level be breached, it is generally considered that the 24-hour compliance criteria is likely to be breached. The Construction Contractor can review the trigger level, in consultation with TfNSW, if:

- Complaints are received and verified
- Dust is observed to be leaving site risking the amenity of the surrounding environment
- Other dust monitoring methods indicates frequent exceedances of the relevant Project criteria attributable to the Project.

If any of the variables are observed, the dust control measures will be reviewed and amended by the Construction Contractor and ESR where required in consultation with TfNSW. Management measures are described in Section 7 of this CAQMP.

Table 5-1: Air quality criteria for particulate matter

| Pollutant | Averaging time | Compliance Criteria | Management Criteria | Source |
|---|---|---|---|---|
| Particulate matter ($PM_{10}$) | Annual | 25 µg/m$^3$ | N/A | NSW EPA, 2017 |
| | 24 hours | 50 ug/m$^3$ | 38 ug/m$^3$ | NSW EPA, 2017<br>NEPM-AAQ, 1998 |
| | 1 hour *('short-term')*[a] | N/A | 190 ug/m$^3$ [a] | IAQM, 2018 |
| Particulate matter ($PM_{2.5}$) | Annual | 8 ug/m$^3$ | N/A | NSW EPA, 2017 |
| | 24 hours | 25 ug/m$^3$ | 21 ug/m$^3$ | NSW EPA, 2017<br>NEPM-AAQ, 1998 |
| | 1 hour *('short-term')* [a] | N/A | 190 ug/m$^3$ [a] | IAQM, 2018 |

*Source: Adapted from Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (NSW EPA, 2017)*

*Notes:*

*a. Trigger level over 1-hour ('short-term') period (IAQM, 2018)*

## 5.2 Other pollutants

Table 5-2 details the air quality monitoring criteria for other pollutants for construction of the Project. This is based on the 'Approval Methods'.

Table 5-2: Air quality criteria for other pollutants

| Pollutant | Averaging time | Compliance Criteria |
|---|---|---|
| Nitrogen dioxide (NO2) | 1 hour | 246 µg/m$^3$ |
| | Annual | 62 µg/m$^3$ |
| Carbon monoxide (CO) | 15 minutes | 100 mg/m$^3$ |
| | 1 hour | 30 mg/m$^3$ |
| | 8 hours | 10 mg/m$^3$ |
| Benzene | 1 hour | 29 µg/m$^3$ |

*Source: Adapted from Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (NSW EPA, 2017)*

# 6 Construction impacts on air quality

The Environmental Assessment Documentation refers to the IAQM (2014) risk assessment, a semi-quantitative method developed by the UK IAQM to assess, identify risks and recommend appropriate management measures for potential air quality impacts during construction.

The risk assessment considers four primary construction activities including:

- Demolition
- Earthworks
- Construction
- 'Trackout' or the transport-related handling of construction materials.

The process includes four steps and several criteria including a screening review, risk assessment, development of mitigation measures and residual risk assessment:

- Step 1 - Screening review: undertaking a screening review to identify whether there are receivers nearby which have the potential to be impacted by the intended works, and whether a more detailed assessment is required
- Step 2 - Risk assessment:
  - Step 2A: Evaluating the potential magnitude of the works
  - Step 2B: Determining receiver sensitivities to dust soiling, human health and ecological dust impacts
  - Step 2C: Estimating the risk of dust soiling, human health and ecological dust impacts if no mitigation measures are applied
- Step 3 - Mitigation and management, involving the development of mitigation measures for each work location depending on the level of risk determined in Step 2
- Step 4 - Residual risks, involving evaluation of any residual dust related risks following the application of the mitigation measures in Step 3 to verify that a suitable level of mitigation has been applied to reduce the impact to the extent practicable.

The risk assessment concluded the magnitude of potential dust emissions for the M12 Project as summarised below:

- Sensitive receivers: Low-medium risk of dust soiling across the Project due to the density of receivers in close proximity to the construction footprint
- Human health: Medium risk of Human health effects for sensitive receivers in all areas except for between Western Sydney Airport entrance/exit road and Clifton Avenue (designated M12_02), which was determined to have a high risk of human health effects due to the higher density of receivers in closer proximity to the construction footprint
- Ecological impact: High risk of ecological sensitivity due to the presence of protected ecological habitat areas within 20 metres of the construction footprint.

Based upon the risk assessment, appropriate management measures were recommended as detailed in the Environmental Assessment Documentation. These management measures have been adapted and are detailed in Section 7.

## 6.1 Construction activities

Construction activities that generate dust and particulates represent the primary air quality-related risk during construction. Key construction activities associated with the Project that could result in dust emissions include:

- Earthworks, particularly during site establishment
- Installation of construction signage and environmental controls
- Geotechnical and soil investigations
- Establishment and operation of ancillary facilities and compounds
- Demolition activities
- Vegetation clearing and grubbing
- Excavation
- Pavement construction
- Preparation of road subgrade and grade
- Landscaping and finishing works
- Bridge preparation and installation
- Spray painting of the road for line marking
- Drainage works
- Operation of concrete / asphalt batching plant / pug mill
- Topsoil / material handling including stripping, stockpiling, material loading and material haulage
- Vehicular movements over unpaved surface (including unsealed access roads)
- Temporary stockpiling which may result in wind erosion of exposed areas.

The settlement of dust may cause nuisance to sensitive receivers located near the Project and substantial dust generation could result in health impacts to nearby receivers.

Other potential air quality risks include exhaust emissions from construction plant and equipment, odour, and airborne hazardous materials. Emissions, other than dust, which may be generated by construction activities include:

- Vehicle and plant exhaust emissions, which may be excessive if vehicles and plant are poorly maintained
- Odours / gases released during:
  - Excavations of organic or contaminated materials
  - During sealing works
  - Operation of concrete / asphalt batching plant / pugmill
  - Road line marking.

Refer to the Aspects and Impacts Register included in Appendix A2 of the OCEMP.

## 6.2 Factors likely to affect dust generation

In addition to the inherent risks of specific construction activities creating the potential to generate dust, a number of other environmental factors also affect the likelihood of dust emissions. These include:

- Wind direction – determines whether dust and suspended particles are transported in the direction of the sensitive receivers
- Wind speed – governs the potential suspension and drift resistance of particles
- Soil type – more erodible soil types have an increased soil or dust erosion potential
- Soil moisture – increased soil moisture reduces soil or dust erosion potential
- Rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation
- Evaporation – dries out the surface of the soil and leads to increased risk of dust generation
- Exposed surfaces – during construction non-vegetated surfaces will be exposed prior to revegetation, which is a key factor influencing dust emissions.

## 6.3 Nature of air quality impacts

Construction activities listed in Section 6.1 have the potential to increase airborne particulate matter and cause nuisance impacts where construction is in close proximity to sensitive receivers. The IAQM risk assessment concluded a low-medium risk of dust soiling across the Project due to the density of receivers in close proximity to the construction footprint.

Potential impacts to air quality that may arise during construction include:

- Temporary increase in air emissions from dust and products of combustion (from equipment operations)
- Temporary increased windborne dust emanating from disturbed/exposed surfaces
- Increased dust and debris arising from haulage of materials during construction
- Odours arising from uncovered contaminated and/or hazardous materials
- Deposition of dust on surfaces where it may cause damage and/or lead to a need for increased cleaning or repair
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces
- Need for increased maintenance of air filtering systems (e.g. air conditioners etc.)
- Potential adverse health effects including eye, nose and throat irritation from excessive inhalation of fine particles
- Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities
- Dust deposition impacts on sensitive agricultural receivers
- Complaints from the public relating to dust or odours.

## 6.4 Ecological impacts

The IAQM risk assessment detailed in the EIS concluded that ecological sensitivity was determined to be high for the Project due to the presence of protected ecological habitat areas within 20 metres of the construction footprint.

Construction activities listed in Section 6.1 have the potential to increase airborne particulate matter and cause direct and indirect impacts to biodiversity located within and near the construction boundary, including:

- Dust deposition on plant foliage during construction
- Accidental release of contaminants into the environment that may potentially affect biodiversity
- Impacts on water quality and/or vegetation health from dust deposition.

## 6.5 Cumulative impacts

The concurrent construction of various projects within the vicinity of the M12 Project gives rise to the potential of cumulative air quality impacts, however it is noted that the scale of impact is dependent upon timing, location and type of construction activities. It is also considered that although there is the potential for cumulative local dust impacts during construction, that emissions from neighbouring projects (including dust, exhaust, odours and airborne hazardous materials) will be effectively controlled so that the potential for cumulative impacts at receivers is limited.

Projects within the vicinity of the M12 Project include, but is not limited to:

- Western Sydney International Airport
- Sydney Metro – Western Sydney Airport The Northern Road upgrade
- Western Sydney Aerotropolis
- Other potential road projects such as Elizabeth Drive upgrade, Mamre Road upgrade and Outer Sydney Orbital
- Development land releases such as Southwest Growth Area and Western Sydney Employment Area.

Regular interface meetings will be undertaken with government authorities, neighbouring projects, and stakeholders as detailed in Section 5.5.2 and 5.5.3 of the OCEMP and within the Overarching Communication Strategy (OCS).

Air quality impacts are anticipated to be short-term and minor as they will be limited to the construction phase and will be minimised through the implementation of management measures identified in Section 7.

# 7 Environmental control measures

Performance outcomes, commitments and management measures were identified in the Environmental Assessment Documentation, the CoAs, REMMs and relevant TfNSW documents.

All specific practicable measures and requirements to minimise and manage impacts on air quality are outlined in Table 7-1.

Table 7-1: Air quality management and mitigation measures

| ID | Management Measure | When to implement | Responsibility for implementation | Applicability | | | Reference or source | Evidence of implementation |
|---|---|---|---|---|---|---|---|---|
| | | | | M12 West | M12 Central | M12 East | | |
| AQ1 | All employees, Construction Contractors and sub-contractors will receive a Project induction prior to commencing work on site. The induction will include:<br>• Requirements of this CAQMP<br>• Relevant legislation and guidelines<br>• Location of sensitive receivers<br>• Complaints reporting and recording<br>• How to implement air quality management measures<br>• Specific responsibilities to minimise air quality impacts on the community associated with construction activities. | During construction | Construction Contractor<br>ESR | ✓ | ✓ | ✓ | REMM AQ01 | Induction records |
| AQ2 | Dust generation will be minimised during construction where possible. Where practicable, specific measures will include (but not be limited to):<br>• Regularly watering exposed and disturbed areas including stockpiles, especially during inclement weather conditions<br>• Adjusting the intensity of activities based on measured and observed dust levels, weather forecasts and the proximity of and direction of the works in relation to the nearest identified sensitive receivers<br>• The planning and undertaking of demolition activities, including the removal of hazardous building materials in a manner that minimises dust generation. This will also | During construction | Construction Contractor<br>ESR | ✓ | ✓ | ✓ | REMM AQ02 | Air Quality Monitoring Reports<br>Site inspections |

| ID | Management Measure | When to implement | Responsibility for implementation | Applicability | | | Reference or source | Evidence of implementation |
|---|---|---|---|---|---|---|---|---|
| | | | | M12 West | M12 Central | M12 East | | |
| | include the removal of hazardous building materials before the start of general demolition works. | | | | | | | |
| AQ3 | Dust generation of stockpiles will be minimised where possible including:<br>• Minimising the number of stockpiles and amount of material stockpiled where practicable<br>• Minimising the potential for mobilisation and transport of dust and sediment in runoff in accordance with TfNSW Stockpile Sites Management Guideline (Roads and Maritime, 2015).<br>• Covering, or otherwise protecting from erosion, stockpiles that will be in place for more than 20 days as well as any stockpiles that are susceptible to wind or water erosion, within 10 days of forming each stockpile<br>• Positioning stockpiling areas as far as possible from identified sensitive receivers, including potentially ecologically sensitive receivers<br>• Limiting stockpiling activities during conditions where winds are blowing strongly in the direction(s) from the stockpiling location to identified sensitive receivers. | During construction | Construction Contractor<br>ESR | ✓ | ✓ | ✓ | REMM AQ02<br>REMM SWH04 | Air Quality Monitoring Reports<br>Site inspections |
| AQ4 | Ensure loads are covered, and any loose materials/debris are removed before vehicles exit the site | During construction | Construction Contractor | ✓ | ✓ | ✓ | REMM AQ02 | Air Quality Monitoring Reports |

| ID | Management Measure | When to implement | Responsibility for implementation | Applicability | | | Reference or source | Evidence of implementation |
|---|---|---|---|---|---|---|---|---|
| | | | | M12 West | M12 Central | M12 East | | |
| | | | ESR | | | | | Site inspections |
| AQ5 | Consultation to be undertaken with nearby developers to co-ordinate and plan activities where practicable to minimise the potential for cumulative dust-related impacts | During construction | TfNSW<br>Construction Contractor<br>ESR | ✓ | ✓ | ✓ | REMM AQ02 | Air Quality Monitoring Reports<br>Site inspections |
| AQ6 | Odorous materials identified on site will be excavated in a staged process.<br>Exposed areas of odorous material will be kept to a minimum to reduce the total emissions from the site where feasible. | During construction | Construction Contractor<br>ESR | ✓ | ✓ | ✓ | REMM AQ03 | Air Quality Monitoring Reports<br>Site inspections |
| AQ7 | Vehicles, plant and equipment will be switched off when not in use to minimise GHG emissions | During construction | Construction Contractor | ✓ | ✓ | ✓ | REMM GG01 G36 | Site inspections |
| AQ8 | Vehicles, plant and equipment will be operated in an efficient manner | During construction | Construction Contractor | ✓ | ✓ | ✓ | REMM GG01 G36 | Site inspections |
| AQ9 | Any plant and equipment emitting visible smoke will be turned off until properly investigated | During construction | Construction Contractor | ✓ | ✓ | ✓ | Best practice | Site inspections |

# 8 Compliance management

## 8.1 Roles and responsibilities

The Project's organisational structure and overall roles and responsibilities are outlined in Section 5.1 of the OCEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 7 of this Plan.

## 8.2 Communication

TfNSW will prepare and implement an OCS in accordance with the requirements of NSW CoA B1 and B2 to document the approach to stakeholder and community communications for the Project. The OCS will identify opportunities and tools for providing information and consulting with the community and stakeholders during the construction of the Project. The Construction Contractor will support the delivery of the OCS.

Air quality management information will be communicated to the community and stakeholders in accordance with the principles and procedures outlined in the OCS. Construction Contractors will provide timely, accurate, relevant and accessible information about construction activities that may impact upon air quality, with provision for feedback through a complaints line during construction.

Further detail about the OCS is provided in Section 5.5 of the OCEMP.

## 8.3 Complaints management

In accordance with NSW CoA B6, TfNSW will develop a Complaints Management System (CMS) to document the overall approach to complaints management for the Project. The Construction Contractors will adopt the requirements of the CMS, including reporting requirements. The CMS will include a Complaints Register which will record the details of all complaints relating to the Project.

The CMS includes a Complaints Register in accordance with NSW CoA B8, which will record the details of all complaints relating to the Project including the following as a minimum:

- Date and time of the complaint
- Method by which the complaint was made
- Any personal details of the stakeholder
- Number of people affected in relation to a complaint
- Nature of the complaint
- Action taken in relation to the complaint, means by which the complaint was addressed and any follow up
- Whether resolution was reached, with or without mediation
- If no action taken, reasons why
- The status of resolution of the complaint.

All complaints will be recorded in the Complaints Register (by the Communications Manager) within 24 hours. The Complaints Register will be provided to the ER on the day complaints are received. The Complaints Register will be provided to the Planning Secretary on request in

accordance with NSW CoA B9. The Construction Contractor is not required to submit a report for any reporting period during which no complaints have been received.

If the investigation identifies construction works or activities being undertaken as the likely source of the complaint, the Construction Contractor will make an offer to the complainant to undertake attended noise or vibration monitoring at their premises. If the offer to undertake attended noise or vibration monitoring is accepted, the Construction Contractor will undertake the monitoring:

- As soon as practicable or
- At a time agreed with the complainant.

The Construction Contractor will advise each complainant of the results of its investigation of their complaint and any proposed remedial action.

## 8.4 Training

To ensure that this Plan is effectively implemented, all site personnel (including sub-contractors) will undergo site induction training that includes construction air quality management issues prior to undertaking their duties. The induction training will address elements related to air quality management, including:

- Existence and requirements of this CAQMP, the Construction Contractor's CAQMP and all plans and procedures prepared under the CAQMPs
- Relevant legislation, regulations and EPL conditions (where applicable)
- Incident response, management and reporting
- Location of sensitive receivers
- Complaints response and reporting
- Wetting down or covering of exposed areas
- Road cleanliness and use of street sweeper
- Covering of loads
- Proper and efficient use and maintenance of plant and equipment
- Reporting of dusty conditions to arrange appropriate management
- Minimising drop heights
- Stockpile management
- Stop works procedure for windy conditions
- Specific responsibilities to minimise air quality impacts on the community associated with the works.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in air quality management or those undertaking an activity with a high risk of environmental impact. Site personnel will undergo refresher training at not less than six monthly intervals.

The ER will review and approve the induction and training program prior to the commencement of construction and monitor implementation.

Daily pre-start meetings conducted by the Construction Contractor Foreman/ Site Supervisor will inform the site workforce of any environmental issues relevant to air quality that could potentially be impacted by, or impact on, the day's activities.

Further details regarding staff induction and training are provided in Section 5.3 of the OCEMP.

## 8.5 Inspection and monitoring

### 8.5.1 Monitoring

An overarching Construction Air Quality Monitoring Program has been prepared and is provided in Appendix C. Table 8-1 details the air quality and climate monitoring that will be undertaken during construction by the Construction Contractor.

Table 8-1: Summary of air quality and climate monitoring procedures

| Monitoring details | Frequency | Test procedure | Responsibility |
|---|---|---|---|
| Prevailing wind conditions and weather forecast | Daily | • Weather conditions and forecasts will be obtained from the Australian Bureau of Meteorology (BoM) operated weather stations such as Badgerys Creek AWS (station ID 067108) | Construction Contractor ESR |
| Climate monitoring | Daily | • Daily rainfall monitoring will be undertaken via automatic weather stations installed at ancillary facilities or construction sites and confirmed with manual rainfall gauges installed across the Project | Construction Contractor ESR |
| | Hourly | • Hourly temperature, humidity, wind velocity and rainfall from either the Project weather station, or through analysis of equivalent weather information obtained from the BoM (Badgerys Creek AWS station ID 067108) | Construction Contractor ESR |
| Suspended particulate monitoring ($PM_{10}$ and $PM_{2.5}$ concentrations in $\mu g/m^3$) | Continuous (Real time) | • Real-time monitoring using a light-scattering laser photometer (aerosol monitor) at various locations within each stage dependent upon location of environmentally sensitive areas and receivers. | Construction Contractor ESR |
| Odour monitoring | Daily, or in response to complaints | • No detectable odours beyond the site boundary, or at the nearest sensitive land use downwind | Construction Contractor ESR |

### 8.5.2 Inspections

Regular inspections of sensitive areas and activities will occur for the duration of the Project. The Construction Contractor's ESR will carry out weekly site inspections. TfNSW will also conduct

independent inspections to confirm the Construction Contractors' compliance with air quality management requirements.

Weekly and other routine inspections by the TfNSW ESM (or delegate), Environmental Review Group (ERG) representatives and the ER will occur throughout construction. Detail on the nature and frequency of these inspections are documented in Section 7.1 of the OCEMP.

Proposed inspections to be carried out by Construction Contractors that are relevant to air quality are contained in Table 8-2. The purpose of these inspections is to provide a record of activities and observations related to air quality which could be correlated to real-time monitoring.

Table 8-2: Air quality inspections

| Inspection | Frequency | Responsibility | Record |
|---|---|---|---|
| Visual surveillance for dust emissions or sediment tracking off-site | Daily | • Environmental Site Representative<br>• Construction Contractor Superintendent | • ESR Weekly inspection<br>• Daily diary |
| Inspection of dust controls to ensure effective implementation | Daily | • Construction Contractor ESR<br>• Construction Contractor Superintendent | • ESR Weekly inspection<br>• Daily diary |
| Investigation in response to recurring or major complaints, or authorised agency request, regarding exceedance of air emissions | As required | • Construction Contractor ESR<br>• Construction Contractor Site Engineer<br>• Construction Contractor Superintendent | • Incident report<br>• Complaints register |
| Project entry/ exit integrity to minimise dust/ mud tracking on public roads | Daily | • Construction Contractor ESR<br>• Construction Contractor Superintendent | • ESR Weekly inspection<br>• Daily diary |
| Site inspection for visible dust emissions, dust deposits on surfaces | Weekly | • Construction Contractor ESR<br>• Construction Contractor Superintendent<br>• ERG representatives | • ESR Weekly inspection<br>• Daily diary |
| Haul road integrity | Daily | • Construction Contractor Superintendent | • Daily diary |
| Plant / equipment inspections including maintenance and emissions | As required, prior to use | • Construction Contractor Superintendent | • Daily diary |
| Vehicles switched off when not in use to minimise emissions | Daily | • Construction Contractor Superintendent | • Daily diary |

## 8.6 Incident planning and response

Response to incidents will be undertaken as described in Section 6.1 of the OCEMP and in accordance with the Environmental Incident Classification and Reporting Procedure (refer to Appendix A7 of the OCEMP).

## 8.7 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of air quality management measures, compliance with this CAQMP, CoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 7.4 of the OCEMP.

## 8.8 Non-conformances

A non-conformance is the failure or refusal to comply with the requirements of project system documentation, including this Plan that does not result in a non-compliance as defined in the Section 7.3 of the OCEMP.

Where a non-conformance is detected or monitoring results directly attributable to the Project exceed the target set in the Construction Air Quality Monitoring Program, the processes described in the Air Quality Monitoring Program (Section 3.3)and  the OCEMP (Section 7.3) will be implemented.

Any member of the Construction Contractors' Project team may raise a non-conformance or improvement opportunity. The Construction Contractor's Quality Plan will describe the process for managing non-conforming work practices and initiating corrective / preventative actions or system improvements in accordance with the process outlined in Section 7.3.5 of the OCEMP.

## 8.9 Reporting and identified records

Reporting requirements and responsibilities are documented in Section 7.5 of the OCEMP.

The Construction Contractors will report on air quality monitoring in accordance with the Construction Air Quality Monitoring Program provided in Appendix C.

The Construction Contractors will be required to maintain accurate records substantiating all construction activities associated with the Project or relevant to the conditions of approval, including measures taken to implement this CAQMP.

# 9 Review and improvement

## 9.1 Continuous improvement

Continuous improvement of this CAQMP and the Construction Air Quality Monitoring Program (Appendix C) will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of air quality management and performance
- Identify environmental risks not already included in the risk register
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets

The Construction Contractors will be responsible for ensuring Project environmental risks are identified and included in the risk register and appropriate mitigation measures implemented throughout the construction of the Project, as part of the continuous improvement process. The process for ongoing risk identification and management during construction is outlined in Section 4.1.2 of the OCEMP.

## 9.2 AQMP update and amendment

The processes described in Section 7.7 of the OCEMP may result in the need to update or revise this CAQMP. This will occur as needed. Any revisions to this CAQMP will be in accordance with the process outlined in Section 1.12 of the OCEMP.

A copy of the updated CAQMP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure (refer to Section 7.6.2 of the OCEMP).

# Construction Air Quality Management Sub-plan

## Appendix A – Consultation Correspondance

M12 Motorway

November 2021

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# 1 Introduction

As detailed in Section 1.5 of the CAQMP, in accordance with NSW CoA C4(g), consultation has been undertaken with the following government agencies and stakeholders during the preparation of the CAQMP:

- Fairfield City Council
- Penrith City Council
- Liverpool City Council.

A log of the dates of engagement or attempted engagement with the parties identified above has been included in Section 1.5.1 of the CAQMP in accordance with NSW CoA A5(b). Section 2 details the evidence of engagement with each party and responses.

# 2 Government Agency and Stakeholder Responses

This section provides consultation documentation undertaken during the consultation period with parties including:

- Engagement with parties identified in NSW CoA C4(g) that occurred prior to the submission of the CAQMP for approval by the Planning Secretary as required by NSW CoA A5(a)
- A copy of the responses provided during consultation with the required parties
- A summary of the issues raised during consultation and how they have been addressed as required by NSW CoA A5(d). A description of the outstanding issues raised during consultation and why they have not been addressed has also been included where required as per NSW CoA A5(e).

## 2.1 Fairfield City Council

Section 2.1 details the engagement and response from FCC regarding the CAQMP prior to submission for approval and a summary of how the issues have been addressed.

# Document Transmittal

[redacted]

**Transmittal No:** M12PPW-TFNSW-TX-000480

**Date:** 06 October 2021 02:54 PM

**Reason for Issue:** Issued For Review

**Subject:** M12 Motorway - Draft Construction Air Quality Management Plan for review

**Contract No:** M12PPW - M12 - Project Wide

**Message:**

Dear Kerren,

As you are aware, Transport for NSW (TfNSW) is delivering the M12 Motorway Project between the M7 Motorway and The Northern Road.
The M12 Motorway is to be open by 2026 prior to the opening of the Western Sydney International Airport.
An overarching Construction Environmental Management Plan has been drafted and is ready for stakeholder feedback.
As required by Condition of Approval (CoA) C4(g) in the M12 Motorway Infrastructure Approval (23 April 2021), TfNSW is required to consult with Fairfield City Council in relation to the following construction environmental management sub-plans:

- Construction Air Quality Management Sub-Plan

Please provide your comments using the attached MS Excel spreadsheet by **20/10/2021.**

If you have any questions in relation to this email, please contact me on the details below.

Kind regards,
Suzette Graham
Environment and Sustainability Manager
Sydney Infrastructure Development | Safety, Environment and Regulation
**M** 0476 828 524 **E** suzette.graham@transport.nsw.gov.au
**Transport for NSW**
27 Argyle Street, Parramatta NSW 2150

**OFFICIAL**

Please submit your comments by 20 October 2021

**Transmitted to:**

| Company | Name |
|---|---|
| Fairfield City Council | Kerren Ven |

**Transmitted cc:**

| Company | Name |
|---|---|
| Transport for NSW | Suzette Graham |

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

| Item | Document No | Rev | Sts | Title | Contract No | Design Package No |
|---|---|---|---|---|---|---|
| 1 | M12PPW-TFNSW-ALL-EN-PLN-000019 | F.01 | S3 | M12 Motorway Construction Air Quality Management | M12PPW | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Plan (Rev F) - draft for consultation | | |

**Transmitted by:** Suzette Graham, Transport for NSW

**Attachments:**
M12 - Feedback on Document Comments or Responses.xlsx(41KB)

**Sent:** Tuesday, 26 October 2021 11:42 AM
**To:** Suzette Graham [redacted]
**Subject:** RE: M12 Motorway - Draft Construction Air Quality Management Plan for review



Hi Suzette,

Please find attached Council's comments in relation to the draft Construction Air Quality Management Plan. Thank you.

Kind regards,

**Kerren Ven**
Strategic Planner | Strategic Land Use Planning
City Strategic Planning
PO Box 21, Fairfield NSW 1860
[redacted]

www.fairfieldcity.nsw.gov.au
mail@fairfieldcity.nsw.gov.au

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[endif]-
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*We acknowledge the Cabrogal of the Darug nation who are the Traditional Custodians of this Land. We also pay our respect to the Elders both past, present and emerging of the Darug Nation.*

---

**From:** Suzette Graham [redacted]
**Sent:** Friday, 8 October 2021 11:17 AM
**To:** Kerren Ven [redacted]
**Subject:** RE: M12 Motorway - Draft Construction Air Quality Management Plan for review

Hi Kerren,

Thanks for the email and getting in touch.

Not a problem, an extension for review comments to the 29th is ok.

Kind regards,
Suzette Graham
Environment and Sustainability Manager
Sydney Infrastructure Development | Safety, Environment and Regulation
[redacted]
**Transport for NSW**
27 Argyle Street, Parramatta NSW 2150

I work flexibly. Unless it suits you, I don't expect you to read or respond to my emails outside of your normal work hours.

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---

**From:** Kerren Ven [redacted]
**Sent:** Friday, 8 October 2021 10:13 AM
**To:** Suzette Graham [redacted]
**Subject:** FW: M12 Motorway - Draft Construction Air Quality Management Plan for review

**CAUTION**: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Hi Suzette,

Could I please request an extension until Friday 29th October for comments the Construction Air Quality Sub Plan. Our Environmental Management Team are currently short-staffed to complete requests while undertaking their roles.

Kind regards,

**Kerren Ven**
Strategic Planner | Strategic Land Use Planning
City Strategic Planning
PO Box 21, Fairfield NSW 1860
[redacted]

www.fairfieldcity.nsw.gov.au
mail@fairfieldcity.nsw.gov.au

<!--[if
!vml]-
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[endif]-
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*We acknowledge the Cabrogal of the Darug nation who are the Traditional Custodians of this Land. We also pay our respect to the Elders both past, present and emerging of the Darug Nation.*

---

**From:** Suzette Graham via InEight Document [redacted]
**Sent:** Wednesday, 6 October 2021 2:55 PM
**To:** Kerren Ven <[redacted]
**Subject:** M12 Motorway - Draft Construction Air Quality Management Plan for review

# Document Transmittal

**Transmittal No:** M12PPW-TFNSW-TX-000480

**Date:** 06 October 2021 02:54 PM

**Reason for Issue:** Issued For Review

**Subject:** M12 Motorway - Draft Construction Air Quality Management Plan for review

**Contract No:** M12PPW - M12 - Project Wide

**Message:**

Dear Kerren,

As you are aware, Transport for NSW (TfNSW) is delivering the M12 Motorway Project between the M7 Motorway and The Northern Road.

The M12 Motorway is to be open by 2026 prior to the opening of the Western Sydney International Airport.

An overarching Construction Environmental Management Plan has been drafted and is ready for stakeholder feedback.

As required by Condition of Approval (CoA) C4(g) in the M12 Motorway Infrastructure Approval (23 April 2021), TfNSW is required to consult with Fairfield City Council in relation to the following construction environmental management sub-plans:

- Construction Air Quality Management Sub-Plan

Please provide your comments using the attached MS Excel spreadsheet by **20/10/2021.**

If you have any questions in relation to this email, please contact me on the details below.

Kind regards,

Suzette Graham
Environment and Sustainability Manager

Sydney Infrastructure Development | Safety, Environment and Regulation

[redacted]
Transport for NSW
27 Argyle Street, Parramatta NSW 2150

**OFFICIAL**

Please submit your comments by 20 October 2021

**Transmitted to:**

| Company | Name |
|---|---|
| Fairfield City Council | Kerren Ven |

**Transmitted cc:**

| Company | Name |
|---|---|
| Transport for NSW | Suzette Graham |

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

| Item | Document No | Rev | Sts | Title | Contract No | Design Package No |
|---|---|---|---|---|---|---|
| 1 | M12PPW-TFNSW-ALL-EN-PLN-000019 | F.01 | S3 | M12 Motorway Construction Air Quality Management Plan (Rev F) - draft for consultation | M12PPW | |

**Transmitted by:** Suzette Graham, Transport for NSW

TeamBinder Transmittal Reference: {C710F1E5-BE66-4D8F-A720-8F701F076267}

Table 1 provides a summary of the issues raised during consultation and how they have been addressed as required by NSW CoA A5(d).

Table 1: FCC comments and TfNSW response

| Section of comment | Comments | TfNSW Response | Section Amended |
|---|---|---|---|
| N/A | The Report adequately outlines the information about construction air quality management and Environmental Management Section does not have any objection.<br><br>The project identifies, as State Significant Development (SSD), therefore the NSW Environmental Protection Agency (NSW EPA) is the appropriate regulatory authority (ARA). | No further comment required. | N/A |

## 2.2 Penrith City Council

Section 2.2 details the engagement and response from PCC regarding the CAQMP prior to submission for approval and a summary of how the issues have been addressed.

# Document Transmittal

[redacted]

**Transmittal No:** M12PPW-TFNSW-TX-000481

**Date:** 06 October 2021 02:55 PM

**Reason for Issue:** Issued For Review

**Subject:** M12 Motorway - Draft Construction Air Quality Management Plan for review

**Contract No:** M12PPW - M12 - Project Wide

**Message:**

Dear Ari,

As you are aware, Transport for NSW (TfNSW) is delivering the M12 Motorway Project between the M7 Motorway and The Northern Road.
The M12 Motorway is to be open by 2026 prior to the opening of the Western Sydney International Airport.
An overarching Construction Environmental Management Plan has been drafted and is ready for stakeholder feedback.
As required by Condition of Approval (CoA) C4(g) in the M12 Motorway Infrastructure Approval (23 April 2021), TfNSW is required to consult with Penrith City Council in relation to the following construction environmental management sub-plans:

- Construction Air Quality Management Sub-Plan

Please provide your comments using the attached MS Excel spreadsheet by **20/10/2021.**

If you have any questions in relation to this email, please contact me on the details below.

Kind regards,
Suzette Graham
Environment and Sustainability Manager
Sydney Infrastructure Development | Safety, Environment and Regulation
**M** 0476 828 524 **E** suzette.graham@transport.nsw.gov.au
**Transport for NSW**
27 Argyle Street, Parramatta NSW 2150

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Please submit your comments by 20 October 2021

**Transmitted to:**

| Company | Name |
|---|---|
| Penrith City Council | Ari Fernando |

Click here to download all Transmittal files.

Click on Document Nos to download them individually.

| Item | Document No | Rev | Sts | Title | Contract No | Design Package No |
|---|---|---|---|---|---|---|
| 1 | M12PPW-TFNSW-ALL-EN-PLN-000019 | F.01 | S3 | M12 Motorway Construction Air Quality Management Plan (Rev F) - draft for consultation | M12PPW | |

**Transmitted by:** Suzette Graham, Transport for NSW

**Attachments:**

M12 - Feedback on Document Comments or Responses.xlsx(41KB)

**From:** Suzette Graham
**To:** Ari Fernando
**Subject:** M12 Motorway - Construction Air Quality Management Plan for review
**Date:** Thursday, 21 October 2021 4:55:00 PM
**Attachments:** 21_1006 (Email to PCC) M12 - Transmittal__M12PPW-TFNSW-TX-000481 AQMP.PDF

---

Hi Ari,

Just following up on the attached email and the review of the M12 Air Quality Management Plan by Council.
Can you please advise if Council are expecting to comment on the Plan? Comments were due back to TfNSW yesterday.

FYI - I have also sent the Traffic and Transport and the Soil and Water Management Plans through to you today via Teambinder for review.

Thanks,

Kind regards,
Suzette Graham
Environment and Sustainability Manager
Sydney Infrastructure Development | Safety, Environment and Regulation
[redacted]
**Transport for NSW**
27 Argyle Street, Parramatta NSW 2150

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| | | | | | | |
|---|---|---|---|---|---|---|
| | PLN-000019 | | | Construction Air Quality Management Plan (Rev F) - draft for consultation | | |

**Transmitted by:** Suzette Graham, Transport for NSW

TeamBinder Transmittal Reference: {CACC65B5-7BA0-4C6A-A007-0D6A06708FD1}

---

**Discipline:** Environmental

**Location:** General

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Table 2 provides a summary of the issues raised during consultation and how they have been addressed as required by NSW CoA A5(d).

Table 2: PCC comments and TfNSW response

| Section of comment | Comments | TfNSW Response | Section Amended |
|---|---|---|---|
| N/A | Council expects that TfNSW shall manage the air quality in accordance with this CAQMP and Guidelines and Standard noted in Section 3.1.2 of the CAQMP. | No further comment required. | N/A |

## 2.3 Liverpool City Council

Section 2.3 details the engagement and response from LCC regarding the CAQMP prior to submission for approval and a summary of how the issues have been addressed.

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Plan (Rev F) - draft for consultation | | |

**Transmitted by:** Suzette Graham, Transport for NSW

**Attachments:**
M12 - Feedback on Document Comments or Responses.xlsx(41KB)

**From:** Suzette Graham
**To:** [redacted]
**Cc:** M12 Detailed Design
**Subject:** RE: M12 Motorway - Draft Construction Air Quality Management Plan for review
**Date:** Thursday, 21 October 2021 4:50:00 PM
**Attachments:** image001.jpg

---

Hi Charles,

Just following up on the below email and the review of the M12 Air Quality Management Plan by Council.
Can you please advise if Council are expecting to comment on the Plan?

FYI - I have also sent the Traffic and Transport and the Soil and Water Management Plans through to you today via Teambinder for review.

Thanks,

Kind regards,
Suzette Graham
Environment and Sustainability Manager
Sydney Infrastructure Development | Safety, Environment and Regulation
[redacted]
**Transport for NSW**
27 Argyle Street, Parramatta NSW 2150

I work flexibly. Unless it suits you, I don't expect you to read or respond to my emails outside of your normal work hours.

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---

**From:** Suzette Graham via InEight Document [redacted]
**Sent:** Wednesday, 6 October 2021 2:58 PM
**To:** [redacted]
**Subject:** M12 Motorway - Draft Construction Air Quality Management Plan for review



# Document Transmittal

**Transmittal No:** M12PPW-TFNSW-TX-000482

**Date:** 06 October 2021 02:57 PM

**Reason for Issue:** Issued For Review

**Subject:** M12 Motorway - Draft Construction Air Quality Management Plan for review

**Contract No:** M12PPW - M12 - Project Wide

**Message:**

Dear Charles,

As you are aware, Transport for NSW (TfNSW) is delivering the M12 Motorway Project between the M7 Motorway and The Northern Road.

The M12 Motorway is to be open by 2026 prior to the opening of the Western Sydney International Airport.

An overarching Construction Environmental Management Plan has been drafted and is ready for stakeholder feedback.

As required by Condition of Approval (CoA) C4(g) in the M12 Motorway Infrastructure Approval (23 April 2021), TfNSW is required to consult with Liverpool City Council in relation to the following construction environmental management sub-plans:

- Construction Air Quality Management Sub-Plan

Please provide your comments using the attached MS Excel spreadsheet by **20/10/2021.**

If you have any questions in relation to this email, please contact me on the details below.

Kind regards,

Suzette Graham
Environment and Sustainability Manager

Sydney Infrastructure Development | Safety, Environment and Regulation

[redacted]
**Transport for NSW**
27 Argyle Street, Parramatta NSW 2150

**OFFICIAL**

Please submit your comments by 20 October 2021

**Transmitted to:**

| Company | Name |
|---|---|
| Liverpool City Council | Charles Wiafe |

**Transmitted cc:**

| Company | Name |
|---|---|

| | |
|---|---|
| Transport for NSW | Suzette Graham |

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Click on Document Nos to download them individually.

| Item | Document No | Rev | Sts | Title | Contract No | Design Package No |
|---|---|---|---|---|---|---|
| 1 | M12PPW-TFNSW-ALL-EN-PLN-000019 | F.01 | S3 | M12 Motorway Construction Air Quality Management Plan (Rev F) - draft for consultation | M12PPW | |

**Transmitted by:** Suzette Graham, Transport for NSW

TeamBinder Transmittal Reference: {B0908D4B-9BCD-4C56-BF68-A38755274D0A}

Table 3: LCC comments and TfNSW response

| Section of comment | Comments | TfNSW Response | Section Amended |
|---|---|---|---|
| N/A | No comments were provided. | No further comment required. | N/A |

# Construction Air Quality Management Sub-plan

## Appendix B – Secondary CoA and REMMs

M12 Motorway

November 2021

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# Appendix B – Secondary CoA and REMMs

The primary NSW CoA specifically relevant to the development of this Plan are listed below. Secondary conditions that are related, but not specific to, the development of this Plan have been listed in the table below. A cross reference is also included to indicate where the CoA is addressed in this Plan or other Project management documents.

## CoA

| CoA No. | Condition Requirements | Applicability | | | CAQMP Reference |
|---|---|---|---|---|---|
| | | M12 West | M12 Central | M12 East | |
| A5 | Where the terms of this approval require a document or monitoring program to be prepared or a review to be undertaken and submitted to the Planning Secretary, and the terms of this approval require the document, monitoring program or review to be prepared/undertaken in consultation with identified parties, evidence of the consultation must be submitted to the Planning Secretary with the relevant document, monitoring program or review. The evidence must include: | ✓ | ✓ | ✓ | Section 1.5.1<br>Appendix A |
| | (a) Documentation of the engagement with the party identified in the condition of approval that has occurred before submitting the document for approval | | | | |
| | (b) A log of the dates of engagement or attempted engagement with the identified party | | | | |
| | (c) Documentation of the follow-up with the identified party where engagement has not occurred to confirm that they do not wish to engage or have not attempted to engage after repeated invitations | | | | |
| | (d) Outline of the issues raised by the identified party and how they have been addressed | | | | |
| | (e) A description of the outstanding issues raised by the identified party and the reasons why they have not been addressed. | | | | |
| B6 | A Complaints Management System must be prepared and implemented before the commencement of any Work and maintained for the duration of construction and for a minimum for 12 months following completion | ✓ | ✓ | ✓ | Section 8.3 |

| CoA No. | Condition Requirements | Applicability | | | CAQMP Reference |
|---|---|---|---|---|---|
| | | M12 West | M12 Central | M12 East | |
| | of construction of the CSSI. The Complaints Management System must require complainants to be advised that: | | | | |
| | (a) The Complaints Register may be forwarded to Government agencies, including the Department, to allow them to undertake their regulatory duties; | | | | |
| | (b) By providing personal information, the complainant authorises the Proponent to provide that information to government agencies; | | | | |
| | (c) The supply of personal information by the complainant is voluntary; and | | | | |
| | (d) The complainant has the right to contact government agencies to access personal information held about them and to correct or amend that information (Collection Statement). | | | | |
| | The Collection Statement must be included on the Proponent's or project website to make prospective complainants aware of their rights under the Privacy and Personal Information Protection Act 1998. For any complaints made in person, the complainant must be made aware of the Collection Statement. | | | | |
| B7 | The following information must be available to facilitate community enquiries and manage complaints one (1) month before the commencement of Work and for 12 months following the completion of construction: | ✓ | ✓ | ✓ | Section 8.3 |
| | (a) 24- hour telephone number for the registration of complaints and enquiries about the CSSI | | | | |
| | (b) A postal address to which written complaints and enquires may be sent | | | | |
| | (c) An email address to which electronic complaints and enquiries may be transmitted; and | | | | |
| | (d) A mediation system for complaints unable to be resolved. | | | | |
| | This information must be accessible to all in the community regardless of age, ethnicity, disability or literacy level and must be provided on the website required under Condition B10. | | | | |

| CoA No. | Condition Requirements | Applicability | | | CAQMP Reference |
|---|---|---|---|---|---|
| | | M12 West | M12 Central | M12 East | |
| C2 | (h) A list of all the CEMP Sub-plans required in respect of construction, as set out in Condition C4. Where staged construction of the CSSI is proposed, the CEMP must also identify which CEMP Sub-plan applies to each of the proposed stages of construction | ✓ | ✓ | ✓ | Section 1.3 |
| | (k) For periodic review and update of the CEMP and all associated plans and programs | ✓ | ✓ | ✓ | Section 9 |
| | (l) The outcomes of consultation with government agencies in accordance with Condition A5. | ✓ | ✓ | ✓ | This CAQMP Appendix A |
| C9 | Any of the CEMP Sub-plans may be submitted to the Planning Secretary for approval along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before the commencement of construction | ✓ | ✓ | ✓ | Section 1.4 |
| C10 | Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction. Where construction of the Critical State Significant Infrastructure (CSSI) is staged, construction of a stage must not commence until the CEMP and sub-plans for that stage have been endorsed by the ER and approved by the Planning Secretary. | ✓ | ✓ | ✓ | Section 1.4 |

## REMMs

| ID | Measure/requirement | Timing | Applicability | | | CAQMP Reference |
|---|---|---|---|---|---|---|
| | | | M12 West | M12 Central | M12 East | |
| AQ02 | Dust generation will be minimised during construction where possible. Where practicable, specific measures will include (but not be limited to):<br>• Regularly watering exposed and disturbed areas including stockpiles, especially during inclement weather conditions | During construction | ✓ | ✓ | ✓ | Table 7-1 |
| | • Adjusting the intensity of activities based on measured and observed dust levels, weather forecasts and the proximity of and direction of the works in relation to the nearest surrounding receivers | During construction | ✓ | ✓ | ✓ | |
| | • Ensuring loads are covered, and any loose materials/debris are removed before vehicles exit the site | During construction | ✓ | ✓ | ✓ | |
| | • Minimising the number of stockpiles and amount of material stockpiled where practicable | During construction | ✓ | ✓ | ✓ | |
| | • Positioning stockpiling areas as far as possible from surrounding receivers, including potentially ecologically sensitive receivers | During construction | ✓ | ✓ | ✓ | |
| | • Limiting stockpiling activities during conditions where winds are blowing strongly in the direction(s) from the stockpiling location to nearby receivers | During construction | ✓ | ✓ | ✓ | |
| | • Consultation with nearby developers to co-ordinate and plan activities where practicable to minimise the potential for cumulative dust-related impacts | Prior to construction and during construction | ✓ | ✓ | ✓ | |

| ID | Measure/requirement | Timing | Applicability | | | CAQMP Reference |
|---|---|---|---|---|---|---|
| | | | M12 West | M12 Central | M12 East | |
| | • The planning and undertaking of demolition activities, including the removal of hazardous building materials in a manner that minimises dust generation. This will also include the removal of hazardous building materials before the start of general demolition works. | Prior to construction and during construction | ✓ | ✓ | ✓ | |
| AQ03 | Odorous materials identified on site will be excavated in a staged process and exposed areas of odorous material will be kept to a minimum to reduce the total emissions from the site where feasible | During construction | ✓ | ✓ | ✓ | Table 7-1 |
| GG01 | Targets to reduce GHG emissions during construction will be included in the project's Sustainability Management Plan. | During construction | ✓ | ✓ | ✓ | Sustainability Management Strategy<br>Section 8.5.1<br>Section 8.5.2<br>Table 7-1 |

# Construction Air Quality Management Sub-plan

## Appendix C – Construction Air Quality Monitoring Program

M12 Motorway

November 2021

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# Document control

| | |
|---|---|
| **File Name** | M12PPW-ADAP-ALL-EN-PLN-000020_AppC |
| **Title** | M12 Motorway OCEMP<br>Construction Air Quality Management Sub-plan<br>Appendix C – Construction Air Quality Monitoring Program |
| **Document Number (Teambinder):** | M12PPW-ADAP-ALL-EN-PLN-000020 |

# Approval and authorisation

| Plan reviewed by: | Plan reviewed by: |
|---|---|
| Suzette Graham<br>TfNSW Environment and Sustainability Manager | Deanne Forrest<br>TfNSW Project Director, M12 |
| 05.11.2021 | 08/11/2021 |
| | |

# Revision history

| Revision | Date | Description |
|---|---|---|
| A | 14/10/2020 | First draft for TfNSW review |
| B | 5/11/2020 | Response to TfNSW comments |
| C | 21/11/2020 | Response to TfNSW comments |
| D | 30/07/2021 | Updated with Final NSW and Commonwealth CoA |
| E | 07/09/2021 | Response to TfNSW and ER comments |
| F | 01/10/2021 | Close out of ER comments |
| G | 02/11/2021 | Response to comments received during consultation |

# Content



# Tables

# Glossary/ Abbreviations

| Term | Expanded text |
|---|---|
| AQI | Air quality index |
| AQMS | Air Quality Monitoring Station |
| ARSR | Amendment Report to the Submissions Report |
| AWS | Automatic Weather Station |
| BoM | Bureau of Meteorology |
| CAQMP | Construction Air Quality Management Plan |
| CMS | Complaints Management System |
| CO | Carbon monoxide |
| $CO_2$ | Carbon dioxide |
| CoA | Conditions of Approval |
| Construction | Includes all activities required to construct the CSSI as described in the documents listed in Condition A1, including commissioning trials of equipment and temporary use of any part of the CSSI, but excluding Low Impact Work which is carried out to complete prior to the approval of the CEMP, works approved under a Site Establishment Management Plan, demolition of acquired residential houses, structures and sheds, and works specified in Appendix B of the Infrastructure Approval and approved under an environmental management plan(s) in accordance with Condition A24. |
| DEC | Former Department of Environment and Conservation |
| DECC | Former Department of Environment and Climate Change |
| DECCW | Former Department of Environment, Climate Change and Water, now EES |
| DPIE | Department of Planning, Industry and Environment |
| EEC | Endangered ecological communities |
| EES | NSW Environment, Energy and Science |
| EIS | Environmental Impact Statement |
| EMS | Environmental Management System |
| EPA | NSW Environment Protection Authority |
| EP&A Act | *NSW Environmental Planning and Assessment Act 1979* |
| ER | Environmental Representative |
| ESM | Environment and Sustainability Manager |
| ESR | Environmental Site Representative |

| Term | Expanded text |
|---|---|
| EU | European Union |
| IAQM | UK's Institute of Air Quality Management |
| km | kilometre |
| LVAS | Low Volume Air Sampler |
| MP | Monitoring Program |
| NEPC | National Environment Protection Council |
| NEPM | National Environment Protection Measure |
| NEPM-AAQ | National Environment Protection Measure (Ambient Air Quality) |
| $NO_2$ | Nitrogen dioxide |
| NERDDC | Former National Energy Research, Development and Demonstration Council |
| $O_3$ | Ozone |
| OCEMP | Overarching Construction Environmental Management Plan |
| OCS | Overarching Communication Strategy |
| OEH | NSW Office of Environment and Heritage, now EES |
| Planning Secretary | Secretary of the NSW Department of Planning and Environment, or delegate |
| $PM_{10}$ | Particulate matter 10 micrometres or less in diameter |
| $PM_{2.5}$ | Particulate matter 2.5 micrometres or less in diameter |
| POEO Act | *Protection of Environment Operations Act 1997* |
| QA | Quality Assurance |
| REMM | Revised Environmental Management Measure as provided in the Amendment Report |
| SMART | TfNSW's Specific, Measurable, Achievable, Realistic and Timely principles |
| $SO_2$ | Sulphur Dioxide |

| Term | Expanded text |
|---|---|
| TfNSW | Transport for New South Wales (formerly Roads and Maritime Services (RMS)) |
| Work | Any physical work to build or facilitate the building of the CSSI, including low impact work, environmental management measures and utility works.<br>However, it does not include activities that inform or enable detailed design of the CSSI and generate noise that is no more than 5 dB(A) above the rating background level at any sensitive receiver. |
| WSIA | Western Sydney International Airport |

# 1 Introduction

## 1.1 Context

This Construction Air Quality Monitoring Program (this Monitoring Program) is an appendix of the Construction Air Quality Management Sub-plan (CAQMP) and forms part of the Overarching Construction Environmental Management Plan (OCEMP) for the M12 Motorway (the Project).

It should be noted that is this Monitoring Program is not a requirement of the NSW Conditions of Approval (CoA), however has been included to fulfil Transport for New South Wales (TfNSW) requirements.

## 1.2 Background

TfNSW is planning to construct and operate the M12 Motorway (the Project) to provide direct access between the Western Sydney International Airport (WSIA) at Badgerys Creek and Sydney's motorway network. The M12 Motorway will run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for about 16 kilometres (km) and is expected to be opened to traffic prior to opening of the WSIA.

The Project will be constructed in three separate stages under four separate construction contracts:

- M12 West (construct only contract) – between The Northern Road, Luddenham and about 250 metres east of Badgerys Creek
- M12 Central (construct only contract) – between about 500 metres west of South Creek and the Western Sydney Parklands at Duff Road, Cecil Park
- M12 East (construct only contract) – Elizabeth Drive connections south of Cecil Park
- M12 East (design and construct contract) – the M7/M12 interchange.

## 1.3 Scope of the program

The scope of this Monitoring Program is to describe how the Construction Contractor proposes to monitor dust and air pollutants during construction of the Project. This purpose of this Monitoring Program is to:

- Provide a procedure to monitor air quality impacts during construction of the Project
- Meet the requirements of the relevant Conditions of Approval (CoA) for the Project
- Meet any relevant legal and other requirements for the Project.

The Construction Contractors will be required to develop a detailed Air Quality Monitoring Program to address specific requirements in accordance with the CAQMP. The Construction Contractors will supplement this overarching Monitoring Program with stage specific information and include the updated Monitoring Program in their stage-specific Construction Air Quality Management Sub-plan (CAQMP).

The SMART (Specific, Measurable, Achievable, Realistic and Timely) principles have been considered in the preparation of this Monitoring Program. Refer to Section 2 for further details on how the monitoring procedures are being conducted.

## 1.4 Environmental Management Systems overview

The overarching Environmental Management System (EMS) for the Project is described in Section 3 of the OCEMP. The Construction Contractor delivering the Project will have an EMS consistent with the overarching EMS described in the OCEMP.

This overarching Monitoring Program forms part of the Environmental Management Framework for the Project as described in Section 3 of the OCEMP.

## 1.5 Responsibilities

Site personnel or sub-contractors with suitable experience and qualifications will undertake the monitoring outlined in this Monitoring Program.

The Construction Contractors' Project Manager and Construction Managers are responsible for ensuring that all legal and other requirements described in this Monitoring Program are met.

## 1.6 Approval, review and modification

As noted in Section 1.1, this Monitoring Program is not a NSW CoA requirement. However, the Monitoring Program will be reviewed by the TfNSW Project Director and the Environment and Sustainability Manager (ESM) (or delegate). The Monitoring Program will be provided to the Environmental Representative (ER) and Planning Secretary for information. Copies of the Monitoring Program will be provided to the EPA.

Construction will not commence until all relevant baseline data for the specific construction activity has been collected. The Monitoring Program will be implemented for the duration of construction and for any longer period set out in this Monitoring Program or specified by the Planning Secretary, whichever is the greater.

This Monitoring Program will be reviewed every six months by TfNSW in consultation with the Construction Contractors. Minor amendments to this Monitoring Program may be provided to the ER.

Any amendments to the Monitoring Program will be documented in subsequent revisions of this Monitoring Program. A copy of the updated Monitoring Program and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure outlined in the Construction Contractors' CEMPs. Site personnel with responsibilities relevant to air quality monitoring will be informed of any amendments to the Monitoring Program and training provided, where required.

TfNSW will review the Contractors' Construction Monitoring Programs to confirm compliance with the requirements of the CAQMP and specifications.

## 1.7 Relevant legislation

Legislation and regulations relevant to air quality management includes:

- *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 2010
- Protection of the Environment Operations (General) Regulation 2009, Part 5.4 Air pollution
- *National Greenhouse and Energy Reporting Act 2007 (NGER Act)*.

Relevant provisions of the above legislation are identified in the register of legal requirements included in Appendix A1 of the OCEMP.

## 1.8 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Monitoring Program include:

- National Environment Protection Measure for Ambient Air Quality (AAQ NEPM)
- National Environment Protection Council (NEPC, 2016)
- National Environment Protection Measure for Air Toxics (Air Toxics NEPM) (NEPC, 2011)
- Australian Standard AS 3580.1.1:2007 Methods of Sampling Analysis of Ambient Air. Part 1.1 Guide to Siting Air Monitoring Equipment
- Australian Standard AS 3580.9.9: 2017 Methods for sampling and analysis of ambient air Determination of suspended particulate matter - PM 10 low volume sampler - Gravimetric method
- Australian Standard AS 3580.10.1: 2016 Methods of Sampling Analysis of Ambient Air. Determination of Particulate Matter – Deposited Matter - Gravimetric Method
- Approved Methods for Modelling and Assessment of Air Pollutants in NSW (NSW EPA, 2017)
- Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (Department of Environment and Conservation (DEC, 2005)
- Air Emissions Inventory for the Greater Metropolitan Region in New South Wales (EPA, 2012)
- Guidance on the assessment of dust from demolition and construction Version 1.1 (UK IAQM, 2014)
- Technical Framework: Assessment and management of odour from stationary sources in NSW (DEC, 2006)
- Managing Urban Stormwater: Soils and Construction, Volume 1 (Landcom, 2004) and Volume 2 (Department of Environment and Climate Change (DECC), 2008) (the “Blue Book”)
- Air Quality Monitoring Criteria for Deposited Dust (DEC Guideline)
- Government Resource Efficiency Policy (NSW Office of Environment and Heritage (OEH, 2014)
- Environmental Sustainability Strategy 2019-2023 (Roads and Maritime, 2021).

## 1.9 TfNSW QA specifications

- TfNSW QA Specification G36 – Environmental Protection (Management System)
- TfNSW QA Specification G38 – Soil and Water Management (Soil and Water Management Plan)
- TfNSW QA Specification R272 – Automatic Weather Stations.

# 2 Air Quality Monitoring

A summary of the baseline air quality criteria is provided in the CAQMP Section 5. The overarching monitoring to be adopted for the Project is detailed in Table 2-1. Air quality and climate monitoring will be undertaken by the Construction Contractor's ESR and detailed within the stage-specific CAQMP and monitoring program.

Table 2-1: Summary of air quality and climate monitoring and inspections

| Monitoring details | Frequency | Test procedure | Responsibility |
|---|---|---|---|
| **Monitoring** | | | |
| Prevailing wind conditions and weather forecast | Daily | • Weather conditions and forecasts will be obtained from the Australian Bureau of Meteorology (BoM) operated weather stations such as Badgerys Creek AWS (station ID 067108) | Construction Contractor ESR |
| Climate monitoring | Daily | • Daily rainfall monitoring will be undertaken via automatic weather stations installed at ancillary facilities or construction sites and confirmed with manual rainfall gauges installed across the Project | Construction Contractor ESR |
| | Hourly | • Hourly temperature, humidity, wind velocity and rainfall from either the Project weather station, or through analysis of equivalent weather information obtained from the BoM (Badgerys Creek AWS station ID 067108) | Construction Contractor ESR |
| Suspended particulate monitoring ($PM_{10}$ and $PM_{2.5}$ concentrations in $\mu g/m^3$) | Continuous (Real time) | • Real-time monitoring using a light-scattering laser photometer (aerosol monitor). | Construction Contractor ESR |
| Odour monitoring | Daily, or in response to complaints | • No detectable odours beyond the site boundary, or at the nearest sensitive land use downwind | Construction Contractor ESR |
| **Inspections** | | | |
| Investigation in response to recurring or major complaints, or authorised agency request, regarding exceedance of air emissions | As required | • Ongoing monitoring and data collection will be undertaken<br>• The Construction Contractor will respond to complaints in accordance with the Project Complaints Management System (CMS), OCEMP and OCS.<br>• The Construction Contractor will undertake an investigation of the complaint including an assessment of operations, weather conditions and visual observation of impact<br>• The Construction Contractor will review real-time monitoring data in the vicinity of the complainant | Construction Contractor ESR |

| Monitoring details | Frequency | Test procedure | Responsibility |
|---|---|---|---|
| | | • The Construction Contractor will review efficiency of dust mitigation measures and detail additional mitigation measures if required. | |
| Visual surveillance | Daily | • Dust control measures are in an adequate condition<br>• No long-term visible dust emissions from the site<br>• No mud-tracking off-site from haul roads | Construction Contractor ESR |

## 2.1 Meteorological monitoring

Rainfall at the construction sites will be measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office associated with the activities is established. The Construction Contractors will install automatic rainfall intensity / automatic weather stations (AWS) to record hourly rainfall, temperature, relative humidity, wind speed, wind direction and bathometric pressure. Manual rain gauges will also be used across the Project to assist with assessment of rainfall data accuracy.

The location of the AWS and manual rainfall gauges will be determined by the Construction Contractor before the commencement of construction and details will be provided in the Construction Contractors' CAQMP.

The AWS will conform to TfNSW QA Specification R272 for the design and location of such devices. AWS will be located within a secured compound area fully protected by fencing, likely to be at major site compounds, where not constrained by land use. AWS instrumentation, communication or power cabling contained within conduits will be buried to a depth of at least 100 millimetres.

The AWS will be installed on land owned by TfNSW or publicly owned land where feasible. If the AWS is to be located on private land, permission must be granted by the landowner to access the AWS on a monthly basis.

Before establishment of the AWS, the Construction Contractor will prepare a report identifying suitable locations for the AWS and other weather gauges in consultation with a suitably qualified person with experience installing and operating AWSs, and any relevant stakeholders. The TfNSW ESR (or delegate) will review the proposed locations of the AWS for consistency with specifications and the CAQMP and this Monitoring Program.

In accordance with normal standard construction practices, weather forecasts will be used to guide work activities undertaken on-site. The Construction Contractor will review the weather forecasts at the start of each day and before undertaking new work activities that may be affected by rainfall or adverse weather.

The Beaufort Wind Scale as detailed in Table 2-2 will be used to determine wind conditions. If wind conditions are classified as "strong winds" or greater, all dust generating activities are to cease. For wind categories less than "strong winds", the Construction Contractor will assess dust generating activities and either implement additional mitigation measures or reschedule the activity to when dust can be contained on-site.

Table 2-2: Beaufort wind scale (adapted from BoM)

| Beaufort scale number | Descriptive term | Wind speed (km/h) | Wind speed (knots) | Description on land |
|---|---|---|---|---|
| 0 | Calm | 0 | 0 | Smoke rises vertically |
| 1-3 | Light winds | ≤19 | ≤10 | Wind felt on face; leaves rustle; ordinary vanes moved by wind |
| 4 | Moderate winds | 20 - 29 | 11 - 16 | Raises dust and loose paper; small branches are moved |
| 5 | Fresh winds | 30 - 39 | 17 - 21 | Small trees in leaf begin to sway; crested wavelets form on inland waters |
| 6 | Strong winds | 40 - 50 | 22 - 27 | Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty |
| 7 | Near gale | 51 - 62 | 28 - 33 | Whole trees in motion; inconvenience felt when walking against wind |
| 8 | Gale | 63 - 75 | 34 - 40 | Twigs break off trees; progress generally impeded |
| 9 | Strong gale | 76 - 87 | 41 - 47 | Slight structural damage occurs -roofing dislodged; larger branches break off |
| 10 | Storm | 88 - 102 | 48 - 55 | Seldom experienced inland; trees uprooted; considerable structural damage |
| 11 | Violent storm | 103 - 117 | 56 - 63 | Very rarely experienced - widespread damage |
| 12+ | Hurricane | ≥118 | ≥64 | Very rarely experienced - widespread damage |

## 2.2 Air Quality monitoring

### 2.2.1 Air quality criteria

The Approved Methods provides air quality criteria based on several pollutant criteria and averaging periods from multiple sources, including the NEPM-AAQ (1998) and NERDDC (1988).

Table 2-3 details the air quality criteria for particulate matter. Compliance criteria is related to a maximum 24-hour and annual average of $PM_{10}$ and $PM_{2.5}$ concentrations exceeding the micrograms per cubic metre criterion. This is based on the maximum background concentration and the 100$^{th}$ percentile to obtain the total impact average over 24 hours.

Management criteria is based on the UK IAQM *Air Quality Monitoring in the Vicinity of Demolition and Construction Sites* (2018) used as a basis prior to conducting monitoring during construction. The 1-hour 'short-term' period has been adapted from the IAQM (2018) and although arbitrarily derived significantly greater concentrations than longer term (e.g. 24-hour average) air quality compliance criteria, it provides a reference point upon which the Construction Contractor must act immediately to minimise dust emissions. Should the '1-hour' trigger level be breached, it is generally considered that the 24-hour compliance criteria is also likely to be breached.

If any of the variables are observed, the dust control measures will be reviewed and amended by the Construction Contractor and ESR where required in consultation with TfSNW. Adaptive management is described in Section 4 of this Air Quality Monitoring Program.

Table 2-3: Air quality criteria for particulate matter

| Pollutant | Averaging time | Compliance Criteria | Management Criteria | Source |
|---|---|---|---|---|
| Particulate matter ($PM_{10}$) | Annual | 25 µg/m$^3$ | N/A | NSW EPA, 2017 |
| | 24 hours | 50 ug/m$^3$ | 38 ug/m$^3$ | NSW EPA, 2017<br>NEPM-AAQ, 1998 |
| | 1 hour *('short-term')*[a] | N/A | 190 ug/m$^3$ [a] | IAQM, 2018 |
| Particulate matter ($PM_{2.5}$) | Annual | 8 ug/m$^3$ | N/A | NSW EPA, 2017 |
| | 24 hours | 25 ug/m$^3$ | 21 ug/m$^3$ | NSW EPA, 2017<br>NEPM-AAQ, 1998 |
| | 1 hour *('short-term')* [a] | N/A | 190 ug/m$^3$ [a] | IAQM, 2018 |

*Source: Adapted from Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (NSW EPA, 2017)*

*Notes:*

*a. Trigger level over 1-hour ('short-term') period (IAQM, 2018)*

### 2.2.2 Real-time particulate monitoring

Real time digital particulate monitoring equipment will be installed in accordance with Australian Standard AS/NZS 3580.10.1:2016 Determination of particulate matter - Deposited matter - Gravimetric method by a suitability qualified person, with relevant air quality monitoring experience.

The equipment must log real-time aerosol mass fraction concentrations for $PM_{2.5}$ and $PM_{10}$. The equipment to be used should:

- Use light-scattering laser photometer
- Issue an alert to the Construction Contractor when the short-term 1-hr average concentration Trigger level is exceeded via alarm or SMS.

Real time monitoring trigger levels are generally determined on a case-by-case basis as there are variables that can affect the relationship between the dust levels measured within the site and the resulting dust levels occurring off-site including:

- Distance between the monitoring location and sensitive receivers
- Intensity, duration and frequency of dust generating activities
- Background dust levels
- Direction of the prevailing winds in relation to sensitive receivers.

The trigger levels for real time monitoring are arbitrary figures with consideration for the above factors and are generally significantly greater concentrations than longer term (e.g. 24-hour average) air quality compliance criteria.

The site $PM_{10}$ and $PM_{2.5}$ trigger level is set at 190 µg/m$^3$ (one-hour average) (based on IAQM 2018). See Table 2-3.

The trigger level will be reviewed if:

- Complaints are received and verified
- Dust is observed to be leaving site risking the amenity of the surrounding environment
- Other dust monitoring methods indicates frequent exceedances of the relevant Project criteria attributable to the Project.

If any of the variables are observed, the dust control measures will be reviewed and amended by the Construction Contractor and ESR where required.

### 2.2.3 Site selection and positioning

The siting of monitors will consider the below criteria:

- Positioning in accordance with *AS 3580.1.1:2016: Methods of Sampling and Analysis of Ambient Air, Part 1.1: Guide to Siting Air Monitoring Equipment*
- Proximity to ancillary facilities and stockpile locations
- Proximity to sensitive receivers and location of threatened species or endangered ecological communities (EECs). However, if feasible, will be located in low or sparsely built-up areas
- Typical wind direction
- Avoiding locations where:
  - Airflow is restricted, including behind trees or structures, with a minimum clear sky angle of 120º required
  - Objects might alter the pollution concentration by adsorption or absorption, such as leafy vegetation and some building materials
  - Chemical interference may interfere with dust monitoring, such as near vehicle or plant emissions or other unrelated local emissions
  - Physical interference may produce atypical results or where electrical interference to sampling equipment could occur from nearby high voltage power lines
- Monitoring sites will, to the extent possible, be located where:
  - There is a low potential for vandalism
  - There is adequate access for transporting equipment
  - Personnel can perform their activities in a safe environment
  - The priority for siting of monitors will be on TfNSW or publicly owned land first, then private land second. If monitors are located on private property, permission must be granted by the landowner to locate the monitor on their property, to access a power supply (if required) and to access the monitors for maintenance, calibration etc.
  - Access to a power source (if necessary).

The Construction Contractor will identify the number and locations of monitors with consideration of the areas of sensitive receivers and environmental sensitive areas that require monitoring for that stage of the Project. These details will be identified prior to the commencement of construction within each stage-specific Air Quality Monitoring Program.

Monitoring equipment will remain in place until completion of construction works.

### 2.2.4 Calibration

Real-time monitors are to be calibrated every 6 months by co-locating a Low Volume Air Sampler (LVAS) at each monitoring location to derive a site-specific correction factor. LVAS calibration monitoring will be performed in accordance with AS/NZS 3580.9.9 Methods for Sampling and Analysis of Ambient Air – Determination of suspended particulate matter – $PM_{10}$ low volume sampler – Gravimetric Method.

Laboratory calibration will be undertaken in accordance with the manufacturer's guidelines by NATA accredited laboratory. The Construction Contractor will provide calibration details specific to the monitoring equipment being utilised on the project within the stage-specific Air Quality Monitoring Program.

# 3 Reporting

## 3.1 Monthly Environmental Report

The Construction Contractor will prepare Monthly Environmental Reports for the duration of the Project for incorporation in the Monthly Reports and submitted to the TfNSW ESR (or delegate) for review. Information to be detailed in the reports includes:

- Results summary and analysis of the environmental monitoring
- Performance of this Monitoring Program
- Summary of any complaints received that are related to air quality complaints.

The monitoring data will be collected and analysed prior to the preparation of the report. The monitoring data will be compared with the air quality criteria. Following this, a Construction Air Quality Monitoring Report will be prepared.

Refer to Section 7.5 of the OCEMP for further detail on environmental reporting.

## 3.2 Air Quality Monitoring Report

The Construction Contractors will prepare Air Quality Monitoring Reports detailing the results of the monitoring undertaken in accordance with this Monitoring Program. The results of the monitoring will be collected in the form of a Construction Monitoring Report.

The Construction Air Quality Monitoring Reports will be submitted quarterly to the Planning Secretary and to relevant regulatory agencies for information until commencement of operation.

Reports will include, but not be limited to, the following information:

- The date(s) and time at which the monitoring was undertaken
- The locations and description of monitoring undertaken
- The name of the person who undertook the monitoring
- Tabulations of monitoring data
- Compliance monitoring results with the criteria identified in Section 2.2of this Monitoring Program
- Identification of exceedances of the nominated criteria and descriptions of the causes of these exceedances
- Details of any alterations/deviations from the Monitoring Program
- Summary of any complaints received regarding air quality.

The Construction Contractors will maintain accurate records of all air quality monitoring activities.

## 3.3 Reporting on non-conformances and exceedances

In the event that the criteria identified in Section 2.2.1of this Monitoring Program are exceeded, the Construction Contractor will investigate and report the exceedance to the TfNSW Project Director and the ESM (or delegate) and the ER within seven days of identification of the exceedance. Details of exceedances will be provided in the Monthly Environmental Reports.

The investigation into the exceedance will determine if the exceedance is due to Project related activities, from another source, or due to regional events (dust storms, bushfires, etc). If the exceedance is attributed to Project activities, the exceedance will be classified as a non-conformance, incident or reportable event as defined by the M12 Environment Incident Classification and Reporting Procedure (Appendix A7 of the OCEMP).

## 3.4 Complaints management and reporting

Recording and reporting of complaints will be undertaken in accordance with the Complaints Management System for the Project (refer to Section 7.3 of the OCEMP).

# 4 Adaptive management

## 4.1 Response to air quality issues

Where air quality monitoring results directly attributable to the Project exceeding the criteria set out in Section 2.2.1 of this Monitoring Program, the following steps will be undertaken:

- Analysis of the results by the Construction Contractor's ESR in more detail with a view of determining possible causes for the exceedance
- Site inspection by the Construction Contractor's ESR
- Advising relevant personnel of the problem
- Identifying and agreeing on actions and/or additional mitigation measures to resolve or mitigate the exceedance
- Implementing actions to rectify or mitigate the exceedance, including stop work arrangements where necessary or if directed by the ER
- Identifying and implementing additional mitigation measures.

Where air quality criteria are exceeded, the source of excessive air pollutants will be identified and, where available, additional measures will be implemented to either reduce emissions or reduce the impacts on receivers.

An example procedure identifying mitigation measures and preventative/ corrective actions for issues relating to management of air quality issues is provided in Table 4-1.

Table 4-1: Example procedure of mitigation measures and preventative/ corrective actions

| Key Element | Trigger / Response | Condition Green | Condition Amber | Condition Red |
|---|---|---|---|---|
| Visible dust leaving the site | Trigger | Daily inspections show that there is no visible dust leaving the site. | Daily inspections show that there is visible dust leaving the site. | Daily inspections show that there is visible dust leaving the site multiple times during a day OR from multiple locations within the site. |
| | Response | Continue monitoring program as normal. | Review and investigate construction activities and respective control measures. Where appropriate, implement additional remedial measures, such as:<br>• Deployment of additional water sprays, water trucks etc | Undertake an investigation of the dust generating activities, and if necessary, temporarily halt the dust generating activities |
| | Response | Continue monitoring program as normal. | • Analyse data to try to identify the source(s) of dust.<br>• Review operations to reduce dust emissions from the identified key source(s).<br>• Implement any additional mitigation measures as required, such as additional watering. | • Review and investigate construction activities and respective control measures for the monitoring period.<br>• If it is concluded that construction activities were directly responsible for the exceedance (ie the exceedance event was not caused due to high regional dust levels or local non-project dust source), submit an incident report to government agencies.<br>**Note**: If real time suspended particulate monitoring is not being conducted at this location, this should be considered to assist in managing dust from onsite activities. |

| Key Element | Trigger / Response | Condition Green | Condition Amber | Condition Red |
|---|---|---|---|---|
| Real-time suspended particulate matter monitoring ($PM_{10}$ and $PM_{2.5}$) | Trigger | 1-hour average $PM_{10}$ concentrations < 190 µg/m$^3$ | 1-hour average $PM_{10}$ concentrations >190 µg/m$^3$ | Two consecutive 1-hour average $PM_{10}$ concentrations >190 µg/m$^3$ |
| | Response | Continue monitoring program as normal. | Review and investigate construction activities and respective control measures.<br>Where appropriate, implement additional remedial measures, such as:<br>• Deployment of additional water sprays, water trucks etc<br>• Relocation or modification of dust-generating sources<br>• Record findings of investigations and actions taken to reduce dust levels<br>• Continue to closely monitor dust levels to ensure they are decreasing<br>If elevated dust levels are due to regional dust event (fire, dust storm etc) – still take action to minimise dust from the site to minimise cumulative impacts, but also record details of the cause of the elevated background levels. | • Stop work in vicinity of monitor.<br>• Review and investigate construction activities and respective control measures for the monitoring period, in an air pollution incident report (see Appendix A7 of the OCEMP).<br>• Investigation should also consider the monitored rolling 24-hour average (to be in compliance with 50 µg/m$^3$).<br>• If it is concluded that construction activities were directly responsible for the exceedance (ie the exceedance event was not caused due to high regional dust levels or local non-project dust source), submit an incident report to government agencies. |

Mitigation measures and preventative/ corrective actions will be developed in accordance with TfNSW specifications and the procedure for dealing with non-compliance with environmental management measures outlined in Section 7.3 of the OCEMP. The Construction Contractors will be required to verify and document the effectiveness of any management measures or preventative/ corrective actions implemented to avoid further exceedances.

The timing for any improvement will be agreed between the relevant Construction Contractor Project Engineer/ Superintendent and TfNSW Project Director and ESR (or delegate) based on the level of risk or reoccurrence of the exceedance (e.g. a significant risk will require immediate action).