



# Air Quality Management Plan

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## Terms and definitions

The following terms, abbreviations and definitions are used in this plan.

Table 1 - Glossary

| Terms     | Explanation                                       |
|-----------|---|
| AQMP      | Air Quality Management Plan                       |
| BOM       | Bureau of Meteorology                             |
| CoA       | Condition of Approval                             |
| CEMF      | Construction Environmental Management Framework   |
| CEMP      | Construction Environmental Management Plan        |
| CSSI      | Critical State Significant Infrastructure         |
| DPI Water | Department of Primary Industries Water            |
| ECM       | Environmental Control Map                         |
| EIS       | Environmental Impact Statement                    |
| EP&A Act  | Environmental Planning and Assessment Act 1979    |
| EPA       | Environment Protection Authority                  |
| EPL       | Environment Protection Licence                    |
| HSEMS     | Health Safety Environmental Management System     |
| JHLOR     | John Holland Laing O'Rourke                       |
| OEH       | Office of Environment and Heritage                |
| PM10      | Particulate Matter under 10 microns               |
| POEO Act  | Protection of the Environment Operations Act 1997 |
| RMS       | Roads and Maritime Services                       |
| SES       | State Emergency Service                           |
| SM        | Sydney Metro (formerly TfNSW)                     |
| SMu       | Sydenham Metro upgrade                            |
| TSP       | Total Suspended Particulates                      |

## 1. Introduction

### 1.1 Purpose

This Air Quality Management Plan (AQMP) outlines the Sydenham Metro upgrade (SMu) Project's approach to implement measures to minimise and manage dust and air quality impacts during works in accordance with the Project's legal, planning and contractual requirements.

### 1.2 Background and Scope

The project site is located within the rail corridor at Sydenham Station and several hundred meters to the north and south of the station, 11 Sydenham Road, Marrickville, NSW, the Sydenham Pit and Drainage Pump Station and future precinct areas on Railway Parade and Burrows Avenue, Sydenham, NSW.

The works will be undertaken by a John Holland Group Pty Limited (John Holland) and Laing O'Rourke Construction Pty Limited (Laing O'Rourke) joint venture referred to as JHLOR. Laing O'Rourke has been nominated as Principal Contractor and as such the works will occur under Laing O'Rourke's Management Systems.

This AQMP has been developed for the Construction phase of the project, in compliance with Laing O'Rourke's Health Safety Environmental Management System (HSEMS) and the Project's legal, planning and contractual requirements.

### 1.3 Overview of the Sydenham Metro upgrade (SMu) Project

Sydney Metro City & Southwest is a new 30km metro line extending metro rail from the end of Sydney Metro Northwest at Chatswood under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the capacity to run a metro train every two minutes each way through the centre of Sydney. The SMu project forms part of the Sydney Metro City & Southwest project and includes upgrades to Sydenham Station, the surrounding network and other ancillary infrastructure to accommodate Sydney Metro trains.

The SMu works were not assessed under the planning approval for the Sydney City Metro Chatswood to Sydenham that was approved by the Minister on 9 January 2017 under Part 5.1 of the Environmental Assessment & Planning Act 1979. The Sydenham to Bankstown State Significant Infrastructure Application Report identified an opportunity to accelerate the phased opening of the Chatswood to Sydenham Metro Service, through to Sydenham Station if Sydenham Metro upgrade works commence earlier under a separate planning approval. As such, the works have been assessed as a modification to the Sydney City Metro Chatswood to Sydenham Environmental Impact Statement to allow the phased opening of the Metro services from Chatswood to Sydenham Station

### 1.4 SMu Scope of Works

#### 1.4.1 Permanent Works

The works include all permanent new infrastructure and modifications to existing infrastructure, which must be constructed to enable the construction of SMu. The permanent new infrastructure and modifications to existing infrastructure to be constructed includes;

- Sydenham Station and precinct works – demolition and reconstruction of platforms 1 and 2 for metro rail operations and a new aerial concourse connecting to new station entries at Railway Parade and Burrows Avenue. Upgrades to transport interchange facilities and provision for active transport would be delivered as part of the station works

- Track and rail system facilities – reconfiguration of existing track and rail systems to segregate the T3 Bankstown Line and the Goods Line, installation of metro tracks and rail systems including crossover and turnback facilities
- Adjustments to the Sydenham Pit and Drainage Pumping Station – including a new aqueduct over the pit, new pumping station and new maintenance access ramp
- Ancillary infrastructure and works – including fencing, maintenance access, utilities works, drainage, noise barriers, road and transport network works, bridge works, and temporary facilities to support construction.

#### 1.4.2 Temporary Works

The SMu temporary works include:

- temporary arrangements to divert and control pedestrians, public transport users, cyclists, public transport and traffic and to provide public access, amenity, security and safety during all stages of design and construction of the Works;
- temporary arrangements for people and vehicles to safely access all property, including publicly accessible space affected by the Contractor's Activities;
- temporary arrangements for people and vehicles to safely access the Site;
- temporary access stairs, walkways and platforms within the Site;
- temporary construction hoardings, fencing, noise walls, access gates and barriers on and around the Site;
- all environmental safeguards and measures necessary to mitigate environmental effects which may arise during the design and construction of the Works;
- cleaning, maintenance, repair, replacement and reinstatement, as required, of all areas occupied by the Contractor during design and construction of the Works;
- temporary site facilities required for design and construction of the Works,;
- temporary infrastructure, safety screens and ground support installed or erected to undertake design and construction of the Works;
- temporary arrangements for Utility Services including water, electricity, stormwater, sewerage, gas and electronic communications;
- temporary works and measures required as a consequence of requirements arising from the stakeholder and community liaison process; and
- all other temporary works and measures required for the construction of the Works.

### 1.5 Works Location and Site Layout

The SMu work location and site layout is highlighted in Figure 1 below



Figure 1 – Sydenham Metro upgrade Project Site

## 1.6 Objectives and Targets

The Compliance Matrix in Appendix A – Compliance Matrix provides a comprehensive list of compliance requirements, environmental documents and the contract documents.

This AQMP provides the basis for the management of air quality issues and to minimise risk of impact during works. The objectives and targets of air quality management and mitigation are outlined below:

| Objective  | Target  | Responsible                         |
|--|---|-------------------------------------|
| Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable. | Plant and equipment to be inspected for visible emissions during site inspections | Environmental Manager (or delegate) |
|  | Visible dust to be assessed during site inspections                               |                                     |
|  | No visible dust emissions to leave site   |                                     |
| Identify and control potential dust and air pollutant sources.   | Plant and equipment to be inspected for visible emissions during site inspections | Environmental Manager (or delegate) |
|  | Visible dust to be assessed during site inspections                               |                                     |
|  | No visible dust emissions to leave site   |                                     |

These objectives conform to Sydney Metro objectives as described in the Construction Environmental Management Framework (CEMF)

## 1.7 Relation to other SMu Plans

The Air Quality Management Plan (AQMP) is a sub-plan of the Construction Environmental Management Plan (CEMP). The AQMP describes how JHLOR will manage impacts to air quality during the construction phase. The CEMP describes how the Laing O’Rourke HSEMS will be implemented on the project.

This plan should also be read in conjunction with the SMu – Asbestos Management Plan. The Asbestos Management Plan details how airborne asbestos is to be managed from a safety perspective.

Air quality targets must be achieved in accordance with the Sustainability Management Plan.

## 2. Legal and Other Requirements

Table 2 below details the legislation and planning instruments considered during development of this Plan.

Table 2 - Legislation and Planning Instruments

| Legislation   | Description   | Relevance to this AQMP   |
|---|---|--|
| Environmental Planning and Assessment Act 1979                        | This Act establishes a system of environmental planning and assessment of development proposals for the State.  | The approval conditions and obligations are incorporated into this AQMP.                       |
| Protection of the Environment Operations Act 1997 (POEO Act)          | The object of the Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment   | All works must be in accordance with relevant sections of the act                              |
| Protection of the Environment Operations (Clean Air) Regulations 2010 | Requires the fitting of anti-pollution devices to certain motor vehicles and prescribes an offence of emitting excessive air impurities and prescribes standards for certain groups of plant and premises to regulate industry's air impurity emissions | Plant and equipment must be maintained in accordance with relevant sections of this regulation |

JHLOR will construct the project in accordance with the conditions of the Laing O'Rourke Environmental Protection Licence (EPL) 21147. Of particular relevance to air quality is EPL Condition O.3.1: "*Dust generating activities on the premises must be managed to minimise the generation of dust and prevent it going offsite so far as reasonably practicable.*"

The AQMP addresses applicable requirements within the following documents:

- The Sydney Metro City and Southwest – Project Approval – Determination, dated 9th January 2017;
- The Sydney Metro City and Southwest - Environmental Impact Statement, dated 3rd May 2016;
- The Sydney Metro City and Southwest - Sydenham Station and Sydney Metro Trains Facility South Modification Report, June 2017;
- The Sydney Metro City and Southwest - Sydenham Station and Sydney Metro Trains Facility South Submissions Report October 2017;
- The Sydney Metro City and Southwest Modification 4 Instrument of Approval;
- Sydney Metro City & Southwest - Chatswood to Sydenham Staging Report;
- The Sydney Metro Construction Environmental Management Framework v3;
- The Sydenham Metro upgrade Project Deed.

### 2.1 Guidelines

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

- AS 3570 – Automotive Diesel Fuels
- Safe Work Australia 2011 – Workplace Exposure Standards for Airborne Contaminants
- National Environment Protection Council 1998 – Ambient Air: National Environment Protection Measure for Ambient Air Quality
- NSW EPA 2005 – Approved Method for Modelling and Assessment of Air Pollutants in NSW Roles and Responsibilities
- AS 2922 Ambient Air – Guide for the Siting of Sampling Units



- AS 3580.10.1-1991 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter - Gravimetric method
- AS 2724.3-1984 Ambient Air – Particulate Matter – Determination of Total Suspended Particulates (TSP) – High Volume Sampler Gravimetric Method
- National Environment Protection Measure (NEPM) (Diesel Vehicle Emissions)
- OEH's Smokey Vehicles Program under the NSW Protection of the Environment and Operations Act 1997 and NSW Protection of the Environment and Operations Regulations 2010.

## 2.2 Roles and Responsibilities

The roles and responsibilities of key JHLOR Personnel with respect to air quality are as follows:

Table 3 - Roles and Responsibilities

| ROLES                                      | RESPONSIBILITIES   |
|--|--|
| Project Leader                             | Managing the delivery of the SMu Works including overseeing implementation of air quality management<br>Act as Contractor's Representative   |
| Environment Manager                        | Oversee the implementation of all air quality management initiatives   |
| Construction Supervisors<br>Subcontractors | Manage the delivery of the construction process, in relation to air quality management across all sites in conjunction with the Environment Manager<br>Implement air quality management activities during construction works<br>Manage the impacts of vehicle, plant and equipment emissions |
| Environmental Coordinator                  | Manage the on-ground application of air quality management measures during construction (e.g. dust control)<br>Monitor and report on air quality management during construction  |

| ROLES                                  | RESPONSIBILITIES  |
|--|---|
| Independent Environment Representative | <ul style="list-style-type: none"> <li>• Receive and respond to communications from the Secretary in relation to the environmental performance of the Critical State Significant Infrastructure (CSSI);</li> <li>• Consider and inform the Secretary on matters specified in the terms of the planning approval;</li> <li>• Consider and recommend any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community;</li> <li>• Review documents identified in Conditions C1, C3 and C9 and any other documents that are identified by the Secretary, to ensure they are consistent with requirements in or under the planning approval and if so, make a written statement to this effect before submission of such documents to the Secretary (if those documents are required to be approved by the Secretary), or make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Secretary for information or are not required to be submitted to the Secretary);</li> <li>• Regularly monitor the implementation of environmental management related documents to ensure implementation is being carried out in accordance with what is stated in the document and the terms of the planning approval;</li> <li>• Review the Proponent's notification of incidents in accordance with Condition A41 of this approval;</li> <li>• As may be requested by the Secretary, help plan, attend or undertake Department audits of the CSSI, briefings, and site visits;</li> <li>• If conflict arises between the Proponent and the community in relation to the environmental performance of the CSSI, follow the procedure in the Community Communication Strategy approved under Condition B3 of the planning approval to attempt to resolve the conflict, and if it cannot be resolved, notify the Secretary;</li> <li>• Review any draft consistency assessment that may be carried out by the Proponent, and provide advice on any additional mitigation measures required to minimise the impact of the work;</li> <li>• Consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C9 and any document that requires the approval of the Secretary (excluding noise and vibration documents) that comprise updating or are of an administrative or minor nature, and are consistent with the terms of the planning approval and the documents listed in Conditions C1, C3 and C9 or other documents approved by the Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of the planning approval;</li> <li>• Assess the impacts of minor ancillary facilities as required by Condition A18 of the planning approval; and prepare and submit to the Secretary and other relevant regulatory agencies, for information, a monthly Environmental Representative Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month (or other timeframe agreed with the Secretary). The Environmental Representative Report must be submitted within seven (7) days following the end of each month for the duration of works and construction of the CSSI, or as otherwise agreed with the Secretary.</li> <li>• Perform the roles under CoA A24</li> <li>• Must complete project induction covering LORs' environmental management system.</li> </ul> |

### 3. Existing Environment

Table 4 below provides a brief description of the SMu worksite and the surrounding areas, as well as the air quality contexts of the site. Information has been drawn from the Chatswood to Sydenham EIS.

Table 4 - Existing Environment

| Existing Site Characteristics  | Local emission sources   | Existing Air Quality Conditions  | Activities Potentially Affecting Air Quality  | Potentially Sensitive Receivers  |
|--|--|--|---|--|
| <p>The SMu site is surrounded by roads to the north (Railway Parade), west (Gleeson Avenue, which crosses the rail corridor via a road overbridge), and south (Burrows Avenue).</p> <p>An industrial area, which includes food manufacturing, auto services, warehouse storage, office space, and distribution premises, is located further to the north and north-west of the station.</p> <p>Industrial and commercial land uses, and a council works depot, are located to the north-east, between Bolton Street and Unwins Bridge Road. A large hotel (the General Gordon) and residential land uses, characterised mainly by terrace housing, are located to the south of the station.</p> <p>Recreational land uses, including Fraser Park, Tillman Park, and Sydenham Green, are located further to the west, south-west, and south respectively.</p> | <p>A search of the Commonwealth Department of the Environment's National Pollutant Inventory (2015) and a desktop review of land uses surrounding the project area identified a number of air pollution sources close to the project which are likely to influence local air quality. These sources include:</p> <ul style="list-style-type: none"> <li>• Industrial facilities at Sydenham, Marrickville and Mascot that reported air emissions (under the National Pollutant Inventory reporting program) during the 2013–2014 reporting period.</li> <li>• Vehicle exhaust emissions from the road and rail networks</li> <li>• Commercial businesses, such as service stations and smash repairs</li> <li>• Domestic activities, such as wood-fired home heaters and lawn mowing</li> <li>• Other construction projects</li> </ul> | <p>Air quality data was sourced from monitoring stations at Lindfield, Rozelle, Randwick and Earlwood. The data shows that the concentrations of air pollutants were generally below the applicable air quality criteria during the 2012, 2013 and 2014 reporting periods, with the exception of occasional days when the maximum 24-hour average concentration levels of particulate matter with an aerodynamic diameter less than 10 microns (PM10) exceeded the applicable criterion of 50 micrograms per cubic metre. These occurrences are generally the result of natural events including dust storms, bushfires and sea spray arising from on-shore winds.</p> | <p>The main potential air quality impacts during construction would be associated with the generation of dust.</p> <p>Construction activities with the greatest potential to generate dust would include:</p> <ul style="list-style-type: none"> <li>• Excavation, handling, stockpiling, loading and unloading, and transport of spoil</li> <li>• Demolition of buildings and other structures, and the handling, stockpiling and transport of demolition material</li> <li>• Transport, loading and unloading, stockpiling and handling of imported construction materials such as imported fill</li> <li>• Creation of exposed surfaces through the clearing of vegetation, stripping of topsoil and other overlying structures (such as road and footpath pavements), which would increase the potential</li> </ul> | <ul style="list-style-type: none"> <li>• Residential properties to the south east along Burrows Avenue, Railway Road, Gleeson Avenue Swain St, George St and Hogan Avenue</li> <li>• Fraser Park Sporting Clubs</li> </ul> |

| Existing Site Characteristics | Local emission sources | Existing Air Quality Conditions | Activities Potentially Affecting Air Quality  | Potentially Sensitive Receivers |
|-------------------------------|------------------------|---------------------------------|---|---------------------------------|
|                               |                        |                                 | generation of dust emissions by wind erosion<br>• Concrete batching and pre-cast concreting activities.<br>• Track installation, tamping and rail grinding activities<br>• **Treatment of PASS spoil with lime using excavator bucket |                                 |

It is noted that the Sydney Metro City and Southwest - Sydenham Station and Sydney Metro Trains Facility South Modification Report June 2017 has identified existing buildings and structures on the project as a potential sources of asbestos and lead paint. As such, the demolition of these buildings is a potential source of airborne asbestos and lead. The location of buildings to be demolished as part of the project is included within Appendix C.

## 4. Aspects and Impacts

Impacts directly related to SMu construction works are described in Table 5 . Management measures to address these identified risks are contained in Section 5.

Air quality risks are assessed within Appendix C of the Construction Environmental management Plan (CEMP).

Table 5 - Air Quality – Aspects and Impacts

| Aspects                                     | Potential Impacts  |
|---|--|
| <b>Worksite establishment</b>               | Dust generation due to: <ul style="list-style-type: none"> <li>• Clearing, grubbing and stripping of vegetation</li> <li>• Stockpiling of topsoil and mulched vegetation</li> <li>• Demolition of buildings and associated infrastructure</li> <li>• Wind erosion of exposed surfaces and stockpiles</li> <li>• Wheel-generated dust from vehicular traffic on unsealed roads and work site access points</li> <li>• Asbestos or contaminated soil removal (if encountered)</li> </ul> Particulate matter (PM10) generation due to: <ul style="list-style-type: none"> <li>• Operation of construction vehicles and plant</li> <li>• Dust generating activities set out above</li> </ul> |
| <b>Combined Services Route Construction</b> | Dust generation due to: <ul style="list-style-type: none"> <li>• Operation of excavators and other plant on exposed surfaces</li> </ul> Particulate matter (PM10) generation due to: <ul style="list-style-type: none"> <li>• Operation of construction vehicles and plant</li> <li>• Dust generating activities set out above</li> </ul>  |
| <b>Utility Diversions</b>                   | Dust generation due to: <ul style="list-style-type: none"> <li>• Operation of excavators and other plant on exposed surfaces</li> </ul> Particulate matter (PM10) generation due to: <ul style="list-style-type: none"> <li>• Operation of construction vehicles and plant</li> <li>• Dust generating activities set out above</li> </ul>  |
| <b>Civil / Structural Works Corridor</b>    | Dust generation (wheel generated) from: <ul style="list-style-type: none"> <li>• Movement of construction vehicles over unsealed work areas</li> <li>• Movement of construction equipment, generators and other plant over unsealed work areas</li> <li>• PASS treatment</li> </ul> Particulate matter (PM10) generation due to: <ul style="list-style-type: none"> <li>• Operation of construction vehicles and plant</li> <li>• Dust generating activities set out above</li> </ul>  |
| <b>Station and Service Building Scope</b>   | Dust generation due to: <ul style="list-style-type: none"> <li>• Demolition of station buildings and associated infrastructure (including potential asbestos and lead dust)</li> <li>• Concrete batching</li> </ul> Particulate matter (PM10) generation due to: <ul style="list-style-type: none"> <li>• Operation of construction vehicles and plant</li> <li>• Concrete batching</li> </ul>   |
| <b>Rail Systems Construction</b>            | Dust generation (wheel generated) from: <ul style="list-style-type: none"> <li>• Movement of construction vehicles over unsealed work areas</li> <li>• Movement of construction equipment, generators and other plant over unsealed work areas</li> <li>• Tamping</li> <li>• Placement of capping</li> </ul>   |

| Aspects  | Potential Impacts  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• General earthworks and stockpiling</li> </ul> Particulate matter (PM10) generation due to: <ul style="list-style-type: none"> <li>• Operation of construction vehicles and plant</li> <li>• Track grinding</li> </ul> Fumes from cutting of tracking  |
| <b>Station</b><br><b>Precinct</b><br><b>Construction</b> | Dust generation (wheel generated) from: <ul style="list-style-type: none"> <li>• Movement of construction vehicles over unsealed work areas</li> <li>• Movement of construction equipment, generators and other plant over unsealed work areas</li> <li>• Removal of existing roads and footpaths</li> <li>• General earthworks and stockpiling</li> </ul> Particulate matter (PM10) generation due to: <ul style="list-style-type: none"> <li>• Operation of construction vehicles and plant</li> </ul> |

## 5. Management Measures

The SMu works will be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust and tracking of material onto public roads. All activities on the site will be undertaken with the objective of minimising dust and exhaust emissions. Should visible dust emissions occur at any time, JHLOR will identify and implement all feasible and reasonable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.

### 5.1 Air Quality and Dust Mitigation Measures

#### Pre-construction:

- Identify sensitive land uses/sensitive receivers in the Environmental Control Map (ECM) prior to works commencing.
- Incorporate information on dust sources, impacts and mitigation measures and methods of managing emissions into Site Inductions, training and on-going Toolbox Talks.
- Dust minimisation measures would be developed and implemented prior to commencement of construction

#### Site establishment:

- Construction site layout and placement of plant would consider air quality impacts to nearby receivers.
- Waste or any other material must not be burnt on construction sites.
- Temporary spoil stockpiles during site establishment are to be maintained, e.g. hosed down or covered.
- Wind breaks, which may include site hoardings, may be constructed where construction works are in close proximity to sensitive receivers (where feasible and reasonable).
- Boundary screening will be established around ancillary facilities that are adjacent to sensitive receivers. The boundary screening will minimise any air quality impacts on the adjacent sensitive receivers.

#### Demolition:

- Water suppression to be used during demolition to minimise dust generation as required.
- The insides of buildings to be stripped, including of elements of hazardous building materials (i.e. asbestos, lead paint, SMF and PCBs) where feasible and reasonable, before demolition.
- Debris screens or sheeting would be used to screen buildings, where dust-producing activities are taking place.

#### General construction:

- Undertake on-going monitoring for dust (e.g. site inspections) to assess the effectiveness of mitigation measures).
- A sweeper will be used to clean dirt tracked on hardstand, pavements, or roads.
- Water sprays and/or water carts to be used as required for dampening exposed surfaces to control dust generation.
- Silt accumulated in sediment control devices (e.g. silt fences and spoon drains) to be removed on a regular basis to prevent dust generation.
- Dust suppression measures, such as water lines, will be used if concrete/rock cutting is required.



- Cutting, grinding or sawing equipment must only be used in conjunction with suitable dust suppression techniques, such as water sprays or local extraction
- Dust generating activities would be assessed during periods of strong winds and rescheduled, where required.
- Exhaust systems of construction plant, vehicles, and machinery to be maintained to minimise exhaust emissions to the atmosphere. All equipment and vehicles are to be regularly maintained and records kept of maintenance. Pre-mobilisation checklist will ensure that plant has been serviced in accordance with manufacturer's specifications (and therefore meets emission requirements).
- Vehicles and construction plant are subject to a pre-acceptance check before arriving to the worksite.
- Engines will be switched off when vehicles and plant are not in use, to minimise idling, and refuelling areas will be away from areas of public access and sensitive receivers.
- Construction plant and equipment will be well maintained and regularly serviced so that vehicular emissions remain within relevant air quality guidelines and standards.
- Plant must be well maintained and serviced in accordance with manufacturers' recommendations.
- Low emission vehicles and plant fitted with catalysts, diesel particulate filters or similar devices would be used, where feasible and reasonable.
- Monitoring emissions of plant and construction vehicles to ensure they have appropriate emissions controls and are maintained correct
- Haul routes and plant (including generators) to be sited away from sensitive receivers, such as dwellings and schools, where feasible and reasonable.
- Workers will be encouraged to use public transport, and consider other modes of transport such as car-pooling (refer to Construction Traffic Management Plan and Green Travel Plan)
- Precautions would be implemented to prevent the occurrence of smoke emissions or fumes from site plant or stored fuel oils.
- Daily site inspections will be undertaken by the Site Supervisor (or delegate). The site inspection will include an assessment of air quality. Air quality issues will be noted within site diaries as they are observed.
- Routine weekly inspections of active work areas to be undertaken to check air quality and dust mitigation measures. This will be recorded within the Weekly Environmental Site Inspection Checklist.

**Excavation and earthworks:**

- Working face and areas of open excavation to be kept to a minimum, where feasible and reasonable
- Water suppression to be used for active earthwork areas, PASS treatment, stockpiles, gravel roads to reduce wind-blown dust emissions.
- The amount of excavated material stored on site is to be minimised.
- All vehicles carrying loose or potentially dusty material to and/or from the site must be covered.
- Vehicular and foot traffic would be restricted to designated areas.

**Spoil handling, storage and transport:**

- Site access roads will be stabilised to minimise tracking of dirt
- Vehicles hauling spoil to stay on the designated roads and access tracks

- Trucks carrying spoil onto or off site are to be covered. Tailgates, under-rigs, wheels and towing apparatus of all trucks to be checked to ensure they are clean and secure, prior to leaving the worksite
- Stockpiles will be located away from sensitive receivers, where feasible and reasonable, and protected from the elements through barriers, covering, or establishing a cover crop in accordance with blue book guidelines.
- Unsealed haul roads must be regularly damped down
- Appropriate site speed limits will be imposed and signed on haul routes
- Hard surfaces would be installed on long term haul routes and regularly cleaned
- Wheel-wash facilities and/or rumble grids will be provided and used near the site exit points, as appropriate

**Asbestos removal:**

- A Hazardous Materials Survey report would be carried out on the buildings on the site to identify if any asbestos is present
- Asbestos handling and management would be in accordance with:
  - Work Health and Safety Act 2011
  - Work Health and Safety Regulation 2017
  - Safework NSW Code of Practice – How to Safely Remove Asbestos – September 2016
- Any asbestos found would be managed under a site specific Asbestos Removal Control Plan prepared by a licenced asbestos removal contractor.
- Asbestos fibre air monitoring would be carried out during removal works.
- Dust suppression would be used to minimise the generation of airborne asbestos fibres.
- Any asbestos material stockpiled on site would be wetted down and covered.
- Any asbestos material stockpiled on site would be separated from non-contaminated material (e.g. separation by lining or storage on hardstand)

**Extreme weather conditions:**

- Reprogramming of dust generating activities during works is to occur during periods when control of dust cannot be achieved to reduce nuisance to neighbouring properties.
- Dust generating activities would be assessed during periods of strong winds and rescheduled where required.

**Complaints:**

- Dust complaints will be handled by the Stakeholder and Community Relations Manager and the Environment Manager, in accordance with the complaints handling process in the Community Liaison Implementation Plan.

**Shutdown periods:**

- When site is to be closed for a period of longer than two days, a site inspection will be carried out to identify any additional measures be put in place to ensure the site is stable.

## 5.2 Air Quality Inspection and Monitoring Program

### 5.2.1 Monitoring Dust Generating Activities

Monitoring the impact of dust generating activities will be undertaken by the Site Supervisor, Site and Project Engineers, and/or the Environmental Coordinators on a daily basis. Monitoring will be conducted through visual inspection of the onsite activities on a daily basis to ensure that an excessive amount of dust is not generated nor impacting receivers in close proximity to the worksites. The visual inspections will target:

- Checking stockpiles have appropriate controls to reduce dust
- Ensuring movement of spoil is being undertaken with the appropriate controls
- Ensuring haul roads are being wet down or are not producing dust
- Ensuring truck and vehicle movements are not producing excessive amounts of mud or dust
- Inspection of public roads for tracked dust or mud
- Regular visual monitoring of dust generation from work zone
- Monitoring of works such as saw-cutting, grinding, drilling and ensuring appropriate controls are being applied.

If dust is being produced and is leaving site, the works generating this will be suspended or controlled/modified so that no further dust is leaving site.

### 5.2.2 Monitoring Plant and Vehicle Emissions

Prior to being used on site plant and vehicles will undergo an inspection performed by the Safety team. This will include a mechanical inspection to ensure that the plant or vehicle is in good working order, and the appropriate emission controls are in place.

Site supervisors, Site Engineers and Environmental Coordinators will undertake visual inspections of the construction activities to ensure that plant and vehicles are not producing excessive smoke or emissions and no unnecessary idling of plant or vehicles.

### 5.2.3 Meteorological Monitoring

Monitoring local meteorological conditions on a daily basis provides information on when onsite construction activities and any exposed areas may be at a higher risk for dust to become airborne and mobilised offsite. The information would then be used to inform the required controls and management as per Section 5.1

In monitoring local meteorological conditions data from the nearest Bureau of Meteorology (BOM) Weather Station (Sydney Airport) will be used (i.e. the BOM website will be viewed). The following parameters will be monitored

- Wind Speed and direction
- Temperature
- Rainfall
- Relative Humidity

### 5.2.4 Demolition of Buildings

JHLOR will demolish a number of structures as part of the project works. In particular the structures to be demolished include Sydenham Station platform 1 & 6 buildings and 11 Sydenham Road (refer to Appendix C for a map of these locations).

Detailed air-monitoring requirements will be covered within the Demolition Plan for each building. Monitoring will be undertaken during the demolition process, including securing any impacted waste materials into the appropriate waste receptacle, where a review of HAZMAT information indicates that there is a risk of creating airborne asbestos or lead.

Indicative timing for the demolitions are;

- Sydenham Station Platform 6 Building – September 2018 and March 2020
- 11 Sydenham Road – November 2018 to March 2019
- Sydenham Station Platform 1 Building – January 2020

Airborne asbestos monitoring will be undertaken in accordance with the requirements of *Safe Work Australia Code of Practice: How to Safely Remove Asbestos* (April 2016).

Health monitoring will be undertaken for workers involved in modification or demolition of any buildings where lead paint may be present (where the lead paint containing surfaces will be disturbed). Other measures to be included within Safe Work Method Statements (SWMS) and implemented during these works include appropriate dust control (such as water sprays or encapsulation as required), appropriate PPE, hygiene procedures and exclusion zones.

## 6. Complaints Handling and Incident Response

The Community Liaison Implementation Plan defines the policies, protocols, procedures and processes for identifying and managing community specific issues arising from design and construction activities, including complaints relating to environmental issues.

The Environment Manager will assist the Communications and Stakeholder Manager in responding to environmental complaints and maintain a register of Environmental Complaints for reporting to the Environment Protection Authority (EPA) and other relevant agencies.

In the event a complaint is received regarding air quality, the Environment Manager will conduct an investigation to determine the potential parameters of influence that could have led to the complaint and potential exceedance.

The investigation will examine amongst other aspects:

- The quantity of exposed areas, which may potentially generate dust
- The nature and volume of the materials being moved
- Whether there is potential to revegetate or cover these areas
- Whether there were any identified days of excessive high wind during the monitoring period
- The number of water-trucks operating within the area during the monitoring period
- An examination of construction activities conducted during this period
- If road sweeping was sufficient
- The potential for contaminated material to become air borne
- Recorded weather conditions reports for the day.

Corrective actions will be managed in accordance with the CEMP.

Incident management and classification will be managed in accordance with the CEMP.

## 7. Training, Reporting and Review

### 7.1 Training

All personnel working on the site will undertake a site induction, which will provide initial training on various environmental aspects including Air Quality.

Additional training will be provided to the workforce during toolbox talk which will explain the aspects of dust monitoring in further detail. The tool box will be presented when seasonal weather increases the risk of poor air quality.

Inductions and toolboxes will cover the following;

- Sources of dust and emissions
- Local sensitive receivers
- Mitigation measures to be implemented during the construction phase to manage dust and emissions
- Hold points (i.e. potential for visible dust or plant emissions to leave the project site)

Refer to Section 9 of the CEMP for further information on environmental training.

### 7.2 Compliance and Reporting

Monitoring events and inspections will be recorded on the Weekly Environmental Inspection Form. The weekly environmental inspection form will be used as an instrument to record the weather conditions, the construction activities and comments about air-quality impacts.

The Environmental Representative will inspect the site regularly and will inspect any air quality control measures.

Typical Compliance records would consist of:

- Inspections undertaken in relation to air quality management measures
- Environmental Inspection forms
- ER Inspection Reports
- Toolbox training records
- Plant Induction forms
- Records of any meteorological condition monitoring
- Records of any management measures implemented as a result of adverse, windy weather conditions.
- Records of air quality and dust inspections undertaken.

Results and outcomes of inspections, monitoring and auditing will be reported internally on a monthly basis. Six-monthly construction compliance reports will be prepared to report on compliance with the Project Approval.

Refer to Section 12 of the CEMP for further information on the control of records.

### 7.3 Approval, Review and Improvement

This sub-plan will be reviewed and endorsed by the Independent Environmental Representative in accordance with CoA-24. Sydney Metro will also review the plan in accordance with condition 3.3e) of the CEMF.

CoA-C5 requires certain sub-plans to be developed in consultation with government agencies. It is noted that in accordance with CoA-C3 there are no requirements to consult government agencies.

In accordance with CoA-C6 the sub-plan must be submitted to the Secretary one month prior to the commencement of construction. Construction must not commence until the Secretary has approved the sub-plan in accordance with CoA-C8.

This AQMP will be reviewed and updated at least annually. JHLOR will undertake the ongoing development, amendment and updating of the AQMP to ensure it remains consistent with Project priorities, risk management, client requirements and Project objectives, taking into account:

- The status and progress of JHLOR's activities
- Changes in the design, delivery and operations processes and conditions
- Lessons learnt during delivery and operations
- Changes in other related Project Plans
- Requirements and matters not covered by the existing Project Plans
- Changes to Project Plans as directed by Sydney Metro's Representative under the Deed.
- Where deemed appropriate in relation to items raised within inspections or audits

## 8. Enquiries, Complaints and Incident Management

Environmental incidents and complaints are to be investigated, reported, documented, actioned and closed out as per the details provided in the Community Consultation Strategy and the CEMP.

## Appendix A – Compliance Matrix

| No.   | Measure   | Timing              | Requirement | Responsibility                         | Reference                             |
|---|---|---------------------|-------------|--|---------------------------------------|
| <b>Project Approval - Specific Management Plan Requirements</b> |   |                     |             |  |                                       |
| 1.  | Boundary fencing that incorporates screening must be erected around all ancillary facilities that are adjacent to sensitive receivers for the duration of construction unless otherwise agreed with Relevant Council(s), and affected residents, business operators or landowners.  |                     | A19         | Site Supervisor<br>Environment Manager | Section 5.1                           |
| 2.  | Boundary screening required under Condition A19 of this approval must minimise visual, noise and air quality impacts on adjacent sensitive receivers  |                     | A20         | Site Supervisor<br>Environment Manager | Section 5.1                           |
| 3.  | <p>The following CEMP sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP sub-plan and be consistent with the CEMF and CEMP referred to in Condition C1. The Construction Traffic Management Plan must also be prepared in accordance with the Construction Traffic Management Framework as required by Condition E81.</p> <p>Required CEMP sub- plan Relevant government agencies to be consulted for each CEMP sub-plan</p> <p>(a) Noise and Vibration: Relevant Council(s)</p> <p>(b) Biodiversity: OEH and Relevant Council(s)</p> <p>(c) Air quality: N/A</p> <p>(d) Soil and Water: DPI Water, Relevant Councils, OEH, SES, NSW Fire and Rescue</p> <p>(e) Groundwater: DPI Water</p> <p>(f) deleted</p> <p>(g) Heritage: Heritage Council, Relevant Council</p> <p>(h) deleted</p> | Before Construction | C3          | Environment Manager                    | This Plan<br>No consultation required |

| No. | Measure  | Timing              | Requirement | Responsibility      | Reference   |
|-----|--|---------------------|-------------|---------------------|---|
| 4.  | <p>The CEMP sub-plans must state how:</p> <p>(a) the environmental performance outcomes identified in the EIS as amended by the documents listed in A1 will be achieved;</p> <p>(b) the mitigation measures identified in the EIS as amended by documents listed in A1 will be implemented;</p> <p>(c) the relevant terms of this approval will be complied with; and</p> <p>issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed</p> | Before Construction | C4          | Environment Manager | <p>This Plan<br/>Sections 1.6, 5</p> <p>This Table Section 5</p> <p>Sections 5.2, 7.2 and 7.3</p> |
| 5.  | <p>The CEMP sub-plans must be developed in consultation with relevant government agencies. Where an agency(ies) request(s) is not included, the Proponent must provide the Secretary justification as to why. Details of all information requested by an agency to be included in a CEMP sub-plan as a result of consultation and copies of all correspondence from those agencies, must be provided with the relevant CEMP sub-plan.</p>  | Before Construction | C5          | Environment Manager | Noted.  |
| 6.  | <p>Any of the CEMP sub-plans may be submitted to the Secretary along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before commencement of construction.</p>   | Before Construction | C6          | Environment Manager | Noted.  |
| 7.  | <p>Construction must not commence until the CEMP and all CEMP sub-plans have been approved by the Secretary. The CEMP and CEMP sub-plans, as approved by the Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction. Where the CSSI is being staged, construction of that stage is not to commence until the relevant CEMP and sub-plans have been approved by the Secretary.</p>  | Before Construction | C8          | Environment Manager | Noted.  |
| 8.  | <p>In addition to the performance outcomes, commitments and mitigation measures specified in PIR, all reasonably practicable measures must be implemented to minimise the emission of dust and other air pollutants during the construction and operation of the CSSI.</p>   | During Construction | E5          | Environment Manager | This Table Section 5.1  |

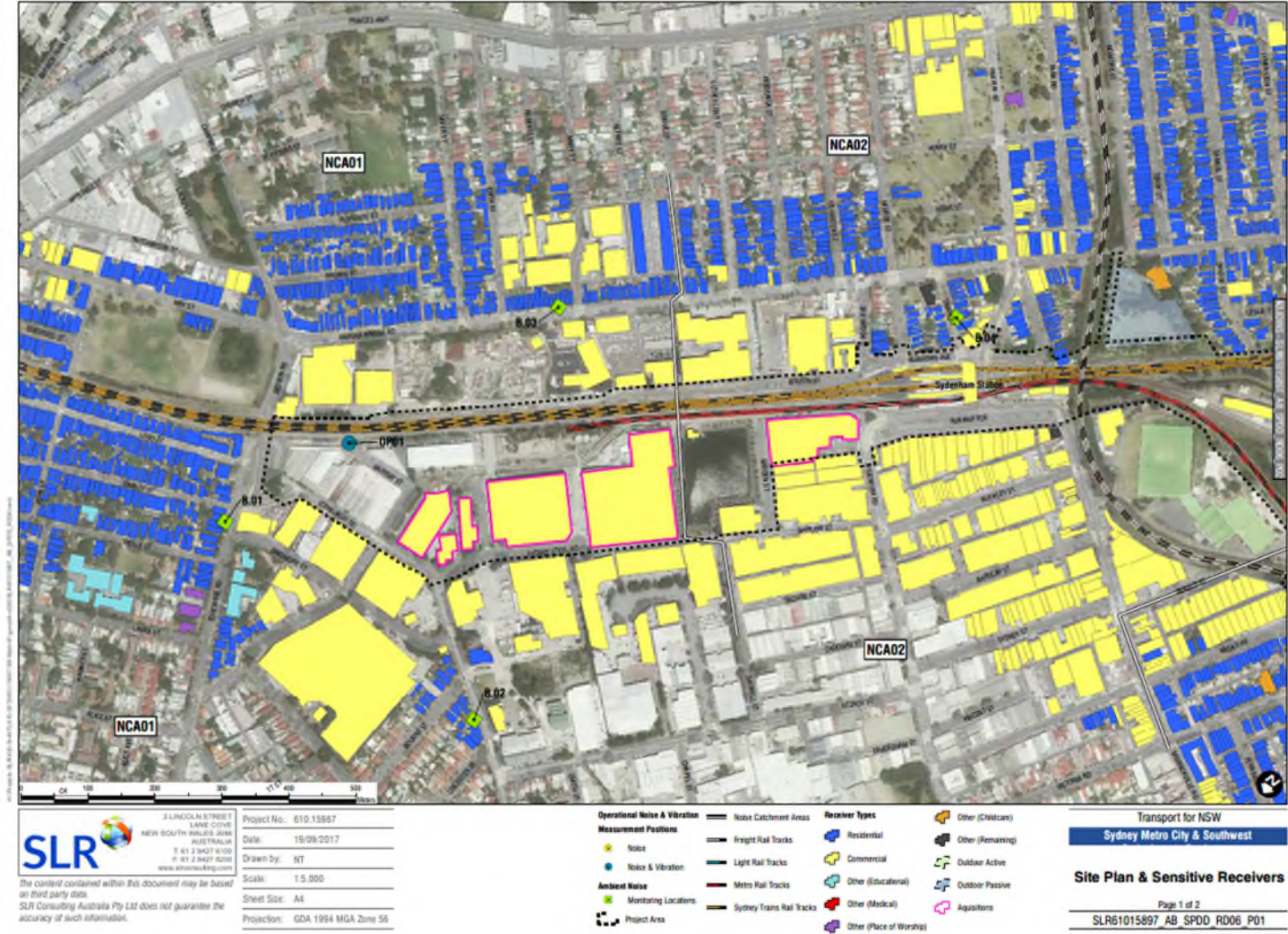


| No.   | Measure   | Timing              | Requirement | Responsibility       | Reference   |
|---|---|---------------------|-------------|----------------------|-------------|
| <b>Revised Environmental Mitigation Measures (Modification 4 Submissions Report)</b>                                      |   |                     |             |                      |             |
| 9.  | The engines of all on-site vehicles and plant would be switched off when not in use for an extended period.   | During Construction | AQ1         | Site Supervisor      | Section 5.1 |
| 10.   | Plant would be well maintained and serviced to minimise emissions. Emissions from plant would be considered as part of pre-acceptance checks.   | During Construction | AQ2         | Site Supervisor      | Section 5.1 |
| 11.   | Construction site layout and placement of plant would consider air quality impacts to nearby receivers.   | During Construction | AQ3         | Site Supervisor      | Section 5.1 |
| 12.   | Hard surfaces would be installed on long term haul routes and regularly cleaned.  | During Construction | AQ4         | Site Supervisor      | Section 5.1 |
| 13.   | Unsurfaced haul routes and work area would be regularly damped down in dry and windy conditions.  | During Construction | AQ5         | Site Supervisor      | Section 5.1 |
| 14.   | All vehicles carrying loose or potentially dusty material to or from the site would be fully covered.   | During Construction | AQ6         | Site Supervisor      | Section 5.1 |
| 15.   | Stockpiles would be managed to minimise dust generation.  | During Construction | AQ7         | Site Supervisor      | Section 5.1 |
| 16.   | Demolition would be managed to minimise dust generation.  | During Construction | AQ8         | Site Supervisor      | Section 5.1 |
| <b>Revised Environmental Performance Outcomes (Chatswood to Sydenham Submissions and Preferred Infrastructure Report)</b> |   |                     |             |                      |             |
| 17.   | Dust and exhaust emissions during construction would be minimised   | During Construction | Table 11-2  | Construction Manager | Section 5   |
| <b>Construction Environmental Management Framework</b>  |   |                     |             |                      |             |
| 18.   | <p>Air Quality Management Objectives</p> <p>The following air quality management objectives will apply to construction:</p> <ul style="list-style-type: none"> <li>Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable.</li> <li>Identify and control potential dust and air pollutant sources</li> </ul> | During construction | 16.1(a)     | Environment Manager  | Section 1.6 |

| No. | Measure   | Timing                         | Requirement | Responsibility   | Reference   |
|-----|---|--------------------------------|-------------|--|---|
| 19. | <p>Air Quality Management Implementation</p> <p>Principal Contractors will develop and implement an Air Quality Management Plan which will include, as a minimum:</p> <ul style="list-style-type: none"> <li>• The air quality mitigation measures as detailed in the environmental approval documentation.</li> <li>• The requirements of any applicable EPL conditions.</li> <li>• Site plans or maps indicating locations of sensitive receivers and key air quality / dust controls.</li> <li>• The responsibilities of key project personnel with respect to the implementation of the plan</li> <li>• Air quality and dust monitoring requirements.</li> <li>• Compliance record generation and management</li> </ul> | Before and during construction | 16.2(a)     | Environment Manager<br>Construction Manager<br>Site Supervisor | <p>This Plan</p> <p>This Table</p> <p>Refer to ECM, Section 5.1 and Appendix B – Sensitive Receivers</p> <p>Section 2.2</p> <p>Section 5.2</p> <p>Section 7.2</p> |
| 20. | <p>Air quality and dust monitoring will involve the following as a minimum:</p> <ul style="list-style-type: none"> <li>• Meteorological conditions will be monitored and appropriate responses will be organised and undertaken periodically by the Principal Contractor.</li> <li>• Regular visual monitoring of dust generation from work zones.</li> <li>• Monitoring emissions from plant and construction vehicles to ensure they have appropriate emission controls and are being maintained correctly.</li> </ul>  | During construction            | 16.2(b)     | Environment Manager<br>Construction Manager<br>Site Supervisor | Section 5.2   |
| 21. | <p>The following compliance records will be kept by the Principal Contractor:</p> <ul style="list-style-type: none"> <li>• Records of any meteorological condition monitoring.</li> <li>• Records of any management measures implemented as a result of adverse, windy weather conditions.</li> <li>• Records of air quality and dust inspections undertaken</li> </ul>   | During construction            | 16.2(c)     | Environment Manager<br>Construction Manager<br>Site Supervisor | Section 7.2   |

| No.   | Measure   | Timing              | Requirement | Responsibility                           | Reference  |
|---|---|---------------------|-------------|--|--|
| 22.   | Air Quality Mitigation<br>Examples of air quality mitigation measures include: <ul style="list-style-type: none"><li>Plant and equipment will be serviced and maintained in good working order to reduce unnecessary emissions from exhaust fumes.</li><li>Water suppression will be used for active earthwork areas, stockpiles, unsurfaced haul roads and loads of soil being transported to reduce wind-blown dust emissions.</li><li>Wheel-wash facilities or rumble grids will be provided and used near the site exit points, as appropriate.</li><li>Dust extraction and filtration systems will be installed for tunnel excavation works and deep excavation with limited surface exposure.</li></ul> | During construction | 16.3(a)     | Construction Manager/<br>Site Supervisor | Section 5.1<br><br>N/A – No tunnelling or deep excavation works will occur |
| <b>JHLOR - Environmental Protection Licence 21147</b> |   |                     |             |  |  |
| 23.   | The licensee must minimise the emission of dust from the premises to the greatest extent practicable  | During construction | O3.1        | Environment Manager                      | Section 5  |

Appendix B – Sensitive Receivers



## Appendix C – Buildings to be demolished

