CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

Moorebank Precinct East Stage 2

19 MARCH 2021

SYDNEY INTERMODAL TERMINAL ALLIANCE
MOOREBANK PRECINCT EAST STAGE 2

Construction Air Quality Management Plan

Author	Ronan Kellaghan	
Checker	Ketan Patel	
Approver	Shannon Blackmore	

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Author Details

Author Details	Qualifications and Experience
Ronan Kellaghan BSc (Hons), HDip, MSc	Ronan Kellaghan has 18 years of professional experience, with the last 13 years as a specialist in air quality management. His areas of expertise include dispersion modelling, emission estimation, odour assessment and monitoring.

REVISIONS

Revision	Date	Description	Prepared by	Approved by
001	8/02/2018	First draft for review	RK	SB
002	6/03/2018	Environmental Representative comments addressed	RK / SH	KP
003	27/04/2018	DP&E comments addressed	RK / ZQ	KP
004	11/05/2018	DP&E comments addressed	KN	KP
005	27/09/2018	Updated to reflect issue of Moorebank Precinct EPL and RfMA 002	ZQ	KP
006	23/05/2019	Updated with MPW Commonwealth Approvals relevant to Moorebank Avenue upgrade works	MWR	HT
007	15/07/2019	Update to reflect DotEE comments on Rev 006	ZQ	JC

Revision	Date	Description	Prepared by	Approved by
008	05/08/2019	Update to reflect DotEE comments on Rev 007	AL	JC
009	20/08/2019	Update to reflect variation to EPBC 2011/6229 Condition 7b)	AL	JC
010	25/10/2019	Minor updates associated with: • RfMA 02A – Additional construction compounds to support warehouse construction • RfMA 007 – Update to compliance and non-compliance definitions and inclusion of cumulative impacts required by EPBC CoA (2011/6029) • RfMA 008 – MAUW Construction Compound • RfMA 012 – Additional temporary construction access points • RfMA 014 – Suitable spoil importation • RfMA 015 – Moorebank Precinct EPL • RfMA 019 – Clarification of definitions for Early Works and Construction Phase A activities • RfMA 021 – New parking area • RfMA 024 – MPW EPBC (2011/6086) and MPE EPBC (2011/9229) approval requirements for DotEE review and approval	ZQ	AL
11	21/11/2019	Update to address ER comments, removal of Construction Phase updates associated with RfMA 019 and minor updates associated with RfMA 016 – Temporary access time extension	RP	JC
12	22/11/2019	Minor update associated with RfMA 26 – Helicopter assisted installation	ZQ	AL
13	20/12/2019	Updated to address ER comments on Rev 11 and Rev 12, and the approved CTAMP-B	ZQ	AL
14	16/01/2020	Updated to address ER comments	ZQ	JC
15	06/08/2020	Minor updates associated with: • RfMA-018 – MAUW boundary change • SSD 7628-Mod 2 approval	KB CS	JC AW
16	19/03/2021	Minor updates associated with:	AW	RJ

Revision	Date	Description	Prepared by	Approved by
		• RfMA-039 – Corrections and update to Extended Hours Works Plan, and revision to construction program • RfMA-040 – Additional compound for light vehicle parking and break facilities • SSD 7268 – MOD3 • SSD 7628 – MOD4		

KEY TERMS AND ACRONYMS

Acronym/Term	Meaning
AAQ NEPM	National Environment Protection (Ambient Air Quality) Measure
AQIA	Air Quality Impact Assessment
BOM	Bureau of Meteorology
CAQMP	Construction Air Quality Management Plan
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CO	Carbon Monoxide
CoA	Conditions of Approval
CoCs	Conditions of Consent
DNSDC	Defence National Storage and Distribution Centre
DotEE	Department of the Environment and Energy
DP&E	Department of Planning and Environment
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ER	Environmental Representative
EWAQMP	Early Works Air Quality Management Plan
EWEMP	Early Works Environmental Management Plan
EWMS	Environmental Work Method Statements
FCMMs	Final Compilation of Mitigation Measures
FEL	Front-end loader
GFA	Gross floor area
Goals	Assessment criteria for dust outlined in CoC B55, being 2g/m^2/month or maximum of 4g/m^2/month at the closest offsite sensitive receiver
ICAM	Incident Cause Analysis Method
Km	kilometres
KPI	Key performance indicator

Acronym/Term	Meaning
LGA	Local Government Agency
MAUW	Moorebank Avenue Upgrade Works
MPE	Moorebank Precinct East
NO_2	Nitrogen dioxide
Non-compliance	An occurrence, set of circumstances, or development that results in a non-compliance or is non-compliant with Development Consent SSD 7628 Conditions of Consent or EPBC Act Approval (EPBC 2011/6229) Conditions of Approval but is not an incident
Non-conformance	Observations or actions that are not in strict accordance with the CEMP and the aspect specific sub-plan
O_3	Ozone
OEH	Office of Environment and Heritage
OSD	On-site detention
PAC	Planning Assessment Commission
PM	Particulate matter
PM_{10}	Particulate matter with aerodynamic diameter of 10 microns or less
$PM_{2.5}$	Particulate matter with aerodynamic diameter of 2.5 microns or less
RSoC	Revised Statement of Commitments
RtS	Response to Submissions
SIMTA	Sydney Intermodal Terminal Alliance
SSD	State Significant Development
SSFL	Southern Sydney Freight Line
the Project	Stage 2 of the MPE Concept Approval (MP 10_0193) approved as the MPE Stage 2 Project (SSD 7628), including the SSD 7628-Mod 2, SSD 7628-Mod 3 and SSD 7628-Mod 4 approvals.. It involves the construction and operation of warehousing and distribution facilities on the MPE site and upgrades to approximately 2.1 km of Moorebank Avenue.
TSP	Total suspended particulate matter

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1 INTRODUCTION

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 2 of the Moorebank Precinct East (MPE) Project (SSD 7628), which comprises the second stage of development under the MPE Concept Approval (MP10_0193). SSD 7628 has been subject to the following modification applications:

- MPE Stage 2 Modification 2 (SSD 7628-Mod 2) application, which was approved on 31 January 2020;
- MPE Stage 2 Modification 3 (SSD 7628-Mod 3) application, which was approved on 18 December 2020; and
- MPE Stage 2 Modification 4 (SSD 7628-Mod 4) application, which was approved on 19 January 2021.

This Construction Air Quality Management Plan (CAQMP) has been developed to manage impacts to air quality during the construction of Stage 2 of the Moorebank Precinct East (MPE) Project (hereafter, 'the Project').

This CAQMP addresses the relevant requirements of the Project Approvals, including the Environmental Impact Statement (EIS), Response to Submissions (RtS) and Minister's Conditions of Consent (CoCs), and all applicable guidelines and standards specified to the management of air quality during construction of the Project.

1.1 Background and Scope

The MPE site, including the Project site, is located approximately 27 kilometres (km) south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany and includes the former Defence National Storage and Distribution Centre (DNSDC) site. The MPE site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West subregion, approximately 2.5 km from the Liverpool City Centre.

The MPE Project involves the development of an intermodal facility including warehouse and distribution facilities, freight village (ancillary site and operational services), stormwater, landscaping, servicing and associated works on the eastern side of Moorebank Avenue, Moorebank.

Stage 2 of the MPE Project (the Project) involves the construction and operation of warehousing and distribution facilities on the MPE site and upgrades[1] to approximately 2.1 km of Moorebank Avenue.

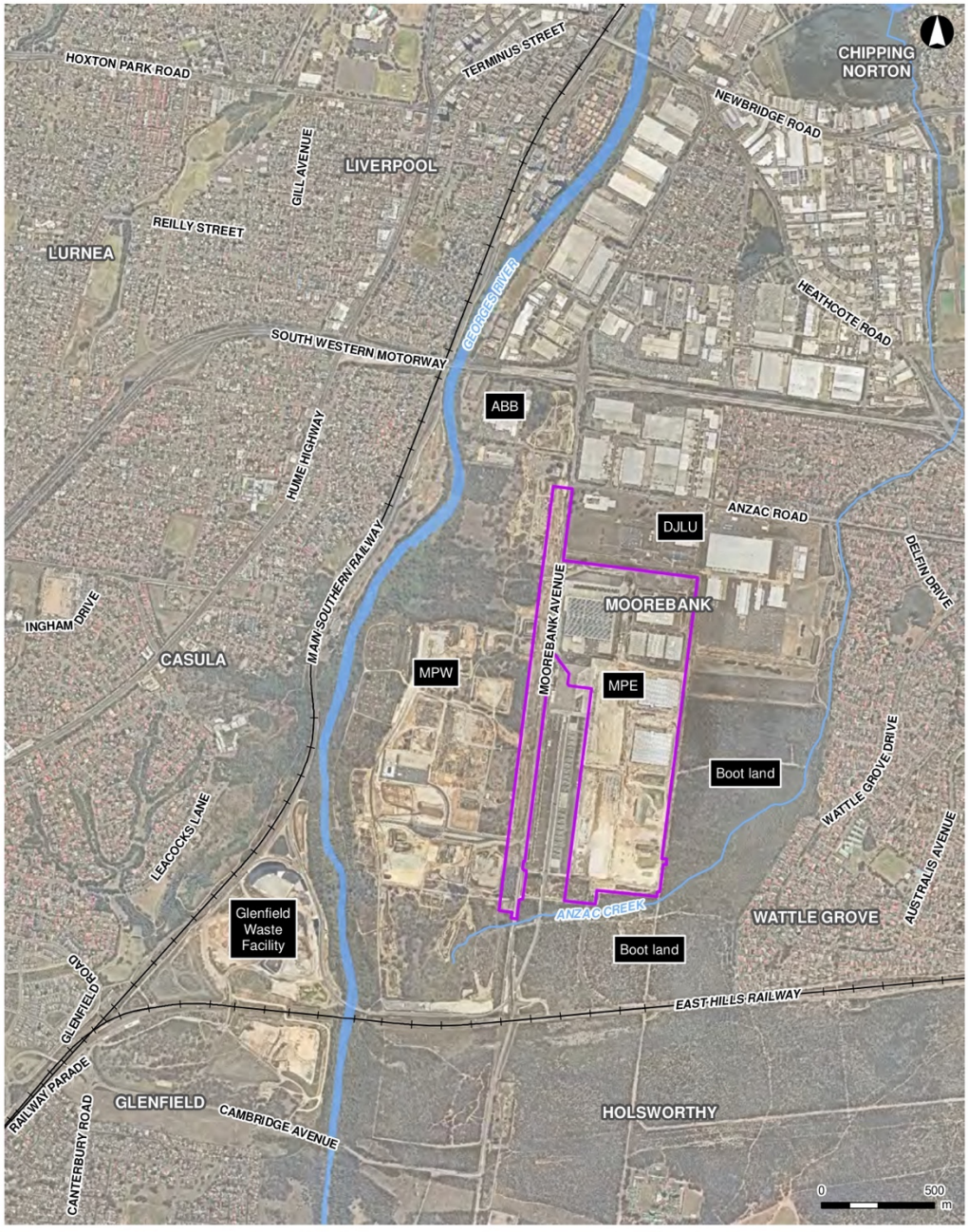
Key components of the Project include:

- Earthworks including the importation of 600,000 m^3 of fill and vegetation clearing
- Importation, stockpiling and placement of up to 250,000 m^3 of suitable spoil (separate to the 600,000 m^3 of imported clean general fill permitted for bulk earthworks)
- Approximately 300,000 m^2 gross floor area (GFA) of warehousing and ancillary offices
- Freight village, 8,000 m^2 GFA of ancillary retail, commercial and light industrial land uses
- Warehouse fit-out
- Internal road network and hardstand across the site
- Ancillary supporting infrastructure within the site, including:
  - Stormwater, drainage and flooding infrastructure
  - Utilities relocation/installation
  - Fencing, signage, lighting, remediation, and landscaping

[1] Other road infrastructure upgrades are required under the MPE Stage 2 Approval however would be undertaken subject to future approval and a separate CEMP (as required).

- An upgrade to Moorebank Avenue comprising the following key components:
  - Raising by about two metres and some widening
  - Embankments and tie-ins to existing Moorebank Avenue road levels
  - Signalling and intersection works
- Upgrading existing intersections along Moorebank Avenue, including:
  - Moorebank Avenue / MPE Stage 2 access
  - Moorebank Avenue / MPE Stage 1 northern access
  - Moorebank Avenue / MPE Stage 2 central access
  - Moorebank Precinct West (MPW) Southern Access/MPE Stage 2 southern emergency access.

The location of the Project site is shown in Figure 1-1.



LEGEND

- Current MPE Stage 2 construction area
- Existing railway
- Watercourse

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56
Aerial imagery supplied by nearmap (Jan, 2020)

1:25,000 at A4

Figure 1-1: Site Location

Date: 4/03/2020 Path: \\hc-aus-ns-fs-01\jobs\AA008765\L-GIS\A_Current\B_Maps\MPES2\MPES2_CEMP\SIMTA_MPES2_CEMP_008_SiteOverview_A4P_v5.mxd
Created by : TT
QA by : RM

Figure 1-1 Site Location

1.1.1 Development Consent

The MPE Stage 2 Project has been assessed by the Department of Planning and Environment (DP&E) under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as State Significant Development (SSD). The Planning Assessment Commission (PAC) granted consent for the MPE Stage 2 Project on 31 January 2018 and is subject to the Minister's CoCs (SSD 7628). The Project has since been subsequently modified and approved under Modification 2 (SSD 7628-Mod 2) on 31 January 2020. The Project, including its potential impacts, consultation and proposed mitigation and management, is documented in the following suite of documents:

- State significant development (SSD) consent SSD 7628, as modified
- SSD partial consent (subdivision) SSD 7628, as modified
- Moorebank Precinct East – Stage 2 – Environmental Impact Statement (Arcadis Australia Pacific Pty Limited, December 2016)
- Moorebank Precinct East – Stage 2 – Response to Submissions (Arcadis Australia Pacific Pty Limited, July 2017)
- MPE *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Approval (No. 2011/6229) granted on March 2014
- MPW *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Approval (No. 2011/6086) granted on September 2016 (for Moorebank Avenue Upgrade Works only)
- Consolidated assessment clarification responses issued on 10 November 2017 (Arcadis 2017).
- Moorebank Precinct East – Stage 2 (Modification 2) – Environmental Impact Statement (Aspect Environmental Pty Limited, July 2019)
- Moorebank Precinct East – Stage 2 (Modification 2) – Response to Submissions (Aspect Environmental Pty Limited, September 2019)
- Moorebank Precinct East – Stage 2 (Modification 3) – Environmental Impact Statement SSD 7628-Mod 3 (Aspect Environmental Pty Limited, June 2020)
- Moorebank Precinct East – Stage 2 (Modification 3) – Response to Submissions SSD 7628-Mod 3 (Aspect Environmental Pty Limited, August 2020)
- Moorebank Precinct East – Stage 2 (Modification 4) – Environmental Impact Statement SSD 7628-Mod 4 (Aspect Environmental Pty Limited, October 2020)

1.2 Construction Works Phases

The Project construction period is anticipated to be up to five years, which will be generally divided into three works phases, as detailed in the following sections.

1.2.1 Summary of Project Delivery Phases

The terminology for the project phases and periods has been developed from the preparation of the EIS and RtS documentation in response to the language of the CoCs and the need to stage the delivery of the environmental management documentation required by the CoC. Current terminology, and the equivalent terminology from the CoC and RtS are included in Table 1.

Table 1 Project Delivery Phase Terminology

Project Delivery Phase	CoC A18 Phase Equivalent	MPE Stage 2 RtS Works Period Equivalent
Early Works	Early works Fill importation (to 60,000 m^3)	Works Period A: Pre-construction Works Period B: Site preparation

Project Delivery Phase	CoC A18 Phase Equivalent	MPE Stage 2 RtS Works Period Equivalent
Construction Phase A	Fill importation Construction	Works Period B: Site preparation Works Period E: Bulk Earthworks, drainage and utilities Works Period F: Construction and internal fit out of warehousing Works Period G: Miscellaneous construction works
Construction Phase B	Fill importation Construction	Works Period C: Construction of Moorebank Avenue Diversion Road Works Period D: Pavement and intersection works along Moorebank Avenue Works Period E: Bulk Earthworks, drainage and utilities

1.2.2 Early Works

The Early Works Environmental Management Plan (EWEMP) is the overarching document that fully describes the 'Early Works' and details the management of environmental aspects and impacts associated with delivery of Early Works. Aspects, impacts and risks specific to air quality are considered in Section 3.1 of this plan, while a summary of the works that will be undertaken as 'Early Works' is provided below:

- Geotechnical and utilities investigation works including potholing to confirm the location of existing services, disconnection of non-critical services (with retention in place), grout filling of disconnected draining lines, and adjustment and relocation where applicable
- Clearing of non-native vegetation, stripping of topsoil and stockpiling of topsoil on site for later re-use within site landscaping
- Stabilisation of areas where topsoil has been stripped with imported clean hard fill or by other methods determined by the Environmental Representative (ER) to have minimal environmental impact
- Establishment of an interim access road to existing warehousing in the north-east portion of the MPE Stage 2 site, utilising existing paved areas with minor pavement extensions as required
- Removal of asbestos from heating equipment and fire resistant building elements (e.g. fire doors) by a licenced asbestos removalist followed by clearance by a certified occupational hygienist
- Hazardous material cleaning and decontamination in Buildings 67, 69, 81 and 83
- Heritage salvage works in Buildings 37, 75 and 80 on the Project site to recover architectural elements for adaptive re-use
- Importation, stockpiling and placement of up to 60,000 m^3 (not exceeding a total of 22,000 m^3 of material per day) of imported clean general fill material by truck-and-dog and / or semi-trailer
- Establishment of a site access point at the existing MPE site northern access and construction of associated access road to provide for access and manoeuvrability of vehicles into and through the site in accordance with CoC B10
- Establishment of temporary site fencing, a site compound(s) and temporary car parking areas to support Early Works and construction of the Project in accordance with CoC B10, B11 and B12
- Other activities determined by the ER to have minimal environmental impact.

Any of the activities defined in SSD Consent 7628 as 'Early Works' may be undertaken during the Early Works. All works during Early Works will be undertaken within the area identified in the EWEMP and required

sub-plans. Upon the commencement of construction, this CAQMP will supersede the Early Works Air Quality Management Plan (EWAQMP).

1.2.3 Construction Works Phase A (excluding Moorebank Avenue Upgrade Works)

The Construction Environmental Management Plan (CEMP) is the overarching document that fully describes the 'Construction' and details the management of environmental aspects and impacts associated with the delivery of Construction. Construction Works Phase A will include all works described in Early Works in addition to bulk earthworks, drainage and utilities, construction and internal fit-out of warehousing and finishing works.

Construction Works Phase A excludes Moorebank Avenue works described in Section 1.2.4. Construction Works Phase A includes, but is not limited to:

Completion of Site Preparation Activities

- Demolition of existing structures
- Clearing of remaining vegetation
- Adjusting the building formation of the site (to final operational levels) within which the Warehousing Compound will be located
- Establishment of temporary batch plant and materials crushing plant.

Bulk Earthworks, Drainage and Utilities

- Importation, stockpiling and placement of up to a total of 600,000 m^3 (including volume imported in the previous phase) of imported clean general fill (including volume imported in the previous phase) for bulk earthworks; limited to 22,000 m^3 of clean general fill per day
- Importation, stockpiling and placement of up to 250,000 m^3 of suitable spoil (separate to the 600,000 m^3 of imported clean general fill permitted for bulk earthworks)
- Installation of on-site detention (OSD) and drainage infrastructure within the MPE Stage 2 site
- Construction of retaining walls
- Creation of internal road formation by general earthworks (by constructing fill embankments)
- Bulk earthworks and adjusting the building formation of the Project site to final level, including the terminal hardstand
- Utilities relocation and installation
- Establishment of hardstand areas.

Construction and Internal Fitout of Warehousing

- Foundation and floor slab installation
- Erection of framework and structural walls
- Installation of roof
- Internal fit-out warehouse (racking and associated services).

Miscellaneous Construction and Finishing Works

- Pavement construction (internal transfer roads and perimeter road), including forming of new kerbs, gutters, medians (where required) and other structures
- Line marking, lighting and sign posting
- Installation of road furniture, including traffic signs and pavement markers
- Miscellaneous structural construction

- Finishing works, including landscaping (including revegetation) and general site rehabilitation, where required
- Commissioning of the Project
- Decommissioning/demobilisation of the Project site, including removal of construction compound(s) and temporary construction environmental controls.

1.2.4 Construction Works Phase B (including Moorebank Avenue Upgrade Works)

Construction Works Phase B will include all works described in Early Works Phase and Construction Works Phase A, in addition to the Moorebank Avenue upgrade works. Generally, the Moorebank Avenue upgrade works are described as construction of the Moorebank Avenue Diversion Road, bulk earthworks, drainage and utilities and pavement works.

Construction Works Phase B includes, but is not limited to:

Construction of the Moorebank Avenue Diversion Road

- Stripping of topsoil within footprint of temporary diversion road
- Installation of temporary drainage
- Placement of fill and temporary road pavement (e.g. gravel)
- Construction of interface between temporary diversion road and existing Moorebank Avenue
- Installation of temporary road signage, street lighting and signalling
- Transfer of traffic onto temporary diversion road from Moorebank Avenue.

Bulk Earthworks, Drainage and Utilities

- Removal of existing pavement and stripping of topsoil within Moorebank Avenue
- Importation, stockpiling and placement of up to a total of 600,000 m^3 (including volume imported in the previous phase) of imported clean general fill (including volume imported in the previous phase) for bulk earthworks; limited to 22,000 m^3 of clean general fill per day
- Importation, stockpiling and placement of up to 250,000 m^3 of suitable spoil (separate to the 600,000 m^3 of imported clean general fill permitted for bulk earthworks)
- Creation of a road formation for Moorebank Ave and the Moorebank Ave Diversion Road by general earthworks (by constructing fill embankments)
- Utilities relocation and installation.

Pavement Works along Moorebank Avenue

- Placement of select layer of earthworks material on top of the road formation
- Placing and compacting the pavement later (concrete, or concrete and asphalt) over the select layer (consisting of a sub-base and base) and potential sealing with bitumen
- Traffic switching from diversion road onto final, upgraded Moorebank Avenue
- Removal of construction traffic management and progressive opening of the internal road and warehouse access roads to traffic
- Removal of road surface, road signage, street lighting and signalling from temporary diversion road
- Commissioning of Moorebank Avenue.

1.2.5 Construction Compounds

Temporary construction compounds will be required to support all construction phases of the Project.

Three construction compounds are required:

- Warehousing Compound
- Liberty Compound
- Moorebank Avenue Compound.

The location of these compounds is shown in Figure 1-2.

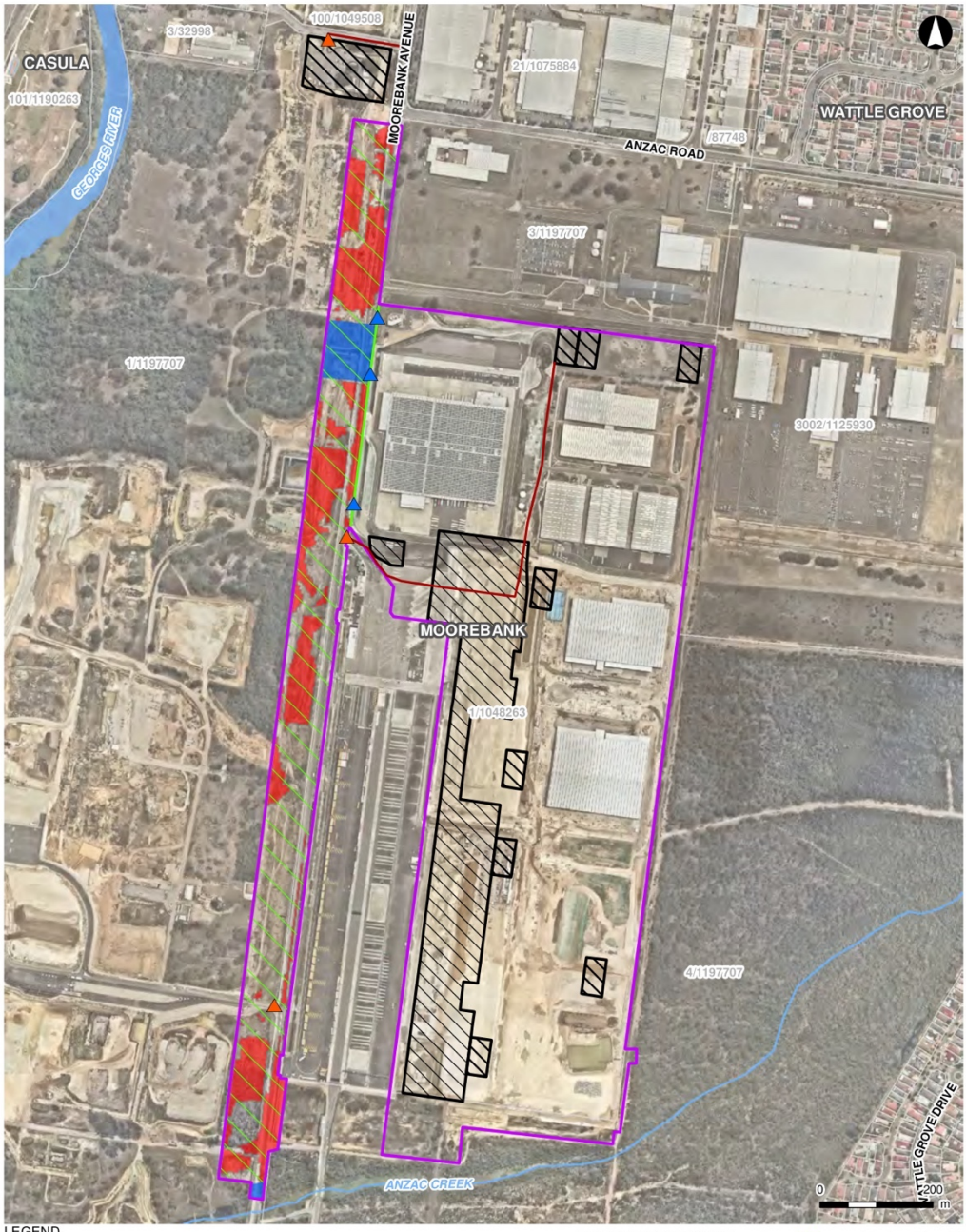


Figure 1-2: Overview of Construction Compounds

Figure 1-2 Construction Compounds

1.3 Purpose and Application

This CAQMP has been developed to address the Minister's CoCs and Final Compilation of Mitigation Measures (FCMMs), and is based upon the MPE Stage 2 Air Quality Impact Assessment (Appendix M of the MPE Stage 2 EIS). This plan aims to demonstrate how air quality impacts will be managed during construction of the Project.

This plan provides methods to measure and reduce the impact to quality by the contractor during the construction of the Project, including all contractor and consultant partners.

The specific requirements of the CoCs for compilation of the CAQMP, as identified in the CoCs and FCMMs are identified in the Compliance Matrices in Section 2.1.1.

The most recent, approved version of this plan will be implemented to manage the Project activities.

1.4 Staged Submission of this Plan

Subject to the approval of the Secretary (CoC A14), the Project has elected to stage the submission of a number of strategies, plans and programs that are required by the CoCs based on the Delivery Works Phases (for a detailed description of the relevant phase, refer to the CEMP) identified in Table 2 .

In accordance with CoC A15, Table 2 identifies the stage of the development to which this document applies, and the relationship between any future stage. The trigger for updating the document is also identified in Table 2 . When a document is updated, the most recent version of the document will supersede the previous version(s).

Table 2 Staged Documentation and Triggers to Satisfy CoC A15

Delivery Works Phases	General Description of Works	Current Document	Trigger to Update Document
Early Works			
Early Works	Utilities adjustments and relocations, clearing and stripping of topsoil, heritage salvage, fill importation, establishment of site access, temporary fencing and compound establishment, and other activities determined by the ER to have minimal environmental impact	☐ Document prepared to address Early Works only	Prior to the commencement of construction works
Construction			
Construction Phase A	Early Works activities, bulk earth works, drainage and utilities, construction and internal fit-out of warehousing and finishing works	☐ Document prepared to address Construction Works Phase A only (does not address Moorebank Avenue upgrade works)	Prior to the commencement of Moorebank Avenue upgrade works
Construction Phase B	Construction Phase A activities, construction of the Moorebank Avenue Diversion Road, bulk earthworks, drainage and utilities and pavement works	☒ Document prepared to address all construction works (Phase A + Phase B)	

1.5 Objectives and Targets

The following high level objectives and targets are set for the Project for the management of air quality are outlined in Table 3.

Table 3 Objectives and Targets

Objectives	Target	Indicator	Timeframe	Accountability
Ensure impacts from dust emissions during Construction are minimised for the sensitive receptors (shown in Figure 4-1)	No visible dust leaving the site No community complaints, written warnings or infringement notices regarding excessive dust arising from the construction	No community complaints, written warnings or infringement notices regarding excessive dust	Ongoing	Contractor's Environmental Manager (EM)
Ensure compliance with relevant CoCs, applicable legislative and other requirements	No written warnings or infringement notices	Number of written warnings or infringement notices	Ongoing	Contractor's EM
Ensure that reasonable mitigation measures are implemented to manage impacts on surrounding residents and commercial stakeholders	No exceedances of dust and air quality criteria	Number of exceedances of dust and air quality criteria	Ongoing	Contractor's EM
Establish and maintain awareness of the importance of ensuring that air quality impacts associated with the Project are avoided, where possible, or minimised	All Project and workforce personnel to complete an environmental induction, which will include information on the importance of minimising air quality impacts	Number and percentage of Project and workforce personnel that have attended required environmental induction prior to commencing work on the Project site	Ongoing	Contractor's EM

2 ENVIRONMENTAL MANAGEMENT

2.1 Legal and Other Requirements

Table 4 details the legislation, planning instruments and guidelines considered during development of this plan.

Table 4 Legislation, Planning Instrument and Guidelines

Legislation	Description	Relevance to this CAQMP
Environmental Planning and Assessment Act 1979	Establishes a system of environmental planning and assessment of development proposals for the State	The CoCs and associated obligations are incorporated into this plan
Protection of the Environment Operations Act 1997	Aims to achieve the protection, restoration and enhancement of the quality of the NSW environment	All plant would be operated in a proper and efficient manner such that air pollution is prevented. No offensive odour would be emitted during construction
Protection of the Environment Operations (Clean Air) Regulation 2010	Includes provisions to regulate emissions to air in NSW including standards for air impurities emitted from activities and plant	Relevant requirements of the Regulation have been incorporated into this plan
Australian / New Zealand Standard AS/NZS 3580.1.1:2007 (Methods for Sampling and Analysis of Ambient Air, Part 1.1 Guide to Siting Air Monitoring Equipment)	Provides guidance for siting of air monitoring equipment	Used to inform the locations for proposed monitoring sites outlined in Section 4
Australian / New Zealand Standard AS/NZS 3580.10.1:2016 (Methods for Sampling and Analysis of Ambient Air, Method 10.1 Determination of Particulate Matter – Deposited Matter – Gravimetric Method)	Describes the monitoring and analysis requirements for measuring nuisance dust	Guides the monitoring requirements outlined in Section 4
Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (“Approved Methods”) (NSW Environment Protection Authority (EPA), 2005)	Lists the statutory measures for modelling and assessing air pollution form stationary sources in NSW	Outlines the impact assessment criteria used to assess compliance for this CAQMP
NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (OEH, 2011)	Provides a review of international best practice management measures to prevent and minimise air quality impacts from Coal Mining	Provides best practice air quality management measures that have been incorporated into this plan

Additional guidelines and standards used in the preparation of this include:

- Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004).

2.1.1 Compliance Matrices

2.1.1.1 State Approvals

The Project is being delivered under Part 4, Division 4.1 (now Division 4.7 as of 1 March 2018) of the EP&A Act. The CoCs include requirements to be addressed in this plan and delivered during the Project. These requirements and how they are addressed along with division of responsibilities is provided within Table 5.

Table 5 Conditions of Consent (CoCs)

CoC	Requirement	Plan Section	How Addressed
A1	In addition to meeting the specific performance measures and criteria established under this consent all reasonable measures must be implemented to prevent, and if prevention is not reasonable, minimise, any harm to the environment that may result from the construction and operation of the development, and any rehabilitation required under this consent	Section 3.3 Section 4	Section 3.3 of this CAQMP identifies the management measures to be implemented to prevent and minimise environmental harm. Section 4 sets out the processes for monitoring and reviewing the effectiveness of these management measures. Opportunities to further minimise environmental harm will be identified through the ongoing evaluation of environmental management performance and effectiveness of this plan.
A2	The development may only be carried out: (a) in compliance with the conditions of this consent; (b) in accordance with all written directions of the Secretary in relation to this consent; (c) in accordance with the EIS, Submissions Report and MPE Stage 2 (SSD-7628) – Consolidated assessment clarification responses and updated Biodiversity Assessment Report; (d) in accordance with all Modification Assessments (if any); (e) in accordance with the amended development layout to be submitted for the Secretary's approval as part of this consent; and in accordance with the management and mitigation measures at APPENDIX B of this consent.	Compliance Matrices	The Compliance Matrices in this plan establish how the CoCs and the FCMMs have been addressed.
A15	If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program	Section 1.4	This CAQMP outlines the proposed staged delivery of this plan. The CAQMP supersedes the EWAQMP.

CoC	Requirement	Plan Section	How Addressed
A20	All licences, permits, approvals and consents as required by law must be obtained and maintained as required for the development. No condition of this consent removes the obligation for the Applicant to obtain, renew or comply with such licences, permits, approvals and consents.	CEMP - Section 2.5.2 Section 2.1	All applicable licences, permits and approvals will be obtained as required. Approvals, permits and licences required for the Project are discussed in the CEMP in Section 2.5.2. An Environmental Protection Licence (EPL) (No 21054) was issued by the EPA on 4 June 2018 (variation issued on 18 April 2019). The licence applies to the Moorebank Precinct (excluding the MPE Stage 1 Rail Access Land Package (RALP) which has a separate EPL licence (No. 20966) and authorises > 100,000 – 500,000 tonnes crushing, grinding or separating processing capacity per annum and > 500,000 – 2,000,000 tonnes extraction, processing or storage capacity per annum. The licence applies to all other activities carried on at the premises, including road construction, bulk earthworks 'cut and fill' and importing fill.
A32	All plant and equipment used at the site or to monitor the performance of the development must be: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner	Section 3.3	Section 3.3 includes measures regarding the maintenance and the operation of trucks and plant to minimise emissions.
B54	Best practice reactive and proactive management measures must be implemented to minimise dust generated during all works authorised by this consent.	Section 3.3	Best practice reactive and proactive management measures are outlined in Section 3.3.
B55	Deposited dust must not exceed an increase of 2g/m2 /month or maximum of 4g/m2 /month at the closest off site sensitive receiver.	Section 4.1.2	Monitoring for dust deposition is proposed at six locations. Figure 4-1 indicates the location of proposed dust monitors.
B56	During construction: (a) fill importation must not exceed 22,000m3 per day; (b) exposed areas and stockpiles must be watered regularly to minimise dust emissions; (c) water carts must be used to control dust emissions from vehicles travelling on unpaved surfaces, and graders and dozers pushing fill material;	Section 3.3	All construction management measures are outlined in Section 3.3.

CoC	Requirement	Plan Section	How Addressed
	(d) grader and bulldozer travel routes and the fill material being handled must be suitably moist; (e) water must be used as appropriate to maintain moisture in the fill material being bulldozed, such that dust emissions would be halved relative to not applying the water; (f) water may be applied prior to fill being delivered to site, provided that the same effect is achieved as in (e) above; (g) all trucks entering or leaving the site with loads must have their loads covered; (h) trucks associated with the development must not track dirt onto public roads; (i) public roads used by trucks associated with the development must be kept clean; and (j) land stabilisation works must be carried out progressively on site to minimise exposed surfaces.		
B57	The Applicant must prepare a Construction Air Quality Management Plan (AQMP) to the satisfaction of the Secretary. The AQMP must be prepared by a suitably qualified and experienced person(s). The Construction AQMP must form part of the CEMP required by condition C1. The AQMP must include: (a) a Construction Air Quality Monitoring Program; (b) identification of sources (including stockpiles and open work areas) and quantify airborne pollutants; (c) best practice reactive and proactive control measures that will be implemented for each emission source including measures to prevent the emission of visible dust from the site as listed in condition B55; (d) provisions for the implementation of additional mitigation measures in response to issues identified during monitoring and reporting; (e) for all emission sources at the site: (i) key performance indicator(s); (ii) monitoring method(s); (iii) location, frequency and duration of monitoring; (iv) record keeping; (v) complaints register; (vi) response procedures; and	a) Section 4.1 b) Section 3.2 c) Section 3.3 and 4.1 d) Section 3.3.1 e)(i) Section 3.3.1 and Table 15 (ii) Section 4.1.1 and 4.1.2 (iii) Section 4.1 (iv) Section 4.1 and Section 4.2 (v) Section 4.4 (vi) Section 3.3.1 and Section 4 (vii) Section 4	This CAQMP has been prepared to address all the requirements of this condition. a) Section 4.1 includes the Construction Air Quality Monitoring Program. b) Section 3.2 identifies the sources of air quality emissions and Table 14 quantifies airborne pollutants. c) Section 3.3 identifies best practice proactive mitigation measures that would be implemented for each emission source. A combination of real time boundary monitoring and dust deposition gauge monitoring will be undertaken at the Project site, in addition to visual monitoring (Section 4.1). d) Section 3.3.1 identifies additional mitigation measures that would be implemented in response to issues identified during monitoring and reporting. e)(i) Table 15 identifies key performance indicators. (ii) Section 4.1.1 and 4.1.2 identifies visual monitoring, real-time boundary monitoring and dust

CoC	Requirement	Plan Section	How Addressed
	(vii) compliance monitoring.		deposition monitoring as monitoring methods. (iii) Section 4.1 indicates the location, frequency and duration of monitoring. (iv) Section 4.1 and 4.2 identify how record keeping will be undertaken. (v) Section 4.4 provides details on the complaints register. (vi) Section 3.3.1 and 4 provide response procedures that would be implemented if exceedances do occur. (vii) Section 4 provides details on compliance monitoring that would be undertaken.
B58	Air quality monitoring must be undertaken during early works, fill importation and construction	Section 4.1 Figure 4-1	Monitoring for dust deposition is proposed at six locations. Figure 4-1 shows the location of these sites. Air quality monitoring has been undertaken throughout Early Works and Fill importation with monitors installed at nominated locations as per the Early Works Air Quality Management Plan (EWAQMP) prior to the commencement of Early Works. Monitoring will continue to occur at locations stipulated within this plan throughout construction.
B60	The Applicant must ensure the development does not cause or permit the emission of any offensive odour (as defined in the POEO Act).	Section 2.1 Section 3.3	Section 2.1 indicates that the development would not permit the emission of any offensive odour. Section 3.3, AQ32-36 also includes management measures that ensure the development will not cause or permit the emission of offensive odour.
B61	Equipment must be installed and operated in accordance with best practice to ensure that the development complies with all load limits, air quality criteria, air emission limits and air quality monitoring requirements as specified under this consent	Section 3.2	All plant and equipment will be installed and maintained to ensure best management practice.
B151	Boundary screening required under condition B150 must minimise visual, noise and air quality impacts on adjacent sensitive receivers.	Section 3.2	Shade cloth will be implemented along boundaries adjacent to sensitive receivers

CoC	Requirement	Plan Section	How Addressed
C7	The Applicant must ensure that the environmental management plans required under this consent are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures/criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) a description of the management measures to be implemented to comply with the relevant statutory requirements, limits or performance measures/criteria; (d) a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of any management measures (see (c) above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the development over time; (g) a protocol for managing and reporting any: (i) incidents and non-compliances; (ii) complaints; (iii) non-compliances with statutory requirements; and (h) a protocol for periodic review of the plan. Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for a particular management plan.	a) Section 3.1 b)(i) Section 2 (ii) Section 1.5 c) Section 3.3 d) Section 4 e) Section 2.1 f) Section 4.3 g)(i) Section 4.5 (ii) Section 4.4 (iii) Section 4.5 h) Section 4.3	(a) Not applicable as air quality monitoring is not currently occurring on site. (b(i)) Relevant statutory requirements for management of impacts on air quality are listed in Section 2. (b(ii)) and (b(iii)) Section 1.5 and Table 18 outline the performance measures and criteria adopted for air quality during construction (c) Management measures are outlined in Section 3.3 and are to be implemented to comply with relevant statutory requirements, limits or performance measures/criteria. (d) A monitoring and report program is outlined in Section 4 for imported spoil management. (e) Section 3.2.1 outlines additional reactive measures to be implemented in the event of unpredicted impacts. (f) Programs to investigate and implement ways to improve the environmental performance of the development over time will be conducted in accordance with Section 4.3. (g) The CEMP outlines a protocol for addressing any incidents, non-compliances and complaints. (h) Periodic review of the plan will occur and is outlined in Section 4.3 of this plan and in the CEMP.

The FCMMs were prepared as part of the MPE Stage 2 Submissions Report (Arcadis 2017). A list of the FCMMs as relevant to the Project and how they have been compiled within this plan are provided in Table 6.

Table 6 Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference
0B	The Construction Environmental Management Plan (CEMP), or equivalent, for the Amended Proposal would be based on the PCEMP (Appendix G of the EIS), and include the following preliminary management plans: • Preliminary Construction Traffic Management Plan (PCTMP) (Appendix K of the EIS) • Air Quality Management Plan (AQMP) (Appendix M of the EIS) • Erosion and Sediment Control Plans (ESCPs) and Bulk Earthworks Plans (Appendix P of the EIS) As a minimum, the CEMP would include the following sub-plans: • Construction Traffic Management Plan (CTMP) • Construction Noise and Vibration Management Plan (CNVMP), prepared in accordance with the Interim Construction Noise Guideline • Construction Air Quality Management Plan • Flora and Fauna Management Plan • A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan • Contamination Management Plan • Flood Emergency Response and Evacuation Plan • UXO, EO, and EOW Management Plan • Asbestos Management Plan • Heritage (Indigenous and Non-Indigenous) Management Plan/s • Bushfire Management Strategy • Community Information and Awareness Strategy	This plan
3A	The Air Quality Management Plan (Ramboll, 2016), included within Appendix M of the EIS, would be further progressed and incorporated into the CEMP for the Amended Proposal. Specifically, the following key aspects would be addressed in the CEMP: • Procedures for controlling/managing dust • Roles, responsibilities and reporting requirements • Construction dust monitoring • Contingency measures for dust control where standard measures are deemed ineffective	Section 2.2 Section 3.3 Section 4.1
3C	During construction and operation, real-time boundary monitoring would be used to measure site emissions and alert site personnel when dust triggers are breached. This monitoring would determine if the best practice measures are effective and/or if additional reactive controls are needed on any particular day.	Real time boundary monitoring will be undertaken at the Project site, in addition to dust deposition gauge monitoring and visual monitoring (Section 4.1).

2.1.1.2 EPBC Approvals

The EPBC Act approval for the MPE Concept was granted by the Federal Minister for the Environment in March 2014 (EPBC. 2011/6229). This approval was provided for the impact of the MPE Project on listed threatened species and communities (Sections 18 and 18A of the EPBC Act) and Commonwealth land (Sections 26 and 27A of the EPBC Act).

The EPBC Act approval for the MPW Concept was granted by a delegate of the Federal Minister for the Environment in September 2016 (EPBC 2011/6086). This approval was provided for the impact of the MPW Project on listed threatened species and communities (Sections 18 and 18A of the EPBC Act) and Commonwealth land (Sections 26 and 27A of the EPBC Act).

The Moorebank Avenue upgrade works will be performed under the MPE Stage 2 Consent as described in Section 1.1 and 1.3 of the CEMP. Since the western side of the Moorebank Avenue upgrade works construction footprint is located in an existing area of hardstand within the MPW site, the works must comply with the MPW Commonwealth Approval.

The construction and operation of the Project has been designed to be consistent with the EPBC Act Approval conditions, where relevant. EPBC Act Approval conditions for the Project include specific conditions and commitments that are required to be addressed in this CEMP. These conditions are identified within Table 7, along with where they have been addressed in preparing this plan.

Table 7 Commonwealth Approvals

Condition	Requirement	Document Reference
MPE EPBC Approval (2011/6229)		
7	For the better protection of Commonwealth land, the persons taking the action must engage a suitably qualified expert(s) to prepare a Construction Environment Management Plan (CEMP), for the approval of the Minister. The CEMP must include in relation to construction of the proposed facility: (a) details on the timing of construction works (accompanied by current and detailed maps); (b) identification and quantification of all potential impacts associated with noise, vibration, air quality, traffic, light spill, hydrological changes, contamination and indigenous heritage (including cumulative impacts associated with the separately approved but related and adjacent intermodal terminal facility project, EPBC approval 2011/6086) upon Commonwealth land. Consideration must be given to people and communities at SME, DNSDC, Defence housing, and the environment more generally in neighbouring bushland areas. Of note, the air quality assessment must quantify <u>all</u> emissions of PM2.5 and PM10 arising from project-related sources identified in the EIS. (c) the results of further investigations with regard to land contamination and indigenous heritage impacts (specifically, PADs two and three). If adverse impacts are identified, details on how such matters will be managed / mitigated must also be provided. Evidence of ongoing consultation with RAPs regarding further investigations for indigenous heritage objects/places must be provided. (d) refined details (including implementation timeframes) for the mitigation measures outlined in the EIS (sections 7.4.2, 7.4.3, 7.4.6, 7.4.7, 7.4.8 and 7.4.9) and summarised in Annexure A;	This plan a) Section 1.2 b) Section 3.1 (Table 14) c) N/A d) Section 3.3 and 4.1.2 e) N/A f) Section 1.5 & Section 4.1 (triggers and criteria are presented in Section 4.1.3 and Table 18) g) Section 4.1 h) Section 4.3 i) N/A – School of Military Engineering has relocated from the site j) Section 4.4

Condition	Requirement	Document Reference
	(e) a commitment to ensure no lights are installed above the height of 40 metres or, the maximum approved height of the intermodal warehouse buildings (whichever is less); (f) Identification of the trigger values and criteria for all matters mentioned in condition 7(b) (excluding light spill, land contamination and indigenous heritage) and will be adopted for monitoring and managing potential impacts to Commonwealth land; (g) details of a comprehensive monitoring program (including locations, frequency and duration) for: i. Validating the anticipated impacts associated with condition 7(b) ii. Determining the effectiveness of proposed mitigation/management measures; (h) provisions to revise the approved CEMP in response to monitoring associated with condition 7(g) including, details of response / contingency mechanisms to address any exceedances of the relevant trigger values; (i) evidence of consultation with Defence regarding the adequacy of proposed mitigation measures in particular, those measures to mitigate potential light spill impacts upon residential dwellings within SME outside of standard construction hours; and (j) Details of a complaints handling procedure. Commencement of the action may not occur until the CEMP has been approved. The CEMP must be implemented once approved.	
MPW EPBC Approval (2011/6086)		
10	Sections of the CEMP and OEMP relating to air quality must be prepared by a suitably qualified expert and must: a) be consistent with the Air Quality Provisional Environmental Management Framework (2 July 2014), provided at Appendix 0 the finalised EIS b) incorporate all measures 10A to 10U (CEMP only) and 1 OV to 10AH and 11 A to 11 H (OEMP only) from Table 7.1 of the finalised EIS that are described as 'mandatory' c) explain how all measures 10A to 10U (CEMP only) and 10V to 10AH and 11A to 11 (OEMP only) from Table 7.1 of the finalised EIS that are described as 'subject to review' have been addressed d) be approved by the Minister or a relevant New South Wales regulator.	a) This plan b) Section 2.3, 3.3, 4.1.1 and 4.1.3 c) No measures described as ‘subject to review’ d) This plan was approved by DP&E on 1 June 2018.

The Commonwealth Mitigation Measures which are relevant to this plan are detailed in Table 8. There are no additional mitigation measures for MPW.

Table 8 Commonwealth Mitigation Measures

Issue	Requirement	Document Reference
Air	A Construction Environmental Management Plan will be prepared prior to construction. This document will include provisions covering air quality management and mitigation, and will be implemented through good site environmental practice. Dust management	Section 3.3

Issue	Requirement	Document Reference
	• Increasing the moisture content of the soil/surface to reduce emissions from the site clearing, particularly during dry and windy conditions. • Modifying work practices during periods of adverse weather conditions • Limiting and staging clearing of designated footprint required for construction • Completing rehabilitation as quickly as possible • Minimising the number of stockpiles on-site and number of work faces on stockpiles • Use of water sprays for dusty activities such as ballast dumping and compacting • Modify or cease demolition activities during periods of adverse weather (hot, dry and windy conditions) • Using water sprays with earth moving equipment during road construction • Modifying work practices during periods of high winds and/or dry conditions by limiting scraper/grader activity • Confining all on-site vehicles to a designated route and enforcing speed limits • Modifying work practices during periods of high winds and/or dry conditions by engaging a water truck to spray travel routes • Controlling and reducing trip frequency and distance by coordinating delivery and removal of materials to avoid unnecessary trips, where possible Cleaning dirt that has been tracked onto sealed roads as soon as practicable. Dirt track-out should be managed using shaker grids and/or wheel cleaning.	

2.1.1.3 Other Approvals

The Revised Statement of Commitments (RSoC) includes the most recent compilation of SIMTA commitments to mitigate the environmental impacts, monitor the environmental performance and/or achieve a positive environmentally sustainable outcome. These RSoC (June 2017) were presented in the Moorebank Precinct East – Concept Plan Modification 2 Response to Submissions. The RSoC that are relevant to this plan are identified in Table 9.

Table 9 Revised Statement of Commitments

RSoC	Requirement	Timing	Document Reference
Air Quality	The Proponent will undertake an air quality monitoring programme during the initial phases of both construction and operation of the SIMTA site in accordance with the Air Quality Impact Assessment and including: • Nuisance Dust • Air Emissions – PM10 and Nitrogen dioxide. The Proponent commits to the preparation of a Construction Environmental Management Plan prior to the construction of each stage to provide air quality and dust management/ mitigation procedures to be adopted during each of the construction phases of the development.	Within 12 months of commencing operation and within 12 months of operating at an annual throughput of 500,000 TEU and 1,000,000 TEU	Monitoring for construction as per CoC B56(Section 4.1)

Infrastructure Sustainability Council of Australia (ISCA) requirements relevant to this plan are detailed in Table 10.

Table 10 ISCA Requirements

Credit	Level	Requirement	Document reference
Dis-4	3	Measures to minimise adverse impacts to local air quality during construction and operation should be implemented.	Section 3.3
		Monitoring of air emissions and/or air quality should be undertaken at appropriate intervals and in response to complaints during construction	Section 4.1, 4.4 and 3.4.1
		Monitoring and modelling should demonstrate no exceedances of air emission or air quality goals.	Section 4.1.2

The MPE Concept Plan was originally approved on 14 September 2011. The most recent modification to the approval was granted on 31 January 2018 subject to the (modified) Conditions of Approval (CoA). MPE Concept Plan CoA are detailed in Table 11.

Table 11 MPE Concept Plan Conditions of Approval (CoA)

Concept CoA	Requirement	Document Reference
Air Quality	Any future Development Application shall include a comprehensive air quality impact assessment for each stage of the proposal, including: a) An assessment in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (2005)* (or its later version and updates); b) Taking into account the final project design with consideration to worst-case meteorological and operating conditions; c) Quantitatively assessing the predicted emission of: i. Solid particles ii. Sulphur oxides iii. Nitrogen oxides iv. Hydrocarbons d) Assessing cumulative air impacts at a local and regional level (including but not limited to contemporaneous operations such as those of the proposed Commonwealth Government MIT); and e) A comprehensive air quality management plan that includes at least the following information: i. Explicit linkage of proposed emission controls to the site specific best practice determination assessment and assessed emissions ii. The timeframe for implementation of all identified emission controls iii. Proposed key performance indicator(s) for emission controls iv. Proposed means of air quality monitoring including location (on an off-site), frequency and duration v. Poor air quality response mechanisms vi. Responsibilities for demonstrating and reporting achievement of key performance indicator(s) vii. Record keeping and complaints response register viii. Compliance reporting	This plan

2.2 Roles and Responsibilities

Key roles and responsibilities associated with this air quality management plan is presented in Table 12 .

Table 12 Roles and Responsibilities

Roles	Responsibilities
Contractor's Project Manager (Contractor's PM)	• Provision of training in air quality and dust control for personnel directly involved with implementation • Ensure that Project responsibilities and authorities are defined and communicated • Attend audit meetings and action results of any audit findings • Allocate Project resources to handle environmental issues • Oversee the implementation and maintenance of the CAQMP • Endorse the CAQMP • Appoint / nominate and provide support for the Contractor's EM • Report to senior management and the Principal's Representative on the performance of the system and environmental breaches • Undergo induction and training in environmental awareness • Take action to resolve environmental non-conformances and incidents • Sign off on all environment and sustainability inspections • Enforce environmental requirements for suppliers and sub-contractors • Report environmental incidents to the Principal's Representative • Authorise expenditure to implement environmental management requirements within limits of authority as defined in the Principal's Representatives Project requirements • Undertake ICAM investigations • Review audit corrective actions and take action as necessary to ensure timely close out of issues • Be contactable 24 hours a day • Direct works to be performed in a more environmental responsible manner that reduces impacts or stop works if there is a risk of environmental harm.
Contractor's Construction Manager (Contractor's CM)	• Communicating with all personnel and sub-contractors regarding compliance with the CEMP and site specific environmental issues / Environmental Work Method Statement (EWMS) • Undergo induction and training in environmental awareness as directed by management • Identifying resources required for implementation of the CEMP • Organise and manage site plant, labour and temporary materials • Coordinating the implementation and maintenance of site environmental controls and provide support for the Contractor's EM • Report all environmental incidents in accordance with the incident reporting protocol • Undertake ICAM investigations • Take action to resolve non-conformances and incidents • Be contactable 24 hours a day • Direct works to be performed in a more environmentally responsible manner that reduces impacts or stop works if there is a risk of environmental harm.

Roles	Responsibilities
Contractor's Environmental Manager **(Contractor's EM)**	• Oversee the overall implementation of this CAQMP • Ensure that sufficient resources are allocated for the implementation of this CAQMP • Ensure that the CEMP covers the management and mitigation measures presented in this CAQMP • Consider and advise senior management on compliance obligations, including demonstrating and reporting achievement of KPIs • Ensure that the outcomes of the visual checks/ compliance construction monitoring/ incident reporting are systematically evaluated as part of ongoing management of construction activities • Ensure that visual monitoring and real time boundary monitoring is undertaken in accordance with Section 4.1 • Ensure all dust mitigation measures are implemented • Where dust mitigation measures are deemed insufficient, undertake reasonable steps to manage adverse impacts • Based on the set trigger thresholds (as per Section 4.1.1), authorise cessation of construction activities on-site • Ensure construction site records/ monitoring records/ incident reports are kept and maintained on-site • Ensure audits of construction site records / monitoring records/ incident reports are undertaken on a monthly basis, findings are shared with relevant site personnel and corrective actions are implemented • Ensure all relevant personnel have and understand the most up-to-date copy of this CAQMP • Ensure that all requirements of this CAQMP are effectively implemented • Ensure that any required actions arising from incident investigation processes during compliance construction monitoring are reported to the relevant personnel for further action and ensure that the actions are effectively implemented • Coordinate the implementation of monitoring requirements and corrective actions • Ensure that qualified personnel conduct the air quality monitoring and laboratory analysis • Ensure all monitoring reporting requirements are met and maintained on site • Authorise all monitoring reports and any revisions to this CAQMP.
All Personnel	• Understand and implement mitigation protocols as required in the CAQMP (as per Section 3) and any other required measures during construction • Undertake relevant training to implement the requirements of this CAQMP.
Personnel undertaking Air Quality monitoring	• Undertake relevant training to implement the requirements of this CAQMP • Undertake all monitoring activities in accordance with this CAQMP • Prior to undertaking monitoring, ensure that a detailed monitoring plan is in place which takes into account sampling protocol, health and safety issues, and quality assurance/control considerations during monitoring/analysis • Ensure regular maintenance of monitoring equipment • Ensure all relevant monitoring quality control/ assurance procedures are effectively implemented • Review laboratory results and write monitoring reports.

2.3 Training

Training will be undertaken in accordance with Section 2.7 of the CEMP. The contractor will provide all employees with suitable environmental induction / training (relevant to this CAQMP) to ensure that they are aware of their responsibilities and are competent to carry out the work.

As a minimum the induction will include the following:

- The Project Environmental Policy and Environment Management System (EMS) requirements
- The requirements of this CAQMP, including environment incident reporting
- Environmental emergency contact details.

Toolbox meetings will also be undertaken, as and when required.

Competency training will be provided by the Construction Contractor as required and may include a certification, vocational qualification or a competency assessment.

Personnel directly involved in implementing dust control measures on site will be given specific training in the various control and mitigation measures to be implemented.

Records of all training are to be filed in accordance with the document control system outlined in the CEMP.

3 IMPLEMENTATION

3.1 Existing Environment

3.1.1 Meteorological Conditions

3.1.1.1 Prevailing Wind Conditions

Figure 3-1 shows the seasonal wind rose of recorded wind speed and direction data from the Office of Environment and Heritage (OEH) Liverpool monitoring station (for the years 2011 to 2015), demonstrating the prevailing wind conditions in the area.

The recorded wind pattern is dominated by southwest to westerly airflow during autumn and winter, switching to easterly flow during summer months. The highest wind speeds are most frequently experienced from the southwest direction.

Average recorded wind speeds are low (approximately 2 m/s in all seasons), with the frequency of calm conditions (wind speeds less than 0.5 m/s) ranging from 8.5 to 12 % of the time.

The prevailing wind directions shown in Figure 3.1 has been considered for monitoring site selection.

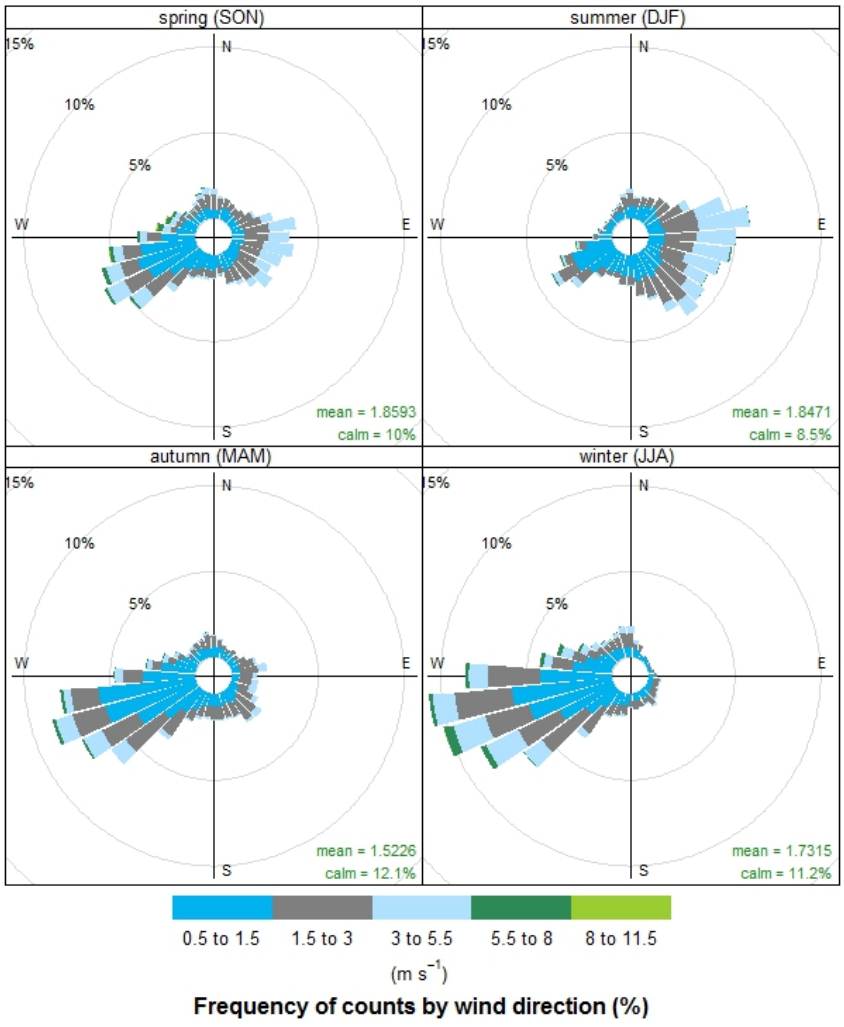


Figure 3-1 Seasonal Wind Rose – Liverpool 2011-2015

3.1.1.2 Ambient Temperature

Monthly mean temperatures range between 5°C to 18°C, with monthly mean maximum temperatures of 17°C to 28°C. The highest temperatures are typically experienced during the summer months, while the lowest are generally experienced between May and September.

Additional mitigation measures are more likely to be required during warmer periods when moisture deficits are more common.

3.1.1.3 Rainfall

Precipitation has the potential to impact on dust generation and removal of atmospheric pollutants, and is therefore an important factor in quantifying predicted air emissions. Historical data recorded at Bankstown Airport since 1968 indicates the region is characterised by moderate rainfall, with a mean annual rainfall of 870mm, and an annual rainfall range between 493 and 1398mm. There is typically significant variation in monthly rainfall within the area, with the wettest periods usually during the summer and autumn months.

There is typically significant variation in monthly rainfall within the area, with the wettest periods usually during the summer and autumn months. During drier conditions, additional mitigation measures may be required, for example by increasing water application rates or hiring additional water carts.

3.1.2 Existing Ambient Air Quality

Air quality data from the OEH Liverpool monitoring station were analysed over a five year period. Baseline air quality for particles (PM_{10} and $PM_{2.5}$) can be described as fair to poor, while baseline air quality for NO_2, SO_2 and CO can be described as very good.

In summary:

- Annual mean PM_{10} concentrations range from 18 µg/m³ to 21 µg/m³ and on average over the past 5 years baseline concentrations are 77% of the National Environment Protection (Ambient Air Quality) Measure (AAQ NEMP) standard
- Annual mean $PM_{2.5}$ concentrations range from 6 µg/m³ to 9 µg/m³ and on average over the past 5 years baseline concentrations are 103% of the impact assessment criterion
- Exceedances of the 24-hour average impact assessment criteria for both PM_{10} and $PM_{2.5}$ occurred in three of the past five years and are typically associated with bushfires, backburning and/or dust storms
- There have been no exceedances over the past five years for NO2, SO2 and CO and in general the background air quality for these pollutants is considered good to very good.

Background air quality concentrations for the Project site and surrounds for key pollutants is summarised in Table 13.

Table 13 Adopted Background Air Quality Concentrations for the Project Site

Pollutant	Averaging Period	Adopted Background Value
PM_{10}	24-hour average	Daily varying
	Annual average	19.4 µg/m³
$PM_{2.5}$	24-hour average	Daily varying
	Annual average	8.2 µg/m³
NO_2	1-hour average	Hourly varying
	Annual average	20.4 µg/m³
CO	1-hour average	5.0 mg/m³
	8-hour average	30 mg/m³
SO_2	1-hour average	74.4 µg/m³

Pollutant	Averaging Period	Adopted Background Value
	24-hour average	13.6 µg/m^3
	Annual average	2.6 µg/m^3
TSP	Annual average	48.4 µg/m^3
Dust deposition	Annual average	1/gm^2/month

3.2 Aspects, Impacts and Risks

The principal pollutant of concern during Construction would be fugitive dust / particulate matter (PM). The highest potential risk would occur during Construction Phase A (from site preparation and bulk earthworks) and to a lesser extent Construction Phase B (additional bulk earthworks associated with Moorebank Avenue upgrade). Cumulative air quality impacts relating to construction are discussed in Section 3.3.

Potential emission sources for a representative worst case Construction scenario were identified and quantified in the MPE Stage 2 Air Quality Impact Assessment (AQIA) provided in the EIS, and are shown in Table 14, expressed in terms of TSP[2], PM_{10}[3] and $PM_{2.5}$[4]. Detailed assumptions underlying the emission inventory are listed in the MPE Stage 2 AQIA, however the estimates from bulk earthworks are based on importation, handling and stockpiling of 600,000 m^3 of material. An additional 250,000 m^3 of suitable spoil will be imported to site separate to the 600,000m^3 permitted by CoC A6. An extract from the MPE Stage 2 AQIA is presented in Appendix A to demonstrate compliance with EPBC 2011/6229 Condition 7b).

Table 14 presents uncontrolled emissions with controlled emissions, which are estimated based on control efficiencies reported in the literature. To account for the operation of a water cart on travel routes, a control efficiency of 75% is applied for controlled emissions from wheel generated dust. For topsoil striping and material handling, a control efficiency of 50% is applied for controlled emissions, based on the assumption that, where practical, surfaces/material would be dampened using water sprays, prior to handling.

These controls are in accordance with the FCMMs and would result in an overall reduction in emissions of approximately 67% for TSP, 58% for PM_{10} and approximately 48% for $PM_{2.5}$. The overall reduction is lower for $PM_{2.5}$ because of the relatively higher contribution of diesel emissions for $PM_{2.5}$, which are not controlled.

Other dust control measures are proposed, including for wind erosion (as outlined in Section 3.3), however they are not explicitly applied as a reduction factor for the emissions comparison in Table 14 .

Following controls, the top three emissions sources for each size fraction are hauling (wheel generated dust), dozers (stripping, clearing, handling fill) and wind erosion. Dust management and mitigation measures therefore focus on these main dust sources. The Construction Air Quality Monitoring Program details the measures that will monitor and validate the potential air quality impacts predicted during the construction of the Project (refer to Section 4.1, Section 4.1.3 and Table 18).

Table 14 Emission Estimates for Construction

Source / Activity	Uncontrolled emissions (kg)			Controlled emissions (kg)		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Hauling on unsealed roads	149,644	48,064	3,845	22,447	7,210	577
Trucks unloading fill	456	216	32.7	456	216	32.7

[2] Total Suspended Particulate matter
[3] Particulate matter less than 10 microns in aerodynamic diameter
[4] Particulate matter less than 2.5 microns in aerodynamic diameter

Source / Activity	Uncontrolled emissions (kg)			Controlled emissions (kg)		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Material handling (excavators, FEL, stockpiles)	456	863	32.7	456	863	32.7
Dozers (vegetation stripping, topsoil clearing, fill)	20,966	4,421	2,201	10,483	2,211	1,101
Crushing	1,069	475	88	238	107	19.8
Screening	4,950	1,703	115	436	147	9.9
Graders on road construction	9,926	3,468	308	4,963	1,734	154
Wind erosion	29,750	14,875	2,231	29,750	14,875	2,231
Diesel combustion (onsite equipment)	733	733	692	733	733	692
On-road trucks diesel combustion	36	36	35	36	36	35
Total	**217,988**	**74,855**	**9,582**	**69,998**	**28,131**	**4,885**

3.3 Cumulative Impacts

Assessment of cumulative air quality impacts was undertaken as part of the EIS preparation (refer to Section 19 of the EIS).

The cumulative construction scenario for the Project included emissions generated from the Project's construction presented in Table 14, combined with the adopted ambient air quality concentrations presented in Table 13 and emissions generated from the construction of the MPE Stage 1 Project and adjacent MPW Stage 2 Project. Air quality goals established for the Project were measured against the cumulative construction scenario, the results of which are included in Table 15.

The modelling results indicate that dust, TSP, PM_{10} and $PM_{2.5}$ emissions at sensitive receivers around the Project comply with all relevant impact assessment criteria. The annual average background concentrations of $PM_{2.5}$ already exceeds the AAQ NEPM reporting standard, meaning that cumulative predictions are also above the standard at all receivers. It is noted, however that the incremental increases in $PM_{2.5}$ emissions created from the Project and MPE Stage 1 and MPW Stage 2 would result in relatively minor increases to the annual average when compared to background concentration levels.

Table 15 Summary of dust particulate matter modelling predictions at most affected sensitive receivers for the cumulative construction scenario

Pollutant	Period	Air quality goal criteria	Receptor maximum
PM_{10} ($\mu g/m^3$)	24 hour maximum	50 $\mu g/m^3$	49.6 $\mu g/m^3$
	Annual average	30 $\mu g/m^3$	21.0 $\mu g/m^3$
$PM_{2.5}$ ($\mu g/m^3$)	24 hour maximum	25 $\mu g/m^3$	24.6 $\mu g/m^3$
	Annual average	8 $\mu g/m^3$	8.8 $\mu g/m^3$
TSP ($\mu g/m^3$)	Annual average	90 $\mu g/m^3$	50.6 $\mu g/m^3$
Dust deposition	Annual average	4 $g/m^2/m$	3.1 $g/m^2/m$

Management measures outlined in Section 3.4 will be implemented prior during construction to avoid and minimise dust and odour impacts to surrounding sensitive receivers. Appropriate implementation of these controls would reduce the risk of dust and odour impacts during construction of the Project.

3.4 Management Measures

In accordance with CoC B54, best practice reactive and proactive management measures must be implemented to minimise dust generated during Construction. Proactive dust management measures are listed in Table 16 , based on the FCMMs, provided as part of the RtS, and the Minister's CoCs, as well as the requirements and standards of SIMTA, the Contractor and best practice.

Each control measure is assigned a key performance indicator (KPI) and monitoring requirement, as required under CoC B57. Further details on the monitoring requirements are provided in Section 4 including response procedures, corrective action and additional reactive controls in response to a non-compliance or complaint.

Table 16 Proactive Management Measures and Key Performance Indicators for validating environmental performance

Emissions Source	ID	Management Measures	KPI / Target	Monitoring
Topsoil stripping and handling	AQ1	The Construction Contractor will deploy water carts during Construction to ensure topsoils/subsoil are moist	No visible dust generated	Visual monitoring of dust leaving the Project site during stripping
	AQ2	Working practices will be modified by limiting clearing, stripping and spoil handling during periods of adverse weather (hot, dry and windy conditions) and when dust is seen leaving the Project site	Zero community complaints and compliance with dust goals	Complaints line and real time boundary monitoring
	AQ3	Progressive rolling and sealing of stripped areas		
	AQ4	Clearing of vegetation and topsoil will be limited to the designated footprint required for Construction	No works outside Construction footprint	Visual checks
	AQ5	Land stabilisation works will be carried out progressively and as soon as possible		
Hauling	AQ6	Water carts will be used on all unsealed internal roadways and travel routes	No visible dust generated	Visual monitoring of wheel generated dust
	AQ7	All vehicles on-site will be confined to a designated route with a speed limit of 20km/hr enforced. Graders will be limited to a speed of 8km/hr.	Zero community complaints and compliance with dust goals	Complaints line and monitoring detailed in Section 4.1
	AQ8	Trips and trip distances will be controlled and reduced where possible, for example by coordinating delivery and removal of materials to avoid unnecessary trips		
	AQ9	Shaker grid and / or wheel cleaning will be used to minimise the potential for dirt tracking. A street sweeper will clean any dirt mud tracking.		
	AQ10	All trucks delivering fill or leaving the Project site with spoil material will have their load covered		
	AQ11	Each truck entry will be visually checked and documented to confirm that only approved materials that are consistent with the		

Emissions Source	ID	Management Measures	KPI / Target	Monitoring
		environmental approvals are allowed to enter the Project site		
	AQ12	Undertake haulage of imported fill in accordance with the Construction Traffic and Access Management Plan (CTAMP) and the Construction Spoil Management Plan (CSMP)		
	AQ13	Trucks must keep public roads clean and must not track dirt onto public roads (CSMP)		
	AQ14	Importation of fill must not exceed 22,000 m^3 per day (CSMP)		
Fill handling and stockpiling	AQ15	Working practices will be modified by limiting spoil handling during periods of adverse weather (hot, dry and windy conditions) and when dust is seen leaving the Project site	Zero community complaints and compliance with dust goals No visible dust leaving the Project site	Complaints line and monitoring detailed in Section 4.1 Visual monitoring
	AQ16	Unloading of dusty material / loads will be minimised by reducing drop heights and using water sprays		
	AQ17	Exposed areas and material stockpiles will not exceed an area of 1 ha and will be watered regularly to prevent dust emissions		
	AQ18	Topsoil stockpiles which are not used for over 6 months will be treated with binder/ hydromulch / hydroseeding with infertile cover crop to prevent dust emissions		
	AQ19	Visually monitor stockpiles for moisture content to ensure dust generation is minimised (CSMP)		
	AQ20	Imported spoil will be suitably moist when delivered to the Project site (CSMP)		
	AQ21	Water carts will apply water to control dust emissions from graders and dozers pushing fill material as well as during fill handling and stockpiling activities		
	AQ22	Water carts will apply water to grader and bulldozer routes and where vehicles travel on unpaved surfaces to minimise dust		
Wind erosion	AQ23	Vegetation and topsoil clearing will be limited to the minimum footprint required	Zero community complaints and compliance with dust goals No visible dust leaving the Project site	Complaints line and monitoring detailed in Section 4.1 Visual monitoring
	AQ24	Wind erosion from stockpiles will be reduced by minimising the number of workfaces on stockpiles and by temporary stabilisation (compaction of surface, water sprays, seeding, veneering)		
	AQ25	Shade cloth and screens will be installed along boundaries adjacent to sensitive receivers		
Demolition of existing structures	AQ26	Where possible, materials and structures will be dampened using water sprays prior to demolition	Zero community complaints and compliance with dust goals	Complaints line and monitoring detailed in Section 4.1
	AQ27	Demolition activities will be modified where excessive levels of dust are observed to be generated during hot, dry and windy conditions		

Emissions Source	ID	Management Measures	KPI / Target	Monitoring
	AQ28	Special consideration, including boundary monitoring, will be given to the demolition of buildings containing asbestos in accordance with relevant guidelines and legislation	No visible dust leaving the Project site	Visual monitoring
Diesel exhaust	AQ29	Trucks and plant on-site will be operated and maintained in accordance with the following: • Manufacturer's specification • National Environmental Protection Measure (NEPM) (Diesel Vehicle Emissions) • Euro V emission standards • US Environmental EPA Tier 3 emissions standards for non-road diesel engines • Exhaust standards of the NSW *Protection of the Environment and Operations Act 1997 (POEO Act)*	Zero community complaints	Complaints line Visible diesel smoke plume
	AQ30	Registered road vehicles with smoky exhausts (more than 10 seconds) will be excluded from the Project site		
	AQ31	Trucks and plant engines will be turned off during periods of inactivity		
Odour Emissions	AQ32	See Section 4 of the Construction Demolition and Waste Management Plan (CDWMP)	Zero community complaints	Complaints line Olfactory observations for potentially offensive odours
	AQ33	Refuelling of plant and equipment will be sited as far from sensitive receivers as practical and limited to diesel to prevent odour impacts.		
	AQ34	Temporary sewage collection (i.e. use of portaloos) will be sited to provide an adequate buffer to sensitive receivers (<200m from closest receivers) and would be operated to ensure no offensive odour (cleaned and emptied on a regular basis). Sewage would be disposed at a suitable licenced disposal facility.		
	AQ35	Laying of asphalt pavement will be undertaken infrequently and over short durations. An adequate buffer to sensitive receivers (<200m from closest receivers) and will be operated to ensure no offensive odour impacts		
	AQ36	Excavation works in potentially contaminated soils will be managed to ensure that they are not conducted during windy conditions to minimise odorous emissions.		
Dust	AQ37	Daily visual monitoring will be undertaken, focusing on dust generation at sources, water cart activity/effectiveness and dust leaving the Project site	Zero community complaints and compliance with dust goals	Complaints line Visual monitoring
	AQ38	Dust deposition will be measured and reported on a monthly basis	No visible dust leaving the Project site	Monitoring detailed in Section 4.1
	AQ39	Implement Action Response Level (ARL) of 50ug/m^3 for PM_{10} (i.e. where the 1-hour average is 50ug/m^3 or greater a trigger alert occurs and a	Zero community complaints and compliance with dust goals	Monitoring detailed in Section 4.1

Emissions Source	ID	Management Measures	KPI / Target	Monitoring
		proactive management response must be initiated)		
	AQ40	During helicopter assisted installation works the following would be undertaken: • Where possible, use sealed hardstand for landing pad and staging area • If not permanent seal on landing pad then water down the loading/lifting zone prior to take off of the helicopter • Continuous visual monitoring of the loading/lifting zone and surrounding area throughout the day • Regular watering of the loading/lifting zone as required	Zero community complaints and compliance with dust goals No visible dust leaving the Project site	Complaints line Visual monitoring Monitoring detailed in Section 4.1

3.4.1 Additional Reactive Management Measures

In accordance with CoC B54, reactive measures are proposed to minimise environmental impact in the event of an incident occurring by instigating an appropriate operational response. Reactive measures instigated in response to a visual inspection or triggered by a non-compliance and/or community complaint are outlined in Table 17.

Table 17 Triggers for Reactive Management Measures

Trigger	Measure
Visible dust from haulage	Relocate water cart to control dust or increase watering intensity rate
Excessive dust generation from stockpiles or exposed areas	Apply water to dampen surface or stabilise surface.
High winds	If dust seen leaving the Project site, relocate or cease dust generating activity. Implement corrective/preventative actions and record actions taken. Notification to External Authorities where incident, environmental harm or community impact has occurred as required by Conditions of Consent.
Excessive/prolonged generation of exhaust fumes	Ensure equipment is maintained to manufacturer's specifications, avoid exposure to sensitive receivers by relocating or turning off engines when not required. Where equipment does not operate to manufactures specifications, equipment is to be put out of service or tagged-out and not used until repaired.
Air quality complaints received from the public or non-compliance with goals	Investigation into activities occurring at the time with reference to meteorological conditions and dust levels measured by monitoring equipment. Where the investigation can identify the activity, which results in the complaints, modified or additional mitigation measures will be developed or campaign monitoring instigated.

4 MONITORING AND REVIEW

4.1 Construction Air Quality Monitoring Program

In accordance with CoC B57, a construction air quality monitoring program must be undertaken during construction. As required by CoC B55, deposited dust must not exceed an increase of 2g/m^2/month or maximum of 4g/m^2/month at the closest off-site sensitive receiver. The Construction Air Quality Monitoring Program will focus on dust deposition monitoring (refer to Section 4.1.2). In addition, daily visual inspections are proposed to ensure dust management measures are effective (refer to Section 4.1.1).

4.1.1 Visual Monitoring

Visual monitoring under this plan will be undertaken by the Contractor's EM or Site Supervisor during daily inspections of construction activities to monitor compliance with the requirements of the CoCs and this plan. Daily inspections will focus on the following key issues:

- Inspect and report on excessive dust being generated at source (helicopter generated dust, wheel generated dust, scrapers/graders/dozers, excavators, wind erosion)
- Inspect and report on water cart activity and effectiveness
- Inspect and report on dust leaving the Project site
- Non-conformance (dust leaving the Project site) would be reported immediately to the Contractor's CM or management.

An Environmental Inspection Checklist will be used to maintain compliance and effectiveness of controls. Items that require action will be documented during environmental inspection and notified to the relevant Site Supervisor. The Site Supervisor will be responsible for providing appropriate resources in terms of labour, plant and equipment to enable items to be rectified in the nominated timeframes.

Daily inspections and maintenance of controls will be made by the Contractor's EM or Site Supervisors and maintenance will be recorded in site diaries during active site works.

4.1.2 Boundary Monitoring

The amenity impacts from nuisance dust generated during construction will be assessed at eight locations around the Project site using six dust deposition gauges and two DustTrack real-time boundary monitors installed and operated in accordance with Australian Standard AS/NZS 3580.10.1:2016 "Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method".

The siting and locations for the monitors will be undertaken in accordance with AS/NZS 3580.1.1:2016 "Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment". The main siting requirements to consider for this monitoring program are:

- Provision of a clear sky angle of 120 degrees for the monitoring inlet.
- Separation distance of greater than 10m to the nearest tree.
- Separation distance of greater than 1m from any all (supporting structure).

Dust deposition will be measured and reported on a monthly basis. Exposed gauges will be replaced on a monthly basis with analysis conducted at a NATA accredited laboratory for insoluble solids. Real-time monitors provide continuous air quality data.

The proposed monitoring sites are shown in Figure 4-1. Monitoring locations are selected by taking into account the location of construction activity (earthworks, demolition and haulage) and the prevailing wind directions, which are typically from the west-southwest or east-southeast. The monitoring locations are positioned at or close to the Project site boundary, so that dust levels can be evaluated beyond the Project site boundary. Also, for certain monitoring periods, some monitoring locations will be downwind of the Project site and can be used to provide an indication of background to inform the compliance evaluation.

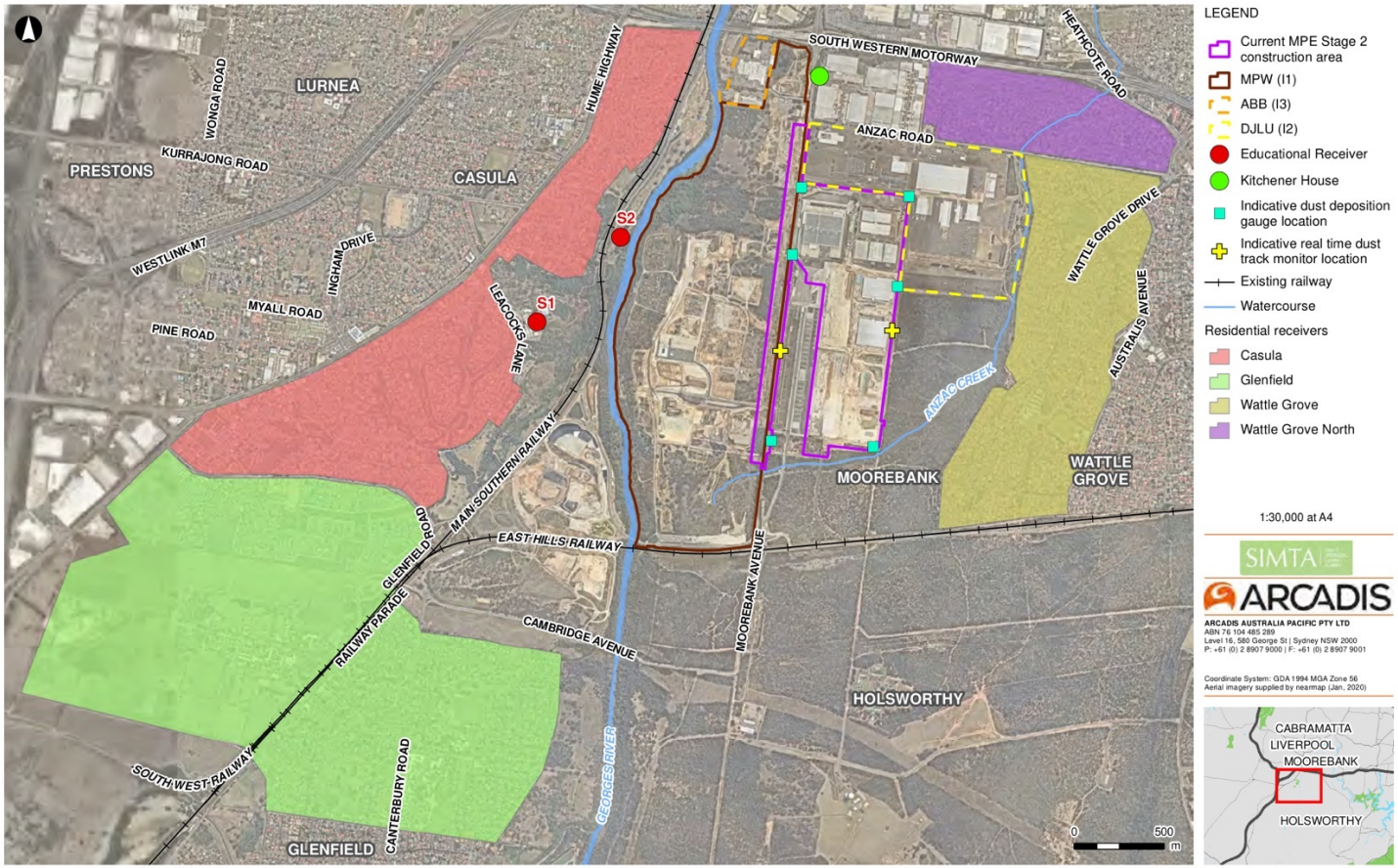


Figure 4-1: Air Quality Monitoring Sites

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QA by : RB

Figure 4-1 Air Quality Monitoring Sites

Compliance will be assessed against the goals outlined in CoC B55, which are consistent with the NSW EPA's impact assessment criteria listed in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*.

The nuisance-based goals for dust deposition outlined in Table 18 are prescribed as a maximum increase or a maximum total dust deposition rate, expressed as insoluble solids. Compliance assessment for the Project will be based on the maximum total dust deposition level (4 g/m^2/month), as there are no baseline data available prior to Construction, to evaluate the increase in dust deposition from the Project. However, at certain times, some monitoring locations will be downwind of the Project site and other monitoring locations will be upwind of the Project site, which may enable compliance assessment against the criteria for maximum increase in dust deposition. Table 17 outlines the response mechanism (investigation) that would be implemented if exceedances to the dust deposition criteria are identified.

Table 18 Dust Deposition Goals

Pollutant	Maximum Increase in Dust Deposition	Maximum Total Dust Deposition Level
Deposited dust (assessed as insoluble solids)	2 g/m^2/month	4 g/m^2/month

4.1.3 Summary of Construction Air Quality Monitoring Program

Table 19 below outlines the details of the Construction Air Quality Monitoring Program.

Table 19 Construction Air Quality Monitoring Program

Location References	Refer to Figure 4-1
Types and numbers of Monitors	Dust deposition gauges (Six) Real-time DustTrack Monitors (Two)
Responsibility	Contractor's EM
Frequency of Measurements	Monthly (dust deposition) Continuous (DustTrack)
Criteria	Dust deposition goals (e.g. CoC B55 states deposited dust must not exceed an increase of 2g/m^2/month or maximum of 4g/m^2/month at the closest off site sensitive receiver)
Action Response Levels	50ug/m^3 for PM_{10} (i.e. where the 1-hour average is 50ug/m^3 or greater a trigger alert occurs and a proactive management response must be initiated)
Guidelines / Legislative Requirements	*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*
Monitoring of Effectiveness of Controls	Monthly monitoring Visual inspections of dust deposition will be undertaken on a daily and weekly basis Continuous Air Quality monitoring
Reporting of Monitoring	Monthly reports will be issued to the Principal's Representative

4.2 Environmental Auditing and Reporting

Environmental auditing and reporting of the Project during construction will be undertaken in accordance with Section 4.3 and Section 4.6 of the CEMP.

In addition, air quality monitoring results will be included within the monthly environment and sustainability report prepared by the Contractor's PM and issued to the Principal's Representative.

4.3 Review and Improvement

Review and improvement of this plan will be undertaken in accordance with the CoCs and Section 4.5 of the CEMP. Continuous improvement will be achieved by the ongoing evaluation of environmental management performance (e.g. from dust deposition adjacent to sensitive receptors) and effectiveness of this plan against environmental policies, objectives and targets (e.g. dust deposition goals, Table 17).

The continuous improvement process is designed to identify areas of opportunity for improvement of environmental management and performance. This process includes:

- Monitoring to detect any non-conformances and deficiencies
- Make comparisons with objectives and targets
- Determining 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

Revisions of this plan will be undertaken in accordance with Section 1.2.7 of the CEMP. Any revisions to this plan may result from:

- Review of the effectiveness of this plan
- Audits (either internal or by external parties)
- Changes to the environmental management system
- Changes to the procedures, scope of works and/or systems after an incident or potential incident
- Design changes
- Changes in the CoCs
- Identification of opportunities for improvement of deficiencies in the Project system (e.g. through the course of site inspections)
- Following complaints.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure and relevant conditions of approval.

This plan will be reviewed annually as a minimum but may be updated more regularly depending on process changes, or as a result of an environmental incident.

4.4 Complaints Handling

Complaints handling will be undertaken in accordance with the CEMP and Construction Community Communication Strategy. A complaints register will be maintained and the following information will be recorded:

- Name of complainant
- Address of complainant
- Form of complaint

- Date and time of complaint
- The nature of the complaint (i.e. fugitive dust, smoky vehicle)
- Allocation of complaint to the relevant Construction Contractor
- Details of the investigation into the complaint
- Actions taken to address complaint
- Results of action taken to address complaint
- Any follow up contact with complainant or further action undertaken.

4.5 Non-compliance, Non-conformances and Actions

It is the responsibility of all personnel to report non-compliances and non-conformances to their Site Supervisor and/or the Contractor's EM.

Non-compliances, non-conformances and corrective and preventative actions will be conducted in accordance with Section 4.4 of the CEMP.

APPENDIX A – MPE STAGE 2 AIR QUALITY IMPACT ASSESSMENT EXTRACT

5. EMISSION INVENTORY

5.1 Emissions scenarios

Emissions and modelling scenarios for the construction and operation of the Proposal are as follows:

Proposal scenarios

- Scenario 1: Construction of the Proposal, including construction works associated with the MPE Stage 2 site and the Moorebank Avenue upgrade.
- Scenario 2: Operation of the Proposal, as described in Section 2.4.

Cumulative scenarios

- Scenario 1a: Concurrent construction of the Proposal with construction of the MPE Stage 1 Project and MPW Stage 2 Project.
- Scenario 2a: Cumulative operation of the Moorebank Precinct, incorporating a combined precinct total 750,000 TEU (250,000 TEU for the MPE Stage 1 and 500,000 TEU for the MPW Stage 2) plus 515,000 m^2 of warehousing (300,000 m^2 for MPE Stage 2 and 215,000 m^2 for MPW Stage 2).

5.2 Scenario 1 - Construction phase emissions

Construction of the Proposal has been indicatively divided into seven 'works periods' as listed in **Section 2.3**. The stage of construction which incorporates activities with the greatest potential for dust emissions is the bulk earthworks (works period E). The indicative construction program shows that bulk earthworks may overlap with the construction works for Moorebank Avenue (including the diversion road (works period C) and pavement and intersection works (works period D)).

Therefore, a representative worst case construction scenario is selected to include bulk earthworks and construction activities associated with Moorebank Avenue upgrades.

Emission factors developed by the US EPA[5] have been applied to estimate the amount of dust generated by each construction activity, as follows:

- Hauling of imported fill material along unsealed haulage routes.
- Trucks unloading fill material.
- Fill material re-handle using dozers and excavators.
- Vegetation cleaning and topsoil stripping.
- Graders on internal road construction.
- Wind erosion from exposed surfaces and stockpiles.

Emissions are estimated based on the following assumptions:

- For bulk earthworks, a total of 600,000 cubic metres (1,320,000 tonnes) of imported fill will be placed, stockpiled, spread and compacted.
- Four dozers are assumed to operate 11 hours per day at 70% utilisation on site preparation, vegetation clearing, topsoil stripping.
- Two graders are assumed to operate 11 hours per day at 70% utilisation on road construction.
- Emissions from hauling are estimated based on a haul route travel distance of 3 km for each trip. Each truck is assumed to import 50 tonnes of fill, corresponding to approximately 26,400 trucks per annum or approximately 220 return trips per day.
- Emissions from material handling is based on a combined 1,320,000 tonnes being re-handled up to 4 times (i.e. trucks unloading, front end loaders (FEL) or excavators re-handling).
- Approximately 30% of the imported fill would be crushed / screened.
- A total area of 35 hectares is assumed as exposed for wind erosion.
- Water carts are used to control emissions from hauling, graders and for dozers pushing fill material. A control of 75% is assumed for watering on haul roads and 50% for graders and dozers. An additional control of 40% is applied to hauling, to account for speed limits

[5] United States Environmental Protection Agency (US EPA) AP-42 Compilation of Air Pollutant Emission Factors (US EPA, 1998b, US EPA, 2004, US EPA, 2006)

keeping average vehicle travel speeds to 40km/hr (Foley et al, 1996) (combined control of 85%).

Emissions from onsite diesel consumption are based on an estimated combined daily diesel consumption of 400 litres per hour with all equipment assumed to operate for 11 hours per day at 70% utilisation. US EPA Tier 1 emission factors (kg/kL) for non-road equipment are used to estimate emissions. Diesel exhaust emissions associated with on-road trucks are also estimated using aggregated emission factors developed by the NSW EPA for the 2008 GMR emissions inventory (NSW EPA, 2012b) which are incorporated into the EPA's Air Quality Appraisal Tool (AQAT) (PAEHolmes, 2013). A return trip distance of 3 km is assumed and 234 heavy vehicles trips per day.

A summary of the estimated emissions for the duration of construction of the Proposal is presented in **Table 5-1**.

Table 5-1: Emissions estimates for construction phase of MPE Stage 2 (kg/annum)

Source / Activity	TSP	PM_{10}	$PM_{2.5}$
Hauling on unsealed roads	22,447	7,210	577
Trucks unloading fill	456	216	32.7
Material handling (excavators, FEL, stockpiles)	456	863	32.7
Dozers (vegetation stripping, topsoil clearing, fill)	10,483	4,421	1,101
Crushing	238	107	19.8
Screening	436	147	9.9
Graders on road construction	4,963	1,734	154
Wind erosion	29,750	14,875	2,231
Diesel combustion (onsite equipment)	733	733	692
On-road trucks diesel combustion	36.5	36.5	35.4
Total	**69,998**	**30,342**	**4,885**

5.2.1 Scenario 1a – cumulative construction scenario

For assessment of cumulative impacts, construction phase emissions for the MPE Stage 1 and MPW Stage 2 are included in the modelling, based on the information presented in Ramboll Environ (2016).

6. IMPACT ASSESSMENT

6.1 Construction phase

The modelling predictions for construction are presented in **Table 6-1** for the sensitive receptors identified in **Section 3.7**.

The modelling results indicate that the construction phase emissions comply with all relevant impact assessment criteria. The maximum predicted increase in annual average PM_{10} (0.4 µg/m³), $PM_{2.5}$ (0.1 µg/m³), TSP (0.6 µg/m³) and dust deposition (0.3 g/m²/month) are considered minor when compared against existing background conditions. The highest predicted short-term impacts occur at the Joint Logistics Unit (north of the Proposal site), with a maximum 24-hour PM_{10} of 4.2 µg/m³ and maximum 24-hour $PM_{2.5}$ of 1.3 µg/m³.

Cumulative construction predictions are also presented in **Table 6-1**, and represent the simultaneous construction of the MPE Stage 1 Project, MPW Stage 2 Project and the background ambient air quality values derived in **Section 4.2.3**. For cumulative 24-hour impacts, modelling predictions are paired with daily background PM_{10} and $PM_{2.5}$ concentrations.

The background dataset contains existing exceedances of the impact assessment criteria (three days for PM_{10} and two days for $PM_{2.5}$). The cumulative 24-hour average PM_{10} is therefore presented as the 4th highest (excluding the three days already over) and the cumulative 24-hour average $PM_{2.5}$ is presented as the 3rd highest (excluding the two days already over). The results indicate that the construction for the Proposal would result in no additional days over the criteria.

The annual average background concentrations of $PM_{2.5}$ already exceed the NEPM AAQ reporting standard, therefore cumulative predictions are also above the standard at all receptors. It is noted, however, that the Proposal results in a relatively minor increase in annual average $PM_{2.5}$ (<0.1 µg/m³ at all sensitive receptors).

Contour plots of ground level concentrations for the key pollutants (PM_{10} and $PM_{2.5}$) are presented in **Appendix 6**.

Table 6-1: Construction phase – modelling predictions for selected sensitive receptors

Receptor	PM_{10} (µg/m³)				$PM_{2.5}$ (µg/m³)				TSP (µg/m³)		Dust Deposition	
	24-Hour Max		Annual Ave		24-Hour Max		Annual Ave		Annual Ave		Annual Ave	
	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative
Goal	50 µg/m³		30 µg/m³		25 µg/m³		8 µg/m³		90 µg/m³		2g/m²/m	4g/m²/m
Receptor Max	**4.2**	**49.6**	**0.4**	**21.0**	**1.3**	**24.6**	**0.1**	**8.8**	**0.6**	**50.6**	**0.3**	**3.1**
R1	0.4	48.2	0.1	19.8	0.1	23.9	0.02	8.4	0.1	48.9	0.03	1.5
R2	0.5	48.3	0.1	20.0	0.2	24.0	0.03	8.5	0.1	49.2	0.04	1.7
R3	1.7	48.3	0.1	20.3	0.6	24.2	0.03	8.6	0.2	49.7	0.06	2.2
R4	1.9	48.3	0.1	20.4	0.6	24.1	0.03	8.6	0.1	50.1	0.05	2.6
R5	1.0	47.9	0.0	19.6	0.3	23.7	0.01	8.3	0.1	49.0	0.03	1.5
R6	0.7	48.0	0.1	19.7	0.2	23.8	0.01	8.4	0.1	49.3	0.03	1.8
R7	0.3	48.0	0.0	19.8	0.1	24.0	0.01	8.4	0.0	48.9	0.01	1.5
R8	0.2	47.9	0.0	19.6	0.1	23.8	0.01	8.3	0.0	48.6	0.01	1.2
R9	0.3	47.9	0.0	19.6	0.1	23.8	0.01	8.3	0.0	48.7	0.01	1.3
R10	0.1	48.0	0.0	19.7	0.1	23.9	0.01	8.4	0.0	48.8	0.01	1.3
R11	0.9	48.3	0.1	20.0	0.3	24.2	0.03	8.5	0.1	49.2	0.05	1.7
R12	3.0	48.6	0.3	20.3	0.9	24.4	0.07	8.7	0.4	49.7	0.19	2.1
R13	3.4	48.9	0.3	20.3	1.0	24.1	0.08	8.6	0.5	49.7	0.24	2.1
R14	1.2	49.3	0.2	20.1	0.4	24.0	0.06	8.5	0.3	49.3	0.10	1.7
R15	0.2	48.0	0.0	19.7	0.1	23.9	0.01	8.4	0.0	48.7	0.01	1.3
R16	0.3	47.9	0.0	19.4	0.1	23.7	0.00	8.3	0.0	48.5	0.00	1.1
R17	1.6	48.5	0.2	20.2	0.5	24.3	0.05	8.6	0.3	49.4	0.10	1.9
R18	0.3	48.1	0.1	19.6	0.1	23.8	0.01	8.3	0.1	48.7	0.01	1.2
R19	0.3	47.9	0.0	19.5	0.1	23.7	0.00	8.3	0.0	48.6	0.00	1.2
R20	0.2	47.9	0.0	19.5	0.0	23.8	0.00	8.3	0.0	48.5	0.00	1.1
R21	0.2	47.9	0.0	19.5	0.1	23.7	0.00	8.3	0.0	48.5	0.00	1.1

Receptor	PM_{10} (µg/m³)				$PM_{2.5}$ (µg/m³)				TSP (µg/m³)		Dust Deposition	
	24-Hour Max		Annual Ave		24-Hour Max		Annual Ave		Annual Ave		Annual Ave	
	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative	Incremental increase	Cumulative
Goal	50 µg/m³		30 µg/m³		25 µg/m³		8 µg/m³		90 µg/m³		2g/m²/m	4g/m²/m
Receptor Max	**4.2**	**49.6**	**0.4**	**21.0**	**1.3**	**24.6**	**0.1**	**8.8**	**0.6**	**50.6**	**0.3**	**3.1**
R22	2.3	48.3	0.2	20.0	0.7	24.3	0.05	8.5	0.3	49.3	0.13	1.8
R23	1.7	48.2	0.1	19.8	0.5	24.0	0.04	8.4	0.2	49.0	0.10	1.5
R24	0.4	47.9	0.0	19.5	0.1	23.7	0.01	8.3	0.0	48.6	0.01	1.2
R25	0.9	48.0	0.1	19.7	0.3	23.8	0.01	8.3	0.1	49.2	0.03	1.8
R26	0.5	47.9	0.0	19.5	0.2	23.7	0.01	8.3	0.0	48.6	0.01	1.2
R27	1.3	48.2	0.1	19.7	0.4	23.7	0.01	8.3	0.1	49.0	0.03	1.6
R28	0.7	47.9	0.0	19.5	0.3	23.7	0.01	8.3	0.0	48.6	0.01	1.2
R29	0.2	48.0	0.0	19.5	0.1	23.7	0.01	8.3	0.0	48.6	0.01	1.1
R30	0.2	48.0	0.0	19.5	0.1	23.7	0.01	8.3	0.0	48.6	0.01	1.2
R31	0.1	47.9	0.0	19.5	0.0	23.7	0.01	8.3	0.0	48.5	0.01	1.1
R32	0.2	47.9	0.0	19.5	0.0	23.7	0.01	8.3	0.0	48.5	0.01	1.1
R34	0.2	48.0	0.0	19.6	0.0	23.9	0.01	8.4	0.0	48.7	0.01	1.3
R35	4.2	49.6	0.4	20.4	1.3	24.2	0.11	8.7	0.6	49.9	0.30	2.1
R36	0.2	47.9	0.0	19.5	0.1	23.7	0.00	8.3	0.0	48.6	0.00	1.2
R37	1.8	48.6	0.1	19.8	0.5	23.8	0.03	8.4	0.2	49.0	0.07	1.5
R38	0.9	48.5	0.1	21.0	0.3	24.6	0.03	8.8	0.1	50.6	0.05	3.1