

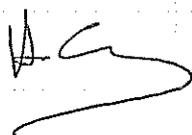


Construction Air Quality Sub-Plan

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Document Approval

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00	10/12/15	CDS-JV				
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Signature:						



Details of Revision Amendments

Document Control

The Project Director is responsible for ensuring that this Sub Plan is reviewed and approved. The Support Services Director is responsible for updating this Sub Plan to reflect changes to the Project, legal and other requirements, as required.

Amendments

Any revisions or amendments must be approved by the Project Director before being distributed or implemented.

Revision Details

Revision	Details
00	Initial Draft for Information / Informal Review
01	Issued for consultation and review by DP&E
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06	Update due to additional EPA odour management requirements in EPL and CEMP annual review



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1. Introduction

1.1 Context

The New M5 Project is the Stage 2 component of the WestConnex scheme, a NSW Government initiative to connect Sydney's west and south-west with Sydney Airport and the Port Botany precinct. It is being delivered by the Sydney Motorway Corporation (SMC), formerly the WestConnex Delivery Authority (WDA).

The CPB Contractors Dragados Samsung Joint Venture (CDS-JV) will deliver the design and construction of WestConnex Stage 2, also referred to as the New M5 (the Project). The Project will run from the existing M5 East corridor at Beverly Hills via tunnel to St Peters, providing improved access to the airport, south Sydney and Port Botany precincts. The Project will substantially improve the east - west corridor access between the Sydney CBD, Port Botany and Sydney Airport precincts and the South West growth areas.

The Project will deliver approximately nine kilometres of two-lane twin tunnels with capacity to operate three lanes in the future, motorway to motorway connections to the upgraded King Georges Road Interchange at Beverly Hills, and a new interchange at St Peters. Infrastructure Approval was granted for the project on 20 April 2016. Major works are expected to commence in mid-2016 and the New M5 tunnel is scheduled to open to traffic in late 2019.

Section 2.3 of the Construction Environmental Management Plan provides further background and detailed description of the Project.

This Construction Air Quality Management Sub-Plan (CAQSP) forms part of the Construction Environmental Management Plan (CEMP) developed for the construction of the Project. The CAQSP describes how CDS-JV will manage air quality and mitigate and/or minimise impacts during construction of the Project.

This CAQSP has been prepared with consideration of Project requirements, and to address the mitigation measures listed in the New M5 Environmental Impact Statement (EIS), the revised environmental management measures (REMMs) listed in Submissions and Preferred Infrastructure Report (SPIR) and applicable legislation.

1.2 Objectives and Targets

The key objectives of the CAQSP are to prevent visible emissions of dust from the site and to ensure that impacts to air quality are minimised and within the scope permitted by the planning approval. To achieve these objectives, the targets in Table 1 have been established for the management of air quality impacts during the Project.

Table 1: Project targets and key performance indicators associated with the management of air quality

Metric / measure	Target	Timeframe	Accountability	Documentation / reporting
Dust and Air Pollution	Visible dust from site responded to immediately	At all times	Project Managers	Environmental Inspections Daily diaries Event based inspections
Spillage or tracking on public roads	Spillage or trackage to be removed within 24 hours	At all times	Project Managers	Environmental Inspections Daily diaries Event based inspections
Dust at Alexandria Landfill Site	In accordance with EPL	At all times	Project Managers	Environmental Inspections Daily diaries Event based inspections

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Metric / measure	Target	Timeframe	Accountability	Documentation / reporting
Emission of offensive odours from the Alexandria Landfill Site	No offensive odours at site boundary	At all times	Project Manager	Environmental Inspections Daily diaries Event based inspections
Compliance with monitoring criteria	Complete reporting of non-compliant monitoring results	At all times	Environment and Sustainability Manager	Incident Reports Quarterly Compliance Report
Meet the infrastructure Approval CoA, REMMs and EPL conditions relevant to air quality	Compliance with all Infrastructure Approval CoA, REMMs and EPL conditions relevant to air quality	At all times	Project Managers	Environmental Inspections Quarterly Compliance Report



1.3 Interface with Other Plans

This CAQSP is part of an integrated set of Sub-plans to the CEMP. Table 2 shows the CEMP framework for the Project.

Table 2: New M5 CEMP Framework

Construction Environmental Management Plan	Sub-Plans to CEMP	Sub-Plan attachments	Standalone Documentation (linked to CEMP)
	Construction Air Quality Sub Plan	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Sustainability Plan • Ancillary Facilities Management Plan
	Construction Noise and Vibration Sub Plan	<ul style="list-style-type: none"> • Out of Hours Works Protocol • Blast Management Strategy 	<ul style="list-style-type: none"> • Land Use Survey • Sustainability Plan • Ancillary Facilities Management Plan • Temporary Noise Barrier Strategy
	Construction Traffic & Access Sub Plan	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Traffic Management Plans • Ancillary Facilities Management Plan • Local Road Dilapidation Report • Road Safety Audit • Construction Parking and Access Strategy
	Construction Soil & Water Quality Sub Plan	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Flood Mitigation Strategy • Groundwater Modelling Report • Groundwater and Soil Salinity Report • Sustainability Plan • Geotechnical Model • Ancillary Facilities Management Plan • Water Quality Plan and Monitoring Program • Construction Contaminated Land Management Plan • Acid Sulfate Soils Sub-Plan • Acid Sulfate Soil Management Procedure • Asbestos Guideline
	Construction Heritage Sub Plan	<ul style="list-style-type: none"> • Historical Archaeological Research Design & Excavation Methodology • Unexpected Heritage Finds 	<ul style="list-style-type: none"> • Sustainability Plan • Geotechnical Model • Ancillary Facilities Management Plan
	Construction Flora & Fauna Sub Plan	<ul style="list-style-type: none"> • Pathogen and Weed Management Strategy • Nest Box Plan 	<ul style="list-style-type: none"> • Sustainability Plan • Ancillary Facilities Management Plan • Urban Design and Landscape Plan • Green and Golden Bell Frog Plan of Management • Biodiversity Offsets Package • Tree Reports
	Waste and Resource Management Plan	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Water Reuse Strategy • Spoil Management Plan • Sustainability Plan
	Energy and Greenhouse Gas Emissions Sub Plan	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Sustainability Plan



1.4 Training

All personnel, including employees, contractors and sub-contractors, are required to complete a Project induction containing relevant environmental information before they are authorised to work on the Project. Air quality specific information to be covered in the Project induction will include:

- Any applicable obligations identified in the Project Conditions of Approval including the identification of potential sources of air pollutants of concern, including dust and chemicals, and the mitigation measures to be implemented, including use of water and covering exposed areas;
- Responsibilities pertaining to the management of air quality under the Protection of the Environment Operations Act 1997 and Protection of the Environment Operations (Clean Air) Regulation 2010;
- Typical construction activities that may impact air quality and associated environmental safeguards; and
- Incident response procedures.

Refer to the training requirements in the CEMP Part B Element 7 and the Training Plan.

2. Legal and Other Requirements

This section provides the relevant legislation and Project requirements that apply to air quality aspects of construction.

2.1 Legislation

Legislation relevant to air quality management for the Project includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- *Protection of the Environment Operations Act 1997* (POEO Act); and
- *Protection of the Environment Operations (Clean Air) Regulation 2010*.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix C – Environmental obligations register of the CEMP.

2.2 Minister's Conditions of Approval

CoA that specifically address the management of air quality are identified in [Table 3](#). A cross-reference is included to indicate where each condition is addressed in this CAQSP or other project management document.

Table 3: Conditions of Approval that address management of air quality

Reference	Requirement	Where addressed
D3	Soil and water management measures consistent with <i>Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition</i> (Landcom, 2004) must be employed during the construction of the SSI to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters. Where available and practicable, and of appropriate chemical and biological quality, stormwater, recycled water or other water sources must be used in preference to potable water for construction activities, including dust control.	Section 6 AQ15 Construction Soil and Water Quality Sub-plan (M5N-ES-PLN-PWD-0005)
D67	(e) details of how environmental performance would be managed and monitored to meet acceptable outcomes, including what actions will be taken to address identified potential adverse environmental impacts (including any impacts arising from the staging of the construction of the SSI). In particular, the following environmental performance issues must be addressed in the CEMP - (i) measures to monitor and manage dust emissions including dust from stockpiles, blasting, traffic on unsealed public roads and materials tracking from construction sites onto public roads, (vi) the sub-plans identified in condition D68.	CEMP (M5N-ES-PLN-PWD-0001) Section 6 AQ24-AQ28, AQ32-AQ39 Blast Management Plan
D68	(e) a Construction Air Quality Management Plan to detail how construction impacts on local air quality will be minimised and managed. The Construction Air Quality Management Plan must include, but not be limited to - (i) identification of sources (including stockpiles and open work areas) and quantification of airborne pollutants including odour, (ii) key performance indicators for local air quality during construction, (iii) details of air quality monitoring methods, including location, frequency and duration of monitoring. (iv) methods for assessing meteorological conditions and measures that would be implemented during adverse meteorological	This plan Sections 4 and 5 Section 1.2 Section 7 Section 6 AQ9

Reference	Requirement	Where addressed
	conditions,	Section 7 Manage Air Quality Procedure (M5N-ES-PRC-PWD-0040)
	(v) best practice management mitigation measures to minimise impacts on local air quality including, but not limited to, the relevant revised environmental mitigation measures set out in the documents referred to in condition A2,	Section 6
	(vi) measures for minimising the release of construction emissions from the site, including plant and equipment,	Section 6 AQ40 - AQ46 Section 7 Manage Air Quality Procedure (M5N-ES-PRC-PWD-0040)
	(vii) procedures for record keeping and reporting against key performance indicators,	Section 7 and 0 Element 11 of the CEMP
	(viii) provisions for implementation of additional mitigation measures in response to issues identified during monitoring and reporting, and	Section 6 and 9 Manage Air Quality Procedure (M5N-ES-PRC-PWD-0040)
	(ix) mechanisms for the monitoring, review and amendment of the Construction Air Quality Management Plan.	Section 7 and 9

2.3 Revised environmental management measures

The revised environmental management measures (REMMs) included in the New M5 SPIR relating to the management of air quality are included in [Table 4](#).

Table 4: Revised environmental mitigation measures from New M5 EIS and SPIR relevant to the management of air quality

Reference	Requirement	Where addressed
General		
REMM AQ01.	Develop and implement a Construction Air Quality Management Plan in consultation with the NSW EPA. Any measures that are required will differ depending on the activities occurring, and so will need to be tailored for each individual site.	This plan
REMM AQ02.	Carry out regular site inspections to monitor compliance with the Construction Air Quality Management Plan, record inspection results.	Section 7



Reference	Requirement	Where addressed
REMM AQ03.	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	Community Communication Strategy (M5N-CS-PLN-PWD-0008)
REMM AQ04.	Display the name and contact details of person(s) accountable for air quality and dust issues at the boundaries of each construction area. This may be the environment manager/engineer or the site manager. Display the head or regional office contact information.	Section 6 AQ7 Community Communication Strategy (M5N-CS-PLN-PWD-0008)
Dust Management		
REMM AQ05.	Plan site layout so that machinery and dust causing activities are located away from receivers, as far as is possible.	Section 6 AQ2
REMM AQ06.	Erect solid screens or barriers around dusty activities or the site boundary.	Section 6 AQ13, AQ11
REMM AQ07.	Ensure, where reasonable and feasible, that appropriate control methods are implemented to minimise dust emissions from the project site.	Section 6 Manage Air Quality Procedure (M5N-ES-PRC-PWD-0040)
REMM AQ08.	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover as soon as practicable.	Section 6 AQ14
REMM AQ09.	Impose and signpost a maximum-speed-limit of 20 km/h on surfaced and unsurfaced haul roads and in work areas.	Section 6 AQ32
REMM AQ11.	Where practicable, only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction (e.g. suitable local exhaust ventilation systems).	Section 6 AQ29
REMM AQ12.	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Section 6 AQ15 CSWQSP
REMM AQ13.	Where possible, use enclosed chutes and conveyors and covered skips.	Section 6 AQ30
REMM AQ14.	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Section 6 AQ31
REMM AQ15.	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using appropriate cleaning methods.	Section 6 AQ16
REMM AQ16.	Avoid scabbling (roughening of concrete surfaces) if possible.	Section 6 AQ16



Reference	Requirement	Where addressed
Stockpile Management		
REMM AQ17.	Stockpiles would be located outside overland flow paths, and where left exposed and undisturbed for longer than 28 days, would be finished and contoured to minimise loss of material in flood or rainfall events. Materials which require stockpiling for longer than 28 days would be stabilised by compaction, covering with anchored fabrics, or seeded with sterile grass where appropriate.	Section 6 AQ24
REMM AQ18.	Where a stockpile, eg sand or fine aggregate, has the potential to generate dust, control measures would be implemented. These would include wetting the stockpile, covering the stockpile or contouring the stockpile.	Section 6 AQ25
REMM AQ19.	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Section 6 AQ33
REMM AQ20.	For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	Section 6 AQ34
Tracking of material on roads		
REMM AQ21.	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.	Section 6 AQ35
REMM AQ22.	Avoid dry sweeping of large areas.	Section 6 AQ18
REMM AQ23.	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Section 6 AQ36
REMM AQ24.	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	Section 7
REMM AQ25.	Record all inspections of haul routes and any subsequent action in a site log book.	Section 7
REMM AQ26.	Where reasonable and feasible, haul roads will be maintained with water carts and graders, and the condition of the roads will be monitored.	Section 6 AQ37
REMM AQ27.	Implement site exit controls (eg. wheel washing system and rumble grids) to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable.	Section 6 AQ38
REMM AQ28.	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	Section 6 AQ39
REMM AQ29.	Access gates to be located at least 10 m from receivers where possible.	Section 6 AQ39
Emissions management		
REMM AQ30.	Ensure all construction vehicles comply with their relevant emission standards.	Section 6 AQ40
REMM AQ31.	Ensure that, where practicable, engine idling is minimised when stationary.	Section 6 AQ41
REMM AQ32.	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Section 6 AQ42



Reference	Requirement	Where addressed
REMM AQ33.	Promote and encourage sustainable travel (public transport, cycling, walking, and car-sharing).	Section 6 AQ43
REMM AQ34.	No bonfires and burning of waste materials.	Section 6 AQ44
Demolition		
REMM AQ35.	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Section 6 AQ20
REMM AQ36.	Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground and may be more useful for covering larger areas.	Section 6 AQ21
REMM AQ37.	Minimise explosive blasting where possible during demolition, using appropriate manual or mechanical alternatives.	Section 6 AQ22
REMM AQ38.	Bag and remove any biological debris or other hazardous materials such as asbestos, damp down such material before demolition.	Section 6 AQ23
Earthworks		
REMM AQ39.	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Section 6 AQ26
REMM AQ40.	Use hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	Section 6 AQ27
REMM AQ41.	Where possible, only remove any cover for exposed areas in small areas during work and not all at once.	Section 6 AQ28
Cumulative impacts		
REMM AQ42.	Regular communication with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	Section 6 AQ1
REMM AQ43.	Undertake regular on-site and off-site inspection, where receivers are nearby, to monitor dust, record inspection results.	Section 7
Complaints management		
REMM AQ44.	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	Section 6 AQ8 Community Communication Strategy (M5N-CS-PLN-PWD-0008)



Reference	Requirement	Where addressed
REMM AQ45.	Make complaints available to the Secretary upon request.	Section 6 AQ8 Section 8 Community Communication Strategy (M5N-CS-PLN-PWD-0008)
REMM AQ46.	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.	Section 6 AQ6
Contamination		
REMM CM06.	Site specific asbestos management plans would be developed where relevant. Refer to Chapter 24 (Resource use and waste minimisation) of the EIS for further information on asbestos management.	Manage Work with Asbestos (M5N-ES-GUI-PWD-0001) Construction Area Plans
Greenhouse Gas		
REMM GHG01.	Prepare a Greenhouse Gas Emissions Strategy and Management Plan for the project.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG02.	Undertake an updated greenhouse gas assessment based on detailed design.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG03.	The emissions intensity of significant construction materials specified in the design of the project would be assessed and, where feasible and in compliance with technical specifications, low emission construction materials would be used.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG04.	Where feasible, recycled content road construction materials such as recycled aggregates in road pavement and surfacing, or similar, would be used.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)



Reference	Requirement	Where addressed
REMM GHG05.	The fuel efficiency of construction plant and equipment would be assessed before selection and, where feasible and reasonable, equipment with the highest fuel efficiency or equipment that uses lower greenhouse gas intensive fuel such as biofuels (eg biodiesel, ethanol) would be used.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG06.	Project planning would be undertaken to ensure that the site vehicle movements and construction activities are efficient, to avoid double handling of materials and unnecessary fuel use where possible.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG07.	Locally produced goods and services would be procured where feasible and cost effective to reduce transport fuel emissions.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG08.	At least six per cent of construction energy required for the project would be sourced where possible from an accredited GreenPower energy supplier	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG09.	Where possible, and fit for purpose, spoil would be beneficially re-used within the project before offsite re-use or disposal options are investigated. A spoil management strategy would be developed for the project prior to the commencement of construction and would identify spoil disposal sites and the management of excess spoil.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
REMM GHG10.	Waste would be diverted from landfill, including diversion of spoil, construction and demolition waste, and commercial and industrial waste, where reasonable and feasible. The management of waste would be considered as part of the preparation of the CEMP for the project, detailing the appropriate procedures for waste management.	Energy Efficiency and Greenhouse Gas Emissions Strategy (M5N-ES-PLN-PWD-0021)
Cumulative Impacts		
REMM CI01.	Consultation would be undertaken with local communities potentially affected by the impacts of multiple projects in addition to the project.	Community Communications Strategy (M5N-CS-PLN-PWD-0008)

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Reference	Requirement	Where addressed
REMM CI02.	Where relevant, consultation would be undertaken with proponents of other nearby developments to increase the overall awareness of project timeframes and impacts.	Section 6 AQ1 Community Communications Strategy (M5N-CS-PLN-PWD-0008)

2.4 Environment Protection Licence Conditions

The Project's construction activities will be regulated by the project Environment Protection Licences (EPL No. 20772 and EPL No. 4627) issued by the NSW Environment Protection Authority (EPA). EPL No. 20772 is for road construction of the project generally and EPL No. 4627 is for road construction works at the St Peters Interchange site. EPL conditions relevant to the management of air quality are included in Table 5.

Table 5: EPL conditions relevant to the management of air quality

Reference	Requirement	Where addressed
EPL No. 20772		
O3	Dust	
O3.1	The licensee must ensure that construction work is carried on by such practicable means as may be necessary to minimise dust emissions on the premises, and implement all feasible and reasonable mitigation measures to minimise the release of dust from the premises.	Project CEMP including this Plan
O4	Processes and management	
O4.7	The licensee must endeavour to maximise the reuse of captured stormwater on the premises.	Section 6 AQ15 Construction Soil and Water Quality Sub-Plan (M5N-PM-PLN-PWD-0005) Water Reuse Strategy
EPL No. 4627		
P1	Location of monitoring/discharge points and areas	
P1.1	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.	Refer to map titled "WestConnex Motorway Alexandria Landfill EPL 4627: Environmental Monitoring Locations" dated 21 September 2016.



Reference	Requirement	Where addressed			
P1.3	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.	Refer to map titled "WestConnex Motorway Alexandria Landfill EPL 4627: Environmental Monitoring Locations" dated 21 September 2016.			
	Air				
	EPA identification no		Type of Monitoring point	Type of Discharge point	Location description
	9		Dust Monitoring		Air quality/dust monitoring point labelled as "DG1" on map titled "WestConnex Motorway Alexandria Landfill EPL 4627: Environmental Monitoring Locations" dated 21 September 2016.
	10		Dust Monitoring		Air quality/dust monitoring point labelled as "DG2" on map titled "WestConnex Motorway Alexandria Landfill EPL 4627: Environmental Monitoring Locations" dated 21 September 2016.
	11		Dust Monitoring		Air quality/dust monitoring point labelled as "DG3" on map titled "WestConnex Motorway Alexandria Landfill EPL 4627: Environmental Monitoring Locations" dated 21 September 2016.
	12		Dust Monitoring		Air quality/dust monitoring point labelled as "DG4" on map titled "WestConnex Motorway Alexandria Landfill EPL 4627: Environmental Monitoring Locations" dated 1 March 2016.
	16		Odour/Gas Monitoring		At the intersection of Campbell St and Barwon Park Rd, St Peters, specified as point D in document nr M5N-CORR-CDS-14022
17	Odour/Gas Monitoring		Near 238 Princes Highway, St Peters, specified as point A in document nr M5N-CORR-CDS-14022		
18	Odour/Gas Monitoring		Opposite entrance of the Maritime Container Services Terminal along		



Reference	Requirement	Where addressed
		Canal Road, St Peters, specified as point B in document nr M5N-CORR-CDS-14022
19	Odour/Gas Monitoring	Opposite 22 Burrows Rd, St Peters, specified as point C in document nr M5N-CORR-CDS-14022
20	Odour/Gas Monitoring	Outside the St Peters Public School Church Street entrance
L5	Potentially offensive odour	
L5.1	<p>No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997.</p> <p>Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.</p>	Project CEMP including this Plan
O3	Dust	
O3.1	Trucks entering and leaving the premises that are carrying loads must be covered at all times, except during loading and unloading.	Section 6 AQ36
O3.2	The licensee must ensure that no material, including sediment or oil, is tracked from the premises.	Section 6 AQ35 - AQ39, Section 7
O3.3	The licensee must ensure that construction work is carried on by such practicable means as may be necessary to minimise dust emissions on the premises, and implement all feasible and reasonable mitigation measures to minimise the release of dust from the premises.	This plan
M1	Monitoring records	
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Section 7
M1.2	<p>All records required to be kept by this licence must be:</p> <p>a) in a legible form, or in a form that can readily be reduced to a legible form;</p> <p>b) kept for at least 4 years after the monitoring or event to which they relate took place; and</p> <p>c) produced in a legible form to any authorised officer of the EPA who asks to see them.</p>	Section 7



Reference	Requirement	Where addressed												
M1.3	<p>The following records must be kept in respect of any samples required to be collected for the purposes of this licence:</p> <ul style="list-style-type: none"> a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample. 	Section 7												
M2	Requirement to monitor concentration of pollutants discharged													
M2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:	Section 7												
M2.2	<p>Air Monitoring Requirements</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">POINT 9,10,11,12</th> </tr> <tr> <th>Pollutant</th> <th>Units of measure</th> <th>Frequency</th> <th>Sampling method</th> </tr> </thead> <tbody> <tr> <td>Total suspended particles</td> <td>grams per square metre per month</td> <td>Quarterly</td> <td>Australian Standard 3580.10.1-2003</td> </tr> </tbody> </table>	POINT 9,10,11,12				Pollutant	Units of measure	Frequency	Sampling method	Total suspended particles	grams per square metre per month	Quarterly	Australian Standard 3580.10.1-2003	Section 7
POINT 9,10,11,12														
Pollutant	Units of measure	Frequency	Sampling method											
Total suspended particles	grams per square metre per month	Quarterly	Australian Standard 3580.10.1-2003											
M3	Testing methods - concentration limits													
M3.1	<p>Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.</p> <p>Note: The Protection of the Environment Operations (Clean Air) Regulation 2010 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".</p>	Section 7												
M3.2	<p>Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:</p> <ul style="list-style-type: none"> a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place. 	Section 7												
M4	Environmental monitoring													
M4.4	The licensee must engage a suitably qualified independent consultant to undertake odour and gas (H2S and NH3) monitoring surveys around the	Section 7												



Reference	Requirement	Where addressed																														
	perimeter of the premises. The surveys must be undertaken once a day, mid-afternoon. The licensee must keep records of these odour and gas surveys. The frequency of these odour and gas surveys can be decreased to once a week, if the survey identifies no offensive odour leaving the premises for 7 consecutive days.																															
M4.5	The licensee must perform and record a daily perimeter odour survey if the independent odour survey is undertaken on a weekly basis. Licensees staff performing odour surveys must have been trained by the independent odour consultant.	Section 7																														
M4.6	If an offensive odour is detected by the monitoring required under conditions M4.4, the licensee must as soon as practicable (i) notify the EPA by contacting the Environment Line tel 131 555 and (ii) review the landfill management activities to ensure all reasonable and feasible measures are taken to mitigate odours and implement any improvements resulting from this review as soon as practicable.	Section 7																														
M4.7	The licensee can cease all odour surveys when all putrescible waste on the premises has been capped.	Section 7																														
M4.8	The licensee must submit, by 2:00 pm the following business day, an odour and gas monitoring report to the EPA, NSW Health and the Department of Planning and Environment, which details the recorded daily odour and gas monitoring results as described in condition M4.4.	Section 7																														
M5	Weather monitoring																															
M5.1	<p>At the point(s) identified below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1 of the table below, using the corresponding sampling method, units of measure, averaging period and sampling frequency, specified opposite in the Columns 2, 3, 4 and 5 respectively.</p> <table border="1"> <thead> <tr> <th colspan="5">POINT 13</th> </tr> <tr> <th>Parameter</th> <th>Sampling method</th> <th>Units of measure</th> <th>Averaging period</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Rainfall</td> <td>AM-4</td> <td>millimetres</td> <td>-</td> <td>Daily</td> </tr> <tr> <td>Wind speed</td> <td>AM-2 & AM-4</td> <td>metres per second</td> <td>1.5 hours</td> <td>Continuous</td> </tr> <tr> <td>Wind Direction at 10 metres</td> <td>AM-2 & AM-4</td> <td>-</td> <td>1.5 hours</td> <td>Continuous</td> </tr> <tr> <td>Temperature at 10 metres</td> <td>AM-4</td> <td>degrees Celsius</td> <td>1.5 hours</td> <td>Continuous</td> </tr> </tbody> </table>	POINT 13					Parameter	Sampling method	Units of measure	Averaging period	Frequency	Rainfall	AM-4	millimetres	-	Daily	Wind speed	AM-2 & AM-4	metres per second	1.5 hours	Continuous	Wind Direction at 10 metres	AM-2 & AM-4	-	1.5 hours	Continuous	Temperature at 10 metres	AM-4	degrees Celsius	1.5 hours	Continuous	Section 7
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Temperature at 10 metres	AM-4	degrees Celsius	1.5 hours	Continuous																												
M5.2	Rainfall at the premises must be measured and recorded in millimetres per 24 hour period at the same time each day from the time that the site office associated with the activities permitted by this licence is established.	Section 7																														
U1	Odour management improvement program																															
U1.1	On or before 22 May 2017 the licensee must engage a suitably qualified and experienced independent consultant that is not currently involved with the project. The consultant must identify methods of mitigating	Note																														

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Reference	Requirement	Where addressed
	and/or managing landfill odour sources in order to reduce or eliminate odour impacts beyond the boundary of the premises.	
U1.2	On or before Friday 16 June 2017 the licensee must submit to the EPA: - a report from the consultant with recommendations to minimise, reduce and/or manage landfill odour sources in order to eliminate or reduce to the maximum extent practicable odour impacts beyond the boundary of the premises, and; - an action plan identifying those actions that are feasible and reasonable to implement and the timeframes for implementation.	Note
U1.3	The licensee must implement the action plan after consultation with the EPA.	Note
U1.4	The licensee must install, commission and commence operation of the additional Leachate Treatment Plant on 19 June 2017, or as soon as practicable thereafter as agreed in writing with the EPA.	Note

2.5 Sustainability Requirements

In accordance with the Sustainability Plan, CDS-JV will target to achieve Level 2 of ISCA IS Rating Tool Dis-4.

CDS-JV will conduct regular monitoring in accordance with Section 6 of this Plan, to ensure no recurring exceedance of air quality goals occur. CDS-JV will conduct monitoring in response to complaints. The Project will ensure any exceedance is managed and opportunities for improvement implemented to minimise recurring or major exceedance of air quality goals

2.6 Guidelines and Relevant Documents

The main guidelines, specification and policy documents relevant to this CAQSP include:

- AS/NZS 3580.1.1:2007 Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment OR AS 2922-1987 Ambient Air – Guide for the siting of sampling equipment;
- AS/NZS 3580.10.1:2003 Methods for sampling and analysis of ambient air – Determination of particulate matter – deposited matter – gravimetric method;
- Guidance on the assessment of dust from demolition and construction (Institute of Air Quality Management, London, 2014);
- National Environment Protection Council's (NEPC) – National Environment Protection Measure (NEPM) for Ambient Air Quality Guidelines;
- NSW DEC (2006) Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales;
- NSW DEC (2005) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales
- NSW EPA Local Government Air Quality Toolkit, Visual Guide: Dust from urban construction sites; and
- Roads and Maritime Services Specification D&C G36 – Environmental Protection (06 August 2014).



3. Consultation

This plan was provided to relevant councils, EPA, OEH and DPI (Water), in accordance with CoA D67 and REMM AQ01. No comments were received regarding this CAQSP. Refer to Section 3.2 of the CEMP for consultation requirements relating to the CEMP and all sub-plans.

Ongoing consultation with the relevant Councils and other stakeholders may be undertaken for particular issues pertaining to the project's impact on air quality. Community feedback and complaints relating to air quality will be dealt with in accordance with the Community Communication Strategy and the Construction Complaints Management System.

4. Existing Environment

The following sections summarise what is known about factors influencing air quality impacts associated with the construction of the Project.

4.1 Rainfall, Temperature and Wind

The historical records from Sydney Airport (Station ID 066037) and Canterbury Racecourse AWS (Station ID 066194) have been selected to reflect the potential rainfall and temperature conditions across the Project due to its proximity to the overall site, and extent of available data. A summary of the relevant climatic records from the Bureau of Meteorology (BoM) is provided in Table 6 below. Data statistics were sourced from the BoM website on 11 November 2015 and the BoM record period for Sydney Airport AWS was years 1929 - 2015 and for Canterbury Racecourse AWS was years 1995 - 2015.

Table 6 provides a consideration of typical climatic factors that contribute to the proliferation of dust particulates. In addition to the exposure of unconsolidated material during construction (e.g. earthworks), climatic factors such as prolonged dry weather, combined with high winds, can increase the likelihood of dust particulate emissions. Rainfall is typically higher during summer and autumn. Winter and spring are typically drier periods during the year, coinciding with the windier period of the year.

Wind direction varies slightly throughout the year, however due to the urban environment that surrounds the Project; wind direction is not anticipated to be a factor that significantly influences air quality management practices. Table 7 contains general wind speed guidance (based on the Beaufort Scale) that will be used to assist descriptions of dust or wind events during the Project.



Table 6: Climate averages for Sydney Airport and Canterbury Racecourse AWS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Sydney Airport (AWS) - Latitude: 33.95°S; Longitude: 151.17°E													
Mean max temp (°C)	26.5	26.4	25.3	22.9	20.0	17.6	17.0	18.4	20.6	22.6	24.1	25.8	22.3
Mean min temp (°C)	18.9	19.1	17.6	14.2	11.0	8.7	7.2	8.2	10.5	13.2	15.4	17.5	13.5
Mean rainfall (mm)	94.0	111.9	115.4	109.3	98.6	122.5	69.6	76.8	60.3	70.3	81.5	74.1	1083.6
Mean no of days of rain ≥ 1mm rain	8.0	8.6	9.2	8.6	8.5	8.8	6.7	6.8	6.8	7.8	8.4	7.8	96.0
Mean 9am wind speed (km/hr)	14.4	13.8	12.9	12.9	12.6	13.4	13.3	14.4	15.5	16.3	16.0	14.8	14.2
Mean 3pm wind speed (km/hr)	24.1	23.0	21.0	19.3	17.1	17.8	18.2	20.8	23.1	24.6	25.3	25.2	21.6
Canterbury Racecourse (AWS) - Latitude: 33.91°S; Longitude: 151.11°E													
Mean max temp (°C)	27.6	27.2	25.9	23.3	20.5	18.1	17.4	19.0	22.0	23.4	24.6	26.3	22.9
Mean min temp (°C)	18.3	18.3	16.4	12.7	9.3	7.1	5.7	6.5	9.4	12.0	14.8	16.8	12.3
Mean rainfall (mm)	76.0	103.6	73.3	113.4	84.9	98.8	57.6	63.2	46.1	60.8	81.4	64.7	921.9
Mean no of days of rain ≥ 1mm rain	7.6	7.8	7.5	7.8	7.1	8.9	6.6	5.1	5.0	6.2	8.6	6.8	85.0
Mean 9am wind speed (km/hr)	11.4	10.9	9.8	10.4	10.6	9.9	10.2	12.0	12.8	12.6	13.0	12.2	11.3
Mean 3pm wind speed (km/hr)	22.3	20.7	19.2	17.3	15.1	13.7	15.0	17.8	19.8	21.1	22.0	22.2	18.8

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Table 7: Wind speed guidance

Wind Speed (km/h)	Beaufort Scale	Description	Characteristics
0	0	Calm	No horizontal movement of smoke or dust
10	2	Light breeze	Wind felt on skin, leaves rustle.
15	3	Gentle breeze	Leaves and small debris constantly moving. Wind can extend a light flag.
20-30	4	Moderate wind	Dust, leaves and loose paper lifted in the air. Small branches move.
30-40	5	Fresh wind	Small trees begin to sway, dust evident.
40-50	6	Strong winds	Large tree branches moving. Whistling heard from overhead wires. Dust clearly evident.
50+	7+	Near gale	Whole trees in motion, inconvenience felt when walking against wind

4.2 Soil Landscapes

The Project corridor is underlain by seven soil landscapes. The Gymea soil landscape covers the majority of the Project corridor in the west, with smaller areas of the Hawkesbury, Blacktown, Birrong, Warriewood and Oxford Falls soil landscapes. The eastern extent of the Project corridor is largely covered by land identified as being disturbed terrain, associated with Alexandra Canal and industrial land uses. Table 8 presents an estimate of the approximate percentage of each soil landscape within the tunnel, surface works and construction footprint alignment. The estimate is based on 'Figure 16-4 Soil landscapes' as presented in Chapter 16 Soil and Water Quality of the EIS.

Table 8: Soils and geology across the Project footprint

Soil Landscape Name	Approximate Percentage of the Alignment	Description
Residual Blacktown	16%	Occurs on gently undulating rises on Wianamatta Group Shales. Poorly drained, moderately reactive soil. No appreciable erosion occurs on this unit as most of the surface is covered by tiles, concrete, bitumen or turf. If surface cover is disturbed there is potential for pockets of erodible dispersible soils.
Alluvial Birrong	12%	Occurs on level to gently undulating alluvial floodplains draining the Wianamatta Group Shales. Saline soils, seasonal waterlogging and localised flooding. Soil landscapes exhibit a high soil erosion hazard. However, most drainage lines have been artificially lined with concrete to prevent ongoing erosion. Minor streambank erosion has occurred along remaining natural drainage lines.
Erosional Gymea	27%	Occurs on undulating to rolling rises and low hills on Hawkesbury Sandstone.

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Soil Landscape Name	Approximate Percentage of the Alignment	Description
		Localised steep slopes. High soil erosion hazard. Severe sheet erosion occurs when the stabilising vegetative ground cover is removed. Minor gully erosion occurs under concentrated flow conditions.
Colluvial Hawkesbury	3%	Occurs on rugged, rolling to very steep hills on Hawkesbury Sandstone. Extreme soil erosion and mass movement hazard. Severe sheet erosions often occur during storms and after ground cover is removed. Minor gully erosion can occur under concentrated flow conditions.
Transferral Oxford Falls	2%	Occurs in hanging valleys on Hawkesbury Sandstone, with occasional broad benches and scarps. Very high soil erosion hazard, potential for perched water tables and swamps, highly permeable soil.
Swamp Warriewood	1%	Occurs on level to gently undulating swales, depressions and infilled lagoons in Quaternary sands. High water tables and localised flooding, highly permeable soils, compressible soils. No appreciable erosion occurs where slopes are low and a vigorous ground cover is maintained. Subject to wind erosion when ground cover is removed.
Disturbed Terrain	39%	Terrain extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Soil characteristics vary widely. Variable relief and slopes. Erosion hazard varies markedly according to site characteristics including slope, aspect and exposure. In general, severe sheet and rill erosion often occur at quarries, gravel pits and places where unconsolidated or disturbed material remains without a protective cover of vegetation, asphalt or concrete. Risk of contamination, depending on past land use.

4.3 Sensitive Receivers

The construction of the Project will interact with a number of sensitive receivers and some natural environments. The lands surrounding the Project have been considered for potential sensitivity to dust and air quality impacts. The potential sensitive receivers include:

- Residences;
- Native vegetation;
- Sensitive commercial or industrial users;
- Educational, including schools;
- Aged care facilities;
- Child care facilities;
- Medical, including Hospitals;
- Places of Worship
- Road users; and

- Recreational areas including outdoor active and passive areas.

For locations of the nearest sensitive receivers refer to the Noise catchment areas & Sensitive Receivers maps in Appendix B Land Use Survey to the Construction Noise and Vibration Sub-Plan (M5N-ES-PLN-PWD-0003). Residential sensitive receivers generally surround the Project. Site Environment Plans are used to display the location of sensitive receivers that are in close proximity to sites, and may be impacted by construction activities including air quality impacts.

In addition to the numerous residential receivers, the nearest potentially affected non-residential sensitive receivers have been identified, including, those listed in [Table 9](#). This table includes sensitive natural areas and the nearest potentially affected community receivers taken to be representative of particularly sensitive locations (schools, child care centres and hospitals) within a zone 600 metres either side along the Project corridor.

Table 9: Non-residential sensitive receivers

Receiver code	Receiver name
Community Receivers	
SR01	Active Kids Beverly Hills
SR02	Active Kids Narwee
SR03	Beverly Hills North Public School
SR04	Beverly Hills Girls High School
SR05	Barfa Bear Child Care Centre
SR06	Regina Coeli Catholic Primary School
SR07	Footsteps Early Learning Centre
SR08	Footsteps Early Learning Centre Out of Hours School Care
SR09	McCallums Hill Public School
SR10	Hurstville City Council Family Day Care Scheme
SR11	Kingsgrove North High School
SR12	Kingsgrove Early Childhood Health Centre
SR13	Kingsgrove World Of Learning
SR14	Kingsgrove Day Hospital
SR15	Kings Medical Clinic
SR16	Kids Oasis Childcare Centre
SR17	Clemton Park Public School
SR18	The Salvation Army Booth College
SR19	Alloa Nursing Home
SR20	Athelstane Public School
SR21	Kinderoos Childcare Centre



Receiver code	Receiver name
SR22	Ladybugs Day Care
SR23	Macedonian Community Child Care Centre
SR24	Arncliffe Public School
SR25	Tempe High School
SR26	Tillman Park Child Care Centre
SR27	St Pius' Catholic Primary School
SR28	Camdenville Public School
SR29	Camdenville Public School Preschool
SR30	St Peters Public School
SR31	Sydney Park Childcare Centre
SR32	Sydney Park Childcare Centre
SR33	Lady Gowrie Child Centre
SR34	Active Kids Mascot
SR35	Building Blocks Early Childhood Learning
Natural areas	
-	Beverly Grove bushland (between Canterbury Gold Course and existing M5 East motorway – Area of Cooks River Castlereagh Ironbark Forest
-	Kingsgrove – Area of Turpentine iron Forest
-	Kogarah Golf Course – Green and Golden Bell Frog Arncliffe Key population habitat
-	Marsh Street and Spring Street wetlands (near the Kogarah Golf Course) – Green and Golden Bell Frog Arncliffe Key population habitat
-	Eve Street Wetland – potential habitat for migratory birds
-	Stotts Reserve, Wolli Creek Valley (Bexley North)
-	Bardwell Creek Valley
-	Tempe Wetlands (near Alexandra Canal)
-	Park adjacent to Tallawalla Street, Beverly Hills
-	Cooks River
-	Grey-headed Flying Fox Camp at Turrella

5. Construction Aspects and Environmental Impacts

5.1 Construction Aspects

CDS-JV construction activities have potential to impact on air quality.

The majority of the project's construction footprint would be underground. However, surface works will be required to support tunnelling activities and to construct surface infrastructure such as interchanges, bridges, tunnel portals, ventilation facilities, ancillary operations buildings and facilities.

The construction aspects broadly identified in the EIS that have the potential to impact on air quality are:

5.1.1 Dust and Particulate Emissions

- Demolition - any activity that involves the removal of existing structures. This may be referred to as deconstruction, specifically when a building is to be removed a small part at a time;
- Earthworks - the processes of soil stripping, ground levelling, excavation and landscaping. Earthworks will primarily involve excavating material, haulage, tipping and stockpiling;
- Construction - any activity that involves the provision of new structures, modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.; and
- Track-out - the transport of dust and dirt by heavy vehicles from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by the vehicles using the network.

5.1.2 Gaseous Emissions:

- Mobile construction plant and equipment - diesel combustion and petrol (gasoline) combustion;
- Transport of materials, spoil and waste to/from site - diesel combustion;
- Transport of project vehicles – light vehicles (petrol): petrol (gasoline) combustion;
- Vegetation clearance - removal of planted trees and screening vegetation and removal of parklands and open space;
- Electricity purchased from the grid during construction - electricity generation;
- Odours/gases released during landfill excavation and groundwater treatment;
- Construction materials - concrete, cement, structural steel, reinforcement steel, steel rock bolts, aggregate, asphalt, copper, plastic and mains water; and
- Waste - construction and demolition waste.

5.1.3 Key Construction Locations

Table 10 provides a high level summary of construction activities with potential air quality implications, based on key construction sites.

Table 10: Key construction locations

Location	Typical activities with potential to generate air emissions
Western surface works (including M5 East Motorway integration works, Kingsgrove North (C1), Kingsgrove South (C2), Commercial Road (C3))	<ul style="list-style-type: none"> • Establishment of work areas including building demolition, vegetation clearance, clearing / grubbing • Earthworks and exposed areas associated with soil stripping, ground levelling, and excavation • Bridge construction and retaining walls • Construction of the dive structures and cut-and-cover sections of the tunnel, new lanes and realignment of the M5 and approach roads and ramps • Construction of permanent operational infrastructure and the Kingsgrove motorway operations complex (MOC1) • Spoil removal, storage, handling and transport • Stockpiling of materials • Road foundations and sealing of surfaces

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Location	Typical activities with potential to generate air emissions
	<ul style="list-style-type: none"> • Exhaust emissions from the operation of construction plant and vehicles • Surface site rehabilitation and restoration.
Bexley Road surface works (including Bexley Road North (C4), Bexley Road South (C5), Bexley Road East (C6))	<ul style="list-style-type: none"> • Establishment of work areas including building demolition, vegetation clearance, clearing / grubbing • Earthworks and exposed areas associated with soil stripping, ground levelling, and excavation • Construction of Bexley Road South motorway operations complex (MOC2), • Spoil removal, storage, handling and transport • Stockpiling of materials • Road foundations and sealing of surfaces • Exhaust emissions from the operation of construction plant and vehicles • Surface site rehabilitation and restoration.
Arncliffe surface works (including Arncliffe (C7))	<ul style="list-style-type: none"> • Establishment of work areas including building demolition, vegetation clearance, clearing / grubbing • Earthworks and exposed areas associated with soil stripping, ground levelling, and excavation • Construction of Arncliffe motorway operations complex (MOC3) • Construction of offset Green and Golden Bell Frog habitat • Spoil removal, storage, handling and transport • Stockpiling of materials • Exhaust emissions from the operation of construction plant and vehicles • Surface site rehabilitation and restoration.
St Peters interchange surface works (including St Peters interchange, Canal Road (C8), Campbell Road (C9), Landfill Closure Compound (C10), Burrows Road (C11),	<ul style="list-style-type: none"> • Establishment of work areas including building demolition, vegetation clearance, clearing / grubbing • The closure of the former Alexandria Landfill site , including earthworks, foundation treatments and capping, installation of new leachate drainage collection system, new leachate treatment plant management system, installation of a landfill gas collection and management system, installation of a groundwater management system • Earthworks and exposed areas associated with soil stripping, ground levelling, and excavation • St Peters Interchange road bridge construction and retaining walls • Construction of the dive structures and cut-and-cover sections of the tunnel, approach roads and ramps • Construction of permanent operational infrastructure and St Peters motorway operations complex (MOC4) and Burrows Road motorway operations complex (MOC5) • Spoil removal, storage, handling and transport • Stockpiling of materials • Road foundations and sealing of surfaces including sections of road and embankments within the boundary of the St Peters interchange site for connections with future M4-M5 Link and future Sydney Gateway. • Exhaust emissions from the operation of construction plant and vehicles • Surface site rehabilitation and restoration.
Local road upgrade surface works - local roads around the St Peters interchange and the intersection of Campbell Road and Euston Road (including Campbell Road bridge (C12) Gardeners Road bridge (C13) Sydney Park (C14))	<ul style="list-style-type: none"> • Establishment of work areas including building demolition, vegetation clearance, clearing / grubbing • Earthworks and exposed areas associated with soil stripping, ground levelling, and excavation • Construction of permanent operational infrastructure and ancillary facilities • Bridge construction and replacement works including new and upgraded pedestrian and cycle infrastructure.

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Location	Typical activities with potential to generate air emissions
	<ul style="list-style-type: none"> • Spoil removal, storage, handling and transport • Stockpiling of materials • Road foundations and sealing of surfaces • Exhaust emissions from the operation of construction plant and vehicles • Surface site rehabilitation and restoration.

Tunnel spoil stockpiles will be established within appropriate controls (including bunding and acoustic sheds where appropriate) at all tunnelling construction compounds including: Kingsgrove North (C1), Commercial Road (C3), Bexley Road North (C4), Bexley Road South (C5), Arncliffe (C7) and Canal Road (C8). Limited stockpiling of materials will also occur during earthworks associated with civil works at all compounds. Locations of tunnel spoil stockpiles are identified on the construction compound site layouts, refer Ancillary Facilities Management Plan (M5N-ES-PLN-PWD-0026).

5.2 Factors likely to affect Construction Air Quality Impacts

The risk of dust impacts from construction activities (including demolition) causing loss of amenity and/or health or ecological impacts is related to the following (IAQM 2014):

- The size of the site;
- The proximity of receptors to the activities;
- The sensitivity of the receptors to dust;
- Soil conditions of the area to be disturbed;
 - Soil type - more erodible soil types have an increased soil or dust erosion potential;
 - Soil moisture – increased soil moisture reduces soil or dust erosion potential; and
- The meteorological conditions - adverse impacts are more likely to occur downwind of the site and during drier periods;
 - Wind speed – governs the potential suspension and drift resistance of particles;
 - Wind direction – determines whether dust and suspended particles are transported in the direction of the sensitive receivers;
 - Rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation; and
- Duration and nature of construction activities;
- The risk of air quality impacts arising from exhaust emissions are related to the following;
 - The number and type of plant and equipment being used;
 - The duration of use of each item of plant and equipment;
 - Appropriate operation and maintenance of plant and equipment;
 - Compliance of plant and equipment with relevant emission standards; and.
- The adequacy of the mitigation measures applied to reduce or eliminate dust.
- The adequacy of the mitigation measures applied to reduce or eliminate odour particularly from landfill operations.

5.3 Environmental Impacts

As described in the EIS, construction activities have the potential to impact on the surrounding air quality from activities which may generate dust, and from exhaust emissions from construction plant and equipment. Some impacts on air quality attributable to construction of the Project are anticipated. The dominant air quality impacts and amenity issues as a consequence of the identified construction aspects are:

- Dust deposition (soiling of surfaces) and visible dust plumes;
- Temporary elevation of Particulate Matter (PM10) concentrations due to dust-generating activities;
- Exhaust emissions from diesel-powered construction equipment;

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- Odours/gases released during:
 - Excavations of organic or contaminated materials;
 - Excavations of contaminated materials at St Peter's Interchange;
 - Excavations at St Peter's Interchange (release of landfill gas);
 - Material handling and stockpiles;
 - Groundwater treatment;
 - Sealing works; and
- Asbestos fibres during asbestos removal and/or excavations at St Peter's Interchange.
- Potential adverse health effects including eye / nose / throat irritation;
- Potential impacts on sensitive receivers; and
- Potential impacts on water quality and vegetation.

The amount of dust that could be generated is proportional to the area of land that is being worked and is fully exposed. When planning activities and developing Site Environment Plans for each phase of work mitigation measures identified in Table 11 will be selected that provide the most suitable controls relative to the duration and nature of the work that will expose soil. By adopting this strategy of selecting the controls most suited to each activity the potential for significant risks to human health, nuisance or the environment will be limited.



6. Mitigation and Management Actions

Measures to manage air quality impacts are to be implemented prior to and during works. Elimination of the hazard is the first preference of control, followed by engineering, then administrative controls. Controls used on this Project are identified in Table 11. These controls include the relevant CoA associated with the Planning Approval and the REMMs identified in the SPIR.

Table 11: Project controls associated with management of air quality

Reference	Control / Action	Timing	Responsibility	Source
Planning				
AQ1	Regular communication with other high risk construction ancillary facilities within 500 metres of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	Pre-construction Construction	EM, PM	REMM AQ42 REMM CI02
AQ2	Plan site layout so that machinery and dust causing activities are located away from receivers, as far as is possible.	Design Construction	EM, PM	REMM AQ05
AQ3	Ensure air quality risks are considered as part of the development of Construction Area Plans.	Construction	PE	Good practice
AQ4	Ensure Work Packs include relevant environmental control information including a Site Environment Plan where required.	Construction	PE	Good practice
Incidents				
AQ5	All incidents which cause or are likely to cause material harm to the environment are to be immediately reported to NSW EPA and other authorities as per the Pollution Incident Response Management Plan.	Construction	EM, EA, SS	POEO Act
AQ6	Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the site supervisor's daily diary.	Construction	SS	REMM AQ46

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Reference	Control / Action	Timing	Responsibility	Source
Community				
AQ7	Display the name and contact details of person(s) accountable for air quality and dust issues at the boundaries of each construction area. This may be the environment manager/engineer or the site manager. Display the head or regional office contact information.	Pre-construction Construction	CRM, PM	REMM AQ04
AQ8	Record all dust and air quality complaints in accordance with the Construction Complaints Management System, which is to include identification of cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken; and make the complaints available to the Secretary of DP&E upon request.	Construction	CRM, PM	REMM AQ44 REMM AQ45
Dust - general				
AQ9	Weather warnings of wind speeds above 25 km/hr to be reported to the Site Supervisor and Construction Teams.	Construction	EA	Good practice
AQ10	Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase the generation/emission of dust.	Construction	SS	Good practice
AQ11	Control measures including water carts, mechanical sweepers, sprinklers, sprays, dust screens or the application of geo-binding agents will be utilised where applicable to control dust emissions. The frequency of use will be modified to accommodate prevailing conditions.	Construction	SS	REMM AQ06
AQ12	Reprogramming of dust generating activities is to occur during periods when control of dust cannot be achieved to reduce nuisance to neighbouring properties.	Construction	PM	Good practice
AQ13	Solid hoardings or temporary screening will be erected around all construction compounds or dust generating works.	Construction	PM, SS	REMM AQ06
AQ14	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover as soon as practicable.	Construction	PE, SS	REMM AQ08
AQ15	In preference to potable water source and where available and practicable, and of appropriate chemical and biological quality, stormwater, recycled water, groundwater inflow into tunnels, treated water from temporary construction water treatment plants or other non-potable water sources shall be used for construction activities, including concrete mixing and for effective	Construction	PM, PE, EM	CoA D3 EPL O4.7



Reference	Control / Action	Timing	Responsibility	Source
	dust/particulate matter.			REMM AQ12
AQ16	Emergency spill kits would be kept onsite and Project personnel would be aware of the location of spill kits and trained in their use. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using appropriate cleaning methods.	Construction	PM, PE, SS	REMM AQ15
AQ17	Avoid scabbling (roughening of concrete surfaces) if possible. If not possible, minimise scabbling.	Construction	PM, PE	REMM AQ16
AQ18	Avoid dry sweeping of large areas.	Construction	SS	REMM AQ22
AQ19	The application of pesticides will be modified, reduced or controlled during high or unfavourable wind conditions where wind can carry pesticides outside of the defined treatment area.	Construction	SS	Good practice
Dust - demolition				
AQ20	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Pre-construction	PE, SS	REMM AQ35
AQ21	Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground and may be more useful for covering larger areas.	Pre-construction	PE, SS	REMM AQ36
AQ22	Where reasonable and feasible minimise explosive blasting where possible during demolition, using appropriate manual or mechanical alternatives.	Pre-construction	PE	REMM AQ37
AQ23	Bag and remove any biological debris or other hazardous materials such as asbestos, damp down such material before demolition.	Pre-construction	PE, SS	REMM AQ38

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Reference	Control / Action	Timing	Responsibility	Source
Dust – earthworks and stockpiling				
AQ24	Stockpiles would be located outside overland flow paths, and where left exposed and undisturbed for longer than 28 days, would be finished and contoured to minimise loss of material in flood or rainfall events. Materials which require stockpiling for longer than 28 days would be stabilised by compaction, covering with anchored fabrics, or seeded with sterile grass where appropriate.	Construction	PE, SS, EA	CoA D67 REMM AQ17
AQ25	Where a stockpile, e.g. sand or fine aggregate, has the potential to generate dust, control measures would be implemented. These would include wetting the stockpile, covering the stockpile or contouring the stockpile.	Construction	PE, SS	CoA D67 REMM AQ18
AQ26	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Rehabilitation, seeding or grassing should occur as soon as they become available.	Construction	PE, SS, EA	CoA D67 REMM AQ39
AQ27	Use hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	Construction	PE, SS	CoA D67 REMM AQ40
AQ28	Where possible, only remove any cover for exposed areas in small areas during work and not all at once.	Construction	PE, SS	CoA D67 REMM AQ41
Dust – plant and equipment				
AQ29	Where practicable, only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Construction	PE, SS	REMM AQ11
AQ30	Where possible, use enclosed chutes and conveyors and covered skips.	Construction	PE, SS	REMM AQ13
AQ31	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Construction	PE, SS	REMM AQ14

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Reference	Control / Action	Timing	Responsibility	Source
Dust – transport and deliveries				
AQ32	Impose and signpost a maximum-speed-limit of 20 km/h on surfaced and unsurfaced haul roads and in work areas.	Construction	PM, PE	CoA D67 REMM AQ09
AQ33	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Construction	PE, EA	CoA D67 REMM AQ19
AQ34	For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	Construction	PE, SS	CoA D67 REMM AQ20
AQ35	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site..	Construction	PE, SS	CoA D67 REMM AQ21
AQ36	Ensure heavy vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Construction	PE, SS	CoA D67 REMM AQ23
AQ37	Where reasonable and feasible, haul roads will be maintained with water carts and graders, and the condition of the roads will be monitored.	Construction	PE, SS	CoA D67 REMM AQ26
AQ38	Stabilised access, rumble grids, wash bays or similar as practicable shall be established for site entries and exits to minimise mud on public roads. Sweepers shall be used periodically to clean public roads as necessary.	Construction	PE, SS	CoA D67 REMM AQ27
AQ39	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. Access gates to be located at least 10 m from receptors where possible.	Construction	PE, SS	CoA D67 REMM AQ28 REMM AQ29



Reference	Control / Action	Timing	Responsibility	Source
Emissions				
AQ40	Ensure all construction vehicles comply with their relevant emission standards.	Construction	PE, SS	REMM AQ30
AQ41	Ensure that, where practicable engine idling is minimised when vehicles are stationary.	Construction	SS	REMM AQ31
AQ42	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Construction	PE, SS	REMM AQ32
AQ43	Promote and encourage sustainable travel (public transport, cycling, walking, and car-sharing).	Construction	EM, PM	REMM AQ33
AQ44	No bonfires and burning of any materials including waste.	Construction	SS	REMM AQ34
Odour				
AQ45	Public notifications for asphalt sealing works would be undertaken in accordance with the Community Communications Strategy.	Construction	PM	Good practice
AQ46	In the event of uncovering waste with a noxious odour, or detection of nuisance odours (nuisance to workers or confirmed beyond landfill boundaries), stop work and investigate (this does not apply to landfill closure works at Alexandria landfill – refer to Construction Landfill Closure Sub-Plan for mitigation measures).	Construction	PE, SS	Good practice

CRM Community Relations Manager; DM – Design Manager; EA – Environmental Advisor; EM – Environmental Manager; PE – Project Engineer; PM – Project Manager; SS – Site Supervisor

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7. Monitoring

Inspections, observations, and monitoring requirements relevant to the management of air quality are identified in Table 12.

Table 12: Monitoring requirements relevant to management of air quality

Item	Frequency	Description	Records	Responsibility
Inspections				
Site inspection	Daily	No visible dust emissions from site Minimise gaseous emissions Awareness of impending weather	Mobile phone photos as relevant	Environmental Advisor
Site inspection	Daily	All dust controls are being implemented and are working effectively. No mud tracking off-site; check main exit/entry points and material on public roads.	Mobile phone photos as relevant	Environmental Advisor Site Supervisor
Site inspection	Weekly	No visible dust emissions. No continuous visible vehicle/plant/equipment emissions for longer than 10 seconds (POEO (Clean Air) Regulation 2010). No detectable odours and gases (e.g. inspections of freshly disturbed areas, open stockpiles, water treatment plants, waste skips).	Environmental Inspection Checklist	Environmental Advisor
Site inspection	Weekly	Haul road integrity to be maintained.	Site Supervisor's Daily Diary	Site Supervisor
Plant / equipment inspections including maintenance and emissions	Regularly and prior to use	Mechanical maintenance standards (e.g. Original Equipment Manufacturer's (OEM) manuals) POEO Act No continuous visible vehicle/plant/equipment emissions for longer than 10 seconds (POEO (Clean Air) Regulation 2010).	Plant and vehicle inspection logs	Site Supervisor
Observations by Management	Monthly	Compliance with the requirements of this Plan.	Management Inspection Checklist	Project Manager

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Item	Frequency	Description	Records	Responsibility
Visual surveillance	Daily and during activities with high potential to create dust and during prolonged dry or windy conditions'	No visible dust emissions.	Site Supervisor's Daily Diary	Site Supervisor
Monitoring				
Odour & gas monitoring - SPI	Daily / Weekly	Daily survey for offensive odour & gas decreased to once per week if no offensive odour for 7 days. Daily perimeter odour survey if the independent odour survey is undertaken on a weekly basis	Daily Daily	Independent consultant Environmental Advisor / Trained site staff
Prevailing wind conditions and weather forecast from Bureau of Meteorology to be reviewed	Daily	Extreme weather Winds >25 km/hr Rain >20mm per day	Weather records including notifications of trigger events/warnings	Environmental Advisor
Rainfall monitoring	Daily	In accordance with the EPL No. 20772	Monitoring results	Environmental Advisor
Rainfall, wind speed, wind direction at 10 metres, temperature at 10 metres	Daily at Alexandria Landfill throughout construction phase	In accordance with the EPL No. 4627	Monitoring results	Environmental Advisor
Dust deposition monitoring	Quarterly dust deposition monitoring at Alexandria Landfill throughout construction phase	In accordance with the EPL No. 4627	Monitoring results	Environmental and Sustainability Manager

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8. Reporting

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub-plan, the CoA, REMMs and any other relevant approval or licence. Audit requirements are described in Section 8.3 of the CEMP. Project reporting requirements relevant to the management of air quality are identified in [Table 13](#).

Table 13: Reporting Requirements

Item	Frequency	Standards	External Reporting	Responsibility
Incidents and exceedances	As required	As required by the: EPLs; Pollution Incident Response Management Plan (PIRMP); Infrastructure Approval RMS Environmental Incident Classification and Reporting procedure; and RMS Environmental incident report.	Appropriate authority	Environmental and Sustainability Manager or delegate
Complaints	As notified	Community Communication Strategy Construction Complaints Management System Infrastructure Approval Quarterly Compliance Report	As requested by the Secretary of DP&E EPA.	Environmental and Sustainability Manager or delegate
Odour - SPI	As required	EPL 4627 – Condition M4.6	EPA, Dept of Health, DPE	Environmental and Sustainability Manager or delegate

For incident management and emergency management process refer to Element 9 Incident Management, Element 10 Emergency planning and response of the CEMP.



9. Review and Improvement

Refer to the continuous improvement requirements including corrective actions in Section 3.3 and Element 12 of the CEMP.

This includes the following actions:

- Environmental performance trends are identified and corrective actions are implemented as required;
- A monthly environmental report is produced and distributed;
- Regular management reviews are conducted to determine the effectiveness of the CEMP.
- Audits are undertaken to ensure compliance with the requirements of the CEMP; and
- Compliance Tracking.

Appendix A – Glossary of Terms

Term / abbreviation	Definition
BoM	Australian Government Bureau of Meteorology
CAQSP	Construction Air Quality Sub-plan
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997</i>
CoA	Minister's Conditions of Approval (obtained 20 th April 2016)
Construction Area	A separable portion of work that is identified early in construction planning to help drive early definition of construction methodology and alignment of design activities. Work Areas should be listed in the overall construction methodology. The planning document for a work area is called a Construction Area Plan.
Construction Area Plan (CAP)	The main document prepared during the construction planning for that work area. Includes construction methodology, risk assessment, constructability reviews and Work Pack listing.
CSWQSP	Construction Soil and Water Quality Sub-plan
D&C	Design and Construction
Deed	As appropriate to the defined scope of the WestConnex New M5 Main Works D&C Deed.
DP&E	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EMM	Environmental management measures (proposed in the Environmental Impact Statement)
EMS	Environmental Management System
Environmental aspect	Element of an organisation's activities, products or services that can interact with the environment
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ER	Environmental Representative
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statement – a component of the environmental management system that addresses environmental management issues relevant to a specific site and/or activity.



Term / abbreviation	Definition
IC	Independent Certifier
Infrastructure Approval	Approval under the Environmental Planning & Assessment Act 1979 for SSI 6788 signed by the Minister for Planning on 20 April 2016
CDS-JV	CPB Contractors Dragados Samsung Joint Venture (Contractor)
OEH	Office of Environment and Heritage
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
PIRMP	Project's Pollution Incident Response Management Plan required by Part 5.7 of the <i>Protection of the Environment Operations Act 1997</i>
Project	WestConnex New M5 Project
Project Company	WCX M5 AT
Project requirements	The project requirements include all CoA (as part of Infrastructure Approval), REMMs, SWTC and EPL.
REMM	Revised Environmental Management Measure (from the SPIR)
RMS, Roads and Maritime	Roads and Maritime Services
SAP	Sensitive Area Plan – consolidation of environmental and socially sensitive areas, sites or places shown on a series of map-based sheets that extend the length of the site, used to assist with the planning and management of Work Under the deed.
SMC	Sydney Motorway Corporation (formerly WestConnex Delivery Authority – WDA)
SPIR	Submissions [and Preferred Infrastructure] Report
SWTC	As appropriate to the defined scope of the Scope of Works & Technical Criteria defined under the New M5 Main Works D&C Deed.
WCX	WestConnex
WDA	WestConnex Delivery Authority, now Sydney Motorway Corporation (SMC)
Work Pack	Assembly of documents that contain relevant information for the field delivery team to undertake a specific package of works. Inputs include safety, environment, design, temporary works, Project control, approvals/permits and community notices.
Work Procedure	A document that provides a detailed step-by-step description for how work activities will be carried out. May document Risks & Controls associated with each step.