



Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades Construction Environmental Management Plan

Sydney Metro Integrated Management System (IMS)

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00	13 November 2020	For External Consultation
01	18 January 2021	Revised in response to ER and internal comments
02	23 February 2021	Revised in response to DPIE comments
04	30 March 2021	Integrate Downer EMS

Terms and Definitions

Terms	Definitions
AARD	Archaeological Assessment and Research Design report
AS	Australian Standard
ASS	Acid Sulfate Soils
BC Act	Biodiversity Conservation Act 2016 (NSW)
CCS	Community Communication Strategy
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CNVIS	Construction Noise and Vibration Impact Statement
CoA	Conditions of Approval
CoCB	City of Canterbury-Bankstown Council
CSR	Combined Services Route
CSSI	Critical State Significant Infrastructure
CTMP	Construction Traffic Management Plan
CTR	Compliance Tracking Review
Cwth	Commonwealth
dB	Decibels
DECC	NSW Department of Environment and Climate Change
DPI	NSW Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
EAP	Environmental Audit Program
ECM	Environmental Control Map
EESG	NSW Environment, Energy and Science Group (formerly OEH)
EIN	Environmental Improvement Notice
EIS	Environmental Impact Statement
EP&A Act	Environment Planning and Assessment Act 1979 (NSW)
EPA	NSW Environment Protection Authority
EPBC Act	Environment Protection and Conservation Act 1999 (Cwth)
EPL	Environment Protection Licence under the POEO Act
EMS	Environmental Management System
EMP	Environmental Management Plan
EPO	Environmental Performance Outcome
ER	Environmental Representative
ESCP	Erosion and sediment control plan
EWMS	Environmental Works Method Statement
E&SMS	Environment and Sustainability Management System
FFMP	Flora and Fauna Management Plan
GREP	Government Resource Efficiency Policy

Terms	Definitions
HMP	Heritage Management Plan
ICNG	Interim Construction Noise Guideline
IMS	Sydney Metro Integrated Management System
ISO	International Standardization Organisation
IWC	Inner West Council
KPI	Key Performance Indicator
LV	Low Voltage
Minister, the	The Minister of New South Wales (NSW) Planning
NML	Noise Management Level
NSW	New South Wales
NVMP	Noise and Vibration Management Plan
OCCS	Overarching Community Communication Strategy
OEH	NSW Office of Environment and Heritage (formerly DECC)
OOHW	Out-of-Hour Works
PASS	Potential Acid Sulfate Soils
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
Proponent	The person or organisation identified as the proponent in Schedule 1 of the planning approval. In this case Sydney Metro Authority
QMP	Quality Management Plan
RBL	Rating Background Level
REMM	Revised Environmental Mitigation Measure
RMS	NSW Roads and Maritime Services
ROL	Road Occupancy Licence
SCO	Sydney Coordination Office
Planning Secretary	The Secretary of the Department of Planning, Industry and Environment
SDG	TfNSW Sustainable Design Guidelines (Version 4)
SM	Sydney Metro
SMP	Sustainability Management Plan
SMSP6	Sydney Metro Stations Package 6
SPIR	Submissions and Preferred Infrastructure Report
SSI	State Significant Infrastructure
SWM	Southwest Metro
SWMP	Soil and Water Management Plan
SWMS	Safe Works Method Statement
TfNSW	Transport for New South Wales
UCM	Utilities Coordination Manager
VAMP	Visual Amenity Management Plan
WFDIP	Workforce Development and Industry Participation Plan

Construction Environmental Management Plan Compliance matrix

The Conditions of Approval (CoA) relevant to this Construction Environmental Management Plan (CEMP) are listed in Table 1. In accordance with CoA C1, the relevant requirements of the Sydney Metro City and Southwest Construction Environmental Management Framework (CEMF) have also been included in Table 1. This table also provides a cross reference to demonstrate where the relevant requirement is addressed in this CEMP, or other management documents.

Table 1 CEMP CoA compliance matrix

Condition Reference	Condition Requirements	Document Reference															
Conditions of Approval SSI-8256																	
C1	A Construction Environmental Management Plan (CEMP) must be prepared in accordance with the Construction Environmental Management Framework (CEMF) included in the documents listed in Condition A1 to detail how the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1 will be implemented and achieved during Construction.	This document fulfils the requirements of C1. The Compliance Matrix in Appendix A tracks these requirements.															
C2	The CEMP must be endorsed by the ER and then submitted to the Planning Secretary for approval no later than one (1) month before the commencement of Construction.	Section 1.2															
C3	<p>The 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:</p> <table border="1"> <thead> <tr> <th>ID</th><th>Consultation required for CEMP Sub-plans</th><th>Relevant Government Agencies to be consulted for CEMP Sub-plans</th></tr> </thead> <tbody> <tr> <td>a)</td><td>Noise and Vibration</td><td>Relevant Council(s)</td></tr> <tr> <td>b)</td><td>Soil and Water</td><td>Relevant council(s), DoI, OEH</td></tr> <tr> <td>c)</td><td>Waste and Spoil</td><td>Relevant council(s)</td></tr> <tr> <td>d)</td><td>Heritage</td><td>Heritage Council (or its delegate) and relevant council(s)</td></tr> </tbody> </table>	ID	Consultation required for CEMP Sub-plans	Relevant Government Agencies to be consulted for CEMP Sub-plans	a)	Noise and Vibration	Relevant Council(s)	b)	Soil and Water	Relevant council(s), DoI, OEH	c)	Waste and Spoil	Relevant council(s)	d)	Heritage	Heritage Council (or its delegate) and relevant council(s)	<p>Refer to relevant Sub-plans.</p> <p>Note: in accordance with the Sydney Metro City & Southwest - Sydenham to Bankstown Staging Report a Waste and Spoil Sub-plan is not required. As such, consultation in accordance with C3(c) is not required.</p> <p>Waste and Spoil is addressed within a procedure, refer to Appendix E.</p>
ID	Consultation required for CEMP Sub-plans	Relevant Government Agencies to be consulted for CEMP Sub-plans															
a)	Noise and Vibration	Relevant Council(s)															
b)	Soil and Water	Relevant council(s), DoI, OEH															
c)	Waste and Spoil	Relevant council(s)															
d)	Heritage	Heritage Council (or its delegate) and relevant council(s)															
C4	The CEMP Sub-plans must be prepared in accordance with the CEMF .	Refer to the Project's Noise and Vibration Management Plan, Soil and Water Management Plan and Heritage Management Plan.															
C5	Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-Plan	Refer to the Project's Noise and Vibration Management Plan, Soil and Water Management Plan and Heritage Management Plan.															
C6	Any of the CEMP Sub-plans may be submitted along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before Construction.	Section 1.2															

Condition Reference	Condition Requirements	Document Reference									
C7	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary. The CEMP and CEMP Sub-plans , as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of Construction. Where Construction of the CSSI is staged, Construction of a stage must not commence until the CEMP and CEMP Sub-plans for that stage have been approved by the Planning Secretary	Section 1.2									
C8	<p>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of Construction of the CSSI against the predicted performance.</p> <table border="1"> <thead> <tr> <th>ID</th><th>Consultation required for Construction Monitoring Programs</th><th>Relevant Government Agencies to be consulted for Construction Monitoring Programs</th></tr> </thead> <tbody> <tr> <td>a)</td><td>Noise and Vibration</td><td>Relevant Council(s)</td></tr> <tr> <td>b)</td><td>Water Quality</td><td>Relevant council(s)</td></tr> </tbody> </table>	ID	Consultation required for Construction Monitoring Programs	Relevant Government Agencies to be consulted for Construction Monitoring Programs	a)	Noise and Vibration	Relevant Council(s)	b)	Water Quality	Relevant council(s)	Refer to the Project's Noise and Vibration Management Plan and Soil and Water Management Plan.
ID	Consultation required for Construction Monitoring Programs	Relevant Government Agencies to be consulted for Construction Monitoring Programs									
a)	Noise and Vibration	Relevant Council(s)									
b)	Water Quality	Relevant council(s)									
C9	<p>Each Construction Monitoring Program must provide:</p> <ul style="list-style-type: none"> a) details of baseline data available; b) details of baseline data to be obtained and when; c) details of all monitoring of the project to be undertaken; d) the parameters of the project to be monitored; e) the frequency of monitoring to be undertaken; f) the location of monitoring; g) the reporting of monitoring results; h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and i) any consultation to be undertaken in relation to the monitoring programs. 	Refer to the Projects' Noise and Vibration Management Plan and Soil and Water Management Plan.									
C10	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C8 of this approval and must include reasonable information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.	Refer to the Project's Noise and Vibration Management Plan and Soil and Water Management Plan.									
C11	The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one (1) month before the commencement of Construction.	Refer to the Project's Noise and Vibration Management Plan and Soil and Water Management Plan.									
C12	Construction must not commence until the Planning Secretary has approved all of the required Construction Monitoring Programs.	Refer to the Project's Noise and Vibration Management Plan and Soil and Water Management Plan.									
C13	The Construction Monitoring Programs, as approved by the Planning Secretary including any minor amendments approved by the ER must be implemented for the duration of Construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	Refer to the Project's Noise and Vibration Management Plan and Soil and Water Management Plan.									
C14	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring	Refer to the Project's Noise and Vibration Management									

Condition Reference	Condition Requirements	Document Reference
	Report at the frequency identified in the relevant Construction Monitoring Program.	Plan and Soil and Water Management Plan.
C15	Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	Refer to the Project's Noise and Vibration Management Plan and Soil and Water Management Plan.

Table 2 CEMP CEMF compliance matrix

Clause	Requirement	Document Reference
Construction Environmental Management Framework		
3.3 (a)	Principal Contractors are required to prepare and implement a Construction Environmental Management Plan (CEMP) relevant to the scale and nature of their scope of works. The CEMP shall comprise of a main CEMP document, issue specific Sub-plans, activity specific procedures and site based control maps. The CEMP shall illustrate the relationship between other plans required by the contract, in particular those that relate to design management.	This Plan
3.3 (b)	Depending on the scope and scale of the works, TfNSW may decide to streamline the CEMP and Sub-plan requirements. For example, depending on the risk associated with particular environmental issues it may be appropriate to remove the need for a sub plan, or replace with a procedure as part of the CEMP.	Section 1.2 Refer to the Sydenham to Bankstown Staging Report
3.3 (c)	The CEMP will cover the requirements of the relevant planning approval documentation, the conditions of all other permits and licences, the Principal Contractor's corporate EMS, the environmental provisions of the contract documentation and this Construction Environmental Management Framework.	Section 2 This Plan
3.3 (d)	As a minimum the CEMP will:	
(i)	Include a contract specific environmental policy;	Section 1.3 and Appendix D
(ii)	Include a description of activities to be undertaken during Construction;	Section 1.1
(iii)	For each plan under the CEMP include a matrix of the relevant Conditions of Approval or Consent referencing where each requirement is addressed;	Refer to relevant Sub-plan
(iv)	For each plan under the CEMP, set objectives and targets, and identify measurable key performance indicators in relation to these;	Section 1.4 and relevant Sub-plans
(v)	For each role that has environmental accountabilities or responsibilities, including key personnel, provide a tabulated description of the authority and roles of key personnel, lines of responsibility and communication, minimum skill level requirements and their interface with overall project organisation structure;	Section 3.3
(vi)	Assign the responsibility for the implementation of the CEMP to the Environment Manager, who will have appropriate experience. The Principal Contractor's Project Director will be accountable for the implementation of the CEMP;	Section 3.3

Clause	Requirement	Document Reference
(vii)	Identify communication requirements, including liaison with stakeholders and the community;	Overarching Sydney Metro Community Communication Strategy
(viii)	Include induction and training requirements and a summary of the Training Needs Analysis required in Section 3.9(b)	Section 3.5
(ix)	Management strategies for environmental compliance and review of the performance of environmental controls;	Sections 3.10, 3.16 and 3.17
(x)	Processes and methodologies for surveillance and monitoring, auditing and review, and reporting on environmental performance including environmental compliance tracking;	Section 3.9
(xi)	Include procedures for emergency and incident management, non-compliance management, and corrective and preventative action; and	Section 3.8 and 3.10
(xii)	Include procedures for the control of environmental records.	Section 3.15
3.3 (e)	The CEMP and associated Sub-plans will be reviewed by TfNSW and/or an independent environmental representative (see Section 3.11) prior to any Construction works commencing. Depending on the Conditions of Approval, the CEMP and certain Sub-plans may also require the approval of the Department of Planning and Environment (DPIE).	Section 1.2
3.3 (f)	Where a corresponding systems document exists within the Sydney Metro Integrated Management System, the Principal Contractor's procedures will be required to be consistent with any requirements in those documents.	This plan and supporting documents have been written to meet the Sydney Metro project requirements.

Please refer to Appendix A for all other CoA, REMM and CEMF requirements relevant to the development of this Plan.

1. Introduction

Sydney Metro is Australia's biggest public transport project. The network will deliver 31 metro stations and more than 65km of new metro rail. The Sydney Metro Network will provide opportunities to lead the transformation of Sydney's urban environment and support transit orientated development connecting Sydney's Central Business District to vibrant and attractive places across the Greater Sydney Region. The Sydney Metro Network will link Sydney's three Metropolitan centres and introduce the necessary step change in rail infrastructure to ensure, the NSW Government's aim of 30-minute cities as defined in Future Transport Strategy 2056.

The Sydney Metro Network has currently two core corridors, the Northwest Corridor and City and Southwest Corridor, with a further six corridors proposed as shown in Figure 1.

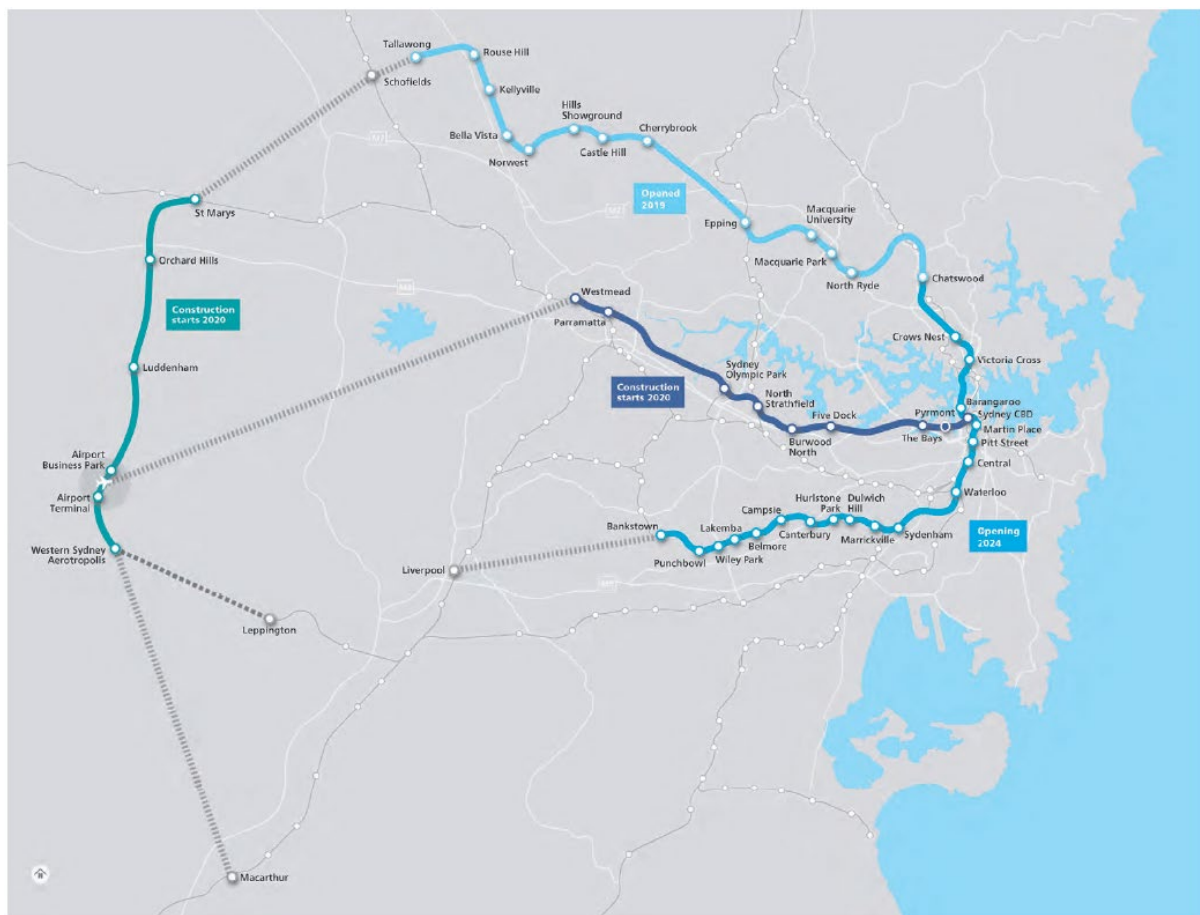


Figure 1 Sydney Metro route map

The Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of the Metro North West Line at Chatswood, under Sydney Harbour, through new Central Business District stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney.

Sydney Metro City & Southwest comprises two core components – the Chatswood to Sydenham project, and the Sydenham to Bankstown upgrade. This document refers to the Sydenham to Bankstown upgrade (herein referred to as the Southwest Metro (SWM) Project).

The SWM Project was declared to be State Significant Infrastructure (SSI) and Critical State Significant Infrastructure (CSSI) by a Ministerial order on 10 December 2015 under Section 5.12 (4) and 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (previously referred to as sections 115U(4) and 115V prior to amendment of the EP&A Act). An Environmental Impact Statement (EIS) (GHD/AECOM September 2017) was prepared and placed on public exhibition from 13 September 2017 to 8 November 2017. A Submissions and Preferred Infrastructure Report (SPIR) (GHD/AECOM June 2018) was prepared in response to the submissions received during the EIS exhibition period. The SPIR was placed on public exhibition from 20 June 2018 to 18 July 2018. A Submissions Report was then prepared by Sydney Metro (September 2018) in response to submissions received during the SPIR exhibition period. The project was approved by the Minister for Planning on 12 December 2018 (Planning Approval number SSI-8256).

A modification report for the SWM Project was prepared by Sydney Metro (May 2020) and placed on public exhibition from 21 May 2020 to 4 June 2020. A Submissions Report was prepared by Sydney Metro (September 2020) in response to the submissions received during the modification report exhibition period. The SWM Project Modification was determined by the Minister for Planning on 22 October 2020.

1.1. Scope of works

This document refers to the Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades (the Project). Below is a description of the Construction scope for the Project:

Dulwich Hill Station

- Construction of new covered station concourse bridge from Bedford Crescent and Light Rail entry to Ewart Lane with connection to platforms;
- Refurbishment and reuse of overhead booking office;
- Refurbishment and reuse existing platform building;
- Provision of new safety rail to Wardell Road bridge adjacent to booking office;
- Construction of new landscaped public plaza incorporating lighting, seating and access to station entries;
- Construction of new platform building;
- Construction of new shared path linking Wardell Road and Ewart Lane;
- Construction of new stairs to Ewart Lane car park;
- Provision of accessible access to the pedestrian crossing at Wardell Road;
- Provision of new bicycle parking hoops;
- Construction of new service building and associated infrastructure;
- Platform works, including raising platform and provision of platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line;
- Platform works also includes provision for platform edge screens (PES), platform screen doors (PSD) and mechanical gap fillers (MGF) (to be installed by others);
- Provision of new pedestrian lighting between Bedford Crescent and Keith Lane;
- Provision of new shelter and seat for kiss and ride on Bedford Crescent;
- Landscaping to the south of the station;

- Dudley Street bus interchange area works;
- Provision of new vertical protection screens to both sides of existing Wardell Road bridge;
- Provision of 2 new lifts and associated infrastructure, landings and canopies to lift entries;
- Installation of new security and segregation fencing;
- Construction of new Combined Services Route (CSR); and
- Services relocations / enabling works.

Campsie Station

- Refurbishment and reuse of heritage platform buildings;
- Construction of secured bike locker;
- Construction of new canopy over the concourse;
- Platform works, including raising platform and provision of platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line;
- Platform works also includes provision for PES, PSD and MGF (to be installed by others);
- Replace open fencing on Beamish Street and renew existing planters;
- Installation of 16 x bike racks off North Parade in existing car park;
- Construction of new services building and associated infrastructure;
- Replacement of planter beds to corners of Beamish Street;
- Construction of new kiss and ride on South Parade;
- Installation of new security and segregation fencing;
- Construction of new CSR; and
- Services relocations / enabling works.

Punchbowl Station

- Repurpose and refurbishment of station rooms in Platform buildings 1 and 2;
- Provision of three new lifts and associated infrastructure, landings and canopies to lift entries and platform;
- Installation of new canopy over existing stair at Northern entry;
- Installation of new roof above the concourse bridge, Southern entry and platform stairs;
- Removal of hooped top fencing to station concourse overbridge and platform stairs and replaced with compliant glass screens and stair balustrades;
- Installation of new handrails;
- Removal of existing southern stairs, installation of new concrete slab at concourse level and new stairs further south;

- Platform works, including raising platform and provide platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line. Provision of egress ramps off platform as required by fire life safety strategy;
- Platform works also includes provision for PES, PSD and MGF to be installed by others;
- Installation of new bike parking hoops off The Boulevarde and adjacent to the Northern entry;
- Installation of bollards to the edge of the carpark and extension to new paving to lift landing and edge of carpark;
- Landscaping to western end of Southern entry behind the retail properties;
- Mass planting to existing garden beds adjacent to Northern entry and replace timber logs;
- Upgrade to existing pedestrian pathway under Punchbowl Road, including handrail and fencing;
- Upgrade to existing lighting;
- Paint finish to wall and soffit and provision for CCTV;
- Landscaping and new lighting to Northern entry;
- Provision for pop-up retail in the park adjacent the Northern entry;
- Provision of kiss and ride on The Boulevarde;
- Construction of new service building, associated infrastructure and landscaping;
- Installation of new security fencing;
- Construction of retaining walls;
- Construction of new CSR; and
- Services relocations / enabling works.

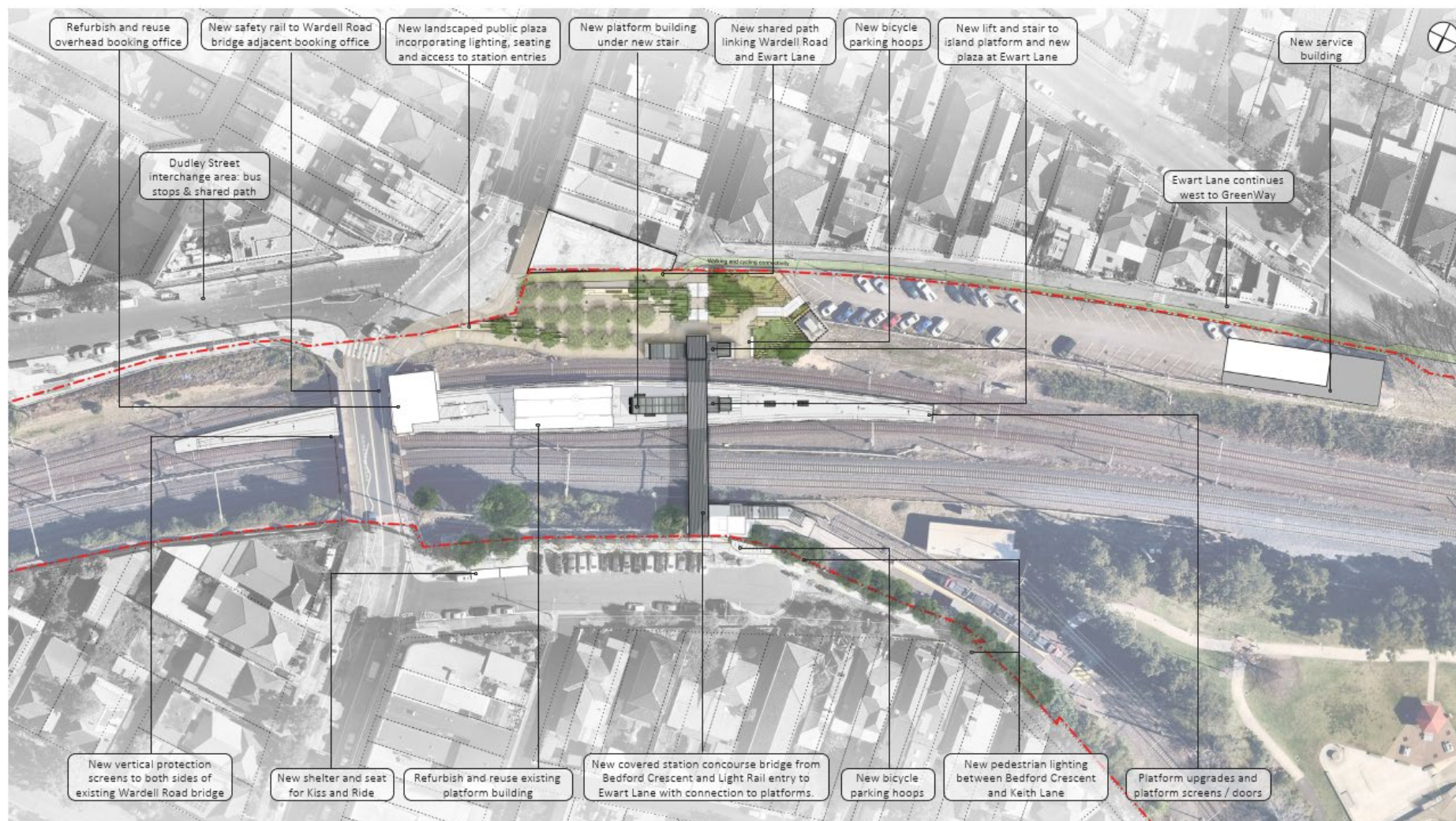


Figure 2 Sydney Metro Dulwich Hill Station upgrades

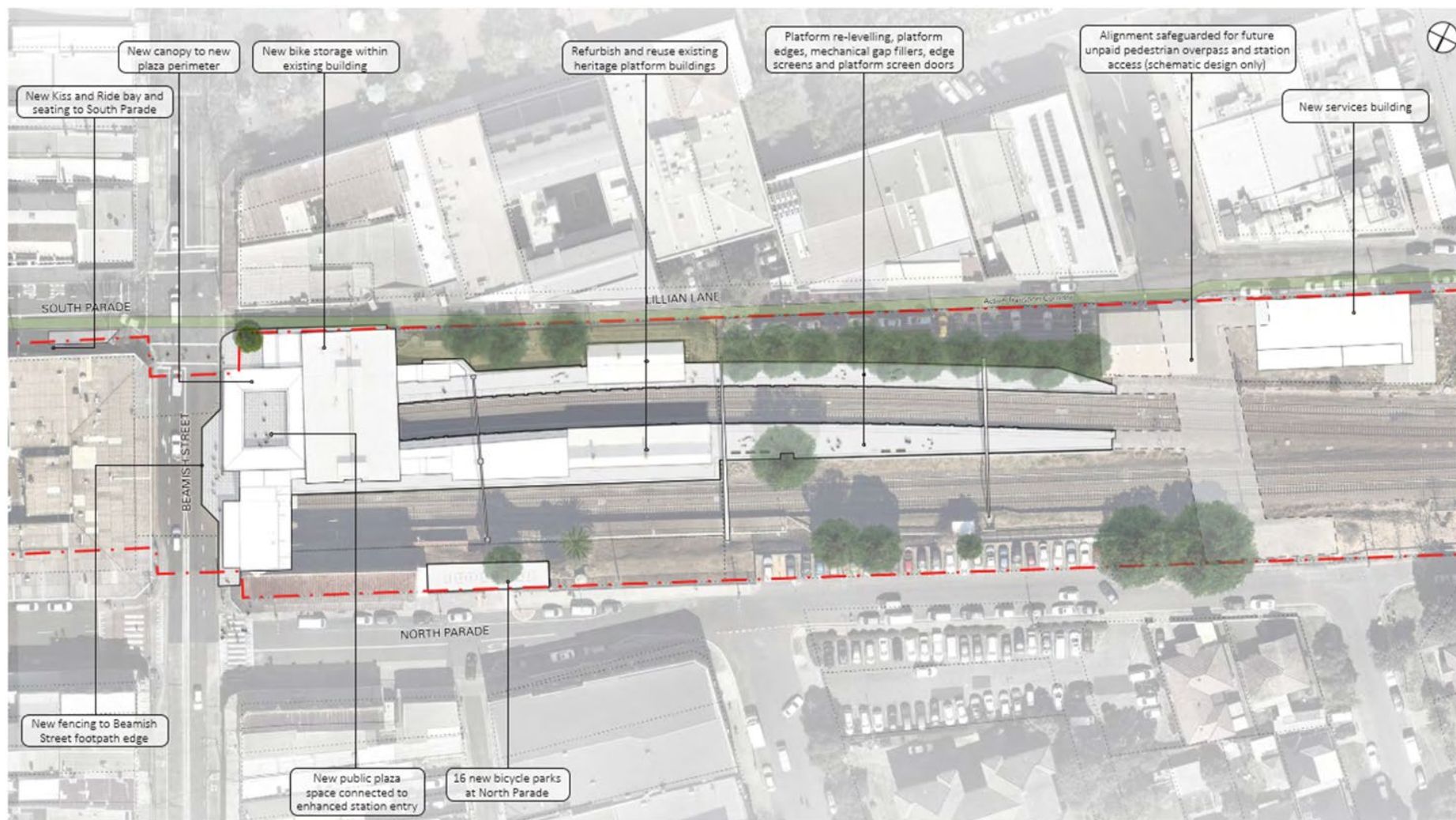


Figure 3 Sydney Metro Campsie Station upgrades

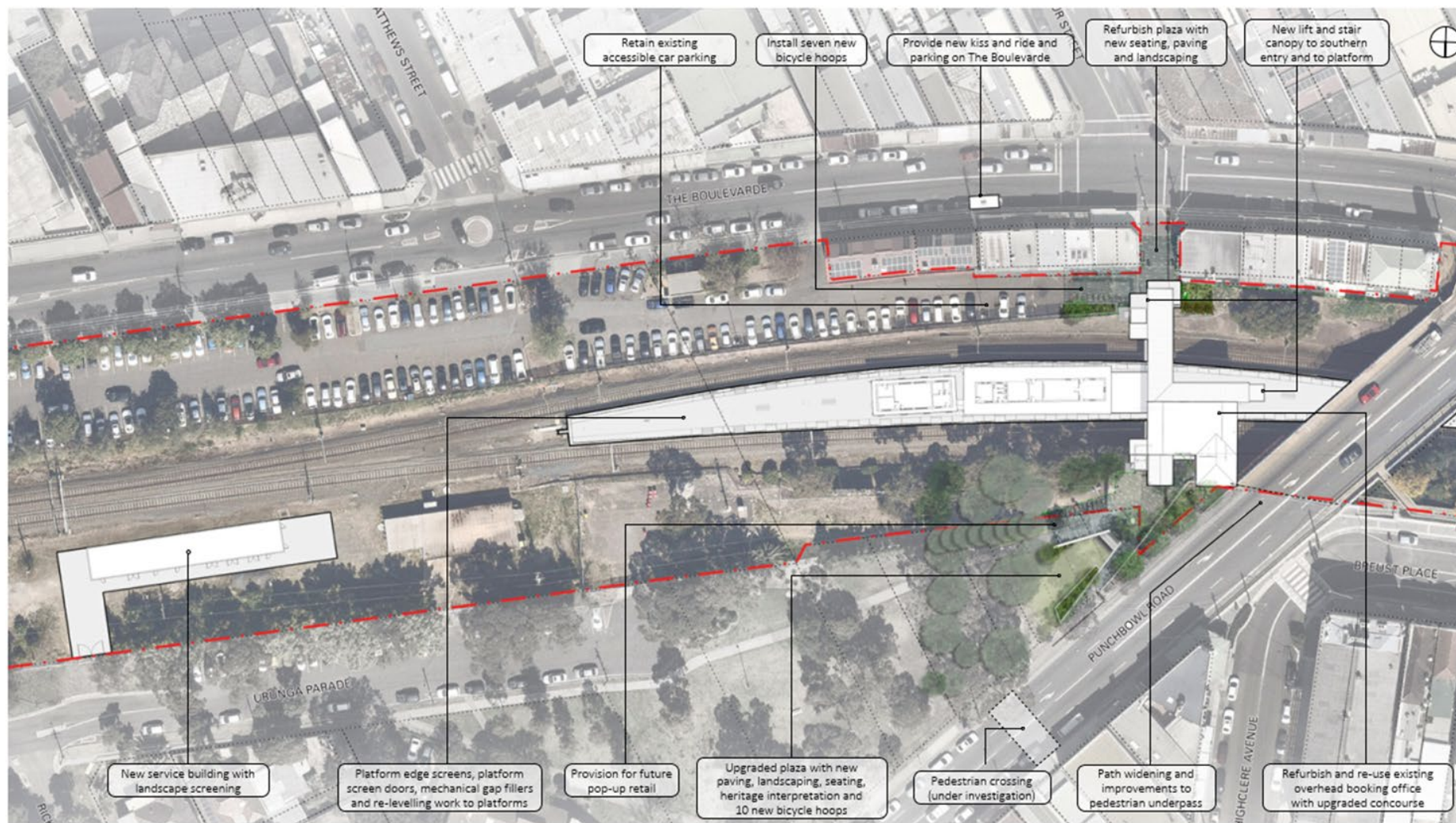


Figure 4 Sydney Metro Punchbowl Station upgrades

Temporary Construction facilities to facilitate Construction of the Project would be located at the locations outlined in Table 3. Refer to Figure 2.1 within Appendix B of the SPIR for indicative layouts of these facilities. Figure 2.4 within Appendix B of the SPIR also provides further detail of work site W7.

Table 3 Temporary Construction facilities

SPIR reference	Location	Existing use
C2	Ewart Lane, Dulwich Hill	Rail corridor, parking
W3	Bedford Crescent, Dulwich Hill	Rail corridor and Council car park
W7	Close Street, Canterbury	Former Canterbury Bowling and Community Club
C7	North Parade/Wilfred Avenue, Campsie	Rail corridor, road reserve with parking
C8	Lilian Street, Campsie	Rail corridor, parking
C18	Urunga Parade Punchbowl	Rail corridor
C19	Urunga Parade, Punchbowl	Rail corridor, road reserve
C20	The Boulevard, Punchbowl	Parking and corridor
C21	Breust Place, Punchbowl	Rail corridor

When establishing a construction facility, Downer will consider the requirements of the CEMF, CoA and REMM in developing the layout of the site. Including, but not limited to:

- The location of noise intensive works and 24 hour activities in relation to noise sensitive receivers;
- The location of site access and egress points in relation to noise and light sensitive receivers, especially for sites proposed to be utilised 24 hours per day;
- The use of site buildings to shield noisy activities from receivers;
- The use of noise barriers and / or acoustic sheds where feasible and reasonable for sites proposed to be regularly used outside of daytime hours; and
- Aim to minimise the requirement for reversing, especially of heavy vehicles.

1.2. Purpose of this CEMP

This Construction Environmental Management Plan (CEMP) outlines how Downer will meet the environmental outcomes for the design and Construction of the Project. This will be achieved through the development and application of Downer contract-specific Environmental Management System (EMS) and this Plan. Sydney Metro is delivering the Project on behalf of the NSW Government.

In accordance with the Sydney Metro City & Southwest - Sydenham to Bankstown Staging Report, the Principal Contractor will implement the environmental management requirements of the CEMF in line with the DCP column in Table 5 of the Staging Report.

Figure 5 outlines the applicability of the CEMF to the Project (and is extracted from Table 5 of the Staging Report).

CEMF Environmental Management Category	DCP
Waste / Spoil / Recycling *	CEMP-P
Groundwater	CEMP
Traffic	CoA E47 CTMP
Noise & Vibration	CEMP sub-plan
Heritage	CEMP sub-plan
Flora & Fauna / Biodiversity	CEMP-P
Visual Amenity	CEMP sub-plan
Carbon & Energy	SMP
Materials	SMP sub-plan
Soil & Water	CEMP sub-plan
Air Quality	CEMP-P
Workforce Development	WFDIP Plan

CEMP-P: CEMP procedure

CTMP: Construction Traffic Management Plan (standalone document)

SMP: Sustainability Management Plan (standalone document)

WFDIP: Workforce Development and Industry Participation Plan (standalone document)

Figure 5 CEMF Applicability to the Project

The following CEMP sub plan, which will be prepared separately to this document, will form part of the CEMP but is not required to be submitted to DPIE:

- Visual Amenity Management Plan (as referred to under Section 3.4 of the CEMF).

The following stand-alone plan will also be prepared and submitted to DPIE for information and to TfNSW for information following engagement with the Sydney Coordination Office (SCO) (as per CoA E47):

- Construction Traffic Management Plan (as referred to in CoA E47 and Section 3.4 of the CEMF).

The following plans are Sub-plans to the Sustainability Management Plan. Refer to the Sustainability Management Plan for further details.

- Carbon and Energy Management Plan; and
- Materials Management Plan.

Management of the following aspects during Construction have been incorporated into the CEMP as procedures (refer to Appendix E for CEMP procedures):

- Biodiversity;
- Groundwater;
- Air Quality; and
- Waste and Spoil.

The CEMP has been developed in accordance with the:

- Framework of AS/NZS ISO 14001:2015 EMS;
- New South Wales Environmental Management Systems Guidelines (Edition 3); and
- Sydney Metro's Construction Environmental Management Framework v3.

Implementation of the CEMP will:

- Identify the environmental obligations and the hazards and risks associated with the works (indicative risks are included in Appendix C);
- Help prevent unauthorised environmental harm;
- Ensure the Principal Contractor complies with the Minister for Planning's Project Planning Approval SSI-8256;
- Ensure the Principal Contractor obtains and complies with relevant licences and approvals, including an Environment Protection Licence (EPL) if required;
- Comply with all relevant environmental legislation;
- Minimise negative impacts on the community that relate to the environmental impacts of the works; and
- Identify and implement feasible opportunities to reduce the environmental impact of the works that are beyond contractual and compliance requirements.

In accordance with CoA C2 and C6 this CEMP will be endorsed by the Environmental Representative (ER) before being submitted to the Planning Secretary of the DPIE along with, or prior to, the submission of the Sub-plans no later than one (1) month before commencement of Construction.

In accordance with CoA C7, Construction will not commence until the CEMP and relevant Sub-plans listed in CoA C3 of the Project Planning Approval have been approved by the Planning Secretary of DPIE.

For Downer this document defines the environmental management principles, processes, procedures, systems, tools, and templates implemented for use throughout the duration of the project. This document is subordinate to the Project Management Plan (PMP) which has been developed to:

- satisfy the requirements of the contract; and
- support the project team in completing the requirements of the project.

This document is subordinate to the Project Management Plan (PMP) and it has been developed to:

- i. Comply with the Conditions of Approval, conditions of any licenses, permits or other approvals issued by government authorities for the Project, all relevant legislation and regulations, and accepted best practice management.
- ii. Comply with Minister's (NSW Government, Department of Planning and Environment, Infrastructure Approval) Conditions of Approval (CoA) relating to Section 5.19 of the Environmental Planning & Assessment Act 1979, the Sydney Metro Sydenham to Bankstown Updgate project State Significant Infrastructure 8256, 12 December 2018.
- iii. Comply with Exhibit A Scope of Works and Technical Criteria – Southwest Metro Station Upgrade Works Package 6 (main body) 1.0.
- iv. Comply with Exhibit A Scope of Works and Technical Criteria – Appendix F03 Environment and Appendix F08 Sustainability.
- v. Comply with Annexure 1 and Annexure 2 to Exhibit A - Scope of Works and Technical Criteria – Appendix F03 Environment.
- vi. Comply with the relevant requirements of the NSW Government's *Guideline for Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and Natural Resources, 2004).
- vii. Include the Downer Environmental Sustainability Policy 2019.
- viii. Comply with Downers Environmental Management System as certified under ISO14001:2015 – certificate no. 47714001610020 (Appendix D).
- ix. Address all relevant obligations under TfNSW Sustainable Design Guidelines v.4.0.
- x. Provides specific management measures to ensure that construction works have minimal environmental impact and risk, and where possible, enhanced environmental outcomes.
- xi. Support the project team in completing the requirements of the project.

1.2.1 Document Scope (Alignment to Downer ISO 14001:2015)

The scope of this document applies to Downer Transport Projects, specifically the Southwest Metro Station Upgrade Works Package 6 hereafter referred to as SMSP6.

This document applies to all aspects of environmental management for the project.

The target audiences for this document are all Downer workers, Dower sub-contractors and any other relevant stakeholders. The document has been produced in a first instance to comply with Downer's Environmental Management System as certified under ISO14001:2015 and looks to ensure the correct environmental controls, mitigation measures, auditing and assurances are upheld throughout the project. As a minimum, Downer's Environmental Management System implemented on this project looks to ensure:

- appointment of an environment lead or environment team, who is responsible for the EMS and for ensuring organisational commitment;
- establishment / implementation of the environmental policy for the organisation;
- identification of significant environmental aspects (activities) and impacts;
- identification of relevant legislative and regulatory requirements;

- identification of environmental priorities and establishment of environmental objectives and targets;
- development and implementation of an environment management program (this includes assigning responsibilities for undertaking actions);
- establishment of a monitoring, review and reporting program to review effectiveness of the program, to report to management on implementation and to undertake any corrective action; and
- ensuring that the EMS is based on the premise of continued improvement.

1.2.2 Referenced Documents

IMS DOCUMENTS

USE FOR PROJECT? If
No, see project specific documents.

POLICIES

SM ES-ST-209	Sydney Metro Environment Sustainability Policy	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-PO200	Downer Environmental Sustainability Policy	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

PRINCIPLES

DG-ZH-PN002	10 Environmental Principles	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
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STANDARDS

DG-QA-ST007	Records Management Standard	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-ST-202	Environment Compliance Management Standard	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-HR-ST013	Training & Competency Management Standard	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
DG-ZH-ST002	Legislative and Other Requirements Standard	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
DG-ZH-ST013	Zero Harm Worker Consultation Standard	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
DA-ZH-PR028	Zero Harm Risk Management	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

PROCEDURES

DG-ZH-PR006	Incident Management Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-DM-PR003	Operational Change Management Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-QA-PR003	Internal Audits Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-PR077.1	Sustainability Data Collection and Reporting Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR002	Legal and Other Requirements	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR003	Training and Competency Management	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-PR006	Incident Reporting and Investigation	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-PR116.1	Inspections Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR007	ZH Project Planning and Performance Reporting	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR013	Communication and Consultation	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

DA-ZH-PR015	Emergency Preparedness and Response	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR022	Visitor and Contractor Management	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR028	Zero Harm Risk Management	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR031	Zero Harm Change Management	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR077	Greenhouse Gas & Energy Reporting	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-PR116	Zero Harm Inspections and Observations	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DI-RM-PR003	Project Risk and Opportunity Management	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-PW-310	Out of Hours Works Assessment Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-PW-303	Environmental Incident Classification and Reporting Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-PW-309	Water Discharge and Reuse Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-PW-314	Planning Approval Consistency Procedure	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM PS-PW-330	Crisis Management Implementation Plan	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM-18-00105232	Sydney Metro City & Southwest TfNSW Unexpected Finds Procedure v1.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

FORMS

DG-ZH-FM006.1	Preliminary Internal Incident Notification	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-FM006.2	Witness Statement Record	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-FM006.3	Incident Report	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-FM006.4	5 Whys Analysis	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DG-ZH-FM006.5	ICAM Interview Record	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-FM002.3	Environmental Legal Obligations Register	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
DA-ZH-FM007.2	Environmental Data Collection Record	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
9TP-FT-439	Air Emission Data Collection Workbook	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-FT-421	Sydney Metro City & Southwest Environmental Reporting Template	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SME ES-FT-439	Sydney Metro City & Southwest Sustainability Reporting Template	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-FT-403	Environmental Incident and Non-Compliance Report Form	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
SM ES-FT-406	Environmental Inspection Information & Summary	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

REGISTERS

DA-QA-RG001	Downer Group Definitions Register	<input checked="" type="checkbox"/> Yes
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OTHER

SS 2017–24	Sydney Metro City & Southwest Sustainability Strategy	<input checked="" type="checkbox"/> Yes
SM ES-ST-210	City and Southwest Construction Noise and Vibration Strategy	<input checked="" type="checkbox"/> Yes
CERT	TfNSW Carbon Estimation and Reporting Tool	<input checked="" type="checkbox"/> Yes

SM ES- ST-214 Principal's General Specifications G10 - Traffic and Transport Management ☒ Yes

PROJECT SPECIFIC DOCUMENTS

DG-ZH-FM116.2	Environmental Inspection Checklist
Minor Works Applications (Feb'21 & Mar'21)	Site Establishment Early Works & Ancillary Facilities Management Sub Plan
This Document	Construction Environment Management Plan
Within CEMP Annex E	Flora and Fauna Management Plan (Biodiversity)
Within CEMP Annex E	Groundwater Management Plan
Within CEMP Annex E	Air Quality Management Plan
Within CEMP Annex E	Waste and Spoil Management
TBA	Soil and Water Management Plan
TBA	Heritage Management Plan
TBA	Noise and Vibration Management Plan
TBA	Sustainability Management Plan
TBA	Workplace Relations Management Plan
TBA	Workforce Development and Industry Participation Plan
TBA	Project Health and Safety Management Plan
TBA	Traffic and Transport Management Plan
TBA	Carbon and Energy Management Plan
TBA	Materials Management Plan
TBA	Project Management Plan
TBA	Technical Management Plan
TBA	Risk Management Plan
TBA	Testing and Commissioning Plan
TBA	Quality Plan
TBA	Construction and Site Management Plan
TBA	Community Communications Strategy (Management Plan)
TBA	Advertising Provisioning Plan
TBA	Obsolescence Management Plan
TBA	Procurement Plan
TBA	Cost Management Plan
TBA	Systems Integration Plan
TBA	Demolition Management Plan
TBA	COVID-19 Management Plan

1.3. Environment and sustainability policy statement

Sydney Metro's Environment and Sustainability Policy is included in Appendix D. The policy reflects a commitment in the delivery of the project to:

- Align with, and support, Transport for NSW (TfNSW) Environment & Sustainability Policy;
- Optimise sustainability outcomes, transport service quality, and cost effectiveness;
- Develop effective and appropriate responses to the challenges of climate change, carbon management, resource and waste management, land use integration, customer and community expectation, and heritage and biodiversity conservation;
- Be environmentally responsible, by avoiding pollution, enhancing the natural environment and reducing the project ecological footprint, while complying with all applicable environmental laws, regulations and statutory obligations; and
- Be socially responsible by delivering a workforce legacy which benefits individuals, communities, the project and industry, and is achieved through collaboration and partnerships.

The Principal Contractor engaged for the Sydney Metro Package 5 (Dulwich Hill, Campsie and Punchbowl) Project is Downer and, this CEMP has been revised to contain and reflect Downer's contract specific environmental policy, in accordance with Section 3.3(d)(i) of the CEMF.

Downer's Environmental Sustainability Policy (DG-ZH-PO200) reflects the following commitments in the delivery of project:

- minimise the short and long-term impact of our activities on the environment and local communities through responsible environmentally sustainable management within design, planning, delivery, construction, manufacturing and operation;
- promote a positive culture through implementing initiatives that foster sustainable innovation;
- optimise our products and services to relentlessly improve our environmental sustainability performance and improve the sustainable use of natural resources;
- comply with relevant environmental legislation, appropriate industry guidelines and standards, customers and regulatory agency requirements;
- implement responsible resilient work practices that minimise the impact on local communities;
- implement and maintain an environmental management system consistent with international standard AS/NZS ISO 14001 which integrates requirements throughout the overarching operational systems;
- establish, monitor and review environmental sustainability objectives and targets and identify opportunities to improve our environmental sustainability;
- evaluate the performance, effectiveness and compliance of our environmental management systems through regular audits and reviews;
- implement effective controls to identify, evaluate, eliminate or reduce adverse environmental risks from our work activities;
- take all practical steps to prevent pollution and protect biodiversity and ecosystems;

- drive innovation to identify sustainable supply chains; reduce and manage energy, waste, and water consumption; reduce and manage air emissions effluents; and climate change mitigation and adaptation;
- procure goods and services to minimise environmental risk and maximise sustainable;
- opportunities and benefits for the total life cycle;
- regularly report our environmental sustainability performance and consult with stakeholders;
- provide education, training and encouragement to our workforce, and business partners to understand their responsibilities for the implementation of environmental sustainability principles and practices; and
- display this policy, making it publicly available and sharing it with interested parties.

1.3.1. Sydney Metro Environment and Sustainability Statement of Commitment

The Sydney Metro Environment and Sustainability Statement of Commitment is included in Appendix D and has six guiding principles which reflect the key sustainability principles for the project, namely to:

- demonstrate leadership – deliver a world class metro that is environmentally and socially conscious, share's knowledge and demonstrate innovation in sustainability;
- tackle climate change – integrate a comprehensive climate change response, and drive excellence in low carbon solutions;
- manage resources efficiently – achieve whole-of-life value through efficient use and management of resources;
- drive supply chain best practice – collaborate with key stakeholders to drive a lasting legacy in workforce development, industry participation and sustainable procurement;
- value community and customers – respond to community and customer needs, promote heritage, liveable places and wellbeing for current and future generations; and
- respect the environment – minimise impacts and take opportunities to provide environmental improvements.

1.4. Objectives and targets

The key objective of this Plan is to set in place a management approach for the Project which addresses all relevant environmental and planning requirements. Key environmental performance outcomes, commitments and mitigation measures for the Project have been sourced from the project's EIS and the CEMF and are summarised in Table 4.

Additional environmental targets for the works are:

- Compliance with the Minister for Planning's Project Planning Approval SSI-8256;

- Compliance with all permits and licences; and
- Continual improvement through collaboration with Sydney Metro, regulatory agencies and other key stakeholders.

In consideration of [DG-ZH-PO200 Environmental Sustainability Policy](#), the customer's contractual requirements, and any identified hazards and/ or risks for the project, Downer has developed a standard set of objectives and targets that are applicable to all projects, as per the following table. These objectives and targets are managed to ensure that all identified, as well as potential environmental impacts that could reasonably be expected to occur during the works, fall within acceptable and agreed limits. This is achieved through pro-active environmental management planning prior to carrying out particular elements of work.

SMSP5 Project specific requirements are listed below in Table 4.

Table 4 Objectives and targets

Objective	Target	Management measure
Biodiversity The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity. Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of project Construction and operation.	The project is designed to minimise impacts on biodiversity. Where practicable, the design minimises the need to clear vegetation. Potential impacts on biodiversity are managed in accordance with relevant legislation, including the EP&A Act, <i>Biodiversity Conservation Act 2016</i> (BC Act) and <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). The biodiversity outcome is consistent with the Framework for Biodiversity Assessment (OEH, 2014a).	Compliance Monitoring and Reporting Program
Flooding and hydrology The project minimises adverse impacts on existing flooding characteristics. Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure. Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised. The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved). Sustainable use of water resources.	Construction is undertaken in a manner that minimises the potential for adverse flooding impacts, through staging of works and the implementation of mitigation measures. Construction compounds and work sites are laid out such that flows are not significantly impeded. The project maintains or reduces flood levels within and adjacent to the rail corridor. The project avoids long term impacts to surface water. Opportunities to reuse water resources are considered during the design process. The use of water during Construction is minimised.	Management of soil and surface water will be undertaken throughout the delivery of the Project in accordance with the SWMP.
Heritage The design, Construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places. The design, Construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage and Aboriginal objects and places.	The design is sympathetic to the historic significance of existing stations and the heritage significance of surrounding listed heritage items, and where practicable, avoids and minimises impacts to heritage. The design and mitigation strategies are reviewed by the Sydney Metro Design Review Panel. Impacts on heritage are managed in accordance with relevant legislation, including the EP&A Act, the Heritage Act 1977, and relevant guidelines. The potential impacts identified are mitigated by the mitigation measures provided.	Management of heritage will be undertaken throughout delivery of the project in accordance with the HMP.
Noise and vibration – amenity Construction noise and vibration (including airborne noise, groundborne noise and	The project will minimise impacts to the local community by:	Management of noise and vibration impacts will be undertaken

Objective	Target	Management measure
<p>blasting) are effectively managed to minimise adverse impacts on acoustic amenity.</p> <p>Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and well-being of the community.</p>	<p>controlling noise and vibration at the source</p> <p>controlling noise and vibration on the source to receiver transmission path</p> <p>controlling noise and vibration at the receiver</p> <p>implementing practicable and reasonable measures to minimise the noise and vibration impacts of Construction activities on local sensitive receivers.</p>	<p>throughout delivery of the project in accordance with the NVMP.</p>
<p>Noise and vibration – structural</p> <p>Construction noise and vibration (including airborne noise, groundborne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings, items including Aboriginal places and environmental heritage, and nearby road infrastructure.</p> <p>Increases in noise emissions and vibration affecting environmental heritage as defined in the Heritage Act 1977 during operation of the project are effectively managed.</p>	<p>The project minimises impacts to structures by:</p> <p>controlling vibration at the source</p> <p>controlling vibration on the source to receiver transmission path</p> <p>implementing practicable and reasonable measures to minimise vibration impacts of Construction activities on structures.</p>	<p>Management of noise and vibration impacts will be undertaken throughout delivery of the project in accordance with the NVMP.</p>
<p>Socioeconomic, land use and property</p> <p>The project minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities.</p> <p>The project minimises impacts to property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.</p>	<p>The project minimises impacts to the local community, community infrastructure, and businesses.</p> <p>Impacts to existing land use and properties are minimised.</p> <p>The project is appropriately integrated with adjoining land uses, and access to private properties is maintained.</p>	<p>Management will be undertaken in accordance with the REMMs and CoA's.</p>
<p>Soils</p> <p>The environmental values of land, including soils, subsoils and landforms, are protected.</p> <p>Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.</p>	<p>Site-specific soil characteristics are taken into consideration during detailed design and Construction.</p> <p>Any contamination is managed in accordance with relevant regulatory requirements.</p> <p>Any soil waste is assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (EPA, 2014).</p>	<p>Management of soil and surface water will be undertaken throughout the delivery of the Project in accordance with the SWMP.</p>
<p>Sustainability</p> <p>The project reduces the NSW Government's operating costs and ensures the effective and efficient use of resources.</p> <p>Conservation of natural resources is maximised.</p>	<p>Sustainability considerations are integrated throughout design, Construction, and operation.</p> <p>The project would be carried out in accordance with the Sydney Metro City & Southwest Sustainability Policy.</p>	<p>Refer to Sydney Metro Sustainability Management Plan and Principal Contractor's Sustainability Management Plan.</p>
<p>Traffic, transport and access</p>	<p>Impacts to traffic and transport are minimised.</p>	<p>Management will be undertaken in</p>

Objective	Target	Management measure
<p>Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts.</p> <p>The safety of transport system customers is maintained.</p> <p>Impacts on network capacity and the level of service are effectively managed.</p> <p>Works are compatible with existing infrastructure and future transport corridors.</p>	<p>Motorist, pedestrian and cyclist safety will be maintained or improved.</p> <p>Safe access to properties is maintained.</p>	<p>accordance with the CTMP, REMMs and CoA's.</p>
<p>Place making and urban design</p> <p>The project capitalises on opportunities to improve place, character and quality of the surrounding build and natural environment (including adjoining public spaces).</p> <p>The project contributes to the accessibility and connectivity of communities.</p>	<p>The project is designed to have regard to the surrounding landscape and visual environment and to minimise the potential for visual impacts.</p> <p>The project is visually integrated with its surroundings.</p> <p>The stations provide a sense of place, and contribute positively to the surrounding urban environment.</p> <p>The design takes into account future planning for the Sydenham to Bankstown Corridor Urban Renewal Strategy.</p> <p>Vegetation providing screening to the rail corridor is retained where practicable.</p>	<p>Management will be undertaken in accordance with the REMMs and CoA's.</p>
<p>Water – quality</p> <p>The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable).</p>	<p>Impacts to water quality during Construction and operation are minimised.</p> <p>Erosion and sediment controls during Construction are implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008a).</p> <p>The project would protect or contribute to achieving the Water Quality Objectives, during Construction and operation.</p> <p>Construction water quality discharge would comply with the requirements of the Water Quality Monitoring Program.</p>	<p>Management of soil and surface water will be undertaken throughout the delivery of the Project in accordance with the SWMP.</p>
<p>Utilities</p> <p>The project is designed, constructed and operated to minimise impacts to utilities and provision of such to the public.</p>	<p>Impacts to utilities during Construction are minimised. The design takes into account the input of utility providers and owners.</p>	<p>Management will be undertaken in accordance with the REMMs and CoA's as well as the Utilities Management Strategy.</p>

2. Legal and approval requirements

2.1. Environmental planning approval process background

As discussed in Section 1, in September 2017 an EIS for the SWM Project was placed on public exhibition for a period of 56 days (eight weeks). A SPIR for the SWM Project was prepared and placed on public exhibition in June 2018 for a period of 28 days (four weeks). A Submissions Report for the SWM project was prepared and publicly released in September 2018. The SWM Project was approved on 12 December 2018 (SSI 8256). A Project Modification was prepared in May 2020 and the Project Modification MOD-1 was approved on 22 October 2020.

Under Section 5.23 of the EP&A Act the following authorisations are not required for approved State Significant Infrastructure (SSI) (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply):

- A permit under section 201, 205 or 219 of the *Fisheries Management Act 1994*;
- An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*;
- An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*;
- A bush fire safety authority under section 100B of the *Rural Fires Act 1997*; and
- A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*.

In addition, Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of approved SSI and the following directions, orders or notices cannot be made or given so as to prevent or interfere with the carrying out of approved critical SSI:

- An interim protection order (within the meaning of the *National Parks and Wildlife Act 1974*);
- An order under Division 1 (Stop work orders) of Part 6A of the *National Parks and Wildlife Act 1974*, or Division 7 (Stop work orders) of Part 7A of the *Fisheries Management Act 1994*;
- A remediation direction under Division 3 (Remediation directions) of Part 6A of the *National Parks and Wildlife Act 1974*;
- an order or direction under Part 11 (Regulatory compliance mechanisms) of the *Biodiversity Conservation Act 2016*;
- An environment protection notice under Chapter 4 of the *Protection of the Environment Operations Act 1997*; and
- An order under section 124 of the *Local Government Act 1993*.

The abovementioned potential aspects and impacts are deemed to be addressed under the Project Planning Approval.

2.2. Approval and licencing requirements

Downer is aware of the importance of complying with all applicable environmental measures, and where practicable, exceeds the minimum legislative and regulatory requirements.

Downer's obligations include conditions of regulatory approvals as well as the generally applicable Environmental Acts and their subsidiary legislation. Downer and the project team monitor changes to environmental legislation through monthly updates on environmental law changes provided by EnviroLaw, and ensure compliance is maintained throughout the project's lifecycle.

The key legislative and approval requirements for the works are outlined in Table 5. Further detail is provided in Appendix B.

Table 5 Approval / licence requirements

Regulatory authority	Approval / licence required for this Project
Department of Planning, Industry and Environment (DPIE)	Project Planning Approval granted under Division 5.2 of the <i>EP&A Act</i> (no. SSI-8256) Approval of reports, studies and plans as required by the Project Planning Approval.
Commonwealth Department of Environment	The <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas. Under the EPBC Act, matters of national environmental significance include world and national heritage properties and listed biodiversity impacts. The EIS concludes that the Project would not have a significant impact in relation to these matters. As such the Project is not a Controlled Action and does not require assessment and approval under the EPBC Act.
TfNSW and other road authorities	In accordance with the <i>Roads Act 1993</i> , the Principal Contractor will obtain the consent of the appropriate roads authority to erect a structure, carry out work in, on or over a public road, or dig up or disturb the surface of a public road. If the applicant is a public authority, the roads authority must consult with the applicant before deciding whether or not to grant consent or concurrence. As required, road occupancy permits will be sought in accordance with the Construction Traffic Management Plans.
Sydney Water	In accordance with the <i>Sydney Water Act 1994</i> , the Principal Contractor will obtain prior approval to connect to the sewer, or discharging to sewer if required under a Trade Waste Agreement.

2.3. Relevant legislation

Legislation and other requirements relevant to the Project are outlined in Appendix B.

2.4. Additional environmental assessment

Changes to the project may require an assessment to determine consistency with the Project Approval and Environmental Documents. This assessment would be carried out in accordance with the Sydney Metro Planning Approval Consistency Assessment Procedure (SM ES-PW314).

The assessment will include:

- A description of the existing surrounding environment;
- Details of the ancillary works and Construction activities required to be carried out including the hours of works;

- An assessment of the environmental impacts of the works, including, but not necessarily limited to traffic, noise and vibration, air quality, soil and water, ecology and heritage;
- Details of mitigation measures and monitoring specific to the works that would be implemented to minimise environmental impacts; and
- Identification of the timing for completion of the Construction works, and how the sites would be reinstated (including any necessary rehabilitation).

Consistency Assessments would require approval from the Sydney Metro Director of Environment, Sustainability and Planning. Consistency Assessments would be made available on the Principal Contractor's website and provided to the ER for information.

2.5. Standards and codes

The project will be constructed in accordance with relevant standards and codes.

Access to the latest Australian standards is available through iGATE.

The environmental publications, standards, codes of practice and guidelines included in Table 6 are relevant to the Project and are referenced throughout this Plan. Other aspect specific guidelines are discussed in the relevant CEMP Sub-plans and other project management plans.

Table 6 Applicable standards and codes

Standard / Guideline	Relevant authority
ISO 14001 Environmental Management Systems – Requirements with Guidelines for use	International Organisation for Standardization
AS/ NZS 1940: 2017 – The Storage and Handling of Flammable and Combustible Liquids	Standards Australia
AS4282:1997 Control of the Obtrusive Effect of Outdoor Lighting	Standards Australia
AS 4326 The Storage and Handling of Oxidising Agents	Standards Australia
AS 3780 The Storage and Handling of Corrosive Substances (similar standards exist for other classes of dangerous goods).	Standards Australia
AS 2436 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites	Standards Australia
AS/NZS 3833 The Storage and Handling of Mixed Classes of Dangerous Goods, in Packages and Intermediate Bulk Containers	Standards Australia
BS 7385-2 Evaluation and Measurement for Vibration in Buildings. Guide to Damage Levels from Groundborne Vibration	British Standards
IECA 2008 Best Practice Erosion and Sediment Control	IECA
ANZECC 1992 Australian Water Quality Guidelines for Fresh and Marine Waters	ANZECC
Australian Dangerous Goods Code	National Transport Commission
Environment Protection Manual for Authorised Officers: Bunding and Spill Management technical bulletin (EPA, 1997)	NSW EPA

Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009)	NSW EPA
ISO 14001 Environmental Management Systems – Requirements with Guidelines for use	International Organisation for Standardization
Managing Urban Stormwater: Soil and Construction (Landcom, 2008)	Landcom
Waste Classification Guidelines (Department of Environment, Climate Change and Water, 2008)	NSW EPA

2.6. Environment Protection Licence

At this stage, Sydney Metro's Principal Contractor has not sought an Environment Protection Licence (EPL) from NSW EPA.

If Sydney Metro's Principal Contractor applies for an EPL for the Project, then this CEMP will be updated to incorporate the EPL's requirements.

For elements of the Project's scope, the Sydney Trains' EPL 12208 may apply. Refer to Appendix A of this Project's CEMP Sub-plans for relevant requirements from EPL 12208.

2.7. Project Environment and Sustainability Management System

At the time of drafting this CEMP by Sydney Metro, a Principal Contractor had not been engaged by Sydney Metro to carry out the Construction of this Project.

The Principal Contractor engaged for this Sydney Metro Package 5 (Dulwich Hill, Campsie and Punchbowl) Project is Downer and, therefore this CEMP is undergoing revision by Downer to integrate and outline the relationship between the CEMP and Downer's Environment and Sustainability Management System (E&SMS).

Project Management Framework

The Downer project management framework aligns and integrates the project functions which define the project's delivery methodologies and processes. The Project Management Plan (PMP), as a key element of the project management framework, is the integration document which identifies and details both the standard Downer project management practices, structure, and execution methods and any project specific requirements for the project.

The PMP incorporates a number of subordinate management plans which provide the specific functional detail required to successfully deliver the project. The relationship between the Downer IMS, the PMP and subordinate management plans is illustrated in the following figure.

Integrated Management System (IMS)

Project Management Plan (PMP)

Subordinate Management Plans

Figure 1: Project Management Plan Structure

The plans reference any IMS documents (including but not limited to, procedures, work instructions, and forms), customer specific requirements, and project specific documents required to execute the project.

The PMP provides project specific details including, but not limited to, the following:

- Project information, i.e. background, project location, and project description;
- Scope of work, i.e. scope of work narrative, basis of design, battery limits, and scope of services; and
- Project objectives and values, i.e. objectives, overarching principles, values, and key performance indicators (KPIs) for the project.

All positions in the project team have a clearly defined role and set of responsibilities that are included either in the PMP or relevant subordinate management plan. All members of the project team are made aware of and understand their responsibilities prior to commencing work on the project. Refer to Section 3.3 – *Resources, Responsibilities and Authority* for the roles and responsibilities for environmental management.

3. Environmental management plan

3.1. Preparation and availability of the CEMP

3.1.1. Preparation

Consistent with the requirements of CoA C1, this CEMP has been prepared in accordance with the approval documents and the Sydney Metro Construction Environmental Management Framework (CEMF).

The CEMP incorporates all relevant requirements of the EIS documentation, CoA, SPIR, Submissions Report, Modification Report as well as all relevant licences, permits and approvals for the Project including Sydney Metro's Environment and Sustainability Policy. The Sydney Metro and Downer Environment and Sustainability Policy has been attached to this CEMP (Appendix D).

For further detail regarding CEMP preparation refer to Section 1.2 of this CEMP. The CEMP will be submitted to the Planning Secretary prior to commencement of Construction as outlined in CoA C2.

3.1.2. Availability

This CEMP will be available to all personnel and subcontractors via Downer's Project document control management system. It is the responsibility of Downer to ensure all personnel and subcontractors have access to the Project's CEMP. An electronic version of the CEMP will be made available on the project website, in accordance with CoA B14.

Subject to confidentiality, all documents subject to CoA B14, including this CEMP will be made publicly available. In accordance with CoA B14, copies of the following documents will be published prior to works commencing and maintained on the Project website:

- a) Information on the current implementation status of the CSSI
- b) The telephone number, postal address and email address required under Condition B6
- c) A copy of the documents listed in Conditions A1 and A2 of the approval and any documentation relating to any modifications made to the CSSI or the terms of this approval
- d) A copy of the approval in its original form, a current consolidated copy of the approval (that is, including any approved modifications to its terms), and copies of any approval granted by the Minister to a modification of the terms of this approval
- e) A copy of an EPL required and obtained in relation to the CSSI
- f) A current copy of each document required under the terms of the approval, which must be published before the commencement of any relevant activity to which they relate or before their implementation, as the case may be
- g) A copy of the compliance reports required under Conditions A29 and A32 of the approval.

Where a CoA requires a document to be prepared prior to commencement of any work or Construction, a current copy of the relevant document will also be published on the Project website before the activity is undertaken.

Confidential information, which may include the location of threatened species, Aboriginal objects or places and personnel contact details, will be removed from all documents provided or made available to the public. The Project's Environment Policy will be displayed on the Project website, at the site office/s, and communicated to staff and other interested parties via inductions and ongoing awareness programs.

This document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by Downer's Quality Manager at the Project office. Copies of this CEMP will be distributed via the Project document management system to:

- Downer's Project Director;
- Downer's Construction Director;
- Downer's Environmental Manager;
- Downer's Public Liaison Manager;
- Sydney Metro; and
- The ER.

3.2. Planning

3.2.1. Compliance tracking

In accordance with CoA A29, a Compliance Monitoring and Reporting Program must be prepared in order to monitor compliance with the terms of the project approval. Compliance reporting on the project will be undertaken in accordance with the requirements of the *City and Southwest – Sydenham to Bankstown Compliance Monitoring and Reporting Program Report* (Sydney Metro, 2019).

It is the responsibility of Sydney Metro to undertake the Compliance Tracking Program in accordance with the *City and Southwest – Sydenham to Bankstown Compliance Monitoring and Reporting Program Report* with input from Downer as required. A compliance matrix has been established for the project, incorporating CoA, REMM, licence conditions, permits and other approvals relevant to the Project to track issues and ensure compliance issues are addressed and closed out. Refer to Section 3.9.4 for further detail regarding the implementation of compliance tracking and reporting during Construction, in accordance with the *City and Southwest – Sydenham to Bankstown Compliance Monitoring and Reporting Program Report*.

3.2.2. Environmental objectives and targets

Refer to Section 1.4.

3.2.3. Environmental Work Method Statement and Environmental Control Maps

Environmental Works Method Statements (EWMS) will be prepared for relevant Construction activities. Relevant Construction activities include those that pose a high risk to the environment, as determined by Downer. Downer will incorporate relevant mitigation measures and controls, including those from relevant management Sub-plans and key procedures to be used concurrently with the EWMS. EWMS will be specifically prepared to communicate requirements, actions, processes and controls to Construction personnel using plans, diagrams and simple written instructions.

EWMS will be prepared progressively prior to and throughout Construction, in consultation with the relevant site management personnel. This will ensure that all issues are addressed, methods and activities are practical and all personnel are aware of their commitments and responsibilities.

The EWMS will include at least the following elements:

- Description of the work activity, including any plant and equipment to be used;
- Outline of the sequence of tasks for the activity, including interfaces with other Construction activities;
- Identification of any environmental and/or socially sensitive areas, sites or places;
- Identification of potential environmental risks/impacts due to the work activity;
- Mitigation measures to reduce the identified environmental risk, including assigned responsibilities to site management personnel; and
- Process for assessing the performance of the implemented mitigation measures.

All Construction personnel and subcontractors undertaking a task governed by an EWMS must participate in training on the EWMS, and acknowledge that they have read and understood their obligations by signing an attendance record prior to commencing work.

Regular monitoring, inspections and auditing of compliance with the EWMS will be undertaken by project management and environmental personnel to ensure its effectiveness and that all controls are being followed and that any non-conformances are recorded and corrective actions implemented (refer to Section 3.10). Any improvements or changes identified in such reviews will be incorporated into subsequent revisions of the EWMS.

Environmental control maps (ECMs) are to be used in project inductions, work site set-up, as information in tender documents to subcontractors (where applicable) and in support of ancillary environmental approvals. ECMs will be prepared prior to Construction commencing.

The ECMs would be 'live' documents and updated to reflect the relevant works stage as works progress. The ECMs will be endorsed by Downer's Environment Manager (or delegate). The ECMs will be endorsed before being utilised.

The project ECMs shall include but not be limited to:

- Environmental procedures, environmental approvals, or licences that are applicable;
- The worksite layout and boundary, significant structures, entry/exit points and internal roads;
- Consideration of minimising light spillage to surrounding properties, in accordance with CoA E54;
- Location of environmentally sensitive areas and sensitive receivers;
- Environmental control measures;
- Endangered and Threatened Ecological Communities;
- Known cultural heritage sites;
- Known fauna habitat to be protected;
- Watercourses, wetlands and natural springs;

- Acid sulphate soils;
- Project boundaries and work locations;
- Environmental protection boundaries; and
- Designated “No-Go Zones”.

The ECMs would be in addition to any erosion and sediment control plans.

3.3. Resources, responsibilities and authority

Sydney Metro (the Proponent) has engaged Downer as the Principal Contractor to undertake the Dulwich Hill, Campsie and Punchbowl Station Upgrades Project. In accordance with the contract for the Project, Downer must perform certain roles and meet certain requirements under the Planning Approval. This includes consultation with key regulatory stakeholders, such as the NSW EPA, Natural Resources Access Regulator (NRAR) (formerly Department of Industry), Environment, Energy and Science Group (EESG) (formerly OEH), Heritage NSW (formerly OEH) and relevant Councils, where required. DPIE is the approval authority for a number of items required under the Planning Approval, including the CEMP and CEMP Sub-plans.

Sydney Metro have engaged, and received DPIE approval, for an Independent ER for the Project. The Independent ER will perform the duties described within Table 7 Roles and responsibilities as per the requirements of CoA A26. Sydney Metro have also engaged an Independent Certifier to assess and certify project compliance. The role includes certification against environmental compliance.

Key responsibilities are indicated in Table 7. Note that this is not an exhaustive list of all site personnel and responsibilities. References to other roles and activities may be referred to throughout the CEMP and Sub-plans. Reporting lines are shown in the Organisation Chart in Figure 6.

Table 7 Roles and responsibilities

Position	Key Responsibilities and Authorities
Project Director (Project Leader)	<ul style="list-style-type: none"> • Reports to senior management within the Principal Contractor's organisation • Ensure that internal audits of the system are conducted • Review audit corrective actions and take action as necessary to ensure timely close out of issues • Authorise expenditure on environmental issues within limits of authority • Resolve major issues which cannot be resolved by the Project Manager • Must complete corporate and project induction covering environmental responsibilities and the Principal Contractor's environmental management system. • Ensure that project responsibilities and authorities are defined and communicated • Provide adequate resources to meet environmental objectives • Approve and implement the CEMP • Ensure that the CEMP is effectively implemented and maintained • Appoint/nominate and provide support for the Environmental Manager • Report to senior management on the performance of the system and environmental breaches • Take action to resolve environmental non-conformances, non-compliances and incidents

	<ul style="list-style-type: none"> • Ensure suppliers and subcontractors comply with requirements • Report environmental incidents to the client / local authorities as required • Liaise directly with the Independent Environment Representative as required and where appropriate to facilitate any environmental management requirements, including those identified within the Planning Approvals.
Project Manager (Construction Manager)	<ul style="list-style-type: none"> • Reports to the Project Director • Support the Project Director in environmental matters as required • Oversight of environmental requirements for design and Construction • Must complete corporate and project induction covering environmental responsibilities and Principal Contractor's environmental management system. • Supervise all site Construction activities and personnel by ensuring that they meet environmental and other requirements • Organise and manage site plant, labour and temporary materials • Ensure that site environmental controls are properly maintained and provide support for the Environmental Manager • Report all environmental incidents • Take action to resolve non-conformances, non-compliances and incidents • Must complete corporate and project induction covering environmental responsibilities and Principal Contractor's environmental management system. • Provide information to the Independent Environment Representative as requested and where appropriate, via the Project Environmental Manager.
Procurement Personnel	<ul style="list-style-type: none"> • Reports to the Project Director • Carefully select suppliers and subcontractors based upon their ability to meet stated requirements • Ensure that purchase orders and agreements include environmental requirements as necessary • Where practical, select materials which are "environmentally friendly" • Must complete corporate and project induction covering environmental responsibilities and Principal Contractor's environmental management system. • Provide information to the Independent Environment Representative as requested and where appropriate, via the Project Environmental Manager.
Project Environmental Manager	<ul style="list-style-type: none"> • Reports to the Project Director • Ensure that the CEMP is effectively established, implemented and maintained at the project level • Ensure relevant licences, approvals and permits are obtained • Ensure compliance with all relevant statutes, regulations, rules, procedures, standards and policies • Carry out six monthly reviews of the CEMP and Sub-plans • Liaise with the ER and/or Superintendent on environmental issues, including the written notification of non-conformances (incidents, emergencies or deviations from the CEMP) and non-compliances • Ensure that all personnel on site receive appropriate environmental induction and training and are aware of their environmental responsibilities under the CEMP, relevant legislation and the contract • Report to the Project Director on the performance of the system and improvement opportunities • Provide support to the project team to enable them to meet their environmental commitments • Ensure that environmental records and files are collected and maintained • Regular compliance checking as required by this CEMP • Ensure that non-conformances, non-compliances and environmental incidents are recorded and written reports provided to the Client's Representative within

	<p>48-hours. Liaise with the required stakeholders to confirm the nature of the corrective action required and comply with the timeframe within which corrective actions must occur.</p> <ul style="list-style-type: none"> • Ensure that environmental controls, materials and equipment are maintained • Conduct six monthly review of the CEMP • Develop and deliver environmental training materials in consultation with the Project Training Coordinator • Liaise directly with the Independent Environment Representative as required and where appropriate to facilitate any environmental management requirements, including those identified within the Planning Approvals. The Project Environmental Manager will be the primary contractor contact for the Independent Environmental Representative • Must have tertiary qualifications in environmental engineering / science along with relevant experience working in environmental management roles in Australia. Infrastructure Sustainability Accredited Professional preferred • Must complete corporate and project induction covering environmental responsibilities and Principal Contractor's environmental management system • Minimum skill levels: • Minimum 10 years' experience post qualification, with extensive experience in the preparation and implementation of environmental management systems and plans • Tertiary qualification in environmental science or engineering discipline or equivalent • Recent relevant experience in environmental management on major infrastructure projects.
Project Environmental Coordinator	<ul style="list-style-type: none"> • Support the Environmental Manager in matters relating to environmental management • Must have tertiary qualifications in environmental engineering / science along with relevant experience working in environmental management roles in Australia. Infrastructure Sustainability Accredited Professional preferred • Must complete corporate and project induction covering environmental responsibilities and Principal Contractor's environmental management system • Liaise directly with the Independent Environment Representative as required and where appropriate to facilitate any environmental management requirements, including those identified within the Planning Approvals.
Communication and Stakeholder Relations Manager	<ul style="list-style-type: none"> • Leadership and management of the Communications, Stakeholder and Community Relations Team • Build and maintain effective working relationship with Sydney Metro's representative and Stakeholder and Community Liaison team • Develops and oversees the implementation of the CCS and subplans • Responsible for a stakeholder and community relations induction and training program for all personnel involved in the performance of the project • Approves the Communications, Stakeholder and Community Relations team roles, role descriptions and responsibilities • Liaising with the Community Complaints Mediator, where required • Ensures the Community Communications Strategy and key activities are integrated into the project schedule • Attends the Sydney Metro led Communications Management Control Group and reports on activities, strategies and issues • Attends the monthly Project Management Review Group meeting to discuss project status and issues • Issues and crisis management • Manages media issues and acts as media spokesperson for the Principal Contractor (subject to media protocols)

	<ul style="list-style-type: none"> Responsible for the Communications and Stakeholder Management KPI as well as the Communications and Stakeholder management component of the Quality of Information and Relationship with the Principal's representative KPI Required to be on call 24 hours based on the team rotation Liaise directly with the Independent Environment Representative as required and where appropriate to facilitate any environmental management requirements, including those identified within the Planning Approvals.
Community Place Manager	<ul style="list-style-type: none"> Build and maintain effective working relationship with community, businesses, and stakeholders Support the successful delivery of the project's Community Communication's Strategy and requirements Implementation of the Community Communications Strategy and any relevant Sub-plans Liaising with the Community Complaints Mediator, where required Establish effective working relationships with local stakeholder to support the effective delivery of the project Required to be on call 24 hours based on the team rotation to respond to enquiries and complaints. Review, approve and oversee the development and distribution of all notification, newsletter, social media, photography, and other communication material. Maintain the Consultation Manager database and generate reports as required. Drives Communications and Stakeholder Management KPIs as well as the Communications and Stakeholder management component of the Quality of Information and Relationship with the Principal's representative KPI.
Project Training Coordinator	<ul style="list-style-type: none"> Develop a Training Needs Analysis to identify relevant environmental training for all contractor (and subcontractor, where appropriate) personnel Develop environmental training materials in consultation with the Project Environmental Manager Organise external environmental training courses/material, where required Provide information to the Independent Environment Representative as requested and where appropriate, via the Project Environmental Manager.
Site Foreman (Site Superintendents)	<ul style="list-style-type: none"> Construction delivery in relation to environmental management and compliance in conjunction with the Project Environmental Manager Authority to direct personnel and/or subcontractors to carry out actions to avoid or minimise unintended environmental impacts
Subcontractors	<ul style="list-style-type: none"> Comply with all legal, contractual requirements and this CEMP Comply with site environmental requirements Comply with management / supervisory directions Participate in induction and training as directed Report all incidents Environmental qualifications as required by contract Must complete project induction covering environmental responsibilities and the Principal Contractor's environmental management system. Provide information to the Independent Environment Representative as requested and where appropriate, via the Project Environmental Manager.
All Personnel	<ul style="list-style-type: none"> Comply with the relevant Acts, Regulations and Standards Comply with the Company's environmental policy and procedures Promptly report to management on any non-conformances, non-compliances environmental incidents and/or breaches of the system Undergo induction and training in environmental awareness as directed by management Report all incidents

	<ul style="list-style-type: none"> • Act in an environmentally responsible manner • Must complete corporate and project induction covering environmental responsibilities and Principal Contractor's environmental management system. • Provide information to the Independent Environment Representative as requested and where appropriate, via the Project Environmental Manager.
Independent Environment Representative	<ul style="list-style-type: none"> • Receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; • Consider and inform the Planning Secretary on matters specified in the terms of this approval; • Consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; • Review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: <ul style="list-style-type: none"> ○ make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning 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 Planning Secretary for information or are not required to be submitted to the Planning Secretary); • Regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval; • As may be requested by the Planning Secretary, help plan, attend or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings and site visits, but not independent environmental audits required under Condition A34 of this approval; • As may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; • Assess the impacts of minor ancillary facilities as required by Condition A19 of this approval; • Consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and • Prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI. • Must complete project induction covering Principal Contractor's environmental management system.
Independent Certifier	<ul style="list-style-type: none"> • Assess and certify the Project for compliance, including environmental requirements.
Utilities Coordination Manager	<ul style="list-style-type: none"> • The management and coordination of all utility work associated with the delivery of the Project, to ensure respite is provided to the community, in accordance with CoA E22; • Establishing a Utilities Project Team with nominated representatives from utility service providers that may be impacted by the CSSI;

	<ul style="list-style-type: none"> • Coordination of meetings with utility service providers as requested by Sydney Metro's Contractors; • Involvement with reviews of CSSI designs and Construction methodologies to assist with identifying potentially impacted utility assets; • Assist with coordination of design and Construction methodology reviews by utility service providers to identify necessary utility works; • Communicate with the Utilities Project Team, Sydney Metro, and Sydney Metro's Contractors' delivery teams to understand the proposed program of works to coordinate intercepting, interconnecting and interrelated works and manage priorities as they may arise; • Observation of utility works; and • Manage escalation of utility work-related issues within Sydney Metro and the utility service providers as required. • In conjunction with the Contractors, co-ordinate utility providers and relevant council(s) to identify opportunities for maintenance, replacement or augmentation of utilities that cross the rail corridor and facilitate and co-ordinate requests by the utility providers and relevant council(s) to undertake the Work during rail shutdowns • Collaborate with the communications team and as required, the Community Complaints Mediator, to ensure utility works are appropriately notified and any complaints are resolved.
<p>It is noted that;</p> <ul style="list-style-type: none"> • "Subcontractors" and "All personnel" are categorised as "Operational Personnel". All other roles as listed above are categorised as "Management". Refer to Section 3.5 for training requirements for each category. • Work must not commence until an ER has been approved by the Planning Secretary and engaged by the Proponent. • The Planning Secretary's approval of an ER must be sought no later than one (1) month before the commencement of Work. • The proposed ER must be a suitably qualified and experienced person who was not involved in the preparation of the EIS, SPIR or Submissions Report and is independent from the design and Construction personnel for the CSSI and those involved in the delivery of it. <p>It is the responsibility of Sydney Metro to engage an appropriate ER and seek approval from DPIE.</p>	

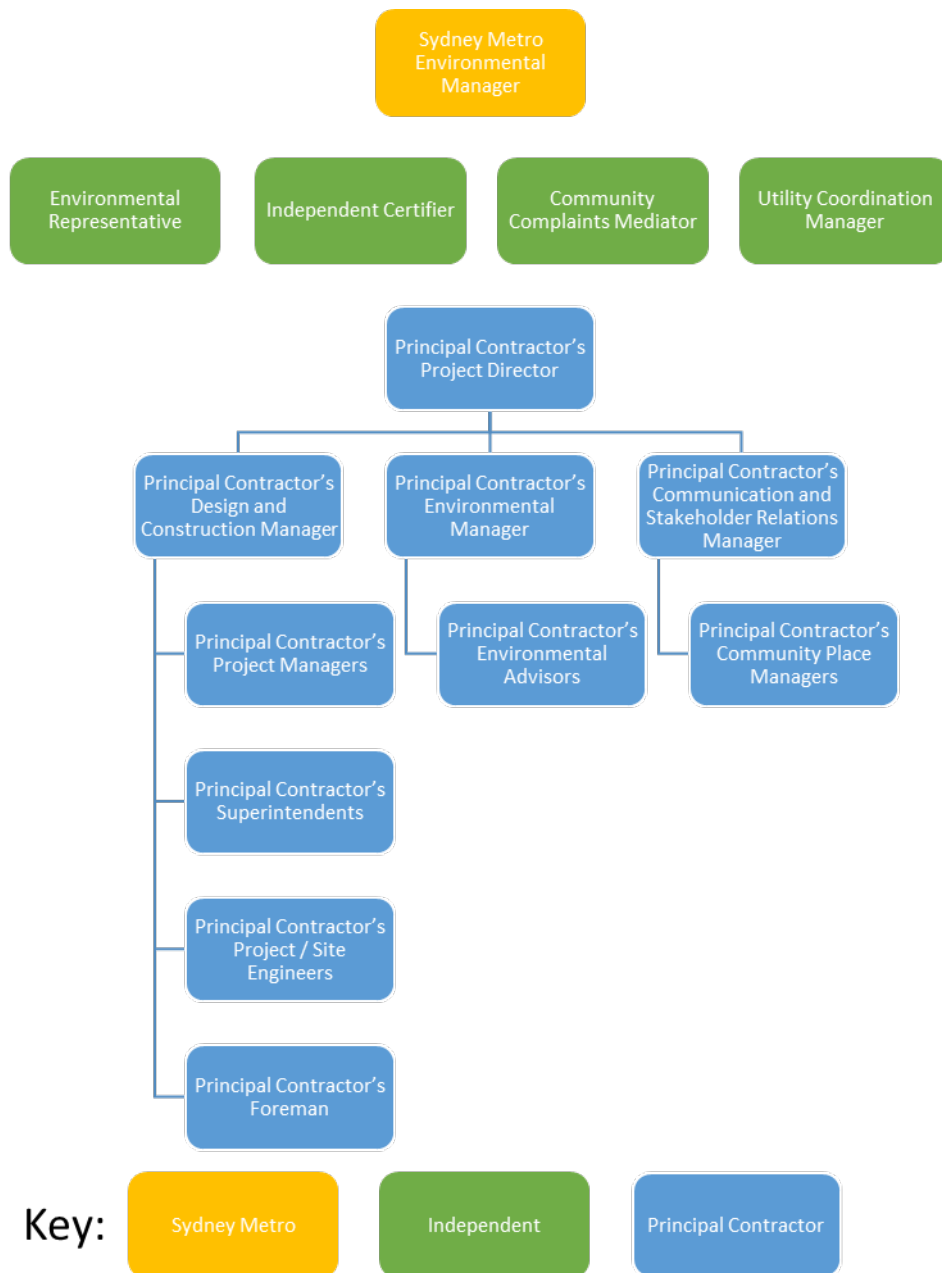


Figure 6 Organisation chart

3.4. Selection and management of subcontractors

Environmental requirements and responsibilities are to be specified to subcontractors in the contract documentation. All subcontractors engaged by Downer will be required to work under Downer's E&SMS.

The supply of goods and/or services by suppliers and subcontractors will be managed in accordance with the following:

- During the tender phase, supply chain partners will be evaluated by Downer for their ability to meet the project's environmental obligations. Environmental issues will be taken into account when selecting subcontractors and suppliers and as provided in the project's Procurement Management Plan;

- Supply, subcontract and consultancy agreements must address the relevant environmental compliance obligations;
- Agreements will outline the contractual requirements to be delivered by the supply chain through their scope of works;
- Suppliers of chemicals and hazardous substances will be required to submit SDS's with delivery or prior to chemicals arriving at site;
- Supply chain partners are to be required to nominate relevant environmental risks and proposed mitigation measures associated with their scope of work within their project specific documentation. As a minimum subcontractors Safe Work Method Statements must address the environmental risks associated with their site activities; and
- The environmental performance of subcontractors will be monitored by Downer during site inspections and in accordance with the obligations in their agreements and contracts.

3.5. Competence, training and awareness

Downer has established [10 Environmental Principles](#) (DG-ZH-PN002) that is a set of fundamental principles that all projects adhere to at all times. The Environmental Principles are prominently displayed on-site in communal areas, on notice boards and the Downer **IMS**.

Downer recognises the importance of employee training and induction, and the critical role it plays in supporting the safe and environmentally responsible conduct of project operations. Downer promotes the following:

- A person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm.
- In determining what activities are required to be taken, the following are considered (amongst other things):
 - The nature of the pollution or potential pollution and the sensitivity of the receiving environment;
 - The current state of technical knowledge and likelihood of successful application of the activities that might be taken; and
 - The financial implications of the activities that might be taken, as those implications relate to the class of person undertaking activities of the same or a similar kind.

Downer manages project activities in such a manner as to:

- minimise impact to the environmental; and
- educate personnel on their responsibilities relating to protecting the environment.

All personnel have environmental management responsibilities and Downer ensures that these responsibilities are communicated to all personnel via appropriate environmental management training, including the initial environment induction.

3.5.1. Environmental induction

All personnel (including subcontractors) are required to attend a compulsory site induction that includes an environmental component before commencing work on site. This is to ensure all personnel involved in the Project are aware of the requirements of the CEMP, EPL (if required) and to ensure the implementation of the REMMs. This will aid in the prevention of any breaches of the CoA resulting from the actions of all persons invited onto any site, including contractors, subcontractors and visitors.

Short-term visitors undertaking inspections or entering site (such as regulators) will be required to undertake a visitor's induction and be accompanied by inducted personnel at all times. Temporary visitors to site for purposes such as deliveries will be required to be accompanied by inducted personnel at all times.

In accordance with the CEMF, the environmental component of the induction would include as a minimum:

- Training purpose, objectives and key issues;
- Contractor's environmental policy and key performance indicators;
- Due diligence, duty of care and responsibilities;
- Relevant conditions of any environmental licence and/or the relevant conditions of approval;
- Site specific issues and controls including those described in the environmental procedures;
- Reporting procedure for environmental hazards and incidents; and
- Communication protocols.

A record of all environment inductions will be maintained and kept on site. Downer's Environmental Manager may authorise amendments to the induction at any time. Possible reasons for changes to the induction may be Project modifications, legislative changes or amendments to this CEMP or related documentation.

Subcontractors that attend site on an intermittent basis, e.g. a delivery driver, are typically inducted on a visitor basis. Subcontractors are assessed by the relevant member of the project team on a case-by-case situation to determine if a subcontractor is required to undertake a visitor induction or full site induction. A visitor induction is valid for a period of 2 weeks.

Environmental awareness training is provided to all personnel involved with the project, including all subcontractors and visitors, via inductions, as per [DG-HR-ST013 Training & Competency Management Standard](#).

A project specific induction is delivered to all personnel and subcontractors highlighting the hazards specific to the site, and the controls necessary to manage them appropriately. Induction handbooks and associated training presentations may be used for the induction. Personnel are re-inducted annually. The environmental component of the induction is tailored for each group of inductees (as applicable) to ensure that specific components of work are adequately addressed. This method of environmental awareness training ensures that all personnel are aware of:

- the importance of conformance with environmental policy and procedures and the requirements of the Environmental Management Plan and associated sub-plans (if applicable);
- DG-ZH-PN002 10 Environmental Principles;
- the significant environmental aspects of the project works and the environmental benefits of improved work performance;
- their roles and environmental responsibilities for achieving conformance with environmental policy and procedures and with the Environmental Management Plan, including site emergency management and response requirements; and
- the potential consequences of departure from specified operating procedures.

All personnel, including subcontractors, attend inductions prior to commencing work on the project. Records of inductions are recorded in the project's training matrix.

Legible environmental records of all environmental inductions will be kept in an Induction Register.

3.5.2. Toolbox talks, training and awareness

Toolbox talks will be used as a method of raising awareness and educating personnel on issues related to all aspects of Construction including project or site wide updates, any key or recurring environmental issues. The toolbox talks will be used to ensure environmental awareness continues throughout Construction and include details of EWMS for relevant personnel. Toolbox talks will also be tailored to specific environmental issues relevant to upcoming works. Toolbox talk attendance is mandatory and attendees of toolbox talks are required to sign an attendance form and the records maintained.

Targeted environmental awareness training will be provided to individuals or groups of workers with a specific authority or responsibility for environmental management or those undertaking an activity with a high risk of environmental impact. All employees (including subcontractors) may receive induction/training in the following (but not limited to):

- Environmental Policy;
- Site environmental objectives and targets;
- Understanding individual authorities and responsibilities;
- Basic understanding of their legal obligations;
- Site environmental rules;
- Emergency procedure and response (e.g. Spill clean-up);
- Relevant project specific and standard noise and vibration mitigation measures;
- Permissible hours of work;
- Any limitations on high noise generating activities;
- Location of nearest sensitive receivers; and
- Relevant licence and approval conditions.

To promote environmental awareness amongst the Construction team, environmental alerts will be issued as required and distributed amongst Downer's Project / Site Engineers and

Supervisors which will be discussed during the daily pre-start meeting or during toolbox talks. In addition, the ECMs will be displayed in crib sheds and site offices to promote awareness of the environmental constraints. Erosion and Sediment Control Plans (ESCPs) will be distributed to Downer's Site Foreman to provide detail on erosion and sediment controls on the Project.

Environmental awareness may also be promoted to Construction personnel through the development and distribution of awareness notes. These will typically take the form of a poster, booklet, or similar and will be distributed to Downer's Engineers, Leading Hands, Site Foreman and others with a responsibility for managing specific work locations or activities. This documentation may be used to inform the broader workforce through either daily pre-start meetings (see Section 3.5.3) or provision in worker crib sheds / break facilities.

In accordance with the CEMF, Downer will conduct a Training Needs Analysis which identifies the competency requirements of staff that hold environmental roles and responsibilities as outlined in Table 7. This CEMP will be revised to include a summary of Downer's Training Needs Analysis.

Employee training and competency requirements are reviewed annually, or as an employee's role changes. Downer maintains a database of training records and employee competencies that provides capabilities such as tracking expiry of time limited competencies and programming of training requirements. This is done via the Training Matrix included in Appendix J.

Personnel who undertake activities with significant environmental risk complete specialist environmental training, which is conducted by Downer (with support of the customer), in addition to the environmental induction.

A Training Register is to be maintained on Downer's information management system.

3.5.3. Daily pre-start meetings

The daily pre-start meeting is a tool for informing the workforce of the day's activities, safe work practices, environmental protection practices, work area restrictions, activities that may affect the works, coordination issues with other trades, hazards and other information that may be relevant to the day's work.

Downer's Site Foreman will conduct a daily pre-start meeting with the site workforce before the commencement of work each day (or shift) or where changes occur during a shift. Daily pre-start meetings will be succinct in nature and generally take approximately 10-15 minutes.

The environmental component of pre-starts will be determined by Downer's relevant Site Foreman and environmental personnel, and will include any environmental issues that could potentially be impacted by, or impact on, the day's activities as required. All attendees will be required to sign on to the pre-start and acknowledge their understanding of the issues explained.

3.6. Working hours

Working hours for the Project are set by the CoA E19 to E26. Standard Construction hours as approved in the CoA E19 are as follows:

- Monday to Friday: 7:00 am to 6:00 pm;
- Saturday: 8:00 am to 6:00 pm; and

- At no times on Sundays or Public Holidays.

CoA E20 permits work outside of the hours specified in CoA E19, in the following circumstances:

- a) For the delivery of materials required by the NSW Police Force or other authority for safety reasons;
- b) Where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm;
- c) Where different Construction hours are permitted or required under an EPL in force in respect of the CSSI;
- d) Work approved under an Out-of-Hours Work Protocol for Work not subject to an EPL as required by Condition E25;
- e) Construction that causes LAeq(15 minute) noise levels:
 - i. no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), and
 - ii. no more than the 'Noise affected' noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses, and
 - iii. continuous or impulsive vibration values, measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), and
 - iv. intermittent vibration values measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006).
- f) Where a negotiated agreement has been reached with a substantial majority of sensitive receivers who are within the vicinity of and may be potential affected by the particular Construction, and the noise management levels and/or limit for ground-borne noise and vibration (human comfort) cannot be achieved. All agreements must be in writing and a copy forwarded to the Planning Secretary at least one (1) week before the commencement of activities.

In accordance with CoA E24, except as permitted by an EPL, highly noise intensive works that result in an exceedance of the applicable NML at the same receiver will only be undertaken:

- Between the hours of 8:00 am and 6:00 pm Monday to Friday;
- Between the hours of 8:00 am and 1:00 pm Saturday; and
- In continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block. 'Continuous' includes any period during which there is less than one hour respite between recommencing any of the work that are the subject of the CoA.

There is no definition in the CoA SSI 8256 for "Highly Noise Intensive Works" as mentioned in CoA E24. Sydney Metro has adopted the following definition for "Highly Noise Intensive Works", based upon definitions within CoA issued by DPIE for other SSI projects. For the purpose of this Project, Highly Noise Intensive Works are Construction activities which are defined as annoying under the ICNG, these include:

- Use of power saws, such as used for cutting timber, rail lines, masonry, road pavement or steel work;
- Grinding metal, concrete or masonry;
- Rock drilling;
- Line drilling;
- Vibratory rolling;
- Rail tamping and regulating;
- Bitumen milling or profiling;
- Jackhammering, rock hammering or rock breaking; and
- Impact piling.

Any other works outside of standard Construction hours would be permitted providing they meet the requirements of CoA E20, an EPL (if applicable) or if they are undertaken as per the City and Southwest Out-of-Hours Work Protocol/Strategy (OOHW) as per CoA E25..

3.7. Communication

Achieving effective communication between all parties is critical to ensure that the requirements of this Environmental Management Plan are met.

Downer uses a number of methods to communicate with employees, subcontractors, and visitors. The requirements, frequency, information, and methods of recording communication are outlined in the project's Stakeholder & Communication Management Plan, [Zero Harm Worker Consultation Standard \(DG-ZH-ST013\)](#), and project's Zero Harm risk management processes and procedures.

Typical methods of communication on site:

- pre-start meetings
- Zero Harm start-up (i.e. pre-commencement) toolbox talks
- Zero Harm inductions
- noticeboards
- toolbox talks; and
- environment alerts.

Pre-start and toolbox meetings include delivering key environmental messages and audit and inspection results and communicating environmental risks for the scheduled activities.

Pre-start meetings are minuted and the minutes reviewed and signed by the meeting chairperson, and made available to all Downer workers and visitors (if applicable) on site.

The Project Manager ensures that relevant documentation is filed electronically, and hard copies made available to personnel. Hard copy documentation made available to personnel typically includes:

- the project's Emergency Management Plan;

- standard operating procedures;
- work instructions;
- customer procedures/ policies;
- fatal risk control standards;
- risk assessments;
- minutes of meetings; and
- copies of pertinent legislation and codes of practice.

Downer's dispute resolution process meets the requirements of the Work Health and Safety Regulation 2011 and is included in [Zero Harm Worker Consultation Standard \(DG-ZH-ST013\)](#).

3.7.1. Internal communication

Clear lines of communication throughout all levels and functions (e.g. management, staff and subcontracted service providers), are key to minimising environmental impacts and achieving continual improvements in environmental performance.

Downer's environmental team will meet regularly to discuss any issues with environmental management on site, any amendments to plans that might be required or any new / changes to Construction activities. Regular meetings may also be scheduled with the ER, Sydney Metro environmental personnel. The purpose of these meetings would be to communicate ongoing environmental performance and to identify any issues to be addressed.

In addition, Construction environmental team members will participate, as required, in toolbox talks, daily pre-start meetings or activity specific pre-start meetings to communicate environmental performance, management or issues with the wider Construction team. This forum will provide an opportunity for the environment team members to advise on any upcoming sensitive environmental matters for future work areas and to receive feedback from on-site personnel.

Further internal communications regarding environmental issues and aspects will be through awareness training as described in Section 3.5.

3.7.2. Liaison with government authorities or other relevant stakeholders

Downer's Environmental Manager will be the authorised contact person for communications with the relevant stakeholders i.e. Sydney Metro, the ER, DPIE and the EPA (if required) on environmental matters. Liaison will include reporting on the ongoing environmental performance, any key environmental matters on the Project to these stakeholders. Relevant government agencies will be consulted throughout Construction as required.

Where changes are made to the CEMP or Sub-plans following consultation, updates will be recorded in the relevant version control section(s).

Incident notification will be undertaken in accordance with the requirements of CoA A36 and A37 (refer to Section 3.10.3).

Liaison with government authorities and relevant stakeholder would be undertaken as per Section 8 of the Sydney Metro Overarching Community Communication Strategy (OCCS).

3.7.3. Community liaison and/or notification

Direct communication with the media and general public is not permitted. Any requests from the media or general public are referred to the Project Manager who takes action in accordance with the project's Stakeholder & Communication Management Plan.

All direct communication with statutory authorities is approved by the Project Manager or the Safety Manager.

The customer typically also has specific requirements relating to external communications.

Sydney Metro has prepared an OCCS in accordance with CoA B2 to provide an approach to stakeholder and community communications. This plan identified opportunities and key communication tools needed to provide information and consult with the community and stakeholders during Construction of the Project. Section 8 of the OCCS outlines how community liaison and/or notification would be undertaken.

The OCCS also includes the process for notifying external stakeholders of new, changed or upcoming Construction works, including works outside of normal working hours. The OCCS has been submitted to DPIE for approval prior to the commencement of works in accordance with CoA B3.

In accordance with Section 1 of the OCCS, the contract-specific communication team is responsible for developing a contract-specific Community Communication Strategy (CCS) for the Project.

3.7.4. Complaints management

In the event of a third-party environmental complaint the following steps will be taken by Downer:

- records complaints as an incident in INX;
- investigates and verifies complaints, and assesses if excessive off-site impacts have occurred;
- implements corrective measures including modification of execution methods and operational techniques to avoid recurrence or minimise ongoing adverse impacts;
- completes monitoring/ additional investigations to verify the adequacy of the recommendations, as required;
- notifies the complainant of actions taken; and
- continues to monitor activity, if required.

Sydney Metro's OCCS details the Complaints Management System, which includes a Complaints Register, which has been developed for the Project, in accordance with the requirements of AS 4269: Complaints Handling and CoA B5, B6, B7, B8 and B9.

As required by CoA B8(a)(b)(c) the Complaints Register must record the:

- a) Number of complaints received
- b) Number of people affected in relation to a complaint
- c) Means by which the complaint was addressed and whether resolution was reached, with or without mediation.

The Complaints Register will be provided to the ER on a daily basis, in accordance with CoA A27(a). Please refer to the OCCS for more information about complaints management. Sydney Metro's OCCS also outlines how the Project will interface with the Community Complaints Mediator, as required, in accordance with CoA B10 to B13.

3.8. Emergency and incident response

In accordance with [Emergency Management Procedure \(DG-ZH-PR015\)](#), the project team establishes an Emergency Management Plan for the project which addresses all emergency response scenarios. Common types of environmental emergencies include:

- sewage spills (to land or to water)
- emulsion spills (to land or to water)
- hydrocarbon spills (to land or to water)
- sediment discharge (to land or to water)
- unexpected finds (cultural heritage); and
- damage to heritage items or protected flora and fauna.

In the event of an incident that may have resulted in a near miss or an impact to the environment or community, Downer employees are expected to respond appropriately in accordance with [Incident Management Procedure \(DG-ZH-PR006\)](#).

3.8.1. General emergency and incident response

The EPA must be notified immediately of all pollution incidents that cause or threaten material harm to the environment. Downer will enact the Emergency Response Plan if an incident causes, or has the potential to cause material harm.

As per the Planning Approval's definition, material harm *"is harm that:*

- *involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or*
- *results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)."*

If an incident presents an immediate threat to human health or property, 000 is to be called in accordance with the procedures outlined in the Construction Health and Safety Management Plan.

The EPA Environment Line is to be contacted on 131555.

The notification will need to include information on:

- The time, date, nature, duration and location of the incident;
- The location of the place where pollution is occurring or is likely to occur;
- The nature, the estimated quantity or volume and the concentration of any pollutants involved;
- The circumstances in which the incident occurred (including the cause of the incident, if known);

- The action taken or proposed to be taken to deal with the incident and any resulting pollution or threatened pollution; and
- Other information prescribed by the regulations.

In addition to notifying the EPA of pollution incidents other authorities as outlined below must also be notified immediately, where relevant:

- Sydney Metro;
- The ER;
- DPIE;
- The NSW Ministry of Health (via the local Public Health Unit – 02 9391 9000);
- The SafeWork NSW (13 10 50);
- Inner West Council (where the incident has occurred within this LGA) – (02 9707 9000);
- City of Canterbury Bankstown (where the incident has occurred within this LGA) – (02 9392 5000); and
- Fire and Rescue NSW on 000.

Regardless of the actual or potential impact, these authorities must be notified under the amended legislation for all notifiable pollution incidents. Further information in relation to the incident must be provided immediately if it becomes available after the initial notification. Records of contact with and details of the information provided to external authorities must be maintained in the project records.

Incident notification will be undertaken in accordance with the requirements of CoA A36 and A37 and the Sydney Metro Incident and Non-compliance Reporting Procedure (refer to Section 3.10.3 and Appendix F).

3.9. Monitoring, inspections and auditing

3.9.1. Environmental inspections

Ongoing inspection of environmental mitigation measures will be undertaken by Downer's Site Foreman. Weekly site environmental inspections will be undertaken by Downer's Environmental Manager to assess the ongoing effectiveness and suitability of the Project's environmental controls. The site environmental inspections will cover the following:

- High risk activities and processes;
- Work in environmentally sensitive areas; and
- Site preparedness for adverse weather conditions, including adequacy of environmental controls and availability of emergency equipment.

Copies of all environmental inspection reports prepared by Project environmental staff will be kept with the Project records and closed out within the agreed timeframes. These timeframes will be dependent on the nature of the required corrective action and the environmental risk associated with the outstanding action as determined by Downer's Environmental Coordinator or Environmental Manager. The outcomes of inspections will be captured on Environmental Inspection Checklists.

In general, the corrective action will concentrate on the environmental management system and its associated processes rather than on the perceived deficiencies of individual workers.

If any maintenance and/or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded in an environmental action list. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority. The environmental action list will then be issued to the relevant Downer Site Foreman for actioning. Actions will be assigned an implementation priority by Downer's Environmental Coordinator based on environmental risk. Actions are closed out by Downer Site Foreman and evidence of close out (usually a photograph) is to be supplied back to the Environmental Coordinator.

When an observation is raised of a significant nature, and where deemed necessary by Downer's Environmental Manager, an Environmental Improvement Notice (EIN) may be issued to either the Engineering Supervisor or the subcontractor supervisor in charge of the work activity and/or an individual. The engineer or individual receiving the improvement notice will be required to respond to the agreed corrective action as outlined on the notice. The timeframe to respond would be determined by Downer's Environmental Manager and documented in the EIN. Examples of observations deemed to be of a significant nature would include, but are not limited to, those that require immediate action due to potential environmental risk or recurring issues.

The completed EIN must be reviewed and followed-up to ensure they are promptly completed. Repetitive observations that have significant hazards should be reviewed to check that a system failure is not occurring. Downer's Environmental Coordinator will confirm close out of the EIN and report this to Downer's Environmental Manager.

Regular site inspections will be completed by the Environmental Representative (ER) and Sydney Metro representatives. These will be conducted at a frequency to be agreed by all parties. However, at minimum they will have a monthly frequency.

In addition to planned internal audits, the project team verifies environmental conformance to the Environmental Management Plan as per the reviews in the following table and [DG-ZH-PR116.1 Inspections Procedure](#).

Type of Review	Goal	Frequency	Responsible Person
Solid Wastes	<ul style="list-style-type: none"> All waste removed from the site will be appropriately tracked from 'cradle to grave' using waste tracking dockets Waste minimisation through implementation of the waste hierarchy Recycling where practical and economically feasible Appropriate use of landfill site for disposal Appropriate placement and use of site amenities Compliance with Waste and Spoil in Appendix E in CEMP 	<ul style="list-style-type: none"> Informal daily monitoring by site team Weekly inspections will include checking on the waste storage facilities on site using the DG-ZH-FM116.2 Environment Inspection Checklist Audits of receiving facilities (recyclers/landfills/other) minimum of 1 every 6 months) 	<ul style="list-style-type: none"> Environmental Coordinator/ Project Manager (PM)
Flora and Fauna	<ul style="list-style-type: none"> Protection of protected species Prevent the spread of weeds Compliance with Biodiversity in Appendix E in CEMP 	<ul style="list-style-type: none"> Informal daily monitoring by site team Weekly inspections using the DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Environmental Coordinator/ Project Manager (PM)

Type of Review	Goal	Frequency	Responsible Person
Erosion and Sediment Control Measures	<ul style="list-style-type: none"> No adverse impacts to receiving water quality Implementation, monitoring, and maintenance of all soil erosion and sediment control measures defined in the Soil & Water Management Plan and associated documents 	<ul style="list-style-type: none"> Informal daily Weekly inspections using the DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Environmental Coordinator/ Project Manager (PM)
Work site storage and handling of fuels, oils, chemicals, and paints	<ul style="list-style-type: none"> Compliance with dangerous substances regulations and hydrocarbons and chemicals procedures defined in the project's Health and Safety Management Plan 	<ul style="list-style-type: none"> Informal daily monitoring by site team Weekly inspections using the DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Site Supervisor / Zero Harm Advisor / Environmental Coordinator / Project Manager (PM)
Hydrocarbon and Oil Spills	<ul style="list-style-type: none"> Compliance with the project's Health and Safety Management Plan 	<ul style="list-style-type: none"> Daily visual monitoring by site team Weekly inspections using the DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Site Supervisor / Environmental Coordinator / Project Manager (PM)
Air Quality and Dust Management	<ul style="list-style-type: none"> Minimise the impact of dust, odour and fumes on the community Compliance with the Air Quality in Appendix E in CEMP 	<ul style="list-style-type: none"> Visual monitoring by Zero Harm Advisor and/or Site Supervisor Spot checks of sites and weekly inspections using the DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Site Supervisor / Zero Harm Advisor / Environmental Coordinator / Project Manager (PM)

Type of Review	Goal	Frequency	Responsible Person
Water management	<ul style="list-style-type: none"> Avoid the use of potable water where possible Protect environmental values of receiving water Compliance with the TfNSW Water Discharge and Reuse Guideline Compliance with the Soil and Water Management Plan 	<ul style="list-style-type: none"> As required – to be monitored through dewatering applications and permits Daily informal monitoring by Site Supervisor and site team Weekly using DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Site Supervisor / Environmental Coordinator / Project Manager (PM)
Heritage	<ul style="list-style-type: none"> Protect items with heritage value Maintain compliance with the Heritage Management Plan 	<ul style="list-style-type: none"> Daily informal monitoring by Site Supervisor and site team Weekly using DG-ZH-FM116.2 Environment Inspection Checklist Heritage-specific inspections to be carried out before, during and after vibration-generating works within 'safe working distances'. 	<ul style="list-style-type: none"> Site Supervisor / Environmental Coordinator / Project Manager (PM)
Noise and Vibration	<ul style="list-style-type: none"> Reduce the impact of noise and vibration on sensitive receivers Maintain compliance with the Project Noise and Vibration Management Plan 	<ul style="list-style-type: none"> As per Appendix A of the Construction Noise and Vibration Monitoring Guideline of City and Southwest Construction Noise and Vibration Strategy (SM ES-ST-210) Refer to SM CEMF Section 9 Construction Noise and Vibration Management 	<ul style="list-style-type: none"> Environmental Coordinator / Project Manager (PM)

Type of Review	Goal	Frequency	Responsible Person
Additional risk-mitigation measures	<ul style="list-style-type: none"> Compliance to SWMS requirements and the CEMP and any relevant sub-plans 	<ul style="list-style-type: none"> Daily informal monitoring by Site Supervisor and site team Weekly using DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Environmental Coordinator / Project Manager (PM)
Housekeeping	<ul style="list-style-type: none"> Tidy work site with no litter and all waste contained in appropriate containers Containers to be emptied and disposed of at appropriate intervals Compliance with all Sub Plans 	<ul style="list-style-type: none"> Daily informal monitoring by Site Supervisor and site team Weekly using DG-ZH-FM116.2 Environment Inspection Checklist 	<ul style="list-style-type: none"> Environmental Coordinator / Project Manager (PM)

3.9.2. Environmental monitoring

Environmental monitoring will be undertaken to validate the impacts predicted for the Project, to measure the effectiveness of environmental controls and implementation of this CEMP, and to address approval requirements. The monitoring requirements for required aspects are included in the relevant environmental management Sub-plans and summarised in Table 8.

Table 8 Summary of Construction phase environmental monitoring required by the Project approval

CoA / EMM	Description	Relevant Sub-plan or CEMP Chapter	Reporting Requirements
C8(a)	Noise and Vibration Monitoring Program	NVMP – Section 8	Submitted to the Planning Secretary and relevant regulatory authorities for information at a frequency as specified in the monitoring program.
C8(b)	Water Quality Monitoring Program	SWMP – Section 6	Submitted to the Planning Secretary and relevant regulatory authorities for information at a frequency as specified in the monitoring program.

3.9.3. Auditing

Sydney Metro's *City and Southwest Compliance Monitoring/Tracking and Reporting Program Report* (Sydney Metro 2019) has been prepared to satisfy the obligations of CoA A33-A35. In accordance with the *City and Southwest Compliance Monitoring/Tracking and Reporting Program Report*, two levels of environmental auditing will be undertaken on the Project:

- Internal auditing coordinated by the Principal Contractor; and
- Via the independent Environmental Audit Program (EAP).

In addition to these, the Project may be audited by the Secretary upon the Secretary's request. In this event, the ER will facilitate the audit on behalf of the Secretary in accordance with CoA A26(f).

Audits will include works undertaken by subcontractors. Internal and external environmental audits will be undertaken and prepared in accordance with the terms of the project approval and AS/NZS ISO 19011:2014.

The ER will ensure that environmental auditing is undertaken in accordance with this CEMP and the Project's environmental management system, in accordance with CoA A26.

Internal audits undertaken in accordance Section 4.4.3.1 of the *City and Southwest Compliance Monitoring/Tracking and Reporting Program Report* will be carried out on a quarterly basis. Independent Environmental Auditing will be conducted at a frequency set out in the EAP.

An indicative Audit Schedule is provided in Appendix I. Note that this is integrated into the project Quality Management Plan.

To complement the above internal audits, Downer conducts internal environmental audits in accordance with [Downer's Internal Audits Procedure](#) (DG-QA-PR003) to ensure the ongoing adequacy and effectiveness of the Environmental Management Plan and **IMS**, and to facilitate continuous improvement.

Environmental audits are planned and scheduled with all other project audits, and detail the type of audit, duration, auditors (including the Lead Auditor), and dates. Refer to the project's Quality Management Plan for further information.

The findings from internal audits on the implementation of the Environmental Management Plan and **IMS** for the project are provided to the Project Manager. Any customer requirements for audits are also defined in the project's Quality Management Plan.

Audits are conducted by personnel with the relevant expertise.

In addition to planned internal audits, the project team verifies environmental conformance to the Environmental Management Plan as per the reviews in the table (Section 3.9.1 environmental inspections) and Downer's [Inspections Procedure \(DG-ZH-PR116.1\)](#).

3.9.4. Construction phase compliance tracking

In accordance with CoA A29 to A32, Sydney Metro has developed the *City and Southwest Compliance Monitoring/Tracking and Reporting Program Report*. Compliance reporting on the Project will be undertaken in accordance with the requirements of this document throughout the Construction phase of the Project.

In accordance with the *City and Southwest Compliance Monitoring/Tracking and Reporting Program Report*, Downer will undertake quarterly reviews of the compliance requirements contractually allocated to them by Sydney Metro. These reviews are a collaborative exercise undertaken between Downer, Sydney Metro and the ER. The Compliance Tracking Review process is as follows:

- Upon the award of each major contract, Sydney Metro to issue a Compliance Tracking Register (CTR) template containing a list of all the compliance requirements contractually allocated to Downer. Downer is required to complete the template and return to Sydney Metro no later than two weeks prior to the anticipated commencement of Construction activities.

Downer is to complete the template by demonstrating how compliance against each requirement has been addressed from the date of contract award to the date the CTR is due to be returned to Sydney Metro (including references to evidential documentation). This completed CTR will be used by Sydney Metro to prepare any documentation required to prepare/update the applicable Pre-Construction Compliance Report

- Following the commencement of Construction, Downer is to complete a new CTR to cover all activities from the commencement of Construction until the end of the existing or subsequent calendar quarter (as determined by Sydney Metro). Downer must issue the completed CTR to the ER within five working days following the end of the reporting period. The ER will review the CTR and where necessary, provide comments and/or requests for evidence to Downer. The ER will provide the Planning Approvals Compliance Report only after all comments have been addressed, and all evidence requested during the CTR has been provided by Downer.
- Within five working days of receiving the final completed CTR (and any evidence requested) from Downer, the ER is to issue a draft Planning Approvals Compliance Report (with the associated completed CTR) to Sydney Metro for comment. After reviewing any comments, the ER is to issue a final Compliance Summary Report to Sydney Metro.
- Following receipt of the final Compliance Summary Report from the ER, Sydney Metro will issue the next quarterly period CTR template to Downer for completion. This process repeats every quarter until all compliance requirements have been 'completed' (refer to Section 4.3 of the City and Southwest Compliance Monitoring/Tracking and Reporting Program Report).

In the event of a non-compliance against a requirement at any time during this process, a summary of the non-compliance needs to be entered into the relevant CTR template. This is in addition to the requirements of the Sydney Metro Environmental Incident and Non Compliance Reporting Procedure SM-17-00000096 (refer to Appendix F).

Downer compliance tracking is undertaken on a continuous nature during execution using Downer's compliance management system **INX**, which allows authorised users to:

- access the Compliance Tracking Database, Incident Reporting Database, and Complaints Register; and
- sort and evaluate the compliance status of all conditions at any time.

The Compliance Tracking Database includes a protocol to address:

- auditing requirements;
- reporting requirements;
- incident response mechanisms; and

- Compliance with SM quarterly *Compliance Monitoring/Tracking and Reporting Program Report*.

3.10. Environmental incidents non-conformances and non-compliances

All environmental incidents, non-conformances and non-compliances must be reported to the ER and Sydney Metro in accordance with Sydney Metro Environmental Incident and Non-compliance Reporting Procedure SM-17-00000096 (refer to Appendix F).

3.10.1. Environmental incidents under Sydney Metro

The Environmental Incident and Non-compliance Reporting Procedure is summarised below.

Sydney Metro has defined an Environmental Incident as:

An occurrence or set of circumstances, as a consequence of which pollution (air, water, noise, and land) or an adverse environmental impact has occurred or is likely to have occurred.

Adverse environmental impact includes contamination, harm to flora and fauna (either individual species or communities), damage to heritage items, or adverse community impacts.

The Instrument of Approval defines an incident as:

An occurrence or set of circumstances that causes or threatens to cause material harm¹ and which may or may not be or cause a non-compliance.

Environmental incidents are classified into three classes that are based upon the consequence descriptors for environmental risks in the Sydney Metro Risk Matrix (refer to Sydney Metro Risk Management Standard). These classifications trigger a variety of management actions and/or legislative requirements depending on the severity of the consequence described where Class 3 represents minor consequences and Class 1 represents major consequences.

This matrix is further sub-divided into consequence ratings ranging from C6 (low impact) to C1 (high impact). An incident transitions between a Class 3 to a Class 2 incident once material harm has been caused, and transitions into a Class 1 incident once it is determined that the Environmental Harm caused is large-scale and cannot be remediated (see Table 9).

Table 9 Classification System for Environmental Incidents

Class 3			Class 2	Class 1	
C6	C5	C4	C3	C2	C1
No appreciable changes to environment and/or highly	Change from normal conditions within environmental regulatory limits and environmental	Short-term and/or well-contained environmental effects. Minor remedial actions	Impacts external ecosystem and considerable	Long-term environmental impairment in neighbouring or valued ecosystems	Irreversible large-scale environmental impact with loss of valued ecosystems

¹ Material harm is harm that: (a) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or (b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).

Class 3			Class 2	Class 1	
localised event	effects are within site boundaries	probably required	remediation is required	Extensive remediation required	

All incidents and complaints (including potential incidents) must be reported so that they can be investigated and prevented from recurring. Incidents, non-conformances and non-compliances are to be recorded using the Environmental Incident and Non-compliance Report Form (SM ES-FT-403), by Downer. It is expected that the person responsible for completing the Environmental Incident and Non-compliance Report Form makes appropriate enquiries to determine the likely causal factors involved and assigns effective corrective actions. Corrective actions are to be raised, addressed and closed-out in accordance with Downers own internal relevant management system procedure. When an environmental incident occurs which causes environmental harm, in all cases both verbal and written communication of the incident must be carried out immediately and within 48 hours respectively. For Class 1 and 2 Incidents the notification process shown in Figure 7 must be followed. Incident Notification Reports satisfy the requirement for written communication to Sydney Metro and are to be completed using the Environmental Incident and Non-compliance Notification Report (SM ES-FT-403) or a similar and consistent form approved by Sydney Metro.

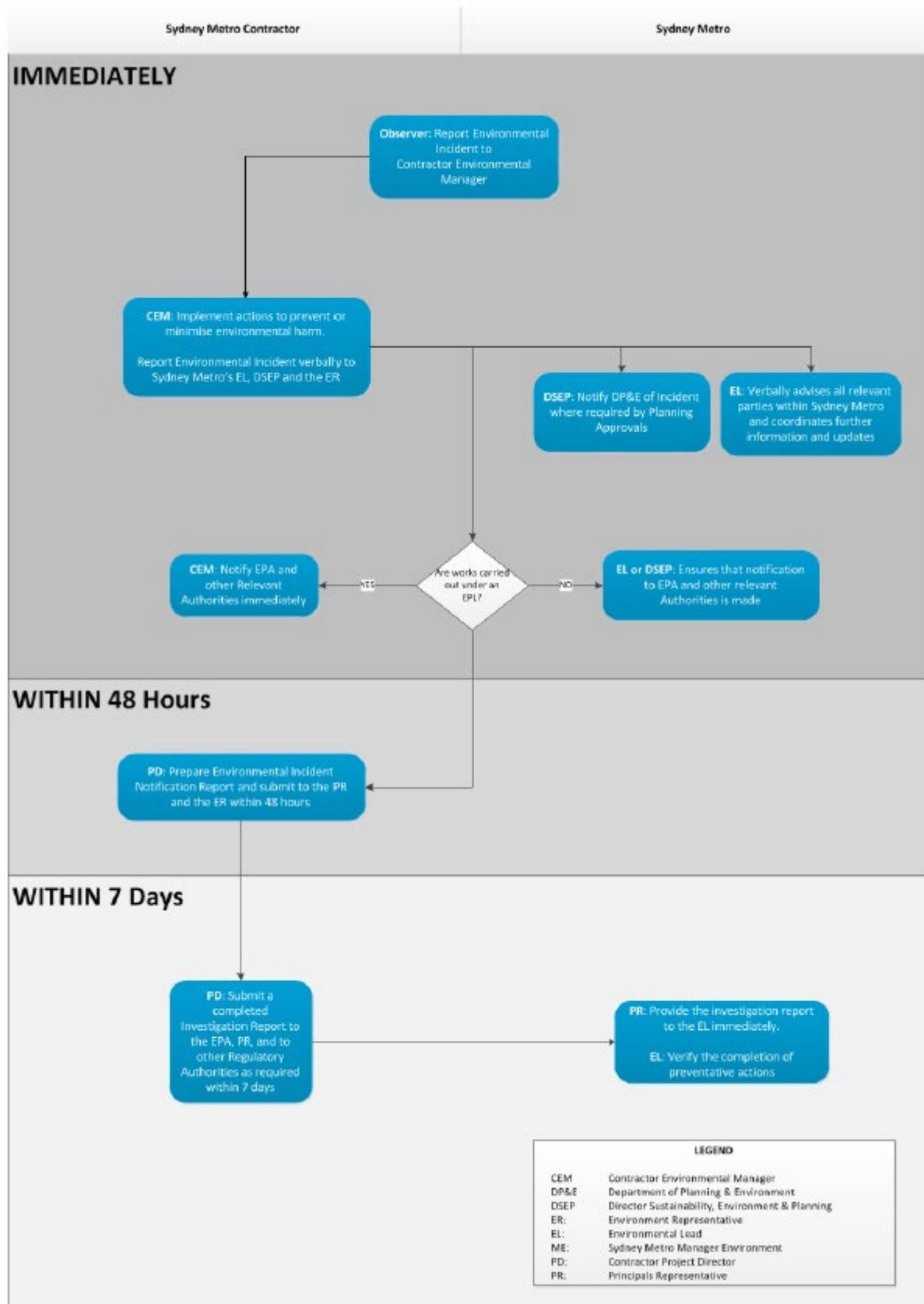


Figure 7 Environmental incident notification process for Class 1 and 2 Incidents

3.10.1.1. Environmental incidents under Downer process

In accordance with [DG-ZH-PR015 Emergency Management Procedure](#), the project team establishes an Emergency Management Plan for the project which addresses all emergency response scenarios. Common types of environmental emergencies include:

- sewage spills (to land or to water);
- emulsion spills (to land or to water);
- hydrocarbon spills (to land or to water);
- sediment discharge (to land or to water);
- unexpected finds (cultural heritage); and
- damage to heritage items or protected flora and fauna.

In the event of an incident that may have resulted in a near miss or an impact to the environment or community, Downer employees are expected to respond appropriately in accordance with [DG-ZH-PR006 Incident Management Procedure](#).

Downer's Incident Management Procedure describes how to:

- accurately report workplace incidents within Downer;
- notify customers and external regulators, where required;
- record details of incidents in Downer's INX; and
- investigate corrective actions to prevent any recurrence and communicate and share learnings with relevant stakeholders.

The INX InControl System is a database where every Health, Safety and environmental incident or event is recorded, assessed, actioned and closed.

It enables the effective monitoring and reporting of all things, not necessarily just Health and Safety, in the workplace but contributes to ensuring continual behavioural and cultural improvement across Downer.

In addition, InControl includes facilities to record a risk review to establish the context, identification, analysis, evaluation and treatment of risks.

3.10.2. Review of compliance

An environmental non-compliance is a breach of an environmental requirement originating from Planning Approvals, EPLs, lease agreements, and other requirements documented in environmental management plans. Whether an event is classified as a Non-compliance, Non-conformance or an Incident the process behind managing the event remains the same, with the following exceptions:

- Non-compliances are not notifiable to Regulatory Authorities under the POEO Act;
- Non-compliances are reported to have occurred on the day the breach was raised as opposed to the date when the requirement was breached;
- Non-compliances are not divided into severity classes;

- Non-compliances do not have the potential to trigger crisis or emergency management processes; and
- There is an informal notification process in the immediate timeframe following a Non-compliance being raised.

When an Environmental Event (as defined by the Sydney Metro Environmental Incident and Non-compliance Reporting Procedure) occurs that causes Environmental Harm and also breaches one or more Environmental Requirements, then an Incident Notification Report will be created which records what requirements were breached.

If a Non-compliance is identified then it must be raised using the Environmental Incident and Non-compliance Report Form within 48 hours by the party responsible for the breach.

Downer's subcontractors found to be in breach of this Environmental Management Plan are managed in accordance with the subcontract under which they have been engaged.

Employees who breach the requirements of this Environmental Management Plan are managed in accordance with the project's Employee Relations Management Plan. Personnel found to be grossly negligent or commit an intentional environmental breach are removed from site and managed in accordance with the project's Employee Relations Management Plan.

Non-compliances raised by the customer and via internal project audits are registered and controlled in accordance with Downer's [Incident Management Procedure \(DG-ZH-PR006\)](#).

Possible non-compliances include non-compliance with the management measures outlined in this [Environmental Management Plan](#), and mitigation strategies/ management measures outlined in the Environmental Management Plan sub-plans.

Where detected, any non-compliance or environmental impact exceeding specified limits are investigated by the Environmental Advisor to determine the extent of possible non-conformance. The non-compliance is corrected as soon as possible with necessary action taken to prevent recurrence.

All non-compliances are reported to the customer and clearly identify the corrective/preventative actions to be taken and the close-out date.

3.10.3. Department of Planning, Industry and Environment incident notification

The Conditions of Approval define an incident as:

An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not cause a non-compliance with this approval.

Environmental incident and notification requirements are outlined in CoA's A36 and A37 and Appendix A of the Instrument of Approval. These requirements are outlined in Table 10. Any incidents would be notified to the Planning Secretary in accordance with these requirements.

Table 10 Incident notification to DPIE

CoA/Requirement	Details
CoA A36	The Department must be notified in writing to compliance@planning.nsw.gov.au immediately after the Proponent becomes aware of an incident. The notification must identify the CSSI (including the application number and the name of the CSSI if it has one) and set out the location and nature of the incident.
CoA A37	Subsequent notification must be given, and reports submitted in accordance with the requirements set out in Appendix A (of SSI-8256) .
Appendix A - 1	A written incident notification addressing the requirements set out below must be emailed to the Department at the following address: compliance@planning.nsw.gov.au within seven (7) days after the Proponent becomes aware of an incident. Notification is required to be given under this condition even if the Proponent fails to give the notification required under Condition A37 or, having given such notification, subsequently forms the view that an incident has not occurred.
Appendix A - 2	Written notification of an incident must: <ul style="list-style-type: none"> (a) identify the CSSI and application number; (b) provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident); (c) identify how the incident was detected; (d) identify when the Proponent became aware of the incident; (e) identify any actual or potential non-compliance with conditions of approval; (f) describe what immediate steps were taken in relation to the incident; (g) identify further action that will be taken in relation to the incident; and (h) identify a project contact for further communication regarding the incident.
Appendix A - 3	Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, the Proponent must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.
Appendix A - 4	The Incident Report must include: <ul style="list-style-type: none"> (a) a summary of the incident; (b) outcomes of an incident investigation, including identification of the cause of the incident; (c) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and (d) details of any communication with other stakeholders regarding the incident.

3.11. Work in environmentally sensitive areas

Addressed in Section 3.2.3 of this CEMP.

3.12. Ancillary site facilities

Ancillary site facilities used as part of the Project are discussed in Section 1.1.

3.12.1. Ancillary facilities approval pathways

Ancillary facilities proposed to be used as part of the Project are discussed in Section 1.1. However, any ancillary facilities outlined in the Approval Documents may be used by the Project.

As per CoA A16 ancillary facilities not identified in the Approval Documents can be established and used if:

- a) they are located within the Construction boundary of the CSSI; and
- b) they are not located next to a sensitive receiver (including access roads) (unless landowners and occupiers have accepted in writing the carrying out of the relevant facility in the proposed location); and
- c) they have no impacts on heritage items (including areas of archaeological sensitivity), and threatened species, populations or ecological communities beyond the impacts approved under the terms of this approval; and
- d) the establishment and use of the facility can be carried out and managed within the outcomes set out in the terms of this approval, including in relation to environmental, social and economic impacts.

If proposed ancillary facilities are not identified in the Approval Documents and cannot satisfy the conditions of CoA A16 they can only be established and operated when a review of environmental impacts has been prepared as per CoA A17. When the proposed ancillary facility is located within the rail corridor the review of environmental impacts may be endorsed by the ER. When the proposed ancillary facility is located outside the rail corridor the review of environmental impacts would require approval of the Planning Secretary.

Minor ancillary facilities are defined in CoA A19 as:

Lunch sheds, office sheds, portable toilet facilities, and the like, that are not identified as an ancillary facility in the documents listed Condition A1

As per CoA A19, minor ancillary facilities can be established where they satisfy the following criteria:

- a) are located within the Construction boundary; and
- b) have been assessed by the ER to have –
 - i. minor amenity impacts to surrounding residences and businesses, after consideration of matters such as compliance with the Interim Construction Noise Guideline (ICNG) (DECC, 2009), traffic and access impacts, dust and odour impacts, and visual (including light spill) impacts, and
 - ii. minor environmental impact with respect to waste management and flooding, and
 - iii. no impacts on biodiversity, soil and water, and heritage items beyond those already approved under other terms of this approval.

In accordance with CoA A18, the use of an ancillary facility for the Construction of this Project must not commence until this CEMP and the Project's Sub-plans (including monitoring programs therein), have been approved by the Planning Secretary.

3.12.2. Boundary screening approach

Boundary screening will be erected around ancillary facilities that are adjacent to sensitive receivers as required under CoA A20 and A21. This will be for the duration of Construction unless otherwise agreed with relevant councils, and affected residents, business operators or landowners. All boundary screening will minimise visual, noise and air quality impacts as required by CoA A21. Boundary screening at sites would be consistent with the requirements identified in the Construction Noise and Vibration Impact Statement's (CNVIS) (refer to NVMP). All fencing and hoarding will be in accordance with the requirements of the OCCS.

3.13. Hold points

The activities outlined in Table 11 are not to proceed without objective review and approval by the nominated authority. These activities are considered hold points. The hold points should be incorporated into the working plans for the project (EWMS, work instructions, Construction methodologies, etc.).

Table 11 Hold points

Item	Process Held	Acceptance Criteria	Approval Authority
Construction Environmental Management Plan and Sub-plans	Site activities	Site specific Construction Environmental Management Plan and Sub-plans have been developed, reviewed and approved.	Department of Planning, Industry and Environment.
Monitoring Program Amendments (CoA C13)	Amendments to Monitoring Program(s) (during Construction, as per CoA C13)	Amendments have been reviewed and approved for implementation.	ER Endorsement and Approval
CNVIS	Site activities (Prior to Construction commencement)	CNVIS to be prepared by Specialist Consultant.	ER Endorsement
Specific Environmental Control Maps (ECMs)/ progressive ESCPS	Dulwich Hill Station works Campsie Station works Punchbowl Station works	ECMs/PESCPs are developed with site specific environmental controls/mitigation measures with site supervisor/engineers for work activities and are to be implemented prior to works commencing (or a new work stage as appropriate).	Environmental Manager or Coordinator
Works that require a Project Approval Consistency Assessment	Specific site activities related to Consistency Assessment.	Consistency Assessment approval.	Sydney Metro (Approval)
Reuse or Discharge of water	Dewatering activities (During Construction)	Implementation of requirements within Section 5.2 of SWMP, prior to any discharge off the premises or reuse within the premises.	Environmental Manager or Coordinator
Sediment and erosion control measures	Construction activities involving ground disturbance.	Sediment and Erosion Control Plan has been developed, reviewed, approved and implemented.	Environment Manager (or delegate)
Vegetation removal	Commencement of site clearing or vegetation removal.	Pre-clearing surveys and inspections for endangered and threatened flora and fauna species have been undertaken by qualified ecologists.	Environment Manager (or delegate)
Vegetation removal	Commencement of site clearing or vegetation removal.	Clearing limits have been verified against the project approval environmental assessment, limits have been set-out and vegetation to be retained has been delineated and or protected. Tree Report has been completed and submitted to the DPIE.	Environment Manager (or delegate)
Vegetation removal	Commencement of site clearing or vegetation removal.	Trained ecologist to be present during the clearing of native vegetation or removal of potential fauna habitat.	Environment Manager (or delegate)

Item	Process Held	Acceptance Criteria	Approval Authority
Construction Methodologies – direct delivery and subcontract works.	Construction process representing potential medium or high impact to the environment.	Construction methodology / EWMS / Job Safety and Environmental Analysis (JSEA) have been reviewed by the Site Environmental Management Representative and addresses the relevant requirements of the CEMP procedures.	Project Engineer
OOHW Applications – individual works scenarios	Works to be performed outside of approved Construction hours (Pre-Construction and during Construction)	OOHW Protocol and Application Form and Community Notification EPL 12208	ER Endorsement and Approval TfNSW Approval (if OOHW are occurring under EPL 12208) EPA (Information to be provided on request)
Use of local roads by heavy vehicles	Use of local roads by heavy vehicles	Preparation of Road Dilapidation Report	Construction Manager (or delegate)
Dangerous Goods	Transport of dangerous goods	Verification that transport vehicles meet the requirements.	Construction Manager (or delegate)
Dangerous Goods	Storage of dangerous goods	Verification that bunded storage is provided and that segregation and separation distances are maintained for the storage area.	Construction Manager (or delegate)
Controlled/ Hazardous Waste	Transport of Controlled / Hazardous waste from the site	Verification that the waste has been classified in accordance with the EPA guidelines, transport licensing in place and landfill can lawfully receive the waste. Section 143 notice or equivalent from waste receiver has been received.	Construction Manager (or delegate)
Spoil Transport	Spoil import and removal	Verification that the spoil has been classified and the disposal location can lawfully receive the waste. Section 143 notice or equivalent from waste receiver has been received. Imported material has classification reports or appropriate testing to demonstrate that it meets any EPA exemptions or has been classified as VENM/ENM.	Construction Manager (or delegate) Environmental Manager (or delegate)
Encounter of Unexpected Heritage Item	Commencement of works in the affected area	The Unexpected Finds Process as outlined in the HMP and Sydney Metro Unexpected Finds Procedure must be applied in the event of encountering unexpected/potential heritage items.	Environmental Manager (or delegate)
Ancillary Facilities	Establishment of new ancillary facilities not identified in the planning approval documents	Demonstration that the ancillary facility meets the requirements of CoA A16. Where facilities don't meet the requirements of CoA A16, complying with the requirements of CoA A17.	DPIE (outside rail corridor) ER

Item	Process Held	Acceptance Criteria	Approval Authority
		Endorsement by the ER for minor ancillary facilities in accordance with CoA A18.	
Pre-Construction compliance report	Construction works	Pre-Construction compliance report to be completed in accordance with CoA A31 and submitted to the DPIE at least one month prior to the commencement of Construction.	DPIE
Construction Monitoring Programs	Construction Works	Endorsement of the programs by the ER and submission to the DPIE for approval at least one month prior to the commencement Construction Relevant baseline data for the specific Construction activity has been collected.	ER DPIE

3.14. Restoration of sites

On completion of the works, any areas disturbed by Construction activities (such as areas for site compounds, material storage, access and haul roads and the provision of Downer's Project accommodation) will be reinstated and restored in accordance with consultation with Sydney Metro, the community and stakeholders. As a minimum, reinstatement will include the following:

- Downer will clear and clean all working areas and accesses at project completion;
- At the completion of Construction all plant, temporary buildings or vehicles not required for the subsequent stage of Construction will be removed from the site;
- All land, including roadways, footpaths, loading facilities or other land having been occupied temporarily will be returned to their pre-existing condition or better; and
- Reinstatement of community spaces, infrastructure and services will occur as soon as possible after completion of Construction.

3.15. Records of environmental activities

3.15.1. Environmental records

Downer's Environmental Manager is responsible for maintaining all environmental management documents and records as current at the point of use. In accordance with the CEMF, records will be maintained onsite for the duration of works. Types of documents and records include:

- All environmental monitoring, inspection and compliance reports/records;
- Environmental monitoring data;
- Documentation as required by performance conditions, approvals, licences and legislation;
- Reports on environmental incidents, other environmental non-compliances or non-conformances and follow-up action;
- Results of internal and external audits;

- Minutes of CEMP and Construction environmental management system review meetings and evidence of any action taken;
- Modifications to site environmental documentation;
- Induction and training records;
- Procedures and protocols;
- Checklists, forms and templates;
- Correspondence with public authorities;
- Complaints and enquiries received, and follow-up action;
- Notifications received by regulators;
- Community engagement information;
- CEMP and Sub-plans;
- EWMS; and
- Additional documents and requirements as identified in the CEMP, CoA and REMMs.

Records will be retained by Downer for a period of no less than seven years and will be made available in a timely manner to Sydney Metro (or their representative) upon request and will be managed in accordance with Downer EMS.

3.15.2. Document control

The Principal Contractor, the ER, and Sydney Metro where relevant, will coordinate the preparation, review and distribution, as appropriate, of the environmental documents and records listed above. During the Project, the environmental documents and records will be stored at each of the main site compounds.

The Principal Contractor will implement a Project document control management system to control the flow of documents within and between the Principal Contractor, Sydney Metro, stakeholders and subcontractors.

The process will also ensure that documentation is:

- Developed, reviewed and approved prior to issue;
- Issued for use;
- Controlled and stored for the legally required timeframe;
- Removed from use when superseded or obsolete; and
- Archived.

A register and distribution list will identify the current revision of particular documents, records or data.

In accordance with Downer EMS, all project documents are generated, numbered, approved, revised, transmitted, and stored in accordance with the project's Document Control Plan.

The Environmental Management Plan review ensures the suitability, effectiveness, and adequacy of the plan. The Environmental Management Plan is formally reviewed annually

(as a minimum) and whenever the plan, risk, and/ or activities change from the scope/ content.

The review is conducted by a review team comprising the Project Manager (or delegate) and the Environmental Advisor/ Project Environmental Manager (or Safety Manager) and considers performance against the Environmental Management Plan with respect to incident trends and findings from internal and external audits.

The Project Manager (or delegate) ensures any changes to the Environmental Management Plan as a result of review/ change is communicated to personnel.

3.16. Management review

Downer will check the status and adequacy of the CEMP to ensure that it meets current requirements as well as relevant environmental standards.

The CEMP will be reviewed as and when required during the course of the contract when the following situations arise:

- Client (Sydney Metro) recommendations for changes;
- Changes to Downer's standard system;
- Opportunities for improvement or deficiencies in the project system are identified; and
- Following an audit of the system or the occurrence of significant incidents, non-conformances or non-compliances.

The routine management review will be undertaken at six monthly intervals.

In addition, Downer will ensure the continual review and improvement of the E&SMS. This will generally occur in response to:

- Issues raised during environmental surveillance and monitoring;
- Expanded scope of works;
- Environmental incidents; and/or
- Environmental non-conformances or non-compliances.

A formal review of the E&SMS by Downer's Senior Management Team will also occur on an annual basis, as a minimum. This review will generate actions for the continual improvement of the E&SMS and supporting management plans.

3.17. CEMP/Sub-plan revision and changes to the Project

3.17.1. CEMP revision

Continual improvement is achieved through regular measurement, evaluation, audit and review of the effectiveness of the CEMP, Project environmental outcomes and Downer's EMS. A review process ensures that environmental documentation is updated as appropriate for the specific works that are occurring on site. Reviews undertaken as described in Section 3.16 will provide specific opportunities to identify improvements in the environmental management system and/or this CEMP.

This CEMP, CEMP Sub-plans and Monitoring Programs will be updated as required:

- To take into account changes to the environment or generally accepted environmental management practices, new risks to the environment, any hazardous substances, contamination or changes in law;
- In response to internal or external audits or six monthly management plan reviews;
- Following reportable environmental incidents;
- Upon identification of new risks, including risks identified during risk register updates;
- When non-conformances or non-compliances are identified;
- Following environmental audits that identify matters that require attention;
- In response to Project change (including modifications);
- As part of a continuous improvement process; and
- Where requested or required by DPIE or any other Authority.

Should the document review process identify any issues or items within the documents that are either redundant or in need of updating, it is the responsibility of Downer's Environmental Manager or Environmental Coordinators to prepare the revised documents.

This CEMP, and subsequent revisions, must be authorised by Downer's Environmental Manager. The ER can approve minor changes to the CEMP, where the ER is satisfied that the amendment to the CEMP is necessary. Minor changes as described in the CoA A26(i) would typically include those that:

- Are administrative in nature (e.g. staff and agency/authority name changes);
- Do not noticeably increase the magnitude of impacts on the environment when considered individually or cumulatively;
- Are in response to audit findings or periodic reviews; and
- Do not compromise the ability of the Project to meet legislative requirements and are consistent with terms of the approval, and does not include any modifications to the terms of Project approval.

Where the ER deems it necessary, the amended CEMP will be forwarded to relevant stakeholders for review and comment if required and forwarded to the Planning Secretary for approval. All updates to the CEMP are to be communicated to Sydney Metro prior to finalisation and/or update of document.

Revised versions of the CEMP or Sub-plans will be made available and distributed to relevant stakeholders through the processes described in Section 3.15.2. Changes will also be communicated through toolbox talks to existing onsite personnel and incorporated into environmental induction materials.

3.17.2. Changes to the Project

Refinements to the Project may result from detailed design refinements or changed circumstances throughout Construction. In these instances Downer's Environmental Manager will undertake a review of the refinement to confirm that it is covered by the Approval Documents. It may be the case that a Consistency Assessment in consultation with Sydney

Metro will need to be undertaken to determine if a Project modification may be required following design changes or changes in scope (refer to Section 2.4).

Should the Consistency Assessment determine that a Project modification may be required (i.e. the impacts are of a nature and scale that it is not considered consistent with the Project approval), a modification application under Section 5.25(2) of the EP&A Act 1979 as prepared and lodged by Sydney Metro to the Planning Secretary for determination.

If required, the CEMP and Sub-plans would be updated as required to incorporate any additional potential environmental impacts or mitigation or management measures that resulted from the proposed changes. Affected personnel will be made aware of changes before the relevant works commence through toolbox talks, daily pre-start meeting, HSE committees or forums arranged to specifically address changes.

4. Environmental management documentation

CEMP Sub-plans, Monitoring Programs and Procedures support the Project's CEMP and environmental management. These documents have been prepared to address the requirements of the CoA, REMM, CEMF and other measures identified in Section 1.2 and environment assessment documentation. The CEMP structure overview is shown in Figure 8 and key environmental management documents are discussed below.

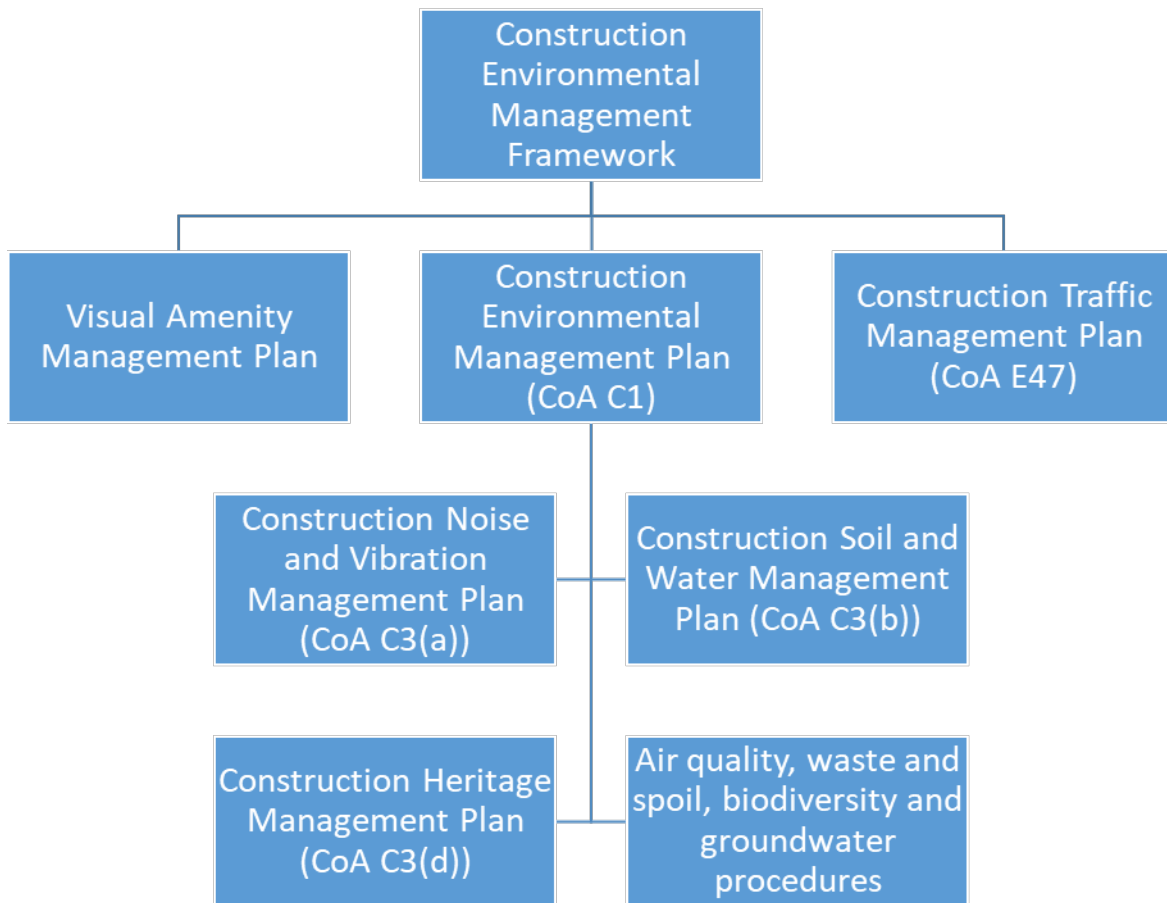


Figure 8 CEMP structure overview

4.1. Noise and vibration

A Noise and Vibration Management Plan (NVMP) has been developed to manage the noise and vibration risks during Construction of the Project. The NVMP is located in Appendix G of the CEMP and has been developed in accordance with CoA C3, C4, C5, C6 and C7.

For further Sub-plan specific CoA, REMM and other relevant requirements used to prepare the NVMP refer to Section 2 of the NVMP.

Furthermore, in accordance with the CoA C8(a) a Noise and Vibration Monitoring Program has been prepared and is included in Section 8 of the NVMP.

4.2. Soil and water

A Soil and Water Management Plan (SWMP) has been developed to manage soil and water quality risks during Construction of the Project. The SWMP is located in Appendix H of the CEMP and has been developed in accordance with CoA C3, C4, C5, C6 and C7.

For further Sub-plan specific CoA, REMM and other relevant requirements used to prepare the SWMP refer to Section 2.2 and Appendix A of the SWMP.

CoA C8(b) requires the preparation of a Water Quality Monitoring Program. Consistent with Section 3.3(b) of the CEMF, a Water Quality Monitoring Procedure has been prepared and is included in Section 6 of the SWMP.

4.3. Heritage

A Heritage Management Plan (HMP) has been developed to manage the risks from Construction of the Project. The HMP is located in Appendix I of the CEMP and has been developed in accordance with CoA C3, C4, C5, C6 and C7.

For further Sub-plan specific CoA, REMM and other relevant requirements used to prepare the HMP refer to Section 2.2 and Appendix A of the HMP.

4.4. Waste and spoil

CoA C3(c) required the preparation of a Waste and Spoil Management Plan. However, in accordance with the Sydney Metro City & Southwest - Sydenham to Bankstown Staging Report a Waste and Spoil Procedure has been prepared. Refer to Section 4.7 and Appendix E for further detail.

4.5. Visual Amenity

A Visual Amenity Management Plan (VAMP) will be prepared by the Principal Contractor to manage the visual amenity risks during Construction of the Project. The VAMP is a standalone document and has been developed in accordance with Section 3.4 of the CEMF.

4.6. Traffic

Construction Traffic Management Plan/s (CTMP/s) will be prepared by the Principal Contractor as per CoA E47. These are standalone documents and do not form part of the CEMP. The CTMP/s will be submitted to DPIE for information following engagement with RMS and SCO.

4.7. Other aspects

Consistent with the Sydenham to Bankstown Staging Report and Sections 3.4 and 3.5 of the CEMF, procedures have been prepared for the following environmental aspects:

- Biodiversity;
- Groundwater;
- Air Quality; and
- Waste and Spoil.

These procedures are included in Appendix E.

4.8. Sustainability

A Sustainability Strategy for the Sydenham to Bankstown project has been prepared in accordance with CoA E43. The Sustainability Strategy is available on the Sydney Metro website <https://www.sydneymetro.info/documents>.

Appendix A: Compliance Matrix

Conditions of Approval compliance matrix

CoA	Condition requirements	Document reference
A16	<p>Ancillary facilities that are not identified by description and location in the documents listed Condition A1 can only be established and used in each case if:</p> <ul style="list-style-type: none"> a) they are located within the Construction boundary of the CSSI; and b) they are not located next to a sensitive receiver (including access roads) (unless landowners and occupiers have accepted in writing the carrying out of the relevant facility in the proposed location); and c) they have no impacts on heritage items (including areas of archaeological sensitivity), and threatened species, populations or ecological communities beyond the impacts approved under the terms of this approval; and d) the establishment and use of the facility can be carried out and managed within the outcomes set out in the terms of this approval, including in relation to environmental, social and economic impacts. 	Section 3.12.1
A17	Ancillary facilities that are not identified by description and location in the documents listed in Condition A1 and do not meet the requirements of Condition A16, can only be established and used with the approval of the Planning Secretary except where they are located within the rail corridor, in which case they may be endorsed by the ER. A review of environmental impacts must be submitted with the request for Planning Secretary's approval or ER's endorsement.	Section 3.12.1
A18	The use of an ancillary facility for Construction must not commence until the CEMP required by Condition C1, relevant CEMP Sub-plans required by Condition C3 and relevant Construction Monitoring Programs required by Condition C8 have been approved by the Planning Secretary.	Section 3.12.1
A19	<p>Lunch sheds, office sheds, portable toilet facilities, and the like, that are not identified as an ancillary facility in the documents listed Condition A1, can be established where they satisfy the following criteria:</p> <ul style="list-style-type: none"> a) are located within the Construction boundary; and b) have been assessed by the ER to have - <ul style="list-style-type: none"> i. minor amenity impacts to surrounding residences and businesses, after consideration of matters such as compliance with the Interim Construction Noise Guideline (DECC, 2009), traffic and access impacts, dust and odour impacts, and visual (including light spill) impacts, and ii. minor environmental impact with respect to waste management and flooding, and iii. no impacts on biodiversity, soil and water, and heritage items beyond those already approved under other terms of this approval. 	Section 3.12.1
A20	Boundary screening must be erected around all ancillary facilities that are adjacent to sensitive receivers for the duration of Construction of the CSSI unless otherwise agreed with relevant council(s), and affected residents, business operators or landowners.	Section 3.12.2
A21	Boundary screening required under Condition A20 of this approval must minimise visual, noise and air quality impacts on adjacent sensitive	Section 3.12.2

CoA	Condition requirements	Document reference
	receivers.	
A22	Work must not commence until an ER has been approved by the Planning Secretary and engaged by the Proponent.	Section 3.3
A23	The Planning Secretary's approval of an ER must be sought no later than one (1) month before the commencement of Work.	Section 3.3
A24	The proposed ER must be a suitably qualified and experienced person who was not involved in the preparation of the EIS, SPIR or Submissions Report and is independent from the design and Construction personnel for the CSSI and those involved in the delivery of it.	Section 3.3
A26	<p>For the duration of the Work until the commencement of Operation, or as agreed with the Planning Secretary, the approved ER must:</p> <ul style="list-style-type: none"> a) receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; b) consider and inform the Planning Secretary on matters specified in the terms of this approval; c) consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; d) review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: <ul style="list-style-type: none"> i. make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or ii. make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary); e) regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval; f) as may be requested by the Planning Secretary, help plan, attend or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings and site visits, but not independent environmental audits required under Condition A34 of this approval; g) as may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; h) assess the impacts of minor ancillary facilities as required by Condition A19 of this approval; i) consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and j) prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The k) Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI. 	Section 3.3
A29	Before the commencement of Construction, a Compliance Monitoring and Reporting Program must be prepared, endorsed by the ER and submitted to the Planning Secretary for information.	Section 3.9 and 3.10

CoA	Condition requirements	Document reference
A30	Compliance reports of the CSSI must be carried out for the duration of Construction and for a minimum of one (1) year following commencement of Operation. The Department must be notified of the commencement dates of Construction and Operation of the CSSI in the pre-Construction and pre-Operational compliance reports (respectively).	Section 3.9 and 3.10
A31	The Construction Compliance Report must provide details of any review of, and minor amendments made to, the CEMP (which must be approved by the ER), resulting from Construction carried out during the reporting period.	Section 3.9 and 3.10
A32	The Compliance Monitoring and Reporting Program in the form required under Condition A29 of this approval must be implemented for the duration of Construction and for a minimum of one (1) year following commencement of Operation, or for a longer period as determined by the Planning Secretary based on the outcomes of independent audits, Environmental Representative Reports and regular compliance reviews submitted through Compliance Reports . If staged Operation is proposed, or Operation is commenced of part of the CSSI, the Compliance Monitoring and Reporting Program must be implemented for the relevant period of each stage or part of the CSSI.	Section 3.9 and 3.10
A33	No later than one (1) month before the commencement of Construction an Independent Audit Program prepared in accordance with AS/NZS ISO 19011:2014 – Guidelines for Auditing Management Systems must be submitted to the Planning Secretary.	Section 3.9.3
A34	Independent audits of the CSSI must be carried out in accordance with: a) the Independent Audit Program submitted to the Planning Secretary under Condition A33 of this approval and Independent Audit Reports prepared.	Section 3.9.3
A35	The Proponent must: a) review and respond to each Independent Audit Report prepared under Condition A34 of this approval; and b) submit the response to the Planning Secretary within six (6) weeks of completing the audit.	Section 3.9.3
A36	The Department must be notified in writing to compliance@planning.nsw.gov.au immediately after the Proponent becomes aware of an incident. The notification must identify the CSSI (including the application number and the name of the CSSI if it has one) and set out the location and nature of the incident.	Section 3.10.3
A37	Subsequent notification must be given, and reports submitted in accordance with the requirements set out in Appendix A	Section 3.10.3
E2	In addition to the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1, 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.	Appendix E – Procedure 3: Air Quality
E3	Where impacts to threatened ecological communities or endangered species cannot be avoided, they must be offset in accordance with the requirements of the NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014) in agreement with OEH. <i>Note: the SPIR proposal does not require offsetting under the Framework for Biodiversity Assessment as it does not have any impacts to threatened ecological communities or threatened species.</i>	Appendix E – Procedure 1: Biodiversity
E4	The CSSI must be designed to retain as many trees as possible. Where trees are to be removed, the Proponent must provide a 2:1 ratio replacement of trees. Replacement trees must be planted within the project boundary or on public land up to 500 metres from the project boundary. Replacement tree plantings can be undertaken beyond 500 metres on public land within the local government areas to which the	Appendix E – Procedure 1:

CoA	Condition requirements	Document reference
	CSSI approval applies if requested by the relevant council(s) or where no more practicable land for planting can be found within and up to 500 metres from the CSSI boundary. The location of replacement trees must be determined in consultation with the relevant council(s).	Biodiversity
E5	<p>The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) before removing any trees as detailed in the documents listed in Condition A1. The Tree Report may be prepared for the entire CSSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the CSSI on trees and vegetation within and adjacent to the Construction footprint. The report(s) must include:</p> <p>(a) assess compliance with the requirements of this approval;</p> <p>(b) a description of the conditions of the tree(s) and its amenity and visual value;</p> <p>(c) consideration of all options to avoid tree removal, including relocation of services, redesign or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services; and</p> <p>(d) measures to avoid the removal of trees or minimise damage to existing trees and ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, root protection zone, excavation, site controls on waste disposal, vehicular access, storage of materials and protection of public utilities.</p> <p>A copy of the report(s) must be submitted to the Planning Secretary before the removal or pruning of any trees, including those affected by site establishment Work. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Planning Secretary.</p>	Appendix E – Procedure 1: Biodiversity
E6	<p>Replacement trees are to have a minimum pot size of 75 litres except where the plantings are consistent with the pot sizes specified in a relevant council's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant council. In areas not subject to council plans / programs / strategies, pot sizes should be informed through consultation with the relevant council(s).</p> <p><i>Note: For the purposes of Conditions E5 and E6, consultation with relevant council(s) encompasses consultation undertaken with those councils on the Station Design and Precinct Plan required by Condition E56, and any agreements reached on replacement pot sizes during consultation.</i></p>	Appendix E – Procedure 1: Biodiversity
E54	The Proponent must construct and operate the CSSI with the objective of minimising light spillage to surrounding properties. All lighting associated with the Construction and Operation of the CSSI must be consistent with the requirements of <i>Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting</i> and relevant Australian Standards in the series AS/NZ 1158 – <i>Lighting for Roads and Public Spaces</i> .	Refer to VAMP Section 3.2.3
E73	<p>Any items or infrastructure that are salvageable must be identified in the relevant CEMP Sub- plan (Condition C3).</p> <p><i>Note: reuse of items may include signal boxes, indicators, ballast or other rail infrastructure. These items should be offered to Sydney Trains or reuse.</i></p>	Appendix E – Procedure 4: Waste and Spoil
E74	The importation of waste and the storage, treatment, processing, reprocessing or disposal of such waste must comply with the Protection of the Environment Operations Act 1997, under the Protection of the Environment Operations (Waste) Regulation 2014, and orders or exemptions made under the regulation.	Appendix E – Procedure 4: Waste and Spoil

CoA	Condition requirements	Document reference
E75	Waste must only be exported to a site licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste, or in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, or to any other place that can lawfully accept such waste.	Appendix E – Procedure 4: Waste and Spoil
E76	All waste must be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.	Appendix E – Procedure 4: Waste and Spoil

CEMF compliance matrix

Clause	Requirement	Document Reference
1.3	<p>Transport for NSW (TfNSW) has developed an Environment and Sustainability Policy (Appendix A) for Sydney Metro Delivery Office (SMDO). Principal Contractors will be required to undertake their works in accordance with this policy. The policy reflects a commitment in the delivery of the project to:</p> <ul style="list-style-type: none"> Align with, and support, Transport for NSW (TfNSW) Environment & Sustainability Policy. Optimise sustainability outcomes, transport service quality, and cost effectiveness. Develop effective and appropriate responses to the challenges of climate change, carbon management, resource and waste management, land use integration, customer and community expectation, and heritage and biodiversity conservation. Be environmentally responsible, by avoiding pollution, enhancing the natural environment and reducing the project ecological footprint, while complying with all applicable environmental laws, regulations and statutory obligations. Be socially responsible by delivering a workforce legacy which benefits individuals, communities, the project and industry, and is achieved through collaboration and partnerships. 	Section 1.3 Appendix D
2	<p>The key environmental obligations to be addressed are contained within:</p> <ul style="list-style-type: none"> Legislative requirements. Project approval documentation. Conditions of Approval. Environment Protection Licences. Other permits, approval and licences. Standards and guidelines. 	Section 2

Clause	Requirement	Document Reference
2.1	Table 1.1 (of the CEMF) identifies key NSW environmental legislative requirements and their application to Sydney Metro C&SW construction works, current as at the date of this document. TfNSW and its Contractors should regularly review their legislative requirements.	Section 2
2.2	<p>Sydney Metro Northwest is classified as Critical State Significant Infrastructure and was approved under the following in accordance with Section 115W of the Environmental Protection and Assessment Act 1997:</p> <ul style="list-style-type: none"> Staged State Infrastructure Approval (1 October 2011, modified on 25 September 2012) Stage 1 – Major Civil Construction Works (25 September 2012, modified on 18 April 2013) Stage 2 – Stations, Rail Infrastructure and Systems (8 May 2013, modified on 20 May 2014). <p>Some components of Sydney Metro Northwest (such as the conversion of the Epping to Chatswood component of the project) have also been approved under Part 5 of the Environmental Protection and Assessment Act. in which case TfNSW is the consent authority.</p> <p>Sydney Metro City and Southwest is also classified as Critical State Significant Infrastructure and requires approval from a consent authority under the requirements of the Environmental Protection and Assessment Act 1997 (Section 115W). Two separate approvals will be sought:</p> <ul style="list-style-type: none"> Sydney Metro City and Southwest – Chatswood to Sydenham Sydney Metro City and Southwest - Sydenham to Bankstown <p>The requirements of the approval are required to be complied with by TfNSW. Responsibility for implementing mitigation measures and conditions of approval will be allocated between TfNSW and Principal Contractors as appropriate. Typically TfNSW will produce a Staging Report which sets out the applicability and allocation of approval requirements within the project's program of works.</p>	Section 2 Appendix A
2.3	<p>Sydney Metro projects often meet the definition of a number of scheduled activities under Schedule 1 of the Protection of the Environment Operation Act 1997 (POEO Act) and as such our contractors may be required to obtain an Environment Protection Licence (EPL) or work under the existing EPL held by Sydney Trains.</p> <p>Where required, Sydney Metro Principal Contractors will:</p> <ol style="list-style-type: none"> Apply for and be granted an EPL from the EPA. Hold an EPL which covers their scope of works as necessary under the POEO Act. Undertake their scope of works in accordance with the conditions of the applicable EPLs as issued by the EPA. Work under the existing Sydney Trains EPL. 	Section 2.6
2.4	<p>Numerous environmental publications, standards, codes of practice and guidelines are relevant to TfNSW construction and are referenced throughout this Construction Environmental Management Framework. A summary of these applicable standards and guidelines is provided below:</p> <ul style="list-style-type: none"> ISO14001 Environmental Management System – Requirements with Guidelines for Use 	Section 2.5

Clause	Requirement	Document Reference
	<ul style="list-style-type: none"> Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009) Managing Urban Stormwater: Soil and Construction (Landcom, 2008) AS4282:1997 Control of the Obtrusive Effect of Outdoor Lighting Waste Classification Guidelines (Department of Environment, Climate Change and Water, 2008) AS 1742.3 Manual of uniform traffic control devices Part 3: Traffic control for works on roads RMS Traffic Control at Worksites Manual Australian and New Zealand Guidelines for Fresh and Marine Water Quality 	
3.1(a)	Principal Contractors are required to have a corporate Environmental Management System certified under AS/NZS ISO 14001:2004 and to have transitioned this accreditation into AS/NZS ISO 14001:2015 by September 2018.	This plan
3.1(b)	<p>Principal Contractors are required to develop a project based Environment and Sustainability Management System (E&SMS).</p> <p>The E&SMS will:</p> <ul style="list-style-type: none"> (i) Be consistent with the Principal Contractors corporate Environmental Management System and AS/NZS ISO 14001:2004 or 2015; (ii) Be supported by a process for identifying and responding to changing legislative or other requirements; (iii) Include processes for assessing design or construction methodology changes for consistency against the planning approvals; (iv) Include processes for tracking and reporting performance against sustainability and compliance targets; (v) Include a procedure for the identification and management of project specific environmental risks and appropriate control measures; and (vi) Be consistent with the Sydney Metro C&SW Sustainability Strategy and Sydney Metro Environment and Sustainability Policy 	This plan
3.1(c)	All sub-contractors engaged by the Principal Contractor will be required to work under the Principal Contractor's E&SMS.	Section 3.4
3.1(d)	The relationship between key documents within the Sydney Metro Environment and Sustainability Management System and the Principal Contractor's Environment and Sustainability Management System is shown in Figure 2 (of the CEMF).	This Plan
3.1(e)	The Principal Contractors Sustainability Plan and its Sub-plans will capture governance and design requirements as well as social sustainability initiatives as required by the Sydney Metro Sustainability Strategies.	Refer to Sustainability Management Plan
3.1(f)	These plans vary in scope across different delivery packages.	Noted

Clause	Requirement	Document Reference
3.4(a)	<p>Subject to Section 3.3(b) and Section 3.2(b) the Principal Contractor will prepare issue-specific environmental Sub-plans to the CEMP and SMP which address each of the relevant environmental impacts at a particular site or stage of the project.</p> <p>Issue specific Sub-plans will include:</p> <ul style="list-style-type: none"> (i) Spoil management; (ii) Groundwater management; (iii) Traffic and transport; (iv) Noise and vibration management; (v) Heritage management; (vi) Flora and fauna management; (vii) Visual amenity management; (viii) Carbon and energy management; (ix) Materials management; (x) Soil and water management; (xi) Air quality management; and (xii) Waste management and recycling. 	Refer to Section 1.2 and Staging Report
3.5(a)	The Principal Contractor will prepare and implement activity specific environmental procedures. These procedures should support environmental management Sub-plans, but may substitute for Sub-plans in agreement with TfNSW if a reasonable risk based justification can be made and the Sub-plans in agreement with TfNSW if a reasonable risk based justification can be made and the sub plan is not a requirement of any approval.	Appendix E
3.5(b)	<p>The procedures will include;</p> <ul style="list-style-type: none"> (i) A breakdown of the work tasks relevant to the specific activity and indicate responsibility for each task; (ii) Potential impacts associated with each task; (iii) A risk rating for each of the identified potential impacts; (iv) Mitigation measures relevant to each of the work tasks; and (v) Responsibility to ensure the implementation of the mitigation measures 	Appendix E
3.5(c)	<p>The Principal Contractor will prepare and implement site based progressive Environmental Control Maps (ECM's) which as a minimum:</p> <ul style="list-style-type: none"> (i) Is a progressive document depicting a current representation of the site; 	Section 3.2.3

Clause	Requirement	Document Reference
	(ii) Indicates which environmental procedures, environmental approvals, or licences are applicable; (iii) Illustrates the site showing significant structures, work areas and boundaries; (iv) Illustrates environmental control measures and environmentally sensitive receivers; (v) Is endorsed by the Principal Contractors Environmental Manager or delegate; and (vi) Relevant workers will be trained in the requirements of and will sign off the procedures prior to commencing works on the specific site and / or activity.	
3.6(a)	Where the requirement for an additional environmental assessment is identified, this will be undertaken prior to undertaking any physical works. The environmental assessment will include: (i) A description of the existing surrounding environment; (ii) Details of the ancillary works and construction activities required to be carried out including the hours of works; (iii) An assessment of the environmental impacts of the works, including, but not necessarily limited to, traffic, noise and vibration, air quality, soil and water, ecology and heritage; (iv) Details of mitigation measures and monitoring specific to the works that would be implemented to minimise environmental impacts; and (v) Identification of the timing for completion of the construction works, and how the sites would be reinstated (including any necessary rehabilitation).	Section 2.4
3.7(a)	Prior to the commencement of construction the Principal Contractors will offer Pre-construction Building Condition Surveys, in writing, to the owners of buildings where there is a potential for construction activities to cause cosmetic or structural damage. If accepted, the Principal Contractor will produce a comprehensive written and photographic condition report produced by an appropriate professional prior to relevant works commencing.	Refer to Construction Noise and Vibration Management Plan.
3.7 (b)	Prior to the commencement of construction the Principal Contractor will prepare a Road Dilapidation Report for all local public roads proposed to be used by heavy vehicles.	Refer to Construction Traffic Management Plan
3.8(a)	Principal Contractors will identify hold points, beyond which approval is required to proceed with a certain activity. Example activities include vegetation removal and water discharge. Hold points will be documented in relevant CEMPs.	Section 3.13
3.8(b)	Table 1.4 (of the CEMF) provides the structure for the register of hold points as well as a preliminary list of hold points which will be implemented.	Section 3.13
3.9(a)	Principal Contractors will be responsible for determining the training needs of their personnel. As a minimum this will include site induction, regular toolbox talks and topic specific environmental training as follows: i. The site induction will be provided to all site personnel and will include, as a minimum: <ul style="list-style-type: none"> • Training purpose, objectives and key issues; • Contractor's environmental policy and key performance indicators; 	Section 3.5

Clause	Requirement	Document Reference
	<ul style="list-style-type: none"> • Due diligence, duty of care and responsibilities; • Relevant conditions of any environmental licence and/or the relevant conditions of approval; • Site specific issues and controls including those described in the environmental procedures; • Reporting procedure for environmental hazards and incidents; • Communication protocols. <p>ii. Toolbox talks will be held on a regular basis in order to provide a project or site wide update, including any key or recurring environmental issues; and</p> <p>iii. Topic specific environmental training, e.g. erosion and sediment control training will be undertaken for relevant site personnel as determined by the Principal Contractor</p>	
3.9(b)	<p>Principal Contractors will conduct a Training Needs Analysis which:</p> <ul style="list-style-type: none"> i. Identifies that all staff are to receive an environmental induction and undertake environmental incident management training ii. Identifies the competency requirements of staff that hold environmental roles and responsibilities documented within the Construction Environmental Management Plan and Sub-plans iii. Identifies appropriate training courses/events and the frequency of training to achieve and/or maintain these competency requirements iv. Implements and documents as part of the CEMP a training schedule that plans attendance at environmental training events, provides mechanisms to notify staff of their training requirements, and identifies staff who do not attend scheduled training events or who have overdue training requirements 	Section 3.5
3.10(a)	<p>Principal Contractors will develop and implement a Pollution Incident Response Management Plan, in accordance with the requirements of the POEO Act. Contractors' emergency and incident response procedures will also be consistent with any relevant SMDO procedures and will include:</p> <ul style="list-style-type: none"> i. Categories for environmental emergencies and incidents ii. Notification protocols for each category of environmental emergency or incident, including notification of TfNSW and notification to owners / occupiers in the vicinity of the incident. This is to include relevant contact details iii. Identification of personnel who have the authority to take immediate action to shut down any activity, or to affect any environmental control measure (including as directed by an authorised officer of the EPA) iv. A process for undertaking appropriate levels of investigation for all incidents and the identification, implementation and assessment of corrective and preventative actions; and v. Notification protocols of incidents to the EPA, DPIE or OEH that are made by the Contractor or TfNSW. 	Sections 3.10
3.10(b)	The Contractor will make all personnel aware of the plan and their responsibilities.	Section 3.3
3.11(a)	Independent Environmental Representatives	Section 3.3

Clause	Requirement	Document Reference
	<p>a. TfNSW will engage Independent Environmental Representatives (ERs) to undertake the following, along with any additional roles as required:</p> <ul style="list-style-type: none"> i. Review, provide comment on and endorse (where required) any relevant environmental documentation to verify it is prepared in accordance with relevant environmental legislation, planning approval conditions, relevant standards and this CEMF. ii. Monitor and report on the implementation and performance of the above mentioned documentation and other relevant documentation. iii. Provide independent guidance and advice to TfNSW and the Contractors in relation to environmental compliance issues and the interpretation of planning approval conditions. iv. Be the principal point of advice for the DPIE in relation to all questions and complaints concerning the environmental performance of the project. v. Ensure that environmental auditing is undertaken in accordance with all relevant project requirements. vi. Recommend reasonable steps, including 'stop works', to be taken to avoid or minimise adverse environmental impacts. 	
3.12(a)	<p>In relation to Roles and Responsibilities the CEMP will:</p> <ul style="list-style-type: none"> i. Describe the relationship between the Principal Contractor, TfNSW, key regulatory stakeholders, the independent environmental representative and the independent certifier ii. For each role that has environmental accountabilities or responsibilities, including key personnel, provide a tabulated description of the authority and roles of key personnel, lines of responsibility and communication, minimum skill level requirements and their interface with the overall project organisation structure iii. Provide details of each specialist environment, sustainability or planning consultant who is employed by the Principal Contractor including the scope of their work iv. Provide an overview of the role and responsibilities of the Independent Environmental Representative, the Independent Certifier and other regulatory stakeholders. 	Section 3.3
3.12(b)	All sub-contractors engaged by the Principal Contractor will be required to operate within the EMS documentation of that Principal Contractor	Section 3.4
3.13(a)	Issue specific environmental monitoring will be undertaken as required or as additionally required by approval, permit or licence conditions	Refer to relevant Sub-plans
3.13(b)	The results of any monitoring undertaken as a requirement of the EPL will be published on the Principal Contractor's, or a project specific, website within 14 days of obtaining the results	Section 2.6
3.13(c)	<p>Environmental inspections will include:</p> <ul style="list-style-type: none"> i. Surveillance of environmental mitigation measures by the Site Foreman. 	Section 3.9.1

Clause	Requirement	Document Reference
	ii. Periodic inspections by the Principal Contractor's Environmental Manager (or delegate) to verify the adequacy of all environmental mitigation measures. This will be documented in a formal inspection record.	
3.13(d)	Regular site inspections by the ERs and TfNSW representatives at a frequency to be agreed with the Principal Contractor	Section 3.9.1
3.13(e)	Principal Contractors will be required to undertake internal environmental audits. Internal audits will include: <ul style="list-style-type: none"> i. Compliance with approval, permit and licence conditions. ii. Compliance with the E&SMS, CEMP, SMP, Sub-plans and procedures. iii. Community consultation and complaint response. iv. Environmental training records. v. Environmental monitoring and inspection results 	Section 3.9.3
3.13(f)	TfNSW (or an independent environmental auditor) will also undertake periodic audits of the Principal Contractor's E&SMS and compliance with the environmental aspects of contract documentation, including this Construction Environmental Management Framework.	Section 3.9.3
3.14(a)	Environmental Non-compliances Principal Contractors will document and detail any non-compliances arising out of the above monitoring, inspections and audits. TfNSW will be made aware of all non-compliances in a timely manner	Section 3.10
3.14(b)	Principal Contractors will develop and implement corrective actions to rectify the non-compliances and preventative actions in order to prevent the re-occurrence of the non-compliance. Contractors will also maintain a register non compliances, corrective actions and preventative actions	Section 3.10
3.14(c)	TfNSW or the Environmental Representative may raise non-compliances against environmental requirements.	Noted
3.15(a)	Principal Contractors will maintain appropriate records of the following: <ul style="list-style-type: none"> i. Site inspections, audits, monitoring, reviews or remedial actions. ii. Documentation as required by performance conditions, approvals, licences and legislation. iii. Modifications to site environmental documentation (e.g. CEMP, Sub-plans and procedures). iv. Other records as required by this Construction Environmental Management Framework 	Section 3.15
3.15(b)	Records will be retained onsite for the duration of works	Section 3.15
3.15(c)	Additionally records will be retained by the Principal Contractor for a period of no less than 7 years in total. Records will be made available in a timely manner to TfNSW (or their representative) upon request	Section 3.15

Clause	Requirement	Document Reference
3.15(d)	Compliance reports detailing the outcome of any environmental surveillance activity including internal and external audits (refer to Section 3.13) will be produced by the Principal Contractors Environmental Manager or delegate. These reports will be submitted to TfNSW at an agreed frequency	Section 3.9.4
3.16(a)	Principal Contractors will ensure the continual review and improvement of the E&SMS. This will generally occur in response to: <ul style="list-style-type: none"> i. Issues raised during environmental surveillance and monitoring ii. Expanded scope of works iii. Environmental incidents iv. Environmental non-conformances. 	Section 3.16 and 3.17
3.16(b)	A formal review of the E&SMS by the Principal Contractor's Senior Management Team will also occur on an annual basis, as a minimum. This review will generate actions for the continual improvement of the E&SMS and supporting management plans.	Section 3.16
5.1(a)	Standard working hours are between 7am – 6pm on weekdays and 8am – 1pm on Saturdays.	Section 3.6 Noise and Vibration Management Plan
5.1(b)	Works which can be undertaken outside of standard construction hours without any further approval include: <ul style="list-style-type: none"> i. Those which have been described in respective environmental assessments as being required to take place 24/7. For example, tunnelling and underground excavations and supporting activities will be required 24/7 ii. Works which are determined to comply with the relevant Noise Management Level at sensitive receivers iii. The delivery of materials outside of approved hours as required by the Police or other authorities (including RMS) for safety reasons iv. Where it is required to avoid the loss of lives, property and / or to prevent environmental harm in an emergency v. Where written agreement is reached with all affected receivers. 	Section 3.6 Noise and Vibration Management Plan
5.1(c)	Principal Contractors may apply for EPA approval to undertake works outside of normal working hours under their respective Environment Protection Licences	Noise and Vibration Management Plan
5.2(a)	Principal Contractors will consider the following in the layout of construction sites: <ul style="list-style-type: none"> i. The location of noise intensive works and 24 hour activities in relation to noise sensitive receivers ii. The location of site access and egress points in relation to noise and light sensitive receivers, especially for sites proposed to be utilised 24 hours per day iii. The use of site buildings to shield noisy activities from receivers iv. The use of noise barriers and / or acoustic sheds where feasible and reasonable for sites proposed to be regularly used outside of daytime hours 	Noise and Vibration Management Plan

Clause	Requirement	Document Reference
	v. Aim to minimise the requirement for reversing, especially of heavy vehicles.	
5.3(a)	Mitigation measures for reinstatement will be produced in consultation with TfNSW, the community and stakeholders.	Section 3.14
5.3(b)	Mitigation measures required for reinstatement will be incorporated into the CEMP and will include as a minimum: <ul style="list-style-type: none"> i. Principal Contractors will clear and clean all working areas and accesses at project completion ii. At the completion of construction all plant, temporary buildings or vehicles not required for the subsequent stage of construction will be removed from the site iii. All land, including roadways, footpaths, loading facilities or other land having been occupied temporarily will be returned to their pre-existing condition or better iv. Reinstatement of community spaces, infrastructure and services will occur as soon as possible after completion of construction. 	Section 21
6.1 (a)	The following spoil management objectives will apply to the construction of the project: <ul style="list-style-type: none"> i. Minimise spoil generation where possible; ii. The project will mandate 100% reuse or recycling (on or off-site) of usable spoil; iii. Spoil will be managed with consideration to minimising adverse traffic and transport related issues; iv. Spoil will be managed to avoid contamination of land or water; v. Spoil will be managed with consideration of the impacts on residents and other sensitive receivers; and vi. Site contamination will be effectively managed to limit the potential risk to human health and the environment. 	Appendix E – Procedure 4: Waste and Spoil Appendix H – Soil and Water Management Plan
6.2 (a)	Principal Contractors will develop and implement a Spoil Management Plan for their scope of works. The Spoil Management Plan will include as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
6.3 (a)	Examples of spoil mitigation measures include: <ul style="list-style-type: none"> i. Implementing the spoil re-use hierarchy; ii. Handling spoil to minimise potential for air and water pollution; and iii. Minimise traffic impacts associated with spoil removal. 	Appendix E – Procedure 4: Waste and Spoil
7.1 (a)	The following groundwater management objectives will apply to construction: <ul style="list-style-type: none"> i. Reduce the potential for drawdown of surrounding groundwater resources; ii. Prevent the pollution of groundwater through appropriate controls; and iii. Reduce the potential impacts of groundwater dependent ecosystems. 	Appendix E – Procedure 2: Groundwater
7.2 (a)	The following content may be provided within other sub plans such as the Soil and Water Management Plan and the Flora and Fauna Management Plan	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.

Clause	Requirement	Document Reference
7.2 (b)	Principal Contractor's will develop and implement a Groundwater Management Plan for their scope of works. The Groundwater Management Plan include as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
7.3 (a)	Examples of groundwater mitigation measures include: <ul style="list-style-type: none"> i. Implementing all feasible and reasonable mitigation measures to limit groundwater inflows to stations and crossovers; and ii. Undertaking groundwater monitoring during construction (levels and quality) in areas identified as 'likely' and 'potential groundwater dependent ecosystems. 	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
11.1 (a)	The following flora and fauna objectives will apply to construction: <ul style="list-style-type: none"> i. Minimise impacts on flora and fauna; ii. Design waterway modifications and crossings to incorporate best practice principles; iii. Retain and enhance existing flora and fauna habitat wherever possible; and iv. Appropriately manage the spread of weeds and plant pathogens. 	Appendix E – Procedure 1: Biodiversity 11.1(a) ii. Is not relevant to this Project as no waterway modifications or crossings are proposed.
11.2 (a)	Principal Contractor's will develop and implement a Flora and Fauna Management Plan which will include as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
11.2 (b)	Principal Contractors would undertake the following ecological monitoring as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
11.2 (c)	The Principal Contractor's regular inspections will include a check on the ecological mitigation measures and project boundary fencing.	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
11.2 (d)	The following compliance records would be kept by the Principal Contractor: <ul style="list-style-type: none"> i. Records of pre-clearing inspections undertaken; ii. Records of the release of the pre-clearing hold point; and iii. Records of ecological inspections undertaken. 	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
11.3 (a)	Examples of flora and fauna mitigation measures include: <ul style="list-style-type: none"> i. Areas to be retained and adjacent habitat areas will be fenced off prior to works to prevent damage or accidental over clearing; ii. Clearing will follow a two-stage process as follows: <ul style="list-style-type: none"> - Non-habitat trees will be cleared first after sign-off of the pre-clearing inspection; and 	Appendix E – Procedure 1: Biodiversity

Clause	Requirement	Document Reference
	<ul style="list-style-type: none"> - Habitat trees will be cleared no sooner than 48 hours after non-habitat trees have been cleared. A suitably qualified ecologist will be present on site during the clearing of habitat trees. Felled habitat trees will be left on the ground for 24 hours or inspected by the ecologist prior to further processing. iii. Weed management is to be undertaken in areas affected by construction prior to any clearing works in accordance with the Noxious Weeds Act 1993. 	
16.1 (a)	<p>The following air quality management objectives will apply to construction:</p> <ul style="list-style-type: none"> i. Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable; and ii. Identify and control potential dust and air pollutant sources. 	Appendix E – Procedure 3: Air Quality
16.2 (a)	Principal Contractors will develop and implement an Air Quality Management Plan which will include, as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
16.2 (b)	Air quality and dust monitoring will involve the following as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
16.2 (c)	The following compliance records will be kept by the Principal Contractor: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
16.3 (a)	<p>Examples of air quality mitigation measures include:</p> <ul style="list-style-type: none"> i. Plant and equipment will be serviced and maintained in good working order to reduce unnecessary emissions from exhaust fumes; ii. 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; iii. Wheel-wash facilities or rumble grids will be provided and used near the site exit points, as appropriate; and iv. Dust extraction and filtration systems will be installed for tunnel excavation works and deep excavation with limited surface exposure. 	<p>Appendix E – Procedure 3: Air Quality</p> <p>16.3 (a) iv. Is not relevant to this Project as no tunnel excavation works or deep excavations are proposed</p>
17.1 (a)	<p>The following waste objectives will apply to construction:</p> <ul style="list-style-type: none"> i. Minimise waste throughout the project life-cycle; and ii. Waste management strategies will be implemented in accordance with the <i>Waste Avoidance and Resource Recovery Act 2001</i> management hierarchy as follows: <ul style="list-style-type: none"> - Avoidance of unnecessary resource consumption; - Resource recovery (including reuse, reprocessing, recycling and energy recovery); and - Disposal. 	Appendix E – Procedure 4: Waste and Spoil

Clause	Requirement	Document Reference
17.1 (b)	Targets for the recovery, recycling or reuse of construction waste, and beneficial reuse of spoil will be provided by the Principal Contractor.	Appendix E – Procedure 4: Waste and Spoil
17.2 (a)	Principal Contractors will develop and implement a Waste Management and Recycling Plan which will include as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
17.2 (b)	Principal Contractors will undertake the following waste monitoring as a minimum: [...]	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
17.2 (c)	Principal Contractors will report all necessary waste and purchasing information to TfNSW as required for TfNSW to fulfil their WRAPP reporting requirements.	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
17.2 (d)	Compliance records will be retained by the Principal Contractors in relation to waste management including records of inspections and waste dockets for all waste removed from the site.	As outlined in the Sydenham to Bankstown Staging Report (rev 4) this is not applicable to the Project.
17.3 (a)	<p>Examples of waste management and recycling mitigation measures include:</p> <ul style="list-style-type: none"> i. All waste materials removed from the sites will be directed to an appropriately licensed waste management facility; ii. The use of raw materials (noise hoarding, site fencing, etc...) will be reused or shared, between sites and between construction contractors where feasible and reasonable; and iii. Recyclable wastes, including paper at site offices, will be stored separately from other wastes. 	Appendix E – Procedure 4: Waste and Spoil

Revised Environmental Mitigation Measures compliance matrix

REMM No.	REMM Requirement	Timing	Document Reference
LV4	<p>The management of trees during detailed design and construction planning would be guided by the project's Tree Management Strategy, which would be developed in consultation with councils and include consideration of relevant local plans and strategies. Where removal cannot be avoided, trees would be replaced in accordance with the Tree Management Strategy, including replacement of removed trees in a two for one ratio.</p> <p>Opportunities to retain and protect existing trees would be defined during detailed design and construction planning, in accordance with the project's Tree Management Strategy. The design would aim to reduce tree removal to the extent practicable, particularly where they contribute to screening vegetation or landscape character.</p>	Design/pre-construction	Appendix E – Procedure 1: Biodiversity
LV12	<p>Trees to be retained would be protected prior to the commencement of construction in accordance with AS4970-2009 Protection of trees on development sites and the project's Tree Management Strategy.</p> <p>Any tree pruning would be undertaken in accordance with the project's Tree Management Strategy, guided by a tree report prepared by a qualified arborist.</p>	Construction	Appendix E – Procedure 1: Biodiversity
B1	Detailed design and construction planning would avoid direct impacts to vegetation mapped as threatened ecological communities or native plant community types, specifically Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box.	Design/pre-construction	Appendix E – Procedure 1: Biodiversity
B2	Pre-clearing surveys and inspections for endangered and threatened flora and fauna species would be undertaken by qualified ecologists prior to any clearing occurring. The surveys and inspections, and any subsequent relocation of species, would be undertaken in accordance with the measures provided in the biodiversity assessment report.	Design/pre-construction	Appendix E – Procedure 1: Biodiversity
B3	Areas of biodiversity value outside the project area would be marked on plans, and fenced or signposted where practicable, to prevent unnecessary disturbance.	Construction	Appendix E – Procedure 1: Biodiversity

REMM No.	REMM Requirement	Timing	Document Reference
B4	Impacts to Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box would be avoided. The locations of these species and communities would be marked on plans, fenced on site, and avoided.	Construction	Appendix E – Procedure 1: Biodiversity
B5	Equipment storage and stockpiling would be restricted to identified compound sites and already cleared land.	Construction	Appendix E – Procedure 1: Biodiversity
B6	A trained ecologist would be present during the clearing of native vegetation or removal of potential fauna habitat to avoid impacts on resident fauna and to salvage habitat resources as far as is practicable.	Construction	Appendix E – Procedure 1: Biodiversity
B7	Priority weeds would be managed in accordance with the Biosecurity Act 2015. Weeds of national environmental significance would be managed in accordance with the Weeds of National Significance Weed Management Guide.	Construction	Appendix E – Procedure 1: Biodiversity

Appendix B: Legal and Other Requirements

Legal requirements

Legal and Other Requirements	Summary of Obligations	Relevance to the Project / Notes and System
Commonwealth requirements		
<i>Environment Protection and Biodiversity Conservation Act, 1999</i>	National environment law that provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, defined in the Act as matters of national environmental significance.	No Relevance The Project would not impact on any matters of national environmental significance or Commonwealth land
<i>National Greenhouse and Energy Reporting Act 2007</i>	Corporations emitting more than 50kT of carbon dioxide equivalent units are required to register and report their Scope 1 and Scope 2 emissions for all Facilities in which they have Operational Control. Facilities emitting more than 25kT of carbon dioxide equivalent units must register and report Scope 1 and Scope 2 emissions.	High Relevance Where the Principal Contractor has Operational Control, the Scope 1 and Scope 2 emissions associated with the project must be reported. This includes the collation and reporting of subcontractors site emissions.
<i>Ozone Protection Act 1989</i>	This Act provides for a system of controls and to regulate and prohibit the manufacture, sale, distribution, use, emission, re-cycling & disposal of stratospheric ozone depleting substances and articles that contain these substances. The impact is that appropriately qualified people in accordance with this Act must undertake all servicing and maintenance of this type of equipment.	Low Relevance The relevance of this Act will relate to the use of refrigerators and air conditioning units in site buildings and vehicles which still contain CFCs. Such items are unlikely to be found on site.
NSW requirements		
<i>Biodiversity Conservation Act 2016</i>	The <i>Biodiversity Conservation Act 2016</i> provides provision for listing of species and ecological communities in NSW, protection of animals and plants, private land conservation agreements, the biodiversity offsetting scheme, Biodiversity Assessment under the EP&A Act 1979, biodiversity certification of land, public consultation on biodiversity matters, the functions of the Biodiversity Conservation Trust, regulatory compliance mechanisms, investigative powers and criminal proceedings under the Act.	Medium Relevance SSI projects are exempt for regulatory compliance mechanisms set out under Part 11 of the <i>Biodiversity Conservation Act</i> . Species listed within the act are recognised and are to be protected.
<i>Biosecurity Act 2015</i>	This Act relates to diseases and pests that may cause harm to human, animal or plant health or the environment, and for related purposes. Declared weeds	Low Relevance

Legal and Other Requirements	Summary of Obligations	Relevance to the Project / Notes and System
Biosecurity Regulation 2017	are listed in Schedule 8 of the Biosecurity Regulation 2017. This act repeals the <i>Noxious Weeds Act 1993</i> .	The Act relates to the management of vegetation during and removal activities and the duty to notify should certain pests and diseases be identified. No such species have been identified on the Project's works sites.
Contaminated Land Management Act 1997	This Act provides for a process to investigate and remediate land that has been contaminated and presents a significant risk of harm to human health. Section 60 of the Act is a "Duty to Report Contamination". This duty applies to owners of land and persons who become aware their activities have contaminated the land.	Medium Relevance The relevance of this Act to the Principal Contractor will be in the event suspected or potentially contaminated ground is found during Construction activities.
Dangerous Goods (Road and Rail Transport) Act 2008	The purpose of this Act is to regulate the transport of Dangerous Goods by road and rail in order to promote public safety and protect property and the environment. The transport of Dangerous Goods is required to be appropriately licensed (both vehicle and driver). Depending on the quantities being transported, the Act outlines specific requirements for including appropriate placards on the transport vehicle, emergency procedures, Personal Protective Equipment, manifest documentation and fire extinguishers.	High Relevance The relevance of the Act is in respect to the transport of dangerous good to & from the site. The project will require the use of a variety of dangerous goods. The Principal Contractor will need to review and ensure Dangerous Goods requirements are addressed where transported by its vehicles, plant and equipment.
Environmentally Hazardous Chemicals Act 1985	This Act prohibits the manufacturing, processing, keeping, distributing, conveying, using, selling or disposing of an environmental hazardous chemical or waste (prescribed activity) except under the provisions of a chemical control or a licence. The EPA is required to prepare inventories of environmentally hazardous chemicals and declared chemical wastes.	Low Relevance It is not anticipated any environmentally hazardous chemicals or declared chemical waste will be used or stored on site. The Act therefore has little relevance to the sites other than being aware of the existence of registers of declared chemical wastes and environmentally hazardous chemicals.
Environmental Planning and Assessment Act 1979	This Act establishes a system of environmental planning and assessment of development proposals in NSW.	High Relevance The Project has been declared Critical State Significant Infrastructure (CSSI) by virtue of Schedule 5, clause 4 of <i>State Environmental Planning Policy (State and Regional Development) 2011</i> . The development consent conditions and obligations are incorporated into the CEMP.
Fisheries Management Act 1994	This Act is applicable to all waters within the state including private and public waters and all permanent and intermittent waters. The Act is most relevant in respect to maintaining water quality and ensuring no polluted water from site	Low Relevance Along with the POEO Act water discharging from the site must not pollute the adjacent streams or watercourses. Projects

Legal and Other Requirements	Summary of Obligations	Relevance to the Project / Notes and System
	works enters streams, creeks and waterways. In addition this Act also has relevance for the removal of marine vegetation.	assessed under Division 5.2 of the EP&A Act are exempt from permits required under sections 201, 205 or 219.
<i>Heritage Act 1977</i>	<p>This Act provides for the preservation and conservation of heritage items such as building, works, relic, places of historic interest, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance.</p> <p>Under this Act a relic means any deposit, object or material evidence which is 50 or more years old and relates to the settlement of the area (not being an aboriginal settlement). It is an offence under this Act to wilfully and knowingly damage or destroy items of heritage value.</p> <p>Do not demolish damage, move or develop around any place, building, work, relic, moveable object, precinct, or land that is the subject of an interim heritage order or listing on the State Heritage Register or heritage listing in a Local Environmental Plan without an approval from the Heritage Council (NSW) or local council.</p>	<p>Low Relevance</p> <p>Works will not occur within a State Heritage Register item. Regardless, projects assessed under Division 5.2 of the EP&A Act are exempt from approvals required under Part 4 and permits required under section 139 of the <i>Heritage Act</i>.</p>
<i>National Parks and Wildlife Act 1974</i>	<p>The relevance of this Act is firstly in respect to the protection and preservation of Aboriginal artefacts. Discovery of material on site suspected as being of Aboriginal origin must be reported and protected pending assessment and direction by the Client's Representative.</p> <p>Secondly it is an offence under Part 8A of this Act to pick or harm threatened species.</p>	<p>Low Relevance</p> <p>No identified Aboriginal artefacts have been identified within the Project's Construction area. Projects assessed under Division 5.2 of the EP&A Act are exempt from obtaining an Aboriginal Heritage Impact Permit required under section 90.</p>
<i>Pesticides Act 1999</i> <i>Pesticides Regulation 1995</i>	This Act and Regulation establish a legislative framework to regulate the use of pesticides. They have the objective to promote the protection of human health, the environment, property and trade in relation to pesticides. It is an offence under this Act and Regulation to wilfully or negligently misuse pesticides.	<p>Low Relevance</p> <p>It is not envisaged that pesticides will be used on the project by the Principal Contractor.</p>
<i>Protection of the Environment Operations Act 1997</i>	This Act is of most relevance to work being carried out under this contract. It integrates into one Act all the controls necessary to regulate pollution and reduce degradation of the environment, provides for licensing of scheduled development work, scheduled activities and for offences and prosecution under this Act.	<p>High Relevance</p> <p>The POEO Act provides for the issuing of environmental protection notices to control work and activities not covered by licences.</p> <p>Section 148 of the Act requires a pollution incident causing or threatening material harm to the environment to be notified to the EPA and other authorities immediately.</p>

Legal and Other Requirements	Summary of Obligations	Relevance to the Project / Notes and System
		<p>Sydney Metro's Principal Contractor may choose to apply for an EPL from NSW EPA. If an EPL is granted for this Project, then this CEMP and Sub-plans would be revised to reflect the EPL's requirements.</p> <p>Project activities may be carried out under the Sydney Trains EPL 12208, where they are required as part of a Sydney Trains rail possession.</p>
Roads Act 1993	This Act and associated Regulation primarily provide for such things as the opening and closing of public roads, identification of road boundaries and road widening, road levels, classification of public roads, road work, protection of public road and regulation of traffic, regulation of work, structures and activities.	<p>Medium Relevance</p> <p>This act governs Road Occupancy Licences (ROL) that will be required for works on and round roads. An ROL cannot be refused to carry out works required under an SSI approval as per Section 115ZH of the EP&A Act.</p>
Rural Fires Act 1997	This Act is intended to prevent, mitigate and suppress bush and other fires. It places a duty on the Principal Contractor as the occupier of the site to extinguish fires during bush fire danger periods or if unable to do so notify appropriate firefighting authorities of the existence of the fire and its location.	<p>Low Relevance</p> <p>The Project's work sites and surrounding areas are not prone to bush fires.</p>
Sydney Water Act 1994 Sydney Water Regulation 1994	This Act and Regulation establishes the Sydney Water Corporation as a statutory State owned corporation. The functions of the Sydney Water Corporation is to supply and store water, provide sewerage services, provide stormwater drainage and dispose of waste water within it area of operations.	<p>High Relevance</p> <p>Coordination will be required with Sydney Water during the works.</p>
Waste Avoidance and Resource Recovery Act 2001	This Act repeals the <i>Waste Minimisation and Management Act 1995</i> . The purpose of the Act is to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecological sustainable development. The Act provides for the making of policies and strategies to achieve these ends. It is an offence under the <i>Protection of the Environment Operations Act</i> to wilfully or negligently dispose of waste in a manner that harms or is likely to harm the environment.	<p>High Relevance</p> <p>The relevance of the Act to this project is to implement the strategies by adopting the hierarchy of avoidance; avoidance of unnecessary resource consumption; resource recovery (including reuse, reprocessing, recycling and energy recovery), disposal (as a last resort).</p>
Water Act 1912	This Act provides for licences to extract water for Construction purposes either from surface or artesian sources. Should Construction water be extracted from surface (other than sedimentation ponds) or artesian sources a licence will be required.	<p>Low Relevance</p> <p>It is not proposed that Construction water will be obtained from surface (e.g. creeks, lakes etc.) or artesian sources.</p>
Water Management Act 2000	This Act repeals the Rivers and Foreshores Improvement Act, 1948 and the Water Act, 1912. The provisions of both the aforesaid Acts are progressively	<p>No Relevance</p>

Legal and Other Requirements	Summary of Obligations	Relevance to the Project / Notes and System
Water Management (General) Regulation 2004	rescinded as Water Management Plans are prepared and gazetted for catchment areas within the state. This Act and Regulation provide for the protection, conservation and ecologically sustainable development of water sources of the State and in particular to protect, enhance and restore water sources and their associated ecosystems.	Projects assessed under Division 5.2 of the EP&A Act are exempt from obtaining water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91.

Other requirements

Approval / Licence	Requirement	Relevant section of CEMP
EPL	Required for activities listed in Schedule 1 of the POEO Act	Section 2.6
Section 143 notice of POEO Act	Prior to transportation of waste to receiving facility	Appendix E - Procedure 4: Waste and Spoil
Road Occupancy Licences	Prior to commencement of traffic related works that require access to roads	Section 2.2 and Appendix B

Appendix C: Risk Assessment

This appendix includes an indicative risk assessment for the Project. Once a Principal Contractor has been engaged for this Project, the Principal Contractor will be responsible for revising this risk assessment to adequately reflect any changes to their scope of works and/or methodologies, and to conform to their E&SMS.

All indicative environmental issues have been assessed in accordance with the table below:

Risk Assessment Rankings:

- >31 Very High;
- 22 to 30 High;
- 11 to 21 Medium; and
- 1 to 10 Low.

Risks will be reassessed by Sydney Metro's Principal Contractor following the consideration of control measures. The Principal Contractor will be responsible for nominating an owner for the implementation of management measures.

Issues or activities that represent a Very High risk after the application of control measures are not to be undertaken.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
Approvals and Licensing									
Not identifying appropriate approvals, licenses or permits required and proceeding without them	Works delayed, infringements, prosecution, poor community relations and reputational loss.	L4	C3	17	Review the project planning approval and statutory documentation for requirements relevant to the Project. Identify and implement approval requirements within the CEMP, sub-plans and ERAPs. Check contract documentation. Identify and implement requirements from the Contract. Establish a register of approvals, licenses and permits.	L5	C3	13	Maintain Compliance Risk Matrix Undertake environmental audits as per Section 3.9 of this plan
Noise									
Noise from general construction activities resulting in impact to residents	Disturbance to residents or neighbouring businesses. Potential for complaints.	L2	C5	18	Mitigation measures as per NVMP are to be implemented. Respond to community enquiries and complaints in accordance with Sydney Metro requirements and implement the OCCS. Consult with the community in relation to upcoming activities that may result in concern. Monitor noise for compliance as the works progress at receiver locations. Provide periods of respite for high noise generating activities. Apply noise mitigation measures during entire project. Noise efficient equipment to be used on site.	L3	C5	12	Noise performance will be continually monitored as per the requirements of the NVMP. The Sydney Metro Construction Noise and Vibration Strategy is to be implemented
Noise during works required to be undertaken out of standard construction hours	Disturbance to residents or neighbouring businesses with	L2	C5	18	Implement noise mitigation strategies for OOHV. Monitor noise for compliance to project goals.	L3	C4	11	Noise performance will be continually monitored as per the requirements of the NVMP.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
	potential for complaints.				Control Measures as per the NVMP are to be implemented.				The Sydney Metro Construction Noise and Vibration Strategy (CNVS) is to be implemented
Vibration									
Vibration intensive activities undertaken on the site such as hammering, vibratory rolling, etc	<p>Disruption, annoyance and nuisance to residents.</p> <p>Potential damage to adjacent residential and commercial residences and structures.</p> <p>Disruption to businesses as a result of vibration nuisance</p>	L3	C5	12	<p>Mitigation measures as per the NVMP are to be implemented.</p> <p>Determine vibration limits and structure/receiver offset distances.</p> <p>Consult with potentially affected parties prior to commencement of works on their upcoming activities that may be impacted by construction vibration.</p> <p>Ongoing vibration monitoring during vibration intensive works.</p>	L4	C5	7	Standard and additional mitigation measures for sensitive receptors around the Project works will be applied as per the CNVS, NVMP and the CNVIS.
Water Quality, Erosion and Sedimentation									
Sediment laden runoff from construction works leaving site	<p>Degradation of local watercourses.</p> <p>Increased turbidity in local water ways resulting in impact on aquatic life.</p> <p>Fines for sediment escaping site.</p>	L4	C4	11	<p>Mitigation Measures as per SWMP and any ESCP to be implemented.</p> <p>Install erosion and sediment controls within the project area.</p> <p>Ensure measures are inspected and maintained as the works progress and also prior to and post rainfall events.</p> <p>Provide training and awareness on the need to prevent pollution.</p> <p>Relevant people to undertake Erosion and Sediment Control training.</p>	L5	C4	8	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Stockpiling of vegetation and topsoil	<p>Wind and water erosion causing weed/seed dispersion offsite.</p> <p>Location of stockpiling next to</p>	L4	C3	17	<p>Develop Environmental Control Maps to show stockpile areas.</p> <p>Utilise appropriate locations for stockpiling (away from waterways, watercourses, drains where feasible and reasonable).</p>	L5	C4	8	Implement stockpile controls prior to the work commencing. Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
	waterways causing weeds/seeds to disperse from construction site.				Designated vegetation stockpiling areas. Minimise stockpiling / Use temporary stockpiling Cover stockpiles if left for extended periods				
Non-compliant water from construction works discharged from site	Non-compliant water entering stormwater system waterways (i.e. polluting - not compliant with discharge criteria).	L4	C4	11	Environmental Manager to approve all water discharges from site. Induction and toolbox talks Toolbox training on site procedures for water discharge Educate site staff on requirements and consequences of prosecution	L5	C4	8	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Works with the potential to intercept groundwater table	Ground water entering excavations Without appropriate safeguards onsite could lead to ground water contamination Spreading contamination via groundwater management	L3	C4	16	Implement the controls within Appendix E - Procedure 2: Groundwater Induction and toolbox talks Toolbox training on site procedures for water discharge Educate site staff on requirements and consequences of prosecution Environmental Manager/representative to approve all water discharges from site	L4	C4	11	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Waste									
Waste disposal during construction	Incorrect disposal of waste, further costs incurred for classifications and disposal, fines may be issued.	L3	C5	12	Implement the controls within Appendix E - Procedure 4: Waste and Spoil Identify opportunities to incorporate recovered materials into the permanent works. Provide facilities on site for source separation and recycling. Ensure accurate waste records are retained. Removal of wastes from the site would only be undertaken by a licensed	L4	C5	7	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition. Monitor and ensure reporting of all movements of waste from the worksite.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
					contractor as required by the POEO Act and with appropriate approvals, if required, for contaminated materials, etc. All material to be recovered off-site to be appropriately classified in accordance with the Resource Recovery Exemptions. All material that requires off-site disposal to be appropriately tested and classified against the Waste Classification Guidelines (NSW EPA, 2014)				
Earthworks spoil disposal	Incorrect classification of waste (spoil) resulting in incorrect / illegal disposal/reuse.	L3	C5	12	Inductions, toolbox talks and training on recycling facilities and waste segregation practices. Separation of waste on site. Tracking of disposal processes. All contamination hotspots would be clearly marked in the field (where possible). Hotspots will be shown within contamination mapping and will be included in the Permit to Disturb process.	L4	C5	7	Regular inspections of work areas Monitor and ensure reporting of all movements of waste from the worksite
Washout of concrete in undesignated areas.	Sediment laden/alkaline water polluting surrounding stormwater system /watercourses.	L3	C4	16	Concrete washout areas clearly marked on Environmental Control Maps and delineated. Inductions on designated concrete washout areas. Subcontractor's agreements to include project compliant waste management principles.	L5	C4	8	Regular inspections of concrete washout areas and controls
Contamination									
Management of contaminated or untreated materials	Non-compliant material and contaminated water entering surrounding	L3	C4	16	Implement contamination management procedures from within SWMP. Identify any contamination hotspots and incorporate procedures for these	L4	C4	11	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
	waterways. Decrease in health of nearby ecosystems.				locations into construction documentation. Apply the unexpected finds procedure within the SWMP. Induct personnel on unexpected finds procedure.				Monitor and ensure reporting of all movements of waste from the worksite.
Potential for discovery of unexpected contaminated spoil during construction.	Health effects resulting from airborne contamination, e.g. asbestos. Complaints received from odours released during excavations. Classification of spoil is changed and disposal options altered, costs incurred associated with disposal of higher classification of waste.	L4	C4	11	If contaminated soil is encountered, all works are to stop in the vicinity of the find and investigations commence. Unexpected finds procedure within the SWMP to be implemented. Induct personnel on location, type, nature, concentration of contaminants on site if found.	L5	C4	8	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition. Complete regular toolbox talks on how to manage unexpected finds.
Encountering asbestos / contaminated material on site	Transfer of material into previously uncontaminated area (outside work site) causing new contamination.	L3	C4	16	Inspections of excavated and filled surfaces would be made during Construction to determine the presence of visible asbestos. Conduct further site investigations to determine the presence and extent of contamination prior to Construction works commencing. Contaminated soils would not be stockpiled on the structural fill layer or formation layers to avoid cross contamination.	L4	C4	11	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition. Complete regular toolbox talks on how to manage unexpected finds.
Hazardous Materials									

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
Storage of hazardous substances, leaking plant and equipment and spillage from refuelling.	Localised ground contamination / pollution of stormwater and requiring clean-up and/or receiving fines. Risk of igniting volatile substances. Unauthorised access to site / potential vandalism/damage leading to pollution.	L3	C4	16	<p>Induction, toolbox talks and training on appropriate handling and storage of liquids.</p> <p>All storm water drains should be identified prior to works and protection installed.</p> <p>Storage areas to be away from sensitive areas and appropriately bunded.</p> <p>SDS approved prior to bringing hazardous substances on site including risk assessment.</p> <p>Environmental Control Maps show storage locations and associated controls e.g. spill kits, etc.</p> <p>Training in use of spill kits.</p> <p>Contingency plans would be developed to deal with any spills which might occur during Construction.</p> <p>Clearly label containers.</p> <p>Regular auditing and inspection of storage areas and materials.</p> <p>Make storage areas restricted access areas.</p> <p>Reduce/eliminate need for hazardous substances.</p> <p>Ensure all work sites are secure before leaving the site.</p> <p>All liquids i.e. paint etc. are to be securely locked away at the end of each day</p>	L5	C4	8	Regular inspections of storage areas
Fuel contaminated runoff from construction works leaving site	Fuel contaminated runoff entering stormwater or waterways (i.e. polluting – not	L3	C4	16	<p>All storm water drains should be identified prior to works and controls implemented.</p> <p>Appropriate bunding/storage of substances.</p>	L4	C4	11	Regular inspections of works site to ensure all controls are in good condition and working.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
	compliant with discharge criteria).				Toolbox on site procedures for sediment controls and chemical storage. Educate site staff on requirements and consequences of prosecution.				
Acid Sulfate Soils									
Disturbance of Potential Acid Sulphate soils (PASS) and Actual Acid Sulphate Soils (ASS) during excavations.	Mobilisation of metals within runoff to levels toxic to natural systems. Release of acidic runoff.	L4	C5	7	Assess risk for acid sulphate soils, and if the risk is determined to be high then implement the Acid Sulphate Soils Procedure (refer to SWMP). Awareness training in the identification and management of ASS. Provide containment and treatment facility on site. Ensure ASS material is left under the water table, disposed off-site or appropriately treated in a bunded area with sump.	L5	C5	4	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Heritage									
Unexpected heritage items encountered.	Work delays, additional studies, approvals required, damage to heritage item.	L3	C4	16	Implement the mitigation measures within the HMP. General inductions toolbox training on heritage management protocols. Label any known heritage items on Environmental Control Maps. If suspected heritage item encountered. Works to stop immediately and implement the Sydney Metro Unexpected Heritage Finds Procedure (refer to HMP). Clearly highlight no-go zones on the ECM and communicate requirements to construction personnel during pre-start briefs, inductions and tool-box talks.	L4	C4	11	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition. Provide frequent toolbox talks on Unexpected Heritage Finds Procedure

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
Impact to Heritage Items	Damage to heritage fabric of heritage items by Project works	L3	C3	24	<p>Implement the mitigation measures within the HMP.</p> <p>General inductions toolbox training on heritage management protocols.</p> <p>Label any known heritage items on Environmental Control Maps.</p> <p>Work within the safe working distances nominated in the NVMP.</p> <p>Undertake vibration compliance monitoring as per the NVMP.</p> <p>Clearly highlight no-go zones on the ECM and communicate requirements to construction personnel during pre-start briefs, inductions and tool-box talks.</p> <p>Demarcation of worksites and communicate it clearly with all construction personnel.</p> <p>The method for the demolition of existing elements at the Project sites would be developed to minimise direct and indirect impacts to adjacent and / or adjoining heritage items.</p>	L4	C3	17	<p>Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.</p> <p>Provide frequent toolbox talks on managing change.</p>
Biodiversity									
Vegetation trimming / clearing required outside approved work area	Unauthorised works / removal of vegetation outside defined work area, possibility of removing threatened species, fines incurred.	L4	C4	11	<p>Implement the controls within Appendix E – Procedure 1: Biodiversity</p> <p>Induction and tool box training on clearance zones and required protection measures</p> <p>If vegetation, other than grass and weeds, needs to be trimmed or removed, further assessment would be undertaken in accordance with the CEMP and CoA.</p> <p>If trees require trimming or removal, the requirements of CoA E5 would be implemented.</p>	L5	C4	8	<p>Implement Vegetation Removal Permit System.</p> <p>Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.</p>

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
					Inspections during clearing activities. Fencing in place/ clear marking of trees to be retained and cleared / demarcation areas / plans showing clearing areas. Pre clearing checklist to be completed before any clearing of vegetation.				
Clearing and grubbing of vegetation within work site.	Erosion of soils, uncontrolled runoff, sediment deposited into surrounding vegetated areas and water courses, and invasion of weeds. Wrong vegetation removed. Potential for injury to native fauna.	L3	C4	16	Implement the controls within Appendix E – Procedure 1: Biodiversity Implement the mitigation measures within the SWMP. Inductions and toolbox training on erosion and sediment controls. Where possible works to be staged so environmental controls can be implemented after clearance works. If vegetation, other than grass and weeds, needs to be trimmed or removed, further assessment would be undertaken in accordance with the CEMP and CoA. If trees require trimming or removal, the requirements of CoA E5 would be implemented. A Tree Report is to be prepared for trees to be removed or pruned. Approved Erosion and Sediment Control Plans in place prior to starting works. Where applicable, mature trees and other native vegetation to be retained would be clearly delineated, with all Construction activities excluded from these areas. Pre clearing checklist to be completed before any clearing of vegetation.	L4	C4	11	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
Loss, damage or injury to endangered or threatened species.	Removal, death, damage or injury to endangered or threatened species by plant and equipment	L4	C3	17	<p>Implement the controls within Appendix E – Procedure 1: Biodiversity</p> <p>All personnel attending site will be advised of controls and management during the onsite induction.</p> <p>Toolbox talks will be carried out prior to ground disturbance /site clearing works to ensure onsite personnel are made aware of potential loss of endangered species.</p> <p>If vegetation, other than grass and weeds, needs to be trimmed or removed, further assessment would be undertaken in accordance with the CEMF and CoA.</p> <p>If trees require trimming or removal, the requirements of CoA E5 would be implemented.</p> <p>If threatened flora or fauna species are identified on site, work in the vicinity of these species would stop immediately.</p> <p>spotter/catcher/botanist would be engaged to survey the</p>	L5	C3	13	<p>Implement Vegetation Removal Permit System.</p> <p>Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.</p>
Air Quality									
General Construction works; site establishment, excavations, piling	Dust activity in close proximity to residential and commercial premises, complaints received.	L3	C5	12	<p>Implement the controls within Appendix E – Procedure 3: Air Quality</p> <p>Toolbox training on dust and air quality Management.</p> <p>Provide dust mitigation measures through water sprays/misting as required.</p> <p>Cover stockpiles that are not to be worked on for a period of greater than 10 days.</p> <p>Erosion and Sediment Control Plans approved before works commence.</p>	L4	C5	7	<p>Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.</p>

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
Exhaust from plant and equipment.	Emissions resulting in air pollution.	L3	C5	12	Inductions and toolbox training on dust and air quality management. Well maintained plant/ equipment and prestart checks and servicing. Non-compliant vehicles removed from site / repaired.	L4	C5	7	Review plant check list prior to operating on site. Undertake verification checks as required.
Traffic									
Loss of on-street car parking in adjacent residential streets and commercial areas during construction.	Loss of parking availability to adjacent residential and commercial properties could result in community complaints.	L3	C5	12	Community notifications in accordance with the OCCS. Site vehicles shall be parked within the rail corridor and not affect public parking area where possible. Develop CTMP / Traffic control procedures. Limited street parking available around the Project sites.	L4	C5	7	Complete regular toolbox talks on how to minimise impacts in relation to traffic. Undertake regular inspections of worksite and adjacent streets. Supervisor and traffic controller to enforce traffic management requirements
General construction traffic disturbing public access between local roads.	Disturbance to local residents resulting in complaints being made, limited access, potential for delays at local road access points resulting in complaints.	L3	C5	12	Deliveries of plant and materials shall be undertaken outside of peak periods where possible. Site vehicles shall be parked within the rail corridor and not affect public parking areas. Scheduled road movements shall be minimised where possible. Oversized deliveries would be undertaken in accordance with the requirements of NSW Police or Roads and Maritime Services. Approved Traffic Management Plans in consultation with relevant authorities. Detour routes to be advertised/ notified. Approved access routes, detailed Traffic Control Plans. Clear notifications / signage	L4	C5	7	Complete regular toolbox talks on how to minimise impacts in relation to traffic. Undertake regular inspections of worksite and adjacent streets.

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
Management of heavy vehicles / access routes.	Complaints from sensitive receivers due to increased level and frequency of noise.	L3	C5	12	<p>Deliveries of plant and materials shall be undertaken outside of peak periods where possible.</p> <p>Site vehicles shall be parked within the rail corridor and not affect public parking areas.</p> <p>Scheduled road movements shall be minimised where possible.</p> <p>Oversized deliveries would be undertaken in accordance with the requirements of NSW Police or Roads and Maritime Services.</p> <p>Designated access routes.</p> <p>Approved CTMP.</p> <p>Community Notifications.</p> <p>Pedestrian management with traffic controller in place where required.</p>	L4	C5	7	<p>Complete regular toolbox talks on how to minimise impacts in relation to traffic.</p> <p>Permits from local council and/or RMS</p>
Truck deliveries out of normal working hours	<p>Un-approved deliveries resulting in non-conformance with project requirements.</p> <p>Noise impact to community / potential complaints.</p>	L3	C5	12	<p>Personnel training of noise awareness to community included in induction and toolboxes.</p> <p>Induction on Construction Hours for deliveries.</p> <p>Communication of delivery times to suppliers.</p> <p>Community Notifications on project activities occurring locally.</p> <p>Code of conduct / selection criteria in place for subcontractors.</p> <p>Out of hours works approval where required.</p> <p>Approved traffic/access routes.</p> <p>Planning and staging of works in approved hours as much as practical.</p>	L4	C5	7	<p>Delivery drivers provided with haulage routes prior to travelling to site and delivery times.</p> <p>Complete regular toolbox talks on how to minimise impacts in relation to traffic.</p>
Visual Amenity									

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
Building Materials Stockpiles Temporary construction sheds and storage containers Plant and equipment movement Lighting	Surrounding aesthetic temporary altered during construction Lighting towers used during out of hours works may spill on nearby residents	L3	C5	12	The work area shall be maintained in an orderly manner Lighting required during night works shall be directed towards the work area and are from adjacent sensitive receivers	L4	C5	7	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Ancillary facilities									
Appropriate selection and management of the ancillary facilities	Inadequate assessment of impacts to surrounding business and residential receivers and environmental receptors. Potential for complaints.	L4	C4	11	Any ancillary facility not identified in the project Planning Approval, must comply with the relevant CoA (A16-A18). Use of site compounds would comply with the requirements of the CEMP and Sub-plans, CoA, REMM and CEMF to ensure environmental impacts are adequately managed.	L5	C4	8	Undertake regular inspections of work areas pre, during and after works to ensure controls are in good condition.
Utilities									
Utility Management	Service strike leading to environmental degradation	L3	C4	16	Develop and implement the Utilities Management Strategy in accordance with the Utilities Management Framework Engage a Utilities Coordination Manager (UCM) to oversee the coordination of utility works across the project and with third part service providers. The UCM will collaborate with the Community and Stakeholder Manager, the Place Manager and, where required, the Community Complaint Mediator to mitigate impacts to the local community during utility works and to resolve any	L5	C4	8	Permit to Disturb Service searching Detailed Site Survey management

Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		L x	C			L x	C		
					community complaints relating to utility works. Implement a Permit to Disturb Induction and toolbox talks Detailed Site Survey to be managed by an appropriately qualified surveyor.				

Sydney Metro Consequence Criteria

	ENTERPRISE RISK CONSEQUENCES					
	C6 Insignificant	C5 Minor	C4 Moderate	C3 Major	C2 Severe	C1 Catastrophic
Environment	No appreciable changes to environment and/or highly localised event.	Change from normal conditions within environmental regulatory limits & environmental effects are within site boundaries.	Short-term and/or well-contained environmental effects. Minor remedial actions probably required.	Impacts external ecosystem & considerable remediation is required.	Long-term environmental impairment in neighbouring or valued ecosystems. Extensive remediation required.	Irreversible large-scale environmental impact with loss of valued ecosystems.

Sydney Metro Likelihood Criteria and Risk Matrix

Probability	One off event How likely?	Frequency	Repeated How often?	Likelihood		Consequences					
						C6	C5	C4	C3	C2	C1
						Insignificant	Minor	Moderate	Major	Severe	Catastrophic Transformational for opportunities
	Expected to occur frequently during time of activity or project. Greater than a 90% chance of occurring.		10 times or more every year	Almost certain	L1	20	22	29	32	34	36
	Expected to occur occasionally during time of activity or project. A 75-90% chance of occurring.		1-10 times every year	Very Likely	L2	14	18	23	28	31	35
	More likely to occur than not occur during time of activity or project. A 50-75% chance of occurring.		Once each year	Likely	L3	9	12	16	24	27	33
	More likely not to occur than occur during time of activity or project. A 25-50% chance of occurring.		Once every 1 to 10 years	Unlikely	L4	6	7	11	17	25	30
	Not expected to occur during the time of activity or project. A 10-25% chance of occurring.		Once every 10 to 100 years	Very Unlikely	L5	3	4	8	13	19	26
	Not expected to ever occur during time of activity or project. Less than 10% chance of occurring.		Less than once every 100 years	Almost Unprecedented	L6	1	2	5	10	15	21

Appendix D: Downer and Sydney Metro Environment and Sustainability Policies, Sydney Metro Environment and Sustainability Commitments and Downer ISO 14001:2015 Certification

<div></div> <div>Transport for NSW</div> <div>Environment & Sustainability Policy</div> <div></div> <p>This Policy reflects a commitment in our delivery of the Sydney Metro program to:</p> <ul style="list-style-type: none"> Align with, and support, Transport for NSW (TfNSW) Environment & Sustainability Policy. Optimise sustainability outcomes, transport service quality, and cost effectiveness. Develop effective and appropriate responses to the challenges of climate change, carbon management, resource and waste management, land use integration, customer and community expectation, and heritage and biodiversity conservation. Be environmentally responsible, by avoiding pollution, enhancing the natural environment and reducing the project ecological footprint, while complying with all applicable environmental laws, regulations and statutory obligations. Be socially responsible by delivering a workforce legacy which benefits individuals, communities, the project and industry, and is achieved through collaboration and partnerships. <p>To deliver on these commitments, the Sydney Metro team will:</p> <p>Industry leadership</p> <ul style="list-style-type: none"> Implement coordinated and transparent decision making, by engaging with stakeholders and suppliers, encouraging innovation and demonstrating sustainability leadership. Explore new benchmarks for the transport infrastructure sector by requiring high standards from our designers, contractors and suppliers, building on experience gained through development of Sydney Metro Northwest. <p>Community and customer</p> <ul style="list-style-type: none"> Provide accessible, safe, pleasurable, and convenient access and transport service for all customers. Establish positive relationships with community and stakeholders to maximise opportunities to add value to local communities. <p>Land use integration and place making</p> <ul style="list-style-type: none"> Create desirable places, promote liveability, cultural heritage, and optimise both community and economic benefit. Balance transit oriented development opportunities with stakeholder expectations. <p>Embedding environmental and social sustainability</p> <ul style="list-style-type: none"> Establish robust sustainability objectives and targets. Maintain an environmental management system that is integrated into all our project activities. Ensure thorough and open environmental assessment processes are developed and maintained. Develop and maintain an environmental management framework to embed best practice pollution management and sustainable outcomes during construction. Apply effective assurance processes to monitor performance against the project environment and sustainability objectives and identify appropriate reward or corrective action, as required. Apply environment and sustainability specific processes to the procurement of delivery activities. <p>Accountability</p> <ul style="list-style-type: none"> Undertake public sustainability reporting. Hold employees and contractors accountable for proactively meeting their environmental and social sustainability responsibilities. Provide appropriate training and resources necessary to meet our responsibilities. <p>Rodd Staples Program Director, Sydney Metro</p> 	<div></div> <h2>ENVIRONMENTAL SUSTAINABILITY POLICY</h2> <p>Our goal is environmental sustainability in providing our services to customers in global markets including transportation, energy and resources, industrial, infrastructure and commercial services, and facilities.</p> <p>OUR COMMITMENT IS TO</p> <ul style="list-style-type: none"> minimise the short and long-term impact of our activities on the environment and local communities through responsible environmentally sustainable management within design, planning, delivery, construction, manufacturing and operation promote a positive culture through implementing initiatives that foster sustainable innovation; optimise our products and services to relentlessly improve our environmental sustainability performance and improve the sustainable use of natural resources. comply with relevant environmental legislation, appropriate industry guidelines and standards, customers and regulatory agency requirements implement responsible resilient work practices that minimise the impact on local communities implement and maintain an environmental management system consistent with international standard AS/NZS ISO 14001 which integrates requirements throughout the overarching operational systems establish, monitor and review environmental sustainability objectives and targets and identify opportunities to improve our environmental sustainability evaluate the performance, effectiveness and compliance of our environmental management systems through regular audits and reviews implement effective controls to identify, evaluate, eliminate or reduce adverse environmental risks from our work activities take all practical steps to prevent pollution and protect biodiversity and ecosystems drive innovation to identify sustainable supply chains; reduce and manage energy, waste, and water consumption; reduce and manage air emissions effluents; and climate change mitigation and adaptation procure goods and services to minimise environmental risk and maximise sustainable opportunities and benefits for the total life cycle regularly report our environmental sustainability performance and consult with stakeholders provide education, training and encouragement to our workforce, and business partners to understand their responsibilities for the implementation of environmental sustainability principles and practices; and display this policy, making it publicly available and sharing it with interested parties. <p> Grant Fenn CEO and Managing Director Downer Group</p> <p>Downer EDI Limited ABN 97 003 872 848</p> <p>June 2019 DG-ZH-PO200</p> <p>Page 1 of 1 Version: 1.0</p>
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Certificate of Registration

Awarded to

Downer - Australian Operations.
Road Services, Transport Projects and Utilities

Level 10, 567 Collins Street, Melbourne, VIC 3000, Australia
(This is a multi site certification, other sites are referred in Annexure-A)

Operates an Environmental Management System which complies with the requirements of

ISO 14001: 2015

for the following scope:

Downer works across the full infrastructure value chain including design, construction, commissioning, operation, monitoring, asset management, maintenance, refurbishment, renewal and replacement.

(the detailed description of scope is referred in Annexure-B)

Certificate Number: 477140016100120

Original Issue Date: 09/09/2016
Current Issue Date: 05/09/2019
Expiry Date: 04/09/2022

Sharmin Mahmud

Sharmin Mahmud, MBA, PhD
General Manager Risk and Compliance

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Environment & Sustainability Statement of Commitment

Sydney Metro will deliver great services, places and transport infrastructure for our customers while protecting the environment, contributing to economic prosperity and delivering social benefits for the communities we serve. We have a duty to undertake our activities in the interest of the greater good, to move beyond compliance and be a genuine leader in both environmental management and sustainability.

Sydney Metro is committed to:

- Minimising our impacts and leaving a positive environmental and social legacy;
- Delivering a resilient asset and service for our customers;
- Collaborating with stakeholders to innovate and drive sustainable outcomes; and
- Embedding sustainability into our activities;

To deliver on these commitments Sydney Metro will:

Leave an environmental and social legacy

- Protect the environment, prevent pollution and comply with legal and other requirements.
- Manage resources and waste efficiently, exploring opportunities to minimise waste, use recycled and low impact materials and reduce our environmental footprint.
- Promote a diverse and inclusive workforce and supply chain, build capability and capacity within industry, and increase Aboriginal participation.
- Responsibly minimise environmental and social risks in our supply chain.
- Create liveable places that are well integrated and promote active and sustainable transport.
- Conserve and enhance the natural environment and our built and cultural heritage.
- Work collaboratively with delivery partners to provide social benefits to the communities in which we work.

Drive resilience

- Tackle climate change and contribute to the NSW Government target of net zero emissions.
- Deliver Sydney Metro assets and operations that are resilient to a changing climate, and work with stakeholders to proactively respond to emerging challenges and opportunities.
- Promote the greening of our cities to help combat the 'urban heat island' effect.

Collaborate to deliver sustainable outcomes

- Align with and respond to Transport for NSW policy and other NSW Government priorities.
- Establish and maintain positive relationships with communities and stakeholders to harness local knowledge and maximise opportunities to add value across the project lifecycle.
- Collaborate and consult with Aboriginal stakeholders to understand how we can best respect and celebrate Aboriginal cultural values including Designing with Country.
- Provide industry leadership by setting benchmarks, encouraging innovation and driving continual improvement with our delivery partners.
- Increase environmental awareness amongst staff and customers to drive more sustainable behaviours.

Embed sustainability

- Establish robust objectives and targets that are measurable and take into account whole-of-life considerations.
- Maintain an environmental management system that is integrated into our projects and continually improved to enhance environmental performance.
- Apply effective assurance processes to monitor environment and sustainability performance including ensuring accountability, incentivising beyond compliance behaviours and implementing corrective actions as required.
- Embed sustainability considerations into key project decisions across the project lifecycle.
- Provide appropriate training and resources to meet our obligations and commitments.
- Publish a report on sustainability performance.

Jon Lamonte

Jon Lamonte
Chief Executive, Sydney Metro

This Statement of Commitment supersedes previous versions of the Sydney Metro Environment & Sustainability Policy and aligns with the cluster wide TNSW Environment and Sustainability Policy which has been adopted by Sydney Metro. It applies to all people working for Sydney Metro.

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Appendix E: Environmental Procedures

Procedure 1: Biodiversity

Impact: Biodiversity impacts related to the Project are expected to be minor. There will be some removal of trees and vegetation associated with site establishment, construction of the services building and embankment stabilisation works. Pre-clearance inspections will be undertaken prior to the removal of any trees.

Objective	To comply with contractual and legislative requirements and ensure that native fauna and flora are protected from Construction activities		
Targets	No death or injury to fauna No unapproved destruction of flora		
Legal, Contractual & Other Requirements	Planning consent conditions – SSI 8256		
Site specific planning / approval conditions / licence conditions	CoA – E3-E6 Mitigation measures committed in the EIS & SPIR CEMF Section 11		
Potential impacts and Initial Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Initial Risk Rating	
		P X	C Risk
	Death or injury of fauna	L4	C3 17
	Unapproved damage or removal to threatened plant species, threatened vegetation community or habitat resources	L4	C3 17
	Unapproved removal or trimming of vegetation	L4	C5 7

Controls (means & resources)	Commitments & Mitigation Measures outlined in the EIS / SPIR:		
	Mitigation Measure	Applicable to the Project	Responsibility
	Environmental Performance Outcome (EPO) Biodiversity 1 - The project is designed to minimise impacts on biodiversity. Where practicable, the design minimises the need to clear vegetation.	Applicable	Environmental Manager Design Manager
	EPO Biodiversity 2 - Potential impacts on biodiversity are managed in accordance with relevant legislation, including the EP&A Act, BC Act, EPBC Act, and the <i>Noxious Weeds Act 1993</i> .	Applicable	Environmental Manager Construction Manager Site Supervisor
	EPO Biodiversity 3 – The biodiversity outcome is consistent with the <i>Framework for Biodiversity Assessment</i> (OEH, 2014a).	Applicable	Environmental Manager Construction Manager Site Supervisor
	EPO Biodiversity 4 - Offsets are provided in accordance with the NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014).	Applicable	Environmental Manager Construction Manager
	REMM B1 - Detailed design and Construction planning would avoid direct impacts to vegetation mapped as threatened ecological communities or native plant community types, specifically Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box.	Applicable	Environmental Manager Design Manager Construction Manager Site Supervisor
	REMM B2 - Pre-clearing surveys and inspections for endangered and threatened flora and fauna species would be undertaken by qualified ecologists prior to any clearing occurring. The surveys and inspections, and any subsequent relocation of species, would be undertaken in accordance with the measures provided in the biodiversity assessment report.	Applicable	Environmental Manager Construction Manager Site Supervisor
	REMM B3 - Areas of biodiversity value outside the project area would be marked on plans, and fenced or signposted where practicable, to prevent unnecessary disturbance.	Applicable	Environmental Manager Construction Manager Site Supervisor
	REMM B4 - Impacts to Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine – Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box would be avoided. The locations of these species and communities would be marked on plans, fenced on site, and avoided.	Applicable	Environmental Manager Construction Manager Site Supervisor
	REMM B5 - Equipment storage and stockpiling would be restricted to identified compound sites and already cleared land.	Applicable	Environmental Manager Construction Manager Site Supervisor
	REMM B6 - A trained ecologist would be present during the clearing of native vegetation or removal of potential fauna habitat to avoid impacts on resident fauna and to salvage habitat resources as far as is practicable.	Applicable	Environmental Manager Construction Manager Site Supervisor
	REMM B7 - Priority weeds would be managed in accordance with the <i>Biosecurity Act 2015</i> . Weeds of national environmental significance would be	Applicable	Environmental Manager Construction Manager

managed in accordance with the Weeds of National Significance Weed Management Guide.		Site Supervisor
REMM LV4 - The management of trees during detailed design and construction planning would be guided by the project's Tree Management Strategy, which would be developed in consultation with councils and include consideration of relevant local plans and strategies. Where removal cannot be avoided, trees would be replaced in accordance with the Tree Management Strategy, including replacement of removed trees in a two for one ratio. Opportunities to retain and protect existing trees would be defined during detailed design and construction planning, in accordance with the project's Tree Management Strategy. The design would aim to reduce tree removal to the extent practicable, particularly where they contribute to screening vegetation or landscape character.	Applicable	Environmental Manager Construction Manager Site Supervisor
REMM LV12 - Trees to be retained would be protected prior to the commencement of construction in accordance with AS4970-2009 Protection of trees on development sites and the project's Tree Management Strategy. Any tree pruning would be undertaken in accordance with the project's Tree Management Strategy, guided by a tree report prepared by a qualified arborist.	Applicable	Environmental Manager Construction Manager Site Supervisor

Site Specific Mitigation & Control Measures developed as part of this CEMP:

Mitigation Measure	Responsible
The design will take into consideration the location of vegetation and will aim to minimise vegetation clearing, tree trimming and tree removal, particularly in relation to threatened plant species, threatened vegetation communities and habitat resources. Appropriate justification will be provided for impacts to trees within the Tree Report	Design Manager Environmental Manager
A Tree Report is to be produced by a qualified arborist in consultation with the design team and Environmental Manager.	Environmental Manager Construction Manager
Appropriately trained and qualified tree removal contractors to be used.	Construction Manager Site Supervisor
Awareness training in the need to preserve vegetation to be retained.	Environmental Manager Construction Manager
Provide barricading or other suitable protection measures for trees to be retained	Construction Manager Site Supervisor
Biodiversity offsetting will occur in accordance with CoA E3 where impacts to threatened ecological communities or endangered species cannot be avoided.	Environmental Manager
Where required in accordance with the design some trees will be removed and offset in accordance with requirements of CoA E4 and CoA E6.	Environmental Manager Site Supervisor

	If native fauna is identified within the disturbance footprint, the Principal Contractor's Environmental Manager will be contacted immediately. All necessary steps to minimise harm and mortality to such animals is required.	Construction Manager Site Supervisor
	Open excavations and storage areas to be inspected regularly for the presence of fauna species.	Site Supervisor
	No clearing or vegetation removal to occur without approval.	Environmental Manager Construction Manager Site Supervisor
	All vegetation to be retained shall be protected and demarcated. These areas will be highlighted on the Environmental Control Maps. The clearing limits and protected vegetation is to be clearly communicated to site personnel during site inductions and toolbox talks.	Environmental Manager Construction Manager Site Supervisor
	Works will only be undertaken in designated areas.	Construction Manager Site Supervisor
	The Principal Contractor will identify and remove any weeds within their work area. Any weeds will be lawfully disposed of to a licenced facility.	Environmental Manager Construction Manager Site Supervisor
	Segregate weed impacted waste material and dispose of to a licenced facility.	Construction Manager Site Supervisor
	Inspect plant and machinery before entering and leaving worksite to ensure no dirt remains as it may cause weeds to spread.	Construction Manager Site Supervisor
	Educate work force on common weeds within Bankstown rail corridor.	Environmental Manager
	Plant and equipment brought on to site must be cleaned and free of deleterious material, mud and other material that may harbour weed seeds.	Site Supervisor
	Construction plant, equipment and materials are not to be stored within the dripline of any trees or vegetation to be retained.	Construction Manager Site Supervisor
	The following clearing procedure will be implemented should additional clearing be required.	See flow chart

	<div> <p><u>1. Delineation of area to be cleared</u></p> <p>Vegetation to be cleared will be clearly marked. Habitat trees in close proximity to construction activities will be clearly marked and protected. Marked boundaries will be cross-referenced to the approved impact area.</p> <p>In circumstances where native vegetation or mature tree clearing is required outside of the approved development footprint, an ecologist will inspect the proposed area and provide advice on the impact to flora and fauna and appropriate management.</p> </div> <div> <p>Environment Manager Site Supervisor</p> </div> <div> <p><u>2. Pre-clearance inspections</u></p> <ul style="list-style-type: none"> • Pre-clearance inspections will be undertaken within two weeks prior to the commencement of vegetation clearing. • The pre-clearance inspections will include identification and inspection of trees containing hollows. Any isolated trees that have been identified as providing hollows, and which are located close to the construction areas, will be protected during construction. • Should any threatened species be identified within the project area, the Environment Manager shall be notified immediately. </div> <div> <p>Environment Manager</p> </div> <div> <p><u>3. Vegetation clearance and fauna handling procedures</u></p> <ul style="list-style-type: none"> • Mature trees will be inspected for fauna immediately before and after felling. • Animals found prior to or during clearing activities will be released to surrounding suitable habitat. • If any animal is injured, contact the relevant local wildlife rescue agency (e.g. WIRES) and/or veterinary surgery as soon as practical. Until the animal can be cared for by a suitably qualified animal handler, if possible minimise stress to the animal and reduce the risk of further injury by: <ul style="list-style-type: none"> ◦ Handling fauna with care and as little as possible. ◦ Covering larger animals with a towel or blanket and placing in a large cardboard box. ◦ Placing small animals in a cotton bag, tied at the top. Keeping the animal in a quiet, warm, ventilated and dark location. • In the case of arboreal or flying mammals attempts will be made to relocate the den or roost. After capture, the animal(s) will be held by a trained wildlife carer for a period of no longer than two weeks until the roost or den can be relocated, either as an entire tree or part thereof. • Work may recommence once the animal(s) have been captured and removed from the area. • Felled trees will be placed between cleared and remnant bushland where possible to provide runways of ground cover for dispersal of animals. • Excess material may be mulched and used on site. </div> <div> <p>Environment Manager</p> </div>
Timeframe	Duration of the works.
Monitoring & Reporting	Tree Report Weekly inspections

	Vegetation Removal or Trimming Permits Pre-clearance inspections Daily Clearance reports			
Potential impacts and Residual Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Residual Risk Rating		
		P X	C	Risk
	Death or injury of fauna	L5	C3	13
	Unapproved damage or removal to threatened plant species, threatened vegetation community or habitat resources	L5	C3	13
	Unapproved removal or trimming of vegetation	L5	C5	4

In addition to the above table and to comply with the Downer EMS, the following controls will be applied in the case of unexpected discoveries which may require sensitive management.

The following are critical controls to prevent the unauthorised clearance of protected areas:

- Ensure an authorisation has been received prior to disturbing land or vegetation in accordance with the CoA, REMMS and Downer Land and Vegetation Disturbance Permit: DG-ZH-FM071.3
- Restrict access to protected areas with high visibility barriers and signage and include a buffer zone between the barrier and the protected fauna and flora area
- Restrict vehicle and equipment movement to designated access tracks

The following are general flora, fauna and biosecurity controls / mitigation measures:

- All activities must be conducted with minimum disruption to the natural habitat including the removal of rocks, debris or fallen branches on the land surface in order to prevent habitat loss.
- All clearing of vegetation must be kept to a minimum and only be removed with the required approval or permit.
- High visibility barriers and appropriate signage must be installed around protected or sensitive areas and monitored / maintained appropriately
 - o include a buffer zone between the barrier and the protected fauna and flora area
 - o communicate the restricted barriers locations to all staff; and
 - o visually inspect and maintain barriers for duration of works.
- The establishment of access points, parking areas and temporary laydown areas should be determined early to minimise impact.
- Tracks should be maintained to prevent erosion, weed growth and waterlogging, to discourage drivers from driving off track.
- Type and size of the machinery required should be appropriate to the job and selected to minimise disturbance.

- Materials should be placed on established lay down areas.
- No spoil or stockpiles are to be placed on native vegetation.
- Ensure all open excavations (e.g. trenches) are visually inspected daily for any trapped fauna.
- On open excavations that will remain open overnight or for longer than 24 hours, install at least one (1) fauna escape ramp (e.g. scramble matting, ramps, ladders, battered slopes).
- Personnel are not permitted to intentionally feed, harass, harm, injure or kill fauna.
- Fauna must only be handled by approved and appropriately trained fauna handlers.
- All plant/ vehicles must be operated to minimise disturbance and spread of any weeds or pests.

Weed management –

Weeds need to be managed in accordance with the managed in accordance with section 11.2 of SM CEMF to avoid the spread of weeds through the environment. Weed management is to be undertaken in areas affected by construction prior to any clearing works in accordance with the Noxious Weeds Act 1993.

Weed prevention controls include:

- Ensuring plant, equipment and clothing are free of soil and vegetative matter prior to entry to site
- Minimising disturbance of native vegetation
- Ensure erosion controls are in place
- Apply mulch and revegetate as soon as practical.

Weed management:

- Weed removal in accordance with TfNSW approvals requires placing the weed waste in bags or on plastic sheeting to avoid the spread
- Physically demarcate weed trees/area on site of potential clearing or disturbance
- Weed material needs to be removed from site, preferably the same day
- Weed material must not be mulched on site and must only be taken to suitably licenced disposal facilities
- Areas that have had weeds removed need to be stabilised with mulch, biodegradable weed matting or similar.

Tree Protection Zone (TPZ)

Tree protection zones shall be managed in accordance with TfNSW Vegetation Management (Protection and Removal) Guideline - DMS-SD-111.

The project's direct scope of works area has been identified as highly modified urban landscape with no risk for direct or indirect impacts. However, with the completion of Landscaping, TPZs and associated controls will be applied.

A TPZ provides for the viability and stability of trees to be retained by excluding activities within the TPZ unless under authorisation from a qualified ecologist, horticulturalist or arborist.

Activities not to be undertaken in a TPZ without authorisation must include, but are not limited to:

- machine excavation and trenching
- cultivation
- storage, including vehicle and plant parking (unless no alternative exists when carrying out short term work)
- preparation of chemicals, including refuelling
- storage or placement of waste
- wash down and cleaning of equipment
- changing soil levels including placement of spoil
- installation of utilities.

Procedure 2: Groundwater

Impact: There is some potential for Construction activities to intersect the groundwater table

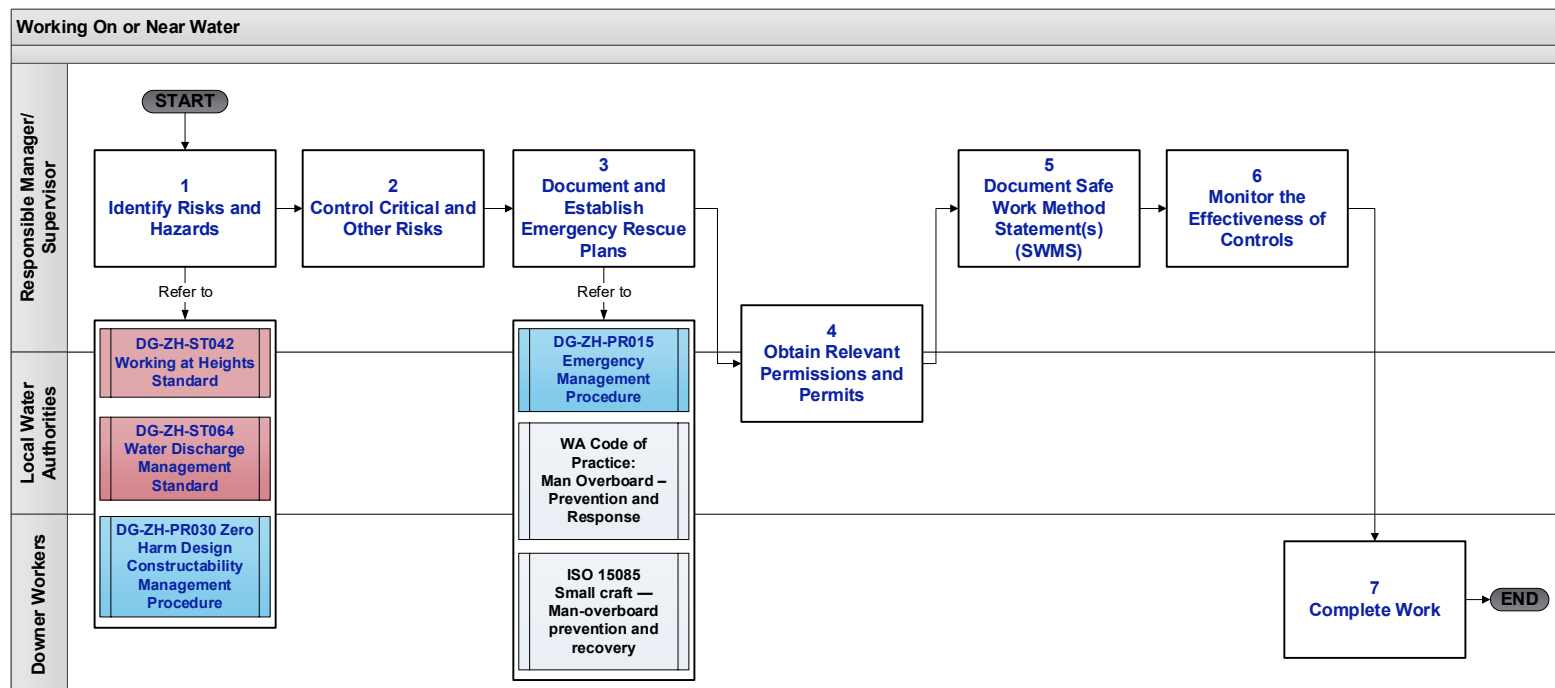
Objective	<ul style="list-style-type: none"> To comply with contractual and legislative requirements in relations to the management of groundwater Reduce the potential for drawdown of surrounding groundwater resources Prevent the pollution of groundwater through appropriate controls Reduce the potential impacts of groundwater dependant ecosystems 		
Targets	All groundwater to be tested before dewatering occurs		
Legal, Contractual & Other Requirements	<ul style="list-style-type: none"> Planning consent conditions – SSI 8256 CEMF Section 7 Water Management Act 2000 NSW Aquifer Interference Policy (NSW Office of Water, 2012) Protection of the Environment Operations Act 1997 		
Site specific planning / approval conditions / licence conditions	In accordance with the Sydney Metro City & Southwest –Sydenham to Bankstown Staging Report the Project does not require a specific Groundwater Management Plan as the likelihood of impacting on groundwater during the works are low. As such, management of any groundwater encountered during the works is to be managed in accordance with this procedure.		
Potential impacts and Initial Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Initial Risk Rating	
		P X	C Risk
	Inappropriate dewatering of groundwater impacting on receiving environment or groundwater source	L4	C5 7
Controls (means and resources)	Commitments & Mitigation Measures outlined in the EIS / SPIR		
	Mitigation Measure	Applicable to the Project	Responsible
	N/A	N/A	N/A
	Site Specific Mitigation & Control Measures developed as part of this CEMP:		
	Mitigation Measure	Responsible	
	A dewatering permit is to be in place for all dewatering activities, including the dewatering of any groundwater.	Environmental Manager Site Supervisor	

	Awareness training is to be provided to workers as required.	Environmental Manager Site Supervisor		
	Water treatment units are to be utilised and maintained where water testing indicates treatment is required.	Environmental Manager Construction Manager Site Supervisor		
	Dewatering may only occur on site or to licenced discharge points	Environmental Manager Construction Manager Site Supervisor		
Responsibilities	<ul style="list-style-type: none">• Engineering personnel are responsible for identifying any works that may interact with known groundwater sources• Engineering personnel are responsible for determining any potential subsidence impacts associated with dewatering of groundwater• The Principal Contractor’s Environmental Manager is to organise testing of any groundwater prior to discharge• Engineering personnel are responsible for implementing appropriate treatment methods based on the results of groundwater quality testing			
Timeframe	Duration of Construction			
Monitoring and Reporting	<ul style="list-style-type: none">• Dewatering permit• Weekly inspections• Inspection and maintenance of treatment units (where applicable)• Incidents are to be recorded on form Environmental Incident and Complaint Report			
Potential impacts and Residual Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Residual Risk Rating		
	Inappropriate dewatering of groundwater impacting on receiving environment or groundwater source	P X	C	Risk
		L5	C5	4

As stated in the table above, the project does not require a specific Groundwater Management Plan as the likelihood of impacting on groundwater during the works are low. As such, management of any groundwater encountered during the works is to be managed in accordance with Section 7 of SM CEMF:

- Any groundwater discharge will be managed in accordance with Downer's Water Discharge Management Standard (DG-ZH-ST064):

- For water release from sediment ponds, trenches, excavations and bunds a water release permit using Downer's Water Release Permit (DG-ZH-FM064.1) will be issued prior to any manual water release.
- In the absence of discharge locations, an appropriate disposal method and location based on the results of analysis, that prevents pollution of local and regional groundwater and surface water resources, is to be selected in consultation with Sydney Metro and/ or regulator.
- Follow the flowchart – Downer's Working On or Near Water Procedure (DG-ZH-PR136)



Procedure 3: Air Quality

Impact: Minimal impact expected due to the small area of disturbance associated with the works.

Objectives	<ul style="list-style-type: none"> To comply with contractual and legislative requirements in relations to the management of air quality Minimise gaseous and particulate pollutant emissions from Construction activities as far as feasible and reasonable Identify and control potential dust and air pollution sources. 		
Targets	<ul style="list-style-type: none"> No dust impacting on offsite activities or surrounding residences No release of contaminants, (odour, smoke etc.) into the air. 		
Legal, Contractual and Other Requirements	<ul style="list-style-type: none"> Planning consent conditions – SSI 8256 CEMF Section 16 <i>Protection of the Environment Operations Act 1997</i> <i>Protection of the Environment Operations (Clean Air) Regulation 2010</i> 		
Site specific planning / approval conditions / licence conditions	<ul style="list-style-type: none"> CoA E2 Mitigation measures committed in the EIS & SPIR 		
Potential impacts and Initial Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Initial Risk Rating	
		P X	C Risk
	Dust or plant emission impacting on the receiving environment and human health	L3	C5 12
	Abrasive blasting waste emissions impacting on the receiving environment and human health	L3	C4 16
	Odour from works causing disturbance to local receivers	L4	C5 7
Controls (means and resources)	Commitments & Mitigation Measures outlined in the EIS / SPIR		
	Mitigation Measure	Applicable to the Project	Responsible
	CoA E2 - In addition to the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1, 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.	Applicable	Environmental Manager Construction Manager Site Supervisor
	Site Specific Mitigation & Control Measures developed as part of this CEMP: The following are the minimum general control measures to be implemented on the project, however additional control measures may be required following the completion of the Construction process procedure/work method statement for the proposed activity.		
	Mitigation Measures	Responsible	

	All plant and machinery would be fitted with emission control devices complying with relevant Australian Standards.	Construction Manager Site Supervisor
	Machinery would be turned off when not in use and not left to idle for prolonged periods.	Site Supervisor
	Machinery and plant that will be kept on site will be serviced as per manufactures specifications.	Site Supervisor
	Vehicle movements would be limited to designed entries and exits, haulage routes and parking areas.	Construction Manager Site Supervisor
	Dust generation would be monitored visually, and where required, dust control measures such as water spraying would be implemented to control the generation of dust.	Environmental Manager Site Supervisor
	Materials transported to and from the site would be covered to reduce dust generation in transit.	Site Supervisor
	Access points would be inspected to determine whether sediment is being transferred to the surrounding road network. If required, sediment would be promptly removed from roads to minimise dust generation.	Environmental Manager Site Supervisor
	Provide shaker grids, rumble strip or equivalent stabilisation at site egress points.	Site Supervisor
	Remove mud from haul vehicles prior to entering public roads.	Site Supervisor
	Stabilisation of any exposed surfaces as soon as practicable, including implementation of final landscaping as early as possible.	Construction Manager Site Supervisor
	Shade cloth would be fastened to the perimeter fence on the project site, where practicable, to minimise dust transported from the site during Construction.	Construction Manager Site Supervisor
	Daily inspections and regular surveillance would be undertaken to identify any vehicles, plant or equipment that is causing visible emissions. If any defective vehicles, plants or equipment are identified, operation of this machinery would cease and service/maintenance would be undertaken.	Site Supervisor
	Works (including the spraying of paint and other materials) would be suspended during strong winds or in weather conditions where high levels of dust or airborne particulates are likely.	Construction Manager Site Supervisor
	Stockpiles will be maintained and contained appropriately, which could include covering or regular watering to minimise dust.	Construction Manager Site Supervisor
	Provision of Water tankers where necessary.	Construction Manager Site Supervisor

	Cover haul vehicles loads & ensure tail gates are closed when operating on public roads.	Construction Manager Site Supervisor		
	Provide awareness training in the need to minimise dust.	Environmental Manager		
	Note any odours during site inspections, particularly from any effluent tanks, and apply de-odourising agents as required.	Environmental Manager Construction Manager Site Supervisor		
Responsibilities	<ul style="list-style-type: none">• The Site Manager to implement the requirements of this procedure• Site Manager and Environmental Manager (or delegate) are to inspect the works at regular intervals.			
Timeframe	Duration of Construction			
Monitoring and Reporting	<ul style="list-style-type: none">• Weekly inspections. Incidents or complaints to be recorded on form Environmental Incident and Complaint Report			
Potential impacts and Residual Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Residual Risk Rating		
		P X	C	Risk
	Dust or plant emission impacting on the receiving environment and human health	L4	C5	7
	Abrasive blasting waste emissions impacting on the receiving environment and human health	L4	C4	7
	Odour from works causing disturbance to local receivers	L5	C5	4

In addition to the above table and to comply with the Downer EMS, Downer's Air Quality Management Standard (DG-ZH-ST070) defines the requirements to be met to manage air emissions from all activities conducted at fixed facilities and construction worksites. Discharges to air such as fumes, dust and odour can contaminate the environment and be a nuisance to communities and animals.

Downer will take all reasonable and practicable measures to manage air emissions from all activities conducted on site. Controls for emissions to air will be addressed using the following hierarchy.

Table 7. Hierarchy of air quality management controls

Control Hierarchy	Example
-------------------	---------

Avoid	During the design and planning phase, eliminate the need for high-dust generating activities. Using technology that avoids or minimises air emissions (i.e. newer plant)
Reduce	Treating air emissions before release / utilising water misters and dust suppression techniques to suppress dust and or bind it.
Manage	Limiting dust-generating construction activities during windy conditions. Monitoring emissions for changing conditions during works.

Diesel exhaust and emissions will be managed with proper maintenance and tuning of engines to manufacturer's specifications. This includes Catalytic converters and exhaust filters; Correct fuel specification; Limiting idling time; Avoiding overloading; Appropriate height of discharge above ground level, Vehicles operated in accordance with Downer's Vehicles and Mobile Plant Standard (DG-ZH-ST057).

Procedure 4: Waste and Spoil

Impact: Minimal impact expected due to the small amount of waste generated and spoil to be handled.

Objectives	<ul style="list-style-type: none"> Minimise spoil generation where possible The project will mandate 100% reuse or recycling (on or off site) of usable spoil Spoil will be managed with consideration to minimising adverse traffic related issues Spoil will be managed to avoid contamination of land or water Spoil will be managed with consideration of the impacts on residents and other sensitive receivers Site contamination will be effectively managed to limit the potential risk to human health and the environment Minimise waste throughout the project life-cycle Waste management strategies will be implemented in accordance with the <i>Waste Avoidance and Resource Recovery Act 2001</i> management hierarchy as follows: <ul style="list-style-type: none"> Avoidance of unnecessary resource consumption Resource recovery (including reuse, reprocessing, recycling and energy recovery) Disposal. 			
Targets	<ul style="list-style-type: none"> 100% reuse or recycling of usable spoil. 90% recycling target (in accordance with REMM WM2) Waste tracking to occur throughout project and records to be maintained The principles of the waste management hierarchy will be adopted. 			
Legal, Contractual and Other Requirements	<ul style="list-style-type: none"> Planning consent conditions – SSI 8256, CoA C3(c) CEMF Section 6 and Section 17 <i>Protection of the Environment Operations Act 1997</i> <i>Protection of the Environment Operations (Waste) Regulation 2014</i> 			
Site specific planning / approval conditions / licence conditions	CoA – E73 to E76 REMM – WM1 to WM7 Mitigation measures committed in the EIS & SPIR			
Potential impacts and Initial Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Initial Risk Rating		
		P X	C	Risk
	Inappropriate waste disposal impacting on environmental receivers	L3	C5	12
Controls (means and resources)	Commitments & Mitigation Measures outlined in the EIS / SPIR			
	Mitigation Measure	Applicable to Project Locality	Responsible	

	CoA E73 - Any items or infrastructure that are salvageable must be identified in the relevant CEMP Sub-plan (Condition C3). Note: reuse of items may include signal boxes, indicators, ballast or other rail infrastructure. These items should be offered to Sydney Trains or reuse.	Applicable	Construction Manager Site Supervisor
	CoA E74 - The importation of waste and the storage, treatment, processing, reprocessing or disposal of such waste must comply with the <i>Protection of the Environment Operations Act 1997</i> , under the <i>Protection of the Environment Operations (Waste) Regulation 2014</i> , and orders or exemptions made under the regulation.	Applicable	Environmental Manager Construction Manager Site Supervisor
	CoA E75 - Waste must only be exported to a site licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste, or in accordance with a Resource Recovery Exemption or Order issued under the <i>Protection of the Environment Operations (Waste) Regulation 2014</i> , or to any other place that can lawfully accept such waste.	Applicable	Environmental Manager Construction Manager Site Supervisor
	CoA E76 - All waste must be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.	Applicable	Environmental Manager Construction Manager Site Supervisor
	REMM WM1 - Detailed design would include measures to minimise excess spoil generation. This would include a focus on optimising the design to minimise spoil volumes, and the reuse of material on-site.	Applicable	Design Manager Sustainability Manager Environmental Manager Construction Manager
	REMM WM2 - A recycling target of at least 90 per cent would be adopted.	Applicable	Sustainability Manager Environmental Manager Construction Manager Site Supervisor
	REMM WM3 - Spoil would be managed in accordance with the spoil management hierarchy.	Applicable	Sustainability Manager Environmental Manager Construction Manager Site Supervisor
	REMM WM4 - Target 100 per cent reuse of reusable spoil.	Applicable	Sustainability Manager Environmental Manager Construction Manager Site Supervisor

REMM WM5 - Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging.	Applicable	Sustainability Manager Environmental Manager Construction Manager Site Supervisor
REMM WM6 - All waste would be assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (EPA, 2014).	Applicable	Environmental Manager Construction Manager Site Supervisor
REMM WM7 - Waste segregation bins would be located at various locations within the project area, if space permits, to facilitate segregation and prevent cross contamination.	Applicable	Sustainability Manager Environmental Manager Construction Manager Site Supervisor

Site Specific Mitigation & Control Measures developed as part of this CEMP:

The following are the minimum general control measures to be implemented on the project, however additional control measures may be required following the completion of the Construction process procedure/work method statement for the proposed activity.

Mitigation Measures	Responsible
Minimise spoil generation where possible by undertaking a cut/fill balance exercise	Construction Manager Site Supervisor
Minimise spoil generation where possible by not over-excavating	Construction Manager Site Supervisor
Minimising adverse traffic related issues associated with spoil movement by primarily keeping any movements to within the corridor and by only using approved haulage routes under the Construction Traffic Management Plan	Construction Manager Site Supervisor
Spoil will be managed to avoid contamination of land or water by segregating soils known to contain contaminants	Environmental Manager Construction Manager Site Supervisor
Spoil will be managed to avoid contamination of land or water by implementing appropriate erosion and sedimentation controls, in particular by covering stockpiles where practicable	Environmental Manager Construction Manager Site Supervisor

	Spoil will be managed to avoid contamination of land or water by avoiding overland flow paths and known flood zones as storage areas	Environmental Manager Construction Manager Site Supervisor
	Spoil will be managed with consideration of the impacts on residents and other sensitive receivers by selecting laydown areas that are as far away from receivers as possible	Environmental Manager Construction Manager Site Supervisor
	Spoil will be managed with consideration of the impacts on residents and other sensitive receivers by using approved haulage routes under the Construction Traffic Management Plan	Construction Manager Site Supervisor
	Site contamination will be effectively managed to limit the potential risk to human health and the environment by segregating contaminated spoil	Environmental Manager Construction Manager Site Supervisor
	Site contamination will be effectively managed to limit the potential risk to human health and the environment by implementing the unexpected contamination finds procedure (refer to Appendix B of the SWMP).	Environmental Manager Construction Manager Site Supervisor
	Implement the mitigation measures within the Soil and Water Management Plan and other procedures within this CEMP.	Environmental Manager Construction Manager Site Supervisor
	Maintain a waste tracking register, including a copy of all waste dockets	Sustainability Manager
	Waste will be lawfully disposed of to a licenced facility	Environmental Manager Construction Manager Site Supervisor
	Any materials sent from the Project sites to another project site will comply with the NSW EPA Resource Recovery Exemptions. Appropriate testing and reporting in accordance with the Resource Recovery Exemption will be undertaken by an Environmental Consultant. All records will be kept on file and provided to the receiver.	Environmental Manager Construction Manager
	A spoil import and export form will be completed for any spoil coming to and leaving from the site.	Environmental Manager Construction Manager
Responsibilities	<ul style="list-style-type: none"> The Site Manager to implement the requirements of this procedure. Site Manager and Environmental Manager (or delegate) are to inspect the works at regular intervals. 	
Timeframe	<ul style="list-style-type: none"> Duration of Construction until all Principal Contractor waste obligations are met 	

Monitoring and Reporting	<ul style="list-style-type: none"> • Skips monitored visually by the Site Manager on a daily basis. • Weekly inspections. • Incidents or complaints to be recorded on form Environmental Incident and Complaint Report • Waste disposal records to be recorded in Principal Contractor's Waste Register. 		
Potential impacts and Residual Risk Rating Refer to Appendix 3 for Risk Matrix	Potential impact	Residual Risk Rating	
	Inappropriate waste disposal impacting on environmental receivers	P X	C Risk
		L4	C5 7

In addition to the above table and to comply with the Downer EMS, Waste and Spoil will be managed in accordance with Downer's 10 Environmental Principles (DG-ZH-PN002) of which the following are relevant:

- EP4 – Store and secure chemical substances in a bunded area;
- EP5 – Reduce, Reuse, Recycle to minimise waste;
- EP9 – Report all environmental hazards and incidents; and
- EP10 – Keep every site, secure, tidy and housekeeping maintained

Downer's Waste Management Standard (DG-ZH-ST063) applies to the identification and management of waste in accordance with the Waste Hierarchy with the aim of creating a circular economy encouraging life cycle thinking.

For job specific tasks refer to the following Zero Harm compliance guidelines:

- Management of Waste (DG-ZH-CG063);
- Waste Minimisation (DG-ZH-CG064);
- Re-use and Recycling (DG-ZH-CG065); and
- Waste Treatment (DG-ZH-CG066).

All waste streams must be segregated and classified in accordance with relevant jurisdiction regulations and guidelines. In some instances, chemical analysis will be required to determine the classification of the waste, e.g. asbestos contained in fill material. For further information refer to Downer's Fill Material Management Standard (DG-ZH-ST068.1) and Downer's Asbestos Management Standard (DG-ZH-ST086).

The management of waste must be accordance with the waste management hierarchy.



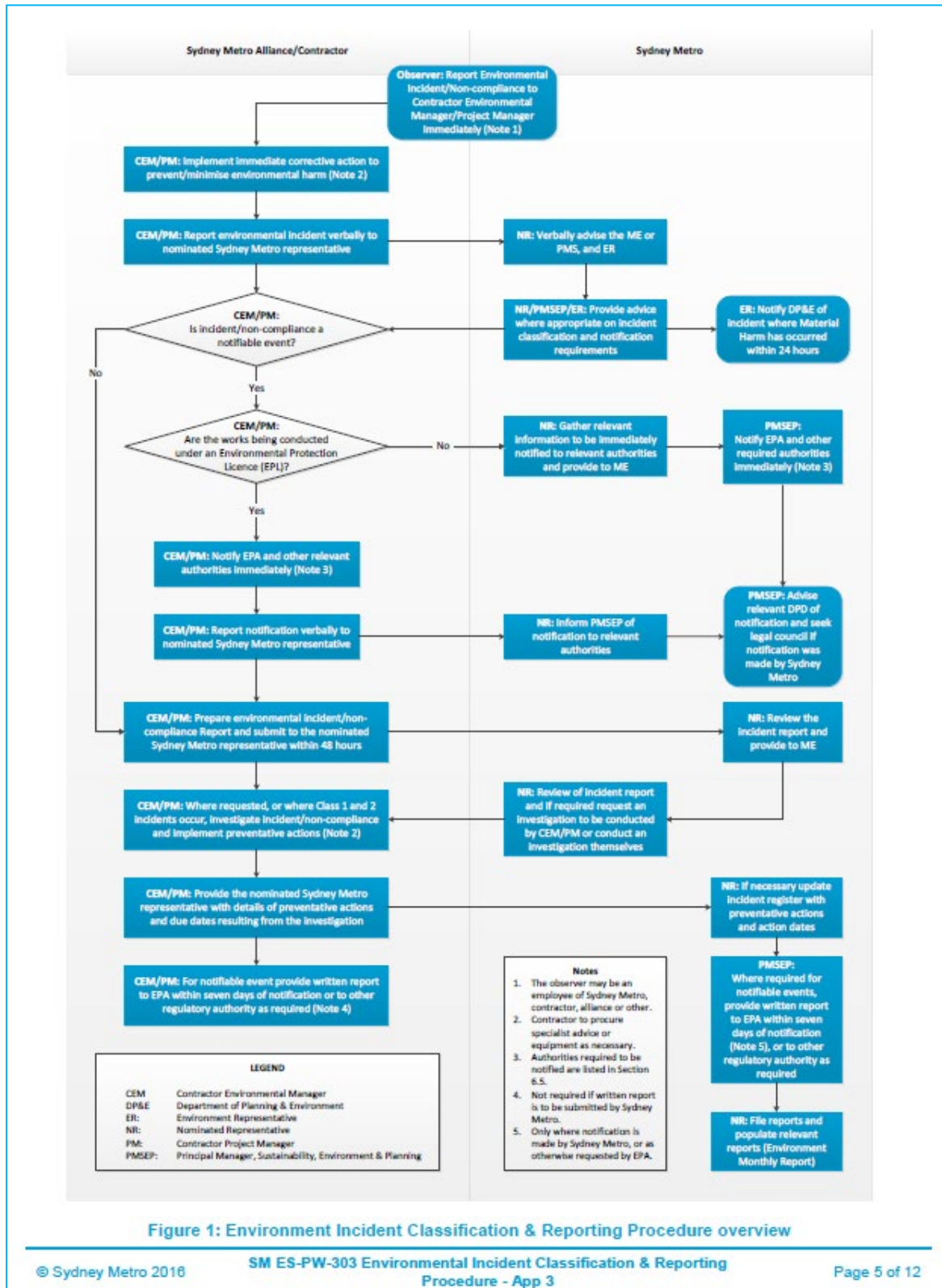
Before commencing any work, determine the sources of waste and management requirements and include them as part of the Project's Work Health and Safety (Zero Harm) Management Plan and or referenced within Appendix E of this CEMP.

Basic information to consider includes:

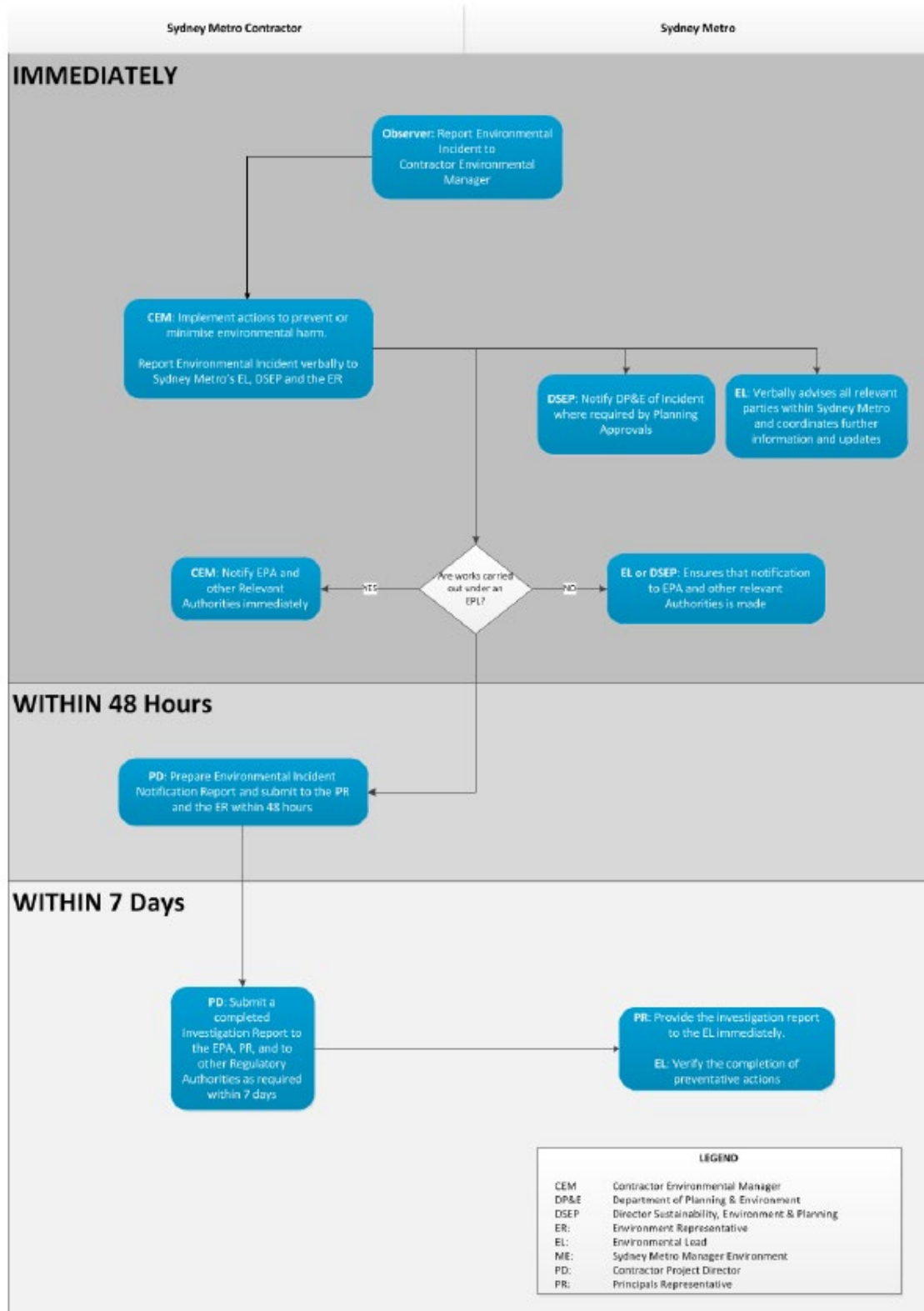
- identification and classification of all waste streams
- assessment of waste streams based on the waste hierarchy
- estimation of waste types and quantities to be generated, optionally using DG-ZH-FM063.2 Waste Estimation Record to record this data
- waste segregation, handling and storage arrangements
- waste transport methods and disposal locations
- permits/ licences required to store, transport or dispose of waste; and
- regulated waste transporters and receiving facilities licenses.

Downer reports and captures waste data into the Downer Environmental Data Reporting System (Envizi). This information can be recorded by completing Downer's Envizi Facility Details Record (DG-ZH-FM077.1) and submitting to an authorised person who can enter the data into Envizi.

Appendix F: Sydney Metro Environmental Incident and Non-compliance Reporting Procedure



Appendix F(a): Sydney Metro Environmental Incident Notification Process for Class 1 and 2 Incidents



Appendix F(b): Sydney Metro Environmental Incident and Non-Compliance Report Template

Environmental Incident and Non-Compliance Report Template

Record only factual information that you know to be correct. Do not make assumptions, be succinct and avoid speculation.

Section 1: General Details

Contractor:			
Site:			
TfNSW ID Code: (If known)	Contractor reference: (If known)		
Date of incident/ non-compliance:	Time of incident/ non-compliance:		
Date of notification:	Time of notification:		
Method of notification:			
Notification received by – Name:			
Notification received by – Position:			
Incident Classification:		Duration	
<input type="checkbox"/> Non-compliance only (complete Section 6 and 7 only)	<input type="checkbox"/> Class 3	<input type="checkbox"/> Short term (less than 1 week)	<input type="checkbox"/> Medium term (less than 3 months)
<input type="checkbox"/> Class 2	<input type="checkbox"/> Class 1	<input type="checkbox"/> Long term (greater than 3 months)	<input type="checkbox"/> Permanent
Incident Properties: (Tick as many as appropriate, where significant off-site impacts on people or the biophysical environment occurs this incident is also notifiable to DP&E)		<input type="checkbox"/> Notifiable event (also complete Section 4)	
		<input type="checkbox"/> Non-compliance (also complete Section 6)	
Incident type (choose one):			
<input type="checkbox"/> Air & Dust (e.g. dust or odour emission, excessive exhaust from plant or equipment)	<input type="checkbox"/> Unauthorised Works (e.g. work being carried out prior to approval or permits being obtained)	<input type="checkbox"/> Noise & Vibration (e.g. exceedances of noise and vibration limits)	
<input type="checkbox"/> Flora and Fauna (damage/harm to species /habitat/ecological community)	<input type="checkbox"/> Water Pollution (e.g. discharge to any onsite or offsite waterway)	<input type="checkbox"/> Traffic, Transport & Access (e.g. Issues regarding the management of traffic flow)	
<input type="checkbox"/> Land Contamination (e.g. events where harmful materials escape into soil)	<input type="checkbox"/> Community (e.g. events causing impacts on community amenity/property)	<input type="checkbox"/> Waste & Hazardous Materials (e.g. disposal causing environmental harm)	
<input type="checkbox"/> Systems & Documentation (e.g. Non-Compliance with project approval, or a CEMP requirement)	<input type="checkbox"/> Heritage (e.g. damage/disturbance to heritage item/object/place)		

Appendix G: Noise and Vibration Management Plan



Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades Noise and Vibration Management Plan

Sydney Metro Integrated Management System (IMS)

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03	31 March 2021	Integrate Downer EMS

Terms and Definitions

Terms	Definitions
AMM	Additional Mitigation Measures
AS	Australian Standard
AVTG	NSW EPA Assessing Vibration – a Technical Guideline
CoCB	City of Canterbury-Bankstown
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CNVIS	Construction Noise and Vibration Impact Strategy
CNVS	Sydney Metro Construction Noise and Vibration Strategy (2016)
CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure
CTMP	Construction Traffic Management Plan
dB	Decibels, used to express sound power or pressure level and vibration velocity or acceleration
dB(A)	A-weighted decibel (sound or vibration)
DECC	NSW Department of Environment and Climate Change (now OEH)
DPIE	Department of Planning, Industry and Environment
ECM	Environmental Control Map
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence under the POEO Act
ER	Environmental Representative
Frequency	Repetition of a sound or vibration wave, measured in Hertz (Hz), or cycles per second
HMP	Heritage Management Plan
HNA	Highly Noise Affected
ICNG	NSW EPA Interim Construction Noise Guideline
IMS	Sydney Metro Integrated Management System
ISO	International Standardization Organisation
I&S	TfNSW Infrastructure and Services
IWC	Inner West Council
LA₁(period)	A-weighted sound pressure level that is exceeded 1% of the measurement period
LA₉₀(period)	A-weighted sound pressure level that is exceeded 90% of the measurement period, used to derive background noise levels
LA_{eq}(period)	A-weighted sound pressure level, energy average over the measurement period
Minister, the	The Minister of New South Wales (NSW) Planning
NML	Noise Management Level
NPfi	Noise Policy for Industry (NSW EPA, 2017)
NSW	New South Wales

Terms	Definitions
NVMP	Noise and Vibration Management Plan
OOHW	Out-of-Hour Works
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
PPV	Peak Particle Velocity (vibration)
Proponent	The person or organisation identified as the proponent in Schedule 1 of the planning approval. In this case Transport for NSW
RBL	Rating Background Level
REMM	Revised Environmental Mitigation Measure
RMS	Roads and Maritime Services
r.m.s.	Root Mean Square (acoustics, noise and vibration)
RNP	NSW EPA Road Noise Policy
Secretary	The Secretary of the Department of Planning, Industry and Environment
SEP	Site Environmental Plan
SLR	SLR Consulting Australia
SM	Sydney Metro
SPIR	Submissions and Preferred Infrastructure Report
SPL	Sound Pressure Level
SSI	State Significant Infrastructure
SWL	Sound Power Level
TfNSW	Transport for New South Wales
VC	Vibration Criteria
VDV	Vibration Dose Value
VML	Vibration Management Level

1. Introduction

1.1. Context and scope of this Sub-plan

This Noise and Vibration Management Plan (NVMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for Southwest Metro – Dulwich Hill, Campsie and Punchbowl Park Station Upgrades (the Project).

This NVMP has been prepared to address requirements of the State Significant Infrastructure (SSI) 8256 Conditions of Approval (CoA), the Revised Environmental Mitigation Measures (REMM), the Project's Submissions and Preferred Infrastructure Report (SPIR) and the Sydney Metro Construction Environmental Management Framework (CEMF).

This NVMP describes how Sydney Metro's Principal Contractor (Downer) proposes to manage noise and vibration during the construction of the Project. Operational management measures do not fall within the scope of this Plan and therefore are not included.

This NVMP forms part of the suite of construction noise and vibration documents aiming to achieve the above objectives. The NVMP:

- Applies the Sydney Metro Construction Noise and Vibration Strategy (CNVS, 2016) during the construction phase of the Project;
- Applies the SSI 8256 CoA for the Project;
- Applies the principles of the NSW EPA Interim Construction Noise Guideline (ICNG, 2009); and
- Considers the interaction of known Conditions of Approval and any applicable Environmental Protection Licence (EPL) 12208 conditions (for works carried out under a rail possession).
- Complies with Downer's Environmental Noise and Vibration Standard (DG-ZH-ST069).

This NVMP summarises the requirements from the documents listed above and explains how they are to be applied in practice for the proposed station works.

This NVMP is supplemented by a Construction Noise and Vibration Impact Statement (CNVIS), which provides a detailed description of the proposed works and the predicted noise and vibration impacts for each site.

The NVMP and the associated CNVIS share the main objectives of the ICNG Section 1.3, a portion of which is presented below:

"The main objectives of the Guideline are to:

- *promote a clear understanding of ways to identify and minimise noise from construction works*
- *focus on applying all 'feasible' and 'reasonable' work practices to minimise construction noise impacts*
- *encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours*

- *streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage*
- *provide flexibility in selecting site-specific feasible and reasonable work practices in order to minimise noise impacts.”*

The NVMP and CNVIS:

- Identify sensitive receivers and noise and vibration management levels applying at each potentially affected receiver;
- Identify and clarify applicable project-specific construction noise and vibration management requirements under the CoA, Sydney Metro’s CNVS and any EPL which may apply;
- Identify the key noise and / or vibration generating construction activities;
- Identify and recommend feasible and reasonable construction noise and vibration mitigation measures (both engineering and management controls);
- Clarify the requirements of Sydney Metro’s City and Southwest Out of Hours Works Strategy/Protocol;
- Clarify the requirements for all necessary noise and vibration monitoring;
- Reference applicable Sydney Metro communications strategies and requirements for responding to and effectively addressing any community noise complaints relating to construction noise and / or vibration;
- Outline the requirements for maintaining records for noise and vibration monitoring and for community enquiries and complaints.

In accordance with Downer’s Environmental Noise and Vibration Standard (DG-ZH-ST069), the NVMP must consider:

- Identification of nearby residences and other sensitive land users
- Description of approved hours of work (refer Annex A – Regulations by Jurisdiction) and scope of work
- Description of complaints handling process
- Existing background level and legal requirement
- Distance between the site and the area likely to be affected by the noise or vibration
- Nature of neighbouring buildings and the activity therein, where the noise is likely to be heard, or vibration perceived (dilapidation report for vibration)
- The likely duration of construction, maintenance and demolition operations and the hours during which the above operations will be carried out
- Undertaking modelling to understand the predicted nature and levels of the noise or vibration; and
- Any initiatives to reduce the impact of noise and vibration.

This process may be required on every occasion noisy works are scheduled to occur outside of approved hours.

Noise reduction measures must be taken for all equipment or activities identified as potentially impacting noise sensitive receivers. Noise reduction measures should be aligned with the relevant Noise Hierarchy of Control categories:

- Avoid/ Reduce.
- Manage.
- Engineer.

Noise reduction (management and mitigation) measures are discussed in Section 7.

1.2. Project background

The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Environmental Impact Statement (EIS) (GHD/AECOM September 2017) assessed the noise and vibration impacts of construction within Chapter 12 (Construction noise and vibration). The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report (SPIR) (GHD/AECOM June 2018) was prepared in response to the submissions received during the EIS exhibition period. The SPIR revised the scope of the Sydenham to Bankstown Upgrade project and updated construction noise and vibration assessment was included in SPIR Appendix E.

This CEMP and Sub-plan suite addresses the upgrade of Dulwich Hill, Campsie and Punchbowl Stations only. Please refer to Section 1 of the CEMP for the Project Description.

1.3. Objectives and targets

This NVMP provides the basis for the management of construction noise and vibration in order to minimise the risk of impact during works. The objectives and targets of noise and vibration management and mitigation are outlined below:

Table 1: Noise and vibration objectives and targets

Objective	Target
Minimise unreasonable noise and vibration impacts on residents and businesses	Mitigation and management measures adopted in accordance with Section 7. Aim is to achieve Noise and Vibration Management Levels where feasible and reasonable, and apply Additional Mitigation Measures for residual excess noise in accordance with Section 7.11
Avoid structural damage to buildings or heritage items as a result of construction vibration	Measured vibration levels from construction activities all meet agreed vibration criteria (refer Section 5.7)
Undertake active community consultation	Community notification and management provided in accordance with the Sydney Metro Overarching Community Consultation Strategy (OCCS) and with notification provided in accordance with Section 7.5 and the Additional Mitigation Measures Matrix (Section 7.12)
Maintain positive, cooperative relationships with schools, childcare centres, local residents and building owners.	Community notification and management provided in accordance with the Sydney Metro Community Consultation Strategy (CCS) and in accordance with Section 7.5

These objectives conform to Sydney Metro objectives as described in the Construction Environmental Management Framework.

1.4. NVMP and supporting documents

This NVMP and the associated CNVIS (Dulwich Hill, Campsie and Punchbowl Station Upgrades draft Construction Noise and Vibration Impact Statement Rev00 17 December 2020) have been developed to assess works to be carried out by Downer. Sydney Metro has provided indicative works stages, locations, and plant for assessment.

The CNVIS and NVMP, with appropriate mitigation measures, can be updated at any time to reflect the detailed design, development of construction methods, and coordination with other contractors / projects in the areas to manage cumulative impacts.

If Downer proposes to carry out any works activity which is not covered in the CNVIS, and if that activity is predicted to exceed CNVIS noise predictions, be in a different location, or be noticeably different in noise character to the assumed activities for the associated works stage, then the CNVIS must be updated and approved prior to commencement of those different works.

Downer can refer to the NVMP and CNVIS to consider ways to mitigate impacts from their proposed works, through plant selection and / or screening, and scheduling of noisy activities to less noise-sensitive periods when possible.

It is expected that Downer will also prepare works plans and out of hours works (OOHW) applications in accordance with the Sydney Metro City and Southwest Out of Hours Works Strategy/Protocol (SM-17-00005396) which has been prepared to satisfy CoA E25 and REMM NVC16, which describe in more detail the plant and activities to be scheduled. These will build on the findings of the CNVIS but be broken down further when plant selection is confirmed and sequencing and location of activities is clear, allowing impacts to be managed appropriately.

The NVMP and CNVIS are part of a suite of construction noise and vibration management documents and have an interrelationship with other documents, as outlined below:

- The CEMP prepared for the Project;
- Site Environment Plans (SEPs) or Environmental Control Maps (ECMs) identify nearby residential and other noise-sensitive receivers and Noise Catchment Areas. These are progressively updated to incorporate physical noise management measures identified in the CNVIS, such as solid hoarding;
- The Heritage Management Plan (HMP) prepared for the Project, given the potential for vibration intensive works to be carried out at heritage-listed railway stations;
- The Construction Traffic Management Plan (CTMP) prepared for the Project; and
- The Sydney Metro City and Southwest Overarching Community Communications Strategy (OCCS) (SM-17-00083972). The OCCS describes the procedures and processes for community notification, consultation and complaints management.

1.5. Consultation

CoA C3(a) and CoA C8(a) require that the NVMP and Noise and Vibration Monitoring Program be prepared in consultation with the relevant Council. As such the following stakeholders will be consulted in developing this Plan:

- City of Canterbury Bankstown Council (CoCB); and
- Inner West Council (IWC).

A summary of the consultation is provided below and in Appendix E.

Table 2: Consultation carried out in the development of this Plan

No.	Agency Consultation	Requirements and date submitted	Key issues raised	NVMP Section Reference
Conditions of Approval				
C6	Department of Planning, Industry and Environment (DPIE)	Issued for review and approval Re-issued in response to DPIE comments	Various comments	Section 5 Section 7 Section 8 Appendix A Appendix B
C3(a)	CoCB	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 22/12/20	Nil.	N/A
	IWC	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 21/01/20	Request for IWC to be kept informed should Downer receive an EPL. Query regarding the limits of EPL 12208. Request for IWC to be notified of outcomes of community consultation.	N/A
C8(a)	CoCB	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 22/12/20	Nil.	N/A
	IWC	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 21/01/20	Request for IWC to be kept informed should Downer receive an EPL. Request for IWC to be notified of outcomes of community consultation. Editorial comment. General queries on NVMP content	

2. Legal and other requirements

This Plan addresses applicable requirements within the following documents:

- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Conditions of Approval SSI-8256*, determined 12 December 2018
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Environmental Impact Statement*, September 2017.
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report*, June 2018.
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Bankstown Modification Report*, May 2020
- The Sydney Metro *Sydenham to Bankstown Staging Report* (2020)
- Sydney Metro *City and Southwest Construction Noise and Vibration Strategy* (2016)
- Sydney Metro *City and Southwest Out-of-Hours Works Strategy/Protocol* (2019)
- Sydney Metro *Construction Environmental Management Framework v3.2* (2017);
- Sydney Trains Environment Protection Licence 12208; and
- Downer Environmental Noise and Vibration Standard (DG-ZH-ST069).

The Compliance Matrix in Section 2.2 provides a comprehensive list of compliance requirements, environmental documents and the contract documents.

Table 3 below details the legislation and planning instruments considered during development of this Plan.

Table 3: Legislation and Planning Instruments

Legislation	Description	Relevance to this Plan
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 NVMP.
Protection of the Environment Operations Act 1997 (POEO Act)	This Act includes all the controls necessary to regulate pollution and reduce degradation of the environment, provides for licensing of scheduled development work, scheduled activities and for offences and prosecution under this Act.	This Plan defines how the Project will manage works to comply with this Act. The works will be conducted in accordance with the requirements of the Sydney Trains EPL (#12208).

2.1. Policies, Standards and Guidelines

Additional guidelines and standards to the management of noise and vibration include:

- NSW EPA *Noise Policy for Industry* (NPfI, 2017);
- NSW EPA *Interim Construction Noise Guideline* (2009);
- NSW EPA *Assessing Vibration – a Technical Guideline* (AVTG, 2006 – for human exposure);
- NSW EPA *Road Noise Policy* (RNP, 2011);

- Transport for NSW (TfNSW) *Infrastructure and Services Construction Noise and Vibration Strategy* (I&S CNVS, 2018, for supplementary information not provided in the Sydney Metro CNVS);
- TfNSW Roads and Maritime Services *Construction Noise and Vibration Strategy* (RMS CNVS, 2016, for supplementary information not provided in the Sydney Metro CNVS);
- Australian Standard AS 2017-2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors*;
- Australian Standard AS 3671-1989 *Acoustics – Road traffic noise intrusion – Building Siting and Construction (for guidance only; applies to siting of the receiver buildings)*;
- Australian Standard AS/NZS 2107:2016 *Acoustics - Recommended design sound levels and reverberation times for building interiors*;
- Australian Standard AS 2187:2-2006 *Explosives - Storage and Use - Part 2: Use of Explosives*;
- Australian Standard AS/NZS ISO 3100:2009 *Risk Management – Principals and Guidelines*;
- British Standard BS 6472-1992 *Guide to evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)*;
- British Standard BS 7385:2-1993 *Evaluation and measurement for vibration in buildings Part 2*;
- German Standard DIN 4150: Part 3-1999 *Structural Vibration Part 3: Effects of Vibration on Structures*; and
- Downer Environmental Noise and Vibration Standard (DG-ZH-ST069).

The primary reference for managing noise and vibration from construction and maintenance is the Environment Protection Authority (EPA) *Interim Construction Noise Guideline* ("ICNG", 2009).

2.2. Conditions of Approval

The CoA and REMM relevant to this NVMP are listed in Table 4 below. In accordance with CoA C4, the relevant requirements of the CEMF have also been included in Table 4.

Table 4 also provides a cross reference to demonstrate where the CoA, REMM or CEMF requirement is addressed in this NVMP or other management documents.

Please refer to Appendix A for all other CoA, REMM and CEMF requirements relevant to the development of this Plan.

Table 4: NVMP Compliance Matrix

No.	Requirement	Reference	How addressed?			
Conditions of Approval						
C3	<div>The 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:</div> <table><tr><td>(a)</td><td>Noise and vibration</td><td>Relevant council(s)</td></tr></table>	(a)	Noise and vibration	Relevant council(s)	Section 1.5 Appendix E	This Plan has been prepared in accordance with this condition and describes how Downer proposes to manage noise and vibration during construction of the Project. This plan will be provided to IWC, CoCB and OEH for consultation.
(a)	Noise and vibration	Relevant council(s)				
C4	The CEMP Sub-plans must be prepared in accordance with the CEMF	This Table	Table 4 demonstrates how this Plan has been prepared in accordance with the relevant requirements of the CEMF.			
C5	Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-Plan.	Section 1.5 Appendix E	This Plan has been provided to IWC and CoCB for consultation. Refer to Section 1.5 and Appendix E of this Plan for a summary of consultation.			
C6	Any of the CEMP Sub-plans may be submitted along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before Construction.	Refer to section 1.2 of the CEMP	This Plan has been submitted for approval to DPIE prior to the final submission of the CEMP for DPIE approval.			
C7	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of Construction. Where Construction of the CSSI is staged, Construction of a stage must not commence until the CEMP and CEMP Sub-plans for that stage have been approved by the Planning Secretary.	Refer to section 1.2 of the CEMP	Construction will not commence until the CEMP and all CEMP Sub-plans have been approved by DPIE. The CEMP and Sub-plans will be implemented for the duration of construction.			
C8	<div>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of Construction of the CSSI against the predicted performance.</div> <table><tr><td>(a)</td><td>Noise and Vibration</td><td>Relevant council(s)</td></tr></table>	(a)	Noise and Vibration	Relevant council(s)	Section 1.5 Section 8 Appendix E	The Noise and Vibration Monitoring Program has been provided to IWC and CoCB for consultation, as part of the NVMP. Refer to Section 1.5 and Appendix E of this Plan for a summary of consultation.
(a)	Noise and Vibration	Relevant council(s)				
C9	Each Construction Monitoring Program must provide:					
	<div>(a) details of baseline data available; (b) details of baseline data to be obtained and when;</div>	Section 8.1	Details of baseline noise and vibration data available, and how and when further baseline data is to be obtained is outlined in Section 8.1 of this Plan.			

No.	Requirement	Reference	How addressed?
	(c) details of all monitoring of the project to be undertaken;	Section 8.2	Details of all monitoring of the Project to be undertaken, including the parameters, frequency and location of monitoring is outlined in Section 8.2 of this Plan.
	(d) the parameters of the project to be monitored;	Section 8.2 Section 8.3	Details of the parameters of the project to be monitored are outlined in Section 8.2 and 8.3 of this Plan.
	(e) the frequency of monitoring to be undertaken;	Section 8.4	Details of the frequency of monitoring to be undertaken is outlined in Section 8.4 of this Plan.
	(f) the location of monitoring;	Section 8.2	Details of the location of monitoring to be undertaken is outlined in Section 8.2 of this Plan.
	(g) the reporting of monitoring results;	Section 8.5	The reporting of monitoring results is outlined in Section 8.5 of this Plan.
	(h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and	Section 8.6	The procedures to identify and implement additional mitigation measures where results of noise and vibration monitoring are unsatisfactory are outlined in Section 8.6 of this Plan.
	(i) any consultation to be undertaken in relation to the monitoring programs.	Section 1.5 Section 8.7 Appendix E	Consultation undertaken in relation to the monitoring program is detailed in Sections 1.5, 8.7 and Appendix E of this Plan.
C10	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C8 of this approval and must include reasonable information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.	Section 1.5 Section 8.7 Appendix E	The Noise and Vibration Monitoring Program has been prepared in accordance with this condition and describes how Downer propose to monitor noise and vibration during construction of the Project. The monitoring program has been provided to IWC and CoCB for consultation. Refer to Section 1.5 and Appendix E of this Plan for a summary of consultation.
C11	The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one (1) month before the commencement of Construction.	Section 8	The Noise and Vibration Monitoring Program has been endorsed by the ER. The Noise and Vibration Monitoring Program has been submitted to DPIE as part of this Noise and Vibration Management Plan, for approval no later than one month prior to the commencement of construction activities.

No.	Requirement	Reference	How addressed?
C12	Construction must not commence until the Planning Secretary has approved all of the required Construction Monitoring Programs.	Section 8	Construction will not commence until the CEMP and Sub-plans, including relevant construction monitoring programs have been approved by DPIE.
C13	The Construction Monitoring Programs, as approved by the Planning Secretary including any minor amendments approved by the ER must be implemented for the duration of Construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	Section 8	The Noise and Vibration Monitoring Program will be implemented for the duration of construction as detailed in Section 8 of this Plan.
C14	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	Section 8.5 Section 9.3	Section 8.5 details the reporting requirements and the frequency required for this reporting.
C15	Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	Section 8	The Noise and Vibration Monitoring Program is incorporated in Section 8 of this this Plan.
Construction Environmental Management Framework			
9.2(a)	Principal Contractors will develop and implement a Construction Noise and Vibration Management Plan for their scope of works consistent with the Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009). The Construction Noise and Vibration Management Plan will include as a minimum:	This NVMP	The NVMP addresses the key requirements of 9.2(a) as follows:
	i. Identification of work areas, site compounds and access points,	Section 3.3	Work areas, site compounds and access points described in this NVMP and presented in the CNVIS Appendix B – Worksite Maps
	ii. Identification of sensitive receivers and relevant construction noise and vibration goals,	Section 3.1 Section 4.1 Section 5	Sensitive receiver types are described in Section 3.1 and are identified individually in the NVMP Appendix B (Land Use Map) and in CNVIS Appendices D, E and F (noise prediction tables). Receiver sensitivity is described in Section 4.1. Construction noise and vibration goals are presented in Section 5 for different receiver types. These are also presented in the CNVIS Appendices D, E and F (noise prediction tables).

No.	Requirement	Reference	How addressed?
	iii. Be consistent with and include the requirements of the noise and vibration mitigation measures as detailed in the environmental approval documentation and the Sydney Metro Construction Noise and Vibration Strategy (CNVS).	Section 7	CNVS noise and vibration mitigation measures relevant to the scope of works are presented in Section 7 of this Plan.
	iv. Details of construction activities and an indicative schedule for construction works, including the identification of key noise and/or vibration generating construction activities (based on representative construction scenarios) that have the potential to generate noise or vibration impacts on surrounding sensitive receivers, in particular residential areas.	Section 3.3	Section 3.3 of this Plan includes a description of the main phases of work and the main works scenarios expected to generate noise and / or vibration with potential to impact on surrounding receivers.
	v. Identification of feasible and reasonable procedures and mitigation measures to ensure relevant vibrations and blasting criteria are achieved, including a suitable blast program.	Section 7.4 Section 8.2.2 Section 8.2.3	Section 7.4 describes vibration controls to minimise vibration impacts, and Section 8.2.2 and Section 8.2.3 describe vibration monitoring and building condition survey requirements. Blast program is not applicable to the proposed works.
	vi. Community notification provisions specifically in relation to blasting	Section 7.5	Community notification requirements are covered in Section 7.5 (Community Consultation and Management) and 7.11 of this Plan (Additional Mitigation Measures which include community notification requirements based on predicted noise levels). Blast program is not applicable to the proposed works.
	vii. The requirements of any applicable EPL conditions.	Section 2.3 Section 5.1	Section 2.3 of this Plan presents Sydney Trains EPL 12208 conditions which apply to the Project's works when carried out under a rail possession. Section 5.1 of this Plan explains permissible hours of work under EPL12208.
	viii. Additional requirements in relation to activities undertaken 24 hours of the day, 7 days per week.	Section 5.1	Section 5.1 of this Plan describes permissible hours of work under the Conditions of Approval and the EPL12208 (for works carried out under a rail possession). 24-hours a day, 7-days a week work is not anticipated for the proposed Station upgrade works. However EPL12208 does make allowances for such work under a week-long rail possession.

No.	Requirement	Reference	How addressed?
	ix. Pre-construction compliance requirements and hold points.	Section 1.5 Section 9.1 Section 8.2.3 Section 8.2.2	Section 1.5 and Section 9.1 of this Plan describe hold points for NVMP and Noise and Vibration Monitoring Plan approvals which are required prior to carrying out the works covered by the NVMP. Section 8.2.3 requires that Condition or Dilapidation surveys are required in any building or structure which is inside the recommended Minimum Working Distance for vibration-generating activities. These surveys must be carried out prior to commencement of the vibration-generating works. Section 8.2.2 requires that “site-law” vibration propagation measurements are carried out at the commencement of vibration-generating works, to ensure that the Minimum Working Distances applied in the vibration assessment are suitable.
	x. The responsibilities of key project personnel with respect to the implementation of the plan.	Section 2.4	Roles and responsibilities are listed in Section 2.4 of this Plan.
	xi. Noise monitoring requirements.	Section 8 Section 7.12	Section 8 of this Plan presents noise monitoring requirements for obtaining additional baseline noise data (if required), plant noise audits (as required or requested during the project), and general environmental noise monitoring in accordance with the CNVS Additional Mitigation Measures Matrix (Section 7.12).
	xii. Compliance record generation and management.	Section 9.3 Section 7.5 Section 8.5	Section 9.3 describes requirements for record-keeping. Section 7.5 also describes requirements for keeping records of complaints and community consultation. Section 8.5 describes requirements for noise and vibration monitoring reports.
	xiii. Community consultation requirements.	Section 7.5 Section 7.11	Section 7.5 describes community consultation requirements Section 7.11 includes Additional Mitigation Measures which include community notification requirements based on predicted noise levels.

No.	Requirement	Reference	How addressed?
	xiv. An Out of Hours Works Protocol applicable to all construction methods and sites.	Section 7.6 Appendix D	Section 7.6 refers to the approved Sydney Metro City and Southwest Out of Hours Works Strategy/Protocol. A copy of Sydney Metro's Out of Hours Works Application (to be utilised in accordance with the Strategy/Protocol) is provided in the Appendix D.

2.3. Environment Protection Licence

At this stage, Downer has not sought an Environment Protection Licence (EPL) from NSW Environment Protection Agency (EPA).

If Downer applies for an EPL for the Project, then this is administered by the EPA and may have different or additional noise and vibration management conditions to the CoAs. In this case, the Project's NVMP and CNVIS will be updated to incorporate the requirements of the EPL.

For the Project's activities that are carried out as part of a rail possession of the Sydney Trains operational heavy rail network, the Sydney Trains EPL12208 will apply. The works will be managed in accordance with the railway track maintenance clauses presented in the table in Appendix A.

2.4. Roles and responsibilities

The roles and responsibilities of key Downer personnel (and the ER) with respect to noise and vibration management are as follows in Table 5.

Table 5: Roles and Responsibilities

Roles	Responsibilities
Project Director (Project Leader)	<ul style="list-style-type: none"> Ensure that sufficient resources are allocated for the implementation of this NVMP; Ensure all appropriate noise and vibration mitigation measures are implemented; Authorise cessation of Construction activities on-site if exceedances are identified, in accordance with this NVMP; and Authorise all monitoring reports and any revisions to this NVMP.
Site Foreman (Site Superintendent)	<ul style="list-style-type: none"> Oversee the overall implementation of this NVMP; Ensure all appropriate noise and vibration mitigation measures are implemented; Ensure works occur within standard construction hours unless the appropriate out of hours works approval is in place; and Manage deliveries to mitigate noise impacts.
Project Environmental Manager	<ul style="list-style-type: none"> Oversee the implementation of this NVMP; Consider and advise senior management on compliance obligations; Ensure that the outcomes of compliance monitoring / incident reporting are systematically evaluated as part of ongoing management of construction activities; Ensure all appropriate noise and vibration mitigation measures are implemented; Where standard mitigation measures are deemed insufficient, undertake reasonable steps to manage adverse impacts and implement all additional measures; Authorise cessation of Construction activities on-site if exceedances are identified, in accordance with this NVMP; and Ensure Construction activity records/ monitoring records/incident reports are kept and maintained on-site.
Communication and Stakeholder Relations Manager	<ul style="list-style-type: none"> Leadership and management of the Communications, Stakeholder and Community Relations Team; Build and maintain effective working relationship with Sydney Metro's representative and Stakeholder and Community Liaison team; Develops and oversees the implementation of the Contract Specific Community Communication Strategy and Sub-plans;

Roles	Responsibilities
	<ul style="list-style-type: none"> Responsible for a stakeholder and community relations induction and training program for all personnel involved in the performance of the Project; Approves the Communications, Stakeholder and Community Relations team roles, role descriptions and responsibilities; Ensures the Contract Specific Community Communications Strategy and key activities are integrated into the project schedule; Attends the Sydney Metro led Communications Management Control Group and reports on activities, strategies and issues; Attends the monthly Project Management Review Group meeting to discuss project status and issues; Issues and crisis management; Manages media issues and acts as media spokesperson for the Project (subject to media protocols); Required to be on call 24 hours based on the team rotation; and Liaise directly with the Independent Environment Representative as required and where appropriate to facilitate any environmental management requirements, including those identified within the Planning Approvals.
Community Place Manager	<ul style="list-style-type: none"> Build and maintain effective working relationship with community, businesses, and stakeholders; Support the successful delivery of the Contract Specific Community Communication's Strategy and requirements; Implementation of the Contract Specific Community Communications Strategy and any relevant Sub-plans. Establish effective working relationships with local stakeholder to support the effective delivery of the Project; Required to be on call 24 hours based on the team rotation to respond to enquiries and complaints; Review, approve and oversee the development and distribution of all notification, newsletter, social media, photography, and other communication material; and Maintain the Consultation Manager database and generate reports as required.
Site personnel and Subcontractors	<ul style="list-style-type: none"> Understand and implement mitigation as required in the NVMP and any additional required measures identified during Construction; and Participate in (or conduct if authorised) relevant training to implement the requirements of this NVMP.
Downer's Noise and Vibration Monitoring Personnel (incl. Acoustic Consultants)	<ul style="list-style-type: none"> Responsible for carrying out noise and vibration monitoring to support the contractor and in accordance with the construction noise and vibration monitoring plan. Also responsible for updating the CNVIS and NVMP including updated noise predictions as required; Undertake relevant training where required, to implement this NVMP; Ensure regular maintenance and calibration of monitoring equipment; and Ensure all relevant monitoring quality/control assurance procedures are effectively implemented.
Independent Environmental Representative	<ul style="list-style-type: none"> Receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; Consider and inform the Planning Secretary on matters specified in the terms of this approval; Consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community;

Roles	Responsibilities
	<ul style="list-style-type: none"> Review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: <ul style="list-style-type: none"> (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary); Regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval; As may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; Consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and Prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI.

It is noted that the site team, including Downer's Environmental Manager, Environmental Coordinator, Construction Manager and Site Foreman/Site Superintendent (roles outlined in Section 3.3 of the CEMP) will attend site inspections with the ER upon request.

The ER may request information relating to noise and vibration management from Downer, the primary contact being the Environmental Manager.

3. Existing environment and proposed works

3.1. Existing environment

The proposed station upgrade works are to be carried out at Dulwich Hill, Campsie and Punchbowl Stations. The three stations are located in predominantly suburban residential areas with mixed use near the stations, including commercial, residential, child care and medical consulting rooms. In addition, Downer will utilise work site W7 located at Close Street Canterbury and identified in the EIS and SPIR, as a construction compound throughout the delivery of the Project.

For residential receivers, construction noise targets are set relative to existing background noise levels in the local area.

For other receiver types, noise and vibration targets are often set at absolute levels, without reference to the existing environment.

Nearby sensitive receivers have been divided into 4 different noise catchment areas (NCA). The defined noise catchment areas are consistent with those defined in the EIS for the Sydney Metro City & Southwest Sydenham to Bankstown project.

More detailed maps of each NCA can be found in Appendix B of this NVMP.

The Land Use Survey, as required by CoA E18, has identified some buildings with multiple uses such as shop-top residences. No operating theatres or other vibration-sensitive facilities have been identified in the Medical Centres at near Dulwich Hill, Campsie or Punchbowl Stations. The Land Use Survey is being updated as the Project progresses, also in accordance with E18. Any updates to the receiver list including adding new receivers and changing classification types (including presence of vibration-sensitive facilities) are to be included in updates to the CNVIS.

Most commercial receivers in the vicinity of these works are located along the roads surrounding the stations.

The stations are located within 100m of residences, but are mostly surrounded by cafés and restaurants, commercial buildings, and medical or dental practices.

A large number of the commercial properties are mixed use with residential or other uses above. The CNVIS requires that premises with different uses or receiver types should be classified separately. The other sensitive receivers, as defined in the CNVIS, that have been identified are presented in Appendix B, and listed in the Project's OCCS.

In order to understand the potential for construction activities to affect structures, the type of structure needs to be identified. All stations between Sydenham to Bankstown are heritage-listed, with either local or state significance. The EIS identifies heritage-listed buildings along the Sydenham to Bankstown route. The locations of heritage-listed buildings and the EIS assessment of vibration impacts are summarised in the Table below. Refer to the Project's Heritage Management Plan for further information about these items.

Notwithstanding the EIS assessment of vibration impacts summarised in the Table below and in the NVMP assessment in Section 6.4, it is the Contractor's responsibility to re-assess potential impacts on any heritage receiver and determine whether the proposed vibration-generating works have the potential to cause damage to heritage structures or building fabric.

Table 6: List of heritage receivers near the proposed station works

Station area	Location with respect to the project area	Assessed vibration impacts in EIS
NCA 02 – Dulwich Hill Railway Station Group	Within the station project area	Minor potential impacts, closest elements to works may exceed vibration screening levels
NCA 02 – South Dulwich Hill Conservation Area	Adjacent to the station project area	Minor potential impacts, closest elements to works may exceed vibration screening levels
NCA 02 – Inter-war Heritage Conservation Area Group Dulwich Hill	> 400m from the station project area	Minor potential impacts but not applicable to station works
NCA 02 – Gladstone Hall Dulwich Hill	> 250m from the station project area	Minor potential impacts but not applicable to station works
NCA 04 – Old Sugarmill	Approximately 100m from Canterbury compound site	Minor potential impacts but not applicable to station works
NCA 06 – Campsie Railway Station Group	Within the station project area	Minor potential impacts, closest elements to works may exceed vibration screening levels
NCA 06 – Coffill's Buildings Campsie	Adjacent to the station project area	Minor potential impacts, closest elements to works may exceed vibration screening levels
NCA 06 – Station House Inter-war Commercial Building Campsie	Adjacent to the station project area	Negligible potential impacts
NCA 06 – Campsie Court House	Approximately 200m from station project area	Negligible potential impacts
NCA 06 – War Memorial Clock Tower Campsie	Adjacent to the station project area	Negligible potential impacts
NCA 06 – Federation House Campsie	> 100m from station project area	Negligible potential impacts
NCA 10 – Punchbowl Railway Station Group	Within the station project area	Minor potential impacts, closest elements to works may exceed vibration screening levels
NCA 10 – War Memorial and Street Trees Punchbowl	> 100m from station project area	Negligible potential impacts
NCA 10 – Post-war Civic Building (formerly Punchbowl Baby Health Centre)	Adjacent to station project area	Negligible potential impacts

In accordance with REMM NVC4 where vibration screening levels are predicted to be exceeded at heritage items, condition assessments which consider the specific heritage values of the structure will be undertaken by Downer in consultation with a heritage specialist (refer Section 8.2.3). This assessment is to ensure heritage fabric is monitored and managed during vibration intensive activities.

3.2. Existing noise levels

Construction noise management levels (NML) at residential receivers are set relative to existing background noise levels, measured in the absence of construction activities.

Non-residential NML are absolute levels, but it can be informative to understand the existing ambient noise conditions at both residential and non-residential receivers, when assessing construction noise impacts.

For example, receivers in areas with high ambient noise levels may have well-designed windows, doors and roofing to control noise intrusion. This is particularly true of buildings affected by aircraft noise and new residential buildings which have been built near major road or rail corridors in accordance with State Environment Planning Policy (Infrastructure) (2007) requirements.

Building envelope acoustic performance may be considered for receiver-specific impact assessments to determine suitable additional mitigation measures for high-noise works. It is the responsibility of the Contractor to ascertain whether residential or non-residential noise-sensitive receivers have high performance building envelope attenuation. Sydney Metro and the Contractor are to review and agree on any adjustments to be made to Additional Mitigation Measures which are offered to any receivers with high performance building envelope (refer to Section 7.12).

The background noise levels along the Sydenham to Bankstown route have been measured by SLR Consulting Australia (SLR) to support the EIS noise impact assessment. The NCA described in the EIS report have been adopted for this NVMP and the associated CNVIS for consistency.

In some cases, this NVMP and the associated CNVIS have broken down an NCA into two locations, based on unattended measurement locations presented in the EIS which better represent areas near stations. The ambient and background noise levels are all taken from SLR's noise logger locations used for the EIS which were near the stations.

Measured rating background levels (RBL) and ambient noise levels (L_{Aeq}) are presented as dB(A) values in the table on the following page.

Table 7: Measured ambient and background noise levels

	Day 7am – 6pm		Evening 6pm – 10pm		Night 10pm – 7am	
	RBL	L _{Aeq}	RBL	L _{Aeq}	RBL	L _{Aeq}
NCA 02 – Dulwich Hill (15 Bedford Crescent Dulwich Hill, Dulwich Hill Station)	41	54	41	55	34	50
NCA 04 – Canterbury (9 Canberra Street, Hurlstone Park, Canterbury Substation)	40	53	40	50	35	47
NCA 06 – Campsie (34 North Parade Campsie, Campsie Station)	45	55	42	55	35	54
NCA 10 – Punchbowl (42 Urunga Parade Punchbowl, Punchbowl Station)	47	57	47	54	41	53

3.3. Proposed construction works

The likely works scenarios, locations, plant and duration are presented in the detailed works plan tables in the CNVIS associated with this NVMP.

The tables also provide the sound power level in dB(A) assumed for each plant item, and the % on time for the plant during the assessment interval of 15 minutes.

Construction works associated with the proposed station upgrades are expected to run from March 2021 to April 2022. As construction works will occur in the Sydney Trains operational rail corridor or station precincts, they will mostly take place during rail possessions overnight, on weekends, and in some cases over extended periods of more than one week.

A detailed description of the works has been provided in Section 1 of the CEMP.

The main plant and equipment expected to be used for construction include bobcats, compressors, concrete pumps, concrete trucks / agitators, diamond saws, excavators, franna crane, generators, hand tools, mobile cranes (50 tonnes), piling rigs (bored), rollers (non-vibratory), scissor lifts, semi-trailers, trucks, water tankers and welding equipment.

The Project's proposed work areas as modelled in SoundPlan are shown in Appendix C.

Access gates to the rail corridor are located at:

Dulwich Hill Station:

- Off Ewart Lane – Main access point; and
- Off Ewart Street/ Ewart Lane Carpark – Access for services building site.

Campsie Station:

- Off Lilian Lane – Main access point; and
- Off Lilian Lane – Access to compound for services building site.

(Uncontrolled when printed)

Punchbowl Station:

- Off Urunga Parade – Main access point; and
- Off Urunga Parade – Access to compound area within corridor.

The main construction compound will be located at the former Canterbury Bowling and Community Club off Close Street in Canterbury. The site will be used for site offices and sheds, staff parking, amenities and minor laydown activities including precast element laydown and provision of skip bins. Major noise sources are expected to be utility vehicles, occasional forklifts and temporary plant items such as outdoor condenser units for site office air conditioning. Downer's construction compound will occupy the western-most third of the former bowling greens. The eastern two former bowling greens will be used by the Sydenham Station Junction Contractor.

Table 8: Proposed Construction Works with typical worst case Sound Power Levels (SWL, dBL_{Aeq,15min})

Activity	Details	Indicative Time frame	OOH	SWL (dBL _{Aeq15min})
	Main Plant			
Construction Compound at Former Canterbury Bowling and Community Club				
Canterbury NCA 04 Scenario: General site activities	Forklifts, utes, light vehicles, fixed outdoor plant for air conditioning site offices	Throughout the project	Std hours generally OOH + std for works during possessions	90-106dB(A) SWL
Dulwich Hill Station Upgrade				
Dulwich Hill NCA 02 Scenario 1: Early Works	Chainsaw , mulcher / chipper, bobcat, 13T excavator, vacuum truck, 2Tdump truck / tipper, saw cutter , power tools	February – March 2021 Possession 1: 20-21 March 2021	Std hours generally OOH + std for works during possession	111-120dB(A) SWL With chainsaw and mulcher: 118+5dB(A) With saw cutter : 115+5dB(A)
Dulwich Hill NCA 02 Scenario 2: Main Works	5-13T excavator, power tools, 2T dump truck / tipper, saw cutter , jackhammer , vacuum truck, concrete agitator + pump, smooth drum / pad foot / trench roller, road sweeper, water cart	March – May 2021 Possession 2: 29-30 May 2021	Std hours generally OOH + std for works during possession	107-120dB(A) SWL With saw cutter: 115+5dB(A) With jackhammer: 114+5dB(A)
Dulwich Hill NCA 02 Scenario 3: Main Works	HIAB truck, power tools, saw cutter , 5-13T excavator +hammer , concrete truck, 6T dump truck, Franna, 80-250T mobile crane, EWP	May – June 2021	Standard hours	108-122dB(A) SWL With saw cutter: 117+5dB(A) With excavator +hammer: 117+5dB(A)
Dulwich Hill NCA 02 Scenario 4: Main Works	Hi-rail excavator / dumper / EWP, 5-13T excavator, dump truck, truck+dogs, concrete truck, power tools, hydrema, jackhammer ,	Possession 28 June – 11 July 2021	OOH + Std hours	108-122dB(A) SWL With saw cutter: 117+5dB(A) With jackhammer: 116+5dB(A)

Activity	Details	Indicative Time frame	OOH	SWL (dBL _{Aeq15min})
	Main Plant			
	EWP, lighting tower, crane, saw cutter			
Dulwich Hill NCA 02 Scenario 5: Main Works	5-14T excavator, compactor, concrete truck, bogie truck, 20T roller , hand tools	July – August 2021	Std hours Not under a rail possession	107-121dB(A) SWL If vibratory roller: 116+5dB(A) If padfoot / non-vibratory roller: 114dB(A)
Dulwich Hill NCA 02 Scenario 6: Main works	EWP, power tools, saw cutter , jackhammer , crane, concrete pump + agitator, lighting tower, welding machine, 12-20T excavator, compressor	Possession 15-16 August 2021	OOH + Std	113-121dB(A) SWL With saw cutter: 116+5dB(A)
Dulwich Hill NCA 02 Scenario 7: Main Works	Bogie truck, 5-20T excavator, 20T roller , dump truck, concrete truck, concrete boom / pump, bobcat	August – September 2021	Std hours	109-120dB(A) SWL If vibratory roller: 115+5dB(A) If padfoot / non-vibratory roller: 109dB(A)
Dulwich Hill NCA 02 Scenario 8: Main Works	500T crane, 5-12T excavator, roller , concrete truck, power tools, lighting tower, dump truck	Possession 5: 11-12 September 2021	OOH + std hours	110-121dB(A) SWL If vibratory roller: 116+5dB(A) If padfoot / non-vibratory roller: 114dB(A)
Dulwich Hill NCA 02 Scenario 9: Main Works	5-12T excavator, dump truck, power tools, bobcat, bogie truck, road sweeper	September – October 2021 Possession 6 17-18 October 2021	Std hours generally OOH + std for works during possession	103-110dB(A) SWL
Dulwich Hill NCA 02 Scenario 10: Finishing Works	5-12T excavator, flatbed truck, dump truck, power tools, lighting tower, water cart, road sweeper, bobcat	October – December Possession 7 6-7 November + Contingency Possession 8 26 December 2021 – 9 January 2022	Std hours generally OOH + std for works during possession	112dB(A) SWL
Campsie Station Upgrade				
Campsie NCA 06 Scenario 1: Early Works	Chainsaw , mulcher / chipper, bobcat, 12T excavator, vacuum truck, 2T dump truck / tipper, saw cutter , power tools	February – March 2021 Possession 1: 20-21 March 2021	Std hours generally OOH + std for works during possession	111-120dB(A) SWL With chainsaw and mulcher: 118+5dB(A)

Activity	Details	Indicative Time frame	OOH	SWL (dBL _{Aeq15min})
	Main Plant			
				With saw cutter : 115+5dB(A)
Campsie NCA 06 Scenario 2: Main Works	5-13T excavator, power tools, dump truck, saw cutter , jackhammer , vacuum truck, bogie truck, concrete truck, plate compactor, bored piling rig, excavator + hammer	March – May 2021 Possession 2: 29-30 May 2021	Std hours generally OOH + std for works during possession	109-121dB(A) SWL With jackhammer: 111+5dB(A) With saw cutter: 116+5dB(A) With excavator+hammer: 116+5dB(A)
Campsie NCA 06 Scenario 3: Main Works	HIAB truck, power tools, saw cutter , 5-14T excavator, concrete truck, 6T dump truck, Franna, 80-250T mobile crane, EWP	May – June 2021	Standard hours	103-121dB(A) SWL With saw cutter: 116+5dB(A)
Campsie NCA 06 Scenario 4: Main Works	Hi-rail excavator / dumper / EWP, 5-13T excavator, dump truck, truck+dogs, concrete truck, power tools, hydrema, jackhammer , EWP, lighting tower, crane, saw cutter	Possession 28 June – 11 July 2021	OOH + Std hours	113-121dB(A) SWL With saw cutter: 116+5dB(A) With jackhammer: 116+5dB(A)
Campsie NCA 06 Scenario 5: Main Works	5-14T excavator, EWP, compactor, concrete truck, bogie truck, demo saw , hand tools, dump truck	July – August 2021	Std hours Not under a rail possession	103-120dB(A) SWL With demo saw: 115+5dB(A)
Campsie NCA 06 Scenario 6: Main Works	EWP, power tools, saw cutter , jackhammer , crane, concrete pump + agitator, lighting tower, welding machine, 12-20T excavator, compressor	Possession 15-16 August 2021	OOH + Std	113-121dB(A) SWL With saw cutter: 116+5dB(A)
Campsie NCA 06 Scenario 7: Main Works	Bogie truck, 5-14T excavator, demo saw , dump truck, concrete truck, concrete boom / pump, bobcat	August – September 2021	Std hours	109-120dB(A) SWL With demo saw: 115+5dB(A)
Campsie NCA 06 Scenario 8: Main Works	Demo saw , 5-12T excavator, concrete truck, power tools, lighting tower, dump truck	Possession 5: 11-12 September 2021	OOH + std hours	104-121dB(A) SWL If demo saw: 116+5dB(A)
Campsie NCA 06 Scenario 9: Finishing Works	Vacuum truck, dump truck, flatbed truck, power tools, generator, lighting tower	Possession 6 17-18 October 2021 Possession 7 26 December	OOH + std hours	106-111dB(A) SWL

Activity	Details	Indicative Time frame	OOH	SWL (dBL _{Aeq15min})
	Main Plant			
		2021 – 9 January 2022		
Punchbowl Station Upgrade Works				
Punchbowl NCA 10 Scenario 1: Early Works	Chainsaw , mulcher / chipper, bobcat, 12T excavator, vacuum truck, 2T dump truck / tipper, saw cutter , power tools, Hiab truck, bogie truck	February – March 2021 Possession 1: 20-21 March 2021	Std hours generally OOH + std for works during possession	111-120dB(A) SWL With chainsaw and mulcher: 118+5dB(A) With saw cutter : 115+5dB(A)
Punchbowl NCA 10 Scenario 2: Main Works	5-14T excavator, power tools, dump truck, saw cutter , vacuum truck, bogie truck, concrete truck, plate compactor, bored piling rig, water cart, trench roller	March – May 2021 Possession 2: 29-30 May 2021	Std hours generally OOH + std for works during possession	109-121dB(A) SWL With saw cutter: 116+5dB(A) With vibratory roller: 116+5dB(A) With non-vibratory roller: 116dB(A)
Punchbowl NCA 10 Scenario 3: Main Works	HIAB truck, power tools, jackhammer , saw cutter , trench roller , 5-14T excavator, concrete truck, 6T dump truck, Franna, 80-250T mobile crane, EWP	May – June 2021	Standard hours	103-121dB(A) SWL With saw cutter: 116+5dB(A) With jackhammer: 114+5dB(A) With vibratory roller: 116+5dB(A) With non-vibratory roller: 114dB(A)
Punchbowl NCA 10 Scenario 4: Main Works	Hi-rail excavator / dumper / EWP, 5-14T excavator, dump truck, truck+dogs, concrete truck, power tools, lighting tower, water cart, crane, saw cutter	Possession 28 June – 11 July 2021	OOH + Std hours	108-122dB(A) SWL With saw cutter: 117+5dB(A)
Punchbowl NCA 10 Scenario 5: Main Works	5-14T excavator, EWP, compactor, concrete truck, bogie truck, demo saw , hand tools, dump truck, water cart, franna crane	July – August 2021	Std hours Not under a rail possession	107-121dB(A) SWL With demo saw: 116+5dB(A)
Punchbowl NCA 10 Scenario 6: Main Works	EWP, power tools, crane, concrete pump + agitator, lighting tower, 12T excavator, compressor, bored piling rig	Possession 15-16 August 2021	OOH + Std	110-121dB(A) SWL
Punchbowl NCA 10 Scenario 7: Main Works	Bogie truck, 12-14T excavator, demo saw , dump truck, concrete truck, power tools	August – September 2021	Std hours	109-121dB(A) SWL With demo saw: 116+5dB(A)

Activity	Details	Indicative Time frame	OOH	SWL (dBL _{Aeq15min})
	Main Plant			
Punchbowl NCA 10 Scenario 8: Main Works	12T excavator, Hi Rail excavator / EWP / Flatbed, concrete truck, power tools, lighting tower, 400T crane	Possession 5: 11-12 September 2021	OOH + std hours	105-113dB(A) SWL
Punchbowl NCA 10 Scenario 9: Finishing Works	Bobcat, dump truck, flatbed truck, bogie truck, power tools, generator, lighting tower, 5-14T excavator	September to October 2021 Possession 6 17-18 October 2021	Std hours generally OOH + std for works during possession	103-114dB(A) SWL
Punchbowl NCA 10 Scenario 10: Finishing Works	5-12T excavator, flatbed truck, dump truck, power tools, lighting tower, water cart, road sweeper, bobcat, bogie truck, concrete truck, 20T roller	October – December Possession 7 6-7 November + Contingency Possession 8 26 December 2021 – 9 January 2022	Std hours generally OOH + std for works during possession	102-120dB(A) SWL With vibratory roller: 115+5dB(A) With non-vibratory roller: 112dB(A)

4. Aspects and potential impacts

Refer to Appendix C of the CEMP for the risk assessment prepared for this Project.

When assessing and managing noise and vibration due to construction activities, the following general considerations apply:

- Airborne noise levels generated by the works, and how audible or intrusive they are at noise-sensitive receivers (both internal and external noise level may need to be assessed);
- Ground-borne or structure-borne noise, which is related to vibration energy being transferred through the ground and / or structures and being re-radiated as audible sound. Typically ground-borne noise is assessed inside buildings, while structure-borne noise may be a consideration inside buildings as well as externally (for example, if a structure radiates sound which is audible in the open environment, such as structure-radiated noise from a bridge or viaduct); and
- Ground borne or structural vibration, which is transmitted through the ground and / or structures. Humans can feel vibration at relatively low levels, and human comfort is an important consideration for the management of ground-borne vibration. At much higher levels, vibration can be associated with damage to structures, and even minor cosmetic damage such as development of cracks is to be avoided where possible. Other potentially vibration-sensitive items include highly vibration-sensitive equipment such as medical imaging equipment, or underground services such as buried pipes.

4.1. Receiver sensitivity

The sensitivity of the receiver to noise and vibration depends on the receiver type. This means that the identification of the receiver type is important to any noise and vibration assessment.

Each receiver in the NCA is identified as falling into one of the following categories:

- Commercial
- Educational
- Industrial
- Mixed residential/commercial
- Residential
- Place of Worship
- Medical facilities
- Other sensitive receivers such as Public Buildings

These receivers are identified on Environmental Control Maps and are included in the SoundPlan model which has been used for construction noise predictions.

Note that noise and vibration management levels assigned to receiver types are based on statistical research, however there is a range in noise and vibration sensitivity between individuals.

Furthermore, in 2020 there has been an increased number of people working from home, which may mean that general assumptions about day-time use of homes no longer apply.

During construction phase, active community engagement will assist in understanding local sensitivities to noise and vibration. Community engagement will be undertaken during the construction phase of the Project, in accordance with the OCCS.

For the vibration assessment, heritage-listed buildings and structures within the proximity of the Project have been identified, so that they can be inspected to understand if they are structurally unsound. This affects the vibration management level which applies to the heritage-listed buildings or structures.

5. Construction noise and vibration criteria

5.1. Construction hours

The CoAs acknowledge the need to carry out works outside standard construction hours.

CoA E19 defines standard Sydenham to Bankstown hours of work as:

- Monday to Friday 7am to 6pm and Saturdays 8am to 6pm.

Exceptions for highly noise intensive work (refer Section 5.4) are in accordance with E24:

- 8am to 6pm Monday to Friday and 8am to 1pm Saturday.

In accordance with CoA E20, notwithstanding CoA E19 and E24, work may be undertaken outside the hours specified in the following circumstances:

- For the delivery of materials required by the NSW Police Force or other authority for safety reasons; or
- Where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or
- Where different construction hours are permitted or required under an EPL in force in respect of the Project; or
- Work approved under an Out of Hours Works Protocol for work not subject to an EPL as required by CoA E25; or
- Construction that causes $L_{Aeq(15minute)}$ noise levels:
 - No more than 5dB(A) above the rating background level at any residence in accordance with the ICNG, and
 - No more than the 'Noise affected' noise management levels specified in Table 3 of the ICNG at other sensitive land uses, and
 - Continuous or impulsive vibration values, measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.2 of AVTG, and
 - Intermittent vibration values measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.4 of AVTG.
- Where a negotiated agreement has been reached with a substantial majority of sensitive receivers who are within the vicinity of and may be potential affected by the particular Construction, and the NML and/or limit for ground-borne noise and vibration (human comfort) cannot be achieved. All agreements must be in writing and a copy forwarded to the Planning Secretary at least one week before the commencement of activities.

In accordance with CoA E21, on becoming aware of the need for emergency work in accordance with Condition E20(b), Downer must notify the ER and the EPA (if a EPL applies) of the need for that work. Downer must use best endeavours to notify all noise and/or vibration affected sensitive receivers of the likely impact and duration of those works.

This project does require evening and night work throughout the construction program, particularly to reduce impacts on the operational Sydney Trains railway along the Sydenham

to Bankstown route. The Sydney Trains EPL12208 applies to works carried out under a rail possession.

EPL12208 Condition O13.1 adopts the EPA ICNG standard work hours on Saturdays (8am to 1pm). Out of hours works applications must be prepared and approved for Saturday 1pm to 6pm work if carried out under EPL12208 under a rail possession, but not if the work is carried out outside a rail possession and in accordance with CoA E19.

E19 states that works must not be undertaken on Sundays or Public Holidays, however this would not apply for weekend works or extended periods carried out under rail possessions when EPL12208 would apply. The CoA E24 restriction on highly noise intensive work (as outlined in Section 5.4) does not apply to works under a possession although reasonable and feasible efforts are to be made to conduct highly noise-intensive works during less sensitive periods where possible.

Any works planned to occur outside standard work hours must be assessed and approved in advance in accordance with Sydney Metro's approved City and Southwest Out of Hours Works Strategy/Protocol.

For works conducted outside standard construction hours, the following time periods are considered in order of least noise-sensitive to most noise-sensitive for typical residential receivers:

- Saturday afternoon 1pm to 6pm – least noise-sensitive
- Sunday day 8am to 6pm
- Monday to Sunday evening 6pm to 10pm
- Monday to Sunday night before midnight 10pm to midnight
- Monday to Friday early morning "shoulder period" 6am to 7am
- Monday to Sunday night after midnight 10pm to 6am Monday to Friday, or 10pm to 8am Saturday and Sunday – most noise sensitive

These priorities are generally represented in the CoAs and EPL clauses which relate to restrictions on high impact works.

The break-down of noise-sensitive periods is a useful tool for planning out of hours works using Sydney Metro's City and Southwest Out of Hours Works Strategy/Protocol. Noise impacts can be effectively managed by determining the most practical sequence of events which can also limit noisier activities to less noise-sensitive times.

5.2. General construction noise and vibration criteria

The Sydney Metro CNVS is applied for deriving construction noise and vibration management levels for Sydney Metro projects.

The primary reference for managing noise and vibration from construction and maintenance is the ICNG. Where specific receiver types are not explicitly assigned an NML in the ICNG, Sydney Metro has derived NMLs with reference to Australian Standard *AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors* and Vibration Management Levels (VMLs) in accordance with relevant guidelines and standards. Refer to Section 2.1 for a list of guidelines and standards referenced in the CNVS.

5.3. Airborne construction noise

The three primary noise metrics used to describe construction noise emissions in the modelling and assessments are:

$L_{A1(1\text{minute})}$	The typical 'maximum noise level for an event', used in the assessment of potential sleep disturbance during night-time periods. Alternatively, assessment may be conducted using the $L_{A\text{max}}$ or maximum noise level
$L_{Aeq(15\text{minute})}$	The 'energy average noise level' evaluated over a 15-minute period. This parameter is used to assess the potential construction noise impacts.
$L_{Aeq(15/9\text{hr})}$	The 'energy average noise level' evaluated over a 15-hour Day (7am to 10pm) or 9-hour Night (10pm to 7am) period. This parameter is used to assess the potential construction noise impacts from road traffic noise.
$L_{A90(11/4/9\text{hr})}$	The 'background noise level' in the absence of construction activities. This parameter represents the average minimum noise level during the 11-hour 7am to 6pm daytime, 4-hour 6pm to 10pm evening and 9-hour 10pm to 7am night-time periods respectively. The $L_{Aeq(15\text{minute})}$ construction noise management levels are based on the L_{A90} background noise levels.

The subscript 'A' indicates that the noise levels are filtered to approximate normal human hearing characteristics (A weighted).

Table 9 sets out the ICNG airborne NML for residential receivers and how they are to be applied. The noise management levels are based on the RBL in each relevant assessment period. RBL is the overall single-figure background noise level derived from measurements in each relevant assessment period (as defined in the EPA "Noise Policy for Industry" dated October 2017).

Sydney Metro recognises that there are periods during the night (10pm to 7am) when ambient noise is elevated, such as from traffic during the 10pm to midnight and 6am to 7am shoulder periods. Residents may be less sensitive to noise at these times due to the ambient noise providing more effective masking than during the quietest; midnight to 6am night time period.

Noise management levels are external noise levels from construction activity and apply at the property boundary that is most exposed to construction noise. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence.

Table 9: How noise management levels at residences are derived (external)

Time of Day	Management Level $L_{Aeq(15\text{minute})}$	How to Apply
Recommended standard hours: Monday to Friday 7.00 am to 6.00 pm Saturday 8.00 am to 1.00 pm	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq(15\text{minute})}$ is greater than the noise affected level, the proponent would apply all feasible and reasonable work practices to minimise noise.
No work on Sundays or public holidays	Highly noise affected 75 dB	The highly noise affected level represents the point above which there may be strong community reaction to noise. It is not considered a Noise Management Level.

Time of Day	Management Level $L_{Aeq}(15\text{minute})$	How to Apply
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent would apply all feasible and reasonable work practices to meet the noise affected level.

Table 10 presents airborne NML for non-residential noise-sensitive land uses. The NML apply only when the property is being used, for example classrooms during school hours (including before- and after school activities). Internal noise levels are to be assessed at the centre of the occupied room. External noise levels are to be assessed at the most-affected point within 50 m of the area boundary.

Table 10: NMLs at non-residential sensitive land uses

Land Use	Management Level, $L_{Aeq}(15\text{minute})$ (Applies When Land Use is being Utilised)
Classrooms at schools and other educational institutions, when in use Places of worship, when in use Library, opening hours <i>Hospital wards and operating theatres</i>	Internal noise level 45 dB Equivalent external noise level 55 dB (windows open), or 65 dB (windows closed)
Childcare Centre, when in use	Outside play area External noise level 60 dB Inside play area Internal noise level 45 dB Equivalent external noise level 55 dB (windows open), or 65 dB (windows closed) Inside sleeping area Internal noise level 40 dB Equivalent external noise level 50 dB (windows open), or 60 dB (windows closed)
Active recreation areas (parks, sports grounds or playgrounds)	External noise level 65 dB
Passive recreation areas (such as outdoor grounds used for teaching, outdoor cafes or restaurants)	External noise level 60 dB
Café, Bar, Restaurant, opening hours <i>Hotel Bars and Lounges, Day and Evening</i>	Internal noise level 50 dB Equivalent external noise level 60 dB, windows open, or 70 dB, windows closed
Offices, retail outlets (commercial), when in use <i>Hotel Sleeping areas, Night time</i>	External noise level 70 dB <i>Internal noise level 40 dB</i>
<i>Recording Studio, when in use</i>	<i>Internal noise level 25 dB</i>
<i>Theatre / Auditorium, when in use</i>	<i>Internal noise level 30 dB</i>
<i>Industrial premises</i>	<i>External noise level 75 dB</i>

There have been no hospitals, industrial premises, hotels, bars, lounges, recording studios or theatres identified in the vicinity of the proposed station upgrade works. They are listed for completeness, but in *italic* font to denote that they are not applicable to this NVMP or the associated CNVIS.

Where internal noise management levels apply, the external equivalent has been derived assuming a 10dB noise reduction is used as a default assumption through a window opened sufficiently to allow natural ventilation through the window.

However, depending on observed and repeatable specific receiver characteristics, alternative external noise management equivalents can be revised as follows:

- 20dB through a standard window with poor seals, if it can be demonstrated or reasonably assumed that the windows are fixed or kept closed. That is, the external noise level presented in the table above can be increased by 10dB. This must be determined through observations, and may change during the Project – for example people are more likely to keep their windows closed during colder winter nights than during the spring or summer;
- Higher levels of attenuation may be adopted, if agreed with Sydney Metro or the ER, if site inspections by a qualified acoustic consultant have determined that windows and facades of individual buildings provide a higher level of sound attenuation than 20dB and if it can be demonstrated or reasonably assumed that the windows are fixed or kept closed. In that case, the external noise level presented in the table above can be increased by 15dB or more, depending on the acoustic consultant's receiver-specific building envelope attenuation advice.
- Residential receivers may have been provided with property treatment, for example, as part of the NSW government roll out of aircraft, road noise or freight rail noise abatement programs, or as a result of pro-active construction noise management (including as a consequence of Condition E32 for this project). In these cases, the noise benefit achieved by the property treatment can be considered in the assessment of construction airborne noise impacts at these individual receivers. It is the Contractor's responsibility to determine if specific receivers have benefitted from property treatments. Sydney Metro must approve of any modifications to the external residential noise trigger levels for considering Additional Mitigation Measures (refer to Section 7.12).

Based on the background noise levels measured by SLR for the EIS, the applicable airborne NMLs are as presented in Table 11 below.

Table 11: Project specific residential NML

	Day 7am – 6pm		Evening 6pm – 10pm		Night 10pm – 7am	
	RBL, dBLA90(Day)	NML, dBLAeq(15min)	RBL, dBLA90(Day)	NML, dBLAeq(15min)	RBL, dBLA90(Day)	NML, dBLAeq(15min)
NCA 02 – Dulwich Hill (15 Bedford Crescent Dulwich Hill, Dulwich Hill Station)	41	51 std 46 Sat 1- 6pm if under possession	41	46*	34	39*
NCA 04 – Canterbury site compound (based on 9 Canberra Street, Canterbury)	40	50 std 45 Sat 1- 6pm if under possession	40	45*	35	40*
NCA 06 – Campsie (34 North Parade Campsie, Campsie Station)	45	55 std 50 Sat 1- 6pm if under possession	42	47*	35	40*

	Day 7am – 6pm		Evening 6pm – 10pm		Night 10pm – 7am	
	RBL, dBL _{A90} (Day)	NML, dBL _{Aeq} (15min)	RBL, dBL _{A90} (Day)	NML, dBL _{Aeq} (15min)	RBL, dBL _{A90} (Day)	NML, dBL _{Aeq} (15min)
NCA 10 – Punchbowl (42 Urunga Parade Punchbowl, Punchbowl Station)	47	57 std 52 Sat 1- 6pm if under possession	47	52	41	46*

It is noted that the daytime and evening NML is less than, or similar to, the existing ambient noise level in many of the receiver locations near the station worksites. This is not unexpected, but it does mean that any noise monitoring method would need to consider whether the construction noise can be measured above the ambient noise.

In some areas, the existing ambient evening or night-time level is more than 5dB above the NML. These locations are marked with an asterisk (*), as this is relevant to the noise monitoring plan (Section 8).

5.4. High impact noise

High impact noise can be defined in two ways in the context of Sydenham to Bankstown works.

The ICNG defines “highly noise affected” (HNA) levels as exceeding 75dB(A) at residential receivers during daytime hours. It is common practice to adjust the HNA levels for evening and night time, by 5 and 10dB respectively. Where predicted noise levels exceed the HNA level, all reasonable and feasible mitigation measures are to be applied to the works.

In practice, this already occurs as Sydney Metro aims to meet the lower NML where reasonable and feasible. Residual impacts that cannot be eliminated through engineering controls are managed through timing of works and application of Additional Mitigation Measures (refer Section 7.11).

REMM NVC10 requires high noise and vibration generating activities including ballast tamping may only be carried out in continuous blocks, not exceeding 3 hours each, with minimum respite periods of one hour between each block and these works. CoA E24 also imposes additional restrictions on the timing of “Highly Noise Intensive Works”.

There is no definition in the CoA SSI 8256 for “Highly Noise Intensive Works” mentioned in Condition E24. Sydney Metro has adopted the following definition for “Highly Noise Intensive Works”, based upon definitions within CoA issued by NSW Department of Planning, Industry and Environment (DPIE) for other SSI projects. For the purpose of this NVMP, Highly Noise Intensive Works are construction activities which are defined as annoying under the ICNG, these include:

- Use of power saws, such as used for cutting timber, rail lines, masonry, road pavement or steel work;
- Grinding metal, concrete or masonry;
- Rock drilling
- Line drilling;
- Vibratory rolling;

- Rail tamping and regulating;
- Bitumen milling or profiling;
- Jackhammering, rock hammering or rock breaking; and
- Impact piling.

For the station works, the following plant and activities have therefore been identified as being potentially used and therefore subject to timing restrictions in accordance with CoA E24:

- Road or concrete / diamond saw;
- Jackhammer;
- Excavator with hammer attachment; and
- Vibratory rolling – note that the type of proposed rolling has not been finalised. Smooth drum rollers and pad foot rollers are listed in the preferred list of plant provided by Sydney Metro.

Restrictions on timing of highly noise intensive or high noise impact generating works are summarised in Table 12 below.

Table 12: Restrictions on highly noise intensive works

	Conditions apply if the predicted noise exceeds the NML		
	CoA E24	EPL12208	REMM NVC6
Precedence	Except as permitted by an EPL	During rail possessions, EPL12208 applies	CoA and EPL override REMM if they are more onerous
Timing – general restrictions	Must only be undertaken: (a) between the hours of 8:00 am to 6:00 pm Monday to Friday; (b) between the hours of 8:00 am to 1:00 pm Saturday	O13.2 The licensee may undertake maintenance activities outside of the hours specified in Condition O13.1: a) to provide safe and reliable train services or a safe working environment; [...] c) for the delivery of oversized plant or structures that require special arrangements or authorisation to be lawfully transported along public roads.	Noise intensive plant would not be used during the night-time period (10pm to 7am) unless: <ul style="list-style-type: none"> during a weekend rail possession or shut down a requirement of a road authority, emergency services or Sydney Coordination Office requires works to be undertaken during this period. <i>Interpretation:</i> CoA E24 restrictions on Saturday and Sunday works must be observed, unless there is a weekend rail possession or shutdown, when EPL12208 applies.
Respite	In continuous blocks not exceeding three (3) hours each with a minimum respite from those activities and Works of not less than one (1) hour between each block. For the purposes of this condition, 'continuous' includes any period during which there is less than a one (1) hour respite between ceasing and recommencing any of the work that are the subject of this condition. <i>Interpretation:</i> other works can take place during the 1-hour "respite" time.	No specific requirements.	
Assessment and Notification	Assessment and notification in accordance with Sydney Metro's CNVS and CCS.	O13.4 Where maintenance activities are undertaken, including outside of the hours specified in Condition O13.1, noise impacts must be managed in accordance with the recommendations in the Interim Construction Noise Guideline (DECCW, 2009), as updated from time to time. The licensee is required to: a) identify noise sensitive receivers that may be affected; b) identify hours of work for the proposed activities;	

	Conditions apply if the predicted noise exceeds the NML		
	CoA E24	EPL12208	REMM NVC6
		c) identify noise impacts at noise sensitive receivers; d) select and apply reasonable and feasible work practices to minimise noise impacts; and <i>Interpretation:</i> Assessment requirements are in line with the CNVS and this NVMP / CNVIS.	
Notification	Assessment and notification in accordance with Sydney Metro's CNVS and CCS.	O13.4 e) notify the identified noise sensitive receivers at least 5 days prior to the commencement of maintenance activities undertaken outside of the hours specified in Condition O13.1, except where the licensee first becomes aware of the need to undertake those maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the maintenance activities. <i>Interpretation:</i> Notification requirements similar to CNVS apart from timing – assume that 7 days' notice is required per the CNVS to be consistent with other Sydney Metro works.	

5.5. Sleep disturbance

At residential receivers, the ICNG and the RNP require an assessment of sleep disturbance for noise occurring at night (10pm to 7am). Sydney Metro's CNVS adopts the following approach for assessing sleep disturbance:

- External sleep disturbance screening level of $L_{Amax} > RBL + 15 \text{ dB}$
- External sleep awakening level of 65 dB L_{Amax} (assuming open windows).

If the Sleep Disturbance screening level is not exceeded, then no further review of sleep disturbance is required. If the screening level is exceeded, then the L_{Amax} level is to be compared with the external equivalent Sleep Awakening Level (65dB L_{Amax}).

The Sydney Metro Out-of-hours Works Strategy/Protocol and Out-of-Hours Works Application form consider night-time noise levels in terms of $L_{Aeq(15min)}$ predictions.

While OOHW Application does incorporate sleep disturbance considerations in terms of the emergence of the predicted construction noise above background, additional sleep

disturbance assessments will be made on a case-by-case basis where night time noise construction levels ($\text{dBL}_{\text{Aeq}(15\text{min})}$) exceed:

- RBL + 10dB, as this is roughly equivalent to $L_{\text{Amax}} > \text{RBL} + 15$ for many types of plant / activity; and
- 60 dB(A), as this is roughly equivalent to $L_{\text{Amax}} > 65$ dB(A) for many types of plant / activity.

If the Sleep Awakening Level is exceeded, then sleep disturbance is to be reviewed in more detail. This may include consideration of whether windows are open or can be kept closed. If windows can be kept closed, then the External sleep awakening criterion is 75 dBL_{Amax} because it is based on an internal Sleep Awakening noise level.

The aim of sleep disturbance assessments is to determine appropriate mitigation measures. Mitigation measures may involve the use of quieter equipment, relocating equipment, using screens, or changing the timing of the work to a less noise-sensitive time. Refer to Section 7.

5.6. Construction traffic noise

When trucks and other vehicles are operating within the boundaries of the various construction sites, road vehicle noise contributions are included in the overall predicted $L_{\text{Aeq}(15\text{minute})}$ construction site noise emissions.

When construction related traffic moves onto the public road network a different noise assessment methodology is appropriate, as vehicle movements would be regarded as 'additional road traffic' rather than as part of the construction site. More detail is provided in the Sydney Metro CNVS.

In addition to the Sleep Disturbance criteria provided in Section 5.5, the RNP refers to Practice Note 3 of the Environment Noise Management Manual (ENMM) for specific impacts from road traffic. The ENMM recommends an evaluation of the number and distribution of night-time pass by events where:

- Construction-related truck event $L_{\text{Amax}} - \text{General ambient } L_{\text{Aeq}(1\text{hour})} > 15$ dB, and
- Construction-related truck event $L_{\text{Amax}} > 65$ dB L_{Amax} .

The ICNG does not provide specific guidance in relation to acceptable noise levels associated with construction traffic. For assessment purposes, guidance is taken from the RNP, which suggests feasible and reasonable noise mitigation measures should be considered where:

- The road traffic noise levels are predicted to increase by more than 2 dB as a result of construction traffic, and
- The resultant road traffic noise level, including construction traffic, exceeds the following road traffic noise criteria in the RNP:
 - 60 dB $L_{\text{Aeq}(15\text{hour})}$ day and 55 dB $L_{\text{Aeq}(9\text{hour})}$ night for existing sub-arterial roads.
 - 55 dB $L_{\text{Aeq}(1\text{hour})}$ day and 50 dB $L_{\text{Aeq}(1\text{hour})}$ night for existing local roads.

In addition, night-time road traffic noise due to intermittent maximum noise events, such as truck passby events, should be assessed against the sleep assessment criteria summarised above.

5.7. Building damage vibration goals

Most commonly specified 'safe' structural vibration limits are designed to minimise the risk of threshold or cosmetic surface cracks, and are set well below the levels that have potential to cause damage to the main structure.

Sources of vibration that are considered include demolition, excavation, piling, ground treatments (e.g. compaction), construction equipment and road traffic.

Details about the derivation and application of Sydney Metro construction vibration criteria to protect structures are presented in the Sydney Metro CNVS.

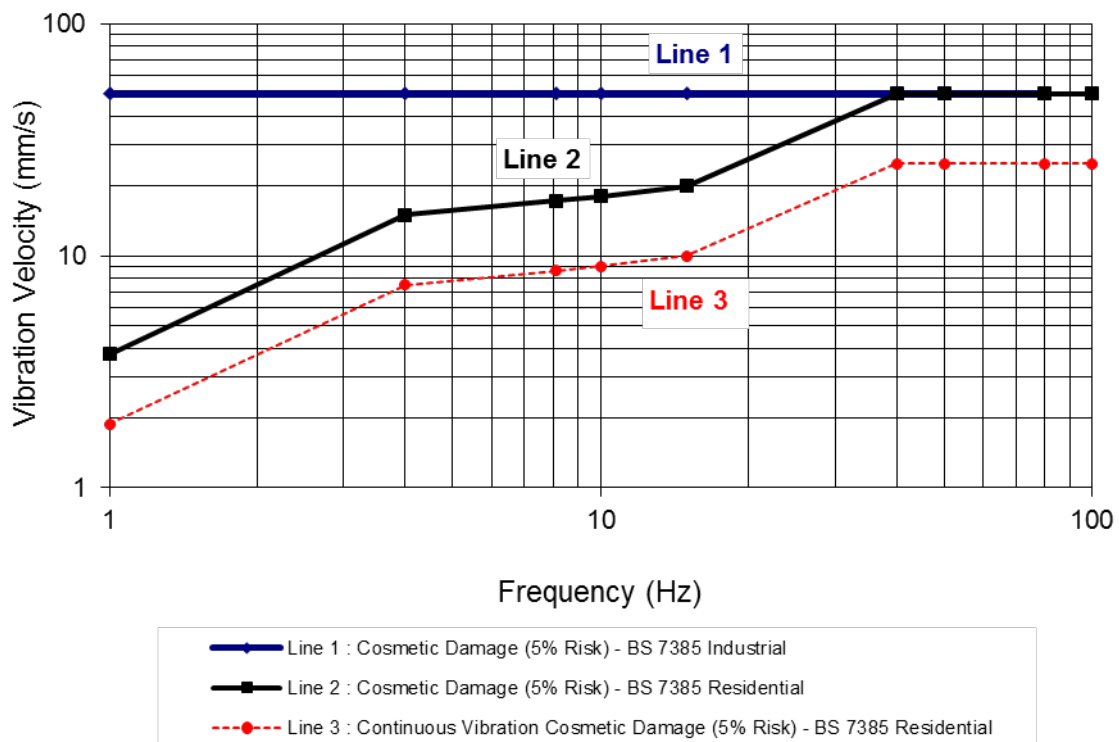
The British Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in Table 13 and graphically in Figure 1. These vibration goals are applicable to relevant structures, building elements or facades with the potential of being affected by vibration impacts.

Table 13: Transient vibration guide values – Minimal risk of cosmetic damage

Line	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Figure 1: Graph of Transient Vibration Guide Values for Cosmetic Damage



The Standard goes on to state that the vibration values given in Table 13 are less than half of vibration magnitudes at which minor damage is possible, and less than a quarter of the vibration magnitudes at which major damage to a building structure may occur.

It is noteworthy that extra to the guide values nominated in Table 13, the standard states that:

“Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK.”

Also that:

“A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.”

The Standard states that the guide values in Table 13 relate predominantly to transient vibration which does not give rise to resonant responses in structures and low-rise buildings.

Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table 13 may need to be reduced by up to 50%.

Most construction activities involving intermittent vibration sources such as rock breakers, vibratory rollers, excavators and the like, produce predominant vibration energy at frequencies greater than 4 Hz (and usually in the 10 Hz to 100 Hz range), and have the potential to cause dynamic loading in some structures (e.g. residences). On this basis, a conservative vibration damage screening level per receiver type adopts 50% of the values in Table 13 as listed below:

- Reinforced or framed structures: 25.0 mm/s
- Unreinforced or light framed structures: 7.5 mm/s
- Heritage structures (structurally sound): 7.5 mm/s
- Heritage structures (structurally unsound): 2.5 mm/s

If a heritage building or structure is found to be structurally unsound (following inspection) a more conservative cosmetic damage criteria (from DIN 4150) would be considered. At construction stage, prior to carrying out works, a structural or condition survey of heritage buildings within 30m of vibration-generating works is required (refer Section 8.2.3).

If the structural or condition survey is not carried out prior to vibration-generating works commencing, then heritage buildings are to be considered “structurally unsound” for the purpose of determining applicable construction-related vibration criteria. This is to adopt a precautionary approach until surveys establish the condition of the building.

At locations where the predicted and/or measured vibration levels are greater than shown above (peak component particle velocity), a more detailed analysis of the building structure, vibration source, dominant frequencies and dynamic characteristics of the structure would be required to determine the applicable safe vibration level.

5.8. Human comfort vibration goals

For vibration, EPA Construction Noise Guideline refers to the EPA Vibration Guideline for assessment of human comfort.

The construction noise and vibration management levels adopted by Sydney Metro represent applicable standards and guidelines. It is important to acknowledge that individual receivers respond to noise and vibration differently. During implementation phase, active community engagement plays a role in understanding individual perception and sensitivity.

The NSW EPA “Assessing Vibration: a technical guideline” dated February 2006 (AVTG) recommends the use of BS 6472-1992 for the purpose of assessing vibration in relation to human comfort.

Vibration dose values are considered appropriate for the assessment of non-continuous vibration sources associated with construction. The vibration dose value depends on both the level and duration of the short-duration vibration event, as well as the number of events occurring during the daytime or night-time period.

The levels highlighted in **bold** in Table 14 below are used in Sydney Metro projects as the Vibration Management Level.

(Uncontrolled when printed)

Table 14: Vibration Dose Value (VDV) Ranges which might result in various probabilities of adverse comment within residential buildings, from BS6472-1992

Place and Time	Low Probability of Adverse Comment (m/s ^{1.75})	Adverse Comment Possible (m/s ^{1.75})	Adverse Comment Probable (m/s ^{1.75})
Residential buildings 16 hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 hr night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Note: For offices / schools and workshops, multiplying factors of 2 and 4 respectively would be applied to the above vibration dose value ranges for a 16 hr day, ie 0.8 m/s^{1.75} for offices, educational institutions and places of worship, and 1.6 m/s^{1.75} for workshops.

It is not always practical to measure VDV during construction works, as the calculation relies upon duration, intensity and characteristic frequency of the measured vibration events throughout a work day.

In some cases, it may be necessary to relate to an instantaneous measurement, such as Peak Particle Velocity (PPV). Appendix C of the AVTG provides guidance on relating measurements of continuous and impulsive vibration to PPV. The criteria are included within Table 15.

Table 15: Criteria for exposure to continuous and impulsive vibration – alternative screening level for human comfort measured in real-time

Place and Time	Peak particle velocity (mm/s) – preferred / maximum	
	Continuous vibration	Impulsive vibration ¹
Residential buildings 16 hr day	0.28 – 0.56	8.6 – 17.0
Residential buildings 8 hr night	0.20 – 0.40	2.8 – 5.6
Offices, when in use	0.56 – 1.10	18.0 – 36.0
Workshops, when in use	1.10 – 2.20	18.0 – 36.0

¹ Impulsive vibration must be defined and measured in accordance with the relevant standard. The PPV levels associated with impulsive vibration would be considered to be intolerably high for intermittent and repetitive “impulsive” events, and should be applied to construction works with caution. It is not to be used to set any Alert / Alarm level in a vibration monitoring system used to assess human comfort.

5.9. Vibration affecting sensitive equipment

Some scientific equipment (e.g. electron microscopes and microelectronics manufacturing equipment) can require more stringent objectives than those applicable to human comfort.

No facilities in the vicinity of the proposed station works have been identified as having vibration-sensitive medical or scientific equipment. The following information is provided for reference in case a receiver with vibration-sensitive equipment is identified in future.

Where it has been identified that vibration sensitive scientific and/or medical instruments are likely to be in use inside the premises of an identified vibration sensitive receiver, objectives for the satisfactory operation of the instrument would be sourced from manufacturer's data. Where manufacturer's data is not available, generic vibration criterion (VC) curves as published by the Society of Photo-Optical Instrumentation Engineers (Colin G. Gordon – 28 September 1999) may be adopted as vibration goals. These generic VC curves are presented in Sydney Metro's CNVS.

The generic VC curves are considered to be conservative. It is beneficial for the project to carry out baseline vibration measurements are carried out at the building where vibration-sensitive equipment is located. If the ambient vibration already exceeds the VC curves, without affecting the equipment operation, then the site-specific sensitive equipment vibration criteria may be reviewed. If the site-specific equipment criteria are reviewed, any changes (ie increased levels compared with VC curves) would need to be agreed with the occupant / users of the equipment.

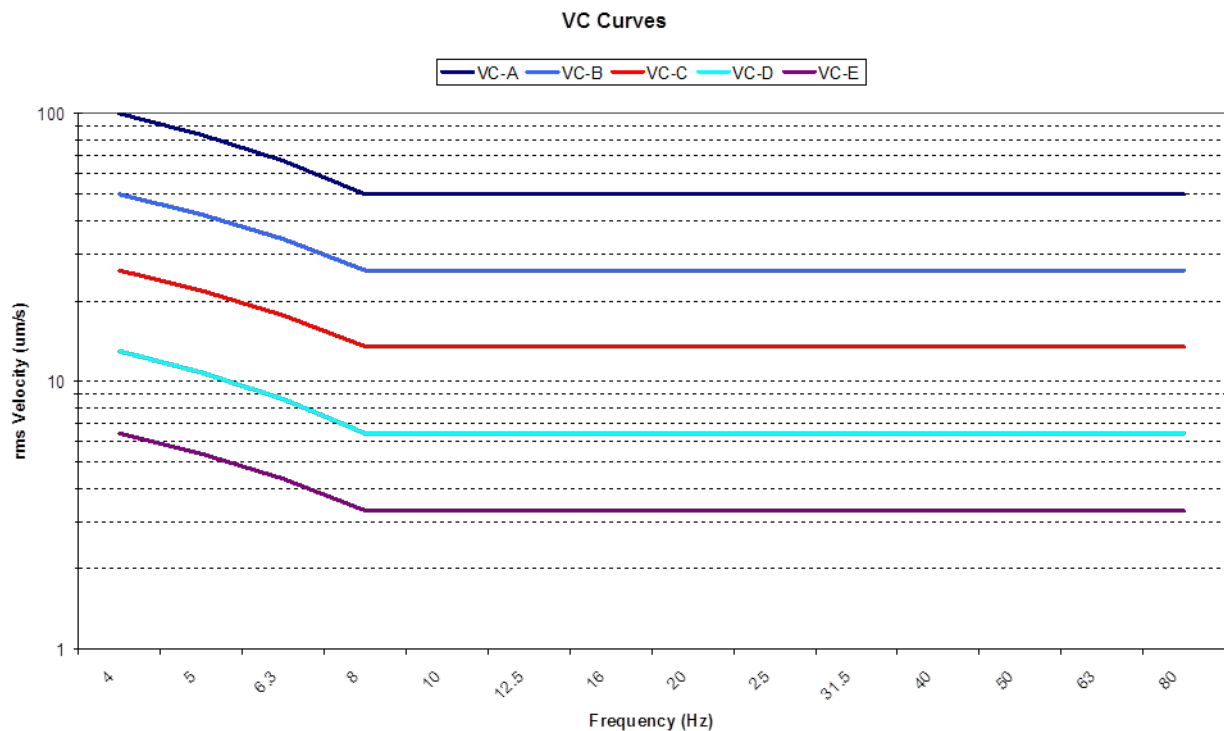
Table 16: Application and Interpretation of generic Vibration Criterion (VC) curves (as shown in Figure 2)

Criterion Curve	Max Level ($\mu\text{m/sec, rms}$) ¹	Detail Size (microns) ²	Description of Use
VC-A	50	8	Adequate in most instances for optical microscopes to 400X, microbalances, optical balances, proximity and projection aligners, etc.
VC-B	25	3	An appropriate standard for optical microscopes to 1000X, inspection and lithography equipment (including steppers) to 3 micron line widths.
VC-C	12.5	1	A good standard for most lithography and inspection equipment to 1 micron detail size.
VC-D	6	0.3	Suitable in most instances for the most demanding equipment including electron microscopes (TEMs and SEMs) and E-Beam systems, operating to the limits of their capability.
VC-E	3	0.1	A difficult criterion to achieve in most instances. Assumed to be adequate for the most demanding of sensitive systems including long path, laser-based, small target systems and other systems requiring extraordinary dynamic stability.

Note 1: As measured in one-third octave bands of frequency over the frequency range 8 to 100 Hz.

Note 2: The detail size refers to the line widths for microelectronics fabrication, the particle (cell) size for medical and pharmaceutical research, etc. The values given take into account the observation requirements of many items depend upon the detail size of the process.

Figure 2: Vibration Criterion (VC) Curves



5.10. Vibration affecting buried utilities and services

Where structures and utilities are encountered which may be considered to be particularly sensitive to vibration, a vibration goal which is more stringent than structural damage goals presented in Section 5.7 may need to be adopted.

Examples of such structures and utilities include:

- Tunnels
- Gas pipelines
- Fibre optic cables

Specific vibration goals would be determined on a case-by-case basis, as the construction of these structures and utilities vary considerably. An acoustic consultant would be engaged by the construction contractor and would liaise with the structure or utility's owner in order to determine acceptable vibration levels.

The British Standard BS 7385-2:1993 'Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration' notes that structures below ground are known to sustain higher levels of vibration and are very resistant to damage unless in very poor condition (British Standard BS 7385-2:1993, p5). Further guidance is taken from the German Standard DIN 4150: Part 3-1999.02 'Structural vibration in buildings – Effects on Structures'. Section 5.3 of DIN 4150: Part 3 sets out guideline values for vibration velocity to be used when evaluating the effects of vibration on buried pipework.

Table 17 presents the initial reference guideline for utilities and other buried pipework to evaluate the effects of short-term vibration impact, for this Sydney Metro NVMP.

If buried services are encountered for the proposed works, the Contractor must consult with the owner of the services to ensure that they agree with the vibration limit set for the works. An acoustic consultant and structural specialist may need to be involved in the consultation and review process.

Table 17: Transient vibration guide values for buried services – minimal risk of cosmetic damage (BS7385) – peak component particle velocity

Pipe material	Guideline values for vibration velocity measured on the pipe ¹
Steel (including welded pipes)	100 mm/s
Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80 mm/s
Masonry, plastic	50 mm/s

¹ Rockbreaking / hammering and sheet piling activities have the potential to cause dynamic loading in some structures and it may therefore be appropriate to reduce the transient values by 50%

5.11. Ground-borne noise

Ground-borne (regenerated) noise is noise generated by vibration transmitted through the ground into a structure. Ground-borne noise caused, for example by underground works such as tunnelling, can be more noticeable than airborne noise.

The ground-borne NML adopted by Sydney Metro are provided in the CNVS.

The ICNG nominates ground-borne NML for residences during evening and night only. The internal noise levels are to be assessed at the centre of the most-affected habitable room. Under the ICNG, these ground borne noise management levels only require consideration of mitigation when ground-borne noise levels are higher than airborne noise levels.

Sydney Metro recognises that ground borne noise from some activities, for example by underground works such as tunnelling, can affect residential receivers during the day, and also other sensitive receivers. The following ground-borne noise levels incorporate the ICNG residential evening and night time noise management levels, and add other receiver types and times for Sydney Metro projects:

- Day (7.00 am to 6.00pm)
Internal Residential: 45 dB $L_{Aeq(15minute)}$
Internal Commercial: 50 dB $L_{Aeq(15minute)}$
- Evening (6.00 pm to 10.00pm)
Internal Residential: 40 dB $L_{Aeq(15minute)}$
Internal Commercial (if in use during Evening hours): 50 dB $L_{Aeq(15minute)}$
- Night-time (10.00 pm to 7.00 am) – typically not occupied, therefore not applicable
Internal Residential: 35 dB $L_{Aeq(15minute)}$

6. Predicted noise and vibration levels

Sydney Metro has provided Sydney Metro's acoustic consultant Acoustic Studio with:

- Worksite locations for each station included in the Project's works;
- Works scenarios and likely timing of those works scenarios;
- A full list of plant and equipment expected during each works scenario.

Acoustic Studio has reviewed the plant and equipment and made assumptions about likely worst case scenarios in terms of the number of plant items which might operate at once on the worksite.

It is assumed that works may be carried out at any time of Day / Evening / Night, particularly during rail possessions. Noise predictions are presented in detail in the CNVIS, and summarised in this NVMP.

The CNVIS prepared in accordance with CoA E27 and REMM NVC1, predicts noise and vibration levels using more accurate understanding of the works scenarios, duration of each scenario, locations of equipment, timing of the works. These predictions are presented in detail, at each receiver. Where exceedances of management levels are predicted, reasonable and feasible mitigation is recommended for consideration by the contractor (refer Section 7).

On the basis of residual exceedances at individual receivers, the CNVIS determines which Additional Mitigation Measured (AMM) are required in accordance with the Sydney Metro CNVIS (refer Section 7.11).

If Downer determines that the mitigation is practical then the CNVIS can be updated with a commitment to adopt the mitigation method(s) and any engineering / site planning mitigation method(s) will then be incorporated in revised noise or vibration predictions.

Downer may rely on the predictions from the CNVIS, or if the works scenario is different to the CNVIS scenarios (for example if fewer plant items are on site), then the Sydney Metro Out of Hours Works Application Form may be used as a simple calculation method for the airborne noise levels. Works that are not adequately described in a works scenario assessed in the approved CNVIS are not permitted, unless the activity is predicted to be quieter than the approved works scenarios presented in the CNVIS or the CNVIS is updated to reflect the change in work activity.

6.1. Prediction methodology

Worksite-related noise emissions have been predicted using the SoundPlan noise modelling software. To complete this, a representative 3-D model within the software was constructed of the site and surrounding receivers. The 3-D model with local receivers was provided by Sydney Metro's Acoustic Assurance team for the Sydenham to Bankstown project.

Factors that are included in the modelling are:

- Source sound level emissions and locations;
- Screening effects from buildings
- Receiver locations;
- Ground topography;
- Noise attenuation due to geometric spreading; and

- Atmospheric absorption and ground effects.

The results of the airborne noise predictions are presented in the CNVIS associated with this NVMP.

For the CNVIS a number of scenarios have been assessed. It is not clear at this stage whether the proposed activities will occur concurrently. Therefore the approach for the assessment is to predict noise levels generated from each major work area at each station.

For the construction compound at the former Canterbury Bowling and Community Club, spreadsheet noise predictions have been used in accordance with the ICNG method for simple works scenarios. The highest noise plant (a forklift) has been used as a noise source, and only distance attenuation has been considered in the calculation.

It must be noted that for the purpose of preparing a CNVIS, realistic “worst case” scenarios have been assessed. For example, if the equipment list states that a 5-10T excavator would be used, the CNVIS noise prediction assumes that the noisier 10T excavator will be on site. To comply with this NVMP, it is expected that Downer will make all reasonable and feasible efforts to apply at-source controls to reduce noise impacts and select the 5T excavator which would have a 5dB lower source sound power level.

It is noted also that applying an area noise source, rather than point sources at discrete locations around the work area, is conservative. Downer may choose to use a noise prediction tool which allows them to position plant items around the site and take account of shielding, attenuation due to locating plant farther from receivers, and so on.

Therefore the CNVIS airborne noise predictions are typically considered to be conservative.

Ground borne noise and vibration prediction is specialist area and will be carried out by an acoustician. Due to the variation in vibration propagation through different ground types and building structures, and the low vibration-risk plant and activities proposed for the station upgrade works, a suitable screening approach for assessing vibration is to review whether vibration-generating plant will be used within “minimum working distances” of sensitive receivers. This is also considered to be conservative for most areas in Sydney; nevertheless it is important to confirm vibration propagation on site where works are within the minimum working distances (refer Section 6.4).

6.2. Predicted construction noise levels

Works for all scenarios are expected to occur outside standard working hours. The OOH works are likely to occur during daytime, evening and night time. Accordingly, the NML for OOH works in the summary table below is for night time, as this assesses the worst potential impact. Predicted L_{Amax} noise levels are also presented for these scenarios.

The SoundPlan model does not incorporate a 5dB penalty in accordance with the ICNG Section 4.5 and also CoA E29, for plant and activities considered to be “annoying”. The table of predicted noise levels in the CNVIS and the summary results presented in this NVMP (below) do include the 5dB penalty where the following plant and equipment are proposed:

- Use of “beeper” style or tonal reversing or movement alarms – it is assumed that non-tonal “broadband” alarms are fitted in accordance with the CNVS;
- Power saws for cutting timber, rail, masonry, road pavement or steel work;
- Grinding metal, concrete or masonry (not proposed);
- Rock drilling (not proposed);

(Uncontrolled when printed)

- Line drilling (not proposed);
- Vibratory rolling (not proposed);
- Rail tamping and regulating (an excavator-mounted tamping attachment is proposed);
- Bitumen milling or profiling;
- Jackhammering (proposed), rock hammering or rock breaking (may be used as an attachment to excavator);
- Impact piling (not proposed; bored piling proposed).

Table 18 below summarises the predicted-worst case construction noise levels from Station upgrade works, compared with the night-time NML and sleep disturbance screening level. A typical worst-case sound power level of 120dB(A) has been assumed for each work site. This represents the worst expected impacts from the works, as most scenarios are expected to generate lower noise levels.

As an example, the site compound activities are expected to be 11dB quieter than the worst-case 120dB(A) SWL assumption. The predicted noise level for forklift activities is 53dB(A) at the nearest residential receiver at 20 Close Street located 100m to the east of the compound boundary, and 72dB(A) at the nearest commercial receiver located 20m to the west of the site compound. The forklift is the noisiest plant item expected to be used at the compound. More typical activities and plant used at the construction compound are likely to generate 42-47dB(A) at the nearest residential receiver. Given that the existing ambient noise levels at night are 47dB(A), the construction compound activities are unlikely to be intrusive.

Table 18: Summary of worst-case predicted noise levels at residential receivers from the Project's works, assuming worst-case 120dB(A) worksite SWL

Noise Catchment Area	Night time NML	Predicted worst case excess above NML $L_{Aeq}(15min)$	Sleep disturbance screening level	Predicted worst case excess above sleep disturbance level L_{Amax}
NCA 02 – Dulwich Hill (Ewart Street)	50	35	60	28
NCA 04 – Canterbury Site Compound	41	31	51	24
NCA 06 – Campsie (Lilian Lane)	54	30	64	23
NCA 10 – Punchbowl (Urunga Parade)	46	31	56	24

Predicted noise levels at non-residential noise sensitive receivers are similar, and indicate that there are several non-residential receivers which may be impacted by the works. The CNVIS details the predicted level of noise excess at both residential and non-residential receivers. This provides a reference for determining applicable noise mitigation measures.

Worst case predicted noise levels excess above NML at commercial receivers including medical and dental facilities are:

- Dulwich Hill: 15dB above NML;

- Campsie: 15dB above NML;
- Punchbowl: 35dB above NML; and
- Site compound at former Canterbury Bowling and Community Club: 2dB above NML

Non-residential receivers such as libraries, places of worship, child care centres and outdoor active recreation areas are predicted to experience excesses of 9-25dB.

Worst-case predicted noise levels are due to high impact activities such as road saws and excavator with tamping head. Mitigation measures are described in Section 7.2 and 7.3.

If these high noise works are limited to less sensitive hours (refer Section 5.1 and 5.4), the predicted noise levels for other works may be in the order of 10-15dB quieter and therefore significantly less impactful on residential receivers.

6.3. Construction traffic noise assessment

At this stage detailed construction traffic volumes have not been determined and a detailed construction traffic noise assessment cannot be undertaken.

However, a high level review has been carried out based on the number of work vehicles and plant arriving by road, as listed in the Sydney Metro works package documents, and comparing the number of vehicles with the road traffic numbers provided in the EIS.

It is noted that a 2dB increase in $L_{Aeq(period)}$ arises from an increase in road traffic numbers by 60%, all other factors being equal (including vehicle type and speed). Even if the construction traffic noise levels are on average significantly louder than general light vehicles, a large increase in numbers is still required to trigger the 2dB increase. It is highly unlikely that the proposed station upgrade works would generate such construction-related traffic increases.

Applying the road type definitions in the RNP, the primary site access roads are classified as either arterial or sub arterial. It is unlikely that construction traffic will be required to use local roads.

Analysis of the measured traffic noise levels at each monitoring location indicates that existing traffic noise in the area is high, and in some locations are above the night-time criteria specified in the RNP.

Based on the high existing traffic noise levels and the access routes being largely restricted to arterial and sub arterial roads, impact from additional construction traffic is expected to be minimal.

However, the Station Upgrade works are just one component of a larger suite of Sydney Metro construction packages.

Downer is responsible for applying all reasonable and feasible mitigation measures to minimise construction-related road traffic noise, in order to contribute the management of Sydney Metro project-wide noise impacts.

This is particularly relevant to shared access gates and the site compound at the former Canterbury Bowling and Community Club, which will also be used by the Southwest Metro Corridor Contractor.

Mitigation options are described in Section 7.

6.4. Construction vibration assessment

As required by CoA E18 all vibration sensitive receivers have been identified. There are a number of medical facilities which were identified during the land use survey. There is a medical centre on Lilian Street/Lane near Campsie Station, and one at South Terrace in Punchbowl. These facilities have all been identified as small general practices and dental practices, without highly vibration-sensitive medical equipment. However there is still potential for them to house medical equipment which is relatively sensitive to vibration.

The vibration-generating works and activities associated with the Project's works are:

- Bored piling rig;
- Vibratory roller (assessed for completeness; smooth drum or padfoot rollers are preferred by Sydney Metro);
- Excavator with hammer attachment; and
- Jackhammer

Safe working distances for these vibration-generating activities are provided in TfNSW I&S CNVS (2018). Extracts of the I&S CNVS table of safe working distances are provided below for the works relating to this Project.

Table 19: Typical vibration emission and working distances from vibration-generating plant proposed for the Station upgrade works

Plant	Recommended minimum working distance ²	
	Building damage	Human comfort
Large vibratory roller (not proposed, but presented for information in case it is necessary to carry out the works)	12m	40m
Smooth drum roller	12m	50m
Vibratory piling (not proposed, but presented for information in case it is necessary to carry out the works)	2-20m	20m
Bored piling	2m (nominal)	n/a
Small excavator with hammer, 3-5 T	2m	15m
Small excavator with hammer, 8 T	3m	20m
Medium excavator with hammer, 12-18 T	4m	30m
Jackhammer, handheld	1m (nominal)	Avoid contact with structure

Unless stated otherwise the assessment will be based on the screening criteria of 7.5mm/s for an unreinforced structure, including heritage-listed buildings and structures which have been found to be structurally sound.

The recommendations made in this NVMP are based on the typical Minimum Work Distances presented in the table above.

REMM NVC3 requires a more detailed assessment of the structure if the vibration levels are predicted to exceed the vibration screening level, or fall within the recommended Minimum Working Distance. REMM NCV4 further requires that heritage items located within the Safe

Working Distance require a more detailed assessment including a condition assessment (refer Section 8.2.3) and specifically consider the heritage values of the structure in consultation with a heritage specialist.

The CNVS requires that attended vibration measurements are carried out before any vibration intensive construction activities commence. Potential mitigation will be reassessed following the attended measurements to determine site-specific safe working distances.

Considering that the station buildings are themselves heritage-listed structures (structurally sound), some of the vibration-generating works are expected to be within the safe work distances.

Where Downer prepares detailed works plans and determines that any vibration-generating works will be carried out within the safe working distances to any affected sensitive receiver, then attended vibration monitoring will be required at the commencement of vibration-generating works in accordance with the CNVS.

CoA E30 also requires that a heritage specialist be consulted when installing equipment used for vibration, movement and noise monitoring around heritage listed structures. More information is provided in Section 8.

Downer must select the plant and equipment which generates the lowest vibration levels while still being capable of effectively carrying out the work (refer Section 7.4). In some cases this may require longer work durations as a necessary outcome of ensuring that no damage occurs due to the works. Downer is expected to build contingencies for vibration-minimising works methods in the work plans.

6.5. Construction ground-borne noise assessment

Ground-borne or regenerated noise is noise generated by vibration transmitted through the ground into a structure that may lead to noise “regenerated” within a space in the building. The ground-borne noise criteria are presented in Section 5.11.

The CNVS states that the ground borne noise criteria are only applicable when ground-borne noise levels are higher than the airborne noise levels.

All the station works are surface works. Ground-borne noise levels within receiver buildings are predicted to be very low, and below the noise management levels. Importantly, the predicted airborne noise will be higher than ground borne noise. A detailed ground-borne noise assessment is not required.

7. Noise and vibration management and mitigation

7.1. Site noise mitigation measures

This section sets out the standard or minimum construction noise and vibration mitigation measures to be implemented on all Sydney Metro projects.

The standard mitigation measures presented in Section 7 shall be applied by default in order to minimise the potential noise and vibration impacts at the surrounding Noise Sensitive Receivers. The aim is to meet the NML and VML where feasible and reasonable in accordance with CoA E29.

Construction hours would be in accordance with the Project's CoA and the EPL (refer Section 5.1).

Avoiding the coincidence of noisy plant working simultaneously close together and adjacent to sensitive receivers will result in reduced noise emissions. Note that clustering noisy plant can present opportunities for effective implementation noise screening, therefore this control needs to be considered on a case by case basis (refer Section 7.3).

Where feasible and reasonable, locate plant to maximise the offset distance and / or maximise screening between noisy plant items and nearby noise sensitive receivers.

Loading and unloading of materials/deliveries is to occur as far as possible from noise sensitive receivers. Provide shielding if close to noise-sensitive receivers.

Select site access points and roads as far as possible away from noise sensitive receivers. Ensure that construction related road traffic adheres to applicable rules and requirements including speed limits and muffler performance. Staff using access gates are required to adhere to neighbour-friendly practices such as quiet operations of gates and locks, and minimising light.

Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.

In accordance with REMM NVC11, ongoing noise and / or vibration monitoring would be undertaken during construction at sensitive receivers during critical periods (ie times when noise emissions are expected to be at their highest) to identify and assist in managing high risk noise events (refer Section 8).

In addition, Downer's Environmental Noise and Vibration Standard (DG-ZH-ST069) specifies:

- Planning and designing the work activities to minimise noise
- Minimising truck movements
- Avoiding portable radios, public address systems or other methods of site communication that may unnecessarily impact on nearby residences.

Furthermore, Managers/Supervisors are responsible

- Maximising the distance between noisy activities and noise sensitive land users
- Scheduling activities at appropriate times of the day
- Avoiding scheduling noise generating works over consecutive nights

- Planning routes for the delivery of materials and parking of vehicles to minimise noise
- Operating plant and equipment in the quietest and most efficient manner
- Regularly inspecting and maintaining plant and equipment to:
- Minimise noise and vibration level increases; and
- Ensure all noise and vibration reduction devices are operating effectively
- Maintaining any pre-existing barriers or walls on a demolition or excavation site as long as possible
- Undertaking noisy fabrication off-site (where possible) so noise can be controlled
- Notifying the community between 5 and 14 days prior to any activity with a high noise or vibration
- Providing a website so the community can be informed on work operations; and
- Organising demolition, earthmoving and ground impacting operations so as not to occur in the same time period.

7.2. Source noise control strategies

The following source noise control strategies are presented as examples of ways that selecting alternative methods and adapting plant can reduce noise at source.

Engines and exhausts are typically the dominant noise sources on mobile plant such as cranes, graders, excavators, heavy vehicles, etc. Residential grade mufflers are to be fitted on all mobile plant used on Sydney Metro construction projects.

The noise levels of plant and equipment items are to be considered in Downer's procurement and rental decisions and in any case cannot be used on site unless compliant with the criteria.

Regular inspection and maintenance of all plant and machinery used for the Project by Downer, will assist in minimising noise emissions, including the reporting of the results.

Regular compliance checks on the noise emissions of all plant and machinery used for the Project would indicate whether noise emissions from plant items were higher than predicted. This also identifies defective silencing equipment on the items of plant.

Downer will also ensure that air brake silencers are correctly installed and fully operational for any heavy vehicle that approaches and uses any of the Project's construction or compound sites.

Non-tonal reversing alarms will be used for all permanent mobile plant operating on the Project. This includes vehicles used in the construction compound at the former Canterbury Bowling and Community Club site. Consideration will be given to fitting non-tonal vertical movement alarms for plant such as cherry pickers. It is noted that OH&S requirements must also be fully satisfied.

Downer will minimise the use of high noise activities such as diamond or concrete saws and hydraulic breaker / tamping, and limit to less sensitive times (refer also Section 5.4).

Downer will use bored piling methods where feasible, instead of impact or driven piling methods. Implement low noise methods for removing spoil from the auger, use of spoil

removal accessories, or rotating the auger in one direction only to avoid the impact noise due to back-and-forth rotation (if spoil type is suited to this method of removal).

Downer will use electric pumps instead of diaphragm air pumps.

Downer will use electric equipment instead of diesel such as electric chainsaws and generators where possible.

Downer will use “silent” lighting towers to minimise continuous noise from lighting towers / daymakers.

Downer will consider off-site mulching instead of using on-site mulching and chipping machines at night.

Downer will use pulverisers instead of conventional concrete breaking methods for demolition where possible (unlikely to be relevant to the Station Upgrade works).

Delivery vehicles are to be fitted with straps rather than chains for unloading, wherever feasible and reasonable.

Tray-back utility vehicles are to have resilient mat or carpet to minimise impact noise.

Noise curtains are to be used for localised equipment, particularly:

- Generators, whenever used out of standard work hours
- Jackhammers and road / demolition saws, particularly at night.

In addition, Downer’s Environmental Noise and Vibration Standard (DG-ZH-ST069) specifies:

- Selecting demolition methods not involving noise impact where possible (e.g. hydraulic rock splitters rather than rock breakers)
- Choosing quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks
- Limiting equipment that generates impulsive noise
- Using broadband audible alarms on vehicles and elevating work platforms.

7.3. Noise barrier control strategies

Temporary noise barriers are recommended between the noise sources and nearby potentially affected noise sensitive receivers, wherever feasible. Typically, 5 dB to 15 dB attenuation can be achieved with a well-constructed solid ply hoarding or mass-loaded vinyl noise curtain such as Echobarrier, Flexshield Sonic Quilt or Acoustica AcoustiFlex SQ products.

Stationary noise sources such as generators will be enclosed or shielded where practicable. Any outdoor plant used in the former Canterbury Bowling and Community Club compound site, such as outdoor condenser units for air conditioning site offices, should be located away from sensitive receivers such as on the industrial (western) side of site buildings.

Localised noisy activities such as concrete saws and jackhammers will be used inside temporary noise screens, whilst ensuring that the occupational health and safety of workers is maintained. Note that it may be preferable in some cases to carry out the noisy activities more quickly, without erecting temporary noise curtains, to avoid the activity extending into more noise-sensitive evening or night-time periods. The use of noise curtains for high noise

activities will be considered on a case-by-case basis to ensure that the Project requirements for limiting the timing of such works are met (refer to Section 5.4).

Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.

Solid hoarding for the services building worksites have been considered in accordance with CoA A21. This is unlikely to be necessary as the temporary site buildings themselves provide shielding for adjacent receivers.

Acoustic enclosures or sheds are not considered to be a reasonable option for the Station Upgrade works. However temporary structures can be considered for equipment used regularly on site, such as pumps and generators.

CoA E32 requires that early implementation of any operational noise mitigation measures which can be installed during construction phase. As there are no potential locations of operational noise mitigation measures near the Project's worksites, E32 is not relevant to the works covered by this NVMP.

In addition, Downer's Environmental Noise and Vibration Standard (DG-ZH-ST069) specifies:

- Barriers or other noise limiting devices that are part of the end product design, as mentioned above, to be installed as early as possible.
- Using hammer cushions when driving steel piles that minimise the vibration generated.

7.4. Vibration control strategies

Vibration-minimising methods are to be selected where feasible and reasonable.

Downer must select the plant and equipment which generates the lowest vibration levels while still being capable of effectively carrying out the work. In some cases this may require longer durations which may be a necessary outcome of ensuring that no damage occurs due to the works.

Examples relevant to the Project's works are:

- Smooth drum roller preferred, or else pad foot roller, instead of vibratory roller
- Diamond / concrete saw to cut platform surface to remove in pieces, instead of jackhammer

Attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity. Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the calculated safe-working distances.

The pattern of vibration radiation is very different to the pattern of airborne noise radiation and is very site specific. Final vibration levels are dependent on many factors including the actual plant used, its operation and the intervening geology between the activity and the receiver. Section 6.4 presents the recommended minimum working distances for vibration intensive

plant. The minimum working distances for cosmetic damage must be complied with at all times, unless otherwise approved by the relevant authority.

REMMS NVC3 and NVC4 require a more detailed assessment of structures located within the Minimum Working Distances presented in Section 6.4. The purpose of the more detailed assessment is to determine the appropriate vibration limits for the potentially affected structure, and to identify sensitive heritage fabric in any heritage-listed structure. This process is described more fully in Section 8.2.3.

The minimum working distances presented in Section 6.4 are indicative and will vary depending on the plant item and local geotechnical conditions. They apply to cosmetic damage of typical buildings under typical geotechnical conditions. Vibration monitoring can be carried out to confirm the minimum working distances at specific sites (refer Section 8.2.2).

In accordance with REMM NVC13, Downer will implement reasonable and feasible measures in accordance with the CNVS and ICNG to minimise groundborne noise where exceedances and predicted.

Vibration loggers monitoring potential effects on structures are to be set up with visual and SMS warning systems, applying the following Alert and Alarm levels (set to align with the affected structure type):

- Reinforced or framed structures: Alert Level 15mm/s, Alarm Level 25.0 mm/s (PPV);
- Unreinforced or light framed structures: Alert Level 5mm/s, Alarm Level 7.5 mm/s (PPV); and
- Heritage building or structure which is found to be structurally unsound (following inspection): Alert Level 1.5mm/s, Alarm Level 2.5 mm/s (PPV).

Construction personnel engaged on the site must have been briefed on the procedures including the location and nature of audio and visual alarms. The audio and visual alarms must be arranged to directly alert the equipment operations to any alarm event.

For vibration measurements to monitor risks of damage to structures, in accordance with the CNVS Appendix, the transducer mounting plates would be installed at the base of the building or structure, at the location closest to the construction works. The monitoring locations would be on a stiff part of the building or structure (at the foundations) on the side of the structure adjacent to the subject construction works.

- (a) If the vibration-generating works are to be conducted inside the safe working distances, first establish whether an alternative method can be used to reduce vibration. For example, reducing the size of a vibratory roller will typically reduce the impact zone.
- (b) If the final works method is still within the applicable safe working distance, carry out attended vibration monitoring at the commencement of vibration-generating works to establish the local site law for vibration propagation, and to re-assess whether levels are expected to exceed applicable criteria at heritage structures. Start the vibration-generating works at as large a distance as possible from the sensitive structure, and move closer with caution while taking attended vibration measurements.

- (c) If the attended noise monitoring determines that vibration levels may exceed the site screening level, install a vibration logger which is capable of sending automated SMS messages to the Site Manager when Alert levels are exceeded. The monitoring is to be carried out with appropriate equipment so as to provide results that are readily comparable to the preliminary survey and relevant criteria (i.e. PPV).
- (d) If the Alert level is exceeded, the Site Manager is to monitor the works and vibration levels to ensure that the Alarm level is not exceeded. An exceedance of the “Alert Level” will not require the excavation activities to cease, but rather alert the Construction Manager to proceed with caution at a reduced force or load.
- (e) If the Alarm level is approached or exceeded, the Site Manager is to stop all nearby construction works immediately and reassess methods. Examples of measures to manage vibration on site include using smaller hammer attachments on excavators, or using concrete saws to introduce a structural disconnection and thereby reduce vibration transmission.
- (f) If the Alarm level is exceeded, the frequency content of the measured vibration and peak component particle velocity (pcpv) levels will be assessed by a suitably qualified specialist and compared against the applicable Standards to determine whether the vibration levels comply with the Standard (based on the frequency content of the vibration signal). A suitably qualified specialist must endorse the conclusions of such an investigation.
- (g) If the Alarm level is exceeded, once works are approved to continue, attended structural damage vibration monitoring must be carried out by a suitably qualified specialist. This monitoring would provide direct feedback to the operators and appropriate modification of construction techniques.
- (h) If the Alarm level is exceeded, a condition survey is to be conducted of the structure or item, in consultation with the Structural and Acoustic Engineers (as required).

In addition, Downer’ Environmental Noise and Vibration Standard (2020) specifies:

- Selecting demolition methods not involving vibration impact where possible (e.g. hydraulic rock splitters rather than rock breakers);
- Choosing plant and equipment with low vibration generation characteristics; and
- Controlling blast vibration by careful attention to blast details and the application of correct techniques.

7.5. Community consultation and management

The benefits of good and clear communications are often under-estimated. In practice it is one of the most important aspects of noise and vibration management.

Pro-active community engagement assists in:

- Building stakeholder support for, and understanding of, the Sydney Metro project;
- Understanding the community and supporting their objectives (be it residential, commercial, education, or other);
- Minimising, where possible, project impacts on stakeholders and the community; and
- Ensuring stakeholders and the community fully understand that activities to be undertaken by the contractors, their objectives, benefits, potential impacts and expected outcomes.

Sydney Metro's Overarching Communications Consultation Strategy (OCCS) describes the requirements for community engagement during various stages of the project. The OCCS includes time frames for responding to complaints, record-keeping, and provision of up-to-date and accurate information.

A Business Management Plan has also been prepared for the Project.

Requirements for community engagement includes, for example:

- Notification (including targeted letterbox drops, doorknocks and email) of any planned works that may disturb local residents and businesses (such as noisy activities, access changes and night work);
- Community signage to advise of work that may affect transport (such as road closures, changes to pedestrian routes and changes to bus stops);
- Community contact facilities including via the Sydney Metro website (sydneymetro.info), community email address and 24-hour toll-free community information line; and
- Regular updates to the Sydney Metro website (sydneymetro.info) including uploading notifications and providing community contact details; and
- Individual briefings as required by the CNVS as part of implementation of Additional Mitigation Measures by Place Managers (refer Section 7.12).

Downer is responsible for providing the Place Manager with as much information as is required to effectively inform the community of upcoming works and potential impacts.

As Downer develops works plans, the timing and duration and location of the works will be known in more detail. This important step of assessing impacts in finer detail enables Downer to better understand what mitigation methods are available, review the works plans, and then update the residual impact predictions after application of mitigation.

Noise predictions, including CNVIS prepared in accordance with CoA E27 are to be as accurate as possible to assist project managers and contractors plan ahead to manage and mitigate the impacts of their activities, and this includes the provision of appropriate community measures.

The residual impact predictions are then provided to the Communications Manager or Place Manager to assist with their role in:

- Preparing works notices or information – such as a description of the works and what to expect, and timing plus location of the works;
- Applying management measures where predicted noise levels exceed trigger levels described in the Sydney Metro CNVS, to provide Specific Notification to affected individuals, and offer Respite, or Alternative Accommodation;
- Engaging with receivers as required to negotiate suitable respite periods, for example rest times in affected Child Care Centres;
- Informing the community of the times of planned high-noise works.

CoA E23 requires that the Proponent identify appropriate respite periods for out-of-hours work in consultation with the community at each affected location on a regular basis. This consultation must include provision of:

- (a) A schedule of likely out-of-hours work for a period no less than two (2) months;

- (b) The potential work / activities proposed and the location and duration of the work;
- (c) The noise characteristics (such as hammering, perceptible vibration), and the likely noise levels of the work; and
- (d) Likely mitigation and management measures to be applied, including the selection of lower-noise and –vibration equipment, use of screening or noise curtains, and timing of noisy works.

If Emergency works are required, Downer must also “use best endeavours to notify all noise and / or vibration affected receivers of the likely impact and duration” of Emergency works in accordance with CoA E20.

A register of noise and vibration sensitive receivers is to be kept on site and in Sydney Metro’s records. The register will include the following details for all known noise and vibration sensitive receivers within 300m of the worksite:

- Address of receiver
- Category of receiver (eg residential, child care, etc)
- Contact name and number if known

Records of consultation and agreements relating to respite periods will be retained by Downer in the noise and vibration sensitive receiver register. In accordance with CoA E23, records of agreed respite periods, timing restrictions and alternate arrangements will be kept on file by Downer and be provided to the Planning Secretary or the EPA, upon request.

It is noted that the sensitive times for non-residential receivers might not align with typical sensitive periods for residential receivers. In accordance with CoA E28, Downer will carry out community consultation with community, religious or educational institutions to identify their noise sensitive periods, prior to works commencing which generate noise levels above the NMLs at these locations. Works which generate noise levels above the NMLs at these locations will not be programmed within sensitive periods, where feasible. Where it is not feasible to plan works outside noise sensitive periods, Downer will consult with the affected receiver(s) to determine if alternate arrangements can be made, at no cost to the affected institution.

Downer is required to consider the impact of noise and vibration on the amenity of businesses in the preparation of the Business Management Plan. The Business Management Plan will consider the potential noise and vibration impacts on businesses, particularly for works during standard business hours, which typically align with the least noise-sensitive periods for residential receivers.

The Sydney Metro Place Manager is responsible for maintaining updated records of the local community and receiver type. If Downer learns that a receiver is incorrectly or incompletely categorised, then they must inform the Sydney Metro Place Manager to follow up and update the receiver records. For example, if a receiver is categorised as “commercial” but is found to have a shop-top residence, then Sydney Metro will need to update the records to apply both “commercial” and “residential” to the same address.

Complaints and enquiries relating to noise and vibration management will be managed in accordance with the Sydney Metro Overarching Community Communication Strategy (OCCS) and Section 3.7 of the CEMP.

Downer's Environmental Noise and Vibration Standard (DG-ZH-ST069) includes a complaints management process to follow. Managers/Supervisors must manage the process and verify that the following takes place or is undertaken:

- Communicate a toll-free hotline or contact phone number to stakeholders.
- Complaints are given a fair hearing.
- Have a documented complaints process, including an escalation procedure so that if a complainant is not satisfied there is a clear path to follow.
- Call back as soon as possible to keep people informed of action to be taken to address noise problems.
- Call back at night-time only if requested by the complainant to avoid further disturbance.
- Provide a quick response to complaints, with complaint handling staff having both a good knowledge of the project and ready access to information.
- Implement all feasible and reasonable measures to address the source of complaint.

Managers/ Supervisors must keep a record in INX of any complaints, including the following details:

- date/ time
- person receiving complaint
- complainant's contact number
- person referred to
- description of the complaint
- work area (for larger projects)
- time of verbal response; and
- timeframe for written response (where appropriate).

7.6. Standard Construction hours and out-of-hours work

As explained in Section 5.1, CoA E19 defines Sydenham to Bankstown standard construction hours as, i.e. 7am to 6pm Monday to Friday, and 8am to 6pm Saturday.

CoA E24 requires that "highly noise intensive works" (refer Section 5.4) are only carried out between 8am and 6pm Monday to Friday and 8am to 1pm Saturday, and with the provision of respite periods such that work must only be undertaken in continuous blocks not exceeding three hours each with a minimum respite period of not less than one hour between each block. The only exception to this Condition is if "highly noise intensive works" are carried out under an EPL, i.e. during a rail possession when Sydney Trains' EPL 12208 applies (refer Section 5.4).

CoA E20 permits works outside the hours specified in E19, to allow for:

- (a) Delivery of materials required by the NSW Police Force or other authority for safety reasons;

- (b) Emergency requirements to avoid injury or loss of life, to avoid damage or loss of property or environmental harm;
- (c) Where an EPL permits different hours of work (applicable when works are carried out under a rail possession);
- (d) Where works has been approved under an Out-of-Hours Work Protocol (refer Appendix D for a copy of the approved Out-of-Hours Work Application to be used for obtaining approval for out-of-hours work);
- (e) When applicable NMLs and VMLs are met; or
- (f) Where a negotiated agreement has been reached with the substantial majority of nearby sensitive receivers – this condition is unlikely to be required for the Project's works, as the scheduled work periods including rail possessions (when EPL 12208 will apply) consider rail operations as well as community impacts, and are unlikely to be substantially modified due to Sydney Trains' requirements to maintain an operational railway.

24-hour, 7-days a week work is not expected for the Project's works. However, if such work were required it would be carried out under a longer term rail possession, when EPL 12208 would apply.

E22 notes that out of hours work may be required to avoid high safety risk to construction personnel or members of the public, or if the proponent has received advice in writing that:

- Carrying out the activities could result in a high risk to road network / utility operational performance or integrity – written advice from the relevant road authority or utility service operator;
- A road occupancy licence (ROL) is required and the ROL will not be issued for the activities during the standard Sydenham to Bankstown approved work hours – written advice from TfNSW Management Centre or other road authority; or
- A rail possession is required – advice from Sydney Trains or ARTC (in locations near the shared freight rail corridor).

Condition E22 states that the conditions listed above are either regulated by an EPL (for example, under Sydney Trains' EPL 12208 during a rail possession), or through Sydney Metro's Out-of-Hours Work Strategy/Protocol. E22 also states that other out-of-hours works can be undertaken with the approval of an EPL (such as EPL 12208 during a rail possession), or through Sydney Metro's Out-of-Hours Works Strategy/Protocol for work not subject to an EPL. Refer to Appendix A for a list of EPL 12208 Clauses that relate to construction noise and vibration for the Project.

Conditions E20, E22, E23 and E25 all refer to Sydney Metro's Out-of-Hours Work Strategy/Protocol.

E25 describes the requirements of the Protocol, including approvals processes. Sydney Metro has prepared a Chatswood to Bankstown document which addresses the requirements of the CNVS and the respective approval conditions for the Chatswood to Sydenham and Sydenham to Bankstown Sydney Metro projects. Both the Sydney Metro City and Southwest Out-of-Hours Work Strategy/Protocol and the approved OCCS describe Planning Secretary, EPA and community notification requirements for out-of-hours work, in accordance with E25.

The Out-of-Hours Work Application is a requirement of the Sydney Metro Out-of-Hours Work Strategy/Protocol. A copy of the OOHW Application is provided in Appendix D. This Application includes both qualitative and quantitative construction noise and vibration

assessment components, and allows Downer to demonstrate how construction noise and vibration impacts are to be minimised for the proposed out-of-hours work. The mitigation methods include equipment selection and location, and timing of works.

The REMM NVC7 and NVC8 also consider timing of activities to provide respite periods for non-residential sensitive receivers, and management of construction-related traffic as follows:

- When working adjacent to schools, medical facilities and childcare centres, particularly noisy activities would be scheduled outside normal working hours, where feasible and reasonable.
- When working adjacent to churches and places of worship particularly noisy activities would be scheduled outside services, where feasible and reasonable.

This is in line with CoA E23, which requires consultation with affected communities. The specific requirements of E23 are described in Section 7.5.

REMM NVC5 also considers timing of construction-related traffic as follows:

- Where feasible and reasonable heavy vehicle movements would be limited to daytime hours.
- The implementation of procedures to maximise the night-time onsite spoil storage capacity where spoil is produced between the hours of 10.00 pm and 7.00 am.
- The arrival and departure times of construction-related vehicles is to be included in the out-of-hours works applications as part of the assessment of noise impacts from construction-related traffic.

7.7. Site environment induction and training

In accordance with NVC2, all employees, contractors and subcontractors are to receive an environmental induction. The site induction would include the following as a minimum:

- All relevant project specific and standard noise and vibration mitigation measures;
- Relevant licence and approval conditions;
- Permissible hours of work;
- Site opening/closing times (including deliveries);
- Any limitations on high noise generating activities;
- Location of nearest sensitive receivers;
- Construction employee parking areas;
- Designated loading/unloading areas and procedures; and
- Environmental incident reporting and management procedures.

A site plan is required to illustrate the location of sensitive receivers, parking and loading areas, and plant and equipment to be used around the site.

7.8. Neighbour friendly behaviour

All staff and workers associated with Sydney Metro projects must implement neighbour-friendly behaviour.

The site induction will include the following standard requirements for all staff working on Sydney Metro projects:

- No swearing or unnecessary shouting or use of loud stereos/radios;
- No dropping of materials from height, throwing of metal items and slamming of doors;
- No excessive revving of plant and vehicle engines;
- Power down plant when not in use;
- Switch off vehicles when stopped for more than 5 minutes or when parked, including near access gates;
- Controlled release of compressed air in heavy vehicles.

All community engagement would be in accordance with the Sydney Metro OCCS.

If staff are approached by members of the public, they are to engage with courtesy and respect, but direct all queries and complaints to the central Sydney Metro information and complaints website, email address or phone service (refer Section 7.5).

7.9. Cumulative impacts management

The term Cumulative Impacts relates to two or more projects occurring around the same time, affecting the same receivers.

In the context of Sydenham to Bankstown project, this occurs when there is an overlap in time and the works are conducted around the same time. This may result in an overall increase in noise levels when works are carried out close to one another, at the same time. It may also result in a lack of “quiet times” or respite periods, when two project packages carry out work in the same location over the same few months but on different days or nights.

Cumulative impacts may result in receivers requiring additional consideration of mitigation and management than if they had been exposed to a single package of work.

Where projects are expected to be carried out in the same area and within a similar time frame, clustering some construction activities may result in reduced durations of noise exposure and may also allow for effective implementation of mitigation of all the works (eg install noise curtains around the shared worksites).

When reviewing out-of-hours works applications for individual works activities, cumulative impact considerations for other projects or contractors working in the area focus on:

- Adding noise levels from concurrent works activities, to ensure that appropriate mitigation measures are in considered and implemented; and
- Coordinating respite periods or “quiet times” to ensure that receivers experience quiet periods, free from audible work (may be one or two hours per night, or three nights per week, for example).

Downer will coordinate their works with other Sydney Metro contractors, as well as external parties such as local Councils, Roads and Maritime Services and Sydney Trains, Utilities services (refer Section 7.10), other infrastructure projects such as WestConnex and also urban renewal projects.

It is useful to understand other contractors’ respite requirements and where feasible adhere to the same respite periods. A common example is where one contractor’s EPL restricts concrete sawing to before midnight, while another has no timing restrictions on concrete saws.

If it is not feasible to adhere to the same restrictions, and if it is not a compliance issue, it may be necessary for the concrete sawing to take place outside of the other contractors' permitted hours. In this case it would be essential to inform the local receivers of the planned works, and explain why the timing restrictions they may expect does not need to be observed by this particular contractor.

The Out-of-Hours Works Application includes a requirement to identify concurrent works in the area, and to demonstrate efforts to manage cumulative impacts.

It is Downer's responsibility to determine concurrent works, or works just prior or just after the proposed activities undertaken by Downer. The purpose is to:

- Add noise levels when works occur concurrently, as this may change the additional mitigation measures which are considered (refer Section 7.11 and 7.12);
- Identify other contractors' agreed hours of respite and make efforts to align the proposed works with the agreed respite hours, or negotiate for changed respite periods, or else provide robust justification for not being able to observe the same respite period;
- Ensure that Evenings / Nights of Respite have been provided by confirming that works are not planned immediately before or after the Project's planned works.

This coordination also a requirement for CoA E26. Refer to Section 7.10 for provision of respite and coordination with other contractors.

It must be recognised that this Project takes place in the context of other Sydney Metro construction activities. For local receivers, the various works packages are likely to be perceived as one works package, being "Sydney Metro works". The duration of the Project's works may be relatively short for a large infrastructure project, but the total duration of Sydney Metro construction activities affect the same receivers for an extended period.

It is important to acknowledge that construction activities carried out over a period of more than a year, affecting the same receivers, is likely to become less tolerable.

For this reason, it is important to understand that the receivers may experience "construction fatigue". There is no definition for construction fatigue, or when it is likely to occur. As with all noise responses, there is likely to be a significant range among individuals. This may be due to individual noise or vibration sensitivity, and individual circumstances.

Even for seemingly straightforward, relatively low noise activities, all feasible and reasonable efforts to mitigate the noise must be made. For example noise screening around noise generators will be provided out-of-hours works, not because they are the dominant noise source, but because they are constant noise sources used over long periods.

7.10. Utility coordination and respite

Related to cumulative impacts and provision of aligned respite periods described in Section 7.9 above, CoA E26 states that:

Work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must:

- (a) reschedule Work to provide respite to impacted noise sensitive receivers so that the respite is achieved in accordance with **Condition E23**; or*
- (b) consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; and*

(c) provide documentary evidence to the **ER** in support of any decision made by the Proponent in relation to respite or mitigation.

The Place Manager and Utility Coordination Manager will be able to assist in helping Downer coordinate works with third parties and understand the various agreed Respite Periods and, where possible, negotiate respite periods which can be effectively implemented by all contractors working in the local area. It is the responsibility of Downer to liaise directly with other Sydney Metro contractors to coordinate works and proposed respite periods.

Interface meetings are regularly facilitated by Sydney Metro to coordinate works including those carried out by local Councils.

If Respite Periods cannot be aligned between Contractors working in the same area, the Downer must be able to justify why the proposed Station upgrade works cannot observe the same Respite Periods as other Contractors. Justification may be related to limited access to the worksite for a rail possession, for example. All reasonable and feasible efforts will be made to observe the same respite periods as other works packages. Community information about planned works must provide information about which package of work cannot adhere to Respite Periods which are observed by other Contractors working in the area, and provide the reason(s) for not being able to align Respite Periods.

Even if Respite Periods cannot be fully aligned such that the exact same Respite Periods are provided by all contractors working in the same area, they must be coordinated so that there is some overlap in respite periods such that “quiet time” is provided by all contractors working in the area. The minimum duration of the “quiet time” shall be a continuous block of one hour.

In accordance with CoA E23(b), where Respite Periods cannot be aligned, Downer will consider the provision of alternative respite offers or mitigation to the impacted noise sensitive receivers. The types of alternative respite offers or mitigation will be determined by Downer’s Environmental Manager, in consultation with their wider Project team.

Documentary evidence of works coordination including copies of written correspondence and meeting minutes with relevant third parties will be retained by Downer and be provided to the ER within one week, should this evidence be requested by the ER.

7.11. Additional mitigation measures

The implementation of the standard management measures, compliance with maximum sound power levels for plant and equipment, construction hour management and standard community engagement measures in this NVMP should significantly reduce the noise and vibration impacts on nearby sensitive receivers.

Nevertheless, due to the highly variable nature of construction activities and the likelihood of work outside the standard construction hours the Project, exceedances of the construction NML and VML are likely to occur, even after application of all feasible and reasonable mitigation.

Where there is a potential exceedance of the construction NML and VML a number of additional measures to mitigate such exceedances – primarily aimed at pro-active engagement with affected sensitive receivers – would be explored and have been included in this Strategy. The Additional Mitigation Measures (AMM) to be applied are outlined in Table 20.

Table 20: Additional Mitigation Measures (AMM)

Measure	Description	Abbreviation
Alternative accommodation	Alternative accommodation options may be provided for residents living in close proximity to construction works that are likely to incur unreasonably high impacts over an extended period of time. Alternative accommodation will be determined on a case-by-case basis. It is recommended that residential receivers who decline the offer of Alternative Accommodation should still have Respite Offers (such as movie tickets or dinner vouchers) made available to them, although this is not a strict requirement under the CNVS.	AA
Monitoring	Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals, noise or vibration monitoring may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the noise or vibration goal has been exceeded so that additional management measures may be implemented.	M
Individual briefings	Individual briefings (door knocks) are used to inform neighbouring properties about the impacts of high noise activities and mitigation measures that will be implemented. Place Managers from the contractor would visit identified receivers at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project.	IB
Letter box drops	For each Sydney Metro project, a newsletter is produced and distributed to the local community via letterbox drop and the project mailing list. These newsletters provide an overview of current and upcoming works across the project and other topics of interest. The objective is to engage and inform and provide project-specific messages. Advanced warning of potential disruptions (e.g. traffic changes or noisy works) can assist in reducing the impact on the community. Content and newsletter length is determined on a project-by-project basis. Most projects distribute notifications on a monthly basis. Each newsletter is graphically designed within a branded template.	LB
Project specific respite offer	The purpose of a project specific respite offer is to provide residents subjected to lengthy periods of noise or vibration respite from an ongoing impact. Respite offers may be in the form of movie tickets or dinner vouchers, to provide residents with opportunities to spend time away from their home during works exceeding the applicable level. Alternative respite offers to movie or dinner vouchers may be considered as the Place Manager is familiar with the local community.	RO
Phone calls and emails	Phone calls and/or emails detailing relevant information would be made to identified/affected stakeholders within 7 days of proposed work.	PC
Specific Notification	Specific notifications will be issued to affected properties 7 days before work starts and may include paper notifications letterbox dropped to affected properties or emailed to registered stakeholders. Phone calls and/or emails provide affected receivers with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs etc. This form of communication is used to support periodic notifications, or to advertise unscheduled works.	SN

7.12. Applying AMM

The Sydney Metro CNVS provides guidance on the application of AMM. In circumstances where - after application of the standard mitigation measures - the $L_{Aeq(15\text{minute})}$ construction noise and vibration levels are still predicted to exceed the noise or vibration objectives, the relevant AMM matrix (see Table 21 to Table 23) is to be used to determine the AMM to be implemented. This requirement is supplemental to the basic requirements in the ICNG.

Using the relevant AMM matrix, the following steps need to be carried out to determine the additional mitigation measures to be implemented:

- Determine the duration (time period) when the work is to be undertaken.
- Determine the level of exceedance.
- From the relevant AMM matrix, identify the additional mitigation measures to be implemented (using the abbreviations which are expanded in Table 20).

Note that the AMM matrix considers residential impacts and noise sensitivity in terms of the standard construction hours defined in the ICNG, and this concept is to be applied to Sydenham to Bankstown works. As the CSSI CoAs permit Saturday 1-6pm work as “standard” for this project, this is not considered to be “out of hours” for the purpose of applying AMM. However during works under a rail possession, in accordance with EPL12208 O13.1, Saturday 1-6pm is considered “out of hours”.

Table 21: AMM matrix – Airborne construction noise

Time Period		Mitigation Measures			
		Predicted $L_{Aeq(15\text{minute})}$ Noise Level Above Background (RBL) for residential receivers, or above NML for non-residential receivers / internal residential receiver locations			
		0 to 10 dB	10 to 20 dB	20 to 30 dB	> 30 dB
Standard	Mon-Fri (7.00 am - 6.00 pm)	-	-	M, LB	M, LB
	Sat (8.00 am - 6.00 pm CoA E19)				
	Sat (8.00 am - 1.00 pm EPL)				
	Sun/Pub Hol (Nil)				
OOHW 1	Mon-Fri (6.00 pm - 10.00 pm)	-	LB	M, LB	M, IB, LB, RO, SN
	Sat (6.00 pm - 10.00 pm CoA E19)				
	Sat (1.00 pm - 10.00 pm EPL)				
	Sun/Pub Hol (8.00 am - 6.00 pm)				
OOHW 2	Mon-Fri (10.00 pm - 7.00 am)	-	M, LB	M, IB, LB, RO, SN	AA, M, IB, LB, RO, SN
	Sat (10.00 pm - 8.00 am)				
	Sun/Pub Hol (6.00 pm - 7.00 am)				

The AMM for airborne noise is based on external noise levels when applied to residential receivers. If the Contractor confirms that a residential receiver has a high performance building envelope, for example due to having treated as part of an aircraft sound insulation plan, then the trigger level for AMM may be adjusted to account for reduced internal noise levels. Sydney Metro and the ER must be consulted to approve any adjustments to the external AMM airborne noise trigger level for residential receivers.

Table 22: AMM matrix – Ground borne construction noise

Time Period		Mitigation Measures		
		Predicted $L_{Aeq(15\text{minute})}$ Noise Level Exceedance above NML		
		0 to 10 dB	10 to 20 dB	> 20 dB
Standard	Mon-Fri (7.00 am - 6.00 pm)	LB	LB	M, LB, SN
	Sat (8.00 am - 6.00 pm CoA E19) Sat (8.00 am - 1.00 pm EPL)			
	Sun/Pub Hol (Nil)			
OOHW 1	Mon-Fri (6.00 pm - 10.00 pm)	LB	M, LB, SN	M, IB, LB, RO, SN
	Sat (6.00 pm - 10.00 pm CoA E19) Sat (1.00 pm - 10.00 pm EPL)			
	Sun/Pub Hol (8.00 am - 6.00 pm)			
OOHW 2	Mon-Fri (10.00 pm - 7.00 am)	M, LB, SN	AA, M, IB, LB, RO, SN	AA, M, IB, LB, RO, SN
	Sat (10.00 pm - 8.00 am)			
	Sun/Pub Hol (6.00 pm - 7.00 am)			

Table 23: AMM matrix – Ground borne construction vibration

Time Period		Mitigation Measures
		Predicted Vibration Levels Exceed Maximum Levels (for human comfort), or the recommended limit (for vibration-sensitive equipment)
Standard	Mon-Fri (7.00 am - 6.00 pm)	M, LB, RP
	Sat (8.00 am - 6.00 pm CoA E19) Sat (8.00 am - 1.00 pm EPL)	
	Sun/Pub Hol (Nil)	
OOHW 1	Mon-Fri (6.00 pm - 10.00 pm)	M, IB, LB, RO, SN
	Sat (6.00 pm - 10.00 pm CoA E19) Sat (1.00 pm - 10.00 pm EPL)	
	Sun/Pub Hol (8.00 am - 6.00 pm)	
OOHW 2	Mon-Fri (10.00 pm - 7.00 am)	AA, M, IB, LB, RO, SN
	Sat (10.00 pm - 8.00 am)	
	Sun/Pub Hol (6.00 pm - 7.00 am)	

Based on the predicted typical worst case noise levels and the review of minimum work distances for vibration-generating works, AMM are expected to be considered for the Project's works (refer to Table 24). The requirements for AMM will be refined as Downer prepares more detailed OOHV Applications which delineate when noisy equipment is used, which engineering mitigation measures can be applied, and where and when noise screening is implemented. It is expected that through careful planning of the timing of noise-intensive works, particularly in accordance with the requirements of E24 and as described in Section 5.4, the requirements for AMM can be reduced in most cases.

Table 24: Recommended AMM matrix to be considered for the Project

Scenario	Period	Dulwich Hill, Campsie, Punchbowl
All Scenarios – worst case	Day	LB, M
	OOHW 1	RO, M, IB, SN, LB
	OOHW 2	AA, RO, M, IB, SN, LB

7.13. Construction traffic noise management

Construction-related activities can occur outside the defined worksite or premises. The most far-reaching aspect is construction-related transport - mostly trucks and large equipment arriving on site by road.

REMM NVC15 requires that *“The routes for construction haulage vehicles and bus services associated with the Temporary Transport Strategy would be selected on the basis of compliance with the relevant road noise traffic criteria, where reasonable and feasible. Where compliance with the noise criteria is not possible, reasonable and feasible noise mitigation would be implemented.”*

Mitigation measures that will be implemented where feasible and reasonable include:

- Implementing and monitoring driver behaviour rules, such as smooth braking and accelerating, adhering to truck speed limits;
- Monitoring and enforcing vehicle compliance including ensuring that compliant mufflers are fitted;
- Engineering solutions such as high grade mufflers.
- Establishing truck routes which avoid noise-sensitive residential receivers as far as practicable. Truck routes would be determined and described in Downer’s CTMP;
- Deliveries to site and removal of material from site is to be restricted to standard construction hours, unless otherwise approved. Access to the site will use the access points specified in Downer’s Construction Traffic Management Plan (CTMP). These will consist of existing Sydney Trains access gates and any new gates that need to be constructed to access the corridor.

8. Construction noise and vibration monitoring program

8.1. Baseline data

Baseline noise data is available from the extensive noise surveys carried out by SLR for the EIS in late 2016. The data is less than five years old and in accordance with the TfNSW I&S CNVS is still applicable.

The results of the surveys are replicated in Section 3.2. As described in Section 3.2, some NCAs have been split into two for the purpose of assessing the Project's works. This is possible without new noise measurements because SLR's EIS Technical Paper includes noise survey results from individual noise loggers along the alignment, some of which are near the Station worksites and more applicable to the proposed works covered by this NVMP and the associated CNVIS.

These SLR baseline noise survey results have been used to set the applicable NMLs for Day, Evening and Night-time works.

No additional baseline noise surveys are considered necessary for the Project at this stage.

8.2. Monitoring

In accordance with CoA C13, a noise and vibration monitoring program is to be carried out for the duration of Construction.

Noise or vibration monitoring is required:

- In response to noise or vibration complaints;
- If requested by Sydney Metro, the ER, DPIE or EPA;
- To augment baseline noise levels, if the noise environment at a receiver is considered to be different from the noise logger locations used for the EIS;
- To validate predicted noise levels associated with each works scenario assessed in the CNVIS, at the commencement of works and new construction activities or location;
- To confirm baseline vibration levels currently experienced at heritage-listed structures and at any vibration-sensitive equipment;
- To verify predictions, particularly at the commencement of vibration-generating works;
- Where vibration levels are predicted to exceed the vibration screening level, attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure, in accordance with REMM NVC12;
- As part of a plant noise audit;
- If predicted noise or vibration levels exceed the trigger levels requiring "M" (Monitoring) in accordance with the AMM matrices provided in Section 7.12.

Noise monitoring is required if the predicted airborne noise level is above the applicable AMM trigger level, which is set relative to the NML. Vibration monitoring is required if vibration-generating works are carried out within the Safe Working Distances provided in Section 6.4.

Ground borne noise measurements are not required for the Project, as the review of ground borne noise indicates that it would not be audible above airborne noise and therefore does not require further assessment in accordance with the CNVS (refer Section 6.5).

Attended noise or vibration monitoring during construction is necessary to:

- Observe the character of the existing noise or vibration sources;
- Note the local topography, built environment, and other man-made or natural features which may affect sound or vibration propagation (eg existing walls which may act as a noise barrier or sound-reflective surface, or structural breaks on site which reduce vibration propagation);
- Validate the noise or vibration logger data by comparing attended and unattended data, and also by comparing subjective experience of how audible or perceptible the noise and vibration is with the measured levels (particularly when the NML is lower than the prevailing ambient noise level, as noted in Section 5.3);
- Obtain spot measurements at more locations around the area to understand local noise variations and confirm that the noise or vibration logger data is representative of the most-affected receivers;
- Determine whether the noise levels from the works are within the predicted levels presented in the approved works CNVIS;
- Meet the requirements of the CNVS AMM to consider monitoring when predicted levels exceed trigger levels defined in the CNVS (refer Section 7.12).

Downer's Environmental Noise and Vibration Standard (DG-ZH-ST069) notes that monitoring must be completed using correctly calibrated equipment and include details of:

- The time when measurements are taken – day or night
- Descriptions of sensitive receiver/s
- Meteorologic conditions (e.g. prevailing winds, inversion layer); and
- Background noises present at the time of monitoring (e.g. traffic, overhead planes, insects).

Generally, noise and vibration monitoring which is triggered by the CNVS AMMM are to be carried out in a location representing the receiver. Downer will be responsible for determining the most appropriate monitoring locations (typically the potentially most exposed receivers), based on the proposed Construction activities and any noise and vibration modelling or assessments carried out, in accordance with the CNVS. The measurements must include a method to derive or directly compare the measured levels with the applicable NML or VML, and the predicted noise level in the CNVIS.

For example, the applicable NML is in terms of $L_{Aeq(15min)}$ which applies outside a residence. The measurement may be carried out on the footpath outside the residence, and the measured level would ideally also be a 15-minute measurement but might need to be a shorter period to exclude other ambient noises such as passing buses. If any post-processing or analysis is required to compare with measurement with the applicable NML or VML, then the adjustment method is to be clearly described in the monitoring report. The raw measured data must be presented in all monitoring reports, and the post-processed data must also be presented if requested by Sydney Metro (or EPA or DPIE).

Unattended noise or vibration loggers are suitable for meeting the requirements of the CNVS AMM matrices, particularly if the noise- or vibration-intensive work is localised (for example, at the station platform). Unattended monitoring is useful for works which move to different parts of the worksite (for example, along the rail corridor). Loggers are less labour-intensive, however the value provided by attended monitoring due to the operator's ability to make observations about the audibility of the noise or perceptibility of the vibration, and the changing levels as s/he moves to different receiver locations.

Each Out-of-Hours Works Application must identify whether the proposed monitoring will be attended, unattended or both. The Application requires justification or explanation on the reasons for selecting attended or unattended monitoring, and locations of the proposed monitoring, to provide the Environmental Representative with sufficient information to be able to assess whether the proposed monitoring is suitable for the proposed works.

For monitoring of works around the Stations, CoA E30 requires that a heritage specialist be consulted when installing equipment used for vibration, movement and noise monitoring around heritage listed structures. Generally noise and vibration monitors do not affect the building fabric in any way. Noise and vibration loggers will be secured such that any chains do not damage the building, and so that they are unlikely to be knocked over and thereby damage surfaces.

8.2.1. Plant noise auditing

The CNVS requires that plant noise auditing is conducted upon arrival on the Project's construction sites and at 6 month intervals thereafter to ensure that they are operating as expected.

Plant noise auditing would preferably be carried out on site, in order to better assess how it operates in the field. Plant noise measurements carried out on site are often affected by other activities, and therefore it is most meaningful for attended measurements to measure event noise levels at a location near to the source. This is a valid method of validating the Sound Pressure Level (SPL) at 10m or the Sound Power Level (SWL) assumed in the CNVS and for the predictions presented in the CNVIS.

However, plant noise auditing can also be carried out in controlled conditions to compare the noise output with applicable standards, including the maximum allowable plant noise levels listed in the CNVS. Off-site plant noise auditing may be requested at any time by Sydney Metro, if inspections indicate that plant used on site is louder than expected.

8.2.2. Vibration monitoring

Attended vibration measurements are required at the commencement of vibration-generating activities listed in Section 6.4 to confirm that vibration levels satisfy the criteria for that vibration generating activity.

If any vibration-generating works take place within the Safe Working Distances of buildings or structures (for both human comfort and building damage), this means that there is the potential for the VML to be exceeded. In these cases, further vibration site law investigations are to be undertaken to determine the site-specific safe working distances for that vibration generating activity. This is in recognition of the fact that vibration propagation is highly variable and site-dependent.

Attended vibration monitoring of each specific item of vibration intensive plant is to be conducted before beginning construction works to establish a more accurate minimum working distance.

Generally, the Safe Working Distances are considered to be conservative. If site conditions are atypical and the vibration levels are higher than expected, then the Safe Working Distance is to be extended to reflect the site conditions. Sydney Metro is to be advised of any extended site-specific Safe Working Distances.

Vibration monitoring will be carried out by a person with experience and / or qualifications in vibration and acoustics.

Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the applicable safe-working distances. Where more than one building falls within the Safe Working Distance, the continuous vibration monitoring shall be located at the building which is nearest to the works and which is accessible to the Contractor's acoustic consultant.

In order to assess the likelihood of cosmetic damage due to vibration, AS2187 specifies that vibration measurements would be undertaken at the base of the building and the highest of the orthogonal vibration components (transverse, longitudinal and vertical directions) would be compared with the guidance curves presented in BS 7385. This is based on the assumption that the base of the building is most affected by construction-related vibration. Where other parts of the building are more affected than the base, for example if demolition is occurring at higher levels of a building which is structurally connected to an adjacent building, then the measurements and assessment need to apply at the most affected part of the receiver building.

CoA E30 requires that a heritage specialist be consulted when installing equipment used for vibration, movement and noise monitoring around heritage listed structures. Generally the method of affixing sensors must meet acoustic requirements of achieving a satisfactory connection with the building structure, and also meeting the heritage requirements of being removable without leaving any permanent markings or damage to the building fabric.

Locations of proposed vibration monitoring, both attended and unattended, must be provided to Sydney Metro for review and consultation as required, at least one week prior to the vibration-generating works commencing. This information can be provided in Out-of-Hours Works Applications, or separately if the works are proposed to be carried out during Standard work hours.

8.2.3. Dilapidation or Condition Surveys

If construction activities have the potential to cause damage through vibration to nearby public utilities, structures, buildings and their contents, an Existing Condition Inspection of these items is required to be undertaken in accordance with AS 4349.1 *"Inspection of Buildings"*.

A Condition Survey is required for any building or structure which is located within the recommended Safe Working Distances (refer Section 6.4).

The Project REMMs specifically require:

- NVC3 – Where vibration levels are predicted to exceed the vibration screening level, a more detailed assessment of the structure would be carried out to determine the appropriate vibration limits for that structure; and

- NVC4 – For heritage items where vibration screening levels are predicted to be exceeded, the more detailed assessment would include condition assessment and specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.

Refer Section 6.4 for Minimum Working Distances used to assess whether the vibration screening level may be exceeded.

All stations require a Condition Survey. They are all heritage-listed buildings located within close proximity of vibration-generating works, and a requirement of the CNVS is that they are subject to a Condition Survey to determine whether or not they are structurally sound. Downer is responsible for the Condition Survey, and for providing results of the survey to Sydney Metro for review.

Heritage-listed buildings are to be considered “structurally unsound” until a structural engineering survey is carried out and determines that it is “structurally sound”. In the unlikely event that the structural engineering survey for a station determines that the building is to be considered “structurally unsound”, the relevant criterion will be as stated in Section 5.7. Sydney Metro is to be advised if the station building or other railway structure is considered to be “structurally unsound”, prior to any vibration-generating works commencing.

If any buildings outside the railway premises are located within the Safe Working Distances of vibration-generating works, the potentially affected buildings also require a Condition survey. The Safe Working Distances are based on the assumption that the buildings are structurally sound. Heritage-listed buildings within 30m of vibration-generating works require a Condition Survey prior to works commencing, even if they are outside the Safe Working Distance.

Prior to conducting the Existing Condition Inspections, the property owners will be advised of the inspection scope and methodology and the process for making a property damage claim.

Downer must maintain a register of all properties inspected and of any properties where owners refused the inspection offer. Evidence is required to demonstrate that three attempts have been made to contact the property owner to offer a Condition Survey. If the property owner does not respond to requests for access to the property after three attempts by Sydney Metro contractors, then the offer for a Condition Survey is considered to be refused by the owner.

The findings of all dilapidation surveys conducted for each construction site would be compiled into a report by Downer and provided to Sydney Metro. Follow-up Condition Inspections may be required at the completion of works.

The results of any Condition Surveys are to be documented in CNVIS updates, and a register is to be kept and managed by Downer. The CNVIS and / or site register will be updated to document the vibration criteria which apply at each affected heritage building, to assist with management, monitoring and evidence in case of queries or complaints.

8.3. General monitoring requirements

CoA C13 requires that approved Construction Monitoring Programs must be implemented for the duration of the Construction, and for any longer period set out in the monitoring program or specified by the Planning Secretary (whichever is greater).

Because the proposed Project is a subset of the wider Sydney Metro Sydenham to Bankstown project, the Noise and Vibration Monitoring Program required for this Project will be carried

out as required by the CNVS for these works only. Longer-duration construction noise and vibration monitoring is likely to be carried out by other contractors.

The monitoring requirements are described in detail in the CNVS. The CNVS describes technical requirements for the monitoring equipment, as well as the required content and measurement parameters to be reported. The measurement parameters must be aligned with, or comparable with, the applicable NMLs or VMLs.

If measurements are carried out at alternative locations to the receiver, such as at a publicly accessible location near the site boundary, then adjustments will be presented to be able to compare the measured levels with those predicted in the approved CNVIS and the applicable NML or VML.

Downer's acoustic consultant or environmental personnel must provide details of their proposed equipment, methodology and reporting format or template to Sydney Metro for review, prior to carrying out any surveys.

Sydney Metro's acoustic representatives may accompany Downer's acoustic consultant or environmental personnel and carry out independent monitoring at any time as requested by Sydney Metro or DPIE.

As stated in the CNVS, all acoustic instrumentation used in the monitoring programme will be designed to comply with the requirements of AS IEC 61672.1:2004 Electroacoustics – Sound level meters – Specifications and carry current National Association of Testing Authorities (NATA) or manufacturer calibration certificates. The instrumentation must be installed, operated and maintained by suitably qualified or trained personnel. The instruments must be externally calibrated at regular intervals.

Airborne noise measurement metrics and metre settings are as follows:

- As a minimum, $L_{Aeq(15min/event)}$ noise levels should be recorded, to allow direct comparison against NMLs. The measured level may need to be corrected to an equivalent distance to the receiver location in order to compare directly with the NML, which applies at the receiver.
- Attended measurements may also report $L_{Aeq(event)}$ levels to provide useful information about particular activities, or to limit measurements to when construction noise events are clearly audible and measurable above extraneous ambient noise. This also allows direct comparison between measured levels for particular plant and activities against the assumed noise levels used in predictions. The measured levels may need to be corrected by distance to compare with data sheets (eg correct to a sound pressure level at 10m). This is a useful measurement to understand whether plant or activities are significantly louder than predicted, and therefore whether actions are required to check the plant.
- In addition, statistical measures may be measured and recorded, such as;
 - L_{Amax} (maximum event level), can be compared against Sleep Disturbance or Sleep Awakening Levels. This needs to be measured at the receiver location, or corrected to an equivalent distance to the receiver location
 - $L_{A10(15min)}$ (highest 10% of noise). The construction LA10 is no longer used in NSW to assess construction noise, but it is a useful indicator of “typical noisiest” event levels.

- $L_{A90(15min)}$ (lowest 10% of noise) should be measured in the absence of construction noise, to verify the background noise levels.
- These A-weighted airborne noise measurements are to be taken using the Fast response setting on the sound level meter or noise logger.

Vibration measurements shall be carried out in accordance with the CNVS Appendix, which describes requirements for construction vibration monitoring instrumentation used for the identification of structural and cosmetic damage. It should be noted that equipment specifications detailed in the Appendix of the CNVS may not be suitable for the measurement of all vibration impacts such as human comfort and or the measurement of vibration impacts to sensitive equipment. Prior to any measurement being conducted the contractor must ensure that the monitoring equipment being proposed is suitable for the type of measurement being conducted.

For Sydney Metro projects, vibration is to be measured using the Fast response setting. Vibration is generally measured using a vibration logger which records Peak Particle Velocity (PPV) levels which can be directly compared with the VMLs for vibration effects on structures.

Attended measurements may also be carried out and this is recommended if there are vibration-sensitive equipment such as medical imaging equipment, in order to measure r.m.s. vibration levels to directly compare with the applicable VMLs for sensitive equipment. If vibration monitoring is conducted for human comfort assessments, then it is typically accepted for PPV vibration loggers to be used as a screening measure, although the VMLs for human comfort are based on a Vibration Dose Value (VDV), rather than a continuous vibration level. It is not always practical to measure VDV during construction works, as the calculation relies upon duration, intensity and characteristic frequency of the measured vibration events throughout a work day. In some cases, it may be necessary to relate to an instantaneous measurement, such as Peak Particle Velocity (PPV). Appendix C of the AVTG provides guidance on relating measurements of continuous and impulsive vibration to PPV.

8.4. Frequency of monitoring

Vibration monitoring is to be conducted whenever vibration-generating works take place within the site-specific Safe Working Distance of sensitive receivers, as described in Section 8.2.2.

Noise monitoring is to be considered whenever the predicted works noise levels exceed the trigger levels listed in the AMM matrices (Section 7.12). If Downer is of the opinion that noise monitoring is not required during out-of-hours works, then justification is to be provided in the OOHW Application or via email and that decision must be endorsed by the Environment Representative. Potential reasons for not carrying out noise monitoring may be that similar works with the same equipment had been carried out on a previous night and found to be compliant with applicable NMLs. In general, noise monitoring would be carried out as specified by the AMM matrices.

Noise or vibration monitoring may also be required:

- In response to noise or vibration complaints;
- To validate predicted noise levels associated with each works scenario assessed in the CNVIS, at the commencement of works and new construction activities or location;

- To confirm vibration “site-law” propagation at commencement of vibration-generating works, to confirm that the Minimum Working Distances are valid for the site (refer Section 6.4);
- To monitor vibration for human comfort and structural effects as required by the CNVS (refer Section 7.12);
- If requested by an authorised officer of the EPA for works undertaken under EPL 12208 (i.e. under a rail possession);
- If requested by Sydney Metro, the ER, or DPIE for works undertaken in accordance with the CoAs.

Additional monitoring may be requested by Sydney Metro, DPIE or EPA at any time, for example in response to complaints or observations of unexpected sound or vibration generated at worksites during inspections. Additional monitoring may be carried out by Downer, or by Sydney Metro’s acoustic representatives.

8.5. Reporting

In accordance with C9(g), Downer is required to submit noise and vibration monitoring reports to Sydney Metro and the Environment Representative for their review.

The requirements of the reports are described in Appendix A of the CNVS.

CoA C14 requires that the results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies including councils and the EPA, for information in the form of a Construction Monitoring Report.

The Construction Monitoring Report will encompass other environmental aspect reports, and would not be limited to noise and vibration monitoring. Downer’s Construction Monitoring Report would be submitted to Inner West Council, City of Canterbury-Bankstown Council, the Planning Secretary and EPA on a six-monthly basis.

The six-monthly Construction Monitoring Reports will include a summary of monitoring undertaken, an overview of the results, analysis of the results and comparison against the nominated noise and vibration management levels, and raw data from monitoring. Once Sydney Metro and the ER have reviewed the reports, the monitoring reports will be provided to DPIE, EPA, the City of Bankstown-Canterbury and Inner West Council.

Reporting associated with incidents, non-conformances and non-compliances are described in the CEMP Section 3.7.2 and 3.10.3. Other noise and vibration-related reporting requirements are as follows:

- Emergency works are to be reported to the Environment Representative and the EPA (if an EPL applies, ie for works under a rail possession), in accordance with CoA E21. The proponent / Contractor must also *“use best endeavours to notify all noise and / or vibration affected receivers of the likely impact and duration”* of Emergency works.
- E23 requires that the outcomes of the community consultation including the agreed appropriate respite periods and works scheduling must be provided to the EPA (for works carried out under Sydney Trains’ EPL 12208 under a rail possession) and the Planning Secretary (for high risk activities after 9pm), upon request. The Environmental Representative will determine whether the noise and / or vibration impacts for any proposed out of hours works are considered to be “high risk” in accordance with Sydney Metro’s approved Out of Hours Work Strategy/Protocol.

- For works carried out under a rail possession under EPL 12208, when requested by an authorised officer of the EPA, O13.6 requires that the Contractor must provide written reasons to demonstrate that works undertaken outside the standard hours specified in EPL 12208 O13.1 comply with the licence.
- For works carried out under a rail possession under EPL 12208, when requested by an authorised officer of the EPA, the Contractor must provide information as described in O13.5 to describe any proposed out-of-hours works, including a contact name and number of a responsible person who will be on site during the works.

8.6. Review of monitoring

Survey notes are required for all attended surveys, which provide details of the works taking place, observed mitigation measures on site, how audible the works noise is relative to the ambient conditions at the time of the survey, and any other details as described in the CNVS which are relevant to the assessment of the success or otherwise of the site noise and vibration mitigation methods.

Attended measurements provide the opportunity to identify ways to improve future works noise and vibration management – for example whether:

- There were ways to reduce impact, for example locating fixed plant behind an existing building, or installing noise curtains to break line of sight between source and receiver;
- There were lessons learned about good or bad practice observed on site;
- Adjustments will be made to future predictions, for example if plant was significantly quieter than the CNVS plant SWLs suggest and this make / model is proposed for future works.

Attended surveys may also determine potential non-conformances and/or non-compliances, which are to be reported to Sydney Metro and the ER within one business day of the survey – for example whether:

- Noise curtains or other mitigation commitments made in the approved OOHW Application have been correctly implemented;
- Agreed respite periods have not been observed, including for Highly Noise Intensive Works (Section 5.4);
- Plant used is not among the approved list of plant from the CNVIS or approved OOHW Application;
- Any item of plant is louder than expected and resulting in exceeding the predicted CNVIS noise levels; or
- Vibration levels exceeded the predicted levels, and in particular were high enough to risk damage to structures.

If mitigation has been implemented but incorrectly installed such that they are ineffective, then this is not in itself a non-compliance but a lesson learned, to be passed on to Downer to include in future site-inductions.

If the noise mitigation was ineffective, Downer must investigate and confirm how to correctly install so that it is effective when required in future. Any observations of ineffective noise mitigation and any rectification actions will be recorded by Downer in their site inspection records and training to prevent recurrence will be provided if required.

Effectiveness of noise mitigation is determined by the decibel reduction achieved by the mitigation, and is not related to whether complaints have been received or not in relation to the works.

If mitigation has not been implemented, although it was stated as required under an approved OOHW Application, this is a non-compliance. Refer to Section 8.5.

Where the measured noise or vibration exceeds the predicted levels, Downer shall undertake an investigation.

If the investigation finds that the works were not undertaken in accordance with the approved work or this NVMP (for example, plant was different and / or mitigation not implemented), then this is to be recorded as a non-conformance under the CEMP, and may have the potential to be a non-compliance against the Planning Approval.

If the investigation finds that the approved plant and mitigation were implemented, but the predicted levels were lower than measured, Downer's acoustic consultant will investigate the reasons for this and update the noise model as required.

Monitoring results are to be reviewed by Downer's Environmental Manager (or delegate) as soon as practicable. Where an opportunity for improvement is identified, mitigation measures will be reviewed. Reviews of monitoring shall occur within a week of any monitoring. If the review must document whether an exceedance of the predicted noise or vibration levels has been recorded, or if a complaint was received related to the works in question.

Downer's Environmental Manager will consult with the construction team to determine whether any further mitigation measures will be adopted. This consultation will occur as soon as practicable following the review finding that measured noise or vibration levels exceeded the CNVIS predictions. If the excess is severe, for example vibration levels associated with risks of damage to structures or night-time noise levels associated with sleep awakening, then the consultation will occur formally through a meeting.

Further mitigation measures which may be considered include:

- Changes to construction methodology (change plant);
- Additional or modified respite periods, such as longer continuous breaks for high impact noise, or changing day-time periods of respite to accommodate individual receiver needs);
- Modifying timing of work to less sensitive periods;
- Modifying plant if safe and practicable, for example to install non-tonal vertical movement alarms on EWPs and mobile cranes;
- Any other reasonable and feasible measure.

8.7. Monitoring program consultation

This Noise and Vibration Monitoring Program was prepared in consultation with the local Council(s), in accordance with CoA C8(a), CoA C9(i) and CoA C10. Any feedback from Council has been incorporated into this Noise and Vibration Monitoring Program. See Section 1.5 and Appendix E for consultation carried out in the development of this program.

9. NVMP administration

9.1. Hold points

The delivery of works covered by the NVMP cannot commence until the NVMP and associated CNVIS are approved by relevant authorities or their nominated representatives.

Approval of the NVMP and the associated CNVIS require approval of components as listed in Table 25 below.

Table 25: NVMP hold points

Item	Process Held	Acceptance Criteria	Approval Authority
CEMP and Sub-plans	Site activities (Prior to construction commencement)	Site specific CEMP and Sub-plans (including this NVMP) have been developed, reviewed, endorsed by the ER and approved by DPIE.	ER Endorsement DPIE Approval.
CNVIS	Site activities (Prior to construction commencement)	CNVIS to be prepared by Specialist Consultant	ER Endorsement
OOHW Applications – individual works scenarios	Works to be performed outside of approved construction hours (Pre-construction and during construction)	OOHW Strategy/Protocol and Application Form and Community Notification EPL 12208	ER Endorsement and Approval Sydney Metro Approval (if OOH are occurring under EPL 12208) EPA (Information to be provided on request)
Construction identified as affecting buildings	Site activities	Building Condition Survey conducted by an appropriate professional nominated by Downer	Downer's Construction Manager

9.2. Review and improvement

The NVMP will be reviewed on a six monthly basis and earlier if required in response to the relevant findings of any audit, incident report, complaint, monitoring event or inspection.

Other reasons for updating the NVMP and the associated CNVIS are:

- Ongoing of review of construction methodology and project noise and vibration issues, aiming for continuous improvement.
- Re-assess CNVIS and NVMP based on new inputs (if necessary, eg if scope, main works scenarios or location of works changes).
- Consistency Assessment (if required).
- Downer's application for a works-specific EPL.
- Amendments to the relevant EPL.

9.3. Records

Records are to be maintained for:

- Records of community enquiries and complaints, and Downer's response – Sydney Metro central complaints management (refer to OCCS);
- Community Consultation – Sydney Metro Place Manager;
- Offers of Respite and / or Alternative Accommodation – Sydney Metro Place Manager;
- Plant and equipment hire – Downerr Site Manager;
- Dilapidation or Condition surveys – Downer Site Manager;
- Works activities including Emergency Works – Downer Site Manager;
- Out of Hours Works Applications reviews, correspondence and approvals – Sydney Metro, Downer, Environment Representative;
- Any works deemed by the Environment Representative to be "High Risk" in accordance with Sydney Metro's approved Out of Hours Work Strategy/Protocol – Sydney Metro, Environment Representative;
- Noise and vibration surveys – Downer Site Manager;
- Records of noise and vibration monitoring results against appropriate NMLs and vibration criteria, including those published in Construction Monitoring Reports;
- Site audits and inspections – Sydney Metro, Downer, Independent Auditor (where required), Environment Representative; and
- Noise and vibration potential and actual incidents – Sydney Metro, Downer, Independent Auditor, Environment Representative.

Appendix A – Other CoA, REMM and CEMF requirements relevant to this plan

Other relevant Conditions of Approval relevant to the development of this Plan

CoA No.	Condition Requirement	Document Reference
A26	<p>For the duration of the Work until the commencement of Operation, or as agreed with the Planning Secretary, the approved ER must:</p> <ul style="list-style-type: none"> (a) receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; (b) consider and inform the Planning Secretary on matters specified in the terms of this approval; (c) consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; (d) review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: <ul style="list-style-type: none"> (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary); (e) regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval; (f) as may be requested by the Planning Secretary, help plan, attend or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings and site visits, but not independent environmental audits required under Condition A34 of this approval; (g) as may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; (h) assess the impacts of minor ancillary facilities as required by Condition A19 of this approval; (i) consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and (j) prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI. 	<p>The interface between the ER and this Plan are outlined in:</p> <ul style="list-style-type: none"> Section 2.4 Section 7.11 Section 8.4 Section 8.5 Section 8.6 Section 9.1 Section 9.3
A36	<p>The Department must be notified in writing to compliance@planning.nsw.gov.au immediately after the Proponent becomes aware of an incident. The notification must identify the CSSI (including the application number and the name of the CSSI if it has one) and set out the location and nature of the incident.</p>	<p>CEMP Section 3.10.3 Section 8.5</p>

CoA No.	Condition Requirement	Document Reference
A37	Subsequent notification must be given, and reports submitted in accordance with the requirements set out in Appendix A. [Appendix A of CoA SSI 8256 not replicated in this NVMP]	CEMP Section 3.10.3 Section 8.5
E18	A detailed land use survey must be undertaken to confirm sensitive receivers (including critical working areas such as operating theatres and precision laboratories) potentially exposed to Construction noise and vibration, Construction ground-borne noise and Operational noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of Work which generate Construction or Operational noise, vibration or ground-borne noise in that area. The results of the survey must be included in the Construction Noise and Vibration Impact Statement(s) or Operational Noise and Vibration Review, where relevant.	Section 3.1 Appendix B
E19	Work must only be undertaken during the following Construction hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 6:00pm Saturdays; and (c) at no time on Sundays or public holidays.	Section 5.1 Section 7.6
E20	Notwithstanding Conditions E19 and E24 Work may be undertaken outside the hours specified in the following circumstances: (a) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (b) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or (c) where different Construction hours are permitted or required under an EPL in force in respect of the CSSI; or (d) Work approved under an Out-of-Hours Work Protocol for Work not subject to an EPL as required by Condition E25; or (e) Construction that causes LAeq(15 minute) noise levels: (i) no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), and (ii) no more than the 'Noise affected' noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses, and (iii) continuous or impulsive vibration values, measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), and (iv) intermittent vibration values measured at the most affected residence are no more than the maximum values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006); or (f) where a negotiated agreement has been reached with a substantial majority of sensitive receivers who are within the vicinity of and may be potentially affected by the particular Construction, and the noise management levels and/or limit for ground-borne noise and vibration (human comfort) cannot be achieved. All agreements must be in writing and a copy forwarded to the Planning Secretary at least one (1) week before the commencement of activities.	Section 5.1 Section 7.6

CoA No.	Condition Requirement	Document Reference
	Note: Section 5.24(1)(e) of the EP&A Act requires that an EPL be substantially consistent with this approval.	
E21	On becoming aware of the need for emergency Work in accordance with Condition E20(b), the Proponent must notify the ER and the EPA (if a EPL applies) of the need for that Work. The Proponent must use best endeavours to notify all noise and/or vibration affected sensitive receivers of the likely impact and duration of those Work.	Section 5.1
E22	<p>Out-of-Hours Work that are regulated by an EPL as per Condition E20(c) or through the Out- of-Hours Work Protocol as per Condition E25 include:</p> <p>(a) Work which could result in a high risk to construction personnel or public safety, based on a risk assessment carried out in accordance with AS/NZS ISO 31000:2009 “Risk Management – Principles and Guidelines”; or</p> <p>(b) where the relevant road authority has advised the Proponent in writing that carrying out the activities could result in a high risk to road network operational performance; or</p> <p>(c) where the relevant utility service operator has advised the Proponent in writing that carrying out the activities could result in a high risk to the operation and integrity of the utility network; or</p> <p>(d) where the Transport for NSW Transport Management Centre (or other road authority) has advised the Proponent in writing that a road occupancy licence is required and will not be issued for the activities during the hours specified in Conditions E19 and E20; or</p> <p>(e) where Sydney Trains (or other rail authority) has advised the Proponent in writing that a Rail Possession is required.</p> <p>Note: Other Out-of-Hours Work can be undertaken with the approval of an EPL, or through the project’s Out-of-Hours Work Protocol for Work not subject to an EPL.</p>	Section 5.1 Section 7.5 Section 7.6 Section 7.9 Section 7.11 Appendix D
E23	<p>In order to undertake Out-of-Hours Work, the Proponent must identify appropriate respite periods for the Out-of-Hours Work in consultation with the community at each affected location on a regular basis. This consultation must include (but not be limited to) providing the community with:</p> <p>(a) a schedule of likely Out-of-Hours Work for a period no less than two (2) months;</p> <p>(b) the potential work, location and duration;</p> <p>(c) the noise characteristics and likely noise levels of the Work; and (d) likely mitigation and management measures.</p> <p>The outcomes of the community consultation, the identified respite periods and the scheduling of the likely Out-of-Hours Work must be provided to the EPA (if an EPL applies) and the Planning Secretary (for high risk activities after 9pm) upon request.</p>	Section 5.1 Section 7.5 Section 7.6 Section 7.9 Section 7.11 Appendix D
E24	<p>Except as permitted by an EPL, highly noise intensive Work that result in an exceedance of the applicable Noise Management Level at the same receiver must only be undertaken:</p> <p>(a) between the hours of 8:00 am to 6:00 pm Monday to Friday;</p> <p>(b) between the hours of 8:00 am to 1:00 pm Saturday; and</p> <p>(c) in continuous blocks not exceeding three (3) hours each with a minimum respite from those activities and Works of not less than one (1) hour between each block.</p>	Section 5.4 Section 7.6

CoA No.	Condition Requirement	Document Reference
	For the purposes of this condition, 'continuous' includes any period during which there is less than a one (1) hour respite between ceasing and recommencing any of the work that are the subject of this condition.	
E25	<p>An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of Work which are outside the hours defined in Condition E19, and that are not subject to an EPL. The Protocol must be approved by the Planning Secretary before commencement of the Work. The Protocol must:</p> <p>(a) provide a process for the consideration of Out-of-Hours Work against the relevant noise and vibration criteria, including the determination of low and high-risk activities;</p> <p>(b) provide a process for the identification of mitigation measures for residual impacts, including respite periods in consultation with the community at each affected location, consistent with the requirements of Condition E23;</p> <p>(c) identify procedures to facilitate the coordination of Out-of-Hours Work approved by an EPL to ensure appropriate respite is provided;</p> <p>(d) identify an approval process that considers the risk of activities, proposed mitigation, management, and coordination, including where:</p> <p>(i) low risk activities and high risk activities that cease by 9pm can be approved by the ER, and</p> <p>(ii) all other high risk activities must be approved by the Planning Secretary; and</p> <p>(e) identify Planning Secretary, EPA and community notification arrangements for approved Out-of-Hours Work, which may be detailed in the Community Communication Strategy.</p>	<p>Sydney Metro Out Of Hours Works Strategy/Protocol</p> <p>Section 5.1</p> <p>Section 7.5</p> <p>Section 7.6</p> <p>Section 7.9</p> <p>Section 7.11</p> <p>Appendix D</p>
E26	<p>Work undertaken for the delivery of the CSSI, including those undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must:</p> <p>(a) reschedule Work to provide respite to impacted noise sensitive receivers so that the respite is achieved in accordance with Condition E23; or</p> <p>(b) consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; and</p> <p>(c) provide documentary evidence to the ER in support of any decision made by the Proponent in relation to respite or mitigation.</p>	Section 7.10
E27	Construction Noise and Vibration Impact Statements must be prepared for Construction sites before Construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive receivers. The Statements must augment the Construction Noise and Vibration Management Sub-plan and must be implemented for the duration of Work. The Statements must be informed by a suite of potential management/mitigation options provided in the Construction Noise and Vibration Sub-plan.	<p>Section 1.4</p> <p>Section 3.3</p> <p>Section 6</p> <p>Section 7.12</p>
E28	Noise generating Work in the vicinity of potentially-affected community, religious, or educational institutions resulting in noise levels above the noise management levels must not be timetabled within sensitive periods, unless other reasonable arrangements with the affected institutions are made at no cost to the affected institution or as otherwise approved by the Planning Secretary.	<p>Section 1.4</p> <p>Section 7.5</p> <p>Section 7.6</p>

CoA No.	Condition Requirement	Document Reference
E29	<p>Mitigation measures must be implemented with the aim of achieving the following Construction noise management levels and vibration criteria:</p> <p>(a) Construction 'Noise affected' noise management levels established using the Interim Construction Noise Guideline (DECC, 2009);</p> <p>(b) vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure);</p> <p>(c) BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and</p> <p>(d) the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage).</p> <p>Note: The Interim Construction Noise Guideline identifies 'particularly annoying' activities that require the addition of 5 dB(A) to the predicted level before comparing to the Construction Noise Management Level.</p>	<p>Section 2</p> <p>Section 5</p> <p>Section 7</p>
E30	<p>The Proponent must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring at heritage-listed structures.</p>	<p>Section 5.7</p> <p>Section 7.5</p> <p>Section 7.6</p>
E32	<p>Operational noise mitigation measures as identified in Condition E31 that will not be physically affected by Construction, must commence implementation within six (6) months of the commencement of Construction in the vicinity of the impacted receiver(s) to minimise Construction noise impacts, and detailed in an updated Noise and Vibration CEMP Sub-plan for the CSSI.</p> <p>Note: For the purpose of Conditions E32 and E33, operational noise mitigation measures refer to at property or other identified non-source controls, the detail of which would broadly be included in the Noise and Vibration CEMP Sub-plan. When detail on the specific mitigation measures is known and before the implementation of the mitigation measures, the CEMP sub- plan must be updated.</p>	<p>CoA E32 is not relevant to the Project as station works are not near locations where operational noise mitigation is identified</p>
E33	<p>Where implementation of Operational noise mitigation measures will be physically affected by Construction such that they cannot commence implementation within six (6) months of the commencement of Construction in accordance with Condition E32, the Proponent must submit to the Secretary a report providing justification as to why, along with details of temporary measures that would be implemented to address construction noise impacts until such time that the Operational noise mitigation measures identified in Condition E31 are implemented. The report must be submitted to the ER for review. When the ER is satisfied that the justification and alternative measures are appropriate to address construction noise impacts, and within six (6) months of the commencement of Construction which would affect the identified sensitive receivers, the report must be submitted to the Planning Secretary for information.</p>	<p>CoA E32 is not relevant to the Project as station works are not near locations where operational noise mitigation is identified</p>

Revised Environmental Mitigation Measures relevant to the development of this Plan

REMM No.	REMM Requirement	Timing	Document Reference
NVC1	In accordance with the Construction Noise and Vibration Strategy, construction noise impact statements would be prepared prior to the commencement of construction components, to consider the scale and duration of construction noise impacts, and identify measures to minimise impacts to sensitive receivers. This would include noise modelling to confirm the results of modelling undertaken as part of the Environmental Impact Statement and Submissions and Preferred Infrastructure Report. Where exceedances of the noise management levels are identified, feasible and reasonable mitigation measures would be identified.	Design/pre-construction	Relevant requirements of the Sydney Metro CNVS form part of this NVMP, as noted in Section 2. Relevant requirements of the Sydney Metro CNVS will be incorporated into the CNVIS prepared for the Station Works outlined in Section 5. Additional mitigation measures, as defined by the Sydney Metro CNVS, are outlined in Section 7.11
NVC2	In accordance with the Construction Noise and Vibration Strategy, all employees, contractors and subcontractors would receive an environmental induction. The induction must at least include: <ul style="list-style-type: none"> i. relevant project specific and standard noise and vibration mitigation measures ii. relevant licence and approval conditions iii. permissible hours of work iv. any limitations on high noise generating activities v. location of nearest sensitive receivers vi. designated loading/unloading areas and procedures vii. site opening/closing times (including deliveries). 	Design/pre-construction	Section 7.7
NVC3	Where vibration levels are predicted to exceed the vibration screening level, a more detailed assessment of the structure would be carried out to determine the appropriate vibration limits for that structure.	Design/pre-construction	Section 5.7 Section 5.8 Section 5.9 Section 5.10 Section 8.2.2
NVC4	For heritage items where vibration screening levels are predicted to be exceeded, the more detailed assessment would include condition assessment and specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	Design/pre-construction	Heritage Management Plan Section 5.7 Section 8.2.2
NVC5	The Construction Noise and Vibration Strategy would be implemented with the aim of achieving the noise management levels where feasible and	Construction	Section 7.1 Section 7.2 Section 7.3 Section 7.4

REMM No.	REMM Requirement	Timing	Document Reference
	<p>reasonable. This may include the following example mitigation measures alone or in combination, where feasible and reasonable:</p> <ol style="list-style-type: none"> The provision of noise barriers around each construction site. The coincidence of noisy plant working simultaneously close together would be avoided. Residential grade mufflers would be fitted to all mobile plant. Non-tonal reversing alarms would be fitted to all permanent mobile plant. High noise generating activities would be scheduled for less sensitive periods considering the nearby receivers, where reasonable and feasible. The layout of construction sites would consider opportunities to shield receivers from noise. Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Loading and unloading of materials/deliveries is to occur as far as possible from noise sensitive receivers. Select site access points and roads as far as possible away from noise sensitive receivers. Dedicated loading/unloading areas to be shielded if close to noise sensitive receivers wherever feasible and reasonable. Use quieter and less vibration emitting construction methods where feasible and reasonable. The noise levels of plant and equipment must have operating Sound Power Levels compliant with the criteria in the Construction Noise and Vibration Strategy. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where feasible and reasonable, the offset distance between noisy plant items and nearby noise sensitive receivers would be as great as possible. Where reasonable and feasible heavy vehicle movements would be limited to daytime and evening hours, with night-time movements avoided where possible. Active community consultation and the maintenance of positive, cooperative relationships with schools, local residents and building owners and occupiers, through: 		<p>Section 7.5 Section 7.13 All example NVC5 mitigation measures will be considered in the development of CNVIS assessments associated with this NVMP.</p>

REMM No.	REMM Requirement	Timing	Document Reference
	<ul style="list-style-type: none"> periodic notification or work activities and progress (e.g. regular letterbox drops, e-consult) specific notification (letter-box drop) prior to especially noisy activities comprehensive website information project information and construction response telephone line email distribution lists. 		
NVC6	Noise intensive plant for, would not be used during the night-time period (10pm to 7am) unless: <ul style="list-style-type: none"> i. during a weekend rail possession or shut down ii. a requirement of a road authority, emergency services or Sydney Coordination Office requires works to be undertaken during this period. 	Construction	Section 5.1 Section 5.4 Section 7.6
NVC7	When working adjacent to schools, medical facilities and child care centres, particularly noisy activities would be scheduled outside normal working hours, where reasonable and feasible.	Construction	This will be addressed in the CNVIS and will incorporate outcomes of consultation in line with Section 7.5
NVC8	When working adjacent to churches and places of worship, particularly noisy activities would be scheduled outside services, where reasonable and feasible.	Construction	This will be addressed in the CNVIS and will incorporate outcomes of consultation in line with Section 7.5
NVC9	Alternative accommodation may be offered to residents living in close proximity to construction works where detailed construction planning identifies unreasonably high noise impacts over a prolonged period. Alternative accommodation arrangements would be offered and discussed with residents on a case-by-case basis.	Construction	Alternative accommodation is to be applied where triggered in accordance with the Sydney Metro City and Southwest Construction Noise and Vibration Strategy, as outlined in: Section 7.11 Section 7.12
NVC10	High noise and vibration generating activities including ballast tamping, may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block and these works.	Construction	Section 5.4 Section 7.6 No ballast tamping is proposed as part of this Project's scope.
NVC11	Ongoing noise monitoring would be undertaken during construction at sensitive receivers during critical periods (i.e. times when noise emissions are expected to be at their highest) to identify and assist in managing high risk noise events.	Construction	Section 5.4 Section 7.11 Section 8.2

REMM No.	REMM Requirement	Timing	Document Reference
NVC12	Where vibration levels are predicted to exceed the vibration screening level, attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure.	Construction	Section 5 Section 8.2.2
NVC13	Reasonable and feasible measures would be implemented in accordance with the Construction Noise and Vibration Strategy to minimise ground-borne noise where exceedances are predicted.	Construction	Section 6.5 Section 7.4 Ground borne noise management levels expected to be met
NVC14	Reasonable and feasible mitigation measures would be implemented where power supply works would result in elevated noise levels at receivers. This could include: <ul style="list-style-type: none"> i. carrying out works during the daytime period when in the vicinity of residential receivers ii. where out of hours works are required, scheduling the noisiest activities to occur in the evening period (up to 10pm) iii. use of portable noise barriers around particularly noisy equipment. 	Construction	This NVMP and associated CNVIS Section 7 No power supply works are proposed in this Project's station upgrade scope of this Project.
NVC15	The routes for construction haulage vehicles and bus services associated with the Temporary Transport Strategy would be selected on the basis of compliance with the relevant road traffic noise criteria, where reasonable and feasible. Where compliance with the noise criteria is not possible, reasonable and feasible noise mitigation would be implemented.	Construction	Bus services for the purpose of the Temporary Transport Strategy is outside the scope of this NVMP, and is not the responsibility of Downer. The sections below only address the construction haulage vehicles component of this REMM. Section 5.6 Section 7.13
NVC16	An Out of Hours Work Strategy would be prepared, in consultation with the Environment Protection Authority, to guide the assessment, management, and approval of works outside recommended standard hours.	Construction	Sydney Metro Out of Hours Works Strategy/Protocol Section 1.4 Section 5.1 Section 7.5 Section 7.6 Section 7.9 Section 7.11 Appendix D

Construction Environmental Management Framework requirements relevant to the development of this Plan

CEMF Section	CEMF Requirement	Document Reference
3.7(a)	Prior to the commencement of construction the Principal Contractors will offer Pre-construction Building Condition Surveys, in writing, to the owners of buildings where there is a potential for construction activities to cause cosmetic or structural damage. If accepted, the Principal Contractor will produce a comprehensive written and photographic condition report produced by an appropriate professional prior to relevant works commencing.	Section 8.2.3 Section 9.1 Table 25
5.1(a)	Standard working hours are between 7am – 6pm on weekdays and 8am – 1pm on Saturdays.	Section 5.1
5.1(b)	Works which can be undertaken outside of standard construction hours without any further approval include: i. Those which have been described in respective environmental assessments as being required to take place 24/7. For example, tunnelling and underground excavations and supporting activities will be required 24/7 ii. Works which are determined to comply with the relevant Noise Management Level at sensitive receivers iii. The delivery of materials outside of approved hours as required by the Police or other authorities (including RMS) for safety reasons iv. Where it is required to avoid the loss of lives, property and / or to prevent environmental harm in an emergency v. Where written agreement is reached with all affected receivers.	Section 5.1
5.1(c)	Principal Contractors may apply for EPA approval to undertake works outside of normal working hours under their respective Environment Protection Licences	Section 5.1
5.2(a)	Principal Contractors will consider the following in the layout of construction sites: i. The location of noise intensive works and 24 hour activities in relation to noise sensitive receivers ii. The location of site access and egress points in relation to noise and light sensitive receivers, especially for sites proposed to be utilised 24 hours per day iii. The use of site buildings to shield noisy activities from receivers iv. The use of noise barriers and / or acoustic sheds where feasible and reasonable for sites proposed to be regularly used outside of daytime hours v. Aim to minimise the requirement for reversing, especially of heavy vehicles.	Section 7.1 Section 7.2 Section 7.3 Section 7.6
9.1a	Construction Noise and Vibration Management Objectives The following noise and vibration management objectives will apply to construction: (i) Minimise unreasonable noise and vibration impacts on residents and businesses; (ii) Avoid structural damage to buildings or heritage items as a result of construction vibration; (iii) Undertake active community consultation; and (iv) Maintain positive, cooperative relationships with schools, childcare centres, local residents and building owners.	Section 1.3

CEMF Section	CEMF Requirement	Document Reference
9.2(b)	Detailed Construction Noise and Vibration Impact Statements will be prepared for noise intensive construction sites and or activities, to ensure the adequacy of the noise and vibration mitigation measures. Specifically, Construction Noise and Vibration Impact Statements will be prepared for EPL variation applications and works proposed to be undertaken outside of standard construction hours.	Section 5.4 Section 7.2 Section 7.3 CNVIS associated with this NVMP (separate document) Separate EPL will not be obtained for these works.
9.2(c)	Noise and vibration monitoring would be undertaken for construction as specified in the CNVS and the EPL.	Section 8
9.2(d)	The following compliance records would be kept by Principal Contractors: (i) Records of noise and vibration monitoring results against appropriate NMLs and vibration criteria; and (ii) Records of community enquiries and complaints, and the Contractor's response.	Section 8.5 Section 9.3
9.3(a)	All feasible and reasonable mitigation measures would be implemented in accordance with the CNVS. Examples of noise and vibration mitigation measures include: (i) Construction hours will be in accordance with the working hours specified in Section 5.1; (ii) Hoarding and enclosures will be implemented where required to minimise airborne noise impacts; and The layout of construction sites will aim to minimise airborne noise impacts to surrounding receptors.	Section 5.1 Section 7.6 Section 7.3 Section 7.1 Section 7

The table below presents the compliance matrix for the EPL 12208 Clauses relating to construction noise and vibration for the Project. The matrix includes the full text of the Clause and the reference in this NVMP or the associated CNVIS which details how compliance is to be achieved.

EPL Clause	Requirement / Measure	Document Reference
Environmental awareness		
O11.1	All staff, including contractors and subcontractors, involved in the carrying out of the activities authorised by this licence must be aware of their environmental responsibilities relating to the activities regulated by this licence.	Section 7.7 Section 7.8
Other operating conditions – Railway maintenance activities		

EPL Clause	Requirement / Measure	Document Reference
O13	Note: The objectives of these conditions are to minimise noise impacts from railway maintenance activities, recognising that operational safety and other factors constrain when these activities can be carried out on the Sydney Trains Network. These factors include avoiding disruptions during peak periods for passenger services and ensuring that programmed track closures facilitate the efficient completion of maintenance activities. Night-time and weekend work will be required for some activities.	Section 7.6
Standard railway maintenance hours		
O13.1	Maintenance activities must be undertaken: a) between the hours of 7:00am and 6:00pm Monday to Friday b) between the hours of 8:00am and 1:00pm Saturday; and c) not on Sunday or public holidays, unless an exception in condition O13.2 or condition O13.3 applies.	Section 5.1 Section 7.6
Exception to standard railway maintenance hours		
O13.2	The licensee may undertake maintenance activities outside of the hours specified in Condition O13.1: a) to provide safe and reliable train services or a safe working environment; or b) for emergency works; or c) for the delivery of oversized plant or structures that require special arrangements or authorisation to be lawfully transported along public roads.	Section 5.1 Section 7.6 Requirements are aligned with the Sydney Metro CNVS and this NVMP Out of Hours Works Protocol to be applied – refer Section 7.6
Exception to standard railway maintenance hours for low noise impact generating works		
O13.3	(a) The licensee may undertake maintenance activities outside of the hours specified in Condition O13.1, if the activities do not exceed: i. 5dBA (LAeq, 15min) above the relevant rating background levels at day, evening and night, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation, and ii. 15dBA (LA1, 1min or LAmax) above the relevant rating background level at night, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation. b) The results of any acoustic investigation undertaken in relation to Conditions O13.3(a)(i) and O13.3(a)(ii) must be provided by the licensee when requested by an authorised officer of the EPA. c) An acoustic investigation referred to in Conditions O13.3(a)(i) and O13.3(a)(ii) is not required if there are no noise sensitive receivers impacted by the activities.	Requirements are aligned with the Sydney Metro CNVS and this NVMP Out of Hours Works Protocol to be applied – refer Section 7.6

EPL Clause	Requirement / Measure	Document Reference
Management of noise impacts from railway maintenance		
O13.4	<p>Where maintenance activities are undertaken, including outside of the hours specified in Condition O13.1, noise impacts must be managed in accordance with the recommendations in the Interim Construction Noise Guideline (DECCW, 2009), as updated from time to time. The licensee is required to:</p> <ul style="list-style-type: none"> a) identify noise sensitive receivers that may be affected; b) identify hours of work for the proposed activities; c) identify noise impacts at noise sensitive receivers; d) select and apply reasonable and feasible work practices to minimise noise impacts; and e) notify the identified noise sensitive receivers at least 5 days prior to the commencement of maintenance activities undertaken outside of the hours specified in Condition O13.1, except where the licensee first becomes aware of the need to undertake those maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the maintenance activities. 	<p>Requirements are aligned with the Sydney Metro CNVS and this NVMP</p> <p>Out of Hours Works Protocol to be applied – refer Section 7.6</p>
Management of noise impacts from railway maintenance		
O13.5	<p>When requested by an authorised officer of the EPA, the licensee must provide the following information regarding any proposed maintenance activities on the Sydney Trains Network:</p> <ul style="list-style-type: none"> a) dates and times of the proposed maintenance activity; b) location of the proposed maintenance activity; c) type(s) of work to be performed in conducting the proposed maintenance activity; d) plant and equipment to be used; and e) contact name and telephone number of a person who will be on site during the activity and who is authorised by the licensee to take action, including the cessation of the activity or any part of it, if so directed by the EPA. A contact person must be contactable 24 hours a day via the supplied telephone number(s) during the whole of the period that the activity takes place outside the hours specified in Condition O13.1. 	<p>Section 8.5</p> <p>Covered in Sydney Metro procedures for interaction with NSW government agencies.</p>
O13.6	<p>When requested by an authorised officer of the EPA, the licensee must provide written reasons that demonstrate that maintenance activities undertaken outside of the hours specified in Condition O13.1 comply with the licence.</p>	<p>Section 8.5</p> <p>Covered in Sydney Metro procedures for interaction with NSW government agencies.</p>

Appendix B – Land Use Survey

Map of Receiver Catchment Areas

Appendix C – Indicative work areas

Appendix D – Sydney Metro Out-of-Hours Works Application

Out-of-Hours Work Application

Appendix E – Consultation Records

Agency	Comment	Project Response
CoCB	<p>Email received 22/12/20</p> <p><i>"I have reviewed both the NVMP and SWMP and it appears that Councils original recommendations have been included in both documents.</i></p> <p><i>The EH team have no further comments."</i></p>	Noted. No changes to this NVMP proposed.
IWC	<p>Email received 21/01/21</p> <p><i>"My apologies for not getting these through earlier. Please see below my comments for the Noise and Vibration Management Plan for Dulwich Hill, Campsie and Punchbowl Station Upgrades (they are quite similar to the Marrickville, Canterbury and Lakemba NVMP):</i></p> <ul style="list-style-type: none"> <i>- If and when an EPL licence is granted for Sydney Metro's Principal Contractor, Inner West Council would like to be informed of the specific changes this has on the Noise and Vibration Management Plan (Section 2.3, p20).</i> <i>- What constitutes the limits of Sydney Trains EPL 12208? Would any interface with council roads/footpaths not be covered under this EPL?</i> <i>- In Appendix A (Conditions of Approval), conditions E23 and E25 (p82-83) pertaining to out-of-hours work state that community consultation will take place to discuss respite periods and notice periods for out-of-hours work, and that the outcomes of community consultation are to be provided to the EPA. Inner West Council will want to be notified of these outcomes.</i> <i>- As the review period for the NVMP is 6 months, will the review date on the front page be changed to 6 months after this revised version is issued?</i> <p><i>Regards"</i></p>	<ul style="list-style-type: none"> Should Downer apply for, and be granted an EPL from NSW EPA, the NVMP will require revision to address this. The revised NVMP will be made publicly available on Downer's website, from which IWC can view the document. The limits of the Sydney Trains EPL 12208 are set out in the Licence's premise maps. It is expected that IWC's roads/footpaths are limits of EPL 12208, given this EPL is specifically related to Railway Activities scheduled activities. IWC will be provided copies of the community consultation carried out on the Project, which will include any nominated respite periods which are proposed. The review date will be set 6 months after the NVMP is approved by DPIE.

Appendix H: Soil and Water Management Plan



Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades Soil and Water Management Plan

Sydney Metro Integrated Management System (IMS)

Applicable to:	City & Southwest
Document Owner:	Southwest Metro
System Owner:	-
Status:	Final
Version:	Rev04
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Document Control

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Terms and Definitions

Terms	Definitions
AS	Australian Standards
AEP	Annual exceedance probability
ARI	Average Rainfall Intensity
AS	Australian Standard
ASS	Acid Sulfate Soils
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes.
CoA	Conditions of Approval (SSI-8256)
CoCB	City of Canterbury-Bankstown Council
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CoCB	City of Canterbury-Bankstown Council
CSSI	Critical Station Significant Infrastructure
DECC	NSW Department of Environment and Climate Change (now EESG)
Dol	NSW Department of Industry
DLWC	NSW Department of Land and Water
DPIE	Department of Planning, Industry and Environment
ECM	Environmental Control Map
EESG	Environment, Energy and Science Group – DPIE (formerly OEH)
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP&A Act	Environment Planning and Assessment Act 1979 (NSW)
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence under the POEO Act
EMS	Environmental Management System
EMP	Environmental Management Plan
ER	Environmental Representative
ESC	Erosion and sediment control
ESCP	Erosion and sediment control plan
ERSED	Erosion and sedimentation
FFMP	Flora and Fauna Management Plan
GREP	Government Resource Efficiency Policy
HMP	Heritage Management Sub Plan
HIL	Health Investigation Level
IMS	Sydney Metro Integrated Management System

Terms	Definitions
ISO	International Standardization Organisation
LEP	Local Environment Plan
MM	Mitigation Measures (REMM – SPIR)
IWC	Inner West Council
NEPM	National Environment Protection Measures
NML	Noise Management Level
NRAR	Natural Resources Access Regulator (formerly DoI Water)
NSW	New South Wales
NVMP	Noise and Vibration Management Plan
OCCS	Sydney Metro Overarching Community Communication Strategy
OCP	Organochlorine pesticides
OPP	Organophosphorous pesticides
OEH	NSW Office of Environment and Heritage (formerly DECC, now EESG)
OOHW	Out-of-Hour Works
PASS	Potential Acid Sulfate Soils
PCB	Polychlorinated biphenyls
PINS	Penalty Infringement Notices
POEO Act	Protection of Environment Operations Act 1997 (NSW)
PPE	Personal Protective Equipment
Proponent	The person or organisation identified as the proponent in Schedule 1 of the planning approval. In this case Transport for NSW
QMP	Quality Management Plan
RBL	Rating Background Level
REMM	Revised Environmental Mitigation Measure
SDS	Safety Data Sheet
SDG	TfNSW Sustainable Design Guidelines (Version 4)
Secretary	The Secretary of the Department of Planning, Industry and Environment
SM	Sydney Metro
SMP	Sustainability Management Plan
SMEW	Southwest Metro Early Works
SoHI	Statement of Heritage Impact
SWMP	Soil and Water Management Plan
SPIR	Submissions and Preferred Infrastructure Report
SSI	State Significant Infrastructure
SWMP	Soil and Water Management Plan
SWMS	Safe Works Method Statement
TPH	Total Petroleum Hydrocarbons
TPZ	Tree Protection Zone

Terms	Definitions
TRH	Total Recoverable Hydrocarbons
TSS	Total Suspended Solids
TfNSW	Transport for New South Wales.
TMP	Traffic Management Sub Plan
VENM	Virgin Excavated Natural Material
WARR Act	Waste Avoidance and Resource Recovery Act 2001 (NSW)

1. Introduction

1.1. Context and scope of this Sub-plan

This Soil and Water Management Plan (SWMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades (the Project).

This SWMP has been prepared to address requirements of the Conditions of Approval (CoA) SSI-8256 granted 12 December 2018 (and updated on 22 October 2020 in response to Mod-1) by NSW Department of Planning, Industry and Environment (DPIE), the Revised Environmental Mitigation Measures (REMM), and the Sydney Metro Construction Environmental Management Framework (CEMF).

This SWMP describes how Downer proposes to manage soil and water during the construction of the Project. Operational management measures do not fall within the scope of this Plan and therefore are not included.

1.2. Project background

The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Environmental Impact Statement (EIS) (GHD/AECOM September 2017) assessed the impacts of construction and operation on soil, contamination, surface and groundwater within Chapter 20 (Soils and contamination) and Chapter 21 (Hydrology, flooding and water quality). The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report (SPIR) (GHD/AECOM June 2018) was prepared in response to the submissions received during the EIS exhibition period. The SPIR revised the scope of the Sydenham to Bankstown Upgrade project, resulting in a reduction of potential hydrology, flooding and water quality impacts during construction. However, the SPIR concluded that potential soil and contamination impacts related to construction of the preferred project would not differ substantially from those of the exhibited project that were described in the EIS.

Please refer to Section 1 of the CEMP for the Project Description.

1.3. Objectives and targets

This SWMP provides the basis for the management of soil and water in order to minimise the risk of impact during works. The objectives and targets of soil and water management and mitigation are outlined below:

Table 1: Soil and water objectives and targets

Objective	Target
Minimise pollution of surface water through appropriate erosion and sediment control.	<p>Erosion and sediment controls are to be inspected on the following basis;</p> <ul style="list-style-type: none"> Weekly during environmental inspection Prior to a rainfall of >20mm in a 24 hour period, where forecasted Following a rainfall event of >20mm in a 24 hour period Daily

Objective	Target
	<p>Records of inspections will be maintained by the Principal Contractor.</p> <p>All water will be tested (and treated if required) prior to discharge from the site in order to determine compliance with the parameters outlined in the Sydney Metro – Water Discharge or Reuse Procedure (refer to Table 10) and/or the Principal Contractor's EPL (where relevant).</p> <p>No water will be discharged from the site without written approval of the Contractor's Environmental Manager (or delegate).</p> <p>No pollution incidents resulting in environmental harm or regulatory action.</p>
Maintain existing water quality of surrounding surface watercourses	<p>Water quality monitoring to be undertaken in accordance with the frequencies committed to in Section 6 and to show that the Project's works have not impacted baseline water quality (ie water quality not to worsen from baseline readings)</p> <p>No pollution incidents resulting in environmental harm or regulatory action.</p>
Source construction water from non-potable sources, where feasible and reasonable	Produce a Water Balance Study prior to Construction

These objectives conform to Sydney Metro objectives as described in the CEMF.

1.4. Consultation

CoA C3(b) requires that the SWMP be prepared in consultation with the relevant Councils, NSW Office of Environment and Heritage (OEH) (note OEH were dissolved in July 2019 and replaced by the Environment, Energy and Science Group (EESG)) and the Department of Industry (DoI), which has been replaced by the Natural Resources Access Regulator (NRAR).

CoA C8(b) requires that the Water Quality Monitoring Program, included in this SWMP, is prepared in consultation with relevant Councils. REMM FHW4 also requires the Water Quality Monitoring Program to be developed in consultation with NSW Environment Protection Authority (EPA).

As such the following stakeholders have been consulted in developing this SWMP:

- NRAR (formerly DoI);
- EESG (formerly OEH);
- NSW EPA;
- City of Canterbury Bankstown Council (CoCB); and
- Inner West Council (IWC).

A summary of the consultation is provided below and in Appendix D.

Table 2: Consultation carried out in the development of this Plan

No.	Agency Consultation	Requirements and date submitted	Key issues raised	SWMP Section Reference
Conditions of Approval				
C6	DPIE	Submitted for Approval	Various Comments	Table 4 Section 5 Section 6
C3(b)	CoCB	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 22/12/20	Nil.	N/A
	IWC	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 9/12/20	Comment on remnant seedbank in the soil at Dudley Street at Dulwich Hill Station, which is noted as a seed collection site for IWC	Section 5.1.1
	NRAR	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 12/01/21	Nil.	N/A
	EESG	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 20/11/20	Nil	N/A
C8(b)	CoCB	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 22/12/20	Nil.	N/A
	IWC	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 9/12/20	Comment on remnant seedbank in the soil at Dudley Street at Dulwich Hill Station, which is noted as a seed collection site for IWC	Section 5.1.1
Revised Environmental Mitigation Measures				
FHW4	NSW EPA	Issued for consultation 18/11/20. Invited to consultation workshop 25/11/20. Response received 29/01/21	Nil	N/A

2. Legal and approval requirements

The SWMP addresses applicable requirements within the following documents:

- The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Conditions of Approval SSI-8256, determined 12 December 2018;
- The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Environmental Impact Statement, September 2017;
- The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report, dated June 2018;
- The Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade Bankstown Station Modification Report May 2020;
- The Sydney Metro Sydenham to Bankstown Staging Report;
- The Sydney Metro Construction Environmental Management Framework v3.2 (2017)

The Compliance Matrix in Section 2.2 provides a comprehensive list of compliance requirements, environmental documents and the contract documents.

Table 3 below details the legislation and planning instruments considered during development of this Plan.

Table 3: Legislation and Planning Instruments

Legislation	Description	Relevance to this Plan
Environmental Planning and Assessment Act 1979 (EP&A Act)	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 SWMP.
Contaminated Land Management Act 1997	This Act provides for a process to investigate and remediate land that has been contaminated and presents a significant risk of harm to human health. Section 60 of the Act is a "Duty to Report Contamination". This duty applies to owners of land and persons who become aware their activities have contaminated the land.	This Plan defines how the Project will manage works to comply with this Act
Protection of the Environment Operations Act 1997 (POEO Act)	This Act includes all the controls necessary to regulate pollution and reduce degradation of the environment, provides for licensing of scheduled development work, scheduled activities and for offences and prosecution under this Act.	This Plan defines how the Project will manage works to comply with this Act.
Water Management Act 2000 Water Management (General) Regulation 2018	This Act and Regulation provide for the protection, conservation and ecologically sustainable development of water sources of the State and in particular to protect, enhance and restore water sources and their associated ecosystems.	This Act will have low relevance to the Project and will only be relevant if water is to be extracted. Projects assessed under Division 5.2 of the EP&A Act are exempt from obtaining water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference

Legislation	Description	Relevance to this Plan
		<p>approval) under section 91. Provisions for aquifer interference approvals have yet to be enabled, as no proclamation has been made under Section 88 of the Water Management Act.</p> <p>Under the Clause 21(1) of the <i>Water Management (General) Regulation 2018 (NSW)</i>, Transport Authorities are exempt from the requirement to hold an access licence. Transport Authorities are also exempt under Clause 34(1) of the <i>Water Management (General) Regulation 2018 (NSW)</i> from the requirement to hold a water use approval. Transport Authorities are not exempt from the requirement to hold a water supply work approval.</p>

2.1. Guidelines

Additional guidelines and standards to the management of soil and water include:

- Landcom (2004). Managing Urban Stormwater: Soils and Construction. (Volume 1 of the 'Blue Book');
- DECC (2008). Managing Urban Stormwater: Soils and Construction. Volume 2D: Main Road Construction. (Volume 2D of the 'Blue Book');
- ANZECC (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality (collectively known as the 'ANZECC Guidelines');
- ANZECC (2018). Australian and New Zealand Guidelines for Water Quality Monitoring and Reporting (collectively known as the 'ANZECC Guidelines');
- ANZG (2018). Australian and New Zealand Guidelines for Fresh and Marine Water Quality (known as 'ANZG Guidelines');
- NSW Fisheries (2004). Guidelines for Controlled Activities, Policy and Guidelines for Fish-Friendly Waterway Crossings;
- NSW Fisheries (1999). Policy and Guidelines for Design and Construction of Bridges, Roads, Causeways, Culverts and Similar Structures;
- ASSMAC (1998). Acid Sulphate Soil Manual. Acid Sulphate Soil Management Advisory Committee, NSW;
- Sydney Metro - Water Discharge or Reuse Procedure;
- Guidelines for the Management of Acid Sulphate Materials: Acid Sulphate Soils, Acid Sulphate Rock and Monosulfidic Black Ooze, RTA;
- NSW Environmental Protection Authority - Assessing and Managing Acid Sulphate Soils;

- Environment Protection Authority, Victoria Information Publication 655 - Acid Sulphate Soil and Rock;
- Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998);
- Acid Sulphate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998);
- Site Investigations for Urban Salinity (NSW Department of Land and Water Conservation (DLWC), 2002)
- National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1) 2013; and
- NSW EPA (2014) Waste Classification Guidelines – Part 1: Classifying Wastes.

The following Downer EMS documentation will be adhered to:

- DA-ZH-ST024 Hazardous Chemicals and Dangerous Goods Standard
- DG-ZH-PR028 Zero Harm Risk Management Procedure
- DG-ZH-FM024.1 Hazardous Chemicals and Dangerous Goods Risk Assessment
- DA-ZH-ST054 Hazardous Chemicals & Dangerous Goods Storage Principles & Transportation
- DG-ZH-PR136 Working On or Near Water Procedure
- DG-ZH-PR015 Emergency Management Procedure
- DG-ZH-ST043 Excavation, Trenching and Services Standard
- DG-ZH-FM043.1 Excavation Permit
- DG-ZH-FM071.3 Land or Vegetation Disturbance Permit
- DG-ZH-ST071.2 Flora and Fauna Management Standard
- DG-ZH-FM116.2 Environmental Inspection Checklist
- DG-ZH-ST064 Water Discharge Management Standard
- WM-QA-GU0009 Location of Utility Services
- DG-ZH-RD042.12 Working at Heights Requirements - Stockpiles and Excavations
- DG-ZH-ST068.2 Acid Sulfate Soils Management Standard
- DG-ZH-FM063.1 Waste Disposal Register
- DG-ZH-FM063.2 Waste Estimation Record
- DG-ZH-ST064 Water Discharge Management Standard
- DG-ZH-PR136 Working On or Near Water Procedure
- DG-ZH-FM064.1 Water Release Permit
- DG-ZH-CG074 Spill Prevention and Control

- DG-ZH-PR068 Contamination Management Procedure
DG-ZH-ST086 Asbestos Management Standard

2.2. Conditions of Approval

The CoA and REMM relevant to this SWMP are listed in Table 4 below. In accordance with CoA C4, the relevant requirements of the CEMF have also been included in Table 4. Table 4 also provides a cross reference to demonstrate where the relevant requirement is addressed in this SWMP or other management documents.

Please refer to Appendix A for all other CoA, REMM and CEMF requirements relevant to the development of this Plan.

Table 4: SWMP Compliance Matrix

No.	Requirement	Reference	How addressed?
Conditions of Approval			
C3	The 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:	Section 1.4 Appendix D	This Plan has been prepared in accordance with this condition and describes how Downer proposes to manage soil and water during construction of the Project. This plan has been provided to IWC, CoCB, NRAR (formerly DoI) and EESG (formerly OEH) for consultation.
	(b) Soil and water Relevant council(s), DoI, OEH		
C4	The CEMP Sub-plans must be prepared in accordance with the CEMF	This Table	Table 4 demonstrates how this plan has been prepared in accordance with the relevant requirements of the CEMF.
C5	Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-Plan.	Section 1.4 Appendix D	This plan has been provided to IWC, CoCB, NRAR and EESG for consultation. Refer to Section 1.4 and Appendix D for a summary of consultation undertaken in the development of this Plan.
C6	Any of the CEMP Sub-plans may be submitted along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before Construction.	Refer to section 1.2 of the CEMP	This Plan has been submitted for approval to DPIE prior to the final submission of the CEMP for DPIE approval.
C7	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of Construction. Where Construction of the CSSI is staged, Construction of a stage must not commence until the CEMP and CEMP Sub-plans for that stage have been approved by the Planning Secretary.	Refer to section 1.2 of the CEMP	Construction will not commence until the CEMP and all CEMP Sub-plans have been approved by DPIE. The CEMP and Sub-plans will be implemented for the duration of construction.
C8	The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of Construction of the CSSI against the predicted performance.	Section 1.4 Section 6 Appendix D	The Water Quality Monitoring Program has been prepared in accordance with this condition and describes how Downer proposes to monitor water quality during construction of the Project. The monitoring program has been provided to IWC and CoCB for consultation.
	(b) Water Quality Relevant council(s)		
C9	Each Construction Monitoring Program must provide:	-	-

No.	Requirement	Reference	How addressed?
	(a) details of baseline data available; (b) details of baseline data to be obtained and when;	Section 6.3	Details of the surface water baseline data available, as well as data to be obtained and when, during the development of the Water Quality Monitoring Program are presented in Section 6.3.
	(c) details of all monitoring of the project to be undertaken;	Section 6.4	The details of monitoring to be undertaken by the Project is described in Section 6.4 of this Plan.
	(d) the parameters of the project to be monitored;	Section 6.5	The parameters to be monitored by the Project are described in Section 6.5 of this Plan
	(e) the frequency of monitoring to be undertaken; (f) the location of monitoring;	Section 6.6	The frequency and location of monitoring to be undertaken by the Project is described in Section 6.6 of this Plan
	(g) the reporting of monitoring results;	Section 6.8	Section 6.8 of this plan details the reporting of monitoring results.
	(h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and	Section 6.9	Procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory are presented in Section 6.9 of this Plan.
	(i) any consultation to be undertaken in relation to the monitoring programs.	Section 1.4 Appendix D	Section 1.4 of this Plan details the consultation undertaken during the development of the Water Quality Monitoring Program.
C10	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C8 of this approval and must include reasonable information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.	Section 1.4 Appendix D	The Water Quality Monitoring Program has been prepared in accordance with this condition and describes how Sydney Metro's Principal Contractor propose to monitor surface water quality during construction of the Project. The monitoring program has been provided to IWC and CoCB for consultation.

No.	Requirement	Reference	How addressed?
C11	The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one (1) month before the commencement of Construction.	Refer to section 1.2 of the CEMP	The Water Quality Monitoring Program has been endorsed by the ER. The Water Quality Monitoring Program will be submitted to DPIE as part of this Soil and Water Management Plan, for approval no later than one month prior to the commencement of construction activities.
C12	Construction must not commence until the Planning Secretary has approved all of the required Construction Monitoring Programs.	Refer to section 1.2 of the CEMP	Construction will not commence until the CEMP and Sub-plans, including relevant construction monitoring programs have been approved by DPIE.
C13	The Construction Monitoring Programs, as approved by the Planning Secretary including any minor amendments approved by the ER must be implemented for the duration of Construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	Section 6.1	The Water Quality Monitoring Program will be implemented for the duration of construction as detailed in Section 6.1 of the Water Quality Monitoring Program.
C14	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	Section 6.8	Section 6.8 details the reporting requirements and the frequency required for this reporting.
C15	Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	Section 6	The Water Quality Monitoring Program is incorporated in Section 6 of this this Plan.
Revised Environmental Mitigation Measures			
FHW4	A construction water quality monitoring program would be developed and would commence prior to construction, to monitor water quality at identified discharge points. The program would include relevant water quality objectives, parameters, and criteria and specific monitoring locations identified in consultation with DPI (Water) and the EPA.	Section 6	The Water Quality Monitoring Program has been prepared in accordance with this condition and describes how Downer propose to monitor surface water quality during construction of the Project. The monitoring program has been provided to IWC, CoCB, DoI Water / NRAR and EPA for consultation.
Construction Environmental Management Framework			

No.	Requirement	Reference	How addressed?
15.2 (a)	i. Principal Contractors will develop and implement a Soil and Water Management Plan for their scope of works. The Soil and Water Management Plan will include as a minimum:	This SWMP	-
	ii. The surface water and flooding mitigation measures as detailed in the environmental approval documentation.	Section 5 Appendix A	Section 5 of this Plan summarises the surface water and flooding mitigation measures as detailed in the environmental approval documentation.
	iii. details of construction activities and their locations, which have the potential to impact on water courses, storage facilities, stormwater flows, and groundwater;	Section 4	Section 4 of this Plan details the Project's construction activities and which have the potential to impact upon soil and water.
	iv. surface water and ground water impact assessment criteria consistent with the principles of the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines;	Section 2.1 Section 5.2.2 Section 5.5	Section 2.1 includes the guidelines that have been considered in the development of this Plan, including ANZECC. Section 5.2.2 of this Plan outlines the offsite discharge criteria to be utilised on this Project Section 5.5 of this Plan outlines the management of groundwater, consistent with the ANZECC guidelines.
	v. management measures to be used to minimise surface and groundwater impacts, including identification of water treatment measures and discharge points, details of how spoil and fill material required by the SSI will be sourced, handled, stockpiled, reused and managed; erosion and sediment control measures; salinity control measures and the consideration of flood events;	Section 5 CEMP Appendix E	Section 5 of this Plan outlines the management measures to be implemented to minimise soil and water impacts. Refer to Appendix E of the CEMP for the Waste and Spoil Management Procedure
	vi. a contingency plan, consistent with the Acid Sulfate Soils Manual (EPA 1998), to deal with the unexpected discovery of actual or potential acid sulfate soils, including procedures for the investigation, handling, treatment and management of such soils and water seepage;	Section 5.11	Section 5.11 of this Plan outlines how acid sulfate soils or potential acid sulfate soils are to be investigated, handled, treated and the management of such soils and water seepage.

No.	Requirement	Reference	How addressed?
	vii. management measures for contaminated material (soils, water and building materials) and a contingency plan to be implemented in the case of unanticipated discovery of contaminated material, including asbestos, during construction;	Section 5.7 Section 5.8 Section 5.9 Section 5.10 Section 5.11	Section 5.7 to 5.11 include the measures for the management of contaminated materials and the procedure to be implemented if unexpected contamination is encountered during construction.
	viii. a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any noncompliance can be rectified;	Section 6	The Water Quality Monitoring Program in Section 6 of this Plan details how often monitoring would be undertaken, the locations of monitoring, the recording and reporting of results and adaptive management should exceedances be identified.
	ix. The requirements of any applicable EPL conditions.	Section 2.3 Appendix A	Section 2.3 and Appendix A of this Plan outlines the requirements of any applicable EPL conditions.
	x. The responsibilities of key project personnel with respect to the implementation of the plan.	Section 2.4	Section 2.4 outlines the responsibilities of key personnel with respect to the implementation of this Plan.
	xi. Procedures for the development and implementation of progressive erosion and sediment control plans.	Section 5.1.4	Section 5.1.4 outlines the development and implementation of progressive erosion and sediment control plans.
	xii. Identification of locations where site specific Stormwater and Flooding Management Plans are required.	-	Stormwater and Flooding Management Plans will be developed by the Principal Contractor prior to Construction where construction sites are within the 100 year ARI + 10% increase in rainfall flood zone.
	xiii. Compliance record generation and management.	Section 8 Section 10.2	Section 8 and 10.2 of this Plan describe compliance record generation and management.

2.3. Environment Protection Licence

At this stage, Sydney Metro's Principal Contractor has not sought an Environment Protection Licence (EPL) from the NSW EPA.

If Sydney Metro's Principal Contractor applies for an EPL for the Project, then this may include different or additional soil and water management requirements to the CoA. In this case, the Project's SWMP will be updated to incorporate requirements of the EPL.

For elements of the Project's scope, the Sydney Trains EPL 12208 may apply. The works will be managed in accordance with the railway track maintenance clauses presented in the table in Appendix A.

2.4. Roles and Responsibilities

The roles and responsibility of key personnel with respect to soil and water management are as follows in Table 5.

Table 5: Roles and Responsibilities

Roles	Responsibilities
Project Director	Managing the delivery of the Project including overseeing implementation of the soil, water and groundwater management Act as Contractor's Representative
Environmental Manager	Oversee the implementation of all soil, water and groundwater management initiatives Responsible for managing ongoing compliance with the CoA, REMM and environmental document requirements Monitoring and report on soil and water management during construction
Commercial Manager	Ensure that relevant soil, water and groundwater management requirements are considered in procuring materials and services
Construction Managers Site Superintendent	Manage the delivery of the construction process, in relation to soil, water and groundwater management across all sites in conjunction with the Environment Manager
Sustainability Manager	Track and report soil and water elements against sustainability targets
Environment Coordinator	Manage the on-ground application of soil and water management measures during construction (e.g. erosion and sediment control, water treatment and monitoring) Monitor and report on soil and water management during construction
Project Engineer	Implement soil and water management activities during construction works
Site Foreman (Site Superintendent)	Monitor and report on erosion and sediment controls during construction works
Independent Environmental Representative (ER)	<ul style="list-style-type: none"> Receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; Consider and inform the Planning Secretary on matters specified in the terms of this approval;

Roles	Responsibilities
	<ul style="list-style-type: none"> Consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; Review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: <ul style="list-style-type: none"> (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary); Regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval; As may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; Consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and Prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI.

It is noted that the site team, including Downer's Environmental Manager, Environmental Coordinator, Construction Manager and Site Foreman/Site Superintendent will attend site inspections with the ER upon request.

The ER may request information relating to soil and water management from Downer, the primary contact being the Environmental Manager.

3. Existing Environment

The following sections summarise what is known about the factors influencing soils and water within and adjacent to the Project. The information within this section is high-level in nature and not exhaustive. Downer will be responsible for reviewing all available information and managing any environmental risks accordingly

The key reference document is Chapters 20 and 21 of the EIS.

3.1. Topography

The area within and adjacent to the Sydenham to Bankstown rail corridor ranges in elevation from the lowest point, which is about 3.5 metres above Australian height datum near Marrickville Station, to the highest point, which is about 36 metres above Australian height datum near Wiley Park Station. Bankstown Station is located about 23 metres above Australian height datum.

Between Punchbowl and Bankstown stations, the project area is located on or near a localised ridgeline. East of Punchbowl Station, the natural topography varies through a series of ridges and gullies. Between Marrickville and Sydenham stations, the project area is located in low-lying terrain.

3.2. Geology

The Project sites traverse a number of regional geological units identified by the *Sydney 1:100,000 Geological Sheet 9130* (Herbert, 1983).

Section 20.2.2 of the EIS identifies the following regional geological units within the Project's footprint:

- Fill – located through numerous parts of the site, particularly within embankments;
- Quaternary Sediments – alluvium and estuarine deposits near Marrickville Station;
- Wianamatta Group – includes Ashfields shales near Canterbury Station;
- Mittagong Formation – between Dulwich Hill and Canterbury;
- Hawkesbury Sandstone – between Marrickville and Canterbury; and
- Dykes – Volcanic intrusions at Marrickville and Canterbury

3.2.1. Soil landscapes

The Project area traverses three soil landscape types identified by the *Sydney 1:100,000 Soil Landscape Sheet Series 9130* (Herbert, 1983). These include Birrong, Gymea and Blacktown soil units.

These soil landscape types are described as follows:

- **Birrong:** Soils – deep (>250 cm) yellow podzolic soils and yellow solodic soils on older alluvial terraces
- **Gymea:** Soils – shallow to moderately deep yellow earths and earthy sands on crests and on the inside of benches

- **Blacktown:** Soils – shallow to moderately deep hard setting mottled texture contrast soils, red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines

It is noted that the Project area is highly disturbed and soils across the station sites likely include imported materials.

Figure 1 indicates the soil units across the Project.

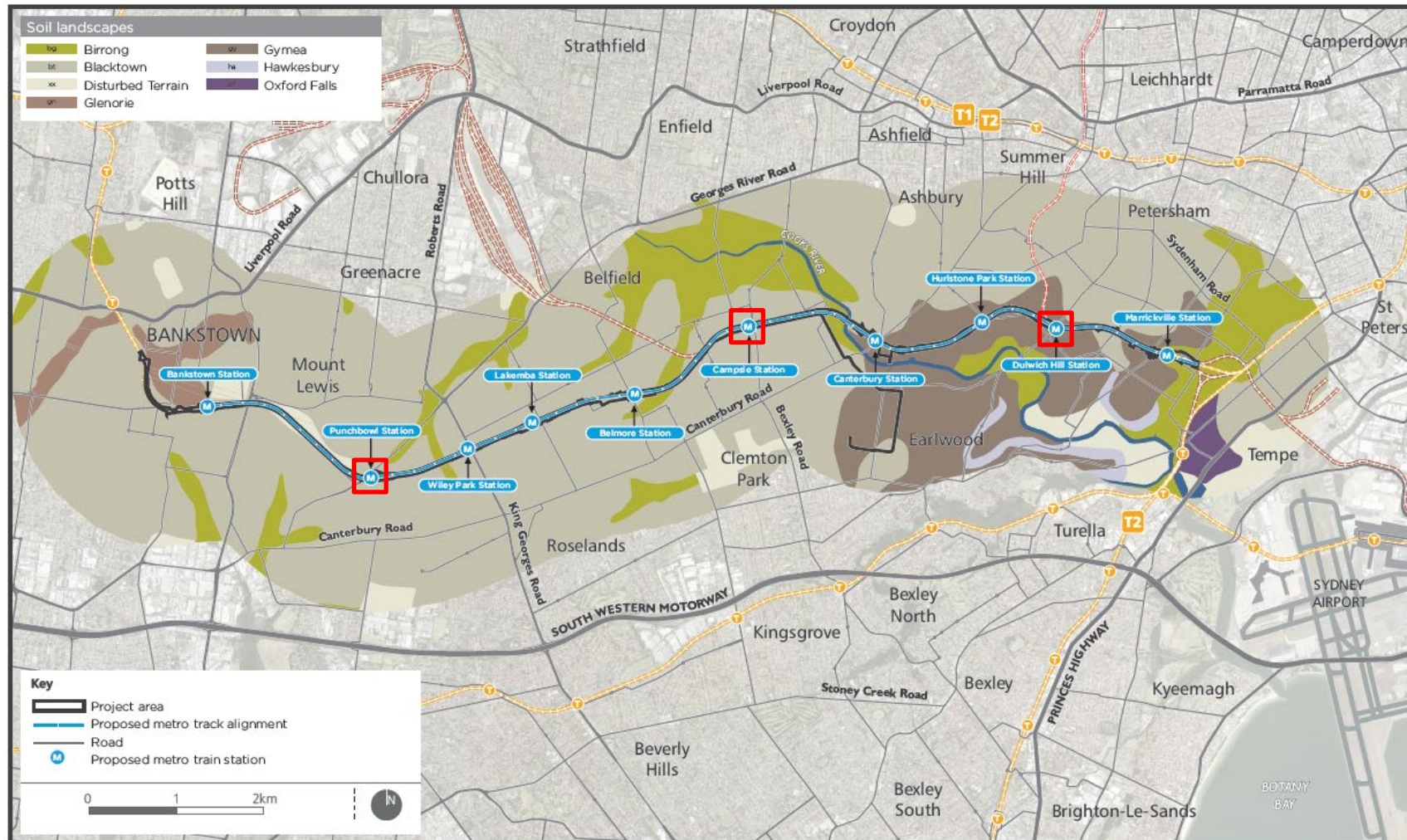


Figure 1 Soil landscapes along the project alignment. Indicative project areas shown in red.

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3.2.2. Soil salinity

Salinity in the Project area was considered within the EIS. Based on the content of the EIS there was no evidence of soil salinity within the Project area. The relevant soil salinity mapping has been extracted from the EIS, and is included in Figure 2. The EIS concluded that “... *potential saline soils are located west of Punchbowl Station.*” As shown in Figure 2, moderate salinity potential soils are mapped within proximity to Punchbowl Station

The EIS also states that “*the remainder of the Project area is not mapped as having salinity potential. However, there may be areas of salinity potential in these areas.*”

In accordance with REMM SC3, prior to Construction ground disturbance in areas of potential soil salinity, testing would be carried out to confirm the presence of saline soils. If saline soils are encountered, they will be managed in accordance with *Site Investigations for Urban Salinity (DLWC, 2002)*.

3.2.3. Acid sulfate soils

Acid sulfate soils (ASS) are the common name given to naturally occurring sediments and soils containing iron sulphides (principally iron sulphide or iron disulphide or their precursors). Exposure of the sulphide in these soils to oxygen as a result of drainage or excavation leads to the generation of sulphuric acid. Areas of acid sulphate soils can typically be found in low-lying and flat locations that are often swampy or prone to flooding.

In accordance with the Australian Soil Resource Information System (CSIRO, 2015) parts of the rail corridor between Sydenham and Bankstown has been deemed to have a high potential for the presence of Acid Sulphate Soils, particularly the area near the Cooks River. Refer to Figure 2 for mapping.

Sydney Metro City & Southwest Sydenham to Bankstown upgrade: Technical Paper – Contamination Assessment Report (GHD, 2017) has reviewed available information on Acid Sulphate Soil and states;

“Marrickville Station to Section D (country side of Hurlstone Park Station) – A review of the mapping indicates that there is unlikely to be occurrences of ASS.

Canterbury Station – The western quarter of the Canterbury Station has been mapped as ‘disturbed terrain’; and there is potential for ASS to depths varying between 2 and 4 m below ground level.

Section E (country side of Canterbury Station to city side of Campsie Station) – The eastern half of section E has been mapped as having a low risk of acid sulphate soils (at two to four metres below ground surface) and ‘disturbed terrain’ on the western and eastern sides of the Cooks River, respectively.

Campsie Station to Section K (Bankstown Station) – A review of the mapping indicates that there is unlikely to be occurrences of ASS.”

With regards to the Project Area the EIS reports a Class 5 risk of encountering ASS within or adjacent to the Project sites at Dulwich Hill, Campsie and Punchbowl Stations. Refer to Figure 2 for the EIS mapping.

Downer’s management of ASS and PASS will occur in accordance with Section 5.11 of this Plan and Downer’s Acid Sulphate Soils Management Standard (DG-ZH-ST068.2).

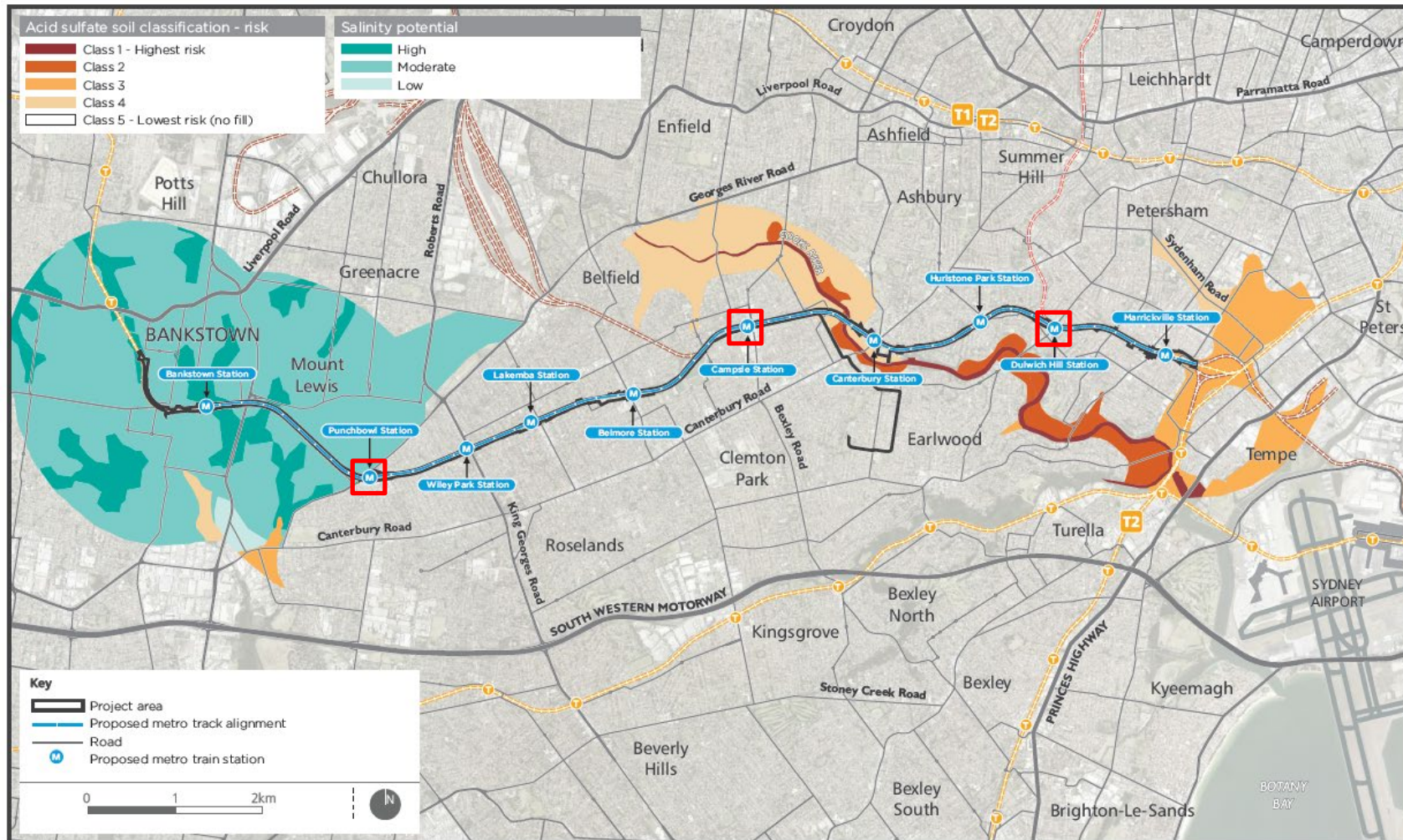


Figure 2 Salinity potential and ASS risk. Indicative project areas shown in red.

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3.3. Contamination

The Sydenham to Bankstown rail corridor has been part of an operational rail corridor for more than 130 years. A Phase 1 contamination assessment for the existing rail corridor between Sydenham and Bankstown Stations was carried out by GHD as part of the development of the EIS. The Phase 1 assessment included a desktop review and site visit. Chapter 20 of the EIS references the preliminary site assessment which concluded; *“that there is a risk of contamination along the length of the project area, albeit a low to medium risk for the majority of the project area, with potential contamination sources being historical rail activities, and commercial and residential land use in surrounding areas.”* Contaminants of potential concern (COPC) associated with the use of railway include:

- Asbestos;
- Hydrocarbons;
- Heavy metals; and
- Herbicides.

Areas identified in the EIS with a medium to high contamination risk along the Sydenham to Bankstown rail corridor are detailed in Table 6 below

Table 6: Areas with a medium to high contamination risk along the rail corridor

Location	Potential contamination sources	Potential contaminants present	Location in relation to the nearest Project site
Between Sydenham and Marrickville stations	<ul style="list-style-type: none"> • Previous site investigations identified asbestos in soil and petroleum aromatic hydrocarbons in groundwater north of the project area, at 361 Victoria Road 	<ul style="list-style-type: none"> • Within the vicinity of 361 Victoria Road: • Asbestos in soil • Petroleum aromatic hydrocarbons in groundwater 	<ul style="list-style-type: none"> • Approximately 1.5km east of the Dulwich Hill Station site
Between Campsie and Belmore stations (triangular area within the rail corridor)	<ul style="list-style-type: none"> • Historical rail activities • Historical commercial and residential land use 	<ul style="list-style-type: none"> • Arsenic in ballast • Asbestos • Hydrocarbons (including chlorinated hydrocarbons in fill) • Heavy metals (including in groundwater) • Herbicides 	<ul style="list-style-type: none"> • Approximately 500m west of the Campsie Station site
Between Punchbowl and Bankstown stations (car park at North Terrace)	<ul style="list-style-type: none"> • Historical rail activities • Historical commercial and residential land use 	<ul style="list-style-type: none"> • Asbestos • Hydrocarbons (in soil and groundwater) • Heavy metals • Herbicides 	<ul style="list-style-type: none"> • >1.8km west of the Punchbowl Station site

Table 6 identifies that the nearest medium to high contamination risk site in relation to the Project is within the triangle area between Campsie and Belmore Stations, located approximately 500m from the Marrickville Station site.

Chapter 20 of the EIS states that no sites listed on the EPA's contaminated land register are located within 100 metres of the Sydenham to Bankstown rail corridor. However, three sites which have been notified to the EPA are located within 100 metres of the rail corridor. These are listed in Table 7 below. To identify and manage dangerous goods, Downer's Hazardous Chemicals and Dangerous Goods Risk Assessment (DG-ZH-FM024.1) will be applied.

Table 7: Registered contaminated sites

Suburb	Site name and address	Site activity	Contamination status	Location in relation to the nearest Project site
Marrickville	Way Street	XPT Maintenance Facility, other industry	Regulation under CLM Act not required	>1.8km east of the Dulwich Hill Station site
Marrickville	2 Carrington Road	Unclassified	Regulation under CLM Act not required	>1.6km east of the Dulwich Hill Station site
Belmore	348 Burwood Road	Rail land, unclassified	Regulation under CLM Act not required	>1.4km west of the Campsie Station site

Due to the history of the rail corridor and surrounding development, Phase 2 contamination testing has been undertaken across the rail corridor and at stations. These assessments include;

- City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment (GHD 2017)
- Sydney Metro City and Southwest Sydney Metro, Sub-portion 1: Sydenham to Bankstown Station Platforms Contamination Assessment (GHD 2017)
- Southwest Corridor Conversion Enabling Works – Tranche 1B Contamination Assessment Report (AGJV 2019)

Table 8 summarises exceedances of screening criteria within 100m of the Project sites, as published in the Targeted Contamination Assessment (GHD 2017).

Table 8: Targeted Contamination Assessment exceedances in proximity to the Project

ID	Location	Summary of exceedance of screening criteria
Dulwich Hill Station		
N/A	N/A	No exceedances of screening criteria were identified in proximity to Dulwich Hill Station
Campsie Station		
BH085	Adjacent to Platform 1	Chrysotile and amosite asbestos was detected in fibre cement fragments at BH085 (depth of 0.1-0.2m)
BH077	Within the rail corridor, city side of Beamish Street bridge	Chrysotile and amosite asbestos was detected in fibre cement material at BH077. Chrysotile and amosite asbestos was detected as loose fibre bundles at BH077 (depth of 0.1-0.2m)
Punchbowl Station		
BH151	Within the car park on The Boulevarde	Chrysotile asbestos was detected in fibre cement fragments at BH151 (depth of 0.1-0.2m).

The Targeted Contamination Assessment states that the conceptual site model is complete and any contaminants, including those listed above, can be “*managed by using appropriate PPE and management measures.*” These measures are included within Section 5 of this Plan.

AGJV’s investigations (boreholes / test pits) between Sydenham and Campsie Stations suggested that concentrations of COPC in fill soil are below the adopted human health screening criteria for commercial / industrial land use and adopted management limits. AGJV’s Tranche 1B Contamination Assessment Report Refined Conceptual Site Model identifies the inhalation of airborne (asbestos) fibres as a potential pathway to receptors and recommends that an Asbestos Management Plan with an appropriate unexpected finds procedure is developed and implemented for the works. Refer to Section 5.9 for asbestos mitigation measures.

The above Asbestos management Plan will be developed based on Downer’s Asbestos/ ACM Management Plan Template (ZH-TP086.1) and be included in the Project’s Health and Safety Management Plan. The management of asbestos/ asbestos containing materials (ACM) will be done in accordance with the with Downer’s Asbestos Management Standard (DG-ZH-ST086).

GHD’s platform contamination assessment report included the results of an intrusive soil investigation. At Dulwich Hill, GHD reported concentration of benzo(a)pyrene TEQ at DHBH03 (depth 0.1-0.2) (12mg/kg) exceeded the Health Investigation Level (HIL) for high density residential land uses (4 mg/kg). At Campsie Station, GHD reported concentration of benzo(a)pyrene TEQ at CSBH05 (depth of 0.1-0.15)(12 mg/kg) exceeded the HIL for high-density land use (4 mg/kg). No exceedances of screening criteria were reported at Punchbowl Station platforms.

REMM SC7 states “*In the event a Remediation Action Plan is required, it would be developed in accordance with Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) and a NSW Environment Protection Authority Accredited site auditor would*

be engaged to audit the works.” Based on the results of the contamination assessments, a Remediation Action Plan is not required.

It is noted that the construction process may lead to the disturbance and mobilisation of existing contamination, or may result in the addition of new contamination to soil, surface water or groundwater via spills or leaks of fuels, oils or other hazardous materials. The risk of contamination arising through the construction process will be mitigated by implementing the mitigation measures as described within Section 5 of this Plan.

- Downer’s Contamination Management Procedure (DG-ZH-PR068), which describes how and when potential contamination risks are identified and managed; and
- The mitigation measures as described within Section 5 of this Plan.

3.3.1. Hazardous materials

A hazardous materials assessment of buildings and structures was conducted by GHD in September 2016, which focused on stations along the rail corridor - *City and Southwest Metro Asset Condition Assessment – Hazardous Materials Assessment (GHD 2016)*. The scope of this assessment was limited to a visual re-inspection of previously identified hazardous materials and an inspection, with limited sampling, for potential hazardous materials not noted on existing registers.

The assessment inspected the following locations relevant to this Project:

- Dulwich Hill Station – Concourse, main station building;
- Campsie Station – Concourse, station master’s office, station building; and
- Punchbowl Station – Concourse.

For the purposes of GHD’s assessment, the hazardous materials assessed included:

- Asbestos containing materials;
- Synthetic mineral fibre;
- Polychlorinated biphenyls (PCB) capacitors within light fittings;
- PCB oils within transformers and other electrical equipment; and
- Leaded paint systems and lead contaminated dust.

The report summarised that the following materials were identified or presumed as containing asbestos:

- Flat cement sheeting;
- Corrugated cement sheeting;
- Asbestos containing cement sheeting debris;
- Asbestos containing vinyl floor tiles;
- Asbestos containing gaskets;
- Asbestos containing textile wrap;
- Asbestos containing fuse;

- Resinous board; and
- Pipe conduit.

The assessment assigns the asbestos instances a 'Very High Risk' status as refurbishment and/or demolition related activities are likely to impact on these instances.

Other hazardous materials that were identified include:

- Synthetic mineral fibres in insulation to underside of roof, acoustic ceiling tiles and insulation to ceiling cavities;
- Polychlorinated Biphenyls (PCB) capacitors within fluorescent light fittings;
- PCB oil within transformers;
- Lead-painted systems to interior and exterior surfaces; and
- Lead-contaminated dust.

The assessment assigned the above instances a 'Very High Risk' status as refurbishment and/or demolition related activities are likely to impact on these instances.

This assessment was undertaken only in nominated areas where access was readily available. In accordance with REMM SC6, Downer will conduct hazardous materials surveys in accordance with Downer's Zero Harm Risk Management Procedure (DG-ZH-PR028) for all proposed demolition activities, and for utility adjustments as required, prior to these works commencing.

All reasonable and feasible management recommendations outlined in City and Southwest Metro Asset Condition Assessment – Hazardous Materials Assessment (GHD 2016) will be implemented by Downer in accordance with Downer's Zero Harm Risk Management Procedure (DG-ZH-PR028).

3.4. Groundwater

Chapter 21 of the Sydney Metro City & Southwest: Sydenham to Bankstown EIS makes the following statements in regards to groundwater;

- *"The groundwater level along most of the project area was recorded at between about 2.3 metres below ground level (to the east of the project area in Marrickville) and about 10.3 metres below ground level (near Bankstown Station)."*
- *"Groundwater has been observed discharging from open cuttings along the rail corridor. The surface groundwater system is likely to be recharged by rainfall and percolation from irrigation of residential gardens and open spaces, as well as incidental runoff from impervious surfaces, such as roads and footpaths."*
- *"Quaternary alluvium underlies the Cooks River and its tributaries and forms an aquifer. Groundwater is also present within localised alluvial deposits in some gullies. Groundwater salinity within the Quaternary alluvium and localised alluvial deposits is expected to vary from lower salinity in the upper reaches of the Cooks River, to higher salinity in the lower reaches due to mixing and tidal influences."*

An assessment of groundwater quality from previous studies is included within the City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment (GHD, 2017) has noted the following;

- Slightly elevated levels of copper, zinc and chromium were identified in groundwater between Campsie and Belmore Stations.

Testing of groundwater within the City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment (GHD, 2017) found;

- Groundwater was identified in one well (BH153) to the east of Punchbowl Station, at a depth of 3.75m below ground level;
- *“All groundwater samples reported one or more analysed metal (copper, mercury, nickel or zine) concentrations above the groundwater investigation level (GIL) for protecting freshwater aquatic ecosystems. These elevated heavy metal concentrations are likely representing the background levels of the groundwater aquifer in the investigation area and the Sydney basin”;*
- Concentrations of TRH, BTEX, PAHs, OCP, OPP and PCB in all groundwater samples were below the adopted health screening criteria for commercial and industrial land use and the adopted GIL; and
- pH of groundwater was between pH4.4 and pH 6.7.

Should groundwater be encountered during works it will be managed and should that groundwater need to be dewatered, the primary approach would be to dewater the groundwater to a nearby water body, if ANZG/ANZECC Guideline criteria is met. Where groundwater cannot be stored and treated to meet ANZG/ANZECC guideline criteria, Sydney Metro’s Principal Contractor will dispose of the groundwater in accordance with the NSW Waste Classification Guidelines.

It is noted that construction processes, if not managed appropriately, could lead to contamination of groundwater via spills and leaks. Management measures outlined in Section 5 and Appendix E of CEMP will mitigate the risk of impact to groundwater quality.

3.5. Surface water

3.5.1. Catchments and waterways

The Project sites form part of the overall Cooks River catchment with water from the area discharging into the Cooks River via local stormwater drainage or overland flow. The catchment area and waterways is highly urbanised with mixed residential, commercial and industrial properties. Waterways within this catchment are largely artificial, hard-lined (e.g. concrete channel, piped channel, brick channel) stormwater channels, with the exception of the Cooks River.

The EIS states *“The Cooks River catchment, located in the inner to middle south-western suburbs of Sydney, has an area of about 102 square kilometres. The majority of the catchment is highly developed. The Cooks River itself is about 23 kilometres long, and flows from Chullora in the west to Botany Bay in the east. The river discharges into the north of Botany Bay, near Sydney Airport. The river is tidally influenced as far as South Enfield. Major tributaries of the river include:*

- Coxs Creek
- Cup and Saucer Creek
- Wolli Creek

- *Alexandra Canal*
- *Muddy Creek*
- *Eastern Channel*
- *Western Channel.”*

It is noted that in accordance with REMM FHW7, works within or near watercourses (including the Cooks River) would be undertaken with consideration given to the NSW Office of Water’s guidelines for controlled activities. Given no works are proposed within watercourses, REMM FHW7 is not relevant to the Project.

The station upgrades and service building construction at Dulwich Hill, Campsie and Punchbowl have a footprint limited to the existing station areas, their immediate precincts and the rail corridor. The Project does not propose any direct impacts or modifications to existing watercourses. The closest Project worksite to an existing watercourse is Punchbowl Station, which is located greater than 300m from an unnamed concrete lined channel, identified as a first-order stream in Figure 3.

Figure 3 indicates the catchments and stream order of waterways for the area, as published in the EIS.

To manage the risk associated with activities on or near water, where applicable, Downer’s Working On or Near Water Procedure (DG-ZH-PR136) will be applied at all times.

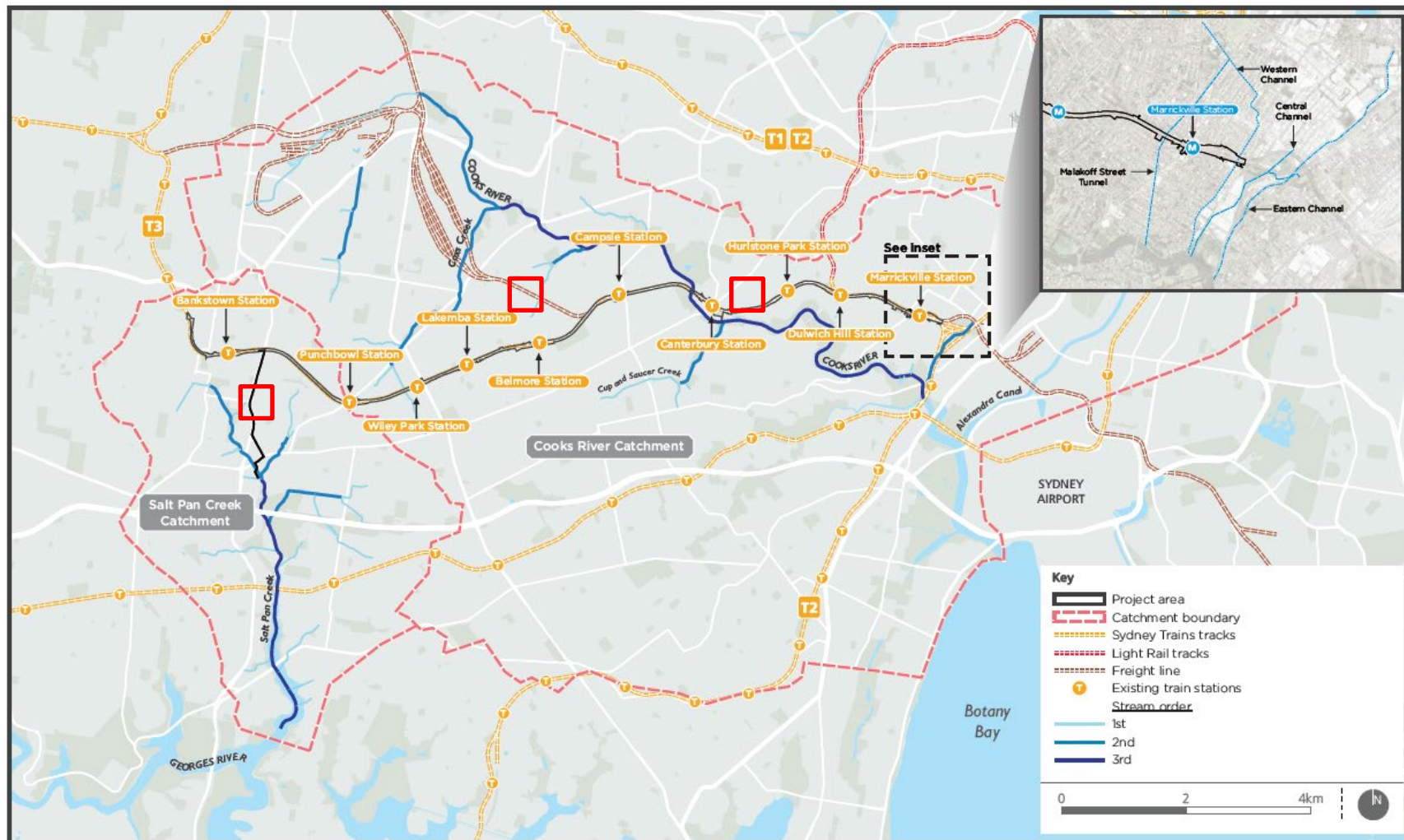


Figure 3 Catchment area and watercourse locations. Indicative project areas shown in red.

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3.5.2. Surface water quality

Water courses within the catchment are heavily urbanised, with stormwater collected by developed stormwater networks and the Cooks River. Surface water quality in the project area is influenced by several factors including:

- Current and former polluting land uses within the catchment;
- Stormwater and sewage overflows and leachate from contaminated and/or reclaimed land;
- Urbanisation of the catchments and subsequent reduction in permeable area, increasing run-off and pollutant loads entering waterways; and
- Illegal dumping.

Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW EESG as part of the Beachwatch programme. The monitoring point is at Kyeemagh Baths at the mouth of the Cooks River in Port Botany. Water quality within the Cooks River catchment is influenced by stormwater, fertilisers, industrial discharges and sewage contamination.

Limited background water quality data is available for the Cooks River through monitoring undertaken by the Cooks River Alliance. However, the most recent data available is from 2013/2014 and monitoring was not undertaken in close proximity to the Project area.

As the Project works are not within the proximity of any first, second or third order streams, minimal impacts to surface water quality are predicted. Refer to Section 5 for erosion and sediment controls measures to be implemented during construction.

3.6. Flooding

Chapter 21 of the EIS cites the draft *Overland Flow Study Canterbury LGA Cooks River Catchment* (Cardno 2016) for the remainder of the Cooks River Catchment and the *Salt Pan Creek Stormwater Catchment Study* (Bankstown City Council 2011).

The EIS summarises the flooding and drainage issues occurring in the remainder of the alignment between the Sydenham and Bankstown Stations. The flooding conditions relevant to this Project are summarised below.

Dulwich Hill Station

Overland flooding into the rail corridor occurs in some locations between Dulwich Hill and Canterbury Station, where existing cross drainage capacity is exceeded. However, these areas are located closer to Canterbury Station, and not within this Project's area.

• Campsie Station

Overland flooding into the rail corridor occurs:

- From west of Campsie Station (high flood hazard area) during events greater than the 10% AEP; and
- Near the Belmore triangle area during events greater than the 39% AEP (located approximately 500m to the west of the Project area).

- **Punchbowl Station**

- East of the rail corridor there are a number of culverts with varying capacities, and potential for overflows into the rail corridor; and
- West of the rail corridor, modelling indicates overflows into the rail corridor at one location for the 1% AEP climate change event.

The Dulwich Hill and Punchbowl Station services buildings are located outside of the 100 year ARI flood zone based on the existing flood studies. The design of these buildings are not anticipated to impact upon the local flooding regime.

The Campsie Station services building sits within the 100 year ARI +10% increase in rainfall flood zone. In accordance with CoA E9, in order to minimise flood impacts, the services buildings have been designed as elevated buildings on footing walls with discrete openings to allow cross flows beneath the building.

In accordance with REMM FHW1, the Dulwich Hill, and Punchbowl services buildings have been designed to ensure there is no increase in stormwater runoff rates. As the addition of these buildings results in an increase of impervious area, on-site detention in the form of on-site detention (OSD) tanks have been provided as part of the design to reduce flows. The Campsie Services Building is located within an existing paved carpark, as such the provision of the building does not result in an increase in impervious area

Given the existing flooding risks, particularly at the Campsie Station services building site, the management measures outlined in Section 5.4 will be implemented by Downer during the construction planning and construction phase of the Project to minimise flooding impacts.

The minimum requirements for work activities involving excavation, shafts, pits, trenches and tunnelling to be conducted in a safe, legal and competent manner in accordance with Downer's Excavation, Trenching and Services Standard (DG-ZH-ST043).

In an event of flooding the emergency plans must be communicated to workers and be prepared and practised in accordance with Downer's Emergency Management Procedure (DG-ZH-PR015).

4. Environmental aspects and impacts

4.1. Construction activities

Key construction activities that could result in adverse impacts to soils and surface water are listed below along with Downer Standards, Procedures and Permits to be adhered to:

- Vegetation clearing and topsoil stripping;
 - Flora and Fauna Management Standard (DG-ZH-ST071.2)
 - Land or Vegetation Disturbance Permit (DG-ZH-FM071.3)
 - Environmental Inspection Checklist (DG-ZH-FM116.2)
- Bulk earthworks;
 - Excavation, Trenching and Services Standard (DG-ZH-ST043)
 - Excavation Permit (DG-ZH-FM043.1)
- Construction and use of site accesses;
 - Environmental Inspection Checklist (DG-ZH-FM116.2)
- Drainage works;
 - Water Discharge Management Standard (DG-ZH-ST064)
 - Excavation Permit (DG-ZH-FM043.1)
- Material stockpiling including the treatment of acid sulfate soil and rock;
 - Acid Sulfate Soils Management Standard (DG-ZH-ST068.2)
 - Waste Disposal Register (DG-ZH-FM063.1)
 - Waste Estimation Record (DG-ZH-FM063.2)
- Water use; and
 - Water Discharge Management Standard (DG-ZH-ST064)
 - Working On or Near Water Procedure (DG-ZH-PR136)
 - Water Release Permit (DG-ZH-FM064.1)
- Operations at site compounds including fuel and chemical storage, refuelling and chemical handling.
 - Hazardous Chemicals and Dangerous Goods Standard (DA-ZH-ST024)
 - Zero Harm Risk Management Procedure (DG-ZH-PR028)
 - Hazardous Chemicals and Dangerous Goods Risk Assessment (DG-ZH-FM024.1)

The key aspects and potential impacts associated with the management of soil and water during the delivery of the Project are listed in Table 9.

Table 9: Aspects and potential impacts

Aspects	Potential impacts
Discharge of contaminated water from within site boundary during rainfall Concrete washout	<ul style="list-style-type: none"> Contamination of adjacent watercourse Contamination of soils
Dust generated by vehicles	<ul style="list-style-type: none"> Potential pollution of waterways and air
Vegetation clearing and topsoil stripping	<ul style="list-style-type: none"> Sediment degrading surrounding environment Runoff entering drainage lines causing pollution and impacting aquatic life in the catchment
Earthworks / Embankment works/ Platform excavation works / Service building works	<ul style="list-style-type: none"> Potential spread of contamination into soils /surface or groundwater Personnel exposure to contaminants Sediment degrading surrounding environment Change to flooding characteristics
Flooding of worksites	<ul style="list-style-type: none"> Contamination of floodwaters by sewage, fuels and/or chemicals onsite
Leaks or spillages of fuels, oils and grease from construction plant and equipment and at compounds	<ul style="list-style-type: none"> Contamination of soil Contamination of watercourse, riparian environment and groundwater ecosystems Personnel exposure to contaminants
Disturbance of Potential Acid Sulphate soils and Actual Acid Sulphate Soils during excavations.	<ul style="list-style-type: none"> Mobilisation of metals within runoff to levels toxic to natural systems Release of acidic runoff
Modifications to natural hydrology or water quality from excavations	<ul style="list-style-type: none"> Localised pollution of waterways Potential loss of surface flow from existing drainage lines
Sediment laden runoff during rainfall	<ul style="list-style-type: none"> Runoff entering drainage lines causing pollution and impacting aquatic life in Cooks River
Sediment tracking onto public roads from vehicles leaving site	<ul style="list-style-type: none"> Potential impact on traffic safety Potential for sediment laden runoff during rainfall Potential for generation of dust
Storage of hazardous chemicals and dangerous goods	<ul style="list-style-type: none"> Contamination as a result of a spill Impact to watercourses from pollution
Construction laydown spills	<ul style="list-style-type: none"> Contamination of soils Potential for pollutants to wash into drainage system Sediment laden/ contaminated runoff entering drainage system Potential for contamination of floodwaters by sewerage, fuels and/or chemicals onsite

Aspects	Potential impacts
Inappropriate management (handling, stockpiling, transport and disposal) of identified contamination or contaminated materials encountered during construction works (e.g. excavation)	<ul style="list-style-type: none"> • Potential for spread of contamination (soil/water) • Personnel exposure to contaminants • Local media coverage • Fines and prosecution from Regulatory Authorities

It is noted that groundwater impacts are not captured in Table 9 as groundwater is not anticipated to be impacted by the works. Further information regarding groundwater management is included in the Groundwater Management Procedure included in Appendix E of the CEMP.

Some impacts on soil and water attributable to the Project are anticipated. Section 5 provides a suite of mitigation measures that will be implemented to avoid or minimise those impacts. No stormwater storage structures are anticipated to be impacted by the Project works.

5. Soil and water management

5.1. Erosion and sediment control

5.1.1. General principles

Environmental protection during construction will involve the installation, use and maintenance of a number of temporary erosion and sediment control measures as required in accordance with the following principles:

- Before undertaking any construction work (including any earthmoving or vegetation removal works), implement all soil and water management works required to minimise pollution of waters;
- All erosion and sediment controls will be installed in accordance with best-practice guidelines such as NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008);
- Erosion and sedimentation mitigation measures would be installed and maintained for the duration of the Project's works;
- Minimise loss of topsoil where practicable;
- Maintaining ground cover for as long as possible to prevent erosion and sedimentation;
- Diversion of 'clean' run-off from offsite around or through the worksite without it contacting exposed soils or mixing with 'dirty' onsite water and maintaining existing drainage infrastructure wherever possible;
- Installation of any permanent scour protection measures required for the operational phase would occur as soon as practical;
- Minimisation of soil erosion and mobilisation of sediment during rain events;
- Use of suitable sediment retention structures and control measures to filter or retain mobilised sediment generated during rain events over surface disturbances;
- Maximum sediment capture through effective positioning of temporary erosion and sediment control structures;
- Progressive rehabilitation and/or stabilisation of completed areas to minimise erosion hazard, as soon as practicable;
- Regular inspection and maintenance of all erosion and sediment controls to ensure they are effective;
- Use of water efficient fittings and fixtures where reasonable and feasible for temporary site facilities;
- Targeted training on ERSO principles for the Principal Contractor's key staff;
- Ensure that any road, footpath, shared path or cycleway which is open to the public is at all times kept free of mud, dirt, dust, deleterious material, debris, obstructions and trip hazards arising from the Project activities in accordance with the Project Approval;

- Utilisation and maintenance of appropriate site exit controls. This may include wheel wash facilities. These measures would be put in place to mitigate the risk of any loss of fuels, lubricants, load or other substances;
- Any spillage or build-up of such material or debris would be cleaned up as soon as practicable;
- Diversion of run-off from areas of exposed soil to appropriate sediment control devices as much as practicable; and
- Installation of erosion controls in the base of drains used to divert runoff, to minimise erosion of sediment from the drain.

5.1.2. Resources

Ultimate responsibility for erosion and sediment control will rest with the construction personnel within the construction team, led by Construction Managers, who will be responsible for the installation and maintenance of erosion and sediment controls. This would include (although is not limited to):

- Hard standing and deployment of spray-on soil stabilisers as required;
- Installation, cleaning and maintenance of controls such as sediment fences, gravel socks, inlet filters, straw bales, sandbags etc;
- Installation of temporary drain and channel liners (e.g. geofabric, jute matting etc); and
- All dewatering activities.

Relevant personnel will receive training and ongoing toolbox talks on installation and maintenance of erosion and sediment controls.

5.1.3. Sediment basins

Due to the limited earthworks proposed as part of this Project, and limited space within the rail corridor, sediment basins are not anticipated to be required during the Construction stage.

At each of the station locations there is limited space available. Erosion and sediment impacts should be sufficiently mitigated by other measures as outlined in Section 5.1.4.

Should Downer propose to use sediment basins to manage soil and water throughout their works, this SWMP will be updated to include this. However, at this stage of construction Downer does not anticipate use of sediment basins.

5.1.4. Erosion and Sediment Control Plans

Erosion and Sediment Control Plans (ESCP) will be developed for the Project sites in accordance with the requirements of Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) and Managing Urban Stormwater: Soils and Construction Volume 2A (DECC 2008) (the “Blue Book”). The ESCPs will typically contain the following key management measures, as applicable to the works:

Site entry and access requirements

- Establish stabilised access points with rumble grids or wheel washes to prevent mud tracking on roads;

- Clearly delineate access points;
- Use of street sweepers;
- Longer term and/or heavily used haul roads would generally be sealed. Sealed haul roads would be regularly cleaned;
- Unsealed haul roads would be regularly damped down with fixed or mobile sprinkler systems;
- Appropriate site speed limits would be imposed and signed on haul routes; and
- Exclusion zones would be designated on construction sites to limit disturbance.

Soil stripping and stockpiling

- Stockpile areas are to be established within approved low-hazard areas clear of watercourses, stormwater drainage lines/culverts and not within the dripline of any retained trees where feasible and reasonable;
- Diversion drains/bunds are to be installed on the high side of stockpiles if run—off from upslope lands could impact on the stockpile;
- As much as is feasible, mulched vegetation, topsoil and subsoil (if applicable) are to be stockpiled separately;
- Any contaminated material stockpiles (i.e. asbestos, contaminated soil) will be covered on-site and short-term material stockpiles (>5 days not in use) with potential to generate dust will be wetted down or covered to prevent fugitive dust emissions or run-off during wet weather. Long-term stockpiles (>30 days) will be stabilised and /or covered in accordance with “Blue Book” requirements;
- Topsoil and mulch stockpiles will be constructed to no more than 2m in height where possible;
- Stockpiles will be battered down to a maximum slope of 2:1 (H:V) where space permits; and
- Material transport from site to surrounding pavement surfaces would be minimised

Dust control

- Dust suppression will be carried out whenever necessary to minimise sediments becoming air borne due to wind erosion; and
- Wherever possible, water detained onsite will be re-used for dust control.

Stabilisation

- Undertake progressive stabilisation of ground surfaces as quickly as possible as they are completed rather than at the end of the works program;
- Progressively revegetate disturbed areas utilising appropriate species in those areas to be revegetated;
- Temporary ground covers such as hydraulic soil stabilisers or geotextile fabric will be used as much as possible to stabilise batters, stockpiles and large surface areas; and
- Scour protection and energy dissipation would be used around discharge points at local points to reduce erosion where necessary.

Sediment controls

- Locations of nearest existing drainage channels and stormwater inlets to the works will be displayed on the ESCP
- Sediment controls will be installed around stormwater inlet pits where appropriate and where they will not cause or exacerbate flooding. Traffic management and safety will need to be considered if installing such devices on or near live traffic;
- Maximise the diversion of turbid construction runoff into sediment retention devices such as sediment sumps, sediment fences and other sediment traps;
- Mulch bunds will not be used in concentrated flow areas or if they have the potential to result in tannin leachate into waterways;
- All erosion and sediment controls will be inspected by the Environmental Manager (or delegate) at least weekly, before forecast rainfall exceeding 20 mm in 24 hours, after rainfall exceeding 20 mm in 24 hours and before a site closure of two days or more. Maintenance will be carried out as required prior to the next forecast rainfall event;
- Site supervisors will undertake daily erosion and sediment control checks and record any issues within site diaries. Site supervisors will ensure controls are maintained and in working order;
- Concrete washout will be confined to designated concrete washout locations or using a Concrete Waste Separation Unit (CWSU), which allows for recycling of concrete waste;
- Clean water diversions would be constructed and stabilised around work areas; and
- No stockpiles of materials or storage of fuels or chemicals would be located adjacent to the existing culverts.

Water storage

- Although sediment basins are not required for the site, some water may be stored for treatment before discharge or re-use. In particular, water within excavations that does not meet the criteria for discharge may be pumped into storage tanks or an impermeable bund for treatment, allowing works to recommence in parallel with water treatment.

ESCPs will provide guidance on the installation of control measures, as per the Blue Book.

As the works will mainly occur under rail possessions (i.e. short term works, over a limited area) Downer will develop a series of ESCPs for the works as they progress. This series of ESCPs will focus on the erosion and sediment risks for each work front as they are established and closed out.

Downer will engage an ERSED Specialist Consultant to review initial site controls and where activities are deemed high risk by the Environmental Manager, ESCPs will be developed. Sydney Metro's Principal Contractor will incorporate any feasible and reasonable recommendations made by the ERSED Specialist.

All ESCPs prepared for the Project will require sign-off by the Environmental Manager (or delegate) prior to implementation. As a minimum, the work sites that would require ESCPs to be developed are included as hold points in Section 10.1.

Downer will comply with CoA E38, which states *“All reasonable practicable erosion and sediment controls must be installed and appropriately maintained to minimise water pollution. When implementing such controls, any relevant guidance in the Managing Urban Stormwater series must be considered.”* Downer will implement Environmental Inspection Checklist (DG-ZH-FM116.2) to ensure environmental controls are established in line with Zero Harm Risk Management Procedure (DG-ZH-PR028).

REMM SC1 states *“Erosion and sediment control measures would be implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Managing Urban Stormwater: Soils and Construction Volume 2A (DECC, 2008). Measures would be designed as a minimum for the 80th percentile, five day rainfall event.”* Sydney Metro’s Principal Contractor will comply with this REMM as it applies to the works, all measures will be installed in accordance with this documentation (e.g. sediment fence, rock check dams, batter protection etc.).

It is noted that the “measures” to be designed in accordance with the 80th percentile, five day rainfall event are the different types of sediment basins described under the Managing Urban Stormwater guidelines. As stated in Section 5.1.3, it is unlikely that sediment basins would be implemented during the construction of the Project. As such, the part of REMM SC1 that states *“Measures would be designed as a minimum for the 80th percentile, five day rainfall event”* is not relevant to the Project works. Should Downer propose to use sediment basins to manage soil and water throughout their works, this SWMP will be updated to include this.

In accordance with REMM FHW8, erosion and sediment mitigation measures would be installed and maintained for the duration of the Construction period.

5.2. Surface water management

The Project site forms part of the greater Cooks River catchment. Specific Water Quality Objectives have been derived for the catchment in line with the NSW Water Quality Objectives. Catchment mapping classifies the Project site as a waterway that is *“affected by urban development”*. The water quality objectives for the catchment include the protection of:

- Aquatic ecosystems - Maintaining or improving the ecological condition of waterbodies and their riparian zones over the long term
- Visual amenity – Aesthetic qualities of waters
- Secondary contact recreation - Maintaining or improving water quality for activities such as boating and wading, where there is a low probability of water being swallowed.

5.2.1. Reuse

Where practicable, any water collected in excavations / work sites will be reused within, the Premises (e.g. dust suppression, watering retained vegetation). The Sydney Metro - Water Discharge or Reuse Procedure regulates both onsite reuse and offsite point source discharge. Prior to any discharge off the premises, or reuse within the premises, Downer’s Environment Manager or Coordinator (or delegate authorised by the Environment Manager/Coordinator) is to sign off that the water is suitable for reuse or discharge. Refer to Section 10.1 for hold points.

5.2.1.1. Onsite reuse

For onsite reuse, the following criteria will be utilised:

- pH – 6.5 to 8.5;
- No visible oil and grease;
- No potential for water to leave the premise;
- No surface runoff will be generated from the reuse (reuse includes dust suppression, watering retained vegetation etc.); and
- No potential for water to reach any watercourse.

5.2.2. Offsite discharge

No water will be discharged off site until it has been tested and a permit to discharge is approved by the Environmental Manager (or delegate). Refer to Section 10.1 for hold points. All water discharges will be documented using Sydney Metro's Water Discharge or Reuse Approval Form or site-specific equivalent.

Water quality testing will be undertaken prior to discharge offsite in accordance with the Sydney Metro – Water Discharge or Reuse Procedure for the following parameters. Refer to Table 10 for testing criteria for offsite discharge as published in the Sydney Metro – Water Discharge or Reuse Procedure.

Table 10: Criteria for offsite discharge

Parameter	Criterion	Method	Time prior to discharge
Oil and grease	None visible	Visual inspection	< 1 hour
pH	6.5 – 8.5	Probe/Meter	< 1 hour
Total Suspended Solids (TSS)	<50 mg/L	Meter/grab sample	< 1 hour/ <24 hours

In accordance with REMM FHW10, discharges from construction water treatment devices would be monitored to ensure compliance with the discharge criteria, as stated above.

The Water Quality Monitoring Program, as included within Section 6, will be implemented to monitor impacts on surface resources during construction.

Should offsite discharge be required, Downer will be responsible for identifying and proposing suitable discharge points. Additionally, Section 5 of Downer's Water Discharge Management Standard (DG-ZH-ST064) defines the standards required to be met for water discharge management. This Sub-plan will be revised to include any discharge points to be utilised by Downer. Sydney Metro's Principal Contractor will consult with the relevant Council prior to discharge in Council stormwater assets where the capacity of the stormwater system may be reduced during wet weather. It is noted that volume of stormwater captured and discharged offsite is expected to be negligible and that under most circumstances the capacity of the system would be sufficient.

Should Downer obtain an EPL which contains additional discharge criteria, this SWMP will be revised to include this. However, at this stage of construction Downer does not anticipate obtaining an EPL and will notify Sydney Metro should this be required.

5.3. Potable water

In-line with the CEMF the following water resource management objectives will apply to the construction of the Project:

- Minimise use of potable water; and
- Maximise opportunities for the reuse of rainwater, stormwater, wastewater and groundwater.

Downer will undertake a Water Balance Study to meet these objectives. The Water Balance Study will be completed prior to the commencement of construction and will estimate the quantities, types and potential sources of water that will be required for the Project. The study will identify the best opportunities to use non-potable water (where available) instead of potable water and minimise the quantities of both potable and non-potable water which will be consumed.

The water balance study will consider the following:

- Site facilities;
- Dust control for construction activities;
- Subgrade treatments;
- Trenching activities;
- Piling activities;
- Landscape establishment; and
- Water demand ongoing for operation and maintenance.
- Measures to minimise water consumption are identified in the Sustainability Management Plan. Examples of initiatives that will be investigated and implemented where practicable include:
 - Installing water efficient controls, fixtures and fittings in temporary facilities;
 - Harvesting and reusing rainwater from roofs of temporary facilities and operation facilities;
 - Using non-potable water sources for dust suppression during construction;
 - Using water efficient construction methods and equipment;
 - Specifying within supply chain contracts that offsite batching plant concrete production operation water is recycled, suitably treated and incorporated into concrete production that is supplied the Project;
- Maximise the use of stormwater in the urban design; and
- Include a drought tolerant planting schedule in the urban design.

5.4. Flooding management

As outlined in Section 3.6, the construction of the Project should have a negligible impact on flooding within the catchment, with minimal loss of flood storage and minimal changes or restrictions to existing flood regimes. However, in accordance with CoA E9, where the works

will worsen flooding impacts, Downer will be responsible for implementing measures to address those impacts. In case of a flooding event, emergency plans must be communicated to workers and prepared and practised in accordance with Emergency Management Procedure (DG-ZH-PR015).

The minimum requirements for work activities involving excavation, shafts, pits, trenches and tunnelling to be conducted in a safe, legal and competent manner will be done through the application of Downer's Excavation, Trenching and Services Standard (DG-ZH-ST043).

In accordance with CoA E8, the location of Downer's construction compounds will not worsen the existing flooding characteristics of the area. Detailed construction planning would consider flood risks for all compounds and work sites. This would include identification of measures to not worsen existing flooding characteristics. In accordance with REMM FHW5, not worsen is defined as:

- A maximum increase in flood levels of 50mm in a one per cent AEP event;
- A maximum increase in time of inundation of one hour in a one per cent AEP event;
- No increase in the potential for soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event.

When determining potential locations for proposed compounds and worksites, Downer will review and consider existing flood information from multiples sources, including *the Sydney Metro City & Southwest Sydenham to Bankstown EIS Technical Paper 8 – Hydrology, Flooding and Water Quality Assessment*, Council Flood Studies and Local Environmental Plan Flood Maps. Downer will undertake further assessment where compounds or worksite are proposed for areas of flooding, to ensure conditions are not worsened in accordance with REMM FHW5.

In addition, Downer will implement the following measures to mitigate impacts of flooding on the Project in accordance with REMM FHW6:

- The site layout and staging of construction activities would;
 - Avoid or minimise obstruction to overland flow paths and limit the extent of flow diversion required
 - Consider how works would affect the existing stormwater network such that alternatives are in place prior to any disconnection or diversion of stormwater infrastructure;
- Stockpiling and storage of materials to occur outside potential flood areas;
- Temporary facilities and hazardous material storage to be above flood levels;
- Maintain overland flow paths;
- Monitoring of rainfall will be undertaken in accordance with Water Quality Monitoring Program;
- Construction equipment (or excess material) would be removed from prone areas where significant events are predicted;
- Site sheds and chemical stores will be constructed above the 10 year ARI level;

- Site inspections will be completed to ensure ERSed controls are place prior to the event;
- Where applicable, temporary levees or bunds would be strategically placed to contain potential flooding impacts resulting from any temporary works on the floodplain and minimise the risk to surrounding properties which might otherwise be affected;
- Stockpiles will be located away from areas subject to concentrated overland flow; and
- In the event of an emergency the requirements set out in the Emergency Response Plan will be implemented.

5.5. Groundwater management

The Project's construction activities are anticipated to have negligible impacts to the groundwater table and local groundwater hydrology. Any potential impacts on groundwater will be considered and managed through each site's ESCP along with mitigation measures listed in Appendix E of the CEMP.

Some groundwater seepage into excavations may occur and will be managed as detailed in the Groundwater Procedure included in Appendix E of the CEMP. Groundwater seepage will be either treated to meet ANZG/ANZECC Guidelines criteria for the nearest water body and discharged; or will be removed from site as liquid waste in accordance with NSW EPA's Waste Classification Guidelines. Should groundwater be encountered and discharge to the nearest waterbody proposed, this Plan will be updated to include the specific criteria and discharge parameters, consistent with the ANZG/ANZECC Guidelines.

5.6. Refuelling, chemicals and spill management

Downer will ensure hazardous chemicals and dangerous goods will be stored and used onsite in accordance with Downer's Hazardous Chemicals and Dangerous Goods Standard (DA-ZH-ST024) which defines the general, planning and safe use and handling requirements along with the following protocols:

- In accordance with CoA E41, dangerous goods, as defined by the *Australian Dangerous Goods Code*, will be stored and handled strictly in accordance with:
 - All relevant Australian Standards;
 - For liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and
 - The Environment Protection Manual for Authorised Officers: Bunding and Spill Management technical bulletin (EPA, 1997).
- In accordance with REMM HRS4 all hazardous chemicals and dangerous goods that may be required for construction and operation would be stored and managed in accordance with the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005) and the Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011);
- Hazardous chemicals and dangerous goods will be stored onsite in lockable containers, in their original receptacles;
- Emergency spill kits would be kept on-site at all times. All staff would be made aware of the location of the spill kit and be trained in its use;

- All hazardous chemicals and dangerous goods will be clearly labelled and will have Safety Data Sheets (SDS) affixed or available nearby. The SDS will be used to determine compatibility of hazardous chemicals to be stored together, i.e. no flammables with corrosives, not all corrosives compatible with each other etc;
- A bund sized to 110% of the largest stored receptacle will be established around any storage area for hazardous chemicals and dangerous goods;
- Storage and handling of flammable or combustible liquids will be in accordance with EES Group guidelines for Bunding and Spill Management, as well as AS 1940-1993 – The Storage and Handling of Flammable and Combustible Liquids;
- An up-to-date register of hazardous chemicals and dangerous goods will be kept onsite at all times;
- Hazardous chemicals and dangerous goods will only be used onsite as required, in accordance with the manufacturer/supplier instructions;
- Any substances with the potential to impact water quality will be assessed by the Environment Manager to determine what environmental safeguards or procedures are required for that substance to minimise the risk of environmental harm;
- The use of any hazardous chemicals and dangerous goods that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds;
- All spills or leakages will be immediately contained and absorbed. Routine inspections of all construction vehicles and equipment would be undertaken for evidence of fuel/oil leaks;
- Vehicles and machinery would be properly maintained to minimise the risk of fuel/oil leaks;
- In the event of a spill, the Spill Management Procedure to be prepared by Downer will be implemented. As set out in Section 3.10 of the CEMP, the management of environmental incidents where material harm to the environment is caused or threatened will be managed in accordance with Sydney Metro's Environmental Incident and Non-compliance Reporting Procedure; and
 - Downer's Spill Prevention and Control Compliance Guide (DG-ZH-CG074) referenced within Downer's Contamination Management Procedure (DG-ZH-PR068) will be complied with.
- Construction plant, vehicles and equipment would be refuelled off-site, or in designated re-fuelling areas located at a minimum distance of 50 metres from drainage lines or waterways, where possible.

5.7. Contamination

Contamination Management Procedure (DG-ZH-PR068) and the following mitigation measures will be implemented by Downer to mitigate risks associated with contamination across the Project sites:

- Known contamination areas will be clearly demarcated on site and within Environmental Control Maps (ECMs) – these will be updated during course of the Project if areas of potential contamination are identified;

- Known and potential contamination would be assessed, managed and/or remediated in accordance with the Unexpected Contaminated Land Procedure and Asbestos Finds Procedure (refer to Appendix B) and the Waste and Spoil Management Procedure in Appendix E of the CEMP for appropriate waste classification and removal of material off-site and in accordance with its classification status to an EPA licenced facility or facility that can lawfully accept the waste;
- Appropriate environmental controls/measures will be included on ECMs and ESCPs and implemented to manage and prevent the spread of contamination. Typical examples of controls/measures would include (although is not limited to):
 - Segregating contaminated material to minimise cross contamination (where safe to do so);
 - Establishing suitable lining prior to stockpiling;
 - Signposting;
 - Covering material; and,
 - Implementing measures outlined within Section 5.11 of this plan for ASS/PASS.
- Identifying reporting requirements, including requirements under the *Contaminated Land Management Act 1997*, when contamination is encountered;
- Providing inductions and toolbox talks detailing the correct response when contaminated material is encountered.

Where contamination is encountered, workers will apply the appropriate Personal Protective Equipment (PPE). The appropriate PPE will depend on the contaminant type and the works to be undertaken. Appropriate PPE will be decided upon in consultation with an Occupational Hygienist.

5.8. Unexpected finds

In the event of unexpected finds of contamination or asbestos Downer's DG-ZH-PR068 Contamination Management Procedure (refer Section 4.4) and Sydney Metro's Unexpected Contaminated Land Procedure and Asbestos Finds Procedure (refer Appendix B) will be implemented. In accordance with CoA E40, the Unexpected Contaminated Land Procedure and Asbestos Finds Procedure will be implemented throughout Construction.

In brief, the following would occur:

- Cease work in the area of concern immediately;
- Isolate the area with barrier tape or any other physical barrier to prevent workers from entering the potentially contaminated location;
- Report the area of concern to the Environmental Manager and WHS Manager immediately. Nearby work groups would be notified;
- Environmental Manager will engage a suitably qualified contamination consultant inspect the site and carry out an initial assessment of the nature and extent of the contamination;

- The Contamination Consultant will advise what management is required in accordance with this plan, any Planning Approval requirements and the contamination report prepared;
- Hazardous materials surveys would be undertaken during detailed design for utility adjustments as required.

5.9. Asbestos

Identified fragments of Asbestos Containing Material (ACM) on the surface and within stockpiles on site would be managed in accordance with the measures above, the Project's Health and Safety Management Plan, Asbestos Management Plan (included in Project Health and Safety Management Plan) and task specific Asbestos Removal Control Plan will be implemented in accordance with Downer's DG-ZH-ST086 Asbestos Management Standard (refer Section 5). The unexpected contamination finds procedure would also be implemented as per Section 5.8.

Removal of ACM would be by a licenced asbestos removal contractor who would produce the following:

- Asbestos removal licences for workers performing the removal works;
- A task specific Safe Work Method Statement (SWMS);
- Evidence of notification to the relevant authority and asbestos removal permit;
- Where there is uncertainty as to whether the exposure standard may be exceeded, or if it is likely to be exceeded, then air monitoring must be performed by a competent person who is independent of the removalist;
- At the completion of the removal works a clearance certificate must be obtained from a competent person;
- A waste disposal certificate must be provided by the removalist following the completion of the works to prove that any asbestos containing material removed from the site has gone to a licenced landfill facility;
- Unless a specific exemption exists, asbestos waste must be tracked using the NSW EPA's WasteLocate. Evidence of this is to be provided by the asbestos removalist.

Safety considerations relating to contamination and asbestos are to be included within the Principal Contractor's Health & Safety Management Plan & Occupational Health Hygiene Welfare Management Plan. Task specific Asbestos Removal Control Plans will be developed for the works if asbestos is encountered.

Where asbestos is encountered, workers will apply the appropriate PPE. Appropriate PPE will be decided upon in consultation with an Occupational Hygienist.

5.10. Salinity

In accordance with the findings of the EIS, the potential for salinity issues on the Project sites are low (refer to Section 3.2.2 and Figure 2). Should salinity be identified during the Project works further investigation is to occur, and measures would be put in place to protect building materials, vegetation and landscaping. If saline soils are encountered, they would be managed in accordance with *Site Investigations for Urban Salinity (DLWC, 2002)* as per REMM SC3.

5.11. Acid sulfate soils

As stated in the EIS and site contamination reports, ASS and PASS have been identified along the Sydenham to Bankstown rail corridor (refer to Section 3.2.3 and Figure 2). In accordance with REMM SC2, prior to ground disturbance in high probability ASS areas, testing would be carried out to determine the presence of ASS. Ongoing testing will occur as per the field and laboratory testing requirements outlined below.

If ASS are encountered, they would be managed in accordance with the *Acid Sulfate Soil Manual* and *Waste Classification Guidelines – Part 4: Acid Sulfate Soils*. and Downer's Acid Sulphate Soils Management Standard DG-ZH-ST068.2 (refer to Sections 4 and 5).

- General mitigation measures for working with ASS and/or PASS include:
 - Completing a preliminary assessment

When completing a preliminary assessment, if some or all the triggers below are met then there is likelihood that PASS/ ASS is present and further sampling and analysis is required to confirm.

Parameter	Trigger
Soil pH test	<ul style="list-style-type: none"> ▪ <4 in water or in dried exposed sediment
Salinity	<ul style="list-style-type: none"> ▪ >1750 $\mu\text{S cm}^{-1}$ in water ▪ 400 $\mu\text{S cm}^{-1}$ in a 1:5 soil water mix
Odour or visual	<ul style="list-style-type: none"> ▪ Salty/ rotten egg odour ▪ Blue grey colour ▪ Yellow or red mottling visual appearance ▪ Iron staining on surface or around waterways ▪ Vegetation dieback

The preliminary assessment findings will inform the designers on the materials and methods of construction to be used especially where PASS/ ASS has been identified.

Where the preliminary assessment identifies a high likelihood of ASS within the work area and the excavated volumes are >50m³, a dedicated ASS Management Plan (ASSMP) must be developed as a sub-plan to the Zero Harm Management Plan (ZHMP) or Environmental Management Plan (EMP).

The ASSMP should be produced in accordance with relevant legislation and jurisdiction guidelines; and include:

- pre-excavation considerations including the establishment of a treatment area and transport logistics
- field and laboratory testing requirements
- neutralisation of spoil and water, including dosing rates for Aglime or similar

- environmental controls to prevent the escape of acidic runoff
- disposal or strategic reburial requirements; and
- post-construction considerations including restoration and stabilisation.

If necessary, a qualified soil remediation or similar consultancy can be engaged to prepare the ASSMP and assist with dosing rate calculations.

ASS excavation volumes $<50\text{m}^3$ can be managed without the need for a dedicated ASSMP provided the section 5 *On the Job* requirements listed in this standard are detailed within the ZHMP or EMP and adhered to at all times.

- Spoil to be managed in accordance with the Waste and Spoil management procedure within Appendix E of the CEMP;
- Areas of ASS and PASS should be included on ECMs and any mapping included in the permit to disturb;
- Plan works to minimise disturbance to areas of ASS and PASS;
- Excavation of ASS or PASS will not occur until an appropriate storage/treatment area is established. This includes the establishment of erosion and sediment controls in the vicinity of the storage/treatment area;
- Field testing for suspected ASS or PASS at a rate of 1 sample per 200m^3 of excavated material from low, medium or high risk areas or where previous testing has indicated the presence of PASS or ASS;
- Field testing will be undertaken with the use of Hydrogen Peroxide based on Appendix I of the Acid Sulfate Soils Assessment Guidelines (Ahern et al, 1998a). Soils that record a pH of below 4, following oxidation with H_2O_2 , will be managed as ASS;
- 10% of samples will be sent for laboratory analysis using the chromium reducible suite (Scr) method to confirm the peroxide screening test results and to confirm the required liming rate;
- PASS will be kept wet to prevent oxidation;
- ASS or PASS stockpiles will be located at least 50m away from drainage lines, unless a risk assessment is undertaken to prove that risks associated with the stockpile storage area are minimal;
- ASS or PASS that will be treated is to be stockpiled separately in a bunded stockpile area. Treatment will occur in accordance with the soil ASS Treatment Plan as described within Appendix C;
- Treatment rates will be determined by laboratory analysis. Estimated treatment rates are included in Section 5.11;
- Testing will occur to validate any treatment of ASS or PASS;
- Any surface water captured within the ASS/PASS storage bund or treatment pad area, or excavation where ASS/PASS is present will be tested in accordance with the Sydney Metro Water Discharge and Re-use Procedure to mitigate impacts on water quality and aquatic environments; and

- Inductions and toolbox talks related to the management of ASS and PASS.

A register of ASS testing will be maintained by the Principal Contractor. A register of ASS/PASS stockpiles, including liming of these stockpiles, will also be maintained.

Complete records of all testing, treatment and monitoring will be kept by Sydney Metro's Principal Contractor including:

- The lime register;
- Results of pH and verification testing;
- Waste classification reports; and
- Verification testing reports (if required).

5.11.1. Treatment and liming

Sampling undertaken within the *City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment* indicated that the liming rate for ASS or PASS soils on site would be between 1 and 8.8 kg CaCO₃/tonne. Liming rates would be confirmed by a Waste Classification Report for any material encountered.

When treating ASS / PASS onsite the following shall apply:

- Any ASS/PASS material shall be treated when there is sufficient quantity – generally in 100m³ batches;
- A bunded impervious pad (treatment pad) shall be created for the treatment of extracted ASS. The area shall be selected to ensure no impact to other environmental aspects or elements;
- A compacted bund wall of no less than 500mm shall be constructed around the entire perimeter of the ASS treatment pad. The bund should be surface limed to neutralise any runoff from stockpiled materials. The location of the bund and treatment pad will be identified on the ECM and is to be a minimum of 50m away from any waterway;
- The base of the treatment pad shall have a minimum of 300mm of clay or plastic lining and be dressed with a layer of lime or crushed limestone of at least 200mm thickness. This is to be established prior to stockpiling and/or placement of ASS materials at this location. A sump shall be constructed at the lowest point on the inside of the bund to contain runoff from the treatment. The sump shall be limed if required to neutralise runoff from stockpiled materials. If the water is to be discharged from this it must comply with the requirements outlined in Section 5.2 of this Plan;
- The treatment pad shall be graded so that all surface water flows to the sump;
- The bund will be covered at the end of each day or in the event of any rainfall.

5.11.2. Waste classification and offsite disposal

Prior to removal from the treatment area, treated materials shall be validated at 1 random test per 200m³ or each batch of soil treated (whichever is less) to ensure effectiveness of treatment.

A batch of soil is defined as soil from one location that has a different liming rate to the rest of the soil on the treatment pad. Should the treated ASS remain above the guideline requirements, further treatment shall be conducted for the balance of lime required.

Once ASS is treated, tested and validated as per the guidelines, the material will no longer be considered ASS. As such, the material can be placed as non-structural fill (where appropriate).

Excavated surfaces will be treated with lime and tested to ensure ASS does not pose a risk to the installation of services.

It is currently the intention that treated materials be reused on site, as far as is practicable, as fill material above the groundwater table. However, should this not be possible, or volumes of excavated material be in excess of that which can be reused, the treated soil will be disposed of to an appropriately licensed landfill following a waste classification by an appropriately qualified environmental consultant.

The waste classification and disposal will be undertaken in accordance with relevant standards and requirements, including the NSW EPA (2014) Waste Classification Guidelines – Part 1: Classifying Wastes. It is noted that the treated soil cannot be classified as virgin excavated natural material (VENM) as per the NSW DECC (2014) requirements.

Disposed Without Treatment (As per Section 5 of DG-ZH-ST068.2)

Managers and Supervisors are responsible for verifying the following:

- In some instances, disposal without treatment may be an option. The spoil must be tested immediately prior to disposal to confirm oxidation has not occurred.
- The landfill facility must be licensed to dispose of PASS and notified prior to disposal below the water table. Where PASS cannot be classified as VENM as per [DG-ZH-ST068.1 Fill Material Management Standard](#) or a suitable underwater disposal site at a landfill is not available, the soil must be treated as per section *Neutralisation* above.
- Delivery to the landfill must be within 8 hours of excavation.
- PASS must be kept covered and wet during transport to the landfill.
- Documentation must be provided to the landfill for each load delivered, indicating that the soil excavation, transport and handling have been conducted in accordance with the relevant guidelines.
- Soil that has dried out, undergone any oxidation of its sulfidic minerals, or which has a pH of less than 5.5 must be treated prior to disposal as per section *Neutralisation* above.
- Jurisdictional rules regarding landfill proximity may apply.

Neutralisation (then Backfilled/ Disposed)

Managers and Supervisors are responsible for verifying the following:

- To treat ASS a brief assessment must be undertaken at a NATA approved laboratory to provide guidance on neutralisation and management (e.g. SPOCAS test).
- ASS must be treated and managed in a designated bunded area in accordance with an approved ASSMP.

- All disturbed ASS material must be immediately transported to the designated treatment area. Where this is not possible, stockpiles must be either encapsulated in a plastic sheet or secured in a lined bund to prevent contact with air and water.
- A layer of Aglime or granular lime 100mm thick must be placed on the underlying soil at the base of the treatment area to provide further safeguard against any leachate generated during the treatment.
- Once treated and validated, the spoil can be used for backfilling excavations.
- Alternatively, treated and validated spoil can be disposed at an appropriately licensed landfill in accordance with standard [DG-ZH-ST068.1 Fill Material Management Standard](#).

6. Water quality monitoring program

6.1. Overview

Downer will monitor the effectiveness of measures for managing soil and water impacts during the construction of the Project. This will be achieved through implementation of a Water Quality Monitoring Program as detailed in this section, and regular inspections of control measures and their effectiveness.

The methodology below forms the Water Quality Monitoring Program to be implemented, to comply with CoA C8 and REMM FHW4. This monitoring program has been prepared to satisfy CoA C8(b) and REMM FHW4, in consultation with IWC, CoCB, NRAR and NSW EPA. See Section 1.4 for summary of consultation undertaken.

No groundwater monitoring is proposed as part of this Project as Appendix C of the Staging Report states that Section 7.2 of the CEMF is not applicable to the Project due to limited impacts.

The monitoring program will be in place and implemented prior to any on or off site discharge and for the duration of the Project works.

In accordance with CoA C14, results of this monitoring program will be submitted to the Planning Secretary, relevant regulatory agencies including the NSW EPA and IWC and CoCB in the form of a Construction Monitoring Report. The Construction Monitoring Report will be submitted on a six-monthly basis from the commencement of construction.

This monitoring program addresses the Project's Construction phase monitoring of the Project. The cessation of Construction phase water quality monitoring at each location will be determined by Downer in consultation with the ER and Sydney Metro. Cessation of monitoring may be driven by the completion of works which generate a risk to surface water quality, necessitating monitoring (for example when no further open excavations remain); or at any other time agreed with the ER. It is noted that monitoring being undertaken by follow-on contractors or works packages will be detailed in their respective management plans, and is outside the scope of this Plan.

6.2. Monitoring purpose, objectives and scope

As outlined in Section 3.5 no watercourses will be directly impacted or modified by the Project's works. Treated construction water may be discharged into existing stormwater systems during the delivery of the Project.

Downer's focus in relation to water quality management during construction is on prevention of pollution – minimising the risk of polluted, sediment-laden or contaminated water leaving the premises, by implementing a comprehensive management and monitoring regime on site.

Surface water quality monitoring of the receiving environment to define suitable standards or benchmarks for water quality discharges from the Project's works is not proposed given:

- Waterways in proximity to the Project sites are highly modified due to the urbanised nature of the surrounding area;
- Waterways detailed in Section 3.5 are typically greater than 100m away from the worksites and connected via stormwater systems;

- The stormwater system collects and transfers water from large urbanised catchment areas, as such there is the potential for contaminants to enter the stormwater systems and waterways from many different sources.
- Water quality in urban areas in proximity to the Project is highly variable and changes according to prevailing weather patterns and day-to-day during rainfall.

As outlined in Section 6.3, pre-construction monitoring data, if available will be obtained from the previous Principal Contractor where monitoring may be required.

6.3. Available baseline data

Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW OEH as part of the Beachwatch programme. The monitoring point is at Kyeemagh Baths at the mouth of the Cooks River in Port Botany. This monitoring point is considered to be too far away from the Project sites to provide data that is useful for background information.

Limited background water quality data is available for the Cooks River through monitoring undertaken by the Cooks River Alliance. However, the most recent data available is from 2013/2014 and monitoring was not undertaken in close proximity to the Project site.

The Southwest Metro Early Works (SMEW) project conducted water quality monitoring at the Cooks River, adjacent to the rail corridor for the purpose of establishing baseline water quality data from May 2019 to September 2020 at quarterly intervals and also during a number of rainfall events. It is noted that the data captured as part of the monitoring indicates that the water quality within the Cooks River at the monitoring location exceeds several of the ANZECC criteria regularly, including; pH and turbidity. Due to the fluctuating results, they offer little in terms of interpretation or predictable trends. Baseline water quality data from the Cooks River will be sourced from the SMEW contractor. No further baseline water quality monitoring is proposed by the Project.

6.4. Construction water quality monitoring

Chapter 21.4.1 of the EIS states that *“where discharge to surface watercourses are required, a monitoring program would be implemented as part of the construction environmental management plan to assess water quality prior to discharge”*. Further, as outlined in Section 3.5 no watercourses will be directly impacted or modified by the Project’s works. Treated construction water may be discharged into existing stormwater systems during the delivery of the Project.

As such, water quality will be monitored to ensure any discharge from the Project’s construction sites is in accordance with the Sydney Metro – Water Discharge or Reuse Procedure and to identify potential non-compliances before they occur.

Water quality monitoring will be undertaken for controlled discharges offsite to ensure compliance with the discharge criteria defined in Section 5.2.2. Monitoring and analysis of data will be carried out by a competent person. Evidence of competence will be retained.

In accordance with CoA C14, results of this monitoring program will be submitted to the Planning Secretary, relevant regulatory agencies such as the NSW EPA, IWC and CoCB in the form of a Construction Monitoring Report. The Construction Monitoring Report will be submitted on a six-monthly basis from the commencement of Construction.

It is the responsibility of Downer's Environmental Manager to ensure all monitoring is performed according to these requirements.

6.5. Monitoring parameters

Downer will monitor site water prior to any discharge from site as outlined in Section 5.2.2. This will ensure that any water that is discharged is compliant with the requirements and would not impact the water quality within the receiving catchment. The monitoring parameters outlined in the Sydney Metro – Water Discharge or Reuse Procedure have been adopted. Table 10 details the parameters to be tested when monitoring site water for discharge.

In addition, Downer will undertake environmental condition surveys on major drainage crossings and outlets within localised catchments where works are to occur. The surveys will include a photo of the drainage outlets during dry, and where possible, wet weather. Downer will record any particular noteworthy conditions related to water quality (e.g. turbid water observed and the source of the turbid water where visible, litter, discolouration, visible oils or sheens).

Environmental condition survey information will be collected and stored on Downer's document management system.

6.6. Monitoring frequency and locations

As described in Section 6.4, water quality monitoring will be conducted for controlled discharges offsite to ensure that discharges from the Project sites are in accordance with the water quality criteria. The frequency of offsite discharges and associated monitoring will be dependent upon rainfall events and degree of surface water inflows into excavations.

The planned monitoring locations and monitoring schedule are set out in Table 11 below. Downer will be responsible for nominating suitable discharge location in consultation with Sydney Metro and the ER.

Table 11: Water quality monitoring schedule

Work site	Source of offsite discharges	Monitoring schedule
Dulwich Hill Station	<ul style="list-style-type: none"> Open excavations 	<ul style="list-style-type: none"> Prior to each dewatering
Campsie Station	<ul style="list-style-type: none"> Open excavations 	<ul style="list-style-type: none"> Prior to each dewatering
Punchbowl Station	<ul style="list-style-type: none"> Open excavations 	<ul style="list-style-type: none"> Prior to each dewatering

6.7. Meteorological monitoring

Meteorological data will be checked to assist with managing impacts and identify potential non-compliances.

Weather data including daily weather conditions and forecasts may be obtained from the most representative weather station, as published on the Bureau of Meteorology website (<http://www.bom.gov.au/places/nsw>). In the absence of electronic meteorological information, the Site Supervisor, Site Engineers and Environmental Coordinator will monitor rainfall events on site.

The criteria for monitoring rain events and the associated response is provided in Table 12.

Table 12: Meteorological monitoring program

Event	Criteria	Response
Rain event	<ul style="list-style-type: none"> >10mm in 24 hours 	<ul style="list-style-type: none"> Inspect any rumble grid and wheel-wash facilities Inspect adjacent roads for signs of mud tracking Inspect site sediment and erosion controls for effectiveness/maintenance Inspect outlets to determine any change in water quality

Visual inspections as outlined in Table 12 will include the following monitoring parameters:

- Water clarity and colour;
- Odour;
- Description of flow and quantity;
- Oil and grease determination;
- Details of any foreign objects within the water; and
- Visible runoff (into the water body).

Downer will maintain a record of inspections (including photographs) on their document management system.

Where water quality issues are visibly observed, Downer will investigate further to determine if the source of the issue is related to Downer's construction activities (where possible, noting safe access limitations). Downer's Environmental Manager or delegate will discuss any visible changes in water quality associated with Construction with the Construction Team to determine if further controls may be implemented.

Once works in a particular area have been completed and any disturbed ground (associated with the Project works) reinstated to a suitable condition, the associated visual inspection within the particular areas will cease.

It is noted that post rainfall inspections within 24 hours of some drainage crossings and outlets may not be possible in some circumstances, including;

- Where there are safety concerns, or access is restricted due to rail safe working requirements; and/or
- Where erosion and sediment controls prevent access to an outlet and removing these controls would present a risk to water quality (ie removing drain guards).

6.8. Reporting

CoA C14 states that *"The results of the Construction Monitoring Programs must be submitted to the Secretary for information, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program"*.

Relevant agencies are identified within CoA C8(b). As such, a Construction Monitoring Report will be submitted on a six monthly basis to the following agencies;

- DPIE;
- IWC; and
- CoCB.

The Independent Environmental Representative will review the Construction Monitoring Report prior to submission to the DPIE, IWC and CoCB. Downer will participate in further consultation with these agencies where any relevant water quality issues are identified by the monitoring.

6.9. Adaptive management

Where water issues are visibly observed, or if water quality monitoring results indicate that discharge criteria are not being achieved or are otherwise unsatisfactory, then appropriate additional mitigation measures will be investigated and implemented. Work methods and management practices will be assessed and revised or adapted when necessary. These measures may include:

- Additional, more frequent or extended water quality monitoring;
- Amending monitoring locations and parameters where necessary
- Inspection of work site to identify possible sources of excess sediment or other contaminants;
- Inspection of ERSED and other environmental controls for condition, suitability, effectiveness and compliance with the applicable ESCP;
- Repair, replace or reinstate any deficient ERSED controls;
- Implement additional or enhanced ERSED controls where necessary, which may include;
 - Enhanced use of soil stabilisers to minimise erosion;
 - Stabilisation of exposed ground and drainage channels by means of geofabric, crushed rock or hydroseeding;
 - Water velocity control measures such as rock check dams or earth bunds;
 - Additional sediment-trapping devices, such as double-layer barriers at drainage points;
 - Stabilisation of vehicle and pedestrian routes with crushed rock, roadbase or spray seal;
- Review construction practices and amend where necessary, such as management of stockpiles, ceasing activities during rain events, access road maintenance;
- Investigation and advice from subject-matter experts such as a soil conservationist;
- Review and update ESCP to include any additional or enhanced control measures; and
- Additional training and/or awareness for Downer staff and sub-contractors.

Any minor changes made to the Water Quality Monitoring Program would be subject to ER review and approval in accordance with CoA C13. Changes other than those of a minor nature would require approval from the Planning Secretary.

7. Training

All personnel working on site will undergo site induction training relating to soil and water management issues. The training will cover the following issues such as:

- Legislative requirements (POEO Act, EPL etc.) including Section 120;
- Erosion and sedimentation control planning and hold points;
- Duty to notify of environmental harm (or the potential for it) including chain of reporting;
- Spill containment and management procedure;
- Storage and use of hazardous chemicals and dangerous goods;
- Water discharge and reuse procedure;
- Maintenance of environmental controls (e.g. erosion and sediment controls);
- Contamination and Unexpected Finds.

Detailed training will be provided to key personnel regarding erosion and sediment control. This training will include:

- Legislation as it applies to erosion and sediment control;
- Basics of soil management, handling and stockpiling;
- Appropriate use, installation and maintenance of various erosion and sediment control techniques;
- Effective site rehabilitation and stabilisation;
- Use of erosion control techniques such as geotextiles, organic fibre mats, mulches and soil polymer stabilisers;
- Preparing, reading and interpreting ESCPs;
- Typical controls around existing drains and maintenance of controls;
- Relevant sampling, testing and reporting requirements;
- Toolbox talks will also be used to further reinforce awareness of Soil and Water issues.

Further details regarding staff induction and training are outlined in Section 3.5 and 3.9 of the CEMP.

8. Monitoring, auditing and reporting

Downer will regularly review the Project activities to ensure compliance with this Plan. A regular inspection, program for soil and water will be conducted as follows:

- Details of daily inspections undertaken by the Site Supervisor will be logged in their respective site diaries;
- Routine weekly inspections are to be conducted to monitor erosion and sediment controls in active worksites. Weekly inspections will be documented;
- Pre/Post inclement weather events will be recorded within the Inclement Weather Inspection Form; and
- Inspect the operation of soil and water management works installed on the premises and undertake any works required to repair and/or maintain these controls:
 - at least weekly during normal construction hours;
 - prior to any major rainfall event forecasted (>20mm, in 24 hours);
 - daily following a major rainfall event in any 24 hour period (>20mm), if safe to do so; and
 - prior to any site closure of greater than 24 hours.

Typical records generated and maintained would include:

- Copies of current ESCPs for all active construction sites;
- Records of soil and water inspections undertaken;
- Observations and works undertaken to repair and/or maintain soil and water management works;
- Records of testing of any water prior to discharge;
- Records of the release of the hold point to discharge water from the construction site to the receiving environment;
- Records of water quality monitoring and results;
- Unexpected finds; and
- Records for contamination management – soil classification, spoil tracking, disposal dockets, remedial action plans, occupational hygienist clearances, and Site Auditor sign-offs.

As stated in Section 6.8, the results of the Water Quality Monitoring Program will be provided to DPIE, IWC and CoCB, in the form of a Construction Monitoring Report. The Construction Monitoring Report will be produced and submitted on a six monthly basis, within 6 weeks of the end of each monitoring period. The Construction Monitoring Report will include a summary of monitoring undertaken, an overview of the results, analysis of the results and raw data from monitoring.

Complaints and enquiries relating to soil and water management will be managed in accordance with the Sydney Metro Overarching Community Communication Strategy (OCCS) and Section 3.7 of the CEMP.

Incidents, non-conformances and non-compliances that relate to soil and water management will be managed in accordance with Section 3.10 of the CEMP.

9. Review and improvement

The SWMP will be reviewed on a six-monthly basis and earlier if required taking into account below:

- The status and progress of The Project's activities;
- Changes in the design, delivery and operations processes and conditions;
- The adaptive Water Quality Monitoring Program and results;
- 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;
- Lessons learnt from incident, events or near misses;
- Feedback from Compliance Tracking Reports; and
- Feedback on Construction Monitoring Program results.

10. SWMP administration

10.1. Hold points

Soil and water management pre-construction and construction hold points are included within Table 13.

Table 13: SWMP hold points

Item	Process Held	Acceptance Criteria	Approval Authority
CEMP and Sub-plans	Site activities (Prior to construction commencement)	Site specific CEMP and Sub-plans (including this SWMP) have been developed, reviewed, endorsed by the ER and approved by DPIE.	ER Endorsement DPIE Approval.
Reuse or Discharge of water	Dewatering activities (During construction)	Implementation of requirements within Section 5.2 of this plan, prior to any discharge off the premises or reuse within the premises.	Environmental Manager or Coordinator
Water Quality Monitoring Program Amendments (CoA C13)	Amendments to Water Quality Monitoring Program (during construction, as per CoA C13)	Amendments have been reviewed and approved for implementation	ER Endorsement and Approval
Specific Environmental Control Maps (ECMs)/ progressive ESCPS	Dulwich Hill Station works Campsie Station works Punchbowl Station works	ECMs/PESCPs are developed with site specific environmental controls/mitigation measures with site supervisor/engineers for work activities and are to be implemented prior to works commencing (or a new work stage as appropriate)	Environmental Manager or Coordinator

10.2. Records

Records associated with this management plan and monitoring programme will be maintained in accordance with Section 3.16 of the CEMP.

Appendix A – Other Conditions of Approval, Revised Environmental Mitigation Measures and CEMF Requirements Relevant to this Plan

Other relevant CoA relevant to the development of this Plan

CoA No.	Condition Requirement	Document Reference
E8	The location of Construction compounds must not worsen the existing flooding characteristics of the area.	Section 5.4
E9	Where the CSSI will worsen flooding impacts, the Proponent is responsible for implementing measures to address those impacts.	Section 3.6 Section 5.4
E38	All reasonably practicable erosion and sediment controls must be installed and appropriately maintained to minimise water pollution. When implementing such controls, any relevant guidance in the Managing Urban Stormwater series must be considered.	Section 5.1.4
E39	An Unexpected Contaminated Land Procedure and Asbestos Finds Procedure must be prepared and must be followed should unexpected contaminated land or asbestos be excavated or otherwise discovered during Construction.	Section 5.8 Appendix B
E40	The Unexpected Contaminated Land Procedure and Asbestos Finds Procedure must be implemented throughout Construction.	Section 5.8 Appendix B
E41	Dangerous goods, as defined by the Australian Dangerous Goods Code, must be stored and handled strictly in accordance with: (a) All relevant Australian Standards; (b) For liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and (c) The Environment Protection Manual for Authorised Officers: Bunding and Spill Management technical bulletin (EPA, 1997). In the event of an inconsistency between the requirements listed from (a) to (c) above, the most stringent requirement shall prevail to the extent of the inconsistency.	Section 5.6

REMM relevant to the development of this Plan

REMM No.	REMM Requirement	Timing	Document Reference
Soils and contamination			
SC1	Erosion and sediment control measures would be implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Managing Urban Stormwater: Soils and Construction Volume 2A (DECC, 2008). Measures would be designed as a minimum for the 80th percentile, five day rainfall event.	Design/pre-construction	Section 5.1.4
SC2	Prior to ground disturbance in high probability acid sulfate areas, testing would be carried out to determine the presence of acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998) and the Waste Classification Guidelines - Part 4: Acid Sulfate Soils (EPA, 2014).	Design/pre-construction	Section 5.11
SC3	Prior to ground disturbance in areas of potential soil salinity, testing would be carried out to confirm the presence of saline soils. If saline soils are encountered, they would be managed in accordance with Site Investigations for Urban Salinity (DLWC, 2002).	Design/pre-construction	Section 3.2.2 Section 5.10
SC4	WorkCover dangerous goods searches would be carried out for properties that have potential contamination near Belmore Station, to provide additional site characterisation and identify the risk of contamination in these areas	Design/pre-construction	SC4 relates to Belmore Station upgrade. As outlined in the Staging Report, this is outside the scope of this Project and is not relevant.
SC5	Prior to ground disturbance, a detailed contamination assessment would be undertaken in areas with a medium to high risk of contamination, to confirm the nature and extent of contamination, specific requirements for further investigation and remediation, and/or management requirements of any contamination.	Design/pre-construction	The areas with a medium to high risk of contamination as published in the EIS are outlined in Table 6. No areas with a medium to high risk of contamination have been identified within proximity of this Project. Phase 2 contamination assessments that have been carried out along the rail corridor, at station precincts and on station platforms are outlined in Section 3.3.
SC6	Hazardous materials surveys would be undertaken during detailed design for all proposed demolition activities, and for utility adjustments as required.	Design/pre-construction	Section 3.3.1

REMM No.	REMM Requirement	Timing	Document Reference
SC7	In the event a Remediation Action Plan is required, it would be developed in accordance with Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) and a NSW Environment Protection Authority Accredited site auditor would be engaged to audit the works.	Design/pre-construction	Section 3.3
SC8	In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the area would cease, and the finds would be managed in accordance with the unexpected contamination finds procedure.	Construction	Section 5.8 Appendix B
Hydrology, flooding and water quality			
FHW1	Where feasible and reasonable, detailed design would result in no net increase in stormwater runoff rates in all storm events, unless it can be demonstrated that increased runoff rates as a result of the project would not increase downstream flood risk.	Design/pre-construction	Section 3.6
FHW2	Detailed design of the project would, as required at Bankstown between Stacy Street and Marion Street, take into account the impact of overland flooding for the full range of flood events up to the Probable Maximum Flood level.	Design/pre-construction	FHW2 relates to Bankstown Station upgrade. As outlined in the Staging Report, this is outside the scope of this Project and is not relevant.
FHW3	The project would be designed in accordance with water quality design criteria based on the Water Sensitive Urban Design Guideline (Roads and Maritime, 2017) to ensure there is minimal potential for water quality impacts, including incorporating water sensitive urban design elements.	Design/pre-construction	REMM FHW3 relates to the Project's design and is not relevant to the content of this SWMP.
FHW5	Detailed construction planning would consider flood risk for all compounds and work sites. This would include identification of measures to not worsen existing flooding characteristics. Not worsen is defined as: <ul style="list-style-type: none"> • a maximum increase in flood levels of 50 mm in a one per cent AEP event • a maximum increase in time of inundation of one hour in a one per cent AEP event • no increase in the potential for soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event. 	Construction	Section 5.4

REMM No.	REMM Requirement	Timing	Document Reference
FHW6	The site layout and staging of construction activities would: <ul style="list-style-type: none"> avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required consider how works would affect the existing stormwater network such that alternatives are in place prior to any disconnection or diversion of stormwater infrastructure. 	Construction	Section 5.4
FHW7	Works within or near watercourses (including the Cooks River) would be undertaken with consideration given to the NSW Office of Water's guidelines for controlled activities.	Construction	No works are proposed within or near watercourses for this Project. Section 3.5.1
FHW8	Erosion and sediment mitigation measures would be installed and maintained for the duration of the construction period.	Construction	Section 5.1
FHW9	The water quality monitoring program would continue during construction, to monitor water quality at identified discharge points.	Construction	Section 6 Section 6.4
FHW10	Discharges from construction water treatment devices would be monitored to ensure compliance with the discharge criteria in the environment protection licence.	Construction	Section 5.2.2
Hazards, risks and safety			
HRS4	All hazardous substances that may be required for construction and operation would be stored and managed in accordance with the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005) and the Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011).	Construction and operation	Section 5.6

CEMF requirements relevant to the development of this Plan

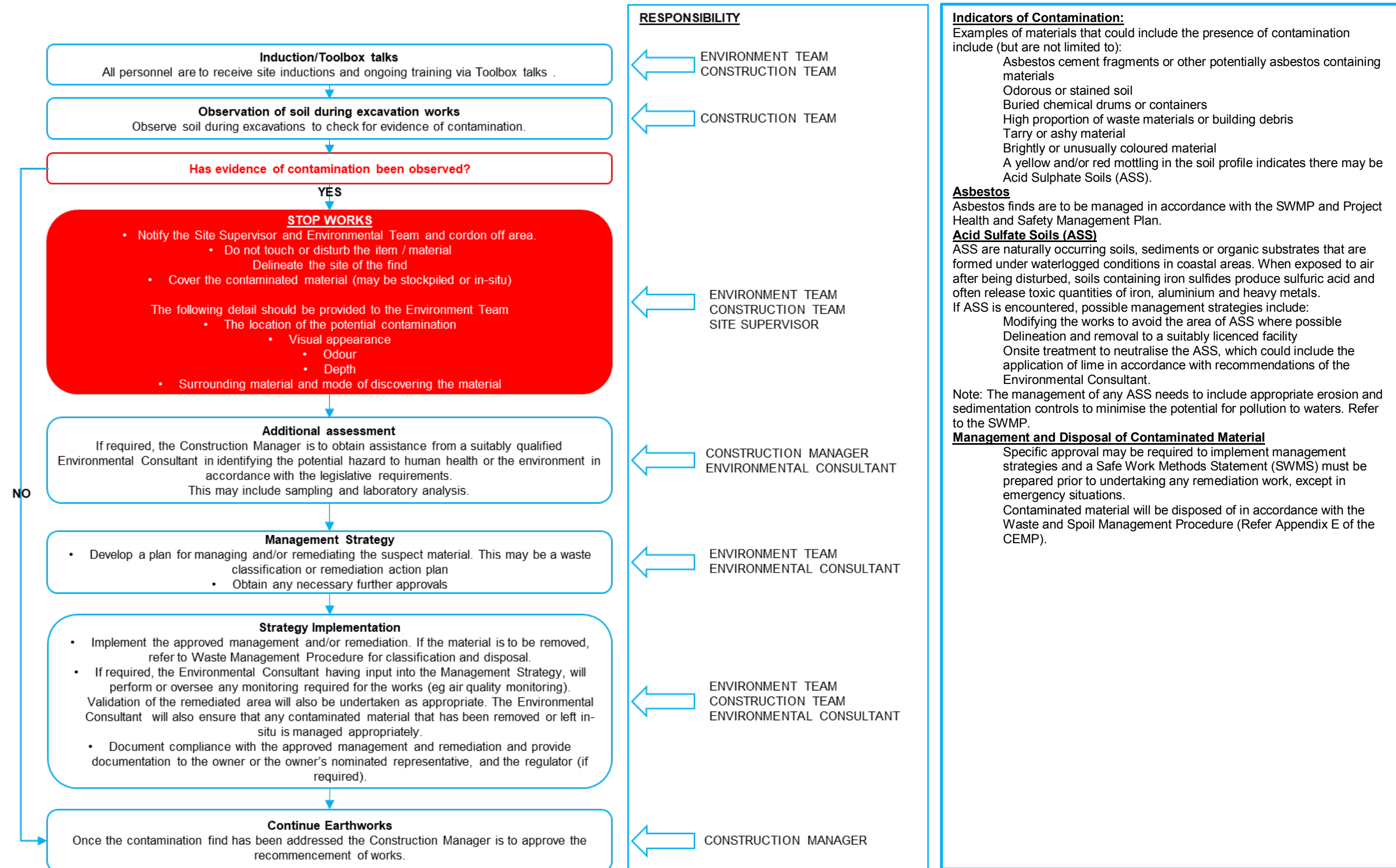
CEMF Section	CEMF Requirement	Document Reference
15.1 (a)	The following soil and water management objectives will apply to construction: <ul style="list-style-type: none"> i. Minimise pollution of surface water through appropriate erosion and sediment control. ii. Maintain existing water quality of surrounding surface watercourses. iii. Source construction water from non-potable sources, where feasible and reasonable. 	Section 1.3 Table 1
15.2 (b)	Principal Contractors will develop and implement progressive erosion and sediment control plans (ESCPs) for all active worksites in accordance with Managing Urban Stormwater: Soils & Construction Volume 1 (Landcom, 2004) (known as the “Blue Book”). The ESCPs will be approved by the Contractor’s Environmental Manager (or delegate) prior to any works commencing (including vegetation clearing) on a particular site. Copies of the approved ESCP will be held by the relevant Contractor personnel including the Engineer and the Site Foreman.	Section 5.1.4
15.2 (c)	ESCPs will detail all required erosion and sediment control measures for the particular site at the particular point in time and be progressively updated to reflect the current site conditions. Any amendments to the ESCP will be approved by the Contractor’s Environmental Manager (or delegate).	Section 5.1.4
15.2 (d)	Principal Contractors will develop and implement Stormwater and Flooding Management Plans for the relevant construction sites. These plans will identify the appropriate design standard for flood mitigation based on the duration of construction, proposed activities and flood risks. The plan will develop procedures to ensure that threats to human safety and damage to infrastructure are not exacerbated during the construction period.	Stormwater and Flooding Management Plans will be developed by the Principal Contractor prior to Construction where construction sites are within the 100 year ARI + 10% increase in rainfall flood zone.
15.2 (e)	Principal Contractors will undertake the following soil and water monitoring as a minimum: <ul style="list-style-type: none"> i. Weekly inspections of the erosion and sediment control measures. Issues identified would be rectified as soon as practicable. ii. Additional inspections will be undertaken following significant rainfall events (greater than 20 mm in 24 hours). iii. All water will be tested (and treated if required) prior to discharge from the site in order to determine compliance with the parameters of the EPL. No water will be discharged from the site without written approval of the Contractor’s Environmental Manager (or delegate). This is to form a HOLD POINT. 	Section 1.3 Section 6 Section 10.1

CEMF Section	CEMF Requirement	Document Reference
15.2 (f)	<p>The following compliance records will be kept by the Principal Contractors:</p> <ul style="list-style-type: none"> i. Copies of current ESCPs for all active construction sites. ii. Records of soil and water inspections undertaken. iii. Records of testing of any water prior to discharge. iv. Records of the release of the hold point to discharge water from the construction site to the receiving environment. 	Section 10.2
15.2 (g)	<p>The following water resources management objectives will apply to the construction of the project:</p> <ul style="list-style-type: none"> i. Minimise demand for, and use of potable water. ii. Maximise opportunities for water re-use from captured stormwater, wastewater and groundwater. iii. Examples of measures to minimise potable water consumption include: <ul style="list-style-type: none"> • Water efficient controls, fixtures and fittings in temporary facilities. • Collecting, treating and reusing water generated in tunnelling operations, concrete batching and casting facility processes. • Using recycled water or treated water from onsite sources in the formulation of concrete. • Harvesting and reusing rainwater from roofs of temporary facilities. • Using water from recycled water networks. • Collecting, treating and reusing groundwater and stormwater. • Using water efficient construction methods and equipment. • Providing designated sealed areas for equipment wash down. 	Refer to Sustainability Management Plan Section 5.3
15.3 (a)	<p>Examples of surface water and flooding mitigation measures include:</p> <ul style="list-style-type: none"> i. Clean water will be diverted around disturbed site areas, stockpiles and contaminated areas. ii. Control measures will be installed downstream of works, stockpiles and other disturbed areas. iii. Exposed surfaces will be minimised, and stabilised / revegetated as soon feasible and reasonable upon completion of construction. iv. Dangerous good and hazardous materials storage will be within bunded areas with a capacity of 110 per cent of the maximum single stored volume. v. Spill kits will be provided at the batch plants, storage areas and main work sites. 	Section 5

The table below presents the compliance matrix for the EPL 12208 Clauses relating to construction soil and water.

EPL Clause	Requirement / Measure	Document Reference
Pollution of waters		
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Section 2 Section 5
Erosion and sediment control		
O13.7	The licensee must, before and during maintenance activities, implement all feasible and reasonable erosion and sediment controls to minimise sediment leaving the Sydney Trains Network.	Section 5.1
O13.8	Erosion and sediment controls must be designed, constructed, operated and maintained in accordance with “Managing Urban Stormwater: Soil and Construction, Volume 1, 4 th Edition” (Landcom, 2004) to be read and used in conjunction with the relevant DECC Managing Urban Stormwater – Soils and Construction volume.	Section 5.1

Appendix B – Procedures

UNEXPECTED CONTAMINATED LAND AND ASBESTOS FINDS PROCEDURE

Appendix C – Acid Sulfate Soils Treatment Process

8.4.5 Soil treatment procedure

Acid sulfate soil material should be placed on the treatment pad (see Figure 8-1) or fill area in layers up to 300 mm thick. Thinner layers of soil can be more easily and thoroughly dried and mixed; 300 mm is suggested as a maximum, not only to prevent inadequate mixing but to prevent equipment from bogging and to allow compaction to improve strength, thus minimising subsidence and heave when filling. Once the ASS is dry enough to work, the appropriate amount of neutralising agent, calculated to include the safety factor, should be spread. The ASS may need reworking several times to achieve adequate mixing of the neutralising agent and/or drying of the soil.

The treated layer will require verification testing (see section 8.2 and ASS tips 13 and 14) to confirm whether enough neutralising agent has been incorporated into the soil. Treated and verified soil should be subsequently compacted before treatment of the next layer begins, or when moved to the permanent placement area if first mixed on temporary treatment pads. Compaction is not necessary if the treated soil is permitted to be disposed of or reused elsewhere.

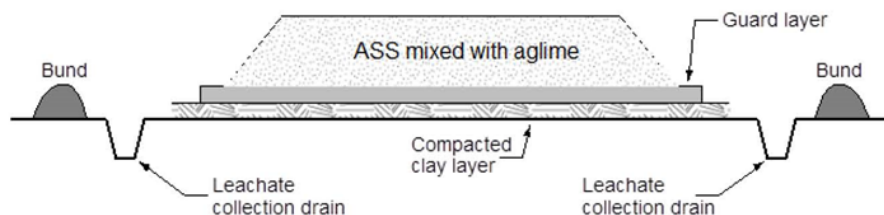


Figure 8-1: Schematic cross-section of a treatment pad, including a compacted clay layer, guard layer, leachate collection system and containment with bunding

Where soil mixing machinery (e.g. Figure 8-2) is used, soil treatment should still be carried out in a bunded and sealed area as per section 8.4.3. Treated batches should be spatially arranged in such a manner that re-treatment is easy in cases of verification test failure.

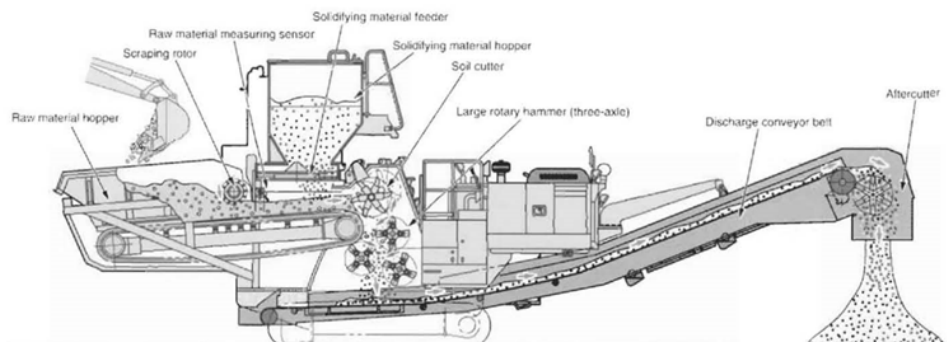


Figure 8-2: Cross-sectional view of soil mixing machinery (Komatsu, 2003). Note that soil treatment with such machinery should be carried out in an appropriately contained area, including bunding and measures to prevent leachate infiltration.

Appendix D – Consultation Register

Agency	Comment	Project Response
CoCB	<p>Email received 22/12/20</p> <p><i>"I have reviewed both the NVMP and SWMP and it appears that Councils original recommendations have been included in both documents.</i></p> <p><i>The EH team have no further comments."</i></p>	Noted. No changes to this SWMP proposed.
IWC	<p>Email received 9/12/21</p> <p><i>"My main comment is about an important seed bank in the soil at Dulwich Hill Station, along Dudley Street as shown in the attached map:</i></p> <ul style="list-style-type: none"> <i>• There is a very valuable seed bank in the soil for Sydney –Turpentine Ironbark Forest understorey (Themeda, Cymbopogon, Rytidosperma and Dichelachne species).</i> <i>• Remnant plants also grow in this area, although they get mown occasionally.</i> <i>• This is an important seed collection site for Council and should not be disturbed"</i> 	<p>As indicated in Figure 1 of the CEMP, minimal Project works are proposed within proximity to the area identified by IWC adjacent to Dudley Street in Dulwich Hill.</p> <p>Section 5.1.1 has been revised to include a dot point which states <i>"Minimise the loss of topsoil where practicable"</i></p> <p>As this area is also identified as Degraded Sydney Turpentine Ironbark Forest in the Planning Approval, refer to the Biodiversity Procedure in Appendix E of the CEMP for management.</p>
NRAR	<p>Email received 12/01/21</p> <p><i>"It is NRARs understanding in 2021 Sydney Metro will start upgrades to stations between Marrickville and Bankstown, as part of the Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade project. You are seeking input from NRAR as a condition of consent under SSI-8256 for the Construction Soil and Water Management Sub-plans for the three station upgrades listed below.</i></p> <p><i>NRAR have no comment on the sub-plans for the following proposed station upgrade projects:</i></p> <ol style="list-style-type: none"> <i>1. Marrickville, Canterbury and Lakemba Station upgrade project</i> <i>2. Dulwich Hill, Campsie and Punchbowl Station upgrade project</i> <i>3. Hurlstone Park, Belmore and Wiley Park Station upgrade project</i> <p><i>Kind regards"</i></p>	Noted. No changes to this SWMP proposed.
EESG	<p>Email received 20/11/20</p> <p><i>"EES will not be providing comments on the sub-plan. Please note that this should not be considered as support for the plan.</i></p> <p><i>If you have any questions, please do not hesitate to contact me.</i></p> <p><i>Regards"</i></p>	Noted. No changes to this SWMP proposed.

Agency	Comment	Project Response
NSW EPA	<p>Email received 29/01/21</p> <p><i>“The EPA’s position on post approval management plans, including the CEMP, is to encourage the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives.</i></p> <p><i>However, we do not approve or endorse these documents as our role is to set environmental objectives for environmental management and not to be directly involved in the development of strategies to achieve those objectives. Therefore we will not be providing comments on the CEMP and associated sub-plans.</i></p> <p><i>The EPA may however request such documents are submitted with Environment Protection Licence applications or variations to ensure compliance with s45 of the POEO Act and to support those decisions.</i></p> <p><i>Please let me know if you need any further information.”</i></p>	Noted. No changes to this SWMP proposed.

Appendix I: Heritage Management Plan



Southwest Metro – Dulwich Hill, Campsie and Punchbowl Railway Station Upgrades Heritage Management Plan

Sydney Metro Integrated Management System (IMS)

Applicable to:	City & Southwest
Document Owner:	Southwest Metro
System Owner:	-
Status:	Final
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02	27 January 2021	Updated in response to ER comments. For ER endorsement and issue to DPIE.
03	4 March 2021	Revised in response to DPIE comments
04	30 March 2021	To incorporate Downer EMS

Terms and Definitions

Terms	Definitions
AARD	Archaeological Assessment and Research Design
ACHAR	Aboriginal Cultural Heritage Assessment Report
AFG	Aboriginal Focus Group
AHIMS	Aboriginal Heritage Information Management System
AMS	Archaeological Method Statement
AMZ	Archaeological Management Zone
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CHL	Commonwealth Heritage List
CoA	Conditions of Approval
CoCB	City of Canterbury-Bankstown
CSR	Combined Services Route
CSSI	Critical State Significant Infrastructure
DECC	NSW Department of Environment and Climate Change (now OEH)
DPC	NSW Department of Premier and Cabinet
DPIE	NSW Department of Planning, Industry and Environment
ECM	Environmental Control Map
ED	Excavation Director
EIS	Environmental Impact Statement
EP&A Act	Environment Planning and Assessment Act 1979 (NSW)
EPA	NSW Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ER	Environmental Representative
GST	Galvanised Steel Troughing
HIA	Heritage Impact Assessment
HMP	Heritage Management Plan
IMS	Sydney Metro Integrated Management System
IWC	Inner West Council
LEP	Local Environmental Plan
Minister, the	The Minister of New South Wales (NSW) Planning
NP&W Act	NSW National Parks and Wildlife Act 1974
NSW	New South Wales
NVMP	Construction Noise and Vibration Management Plan
OEH	NSW Office of Environment and Heritage
PAD	Potential Archaeological Deposit
PIR	Preferred Infrastructure Report

Terms	Definitions
Proponent	The person or organisation identified as the proponent in Schedule 1 of the planning approval. In this case Transport for NSW
RAPs	Registered Aboriginal Parties. As defined in the Aboriginal cultural heritage consultation requirements for proponents 2010
REMM	Revised Environmental Mitigation Measure
Secretary	The Secretary of the Department of Planning, Industry and Environment
SMA	Sydney Metro Authority
SPIR	Submissions and Preferred Infrastructure Report
SSI	State Significant Infrastructure
TfNSW	Transport for New South Wales
WHL	World Heritage List

1. Introduction

1.1. Context and scope of this Sub-Plan

This Heritage Management Plan (HMP or Plan) forms part of the Construction Environmental Management Plan for Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades (the Project).

This HMP has been prepared to address the requirements of the Conditions of Approval (CoA), the Revised Environmental Mitigation Measures (REMM) and the Sydney Metro Construction Environmental Management Framework (CEMF).

This HMP describes how Downer proposes to manage and protect Aboriginal and non-Aboriginal heritage during the construction of the Project. The HMP describes how Downer will ensure risks associated with heritage management are considered and managed effectively during the construction of the Project. It has been prepared to support, and should be read in conjunction with, the Sydney Metro CEMF as well as a number of Sydney Metro and Downer prepared heritage related plans and procedures.

Downer's Heritage Management Standard (DG-ZH-ST076) mentions that the outcome of the comprehensive heritage study will form the basis for any actions to protect the heritage sites. Before commencing any work, heritage requirements must be determined and included within the Construction Environmental Management Plan (CEMP). In some instances, it may be necessary to develop a Heritage Management sub-plan which must include:

- Establishment of existing conditions
- Significance of the heritage site
- Approval conditions
- Downer's proposed management strategies
- Downer's proposed monitoring strategies; and
- The locations of Cultural Heritage Sites of the Contract positioned on a map showing the interaction between the Contract works and the Cultural Heritage Sites. The map may be electronic (e.g. GIS) or paper and must be referenced in the Contract Environmental Management Plan (CEMP) and reviewed annually with the CEMP review.

1.2. Project Background

The Sydney Metro City and Southwest – Sydenham to Bankstown Environmental Impact Statement (EIS) (GHD/AECOM September 2017) assessed the impacts of construction and operation on Non-Aboriginal heritage and Aboriginal heritage within Chapter 14 (Non-Aboriginal heritage) and Chapter 15 (Aboriginal heritage) respectively. The Sydney Metro City and Southwest – Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report (SPIR) (GHD/AECOM June 2018) was prepared in response to the submissions received during the EIS exhibition period. The SPIR revised the scope of the Sydenham to Bankstown Upgrade project, resulting in an overall reduction of potential heritage impacts during construction and the updated Non-Aboriginal Heritage Assessment was included in SPIR Appendix F.

Impact to items in the Project's study area as assessed in the SPIR are listed in Table 1 and are shown in Figure 2, Figure 3, Figure 4 and Figure 5. The Project's impact on Aboriginal Heritage is outlined in Section 3.2 and shown in Figure 1.

Table 1: Impacts to heritage items (SPIR) relevant to this Project

Item	Significance level	Direct	Visual	Potential direct	Significance retained?
Dulwich Hill Railway Station Group	Local	Moderate	Moderate	Negligible	Yes
South Dulwich Hill Conservation Area	Local	Negligible	Negligible	Negligible	Yes
Old Sugarmill	State	Negligible	Negligible	Negligible	Yes
Campsie Railway Station Group	Local	Moderate	Moderate	Negligible	Yes
Punchbowl Railway Station Group	Local	Moderate	Moderate	Negligible	Yes

Please refer to Section 1 of the CEMP for the Project Description.

1.3. Objectives and targets

The HMP provides the basis for the management of heritage issues and aims to minimise the risk of impact during the course of the development, and to mitigate of any impact that cannot be avoided. Mitigation and management measures are outlined in Table 13.

The objectives and targets of heritage management and mitigation are outlined below:

- Minimise impacts on items or places of heritage value;
- Avoid accidental impacts on heritage items;
- Maximise worker's awareness of Aboriginal and non-Aboriginal heritage;
- No disturbance or damage to known heritage sites or items, beyond that approved by the SSI Approval;
- Unknown or undocumented heritage items are not knowingly destroyed, defaced or damaged;
- Consult with Registered Aboriginal Parties (RAP) and other identified stakeholders prior to impacts in areas which have been assessed to possess archaeological potential, and/or upon the discovery of unexpected Non-Aboriginal and Aboriginal objects or cultural features;
- Any historical relics found on site shall be kept safe for consideration for incorporation into interpretation within the public domain—within the proposed site fixtures as may be supported by the Interpretation Strategy and Plan; and
- No harm, destruction or defacement of human remains, including Aboriginal burials, will occur.

These objectives conform to Sydney Metro's objectives as described in the CEMF.

1.4. Consultation

CoA C3(d) requires that the HMP be prepared in consultation with the relevant Councils and Department of Premier and Cabinet (Heritage NSW) (formerly Heritage Division) as delegate for the NSW Heritage Council. As such the following stakeholders have been consulted in developing this HMP:

- Heritage NSW;
- City of Canterbury Bankstown Council (CoCB); and
- Inner West Council (IWC).

A summary of the consultation is provided below and in Appendix C.

Table 2: Consultation carried out in the development of this Plan

CoA	Agency Consultation	Requirements and date submitted	Key issues raised	HMP Section Reference
C6	Department of Planning, Industry and Environment (DPIE)	Issued for review and approval Re-issued in response to DPIE comments	Various comments	Section 5 Table 13 Section 7 Section 8
C3(d)	Department of Premier and Cabinet Heritage NSW (formerly Heritage Council)	Issued for consultation 18/11/20 Invited to consultation workshop held 25/11/20. Response received 9/12/20 HMP Rev02 was re-issued for consultation, due to inclusion of Canterbury compound on 27/01/21. Response received 17/02/21	Query raised with regards to whether consultation with RailCorp has occurred.	N/A
	CoCB	Issued for consultation 18/11/20 Invited to consultation workshop held 25/11/20. Response received 22/12/20	Incorrect heritage specialist role responsibilities in Table 13.	Revisions made to Table 13
	IWC	Issued for consultation 18/11/20 Invited to consultation workshop held 25/11/20. Response received 21/01/21	Incorrect heritage specialist role responsibilities in Table 13. Editorial comment relating to management action in Table 13	Revisions made to Table 13

Consultation with Registered Aboriginal Parties (RAPs) was undertaken during concept design as part of the Sydney Metro Sydenham to Bankstown EIS and also during the preparation of the Aboriginal Cultural Heritage Assessment Report (ACHAR) (Artefact Heritage 2018). No further RAP consultation is required under the CoA or REMM in the preparation of this HMP.

As outlined in Section 5.1.2, S2B PAD02 archaeological excavation methodology will be reviewed by RAPs and RAPs will participate in the archaeological excavation works.

The Downer Heritage Management Standard (DG-ZH-ST076) also refers to consultation with the land owner when planning a high impact activity (e.g. ground disturbance, compaction, vibration, disturbance to trees etc.).

Where a preliminary investigation indicates the potential presence of heritage sites, a more comprehensive study by suitably qualified person(s) must be undertaken prior to any works commencing. This existing environment and heritage context of the Project was assessed by Artefact Heritage with details provided in Section 3.

2. Legal and other requirements

The HMP addresses applicable requirements within the following documents:

- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Conditions of Approval SSI-8256*, determined 12 December 2018 and modified 22 October 2020;
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Environmental Impact Statement*, September 2017;
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Submissions and Preferred Infrastructure Report*, dated June 2018;
- The Sydney Metro *City and Southwest - Sydenham to Bankstown Upgrade Bankstown Station Modification Report* May 2020;
- The Sydney Metro *Sydenham to Bankstown Staging Report*; and
- The Sydney Metro *Construction Environmental Management Framework v3.2*

The Compliance Matrix in Section 2.2 provides a comprehensive list of compliance requirements, environmental documents and the contract documents.

Table 3 below details the legislation and planning instruments considered during development of this Plan.

Table 3: Legislation and Planning Instruments

Legislation	Description	Relevance to this HMP
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 HMP.
Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (Cwth)	<p>The main purpose of this Act is to provide for the protection of the environment especially those aspects that are of national environmental importance and to promote ecological sustainable development.</p> <p>Heritage places are listed on the National Heritage List (NHL) for their 'outstanding heritage value to the nation' and are owned by a variety of constituents, including government agencies, organisations or individuals. Only items owned or controlled by the Commonwealth that meet the threshold for national heritage listing under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) are listed on the Commonwealth Heritage List (CHL) and/or the World Heritage List (WHL) and afforded protection under the EPBC Act.</p>	Not relevant as no NHL, CHL or WHL items

Legislation	Description	Relevance to this HMP
National Parks and Wildlife Act 1974	The relevance of this Act is firstly in respect to the protection and preservation of Aboriginal artefacts. Discovery of material on site suspected as being of Aboriginal origin must be reported and protected pending assessment and direction by Sydney Metro.	An Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974 is not required for works approved under Part 5.1 of the EP&A Act. One area of archaeological potential S2B PAD02 has been identified within the Project site at Punchbowl Station. Management of S2B PAD02 will be carried out under separate provisions to this HMP as itemised in the project ACHAR (Artefact Heritage 2018).
Heritage Act 1977	This Act provides for the preservation and conservation of heritage items such as building, works, relic, places of historic interest, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance. It is an offence under this Act to wilfully and knowingly damage or destroy items of heritage value. Do not demolish, damage, move or develop around any place, building, work, relic, moveable object, precinct, or land that is the subject of an interim heritage order or listing on the State Heritage Register or heritage listing in a Local Environmental Plan without an approval from the Heritage NSW or local council.	Heritage Items are identified on the Project site and addressed as part of the CoA. An approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977 is not required for works approved under Part 5.1 of the EP&A Act.
Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cwth)	This Act provides for the preservation and protection from injury or desecration to areas and objects of particular significance to Aboriginals. Areas and objects can be protected by Ministerial Declaration and it is then an offence to contravene such a declaration.	No areas or objects within the Project have been identified as being subject to such a declaration and this Act is of little relevance to the Project.
Coroners Act	This Act enables coroners to investigate certain kinds of deaths or suspected deaths in order to determine the identities of the deceased persons, the times and dates of their deaths and the manner and cause of their deaths.	This Act is relevant if Human Skeletal Remains are located within the Project area

A number of heritage reports were prepared during detailed design for the Dulwich Hill, Campsie and Punchbowl Railway Station upgrades, in order to address design related REMM. The findings and recommendations of these reports have been included in the HMP where relevant. It is noted in the compliance matrix where the design related REMM for the project have been fulfilled by these reports (refer to Appendix A).

- Sydney Metro City and Southwest Movable Heritage Strategy, October 2020;
- Sydney Metro City and Southwest Adaptive Reuse Strategy, October 2020;
- Sydney Metro City and Southwest Heritage Salvage Strategy, October 2020;
- Sydney Metro City and Southwest Significant Elements Register Dulwich Hill Station, October 2020;
- Sydney Metro City and Southwest Significant Elements Register Campsie Station, October 2020;
- Sydney Metro City and Southwest Significant Elements Register Punchbowl Station, October 2020;
- Sydney Metro City and Southwest Heritage Impact Assessment Dulwich Hill Station, October 2020;
- Sydney Metro City and Southwest Heritage Impact Assessment Campsie Station, October 2020;
- Sydney Metro City and Southwest Heritage Impact Assessment Punchbowl Station, October 2020;
- Sydney Metro City and Southwest Photographic Archival Report Dulwich Hill Railway Station, November 2020;
- Sydney Metro City and Southwest Photographic Archival Report Campsie Railway Station, November 2020;
- Sydney Metro City and Southwest Photographic Archival Report Punchbowl Railway Station, November 2020;
- Sydney Metro City and Southwest Heritage Interpretation Plan Dulwich Hill Station, October 2020;
- Sydney Metro City and Southwest Heritage Interpretation Plan Campsie Station, October 2020; and
- Sydney Metro City and Southwest Heritage Interpretation Plan Punchbowl Station, October 2020.

2.1. Guidelines

Additional guidelines and standards to the management of heritage include:

- *Code of Practice for the archaeological investigation of Aboriginal objects in NSW*, (OEH 2010);
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (OEH 2010);
- *Due Diligence Code of practice for protection of Aboriginal objects in NSW* (OEH 2010);
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2010);
- *Assessing Heritage Significance* (NSW Heritage Office 2001);
- *Levels of Heritage Significance* (NSW Heritage Office 2008);

- *Assessing Significance for Historical Archaeological Sites and Relics* (NSW Heritage Branch, Department of Planning 2009);
- *Investigating Heritage Significance* (NSW Heritage Office 2001);
- *How to Prepare Archival Recording of Heritage Items* (Heritage Branch 1998);
- *Photographic Recording of Heritage Items Using Film or Digital Capture* (Heritage Branch 2006).
- *Downer Heritage Management Standard DG-ZH-ST076* (DG-ZH-ST076)

2.2. Conditions of Approval

The CoA and REMM relevant to this HMP are listed in Table 4 below. In accordance with CoA C4, the relevant requirements of the CEMF have also been included in Table 4. Table 4 also provides a cross reference to demonstrate where the CoA or REMM is addressed in this HMP or other management documents.

Please refer to Appendix A for all other CoA, REMM and CEMF requirements relevant to the development of this Plan.

Table 4: HMP Compliance Matrix

No.	Requirement	Reference	How addressed?			
Conditions of Approval						
C3	<div>The 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:</div> <table><tr><td>(d)</td><td>Heritage</td><td>Heritage Council (or its delegate) and relevant council(s)</td></tr></table>	(d)	Heritage	Heritage Council (or its delegate) and relevant council(s)	Section 1.4 Appendix C	This Plan has been prepared in accordance with this condition and describes how Downer proposes to manage heritage during construction of the Project. This Plan has been provided to Heritage NSW, City of Canterbury Bankstown Council and Inner West Council for consultation. Details of consultation are provided in Section 1.4 and Appendix C.
(d)	Heritage	Heritage Council (or its delegate) and relevant council(s)				
C4	The CEMP Sub-plans must be prepared in accordance with the CEMF	This Table	Table 4 demonstrates how this Plan has been prepared in accordance with the relevant requirements of the CEMF.			
C5	Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-Plan.	Section 1.4 Appendix C	This Plan has been provided to Heritage NSW, City of Canterbury Bankstown Council and Inner West Council for consultation. Details of consultation are provided in Section 1.4 and Appendix C.			
C6	Any of the CEMP Sub-plans may be submitted along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before Construction.	Refer to section 1.2 of the CEMP	This Plan will be submitted for approval to DPIE along with or subsequent to the final submission of the CEMP for DPIE approval, and no later than one month prior to construction.			
C7	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of Construction. Where Construction of the CSSI is staged, Construction of a stage must not commence until the CEMP and CEMP Sub-plans for that stage have been approved by the Planning Secretary.	Refer to section 1.2 of the CEMP	Construction will not commence until the CEMP and all CEMP Sub-plans have been approved by DPIE. The CEMP and Sub-plans will be implemented for the duration of construction.			
Construction Environmental Management Framework						
10.2(a)	Principal Contractors will develop and implement a Heritage Management Plan which will include as a minimum:	-	This Plan			

No.	Requirement	Reference	How addressed?
i.	Evidence of consultation with Registered Aboriginal Parties and the NSW Heritage Council	Section 1.4 Appendix B Appendix C	<p>RAP consultation has been carried out and evidenced in preparation of the ACHAR. Further engagement with RAPs may be required in the event of Unexpected Finds of Aboriginal cultural material, and to facilitate archaeological test excavation of S2B PAD02.</p> <p>As outlined in Section 1.4, the key stakeholders related to Heritage who will be consulted in finalisation of this HMP are</p> <ul style="list-style-type: none"> Heritage NSW (delegate of the Heritage Council); City of Canterbury Bankstown; and Inner West Council.
ii.	Identify initiatives that will be implemented for the enhancement of heritage values and minimisation of heritage impacts, including procedures and processes that will be used to implement and document heritage management initiatives	Table 13	Table 13 includes detailed management and mitigation measures which include all relevant requirements of the CoA, REMM and recommendations of the Heritage Impact Assessment reports prepared during detailed design, as outlined in Section 2.
iii.	The heritage mitigation measures as detailed in the environmental approval documentation	Section 5 Table 13 Appendix A	The Table in Appendix A outlines how the heritage mitigation measures as detailed in the environmental approval documentation have been considered in the development of this Plan.
iv.	The responsibilities of key project personnel with respect to the implementation of the plan	Section 2.3 Table 5	Section 2.3 and Table 5 outline roles and responsibilities of key Project personnel with respect to the implementation of this Plan.
v.	Procedures for interpretation of heritage values uncovered through salvage or excavation during detailed design	Section 2 Section 5.2.4	As outlined in Section 2 and 5.2.4, a Heritage Interpretation Strategy has been prepared for the Sydney Metro Sydenham to Bankstown upgrade project and individual Heritage Interpretation Plans have been prepared for each station precinct by Artefact Heritage as part of detailed design. This requirement has been met during design phases.

No.	Requirement	Reference	How addressed?
vi.	Procedures for undertaking salvage or excavation of heritage relics or sites (where relevant), consistent with and any recordings of heritage relics prior to works commencing that would affect them	Section 5.1.2 Section 5.3.2	<p>The AARD identified that the Project at Dulwich Hill, Campsie and Punchbowl Stations had only a low potential of minor impacts to items of low archaeological significance. Management of such impacts will be handled through implementation of the Sydney Metro Unexpected Heritage Finds Procedure.</p> <p>An Archaeological Method Statement (AMS) will be prepared for the establishment and use of Downer's compound at Canterbury which will include appropriate archaeological management strategies in accordance with the Archaeological Assessment and Research Design (AARD) report.</p> <p>Archaeological excavation of S2B PAD02 will be carried out in accordance with the methodology in the ACHAR.</p>
vii.	Details for the short term and/or long term management of artefacts or movable heritage	Section 5.3.8	<p>The Sydenham to Bankstown Moveable Heritage Strategy outlines retention, storage and reinstatement requirements for moveable heritage identified at Dulwich Hill, Campsie and Punchbowl Stations.</p>
viii.	Details of management measures to be implemented to prevent and minimise impacts on heritage items (including further heritage investigations, archival recordings and/or measures to protect unaffected sites during construction works in the vicinity)	Section 5 Table 13	<p>As outlined in Section 5 and Table 13 the following measures have been put in place to minimise adverse impacts:</p> <ul style="list-style-type: none"> • Exclusion zones; • Recommendations of the station specific heritage impact assessments as outlined in Table 13 will be adhered to; • Use of a Heritage Architect/Heritage Engineer where required; • Archaeological excavation of S2B PAD02 will be carried out in accordance with the methodology in the ACHAR. • Sydney Metro Unexpected Heritage Finds Procedure; • Archaeological management under the Sydney Metro AARD and AMS.

No.	Requirement	Reference	How addressed?
ix.	Procedures for unexpected heritage finds, including procedures for dealing with human remains	Section 5.1.4 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D)	The Sydney Metro Unexpected Heritage Finds Procedure will be implemented for the Project. It is not expected that human remains will be encountered as no potential for burials has been identified. The Sydney Metro Exhumation Plan will be implemented where required.
x.	Heritage monitoring requirements	Section 7	Monitoring of works within Archaeological Management Zones will occur in accordance with the requirements of the relevant AMS and the instruction of the Excavation Director.
xi.	Compliance record generation and management	Section 7	Compliance record generation and management in relation to this Plan will be undertaken in accordance with Section 7.

2.3. Roles and responsibilities

The roles and responsibilities of key personnel with respect to heritage management are as followed in Table 5. All personnel are responsible for ensuring that heritage items are protected.

Table 5: Roles and responsibilities

Roles	Responsibilities
Department of Planning, Industry and Environment	Approval of the Heritage Management Plan Monitor Downer compliance with the Heritage Management Plan
Project Director	Ensure that sufficient resources are allocated for the implementation of this HMP Ensure that the CEMP covers the management and mitigation measures presented in this HMP Ensure that the outcomes of the visual checks/ compliance construction monitoring/ incident reporting are systematically evaluated as part of ongoing management of construction activities Ensure audits of construction site records/ monitoring records/ incident reports are undertaken and findings are shared with relevant site personnel and corrective actions are implemented Authorise all monitoring reports and any revisions to this HMP
Environment Manager	Oversee the overall implementation of this HMP Site Inductions Ensure all relevant personnel have access to and understand the most up-to-date copy of this HMP Ensure that any required actions arising from the detection of unexpected heritage items or if works are required outside of the approved development footprint are reported to the relevant personnel for further action and ensure that the actions are effectively implemented Ensure all monitoring reporting requirements are met and maintained on site
Construction supervisors Subcontractors	Understand and implement mitigation protocols as required in the HMP and any other required measures during construction Undertake relevant training to implement the requirements of this HMP All personnel are responsible for ensuring that heritage items are protected All site personnel to undertake toolbox talks in relation to the reporting process for unexpected finds. Informing the Environmental Manager of any heritage issues as they arise.
Environmental Representative	Receive and respond to communications from the Secretary in relation to the environmental performance of the Project; Receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI; Consider and inform the Planning Secretary on matters specified in the terms of this approval; Consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; Review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so: <ul style="list-style-type: none"> (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or

Roles	Responsibilities
	<ul style="list-style-type: none"> ○ (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary); <p>Regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval;</p> <p>As may be requested by the Planning Secretary, help plan, attend or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings and site visits, but not independent environmental audits required under Condition A34 of this approval;</p> <p>As may be requested by the Planning Secretary, assist the Department in the resolution of community complaints;</p> <p>Assess the impacts of minor ancillary facilities as required by Condition A19 of this approval;</p> <p>Consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and</p> <p>Prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI.</p>
Primary Excavation Director	<p>The Primary Excavation Director must be suitably qualified and be someone who meets the Heritage Council of NSW's Criteria for Assessment of Excavation Directors (September 2019) to oversee and advise on matters associated with historic archaeology and advise the DPIE and Heritage NSW</p> <p>The Excavation Director must be present to oversee excavation and advise on archaeological issues</p> <p>The Excavation Director has the authority to advise on the duration and extent of oversight required as informed by the provisions of the approved AARD and Excavation Methodology</p> <p>Downer will nominate an Excavation Director who is able to manage locally significant archaeology under the NSW Heritage Council Excavation Directors Criteria.</p> <p>The Primary Excavation Director will be engaged by Downer.</p>
Heritage Consultant	<p>The Heritage Consultant will be responsible for providing advice and guidance to manage and minimise potential impacts to any built heritage values through a variety of means, prepare heritage impact assessment reports for built heritage and to undertake required archival recording of the heritage items in accordance with the approval and relevant documents.</p> <p>The Heritage Consultant will be engaged by Downer.</p>
Forensic Anthropologist	<p>The Forensic Anthropologist will respond to find of potential human remains in accordance with the Sydney Metro Exhumation Management Plan.</p> <p>The Forensic Anthropologist will be engaged by Downer if required.</p>
Conservation Architect	<p>The Conservation Architect will provide advice and review work methodologies where direct impacts to significant fabric of heritage items are proposed.</p> <p>The Conservation Architect will be engaged by Downer.</p>

3. Existing environment

3.1. Context

The existing environment and heritage context of the Project has been assessed in the following background reports prepared to support the EIS and SPIR prepared for the Sydney Metro Sydenham to Bankstown upgrade project:

- Sydney Metro City and Southwest – Sydenham to Bankstown: *Aboriginal Heritage Archaeological Assessment*, prepared by Artefact Heritage (2017a);
- Sydney Metro City and Southwest – Sydenham to Bankstown: *Non-Aboriginal Heritage Impact Assessment*, prepared by Artefact Heritage (2017b);
- Sydney Metro City and Southwest – Sydenham to Bankstown *Historical Archaeological Assessment and Research Design (AARD)*, prepared by Artefact Heritage (2017c)
- Sydney Metro City and Southwest – Sydenham to Bankstown: *Aboriginal Cultural Heritage Assessment Report (ACHAR)*, prepared by Artefact Heritage (2018)

Additional reports, which have been prepared for the project and have been used to support this Plan also include:

- Sydney Metro City and Southwest *Heritage Impact Assessment Dulwich Hill Station*, October 2020;
- Sydney Metro City and Southwest *Heritage Impact Assessment Campsie Station*, October 2020; and
- Sydney Metro City and Southwest *Heritage Impact Assessment Punchbowl Station*, October 2020.

These reports have been referenced to inform this Plan in regard to existing environment, heritage significance and archaeological potential.

3.2. Aboriginal heritage

Artefact Heritage (2017a) undertook a heritage assessment of the Sydney Metro City and Southwest – Sydenham to Bankstown Project. No previously registered Aboriginal sites were located within the Project area. Two areas of potential archaeological deposits (PAD) were located during the site survey for the EIS study, near Belmore and Punchbowl Stations. The remainder of the EIS project area was found to have low Aboriginal archaeological potential and significance. One of the two identified PADs, S2B PAD02 is located in a small park between Punchbowl Road and Urunga Parade (Figure 1). S2B PAD02 is within the Project area and will be impacted by works associated with construction of the northern entrance to Punchbowl Station. The ACHAR identified a low to moderate potential that intact archaeological deposits may be located in this location. At the time the ACHAR was written (2018), design indicated that part of S2B PAD02 will be impacted by a proposed new access way from Punchbowl Road to Punchbowl Station, and associated landscaping and access track works.

The ACHAR recommends that prior to Project impacts to the location of S2B PAD02, a representative sample of S2B PAD02 should be subject to archaeological test excavation, conducted in accordance with the test excavation methodology provided in Section 7 of the ACHAR.



The Project works will be largely within the listed curtilages for Dulwich Hill, Campsie and Punchbowl Railway Stations and will affect platforms, platform buildings and areas within the rail corridor. A number of heritage items will be adjacent to the Project works areas but will not be directly impacted. Consideration will be given to indirect impacts such as vibration and visual impacts. These heritage items and their registered listings are shown in Table 6 below. As outlined in Section 1 of the Project's CEMP, Downer will be establishing and utilising a compound at the former Canterbury Bowling and Community Club (SPIR Work Site W7) located at Close Street, Canterbury. This work site is within proximity to the Old Sugarmill, this item has been included in Table 6.

Item	Listings	Significance
Dulwich Hill Railway Station Group	<ul style="list-style-type: none"> RailCorp S.170 Heritage and Conservation Register (4801909) Marrickville Local Environment Plan (LEP) 2011 as “Dulwich Hill Railway Station Group”, LEP# I316 	Local
South Dulwich Hill Heritage Conservation Area	<ul style="list-style-type: none"> Marrickville LEP 2011, #C29 	Local

Item	Listings	Significance
Old Sugarmill	<ul style="list-style-type: none"> SHR (00290) Canterbury LEP 2012 (I82) 	State
Campsie Railway Station Group	<ul style="list-style-type: none"> RailCorp S.170 Heritage and Conservation Register (4801101) Canterbury LEP 2012 (I140) 	Local
Punchbowl Railway Station Group	<ul style="list-style-type: none"> RailCorp S.170 Heritage and Conservation Register (4802009) Canterbury LEP 2012 (I155) 	Local

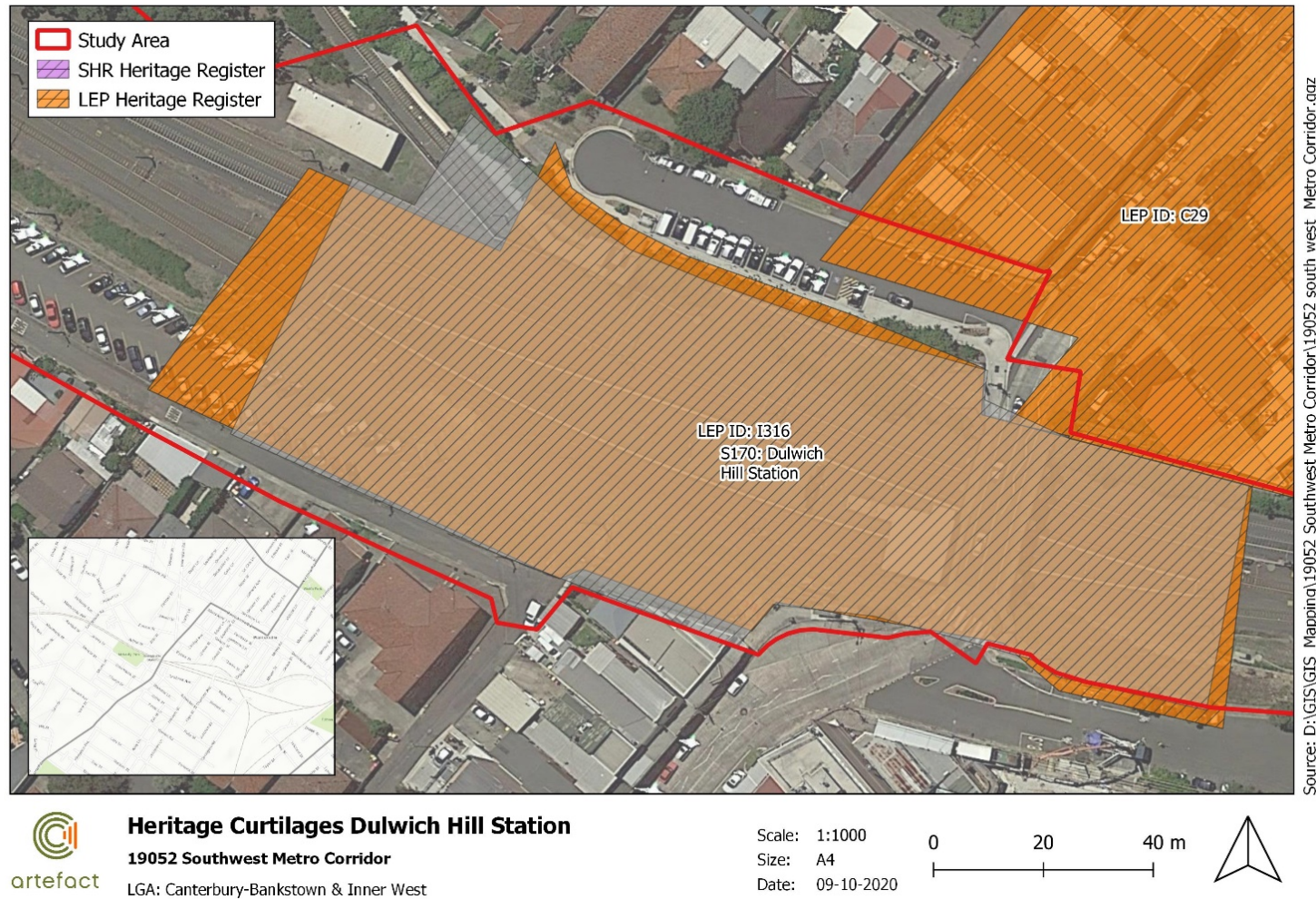


Figure 2 Heritage items – Dulwich Hill Station



Figure 3 Heritage items –Compound at former Canterbury Bowling and Community Club (SPIR Work Site W7)



Heritage Curtilages Campsie Station

19052 Southwest Metro Corridor

LGA: Canterbury-Bankstown & Inner West

Scale: 1:1500
Size: A4
Date: 09-10-2020



Figure 4 Heritage items – Campsie Station



Heritage Curtilages Punchbowl Station

19052 Southwest Metro Corridor

LGA: Canterbury-Bankstown & Inner West

Scale: 1:1000
Size: A4
Date: 09-10-2020



Figure 5 Heritage items – Punchbowl Station

3.4. Non-Aboriginal archaeology

The archaeological potential of the Sydenham to Bankstown Metro project was divided in the AARD into three categories, ranging from Red to Green. Dulwich Hill, Campsie and Punchbowl stations are all located in the Green Zone (zone 3). They are rated as unlikely to contain significant archaeology, and the AARD recommended construction to proceed under the Sydney Metro Unexpected Heritage Finds Procedure.

Downer will be establishing and utilising a compound at the former Canterbury Bowling and Community Club (SPIR Work Site W7) located at Close Street, Canterbury, throughout the delivery of the Project. This compound site is located within an area of non-aboriginal archaeological potential. A summary of the archaeological potential and significance is provided below, with figures indicating areas of potential and required archaeological management from the SPIR shown in Figure 6 and Figure 7.

3.4.1. Compound at the former Canterbury Bowling and Community Club (SPIR Work Site W7)

The AARD found that there is moderate to high potential for remains of structures associated with the Canterbury Sugar Company works and outbuildings in this area. These would have high research value and associative and historical significance at a local or State level depending on nature and intactness, although remains of State significance are unlikely to be present in the Project area and are more likely outside the rail corridor as identified in the AARD. Archaeological remains associated with the historical development of the Bankstown rail line, Canterbury Station and Canterbury Park Racecourse may be present. Depending on the intactness of the remains, potential archaeological remains could reach the threshold for local significance.

It is noted that any subsurface works within the Work Site W7 area (shaded red in Figure 7) will require archaeological monitoring or salvage excavations. The location of subsurface works will be outlined in the AMS with detailed recommendations for works required.



Figure 6: Archaeological potential at Canterbury Compound (SPIR Work Site W7) (site outlined in yellow)



Figure 7: Archaeological management at Canterbury Compound (SPIR Work Site W7) (site outlined in yellow)

4. Construction risk assessment

Impacts of the Project are described in Table 7, Table 8 and Table 9, and the aspects and impacts register in the CEMP. Management measures to address these identified risks are included in Section 5.

Table 7: Aboriginal Heritage – Aspects, Impacts and Risks

Activity	Aspect/s	Impact/s
Subsurface excavations into natural ground surface. The risk is low as no areas within the Project were found to have Aboriginal archaeological potential.	Excavation	Finding/disturbance to and/or destruction of unexpected burials, human remains or Aboriginal objects.
Impacts to Punchbowl S2B PAD02	Excavation	Disturbance to a known area of Aboriginal archaeological potential. The PAD will be archaeologically tested prior to Project impacts. Mitigation measures, if needed, will be adopted in keeping with the results of test excavation.

Table 8: Built heritage – Aspects, Impacts and Risks

Activity	Aspect/s	Impact/s
Installation of Combined Services Route (CSR) and Galvanised Steel Troughing (GST) within curtilages of heritage items	Installation and minor excavations	Visual impacts, impacts to fabric
Removal of redundant infrastructure within curtilages of heritage items	Excavation, vibration and soil compaction due to the use of heavy machinery to hammer out overhead wire portals and footings	Temporary visual impacts to listed items, impacts to fabric
Removal of intrusive fabric	Removal of intrusive material	Inadvertent impacts to significant fabric
Refurbishment and repurposing of concourses and platform station buildings	Removal of intrusive material, repurposing, impacts to some significant fabric. Make good	Visual impacts to listed items, impacts to fabric
Station precinct works and landscaping	Demolition of some elements and construction	Visual impacts, impacts to fabric
Installation of lifts and new pedestrian stairs	Installation and construction of lifts and stairs	Visual impacts, impacts to fabric
Platform works	Removal of brick and concrete coping and construction of Platform screen doors which will require struts to be anchored in the platform.	Visual impacts, removal of significant bricks

Activity	Aspect/s	Impact/s
Construction and use of compound sites and laydown areas	Installation and operation	Temporary visual impacts to listed items. Impacts to the Old Sugarmill SHR item as a result of the compound site at the Bowling Club will need to be managed.
Sydney Metro service buildings	Construction	Visual impacts
New concourse, stairs and lift (Dulwich Hill Station)	Construction	Visual impacts, impacts to fabric
Alterations to footbridge and stairs (Dulwich Hill Station)	Regrading and removal of stairs	Visual impacts, impacts to fabric
Bridge remedial works and anti-throw screen installation at Wardell Road Overbridge (Dulwich Hill Station)	Installation, brick removal	Visual impacts, impacts to fabric
Impact to the overhead booking offices at all stations	Repurposing	Visual impacts, impacts to significant fabric
Platform 1 & 2 building repurposing (Campsie and Punchbowl Stations)	Construction, removal of intrusive fabric	Visual impacts, impacts to fabric
Refurbish / repurpose western platform 1-2 building (Punchbowl Station)	Repurposing	Visual impacts, impacts to fabric
Vehicle collision protection and minor wiring to Beamish Street Overbridge (Campsie Station)	Installation	Visual impacts, impacts to fabric
Fencing and hoarding installation	Installation	Visual impacts and temporary visual impacts
Temporary works	Pedestrian control and access, installation of hoarding, fencing and other temporary works such as temporary generator installation	Temporary visual impacts to listed items
Utilities and drainage works	Excavation, vibration and soil compaction due to the use of heavy machinery, cutting and filling, installation of fencing	Temporary visual impacts to listed items, impacts to fabric
Levelling Platform 1 & 2 (Campsie Station)	Brick removal, demolition, resurfacing	Visual impacts, permanent impacts to fabric
Overhead booking office removal (Campsie Station)	Demolition and removal of the overhead booking office	Visual impacts, permanent impacts to fabric

Table 9: Non-Aboriginal Archaeology– Aspects, Impacts and Risks

Activity	Aspect/s	Impact/s
Installation of CSR and GST within curtilages of heritage items	Excavation	Disturbance to and/or destruction of unexpected non-Aboriginal archaeological deposits
Fencing and hoarding installation	Installation	Disturbance to and/or destruction of unexpected non-Aboriginal archaeological deposits
Construction and use of compound sites and laydown areas	Excavation	Disturbance to and/or destruction of non-Aboriginal archaeological deposits of local significance. Compound area in Canterbury Archaeological Management Zone (AMZ) may require subsurface impacts with potential impact to significant archaeology.
Platform works including excavation for utilities and lift footings	Excavation into platforms	Disturbance to and/or destruction of unexpected non-Aboriginal archaeological deposits within or below platform level
Station precinct works and landscaping	Excavation	Disturbance to and/or destruction of unexpected non-Aboriginal archaeological deposits
Temporary works	Excavation	Disturbance to and/or destruction of unexpected non-Aboriginal archaeological deposits
Utilities and drainage works	Excavation	Disturbance to and/or destruction of unexpected non-Aboriginal archaeological deposits

5. Management measures

Downer's Heritage Management Standard (DG-ZH-ST076) states that Managers and Supervisors must verify that heritage mitigation and general control measures occur as part of the CEMP, including:

- relevant stakeholders are engaged to physically identify known heritage sites and artefacts
- the location of the known heritage sites and artefacts will be displayed and communicated
- all known heritage sites and artefacts are protected using high visibility exclusion fencing, or similar physical barrier
- the location of the heritage sites and artefacts are communicated to all personnel in accordance with DG-ZH-ST014 Zero Harm Communication Standard
- cultural heritage monitors or consultants may be engaged where specified by the Client or by the permit/ approval
- the removal or destruction of a known heritage site is prohibited, unless in accordance with a permit or other approval from an appropriate regulatory authority
- regular inspection of the implemented heritage and artefact control measures and site conditions are to be completed in accordance with DG-ZH-PR116.1 Inspections Procedure and DG-ZH-PR116.2 Observations Procedure; and
- vehicles and equipment movement to remain on designated access tracks.

Actual and potential heritage sites and artefact areas are to be highlighted in the site induction. On more sensitive sites, specific training in relation to heritage management must be considered to provide:

- awareness of heritage sites
- overview of best practice to minimise impact
- overview of incident reporting practices
- awareness of environmental responsibilities and obligations; and
- awareness of relevant legislation.

5.1. Aboriginal archaeological management

5.1.1. Aboriginal Cultural Heritage Assessment Report

An ACHAR was prepared by Artefact Heritage (2018) as part of the Preferred Infrastructure Report (PIR) which forms part of the Approved Project as modified. Comprehensive Aboriginal consultation was undertaken as part of the preparation of the ACHAR, including an Aboriginal Focus Group (AFG) meeting. All RAPs who responded through consultation were in support of the proposed archaeological management methodology included in the ACHAR.

The ACHAR identified one area of PAD inside the Project area at Punchbowl Station. This is S2B PAD02. In accordance with REMM AH3, archaeological test excavation at S2B PAD02 prior to Project impacts will be carried out, in accordance with the ACHAR. The ACHAR recommended that the rest of the Project area will be managed under the Sydney Metro Unexpected Heritage Finds Procedure. The ACHAR will be implemented in accordance with REMM AH2 if unexpected Aboriginal objects were located within the Project area.

5.1.2. Management of S2B PAD02

In accordance with REMM AH3, archaeological test excavation with salvage (if required) will be undertaken prior to impacts occurring at S2B PAD02. The works will require a test excavation methodology to be prepared in accordance with the ACHAR. The methodology will be reviewed by RAPs. RAPs will participate in the archaeological excavation works. The ACHAR and the test excavation methodology will set out the triggers for test excavation to move to salvage (if required). Clearance will be provided by the archaeologist once excavations are complete within the PAD.

5.1.3. Human remains

If suspected human remains or burial sites are identified, the Sydney Metro Exhumation Management Plan will be implemented in accordance with CoA E15, E16 and E17 and REMM NAH9. In accordance with CoA E17, the Sydney Metro Exhumation Management Plan will be implemented for the duration of the Project's Construction activities.

The Sydney Metro Exhumation Management Plan has been prepared to satisfy the requirements of CoA E15.

Works will immediately cease in that area. The discoverer will immediately notify machinery operators so that no further disturbance of the remains will occur, as well as notify the foreman/site supervisor, Downer, Forensic Anthropologist, Primary Excavation Director and Sydney Metro Environmental Representative. The Sydney Metro Exhumation Management Plan will be enacted. Preliminary notification to the NSW Police will be undertaken by the Sydney Metro Environmental Manager.

Once confirmation is received from the Forensic Anthropologist or Primary Excavation Director that the remains are of human origin, there are three possible statutory pathways to follow based on the assessment. Refer to the Sydney Metro Exhumation Management Plan.

No works to recommence until clearance is provided by Heritage NSW, and/or the NSW Police as per the requirements documented in the Sydney Metro Exhumation Management Plan

5.1.4. Unexpected finds

In accordance with CoA E15 and REMM NAH14, Sydney Metro has prepared the Sydney Metro Unexpected Heritage Finds Procedure (SM-18-00105232) (attached to Appendix D). In accordance with CoA E17, the Sydney Metro Unexpected Heritage Finds Procedure will be implemented for the duration of the Project's Construction's activities.

In accordance with REMM NAH18, following the discovery of new finds of Aboriginal objects – works will cease in the immediate area and the area secured. Assessment of the site/object and subsequent management of the site will be carried out in accordance with the Sydney Metro Unexpected Heritage Finds Procedure (refer to Appendix D). The use of the Sydney Metro Unexpected Heritage Finds Procedure will satisfy the requirement in CoA E15, E16 and E17 to include measures to manage an unexpected find in the HMP.

All new sites will be recorded on standard Aboriginal Heritage Information Management System (AHIMS) site cards and lodged with Heritage NSW.

5.1.5. Clearance

A written clearance confirmation will be provided by the Project Archaeologist to Downer once Aboriginal archaeological management has been completed in an area. This will be signed off

by Sydney Metro before works recommence. Construction will continue under the Sydney Metro Unexpected Heritage Finds Procedure.

Downer's Heritage Management Statement (DG-ZH-ST076) outlines critical controls to prevent unauthorised clearance or disturbance of protected heritage areas:

- Ensure an authorisation has been received prior to disturbing land or water.
- Restrict access to protected areas with high visibility barriers and signage and include a buffer zone between the barrier.
- Restrict vehicle and equipment movement to designated access tracks.
- Ensure physical protection of heritage buildings and artefacts when working within striking distance.

5.1.6. Reporting

Upon completion of archaeological excavations at S2B PAD02, unexpected finds management and the implementation of any required mitigation measures, post excavation reporting in accordance with the Heritage NSW, DPC Aboriginal requirements will be undertaken within two years of the completion of the Project's archaeological works. The post-excavation report to be prepared by the Aboriginal Archaeologist in consultation with the RAPs. RAPs will review the draft report prior to finalisation.

5.2. Built heritage management

5.2.1. Design Requirements

This Project is a construct-only project and detailed design has been completed by others. Design requirements have been met at the design phase and are not applicable to this HMP. As outlined in Section 2, a number of heritage reports have been prepared during detailed design and the relevant mitigations therein have been incorporated into this Plan. Detailed HIAs were prepared for all stations which included an impact tracker for detailed design as well as detailed management and mitigation measures responding to the Stage 3 design. These measures have been considered in the plan where appropriate and have been included in the management action checklist (refer to Table 13).

5.2.2. Conservation/Heritage Architect

Work methodologies undertaken where heritage items will be directly impacted will be carried out with the oversight of a conservation/heritage architect in accordance with REMM NAH20.

The architect will also be available to advise Downer during construction and work with the skilled tradespeople, Heritage Consultant and heritage engineer to facilitate good heritage outcomes.

5.2.3. Archival Photographic Recording

Archival photographic recording of Dulwich Hill, Campsie and Punchbowl Stations has been undertaken by Sydney Metro according to the methodologies of the following documents as specified in CoA E10 and E12 and REMM NAH13:

- NSW Heritage Council guideline *"Photographic Recording of Heritage Items Using Film or Digital Capture"* (2006); and

- NSW Heritage Office publication *“How to Prepare Archival Records of Heritage Items”* (1998).

In accordance with CoA E10, archival recording undertaken at each station will be captured within the Heritage Report prepared for the Project.

As outlined in Section 2, archival recording requirements have been met during the detailed design phase and are not applicable to this HMP.

5.2.4. Heritage Interpretation

In accordance with CoA E13, Sydney Metro prepared the Sydney City and Southwest: Sydenham to Bankstown Line Heritage Interpretation Strategy, and issued this for information to DPIE on 3 June 2020. In accordance with CoA E14, individual Heritage Interpretation Plans have been prepared for each station precinct as part of the Sydney Metro Sydenham to Bankstown upgrade detailed design process. The Heritage Interpretation Plans will be implemented at the Project's stations to reflect detailed design. As outlined in Section 2, these requirements have been met during the detailed design phase and are not applicable to this HMP.


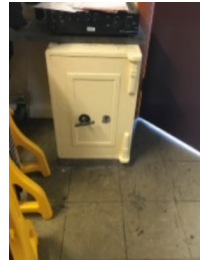

5.2.5. Adaptive reuse

As outlined in Section 2, an Adaptive Reuse Strategy has been prepared for the Sydney Metro Sydenham to Bankstown Project and was considered during the Project's detailed design. This requirement has been met during the detailed design phase and is not applicable to this HMP.

5.2.6. Moveable heritage

In accordance with REMM NAH7, Sydney Metro prepared the *City and Southwest Movable Heritage Strategy* after consultation with and seeking moveable heritage registers from Sydney Trains. Movable heritage items listed in the Sydney Metro *City and Southwest Movable Heritage Strategy* are listed in the tables below for each station. Where a movable heritage item is required to be removed in order to undertake the proposed works at a station, the methods of relocation, storage and reinstatement outlines of the Strategy will be followed.

Table 10: Dulwich Hill Station moveable heritage

Registration Number	Category	Description of object	Location within station	Notes/ History	Sydney Trains Significance / Condition (2019)	Artefact Significance/ Condition (2020)	Likely impacts	Recommended Action	Image
DHL0001	Safe	Cast iron safe - Green	Overhead Booking Office	Standard 'off the shelf' safe used throughout entire rail network for select work practices i.e. cash handling, safety and security of assets.	Little to Moderate/ Good	Moderate/ Good	Overhead booking office to be preserved, refitted for Metro operations	Temporarily remove during works, restore to original location on completion of works.	
DHL0002	Safe	Cast iron safe - White	Platform building	Standard 'off the shelf' safe used throughout entire rail network for select work practices i.e. cash handling, safety and security of assets. Might contribute to the interpretation of historical ticketing practice in the railways; historical railway furnishings; historical methods of security in the railways etc.	Little to Moderate/ Good	Moderate/ Good	Station platform building rooms to be heavily modified.	Temporarily remove during works, restore to platform building storage if possible; relocate to overhead booking office if no platform storage available.	
SM DHL0003. Listed on the SHI.¹	Operational objects	Timber Ticket Box	Platform building	Timber box located in closed cistern room. Appears to have been part of the early operations of	Not assessed by Sydney Trains	Moderate / Good	Station platform building rooms to	Temporarily remove during works, restore to platform building storage	

¹ OEH 2017. "Dulwich Hill Railway Station Group", accessed online at <https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4801909>

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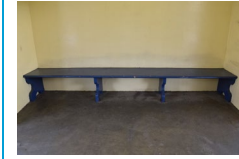


Registration Number	Category	Description of object	Location within station	Notes/ History	Sydney Trains Significance / Condition (2019)	Artefact Significance/ Condition (2020)	Likely impacts	Recommended Action	Image
				the station. Might contribute to the interpretation of historical ticketing practice in the railways; historical railway furnishings etc.			be heavily modified.	if possible; relocate to overhead booking office if no platform storage available.	
SM DHL0004. Listed on the SHI.²	Furnishing	2 x Fitted Timber Benches	Platform building	Timber fitted seating within waiting room of station platform building (two seats).	Not assessed by Sydney Trains	Moderate/ Good	Waiting room to be converted to Sydney Metro equipment room.	Retain at station to provide public seating.	

Table 11: Campsie Station moveable heritage



Registration Number	Category	Description of object	Location within station	Notes/ History	Sydney Trains Significance / Condition (2019)	Artefact Significance/ Condition (2020)	Likely impacts	Recommended Action	Image
SM CMP0001	Timber box	Timber Box	Platform 1 Building, adjoined to external wall	Timber box located along the exterior wall of the platform 1 building. May have been utilised for storage or been associated with ticket sales.	Not assessed by Sydney Trains	Moderate / Good	External wall not to be modified.	Conserve in situ.	

² Ibid




Table 12: Punchbowl Station moveable heritage

Registration Number	Category	Description of object	Location within station	Notes/ History	Sydney Trains Significance/ Condition (2019)	Artefact Significance/ Condition (2020)	Likely impacts	Recommended Action	Image
PUN0001	Clock	Concourse Wall Clock	Overhead Booking Office, external	<p>It was the establishment of a rail network in the mid-1850s that brought about a standard time measure for NSW. The need for accurate time to allow for the timetabling of trains and for passenger movements meant that a common, standard time had to be known at Punchbowl Station. This SRA modern design is representative of a continuation of this railway tradition and relationship of time and the railways</p>	High / Good	High / Good	No works to outside of overhead booking office in this location	Retain and protect in situ during works	


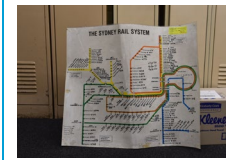
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Registration Number	Category	Description of object	Location within station	Notes/ History	Sydney Trains Significance/ Condition (2019)	Artefact Significance/ Condition (2020)	Likely impacts	Recommended Action	Image
PUN0002	Safe	Cast Iron Safe	Overhead Booking Office	Standard 'off the shelf' safe used throughout entire rail network for select work practices i.e., cash handling, safety and security of assets. Might contribute to the interpretation of historical ticketing practice in the railways; historical railway furnishings; historical methods of security in the railways etc.	Moderate / Good	Moderate / Good	Booking office to be retained.	Retain and conserve in this location.	
PUN0003	Safe	Subfloor Safe	Overhead Booking Office	Standard 'off the shelf' safe used throughout entire rail network for select work practices i.e. cash handling, safety and security of assets. Might contribute to the interpretation of historical ticketing practice in the railways; historical railway furnishings; historical methods of security in the railways etc.	Moderate / Good	Moderate / Good	Booking office to be retained.	Retain and conserve in this location.	

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Registration Number	Category	Description of object	Location within station	Notes/ History	Sydney Trains Significance/ Condition (2019)	Artefact Significance/ Condition (2020)	Likely impacts	Recommended Action	Image
PUN0004	Art and prints	Historic Photo	Overhead Booking Office	Reprint. Historic image depicting railway workers laying track - presumably at Punchbowl Station. Not located at the Australian Railway Historical Society (ARHS).	Little / Good	Little / Good	Booking office to be retained.	Retain and conserve in this location. Opportunities to digitise image for heritage interpretation. Potential to be donated to the ARHS.	
PUN0005	Furniture	Timber Desk Organiser	Overhead Booking Office	Typical railway office furniture - timber desk organiser. Potential prop.	Little / Good	Little / Good	Booking office to be retained.	Retain and conserve in this location.	
PUN0006	Operational objects	Orange Hand Lamp - Signalling	Overhead Booking Office	Representative example of a typical railway signalling lamps; signaller's hand lamp emblematic of continued signalling work processes and practices. Illustrative of the developmental change in technologies in signalling and safe working functions in the railways. Also illustrates Sydney Trains previous corporate identity and history of Sydney Trains' and predecessor	Moderate / Good	Moderate / Good	Booking office to be retained.	Retain and conserve in this location.	

(Uncontrolled when printed)

Registration Number	Category	Description of object	Location within station	Notes/ History	Sydney Trains Significance/ Condition (2019)	Artefact Significance/ Condition (2020)	Likely impacts	Recommended Action	Image
				agencies: Public Transport Commission c. 1970s-80s.					
PUN0008	Furniture	Timber desk Tray	Overhead Booking Office	Timber desk organiser. Potential prop.	Little / Good	Little / Good	Booking office to be retained.	Retain and conserve in this location.	
PUN0009	Maps	Network Map with Ticket Codes	Overhead Booking Office	Snapshot of Sydney rail network with relevant ticketing codes, rare and no longer used across network now that tickets have been largely replaced by electronic system. Tangible link to the past in terms of historic ticketing practice in the railways.	Moderate / Good	Moderate / Good	Booking office to be retained.	Retain and conserve in this location.	

5.2.7. Significant fabric register

As outlined in Section 2, a significant fabric register has been prepared and was considered during detailed design. A salvage register was prepared based on identification of significant fabric and a number of elements have been required for salvage for the Project stations. This requirement has been met at the design phase and is not applicable to this HMP.

5.2.8. Works methodologies

In accordance with REMM NAH15, where work activities are likely to impact upon built heritage (as outlined in Table 8) Downer will ensure methodologies for the removal of existing structures and construction of new structures will be developed and implemented during construction to minimise direct and indirect impacts to other elements within the curtilages of the heritage items, or to heritage items located in the vicinity of works. The methodology will be prepared by the nominated Heritage Consultant where required and provided to Sydney Metro.

5.2.9. Heritage Engineer

A heritage engineer will be consulted in regard to any significant structural issues (where required).

5.2.10. Skilled tradespeople

In accordance with REMM NAH20, appropriately skilled tradespeople with experience working on heritage sites will be used for all works to conserve, protect or remove significant fabric. This includes works within the station buildings that involve the reuse, conservation or maintenance of significant fabric such as masonry, stonework, interiors and flooring. Downer will notify Sydney Metro of the tradespeople nominated for the works. A Conservation/Heritage Architect will be nominated for the Project in accordance with REMM NAH4, and this Architect will be available to consult with the nominated tradesperson.

5.2.11. Exclusion zones

Physical exclusion zones, including hoarding or screening will be provided where the Project works are to be undertaken in close proximity to significant elements/fabric that is not approved to be impacted. In accordance with NAH16 exclusion zones are to be applied to protect fabric during construction works carried out at:

- Dulwich Hill Station Group;
- Campsie Station Group; and
- Punchbowl Railway Station Group.

Where works will be undertaken adjacent to a heritage item but not within the heritage curtilage, the exclusion zones will primarily be limited to identifying the adjacent items on the environmental control map. As a minimum this will apply to the following heritage items:

- South Dulwich Hill Heritage Conservation Area; and
- Old Sugarmill.

5.2.12. Works on significant fabric

HIAs were prepared by Artefact Heritage during the stations detailed design. The HIA include detailed recommendations on management of significant fabric including station buildings, bridges and platforms. These recommendations have been included in the

management measures action checklist (refer to Table 13) and will be adhered to during construction by Downer.

5.2.13. Heritage Consultant advice

Downer will nominate a suitably qualified Heritage Consultant to advise on works during construction in regard to removal, reinstatement and conservation of significant fabric. The Heritage Consultant may be required to provide advice, to monitoring heritage works and to reporting on the outcome of works. The Heritage Consultant will work with the Conservation Architect and utilise their specialist skills where needed.

5.2.14. Landscape plan

Planting along the eastern boundary of the Canterbury Bowling and Community Club (adjacent to the Old Sugarmill site) should be reinstated if trees are impacted for the site compound in accordance with NAH11. Downer will prepare and implement the Landscape Plan should their activities result in impacts to the existing trees on the eastern edge of the site. If required, the scheme would consider appropriate period plants and trees and any boundary wall treatment would be designed in consultation with the Project's Heritage Architect.

5.3. Non-Aboriginal archaeological management

5.3.1. Archaeological Zoning

The AARD divided the Project into archaeological management zones based on archaeological potential and construction impacts. Archaeological management zone mapping depicted is based on a 'traffic light' coding. Dulwich Hill, Campsie and Punchbowl Railway Stations are all in the Green (Zone 3). The compound located within the former Canterbury Bowling and Community Club site (SPIR Work Site W7) is within the Red (Zone 1) (refer to Figure 7).

- Red (Zone 1): Direct impact to significant archaeology. Archaeological investigation required prior to any construction impacts (bulk excavation etc.);
- Amber (Zone 2): Potential impact to significant archaeology. Prepare Work Stage Specific AMS once construction methodology and impacts are known. Archaeological investigation is likely required; and
- Green (Zone 3): Unlikely to contain significant archaeology. Construction to proceed with Sydney Metro Unexpected Heritage Finds Procedure as nil-low potential for significant archaeological remains.

5.3.2. Archaeological Management

Dulwich Hill, Campsie and Punchbowl Railway Stations were all assessed as unlikely to contain significant archaeology therefore archaeology will be managed under the Sydney Metro Unexpected Heritage Finds Procedure.

At the compound located at the former Canterbury Bowling and Community Club site (SPIR Work Site W7), archaeological management will be undertaken in accordance with the works specific AMS documents and in accordance with the archaeological management zoning and AARD (refer to Figure 7).

5.3.3. Archaeological Method Statement

An AMS will be prepared for the Project prior to sub-surface impacts within the Red (Zone 1) archaeological management zone as mapped in Figure 7. The AMS will include management

for works within the defined areas of archaeological potential at Downer's compound at the former Canterbury Bowling and Community Club that will be impacted, as well as the procedure for managing unexpected archaeological finds. The AMS will include detail on archaeological potential and significance based on the AARD with additional information related to the subject site as required. It will include a methodology for archaeological management such as archaeological monitoring or test/salvage excavation in accordance with the AARD approved methodology. In accordance with REMM NAH12 the AMS will also include a methodology for analysis of heritage items, archaeological and artefact management strategies and a sieving strategy.

The AMS will include detailed management for the former Canterbury Bowling Club compound site which is within an area of moderate to high archaeological potential for local and State significant archaeology. If subsurface impacts were proposed archaeological monitoring or salvage excavation may be required.

5.3.4. Excavation Directors

Before excavation of archaeological management sites, Downer will nominate a suitably qualified Excavation Director (ED) who complies with the Heritage Council of NSW's Criteria for Assessment of Excavation Directors (September 2019) to oversee and advise on matters associated with historic archaeology and advise DPIE and Heritage NSW. Where impacts to State significant archaeology are proposed, such as at the Canterbury Bowling and Community Club compound site an ED who meets the criteria for managing State significant archaeology will be required.

Roles and responsibilities are discussed in Table 5.

5.3.5. Unexpected finds

In accordance with CoA E15 and E16 and REMM NAH14 and NAH18, unexpected non-Aboriginal archaeological finds will be managed under the Sydney Metro Unexpected Heritage Finds Procedure (see Appendix D). In accordance with CoA E17, the Sydney Metro Unexpected Heritage Finds Procedure will be implemented for the duration of the Project's Construction activities.

An archaeological find will be unexpected if it was not identified in the AARD or the AMS as a class or type of possible remain, or if it was identified as locally significant but was assessed, after identification, as being of State significance.

The Sydney Metro Unexpected Heritage Finds Procedure complies with Section 146 of the Heritage Act 1977, Notification of discovery of relic:

A person who is aware or believes that he or she has discovered or located a relic (in any circumstances, and whether or not the person has been issued with a permit) must: (a) within a reasonable time after he or she first becomes aware or believes that he or she has discovered or located that relic, notify the Heritage Council of the location of the relic, unless he or she believes on reasonable grounds that the Heritage Council is aware of the location of the relic, and (b) within the period required by the Heritage Council, furnish the Heritage Council with such information concerning the relic as the Heritage Council may reasonably require.

Notification under s146 of the Heritage Act 1977 will only be required if the relic was unexpected.

If unexpected finds were found to be of local or State significance and were to be impacted an AMS will be required prior to management and mitigation being undertaken.

In accordance with Downer's Heritage Management Standard (DG-ZH-ST076) if unknown or unexpected heritage sites, archaeological finds or indigenous artefacts are found during the course of works, managers and supervisors must immediately cease work within the immediate area of the find, barricade the area and implement the emergency plan to limit potential impacts.

In the event human bones are discovered, Police must be contacted.

Liaise and cooperate with heritage stakeholders and await further instructions before recommencing works.

If an adverse unintended result occurs to known significant sites, immediately implement DG-ZH-PR006 Incident Management Procedure.

Downer's Heritage Management Standard (DG-ZH-ST076) specifies that where earthworks are to occur, all emergency plans as per [DG-ZH-PR015 Emergency Management Procedure](#) must detail immediate notifications and response procedures to limit potential impacts in the event of a potential unexpected discovery of heritage sites, indigenous artefacts or remains.

5.3.6. Clearance

A written clearance confirmation will be provided by the Primary Excavation Director to Downer once archaeological management has been completed in an area in the event of archaeological management being required as a result of an unexpected find. This will be signed off by the Sydney Metro before works recommence. Construction will continue under the Sydney Metro Unexpected Heritage Finds Procedure (refer to Appendix D).

Downer's Heritage Management Statement (DG-ZH-ST076) outlines critical controls to prevent unauthorised clearance or disturbance of protected heritage areas:

- Ensure an authorisation has been received prior to disturbing land or water.
- Restrict access to protected areas with high visibility barriers and signage and include a buffer zone between the barrier.
- Restrict vehicle and equipment movement to designated access tracks.
- Ensure physical protection of heritage buildings and artefacts when working within striking distance.

5.3.7. Human Remains

If suspected human remains are identified, the Sydney Metro Exhumation Management Plan will be implemented in accordance with CoA E15, E16 and E17 and REMM NAH19. It is not expected that human remains will be found as no potential burials were identified during research for the EIS and SPIR. In accordance with CoA E17, the Sydney Metro Exhumation Management Plan will be implemented for the duration of the Project's Construction activities.

Works will immediately cease in that area. The discoverer will immediately notify machinery operators so that no further disturbance of the remains will occur, as well as notify the foreman/site supervisor, Downer, Project archaeologist and Sydney Metro Environmental Representative. The Sydney Metro Exhumation Management Plan will be enacted. Preliminary notification to the NSW Police will be undertaken by the Sydney Metro Senior Heritage Advisor.

Once confirmation is received from the technical specialist that the remains are of human origin, there are three possible statutory pathways to follow based on the assessment. Refer to the Sydney Metro Exhumation Management Plan.

No works to recommence until clearance is provided by Heritage NSW and/or the NSW Police as per the Sydney Metro Exhumation Management Plan.

5.3.8. Storage of archaeological remains

Where possible artefact cleaning and preliminary cataloguing will occur on site, otherwise artefacts will be catalogued and stored off site at a location approved by Sydney Metro. Details on proposed sampling and analysis are provided in the AMS document in accordance with the AARD. The nominated Heritage Consultant will create the artefact catalogue under the oversight of the Primary Excavation Director.

5.3.9. Analysis and reporting

In accordance with CoA E11, the Historical Archaeological Excavation Report (as part of the Heritage Report) will be prepared in accordance with the standard requirements of an Excavation permit issued by the Heritage Council, and include:

- An executive summary of the archaeological programme;
- Due credit to the client paying for the excavation, on the title page;
- An accurate site location and site plan (with scale and north arrow);
- Historical research, references and bibliography;
- Detailed information on the excavation, including the aim, the context for the excavation, procedures, treatment of artefacts (cleaning, conserving, sorting, cataloguing, labelling, scale photographs and/or drawings, location of repository) and analysis of the information retrieved;
- Nominated repository for the items;
- Detailed response to research questions (at minimum those stated in the approved Research Design);
- Conclusions from the archaeological programme. The information must include a reassessment of the site's heritage significance, statement(s) on how archaeological investigations at this site have contributed to the community's understanding of the site and other comparable archaeological sites in the local area and any relevant recommendations for the future management of the site information and artefacts; and
- Details of how this information about this excavation has been publicly disseminated (for example provide details about Public Open Days and include copies of press releases, public brochures and/or information signs produced to explain the archaeological significance of the site).

In accordance with CoA E11 and E12, the Historical Archaeological Excavation Report will be prepared in consultation with Heritage NSW following the completion of the Sydenham to Bankstown Upgrade project works and submitted to the Planning Secretary and Heritage NSW for information within two years of completion of the Sydenham to Bankstown Upgrade project works.

5.4. Heritage awareness training and induction

All relevant personnel and contractors involved in the Project will be advised of the relevant heritage considerations and legislative requirements and cultural awareness training will be undertaken for all, including those involved with ground disturbing activities, which will include the following as relevant:

- Information on the heritage significance;
- Information on the Aboriginal archaeological and cultural heritage values of the Project;
- Implementation of the Sydney Metro Unexpected Finds Procedure;
- The location and type of archaeological sites within the Project and give instructions not to disturb these sites;
- Clear information about statutory obligations for heritage in accordance with the NSW National Parks and Wildlife Act 1974 (NP&W Act). It is important to note that failure to report a discovery and those responsible for the damage or destruction occasioned by unauthorised removal or alteration to a site or to archaeological material may be prosecuted under the NP&W Act (as amended);
- How to identify stone artefacts and other Aboriginal heritage sites; and
- Stop works and reporting protocols for discovery of previously unknown heritage and archaeological items.

All relevant personnel and contractors involved in the Project will be advised of the relevant heritage considerations, legislative requirements and recommendations in the Non-Aboriginal Heritage Impact Assessment (Artefact Heritage 2012; 2015);

All personnel involved with ground disturbing activities are made aware of their obligations to avoid any impacts to non-Aboriginal heritage under the NSW Heritage Act 1977:

- This will include information on historic heritage sites and ‘relics’ and information about statutory obligations under the NSW Heritage Act 1977; and
- This will also include information on the potential for human skeletal remains and the requirements of the Sydney Metro Exhumation Management Procedure;
- Information relating to the nature of works and potential impacts via pre-starts at the start of activity; and
- Information about appropriate storage of materials, for example within designated laydown zones and only brought in when ready to install.

All training and tool box meetings will be recorded by Downer. All Project documentation, including environmental compliance and training records, will be kept as objective evidence of compliance with environmental requirements.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

5.5. Ongoing notifications – unexpected finds

The following protocol will be followed with respect to ongoing notifications.

- For all unexpected heritage finds the Downer's Environmental Manager shall notify the Environmental Representative and Sydney Metro Senior Heritage Advisor in accordance with the Sydney Metro Unexpected Heritage Finds Procedure;
- Notification under s146 will only be required if the relic was unexpected and will apply to relics of State significance;
- For unexpected Aboriginal archaeological finds, RAPs will be notified immediately;
- Notification to the RAPs will occur within 1 week where changes to the Project are identified that may have implications for Aboriginal heritage management (such as changes in design);
- Feedback requested from the RAPs should be received within two weeks and no later than four weeks from the date correspondence is issued;
- The appropriate address and format for responses shall be provided as part of the request. Where no response is issued within this timeframe, a follow-up phone call will be made by the Downer Environmental Manager (or Project Heritage Specialist) to close out the outstanding request.

All notification and consultation records will be kept by Downer and its relevant consultants.

6. Management action checklist

The management actions below are a quick reference to management required under the CoA, REMMS and recommendations of the HIAs prepared during detailed design.

Table 13: Management action checklist

Management Action	Responsibility	Description of Management	Location
General actions			
Undertake weekly inspections and monitoring of construction activities to ensure compliance with the requirements of the CoA and this plan.	Environmental Manager	<ul style="list-style-type: none"> Undertake weekly inspections and monitoring of construction activities to ensure compliance with the requirements of the CoAs and this plan. 	All stations

Management Action	Responsibility	Description of Management	Location
Daily inspections of controls will be undertaken by Supervisors during works.	Site Supervisors	<ul style="list-style-type: none"> Complete daily inspections of the controls during works. 	All stations
All relevant personnel and contractors involved in the design and construction of the Project must be advised of the relevant heritage considerations, legislative requirements and commitments.	Environmental Manager Archaeologist	<ul style="list-style-type: none"> Ensure all personnel involved in earthworks or any type of disturbance are appropriately trained / inducted and made aware of the cultural significance of the area, including site identification and materials likely to be uncovered. Personnel will be instructed to notify the Environmental Manager in the event they identify any object which they believe to be of archaeological or cultural origin. 	All stations

Management Action	Responsibility	Description of Management	Location
Where impacts are identified outside the Project area	Environmental Manager	<ul style="list-style-type: none"> Non-compliance procedures outlined in the CEMP. Where practicable avoid additional impacts, or confirm appropriate mitigation measures. Ensure that Consistency Assessments are undertaken for any new impact areas and approval sought from Sydney Metro, as outlined in the CEMP. Further consultation with RAPs will be required where a Consistency Assessment identifies additional impacts to Aboriginal heritage. The Consistency Assessment will outline appropriate mitigation measures. 	All stations
Aboriginal stakeholder identification (RAP) and contact details in case of unexpected finds.	Environmental Manager Archaeologist	<ul style="list-style-type: none"> Identify RAPs (Appendix B). Contact RAPs in accordance with the Sydney Metro Unexpected Heritage Finds Procedure in the case of unexpected finds of an Aboriginal object or potential Aboriginal human skeletal remains and/or Aboriginal burials RAPs should be consulted prior to test or salvage excavation commencing in accordance with the project ACHAR and should be given the opportunity to participate in any excavation works in accordance with the ACHAR. 	All stations

Management Action	Responsibility	Description of Management	Location
Impact to S2B PAD02	Environmental Manager	<ul style="list-style-type: none"> Archaeological test excavation with salvage if required will be undertaken prior to impacts occurring at S2B PAD02. The works will require a test excavation methodology to be prepared in accordance with the ACHAR. The methodology will be reviewed by RAPs. RAPs will participate in the archaeological excavation works. The ACHAR and the test excavation methodology will set out the triggers for test excavation to move to salvage (if required). Clearance will be provided by the archaeologist once excavations are complete within the PAD. . 	Punchbowl
Nomination of an Excavation Director	Environmental Manager	<ul style="list-style-type: none"> Before excavation of archaeological management sites, a qualified Excavation Director (ED) will be nominated who complies with the Heritage Council of NSW's Criteria for Assessment of Excavation Directors (September 2019) in accordance with the AARD. DPIE and Heritage NSW shall be advised of the nominated ED. 	All stations
Preparation of AMS	Excavation Director	<ul style="list-style-type: none"> A works specific AMS will be prepared for this Project in accordance with the excavation methodology outlined in the AARD (NAH12). The AMS will be signed off by the Primary Excavation Director and will be prepared in consultation with the Environmental Representative. The AMS should note archaeological management required in the compound site at the former Canterbury Bowling and Community Club (SPIR Work Site W7), where State significant archaeology may be present. 	The former Canterbury Bowling and Community Club compound site

Management Action	Responsibility	Description of Management	Location
Archaeological management	Excavation Director	<ul style="list-style-type: none"> Non-Aboriginal archaeological management is to be undertaken in accordance with the AARD and AMS. Zoning for the Canterbury compound site is shown in Figure 7. Archaeological management will be undertaken in those portions of identified archaeological management zones at the Canterbury compound site. 	The former Canterbury Bowling and Community Club compound site
Notification and management of relics	Excavation Director	<ul style="list-style-type: none"> If any potential relics are located the ED will assess significance of the find and provide advice. If relics are of local or State significance and are not identified in the AARD or AMS the Heritage NSW will be notified under s146 of the NSW Heritage Act. 	All stations
Site clearance after archaeological management completed	Excavation Director	<ul style="list-style-type: none"> Site clearance will be required from the Project archaeologist prior to construction commencing. This clearance will be in the form of a 	The former Canterbury Bowling and Community Club compound site

Management Action	Responsibility	Description of Management	Location
		memo or email and will apply to a work specific area or the Project sites as a whole, depending on stage of works.	
Unexpected finds procedures for Aboriginal objects.	Archaeologist	<ul style="list-style-type: none"> Following the discovery of previously unrecorded Aboriginal objects – works will cease in the immediate area and the area secured in accordance with the Sydney Metro Unexpected Heritage Finds Procedure which in accordance with CoA E15, E16 and E17 and REMM AH5, NAH14 and NAH18. Assessment of the site/object and subsequent management of the site will be carried out in accordance with the Sydney Metro Unexpected Heritage Finds Procedure and the ACHAR (REMM AH2). In addition, the site will be recorded on standard AHIMS site cards and lodged with Heritage NSW Upon completion of any unexpected finds reporting and required mitigation measures, post excavation reporting in accordance with the Heritage NSW Aboriginal heritage requirements will be undertaken within 12 months of the completion of the Project. Post-excavation report to be prepared by the Aboriginal archaeologist in consultation with the RAPs. 	All stations
Unexpected finds procedures for significant non-Aboriginal archaeology	Archaeologist	<ul style="list-style-type: none"> Works will immediately cease in that area. The discoverer will immediately notify machinery operators so that no further disturbance of the remains will occur, as well as notify the foreman/site supervisor, Downer, Project archaeologist and Sydney Metro Environmental Representative (CoA E17, REMM NAH14, AH5, and NAH19). The Sydney Metro Unexpected Heritage Finds Procedure will be enacted. Preliminary notification to the Sydney Metro Environmental Manager. Assessment of the site/object and subsequent management of the site will be carried out in accordance with the Sydney Metro Unexpected Heritage Finds Procedure and the AARD. 	All stations.

Management Action	Responsibility	Description of Management	Location
		<ul style="list-style-type: none"> • An AMS will be prepared by the Excavation Director to guide archaeological management • If the find is a relic a s146 notification will be provided to Heritage NSW • Upon completion of any unexpected finds reporting and required mitigation measures, post excavation reporting in accordance with the Heritage NSW requirements will be undertaken within 12 months of the completion of the Project. Post-excavation report to be prepared by the Excavation Director. 	
Unexpected finds procedures for human skeletal remains.	Archaeologist	<ul style="list-style-type: none"> • Works will immediately cease in that area. The discoverer will immediately notify machinery operators so that no further disturbance of the remains will occur, as well as notify the foreman/site supervisor, Downer, Project archaeologist and Sydney Metro Environmental Representative (CoA E17, REMM NAH14, AH5, and NAH19). The Sydney Metro Exhumation Management Plan (CoA E15) will be enacted. Preliminary notification to the NSW Police will be undertaken by the Sydney Metro Heritage Program Manager. • Once confirmation is received from the technical specialist that the remains are of human origin, there are three possible statutory pathways to follow based on the assessment. Refer to the Sydney Metro Exhumation Management Plan. • No works to recommence until clearance is provided by Heritage NSW and/or the NSW Police as per the protocol outlined in the Sydney Metro Exhumation Management Plan. 	All stations
Conservation architect	Environmental Manager Conservation Architect	<ul style="list-style-type: none"> • A heritage conservation architect will be consulted where impacts to heritage items are proposed in accordance with NAH20. This will generally be in relation to reviewing work methodologies and advising on managing and minimising impacts to significant fabric within the station buildings. 	All stations

Management Action	Responsibility	Description of Management	Location
Heritage Engineer	Environmental Manager Heritage Engineer	<ul style="list-style-type: none"> Where significant impacts to fabric are proposed a heritage engineer will be consulted in regard to any structural issues, where required. 	All stations
Skilled tradespeople	Environmental Manager	<ul style="list-style-type: none"> Appropriately skilled tradespeople will be used for works that will impact significant fabric. This includes works within the station buildings that involve the reuse, conservation or maintenance of significant fabric such as masonry, stonework, interiors and flooring. Downer will notify Sydney Metro of the tradespeople nominated for the works. 	All stations

Management Action	Responsibility	Description of Management	Location
Moveable Heritage	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> Identified movable heritage items to be impacted are listed in Section 5.2.6. Where a movable heritage item is required to be removed in order to undertake the proposed works at a station, the methods of relocation, storage and reinstatement outlined in the Movable Heritage Strategy should be followed. 	All stations

Management Action	Responsibility	Description of Management	Location
Identification of significant fabric	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> Significant fabric has been identified in the station specific Significant Fabric Registers. Where significant fabric is to be impacted appropriate management should be undertaken in accordance with the salvage strategy and the recommendations of the heritage impact assessments for design as outlined below. Specific fabric which will be impacted by Stage 3 design has been included in the Heritage Salvage Strategy 	All stations

Management Action	Responsibility	Description of Management	Location
Salvage of significant fabric	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> Salvaged elements identified in the Heritage Salvage Strategy should be carefully salvaged, transported and stored in a safe and weather-proofed location, in keeping with the requirements of this report. Salvaged elements should be labelled to identify the origin of the element (i.e. station, building number, room designation), or where large volumes of material are salvaged (e.g. platform coping brick) these should be transported and stored in separately to avoid intermixing of materials from different locations. Where significant fabric identified for salvage is found to be contaminated or effected by insects it should be disposed of in accordance with environmental control measures. 	All stations
Storage of salvaged fabric	Environmental Manager	<ul style="list-style-type: none"> All salvaged materials to be re-used during construction for the Project will be stored on site and will be the responsibility of Downer 	All stations

Management Action	Responsibility	Description of Management	Location
	Heritage Consultant	to ensure their condition and security during works. All salvaged items will be affixed with removable labels to identify their provenance and stored in a safe and weatherproof environment.	
Vibration monitoring	Environmental Manager	<ul style="list-style-type: none"> Vibration monitoring will be undertaken in accordance with the Project's Noise and Vibration Management Plan. 	All stations

Management Action	Responsibility	Description of Management	Location
Removal of brick coping on the platforms	Heritage Consultant	<ul style="list-style-type: none"> That brick coping is removed along a single continuous horizontal line between brick coursework for the length of each platform, to ensure that a clean horizontal course of brick is preserved before the interface with new fabric above 	All stations
Conduit installations in the platform	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> That proposed conduits to be installed in the below-platform cavity are covered or painted in matte, recessive or neutral colours, to minimise their visibility. The installation of a removable screening panel over the conduit cavity, also painted in matte, recessive or neutral colours, should be 	All stations

Management Action	Responsibility	Description of Management	Location
		<p>considered, in order to conceal services located within while still allowing access for maintenance</p> <ul style="list-style-type: none"> That conduits, cabling or new structures are not installed over or on to any lower remnants of original brick fabric 	
Platform ventilation shafts	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> Platform modification works should not impact, cover or remove any existing subfloor ventilation vents. Should platform grading be proposed which will cover over these vents, small spacings should be kept open. 	All stations
Subfloor archaeology	Environmental Manager Excavation Director	<ul style="list-style-type: none"> Subfloor ground disturbance for these works should be managed under relevant provisions of the project AARD 	All stations

Management Action	Responsibility	Description of Management	Location
Subfloor ventilation	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> The installation of the suspended concrete slab on concrete piers should ensure that the subfloor cavity around the perimeter of each room is left open to ensure passive ventilation Subfloor ventilation grates should be protected to prevent inadvertent damage during floor replacement works 	All stations
Repair of significant fabric	Environmental Manager Conservation Architect	<ul style="list-style-type: none"> Repainting works should follow relevant guidelines in Heritage Paint Schemes (RailCorp 2013). Protocols for repainting should match the existing colour scheme present at the station. 	All stations

Management Action	Responsibility	Description of Management	Location
		<ul style="list-style-type: none"> Brickwork which is modified should be repointed following the completion of works as necessary, to ensure a clean and consistent external appearance Where the brickwork to the platform station buildings include a red stain to the mortar and tuck pointing. Ensure that the original condition is maintained and restored, as appropriate, where damage has occurred New ceilings, lighting, flooring and proposed interior window coverings should be carefully detailed to avoid impacting significant fabric (such as door and window frames, panels, lintels and skirting boards and cornices). Where works require the removal of existing intrusive fabric that adjoin original fabric (interior walls, services), the removal of the element should be conducted by hand to mitigate any potential heritage impact. During renovation works, any damaged and deteriorating original fabric should be restored and refreshed. Where a timber element is damaged, remove the entire thickness of the damaged area and geometrically splice in a matching section to the same thickness, shape, profile, form and species of the original timber. Ensure that complementary coloured glass in colour and type is utilised in the top lights to the window sashes by replacing all non-coloured glass in the panes originally intended as coloured glass. 	
Installation of services	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> Existing penetrations into original fabric should be utilised where introduced fabric (new services and equipment) is to be located. Any existing penetrations that will not be utilised for new works should be repaired and made good. A suitably qualified heritage tradesperson should be engaged to complete these works Above ground conduit installation should endeavour to use existing penetrations and entry points to structures. Conduits should not cover significant fabric or areas of detailing wherever possible. Conduits and conduit casings should not introduce large noticeable structures or items in areas of significant detailing or within significant view lines. During detailed design, conduit works should adhere to the principles and guidelines outlined in the <i>Heritage Technical Note, Installation of</i> 	All stations

Management Action	Responsibility	Description of Management	Location
		<p><i>New Electrical and Data Services at Heritage Sites</i> (Sydney Trains, 2017) to prevent minor cumulative impacts to fabric from occurring due to ad hoc conduit design solutions. Conduit design solutions should avoid ad hoc solutions which can cause further physical and visual impacts to heritage significant fabric</p> <ul style="list-style-type: none"> New Combined Services Route (CSR) and Galvanised Steel Troughing (GST) will increase the visual clutter. Prior to the commencement of the Sydney Metro service operation, redundant Sydney Trains GST should be removed to minimise the impact of new services in the station area. 	
Beamish Street overbridge works	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> The installation of new conduits should utilise existing penetrations within the brickwork, while the conduits should be painted dark grey or brown to reduce the visual dominance of the structures. 	Campsie
Campsie booking office	Environmental Manager Heritage Consultant	<ul style="list-style-type: none"> Manage salvage of significant fabric in accordance with the Project salvage methodology 	

Management Action	Responsibility	Description of Management	Location
Landscape Plan – Canterbury	Environmental Manager Arborist	<ul style="list-style-type: none"> Planting along the eastern boundary of the Canterbury Bowls Club (adjacent to the Old Sugarmill site) should be reinstated if trees are impacted for the site compound in accordance with NAH11. Downer will prepare and implement the Landscape Plan should their activities result in impacts to the existing trees on the eastern edge of the site. If required, the scheme would consider appropriate period plants and trees and any boundary wall treatment would be designed in consultation with the Project's Heritage Architect. 	The former Canterbury Bowling and Community Club compound site

7. Monitoring, auditing and reporting

7.1. Compliance

Downer will regularly review the Project activities to ensure compliance with this Plan. A regular inspection program for heritage management will be conducted as follows:

- Details of daily inspection undertaken by the Downer Site Supervisor will be logged in their respective site diaries, and maintenance will be undertaken during active site works;
- Routine weekly inspections are to be conducted by the Downer Environmental Manager to monitor heritage management and implementation of this HMP at active worksites. Weekly inspections will be documented to maintain compliance and effectiveness of controls;
- Items that require action will be documented on the site environmental inspection. Items that require specific and detailed action will be recorded on the Project's Corrective Action Register, maintained by the Downer Environmental Manager.

Downer's Construction Manager will be responsible for providing appropriate resources in terms of labour, plant and equipment to enable issues to be rectified in the nominated timeframes.

Records associated with this Plan, including records of any impacts avoided through construction methods will be maintained in accordance with Section 3.16 of the CEMP. Site inspections will be undertaken and records maintained within Downer's Information Management System.

7.2. Archaeological monitoring

If archaeological remains were encountered as a result of an unexpected find, archaeological monitoring of works which may impact significant archaeological remains will be undertaken in accordance with the AMS. Monitoring will be overseen by the Excavation Director.

7.3. Archaeological reporting

If archaeological remains were encountered as a result of an unexpected find, a preliminary results report will be prepared within two months of completion of archaeological work. This will be prepared under the direction of the Primary Excavation Director. An excavation report will be prepared within two years of completion of the Project's archaeological excavations in accordance with CoA E12.

8. Review and improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies objectives and targets. Downer will be responsible for carrying out these routine and ongoing evaluations.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance;
- Determine the cause or causes of non-conformances and deficiencies;
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies;
- Verify the effectiveness of the corrective and preventative actions;
- Document any changes in procedures resulting from process improvement; and
- Make comparisons with objectives.

This HMP will be reviewed on a six-monthly basis and earlier if required taking into account the following:

- The status and progress of The Project'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;
- Lessons learnt from incident, events or near misses;
- Feedback from Compliance Tracking Reports; and
- Feedback on Construction Monitoring Program results.

8.1. Enquiries, complaints and incident management

Environmental incidents and non-compliances associated with heritage will be managed in accordance with Section 3.10 of the CEMP.

Enquiries and complaints that relate to heritage management will be managed in accordance with the Project's Overarching Community Communication Strategy and Section 3.7 of the CEMP.

9. HMP administration

9.1. Hold points

Heritage management hold points are included within Table 14.

Table 14: HMP hold points

Item	Process Held	Acceptance Criteria	Approval Authority
Encounter of Unexpected Heritage Item	Commencement of works in the affected area	The Unexpected Finds Process as outlined in the HMP and Sydney Metro Unexpected Heritage Finds Procedure must be applied in the event of encountering unexpected/potential heritage items.	Downer's Environmental Manager (or delegate)
Inadvertent impact to Aboriginal heritage at S2B PAD02	Commence of works in proximity of S2B PAD02	Review of controls (including exclusion zone fencing) and work methodologies to ensure adjacent works do not impact archaeology at S2B PAD02. Ongoing monitoring throughout works by Environmental team to ensure controls remain in place and appropriate methodologies followed.	Downer's Environmental Manager
Construction identified as affecting buildings	Site activities	Building Condition Survey conducted by an appropriate professional nominated by Downer	Downer's Construction Manager

9.2. Records

Records associated with this management plan will be maintained in accordance with Section 3.16 of the CEMP. Records relating to heritage management will include (but are not limited to):

- Inspections undertaken in relation to heritage management measures;
- Archival recordings undertaken of any heritage item;
- Unexpected finds and stop work orders; and
- Records of any impacts avoided or minimised through construction methods.

Appendix A – Other Conditions of Approval, Revised Environmental Mitigation Measures and CEMF Requirements Relevant to this Plan

Other relevant Conditions of Approval relevant to the development of this Plan

CoA No.	Condition Requirement	Document Reference
E10	Following completion of Work described in the documents listed in Conditions A1 and A2 in relation to heritage items, a Heritage Report including the details of any archival recording, further historical research either undertaken or to be carried out and archaeological excavations (with artefact analysis and identification of a final repository for finds), must be prepared in accordance with any guidelines and standards required by the Heritage Council of NSW and OEH.	Section 5.2.3 Section 5.3.9
E11	An Excavation Director's Report (EDR) must be prepared for any heritage items of State significance that are discovered during Work. The EDR must be prepared in consultation with OEH	Section 5.3.9 Table 13
E12	The Heritage Report and Excavation Directors Report must be submitted to the Planning Secretary, the Heritage Council of NSW and OEH for information no later than 24 months after the completion of Work referred to in Condition E10.	Section 5.3.9 Table 13
E13	The Proponent must prepare a Heritage Interpretation Strategy which outlines a process to interpret key Aboriginal and non-Aboriginal heritage values and stories of heritage items in the final project design. The Heritage Interpretation Strategy must be prepared in consultation with the Heritage Council of NSW and submitted to the Planning Secretary for information before the commencement of Construction.	Section 5.2.4
E14	A Heritage Interpretation Plan(s) must be prepared, consistent with the Heritage Interpretation Strategy which identifies heritage items to be used in the final design of the project. The plan(s) must identify how items will be interpreted and provide a timeframe for their implementation which must be no later than the commencement of Operation. Heritage interpretation in any station precinct must be identified in the relevant Station Design and Precinct Plan(s) required in Condition E56. The Heritage Interpretation Plan must be prepared in accordance with the NSW Heritage Manual, the NSW Heritage Office's Interpreting Heritage Places and Items: Guidelines (August 2005), and the NSW Heritage Council's Heritage Interpretation Policy.	Section 5.2.4
E15	An Unexpected Heritage Finds and Human Remains Procedure must be prepared to manage unexpected heritage finds in accordance with the guidelines and standards prepared by the Heritage Council of NSW or OEH	Section 5.1.4 Section 5.3.5 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D) Sydney Metro Exhumation Management Plan

CoA No.	Condition Requirement	Document Reference
E16	The Unexpected Heritage Finds and Human Remains Procedure must be prepared by a suitably qualified and experienced heritage specialist in consultation with the Heritage Council of NSW and submitted to the Planning Secretary for information no later than one (1) month before the commencement of Construction	Section 5.1.4 Section 5.3.5 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D) Sydney Metro Exhumation Management Plan
E17	The Unexpected Heritage Finds and Human Remains Procedure, as submitted to the Planning Secretary, must be implemented for the duration of Construction and during Operational maintenance Work. Note: Human remains that are found unexpectedly during Work are under the jurisdiction of the NSW State Coroner and must be reported to the NSW Police immediately.	Section 5.1.4 Section 5.3.5 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D) Sydney Metro Exhumation Management Plan

Revised Environmental Mitigation Measures relevant to the development of this Plan

REMM No.	REMM Requirement	Timing	Document Reference
Non-Aboriginal Heritage			
NAH1	The project design would minimise adverse impacts to heritage buildings, elements, fabric, spaces and vistas that contribute to the overall heritage significance of the Bankstown Line.	Design/pre-construction	This Project's scope does not include design. This requirement was fulfilled during the design phases of the Sydenham to Bankstown project. Section 5.2.1 Table 13

REMM No.	REMM Requirement	Timing	Document Reference
NAH2	The project design would maximise the retention and legibility of heritage buildings, structures, fabric, spaces and vistas that are individually significant and contribute to the overall heritage significance of the Bankstown Line.	Design/pre-construction	This Project's scope does not include design. This requirement was fulfilled during the design phases of the Sydenham to Bankstown project. Section 5.2.1 Table 13
NAH3	The project design would complement retained heritage buildings, elements, fabric, spaces and vistas to avoid outcomes that compromise the significance of these heritage items	Design/pre-construction	This Project's scope does not include design. This requirement was fulfilled during the design phases of the Sydenham to Bankstown project. Section 5.2.1 Table 13
NAH4	The project design would be developed with guidance from an appropriately qualified and experienced conservation architect.	Design/pre-construction	This Project's scope does not include design. This requirement was fulfilled during the design phases of the Sydenham to Bankstown project. Section 5.2.1 Table 13
NAH5	Where heritage significant items or elements are to be retained within the operational area, an adaptive reuse strategy would be prepared by an appropriately qualified and experienced heritage architect.	Design/pre-construction	Section 5.2.5 Table 13
NAH6	A Heritage Interpretation Plan would be prepared to document the development of the Bankstown Line and detail the history of each station and its contribution to both the Bankstown Line and the surrounding suburbs. Appropriate heritage interpretation would be incorporated in the design and would provide legible connection between stations.	Design/pre-construction	Section 5.2.4 Table 13
NAH7	A moveable heritage item strategy would be prepared by an appropriately qualified and experienced heritage specialist in consultation with Sydney Trains, and would include a comprehensive record of significant railway elements to be impacted. This would include items contained within station and platform buildings as well as of any other significant equipment within the curtilage of the heritage railway stations. The moveable heritage item strategy would form part of the broader interpretation strategy.	Design/pre-construction	Section 5.2.6 Table 13

REMM No.	REMM Requirement	Timing	Document Reference
NAH8	<p>Where significant buildings are to be re-purposed or refreshed:</p> <ul style="list-style-type: none"> the inherent character of the building should be retained with new additions, including form, palette and materiality, sympathetic to its heritage values a suitably qualified and experienced heritage architect should advise on appropriate materials and finishes which would be sympathetic to the heritage values of each individual station the internal layout of the building should be retained where possible, and rooms should not be subdivided unless it can be completed without adverse impact and/or is reversible without any long term adverse impact a significant element register should be prepared by a suitably qualified and experienced heritage architect. The register should list significant fabric, assess its condition, tolerance for change and recommend retention or salvage where fabric of high significance is to be removed, adequate assessment should be carried out that outlines impact and justification in accordance with the Statements of Heritage Impact guidelines (NSW Heritage Council 2002) 	Design/pre-construction	<p>This Project's scope does not include design.</p> <p>This requirement was fulfilled during the design phases of the Sydenham to Bankstown project.</p> <p>Section 2.1</p> <p>Section 5.2.1</p> <p>Section 5.2.7</p> <p>Table 13</p>
NAH9	<p>The design and materials used for the construction of new access stairs, concourses, canopies and lift shafts should be as sympathetic as possible to the existing character of the stations with the aim of minimising visual impacts.</p> <p>The design should use unobtrusive, modern, lightweight materials such as glass panelling and slim frame elements. The Design Review Panel should be consulted in regard to the design, form and material of these additions.</p>	Design/pre-construction	<p>This Project's scope does not include design.</p> <p>This requirement was fulfilled during the design phases of the Sydenham to Bankstown project.</p> <p>Section 5.2.1</p> <p>Table 13</p>
NAH10	<p>Where platforms are re-levelled, door thresholds and steps should be accessible without raising or relocation of entries. Sub-floor ventilation should remain open to avoid long term impacts to the structures.</p>	Design/pre-construction	<p>This Project's scope does not include design.</p> <p>This requirement was fulfilled during the design phases of the Sydenham to Bankstown project.</p> <p>Section 5.2.1</p> <p>Table 13</p>
NAH11	<p>A landscape scheme would be prepared for the Old Sugarmill to re-instate planting within and close to the curtilage of the item. The scheme would consider appropriate period plants and trees. Any boundary wall treatment would be designed in consultation with a heritage architect.</p>	Design/pre-construction	<p>Section 5.2.14</p> <p>Table 13</p>

REMM No.	REMM Requirement	Timing	Document Reference
NAH12	The archaeological research design, including any mitigation measures identified in the Archaeological Assessment and Research Design report, would be implemented.	Design/pre-construction	Table 13
NAH13	Photographic archival recording would be carried out in accordance with the NSW Heritage Office's How to Prepare Archival Records of Heritage Items (1998), and Photographic Recording of Heritage Items Using Film or Digital Capture (2006).	Design/pre-construction	Section 5.2.3 Table 13
NAH14	An unexpected finds procedure would be developed and included in the construction heritage management plan.	Design/pre-construction	Section 5.1.4 Section 5.3.5 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D)
NAH15	Methodologies for the removal of existing structures and construction of new structures would be developed and implemented during construction to minimise direct and indirect impacts to other elements within the curtilages of the heritage items, or to heritage items located in the vicinity of works.	Construction	Section 5.2.8 Table 13
NAH16	All retained heritage buildings, structures, fabric and moveable heritage items would be protected to avoid damage during works in the vicinity of these items, including from vibration. Retained significant buildings or elements susceptible to damage would be protected by hoardings or screens.	Construction	Section 5.2.11 Table 13
NAH17	Prior to construction commencing, a detailed inventory of all buildings, structures, fabric, spaces and vistas of heritage significance that are to be retained or removed would be prepared by appropriately qualified and experienced heritage specialists. The inventory must provide an assessment of the heritage impact based on the significance of each element and sub-element that comprises it and include recommendations for protection and conservation relative to the identified level of heritage significance.	Design/pre-construction	Section 2 Section 5.2.7
NAH18	In the event that unexpected archaeological remains, relics, or potential heritage items are discovered during construction, all works in the immediate area would cease, and the unexpected finds procedure would be implemented.	Construction	Section 5.1.4 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D)

REMM No.	REMM Requirement	Timing	Document Reference
NAH19	In the event that a potential burial site or potential human skeletal material is exposed during construction, the Transport for NSW Exhumation Management Plan would be implemented.	Construction	Section 5.1.4 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D)
NAH20	All works to conserve, protect or remove significant heritage fabric would be undertaken by skilled tradespeople with experience working on heritage sites, in consultation with an appropriately qualified conservation heritage architect.	Construction	Section 5.2.10 Table 13
NAH23	Prior to the removal of the Bankstown Parcels Office (former), a heritage salvage and moveable heritage register should be prepared, identifying those significant elements which can be removed and retained for potential reuse.	Design/pre-construction	The removal of Bankstown Parcels Office is not within this scope of this Project. This REMM is not relevant to this Plan.
Aboriginal Heritage			
AH1	Aboriginal stakeholder consultation would continue to be undertaken in accordance with Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECC, 2010).	Pre-construction	Consultation with RAPs was undertaken during concept design as part of the Sydney Metro Sydenham to Bankstown EIS and also during preparation of the ACHAR RAPs will be involved if Aboriginal objects were identified during excavations and during excavation of S2B PAD02 Section 5.1.4 Section 5.1.2 Appendix B
AH2	The Aboriginal Cultural Heritage Assessment Report would be implemented.	Pre-construction	The ACHAR will be implemented in the event of an unexpected find and during archaeological excavations at S2B PAD02, Section 5.1.1 Section 5.1.2
AH3	Archaeological test excavation (and salvage if required) would be carried out at S2B PAD02 at Punchbowl Station. Excavations would be conducted in accordance with the methodology outlined by the Aboriginal cultural heritage assessment report.	Pre-construction	Section 5.1.2
AH4	Appropriate Aboriginal heritage interpretation would be incorporated into the design in consultation with Aboriginal stakeholders.	Pre-construction	Section 5.2.4

REMM No.	REMM Requirement	Timing	Document Reference
AH5	<p>If potential Aboriginal items are uncovered during the works, all works in the immediate area would cease, and the unexpected finds procedure included in the construction heritage management plan would be implemented.</p> <p>During pre-work briefings, employees would be made aware of the unexpected finds procedures and obligations under the National Parks and Wildlife Act 1974.</p>	Construction	<p>Section 5.1.4</p> <p>Section 5.3.5</p> <p>Section 5.4</p> <p>Sydney Metro Unexpected Heritage Finds Procedure (Appendix D)</p>

Construction Environmental Management Framework requirements relevant to the development of this Plan

CEMF Section	CEMF Requirement	Document Reference
10.1(a)	<p>The following heritage management objectives will apply to construction:</p> <p>Embed significant heritage values through any architectural design, education or physical interpretation.</p> <p>Minimise impacts on items or places of heritage value.</p> <p>Avoid accidental impacts on heritage items.</p> <p>Maximise worker's awareness of indigenous and non-indigenous heritage</p>	<p>Significant heritage values have been embedded in the heritage interpretation design development of the Project.</p> <p>Section 1.3</p> <p>Section 5.2.4</p> <p>Section 5.2.11</p> <p>Section 5.3.2</p> <p>Section 5.4</p>
10.2(b)	The Contractor's regular inspection will include checking of heritage mitigation measures	Section 7
10.2(c)	Compliance records will be retained by the Contractor. These will include:	-
i.	Inspections undertaken in relation to heritage management measures	Section 7
ii.	Archival recordings undertaken of any heritage item	Section 5.2.3
iii.	Unexpected finds and stop work orders	<p>Section 5.1.4</p> <p>Section 5.3.5</p> <p>Sydney Metro Unexpected Heritage Finds Procedure (Appendix D)</p>

CEMF Section	CEMF Requirement	Document Reference
iv.	Records of any impacts avoided or minimised through design or construction methods	Section 7 Section 8
10.3(a)	Examples of heritage mitigation measures include:	-
i.	Any heritage item not affected by the works will be retained and protected throughout construction.	Section 5.2.11
ii.	During construction undertake professional archaeological investigation, excavation, and reporting of any historical Indigenous heritage sites of state significance which will be affected. Reporting may be completed as construction progresses	Section 5.1 Section 5.3
iii.	Undertake archival recordings of all non-Indigenous heritage items affected by the works prior to commencement of works	Section 5.2.3
iv.	Implement unexpected heritage find procedures for Indigenous and non-Indigenous heritage items.	Section 5.1.4 Section 5.3.5 Sydney Metro Unexpected Heritage Finds Procedure (Appendix D)
Table 17.4	<p>The design is sympathetic to the historic significance of existing stations, and where practicable, avoids and minimises impacts to heritage.</p> <p>The preferred project retains, and where possible, repurposes all heritage elements.</p> <p>The design and mitigation strategies are reviewed by the Sydney Metro Design Review Panel.</p> <p>Impacts on heritage are managed in accordance with relevant legislation, including the EP&A Act, the Heritage Act 1977, and relevant guidelines.</p> <p>Potential impacts are managed by the mitigation measures.</p>	<p>This Project works do not include design.</p> <p>This requirement was fulfilled during the design phases of the Sydenham to Bankstown project.</p> <p>Section 5.2.1 Table 3 Table 13</p>

Appendix B – Registered Aboriginal Parties

The list of registered Aboriginal stakeholders/Registered Aboriginal Parties (RAPs) and associated contact details for the Project are included below:

Stakeholder
Aboriginal Archaeology Service INC
Bilinga Cultural Heritage Technical Services
DACHA
Darug Land Observations PTY LTD
Duncan Suey & Associates
Gandangara Local Aboriginal Land Council
Gundungurra Tribal Technical Services
Gunyyu Cultural Heritage Technical Services
Kamilaroi-Yankuntjatjara Working Group
Metropolitan Local Aboriginal Land Council
Munyunga Cultural Heritage Technical Services
Murri Bidgee Mullangari Aboriginal Corporation
Murrumbul Cultural Heritage Technical Services
Tocomwall
Wingikara Cultural Heritage Technical Services
Woronora Plateau Gundangarra Elders Council

Appendix C – Consultation Register

Agency	Comment	Project Response										
CoCB	<p>Email received 22/12/20:</p> <p><i>“Same comments as last time - Table 13 identifies responsibilities to the heritage consultant where it relates to the built heritage of the stations - this should however be the responsibility of a Heritage Architect.</i></p> <p><i>Regards,”</i></p>	Responsibilities in Table 13 have been reviewed and revised accordingly to ensure the correct responsibilities have been assigned.										
IWC	<p>Email received 21/01/21:</p> <p><i>“Thanks, I have reviewed the Heritage Management Plan, and suggest the following refinements: Section 6, p. 45</i></p> <table><tr><td>ion architect</td><td>During construction</td><td>Environmental Manager Conservation Architect</td><td><ul style="list-style-type: none">A heritage conservation architect could be consulted where impacts to heritage items are proposed in accordance with NAH20. This would generally be in relation to reviewing work methodologies and advising on impacts to significant fabric within the station buildings.</td><td>All stations</td></tr></table> <p><i>Management description should be amended to: “shall be consulted...”</i></p> <p><i>p. 48</i></p> <table><tr><td>r of significant fabric</td><td>During construction</td><td>Environmental Manager Heritage Consultant</td><td><ul style="list-style-type: none">Repainting works should follow relevant guidelines in Heritage Paint Schemes (RailCorp 2013). Protocols for repainting should match the existing colour scheme present at the station.Brickwork which is modified should be repointed following the completion of works as necessary, to ensure a clean and consistent external appearanceWhere the brickwork to the platform station buildings include a red stain to the mortar and tuck pointing. Ensure that the original condition is maintained and restored, as appropriate, where damage has occurredNew ceilings, lighting, flooring and proposed interior window coverings should be carefully moulded to avoid impacting significant and detailed fabric (such as door and window frames, panels, lintels and skirting boards and cornices).Where works require the removal of existing intrusive fabric that adjoin original fabric (interior walls, services), the removal of the element should be conducted by hand to mitigate any potential heritage impact.During renovation works, any damaged and deteriorating original fabric should be restored and refreshed.Where a timber element is damaged, remove the entire thickness of the damaged area and geometrically splice in a matching section to the same thickness, shape, profile, form and species of the original timber.</td><td>All stations</td></tr></table> <p><i>Responsibility should be amended to “conservation/heritage architect.</i></p> <p><i>Regards”</i></p>	ion architect	During construction	Environmental Manager Conservation Architect	<ul style="list-style-type: none">A heritage conservation architect could be consulted where impacts to heritage items are proposed in accordance with NAH20. This would generally be in relation to reviewing work methodologies and advising on impacts to significant fabric within the station buildings.	All stations	r of significant fabric	During construction	Environmental Manager Heritage Consultant	<ul style="list-style-type: none">Repainting works should follow relevant guidelines in Heritage Paint Schemes (RailCorp 2013). Protocols for repainting should match the existing colour scheme present at the station.Brickwork which is modified should be repointed following the completion of works as necessary, to ensure a clean and consistent external appearanceWhere the brickwork to the platform station buildings include a red stain to the mortar and tuck pointing. Ensure that the original condition is maintained and restored, as appropriate, where damage has occurredNew ceilings, lighting, flooring and proposed interior window coverings should be carefully moulded to avoid impacting significant and detailed fabric (such as door and window frames, panels, lintels and skirting boards and cornices).Where works require the removal of existing intrusive fabric that adjoin original fabric (interior walls, services), the removal of the element should be conducted by hand to mitigate any potential heritage impact.During renovation works, any damaged and deteriorating original fabric should be restored and refreshed.Where a timber element is damaged, remove the entire thickness of the damaged area and geometrically splice in a matching section to the same thickness, shape, profile, form and species of the original timber.	All stations	<p>‘Conservation architect’ Management Action in Table 13 has been revised from “A heritage conservation architect could be consulted...” to “will be consulted”</p> <p>Responsibility for “Repair of significant fabric” Management Action in Table 13 has been revised to “Conservation Architect” rather than “Heritage Consultant”</p>
ion architect	During construction	Environmental Manager Conservation Architect	<ul style="list-style-type: none">A heritage conservation architect could be consulted where impacts to heritage items are proposed in accordance with NAH20. This would generally be in relation to reviewing work methodologies and advising on impacts to significant fabric within the station buildings.	All stations								
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Heritage NSW	<p>Email received 9/12/20:</p>	Revision 00 of this Heritage Management Plan (which was issued to Heritage NSW for consultation) did not consider the establishment										

Agency	Comment	Project Response
	<p><i>"Thank you for your email dated 18 November 2020 inviting comments from the Heritage Council of NSW on the Construction Heritage Management Plan for the above State Significant Infrastructure (SSI) proposal.</i></p> <p><i>There are no listed places located within or near the proposed project area, however the following S.170 registers items are located within and near the project area:</i></p> <p><i>1. Railcorp:</i></p> <ul style="list-style-type: none"> <i>• Dulwich Hill Railway Station – Item No. 4801909</i> <i>• Campsie Railway Station Group – Item No. 4801101</i> <i>• Punchbowl Railway Station Group – Item No. 4802009</i> <p><i>There are also several locally listed heritage places within and adjacent to the site listed on the Canterbury LEP 2012.</i></p> <p><i>The Construction Heritage Management Plan to guide the works required for South west Sydney Metro are noted. The submitted CHMP is considered satisfactory to guide the works required for Dulwich Hill, Campsie and Punchbowl Stations Upgrade Project.</i></p> <p><i>The Heritage Management Plan discusses the historical archaeology of the project area in Section 3.4 Dulwich Hill, Campsie and Punchbowl Stations are all unlikely to contain significant archaeology. The prior Archaeological Assessment and Research Design recommended construction to proceed under the Sydney Metro Unexpected Finds Procedure. Section 2.3 of the HMP also notes that any nominated Excavation Director for archaeology should be able to meet the Heritage Council ED Criteria for 'relics' of local significance. These measures are considered appropriate by HNSW.</i></p> <p><i>As the site contains local heritage items, and other local items are in the vicinity, advice should be sought from the relevant local councils. It is recommended that RailCorp be consulted for comment for items on the s170 register.</i></p> <p><i>If you have any questions regarding the above advice, please contact [redacted] at Heritage NSW on [redacted].</i></p> <p><i>Yours sincerely,"</i></p>	<p>and utilisation of Downer's compound located at the former Canterbury Bowling and Community Club (SPIR Work Site W7), which is located within an Archaeological Management Zone and within proximity of the SHR listed Old Sugarmill item.</p> <p>This Heritage Management Plan has been revised accordingly reflect the risk and management strategies for this site, consistent with the Plan prepared for the Marrickville, Canterbury and Lakemba Project.</p> <p>Revision 02 of this Plan, which considered the establishment and utilisation of Downer's compound located at the former Canterbury Bowling and Community Club, was provided to Heritage NSW for consultation on 27 January 2021. Heritage NSW's response to this submission is outlined below (see email received 17/02/21).</p> <p>Consultation with Sydney Trains (RailCorp) on the Project's design and the proposed changes to S.170 listed station groups has occurred throughout the design development process, as such consultation was not deemed necessary for the development of this Sub-plan.</p>
	<p>Email received 17/02/21:</p> <p><i>"Thank you for your email dated 27 January 2021 inviting comments from the Heritage Council of NSW on the amended Construction Heritage Management Plan for the above State Significant Infrastructure (SSI) proposal.</i></p> <p><i>The amended Heritage Management Plan identifies that a new construction compound has been included in the proposed project area. This compound would be located approximately</i></p>	

Agency	Comment	Project Response
	<p><i>100m from the State Heritage Register (SHR) listed place – Old Sugar Mill (00290) and be within an Archaeological Management Zone identified in the Planning Approval. The following Rail Corp s170 registers items are located within and near the project area:</i></p> <ul style="list-style-type: none"> - <i>Dulwich Hill Railway Station Group – Item No. 4801909</i> - <i>Campsie Railway Station Group – Item No. 4801101</i> - <i>Punchbowl Railway Station Group – Item No. 4802009</i> <p><i>There are also several locally listed heritage places within and adjacent to the site listed on the Canterbury LEP 2012.</i></p> <p><i>The update to the Construction Heritage Management Plan is noted and it is considered that the inclusion on the construction compound would not have any unacceptable adverse impacts. As such Heritage NSW finds that the existing protocols are sufficient to guide the construction works on site.</i></p> <p><i>The updated information for historical archaeology in the HMP (Section 3.4) notes that remains of State significance are unlikely in the project area but locally significant archaeological remains associated with the historical development of the Bankstown rail line, Canterbury Station and Canterbury Park Racecourse may be present. The HMP advises that any subsurface works within the Work Site W7 area (shaded red in Figure 7) will require archaeological; monitoring or salvage excavations. The location of subsurface works will be outlined in the AMS with detailed recommendations for works required. These measures are considered appropriate to manage non-Aboriginal archaeology.</i></p> <p><i>As the site contains local heritage items, and other local items are in the vicinity, advice should be sought from the relevant local councils. It is recommended that RailCorp be consulted for comment on items on the s170 register.</i></p> <p><i>If you have any questions regarding the above advice, please contact [redacted] at Heritage NSW on [redacted].</i></p> <p><i>Yours sincerely'</i></p>	<p>Consultation with Sydney Trains (RailCorp) on the Project's design and the proposed changes to S.170 listed station groups has occurred throughout the design development process, as such consultation was not deemed necessary for the development of this Sub-plan.</p>

Appendix D – Sydney Metro Unexpected Heritage Finds Procedure

Appendix J: Indicative Training Matrix

This matrix is indicative and shall be a live document based on scope and risk applicable with each four week lookahead.

Sydney Metro Packages 5 & 6 Station Upgrades Environment Training Matrix:
Rev 0: 30/03/2021

Complete
Planned
Not completed

Type / Method of Training	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
Downer Environment and Sustainability Induction												
Spill Response												
Noise and Vibration												
Dewatering and erosion and sediment control												
Unexpected finds including asbestos & heritage												
Waste and contamination management												
Flora and Fauna risk												
Air Quality												

Appendix K: Indicative Audit Schedule (Template)

SECTION 1 – GENERAL																																		
Audit Schedule Level:		Sydney Metro Packages 5 and 6 Station Upgrades		Sub-Level:	Hurlstone Park, Belmore and Wiley Park Station Upgrades		Date created	30/03//2021	Rev 0																									
Prepared By:		Ryan O’Leary		Position:	Senior Environment and Sustainability Advisor		Date updated																											
SECTION 2 – COLOUR LEGEND																																		
<p><i>Proposed = Required timing, Scheduled = Confirmed date with Auditee, Complete = Audit undertaken, Overdue = Proposed date or Scheduled date has passed current date and not rescheduled.</i></p> <p><i>Internal Audits are prioritised based on a risk assessment that includes an appreciation of factors including the following:</i></p> <p><i>Safety: including Critical risks; Number of incidents, Relationship with regulatory contact and License conditions.</i></p> <p><i>Environment: Number of incidents, License conditions, Aspects and impacts, critical risks</i></p> <p><i>Quality: including Number of NCR’s, Supply - On time delivery, Capacity and capability to specification</i></p> <p><i>Sustainability: including social, environmental and economic aspects as specified in TfNSW SDGs</i></p> <p><i>Other: including Financial risk to the business, Client feedback, Contract and Certification requirements</i></p>							PROPOSED	SCHEDULED	COMPLETE	OVERDUE/ CANCELLED																								
							RISK RATING																											
							LOW (L)	MEDIUM (M)		HIGH (H)																								
SECTION 3 – MANAGEMENT SYSTEM & INTERNAL AUDITORS				AUDIT REQUIREMENTS		PROJECTS AUDITED ON		AUDIT TYPE																										
<table><tr><td>Downer Environment / Sustainability</td><td>Downer Quality</td><td>Downer Safety/Zero Harm - ZH</td></tr><tr><td>Gareth O’Brien (GOB) Ryan O’Leary (ROL) Abe Sharman (AS)</td><td>TBA</td><td>TBA</td></tr><tr><td>Sydney Metro / Independent Enviro / Sustainability</td><td>TfNSW Quality</td><td>TfNSW Safety</td></tr><tr><td>Sydney Metro – James Wilkinson</td><td>TBA</td><td>TBA</td></tr></table>				Downer Environment / Sustainability	Downer Quality	Downer Safety/Zero Harm - ZH	Gareth O’Brien (GOB) Ryan O’Leary (ROL) Abe Sharman (AS)	TBA	TBA	Sydney Metro / Independent Enviro / Sustainability	TfNSW Quality	TfNSW Safety	Sydney Metro – James Wilkinson	TBA	TBA	<table><tr><td>Source requirement</td><td>Acronym</td></tr><tr><td>Sydney Metro Standard Requirements (Works Contract)</td><td>SMSRs</td></tr><tr><td>ISO 14001:2015</td><td>EMS</td></tr><tr><td>ISO 18001:2007</td><td>SMS</td></tr><tr><td>ISO 9001: 2015</td><td>QMS</td></tr><tr><td>TfNSW Sustainable Design Guidelines. V.4.0</td><td>TfNSW SDG</td></tr><tr><td>Sustainability Management Plan</td><td>SMP</td></tr></table>		Source requirement	Acronym	Sydney Metro Standard Requirements (Works Contract)	SMSRs	ISO 14001:2015	EMS	ISO 18001:2007	SMS	ISO 9001: 2015	QMS	TfNSW Sustainable Design Guidelines. V.4.0	TfNSW SDG	Sustainability Management Plan	SMP	HURLSTONE PARK, BELMORE AND WILEY PARK		INTERNAL = INT
				Downer Environment / Sustainability	Downer Quality	Downer Safety/Zero Harm - ZH																												
				Gareth O’Brien (GOB) Ryan O’Leary (ROL) Abe Sharman (AS)	TBA	TBA																												
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TfNSW Sustainable Design Guidelines. V.4.0	TfNSW SDG																																	
Sustainability Management Plan	SMP																																	
		EXTERNAL = EXT																																

No.	Audit Number / Subject area	Project/Location/Activity	Audit on	Audit by	Audit Type	Audit Requirements	Risk	Feb 2021	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2022	Feb	Mar
1.	CAT 1	AUDITS FROM IPD - DOWNER	SM P5&6		EXT																
	ISO	ISO compliance	SM P5&6		EXT	Full corporate ISO	M														
2.	CAT 2	ASSURANCE AUDIT	SM P5&6		EXT																
	Sustainability / Environment / Community	Quarterly EMS assurance audit	SM P5&6	GOB / ROL	INT	CEMP and full EMS	M														
3.	CAT 3	COMPLIANCE AUDIT ON MANAGEMENT PLANS	SM P5&6		INT																
	Sustainability / Environment / Community	6-monthly review of all Environment and Sustainability Management Plans	SM P5&6	GOB / ROL / AS	INT	CEMP & SMP	L														
4.	CAT 4	SUBCONTRACTORS/SUPPLIER AUDIT			INT																



	Sustainability / Environment / Community	Waste end-location (e.g. Bingo, Suez, etc.)	SM P5&6	GOB / ROL / AS	INT	EMS / SMP (6-monthly)	L													
	Quality / Sustainability	Steel subcontractor	SM P5&6	GOB / Quality	INT	EMS / SMP	L													
5.	CAT 5	COMMERCIAL AUDITS (If Required)	SM P5&6		INT															
6.	CAT 6	AUDIT / INSPECTION BY CLIENT / AEO / ISPs	SM P5&6		EXT															
	Environment and Sustainability	Environment and Sustainability audit	SM P5&6	Sydney Metro to arrange	EXT	SMSRs / SMP	L													
7.	CAT 7	INDEPENDENT REVIEWS	SM P5&6		EXT															
	Environment and Sustainability	Monthly Sustainability report review	SM P5&6	Sydney Metro	EXT	SMSRs / SMP	L													
	Sustainability	Design report reviews	SM P5&6	Sydney Metro	EXT	SMSRs / SMP	L													