

Construction Environmental Management Framework



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PO Box K659
Haymarket NSW 1240

T: 1800 612 173

E: sydneymetrowest@transport.nsw.gov.au

W: sydneymetro.info

Cover: Aerial view of construction at Baranagaroo Station.



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1. Introduction

1.1 Purpose and Scope

This Construction Environmental Management Framework (CEMF) is a Sydney Metro project framework which sets out the environmental management requirements for construction. It provides a linking document between the planning approval documentation and the construction environmental management documentation to be developed by the Principal Contractors relevant to their scope of works.

Sydney Metro Principal Contractors will be required to implement and adhere to the requirements of this CEMF.

Stakeholder and community management requirements during construction are set out in the Overarching Community Communication Strategy (OCCS).

1.2 Status

This is a controlled document, please refer to the version register below which is updated as required.

Table 1 Document Review Status

Version	Description	Date
1.0	EIS 1 – Northwest Rail Link	4 April 2012
1.1	EIS 1 Submissions Report – Northwest Rail link	26 July 2012
1.2	EIS 2 and the Rapid Transit Rail Facility (RTRF) – Northwest Rail Link	31 October 2012
1.3	Updated to incorporate all planning approvals, including ECRL conversion Part 5 approvals	11 July 2014
3.0	Updated to encompass the scope of Sydney Metro – Chatswood to Sydenham EIS	16 February 2016
3.1	Updated for - Chatswood to Sydenham Submissions Report and Preferred Infrastructure Report	15 August 2016
3.2	Updated for – Sydenham to Bankstown EIS	25 August 2017
4.0	Updated for inclusion in Sydney Metro West EIS	23 January 2020
4.1	Updated for inclusion in the Sydney Metro West Stage 1 Submissions Report	9 September 2020
4.2	Updated to include SMP32 (Community Benefits Implementation Plan)	9 November 2020
4.3	Updated to include Sydney Metro Environment and Sustainability Statement of Commitment (Section 1.3) and updates to SMP 1, SMP 32, Appendix A	5 October 2021
4.4	Updates for inclusion in Sydney Metro West Stage 3 EIS	18 February 2022

1.3 Sydney Metro Environment and Sustainability Statement of Commitment

The Sydney Metro Environment and Sustainability Statement of Commitment (Appendix A) which applies to Sydney Metro projects sets out Sydney Metro's approach to delivering best practice sustainability outcomes. Principal Contractors are required to undertake their works in accordance with this document. The Statement of Commitment reflects a commitment in the delivery of the project to:

- Minimise our impacts and leave a positive environmental and social legacy, by avoiding pollution, managing resources and waste efficiently, reducing the project ecological footprint, enhancing the natural environment, conserving and enhancing built and cultural heritage and promoting a diverse and inclusive workforce and supply chain while complying with all applicable environmental laws, regulations and statutory obligations.
- Deliver a resilient asset and service for our customers by responding to a changing climate and minimising carbon.
- Collaborate with stakeholders to innovate and drive sustainable outcomes through establishing and maintaining positive stakeholder relationships and driving continual improvement.
- Embed sustainability into our project delivery activities by establishing measurable targets and objectives and reporting on performance.

2. Legislative and Other Requirements

The below table (Table 2) identifies key NSW environmental legislative requirements and their application to SM construction works, current as at the date of this document. Sydney Metro and its Contractors must regularly review their legislative and other requirements. In addition, there are a range of Sydney Metro obligations that are tailored for each project. A list of Standard Environmental Mitigation Measures is included as Appendix B.

Table 2 NSW Legislative Requirements

Legislation and Administering Authority	Requirements	Application to Sydney Metro
Biosecurity Act 2015	Under this Act, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.	Control weeds as required on land under the management of the Contractor.
Contaminated Land Management Act 1997 NSW Environment Protection Authority (EPA)	The Act provides a process for the investigation and remediation of land where contamination presents a significant risk of harm to human health or some other aspect of the environment. The Act also outlines the circumstances in which notification to the Environment Protection Authority is required in relation to the contamination of land.	Follow the legislative process where contaminated land is identified.
Dangerous Goods (Road and Rail Transport) Act 2008 EPA / SafeWork NSW	A licence is required for the storage (SafeWork NSW) and /or transport (EPA) of prescribed quantities of dangerous goods.	Obtain a licence where storage of dangerous goods would exceed licensable quantities.
Environmental Planning and Assessment Act 1979 Department of Planning and Environment (DPE)	Encourages proper environmental impact assessment and management of development areas for the purpose of promoting the social and economic welfare of the community and a better environment.	Adhere to mitigation measures and conditions within the planning approval documentation. The proponent and their contractors must endeavour to deliver in a consistent manner within the assessed scope of works.

Legislation and Administering Authority	Requirements	Application to Sydney Metro
<p>Heritage Act 1977 NSW Department of Premier and Cabinet</p>	<p>The Act aims to encourage the conservation of the State's heritage and provides for the identification and listing of items of State heritage significance.</p> <p>The Heritage Council must be notified 'of the location of relics unless it is believed on reasonable grounds that the Heritage Council is aware of the location of the relic'.</p>	<p>Projects assessed under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from approvals required under Part 4 and permits required under section 139.</p>
<p>Marine Pollution Act 2012</p>	<p>This Act includes provisions to protect the sea and waters from pollution by oil and other noxious substances discharged from vessels.</p>	<p>Any construction activities requiring the use of a vessel (e.g. a barge) must comply with the requirements of this Act and the Marine Pollution Regulation 2014.</p>
<p>National Parks and Wildlife Act 1974 OEH</p>	<p>The objectives of the Act are for the conservation of nature and the conservation of objects, places or features (including biological diversity) of cultural value within the landscape.</p>	<p>Projects assessed under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from obtaining an Aboriginal Heritage Impact Permit required under section 90.</p>
<p>Biodiversity Conservation Act 2016 OEH</p>	<p>The relevant purpose of the Act is to conserve biodiversity and maintain the diversity and quality of ecosystems.</p>	<p>Projects assessed under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from an order or direction under Part 11 of the Act.</p> <p>The Act also established that other permits and approvals are not required for projects assessed and determined under Part 5, Division 5.2 of the EP&A Act.</p>
<p>Protection of the Environment Operations Act 1997 EPA</p>	<p>The relevant objective of the Act is to prevent environmental pollution.</p>	<p>Where Sydney Metro projects are scheduled activities under Schedule 1 of the Act an Environment Protection Licence (EPL) must be obtained. Further details on the requirements to obtain an EPL are provided in Section 2.3.</p>

Legislation and Administering Authority	Requirements	Application to Sydney Metro
<p>Roads Act 1993 Roads and Maritime Service</p>	<p>The relevant objective of the Act is to regulate the carrying out of various activities on public roads.</p>	<p>Obtain consent under Section 138 for carrying out work in, on or over a public road, or digging up or disturbance of the surface of the road.</p> <p>Under Section 38N of the <i>Transport Administration Act 1988</i>, Section 138 of the <i>Roads Act 1993</i> does not apply to Sydney Metro activities in relation to classified roads for which a council is the roads authority. However, consent from Transport for New South Wales is still required under Section 38N(2) of the <i>Transport Administration Act 1988</i> for those activities described in Section 138(1) of the <i>Roads Act 1993</i>, when carried out in relation to a classified road.</p>
<p>Waste Avoidance and Resource Recovery Act 2001 EPA</p>	<p>The objectives of the Act are to reduce environmental harm, provide for the reduction in waste generation and the efficient use of resources.</p>	<p>Implement strategies to reduce waste volumes and report on waste generated.</p>
<p>Water Management Act 2000 NSW Office of Water</p>	<p>The relevant objective of the Act is to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality.</p>	<p>Sydney Metro projects assessed under Part 5, Division 5.2 of the <i>Environmental Planning and Assessment Act 1979</i> (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.</p>

Key Commonwealth environmental legislative requirements and their application to SM construction works are identified in Table 3, current as at the date of this document. Sydney Metro and its Contractors should regularly review their legislative requirements.

Table 3 Commonwealth Legislative Requirements

Legislation and Administering Authority	Requirements	Application to Sydney Metro
Environment Protection and Biodiversity Conservation Act 1999	The relevant objective of the Act is to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance.	A project may be defined as a controlled action under the Act due to impacts on matters of national environmental significance. If an approval under the Environment Protection and Biodiversity Conservation Act is required for the project, Sydney Metro Principal Contractors must comply with any relevant conditions of the approval.
National Greenhouse and Energy Reporting Act 2007	The Act established a framework for reporting of greenhouse gas emissions, abatement actions, energy consumption and production data.	Report on greenhouse gas and energy usage data as required by the Act.

2.1 Environmental Approvals

All Sydney Metro projects require a planning approval under the *Environmental Planning and Assessment Act 1979*. For infrastructure components, this may take the form of:

- State significant infrastructure or critical State significant infrastructure under Part 5, Division 5.2 of the Act, with the NSW Department of Planning and Environment as the determining authority.
- An approval under Part 5 of the Act, with Sydney Metro as the determining authority.
- Exempt development under Section 1.6 of the Act and in accordance with a relevant State Environmental Planning Policy.

For development components, this may take the form of:

- State significant development under Part 4, Division 4.7 of the Act.
- A local development application under Part 4 of the Act.

The requirements of the relevant approval are required to be complied with by Sydney Metro. Responsibility for implementing mitigation measures and conditions of approval will be allocated between Sydney Metro and Principal Contractors as appropriate. Typically, where there are multiple packages of work, Sydney Metro will produce a Staging Report which sets out the applicability and allocation of approval requirements within the project's program of works.

2.2 Environment Protection Licence Requirements

Sydney Metro projects can meet the definition of a number of scheduled activities under Schedule 1 of the *Protection of the Environmental Operation Act 1997* (POEO Act). Contractors need to review the applicability of Scheduled Activities and assess the need to obtain an Environment Protection Licence (EPL). In other circumstances work may be undertaken using the existing EPL held by Sydney Trains.

Where required, Sydney Metro Principal Contractors will:

- 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.

2.3 Standards and Guidelines

Numerous environmental publications, standards, codes of practice and guidelines are relevant to Sydney Metro construction and are referenced throughout this Construction Environmental Management Framework. A summary of key applicable standards and guidelines is provided in Table 4.

Table 4 Environmental Standards and Guidelines

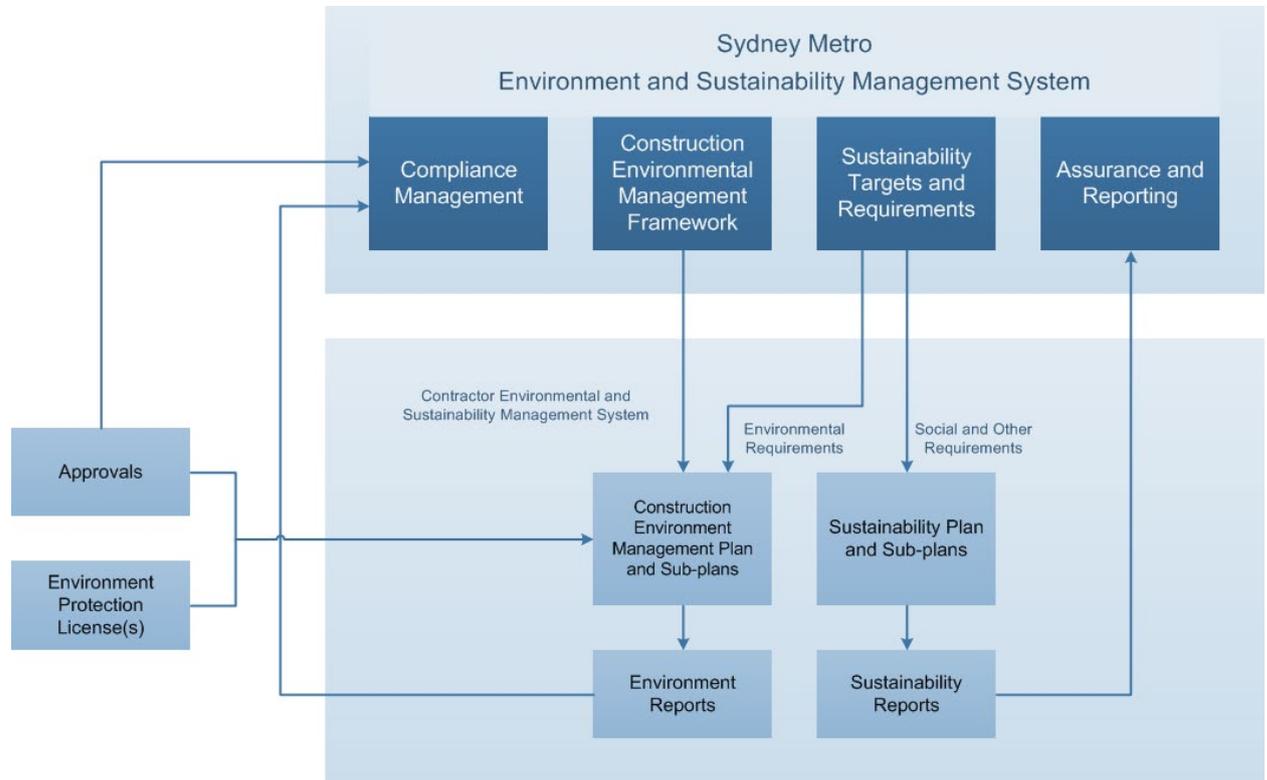
Standard / Guideline	Relevant Authority	CEMF Reference
AS/NZS ISO14001:2016 Environmental Management System – Requirements with Guidelines for Use	DPE	Section 3.1
Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009)	EPA	Section 7.2
Managing Urban Stormwater: Soil and Construction (Landcom, 2008)	EPA	Section 11.2
AS4282:1997 Control of the Obtrusive Effect of Outdoor Lighting	DPE	Section 10.2
Waste Classification Guidelines (Department of Environment, Climate Change and Water, 2008)	EPA	Section 13.2
Australian and New Zealand Guidelines for Fresh and Marine Water Quality	ANZECC	Section 11.2

3. Environmental Management Requirements

3.1 Environmental and Sustainability Management System

- a. Principal Contractors are required to have a corporate Environmental Management System certified under AS/NZS ISO 14001:2016.
- b. Principal Contractors are required to develop a project based Environment and Sustainability Management System (E&SMS). The E&SMS will:
 - i. Be consistent with the Principal Contractors corporate Environmental Management System and AS/NZS ISO 14001:2016;
 - 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 Environment and Sustainability Statement of Commitment and Sustainability Framework.
- c. All sub-contractors engaged by the Principal Contractor will be required to work under the Principal Contractor's Environment and Sustainability Management System.
- d. The relationship between the Sydney Metro Environment and Sustainability Management System and the Principal Contractor's Environment and Sustainability Management System is shown in Figure 1.

Figure 1 Environmental Management and Sustainability Structure



3.2 Sustainability Management Plan

- Principal Contractors are required to prepare and implement a Sustainability Management Plan (SMP) relevant to the scale and nature of the Project Works.
- The SMP must, as a minimum, address and detail the SMP requirements outlined in the table below:

Table 5 Sustainability Requirements for Design and Construction

Reference	SMP Requirements	Design	Construction
SMP1	The relevant requirements of the Sydney Metro Environment and Sustainability Statement of Commitment	•	•
SMP2	A sustainability policy statement	•	•
SMP3	The sustainability management team structure, including key personnel authority and roles of key personnel, lines of responsibility and communication, minimum skill levels of each role and interfaces with the overall project organisation structure	•	•
SMP4	How sustainability initiatives will be identified and integrated into the design of the Project Works	•	

Reference	SMP Requirements	Design	Construction
SMP5	The carbon and energy mitigation measures as detailed in the environmental approval documentation that are applicable to the Project Works	•	•
SMP6	The low carbon strategies and initiatives that will be implemented to minimise the carbon emissions	•	•
SMP7	The energy efficiency strategies and initiatives that will be implemented to minimise energy use	•	•
SMP8	Support innovative and cost effective approaches to energy efficiency, low carbon / renewable energy sources and energy procurement	•	•
SMP9	The strategies and initiatives that will be implemented to enhance the biodiversity	•	
SMP10	The processes and methodologies for assurance, monitoring, auditing, corrective action, continuous improvement and reporting on sustainability performance		•
SMP11	Process (or Processes) for compliance record generation and management		•
SMP12	The processes and methodologies which will be used to achieve the required scores under rating systems identified in General Specification Section 11 – Sustainability	•	•
SMP13	The strategy and methodology for incorporating climate change adaption in designs that respond to the climate change risks and baseline adaptation measures allocated to the Project Works	•	
SMP14	The strategies and initiatives that will be implemented to minimise overall water use, maximise the availability and use of non-potable water sources	•	•
SMP15	Estimates of the quantity of potable water which will be consumed during construction	•	
SMP16	Estimates of the quantity of water from non-potable sources which will be consumed during construction	•	
SMP17	The strategy to reduce material use throughout the project life-cycle	•	•
SMP18	The strategies and initiatives that will be implemented to maximise the use of recycled materials	•	•
SMP19	The strategies and initiatives to recycle and reuse materials onsite	•	•
SMP20	The strategies and initiatives to prioritise the use of materials with a lower embodied impact	•	•
SMP21	Estimates of the Portland cement reduction which will be achieved in concrete (averaged across all mixes) compared to a reference case	•	
SMP22	The strategies and initiatives to prioritise the use of low-VOC, low emission materials	•	•

Reference	SMP Requirements	Design	Construction
SMP23	The use of sustainably sourced and certified timber and wood products	•	•
SMP24	The development of a deconstruction plans to enable recycling and reuse at end-of-life	•	
SMP25	Estimates of fuel consumption	•	
SMP26	Estimates of electricity consumption	•	
SMP27	Estimates of 'Scope 1', 'Scope 2', 'Scope 3' and total carbon emissions (Carbon Emission Targets) that incorporates direct and indirect emissions associated with electricity and fuel consumption, on-site process emissions and embodied emissions for all main materials used	•	•
SMP28	Reporting of carbon and energy will be undertaken in accordance with the National Greenhouse and Energy Reporting Act 2007.		•
SMP29	The strategy and initiatives to influence subcontractors and materials suppliers to adopt sustainability objectives in their works and procurement		•
SMP30	<p>A Sustainable Procurement Policy that must, as a minimum, include:</p> <ul style="list-style-type: none"> ▪ The processes and procedures that will be used to provide environmental and social improvement ▪ The responsibilities of key project personnel with respect to the implementation of the policy ▪ Compliance record generation and management ▪ The processes and environmental and social criteria that will be used for the selection of Subcontractors ▪ The processes that will be used to ensure ethical sourcing of labour and materials ▪ Local sourcing ▪ Where equipment, materials or labour are procured from locations outside Australia, the processes that will be used to ensure human rights impacts and risks are identified and mitigated as well as processes to ensure compliance with modern slavery, and modern slavery reporting 		•
SMP31	The retention of records detailing the consideration of sustainability in the procurement of all materials		•

Reference	SMP Requirements	Design	Construction
SMP32	<p>A Community Benefits Implementation Plan that must, as a minimum, include:</p> <ul style="list-style-type: none"> ▪ Community needs analysis and how this has been informed through input from the local community and stakeholders ▪ Methodology for the development of community benefit initiatives and legacy community benefit initiatives to add value to the communities in which it is working, and demonstrate consistency with the Project Community Benefit Plan ▪ How each initiative aligns with an identified outcome in the Project Community Benefit Plan ▪ How each initiative will be implemented ▪ A monitoring and evaluation methodology to demonstrate the outputs and tangible outcomes achieved, including key performance indicators ▪ A verification process to confirm the outputs and outcomes ▪ A community benefit register which would include details of initiatives submitted for review and approval by the Principal and the date approval is granted by the Principal to undertake the initiative ▪ Tracking of progress against all of the reporting requirements in the Project Community Benefit Plan 		•

3.3 Construction Workforce Development and Industry Participation Plan

a. The Workforce Development and Industry Participation Plan will address and detail:

- i. The proposed response to policies related to skills, apprenticeships, diversity, small business and Aboriginal Participation which will be delivered on the project;
- ii. Proposed appropriately skilled key personnel to support delivery of the workforce development and industry participation requirements;
- iii. Implementation approach, processes and systems to ensure delivery and reporting of workforce development and industry participation priority areas:
 - ♦ Jobs and Industry Participation;
 - ♦ Skills Development;
 - ♦ Diversity and Inclusion; and
 - ♦ Inspiring Future Talent.

3.4 Construction Environmental Management Plan

- 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.
- b. Depending on the scope and scale of the works, Sydney Metro 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.
- 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.
- d. As a minimum the CEMP will:
 - i. Include a contract specific environmental policy;
 - ii. Include a description of activities to be undertaken during construction;
 - iii. For each plan under the CEMP include a matrix of the relevant Conditions of Approval or Consent referencing where each requirement is addressed;
 - iv. For each plan under the CEMP, set objectives and targets, and identify measurable key performance indicators in relation to these;
 - 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 the overall project organisation structure;
 - 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;
 - vii. Identify communication requirements, including liaison with stakeholders and the community;
 - viii. Include induction and training requirements and a summary of the Training Needs Analysis required in Section 3.10(b);
 - ix. Management strategies for environmental compliance and review of the performance of environmental controls;
 - x. Procedures for environmental inspections and monitoring, auditing and review, and reporting on environmental performance including environmental compliance tracking;
 - xi. Include an annual schedule for auditing the CEMP and Sub-Plans that is updated at least monthly;
 - xii. Include procedures for emergency and incident management, non-compliance management, and corrective and preventative action; and
 - xiii. Include procedures for the control of environmental records.
- e. The CEMP and associated sub-plans will be reviewed by Sydney Metro and/or an Independent Environmental Representative (see Section 3.12) 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 NSW Department of Planning and Environment (DPE).

- 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.

3.5 Construction Environmental Management Sub-Plans

- a. Subject to Section 3.4(b) the Principal Contractor will prepare issue-specific environmental sub plans to the CEMP which address each of the relevant environmental impacts at a particular site or stage of the project. Issue specific sub plans will include:
 - i. Spoil management;
 - ii. Groundwater management;
 - iii. Noise and vibration management;
 - iv. Heritage management;
 - v. Flora and fauna management;
 - vi. Visual amenity management;
 - vii. Soil and water management;
 - viii. Air quality management; and
 - ix. Waste management.
- b. Additional detail on the minimum requirements for these sub plans is provided in Sections 5-13 of this CEMF.

3.6 Environmental Procedures and Control Maps

- a. The Principal Contractor will prepare and implement activity specific environmental procedures. These procedures should supplement environmental management sub plans, but may substitute for sub plans in agreement with Sydney Metro if a reasonable risk based justification can be made and the sub plan is not a requirement of any approval.
- b. The procedures will include:
 - 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.
- c. The Principal Contractor will prepare and implement site based progressive Environmental Control Maps (ECM's) which as a minimum:
 - i. Depicts the current representation of the site;
 - ii. Indicate which environmental procedures, environmental approvals, or licences are applicable;
 - iii. Illustrate the site, showing significant structures, work areas and boundaries;

- iv. Illustrate the environmental control measures and environmentally sensitive receivers;
- v. Is endorsed by the Principal Contractors Environmental Manager or delegate;
- vi. Include all the training and competency requirements for relevant workers; and
- vii. Be communicated to relevant workers, including sign-off for the appropriate procedures prior to commencing works on the specific site and / or activity.

3.7 Additional Environmental Assessments

- a. Where the requirement for an additional environmental assessment is identified, this will be undertaken prior to undertaking any construction activities. 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).

3.8 Condition Surveys

- a. Prior to the commencement of construction, the Principal Contractors are to offer Pre-construction Building Condition Surveys, in writing, to the owners of buildings where there is a potential for construction activities to cause damage regardless of severity. If accepted, the Principal Contractor will produce a comprehensive written and photographic condition report produced by an appropriate professional prior to relevant works commencing.
- 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. Dilapidation reports are to include other road infrastructure such as signs, curbs, applicable driveways and pedestrian paths.

3.9 Register of Hold Points

- a. Principal Contractors will identify hold points, beyond which approval is required to proceed with a certain activity. These hold points will be documented in the CEMP or relevant sub-plans. Example activities include vegetation removal and water discharge.
- b. Table 1.4 provides the structure for these hold points to be included in the CEMP as well as an initial list of hold points which will be implemented.

Table 6 Initial list of Hold Points

Hold Point	Release of Hold Point	By Who
Prior to Vegetation Clearing / Ground Disturbance	Pre-clearing inspection Erosion and sediment control plan	Qualified Ecologist Contractor's Environmental Manager or delegate
Discharge of water	Water tested to verify compliance and approval to discharge	Contractor's Environment Manager or delegate
Out of hours works	Noise Assessment	Contractor's Environment Manager
Use of local roads by heavy vehicles	Road Dilapidation Report	Appropriate Professional nominated by Principal Contractor
Construction identified as affecting buildings	Building Condition Survey	Appropriate Professional nominated by Principal Contractor

3.10 Training, Awareness and Competence

- a. Principal Contractors are 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:
 - ♦ Training purpose, objectives and key issues;
 - ♦ Contractor's environmental and sustainability policy(s) 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(s) for environmental hazards and incidents; and
 - ♦ Communication protocols for interactions with community and stakeholders.
 - 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
 - iii. Topic specific environmental training should be based upon, but is not limited to, Issue specific sub-plans required under Section 3.5 (a) (i-xi).

- b. Principal Contractors will conduct a Training Needs Analysis which:
 - i. Identifies that all staff are to receive environmental 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; and
 - 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.

3.11 Emergency and Incident Response

- a. Principal Contractors undertaking work in accordance with an EPL must 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 Sydney Metro procedures and will include:
 - i. Categories for environmental emergencies and incidents;
 - ii. Notification protocols for each category of environmental emergency or incident, including notification to Sydney Metro 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 any regulator or government department);
 - 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 relevant regulators and stakeholders including (but not limited to) the EPA or DPE that are made by the Contractor or Sydney Metro.
- b. The Contractor will make all personnel aware of the plan and their responsibilities.

3.12 Independent Environmental Representatives

- a. Sydney Metro will engage Independent Environmental Representatives (ERs) as required under the applicable planning approval to undertake the following, along with any additional roles as required:
 - 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, Environment Protection Licences, 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 Sydney Metro 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 DPE 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; and
 - vi. Recommend reasonable steps, including 'stop works', to be taken to avoid or minimise adverse environmental impacts.

3.13 Independent Acoustic Advisor

- a. Sydney Metro will engage Independent Acoustic Advisors (AAs) where required under the applicable planning approval to undertake the following, along with any additional roles as required:
 - i. Review, provide comment on and endorse (where required) any relevant noise and vibration documentation to verify it is prepared in accordance with relevant environmental legislation, planning approval conditions, Environment Protection Licences, relevant standards and this CEMF;
 - ii. Monitor and report on the implementation and performance of the above-mentioned noise and vibration documentation;
 - iii. Provide independent guidance and advice to Sydney Metro and the Contractors in relation to noise and vibration compliance issues and the interpretation of planning approval conditions;
 - iv. Ensure that noise and vibration auditing is undertaken in accordance with all relevant project requirements; and
 - v. Recommend reasonable steps, including 'stop works', to be taken to avoid or minimise adverse noise and vibration impacts.

3.14 Roles and Responsibilities

- a. In relation to Roles and Responsibilities the CEMP will:
 - i. Describe the relationship between the Principal Contractor, Sydney Metro, key regulatory stakeholders, Independent Environmental Representative (ER), Independent Environmental Auditor (IEA) and if relevant to the project the Acoustic Advisor (AA) 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 organisational 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; and
 - iv. Where relevant, provide an overview of the role and responsibilities of the Independent Environmental Representative, Independent Environmental Auditor, Independent Acoustic Advisor, the Independent Certifier and other regulatory stakeholders.
- b. All sub-contractors engaged by the Principal Contractor will be required to operate within the EMS documentation of that Principal Contractor.

3.15 Environmental Monitoring, Inspections and Auditing

- a. Issue specific environmental monitoring will be undertaken as required or as additionally required by any approval, permit or licence conditions.
- b. The results of any monitoring undertaken as a requirement of a licence or permit that is required to be published will be published on the Principal Contractor's, or a project specific, website within 14 days of obtaining the results (or as required by a monitoring program).
- c. Environmental inspections will include:
- i. Surveillance of environmental mitigation measures by the Site Foreman; and
 - 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.
- d. Regular site inspections by the Environmental Representatives, Acoustic Advisors and Sydney Metro representatives at a frequency to be agreed with the Principal Contractor.
- e. Principal Contractors must undertake internal environmental audits. The scope will include:
- i. Compliance with any approval, permit or licence conditions;
 - ii. Compliance with the E&SMS, CEMP, SMP, sub-plans and procedures;
 - iii. Community consultation and complaint response;
 - iv. Environmental training records; and
 - v. Environmental monitoring and inspection results.
- f. Sydney Metro (or an independent environmental auditor) will also undertake periodic audits of the Principal Contractor's E&SMS, including this Construction Environmental Management Framework.

3.16 Environmental Non-compliances

- a. Principal Contractors will document and detail any non-compliances with the requirements of any legislative or other requirements. Sydney Metro will be made aware of all non-compliances in accordance with the Sydney Metro Environmental Incident and Non-compliance Reporting Procedure in a timely manner.
- b. Principal Contractors will develop and implement corrective actions to rectify the non-compliances in order to prevent a re-occurrence of the non-compliance. Contractors will also maintain a register of non-compliances and associated corrective actions.
- c. Sydney Metro, the Acoustic Advisor or the Environmental Representative may raise non-compliances against environmental requirements. In these circumstances the Principal Contractor must abide by any requirements of Sydney Metro's procedure for managing non-compliances.

3.17 Environmental Records and Compliance Reporting

- a. Principal Contractors will maintain appropriate records of the following:
 - 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 (eg CEMP, sub-plans and procedures); and
 - iv. Other records as required by this Construction Environmental Management Framework.
- b. Records must be accessible onsite for the duration of works.
- c. Additionally records will be retained by the Principal Contractor for a period of no less than 7 years. Records will be made available in a timely manner to Sydney Metro (or their representative) upon request.
- d. Compliance reports detailing the outcome of any environmental surveillance activity including internal and external audits (refer to Section 3.14) will be produced by the Principal Contractors Environmental Manager or delegate. These reports will be submitted to Sydney Metro at an agreed frequency.

3.18 Review and Improvement of the Environment and Sustainability Management System

- a. Principal Contractors will ensure the continual review and improvement of the management systems. This will generally occur in response to:
 - i. Issues raised during environmental surveillance and monitoring;
 - ii. Expanded scope of works;
 - iii. Environmental incidents; and
 - iv. Environmental non-conformances.
- b. A formal review of the management systems by the Principal Contractor's Senior Management Team will also occur on an annual basis, as a minimum. This review shall generate actions for the continual improvement of the systems and supporting management plans.

4. General Site Works

Figure 2 Aerial View of the Sydney Metro Northwest Station Site



4.1 Working Hours

- a. Standard working hours are between 7am – 6pm on weekdays and 8am – 1pm on Saturdays (or as identified in the planning approval).
- 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 Sydney Roads) for safety reasons;
 - iv. Where it is required to avoid the loss of lives, property and / or to prevent environmental harm in an emergency; and
 - v. Where written agreement is reached with all affected receivers.

- c. Principal Contractors may apply for EPA approval to undertake works outside of normal working hours under their respective Environment Protection Licences. Notification of any licence variation is to be given in writing to Sydney Metro, the Independent Environmental Representative and if applicable the Independent Acoustic Advisor prior to the approved works being undertaken.

4.2 Construction Traffic Management

- a. The management of traffic impacts due to construction is addressed in the Construction Traffic Management Framework (CTMF) which sets out system requirements for management plans and other associated documentation. Requirements in the CTMF must be followed by Principal Contractors.
- b. The Construction Traffic Management Framework (CTMF) sets out the approach to managing traffic impacts during the construction of the Sydney Metro projects. The CTMF also outlines contractor requirements, with reference to third party agreements. Principal Contractors are required to produce these documents in accordance with the CTMF.

4.3 Site Layout

- 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; and
 - vi. Any applicable requirements of the Construction Traffic Management Framework (CTMF).

4.4 Urban Design of Temporary Works

- a. Principal Contractors will ensure as a minimum:
 - i. Temporary construction works consider urban design and visual impacts, including:
 - ♦ Artwork, graphics and images to enhance the visual appearance of temporary works in high visibility locations;
 - ♦ Project information to raise awareness on benefits, explain the proposed works at each site and provide updates on construction progress;
 - ♦ Community information, including contact numbers for enquiries / complaints;
 - ♦ Signage and information to mitigate impacts on local businesses which may be obscured by the construction site;
 - ♦ Sydney Metro advertising / public awareness campaigns; and
 - ♦ Logos / branding, including Sydney Metro, NSW Government, and Contractor branding.
 - ii. The design of all temporary works will require Sydney Metro approval in relation to urban design and visual impacts and Sydney Metro will stipulate the design of hording artwork, including:

- ♦ Sydney Metro advertising / public awareness campaigns; and
 - ♦ Logos / branding, including Sydney Metro, NSW Government, and Contractor branding.
- b. Construction hoardings, scaffolding and acoustic sheds will be regularly inspected and kept clean and free of dust build up. Graffiti on construction hoardings, scaffolding or acoustic sheds will be removed or painted over promptly.
- c. The principles of Crime Prevention Through Environmental Design will be applied to all works, including temporary works, that have a public interface.

4.5 Reinstatement

- a. Mitigation measures required for reinstatement will be incorporated into the CEMP and will include as a minimum:
- 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; and
 - iv. Reinstatement of community spaces, infrastructure and services will occur as soon as possible after completion of construction.

5. Spoil Management

Figure 3 Spoil and Excavation Works at the Showground Site



5.1 Spoil Management Objectives

- a. The following spoil management objectives will apply to the construction of the project:
 - 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.

5.2 Spoil Management Implementation

- 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:
 - i. The spoil mitigation measures as detailed in the environmental approval documentation;
 - ii. The responsibilities of key project personnel with respect to the implementation of the plan;
 - iii. Procedures and methodologies for the haulage and disposal locations, storage and stockpiling arrangements, including those for virgin excavated natural material, contaminated and unsuitable material;
 - iv. Procedures for the testing, excavation, classification, handling and reuse of spoil;
 - v. measures that will be implemented to both reduce spoil quantities and maximise the beneficial reuse of spoil which will be generated during the performance of the Contractor's Activities, including how spoil generation is minimised through the design development process;
 - vi. Details, links or references to where traffic movements in relation to spoil are described, and measures that will be implemented to minimise traffic and noise impacts associated with haulage and disposal of spoil;
 - vii. quantities for reuse of spoil within the Construction Site, for beneficial reuse of spoil off site and for spoil disposal;
 - viii. Processes and procedures for the management of the environmental and social impacts of spoil transfer and reuse;
 - ix. A register of spoil receipt sites that includes the site or project name, location, capacity, site owner and which tier the site is classified as under the spoil reuse hierarchy;
 - x. Spoil management monitoring requirements; and
 - xi. Compliance record generation and management.
- b. Spoil management measures will be included in regular inspections undertaken by the Contractor, and compliance records will be retained. These will include:
 - i. Records detailing the beneficial re-use of spoil either within the project or at off-site locations; and
 - ii. Waste docket for any spoil disposed of to landfill sites.

6. Groundwater Management

6.1 Groundwater Management Objectives

- a. The following groundwater management objectives will apply to construction:
 - 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.

6.2 Groundwater Management Implementation

- a. The following content may be provided within other sub plans such as the Soil and Water Management Plan and Flora and Fauna Management Plan.
- b. Principal Contractors will develop and implement a Groundwater Management Plan for their scope of works. The Groundwater Management Plan will include as a minimum:
 - i. The groundwater mitigation measures as detailed in the environmental approval documentation and Appendix B of this Construction Environmental Management Framework;
 - ii. The requirements of any applicable licence conditions;
 - iii. Details of proposed extraction, use and disposal of groundwater, and measures to mitigate potential impacts to groundwater sources, incorporating monitoring, impact trigger definition and response actions for all groundwater sources potentially impacted by the SSI;
 - iv. Evidence of consultation with relevant government agencies;
 - v. The responsibilities of key project personnel with respect to the implementation of the plan;
 - vi. Procedures for the treatment, testing and discharge of groundwater from the site;
 - vii. Compliance record generation and management; and
 - viii. Details of groundwater monitoring if required.

7. Construction Noise and Vibration Management

Figure 4 Hebel Wall Noise Barrier at the Cheltenham Services Facility Site



7.1 Construction Noise and Vibration Management Objectives

- a. 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.

7.2 Construction Noise and Vibration Management Implementation

- 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:
 - i. Identification of work areas, site compounds and access points;
 - ii. Identification of sensitive receivers and relevant construction noise and vibration goals;
 - iii. Be consistent with, and include the requirements of the noise and vibration mitigation measures as detailed in, the environmental approval documentation, the Sydney Metro Construction Noise and Vibration Standard (CNVS) and Appendix B of this Construction Environmental Management Framework;
 - 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;
 - v. Identification of feasible and reasonable procedures and mitigation measures to ensure relevant vibrations and blasting criteria are achieved, including a suitable blast program;
 - vi. Community consultation requirements and Community notification provisions specifically in relation to blasting;
 - vii. The requirements of any applicable licence or approval (for example EPL);
 - viii. Additional requirements in relation to activities undertaken 24 hours of the day, 7 days per week;
 - ix. Pre-construction compliance requirements and hold points;
 - x. The responsibilities of key project personnel with respect to the implementation of the plan;
 - xi. Noise monitoring requirements;
 - xii. Compliance record generation and management; and
 - xiii. An Out of Hours Works Protocol applicable to all construction methods and sites.
- 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 works proposed to be undertaken outside of standard construction hours and to support applications to undertake out of hours works (this includes variations of EPL's and applications to relevant agencies).
- c. Noise and vibration monitoring would be undertaken for construction as specified in the CNVS.
- 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.

8. Heritage Management

Figure 5 White Hart Inn Excavation Site



8.1 Heritage Management Objectives

- a. The following heritage management objectives will apply to construction:
 - i. Consider heritage values in any architectural design, education or physical interpretation;
 - ii. Minimise impacts on items or places of heritage value;
 - iii. Avoid accidental impacts on heritage items; and
 - iv. Maximise worker's awareness of Aboriginal and Non-Aboriginal heritage.

8.2 Heritage Management Implementation

- a. Principal Contractors will develop and implement a Heritage Management Plan which will include as a minimum:
 - i. Evidence of and processes for consultation with Registered Aboriginal Parties and the NSW Heritage Council;
 - ii. Identification of all heritage buildings and structures, to guide the assessment, retention, protection, conservation, salvage and reuse of heritage elements throughout the work;
 - iii. Identification of initiatives that will be implemented to enhance heritage values and minimise heritage impacts, including procedures and processes that will be used to implement and document heritage management initiatives;
 - iv. The Heritage Management Plan must be prepared in accordance with the relevant conditions of the Planning Approval, and the mitigation measures as detailed in the environmental approval documentation and Appendix B of this Construction Environmental Management Framework, and set out how the Contractor will evidence the achievement of these requirements;
 - v. The responsibilities of key project personnel with respect to the implementation of the plan;
 - vi. Both the methodology and critical stages within the Contractor's Activities for the identification, assessment, retention, protection, conservation, interpretation, salvage and reuse of heritage elements;
 - vii. Procedures for interpretation of heritage items uncovered through salvage or excavation during detailed design;
 - viii. Procedures for the investigation of archaeological relics, objects and/ or sites (where relevant), prior to works commencing that would affect them;
 - ix. Details for the short and / or long term management of objects, archaeological artefacts and/or movable heritage;
 - x. Archaeological management plans for both Aboriginal and non-Aboriginal archaeology;
 - xi. 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);
 - xii. Procedures for unexpected heritage finds, including procedures for dealing with human remains consistent with the Sydney Metro procedures;
 - xiii. Heritage monitoring requirements; and
 - xiv. Compliance record generation and management.
- b. The Contractor's regular inspections will include checking of heritage mitigation measures.
- c. Compliance records will be retained by the Contractor. These will include:
 - i. Inspections undertaken in relation to heritage management measures;
 - ii. Updated salvage registers
 - iii. Archival recordings undertaken of any heritage item;
 - iv. Unexpected finds and stop work orders; and
 - v. Records of any impacts avoided or minimised through design or construction methods.

9. Flora and Fauna Management

Figure 6 Demarcation of Retained Flora



9.1 Flora and Fauna Management Objectives

a. The following flora and fauna management objectives will apply to construction:

- 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.

9.2 Flora and Fauna Management Implementation

a. Principal Contractors will develop and implement a Flora and Fauna Management Plan which will include as a minimum:

- i. The ecological mitigation measures as detailed in the environmental approval documentation and Appendix B of this Construction Environmental Management Framework;
- ii. The responsibilities of key project personnel with respect to the implementation of the plan;
- iii. Procedures for the clearing of vegetation and the relocation of flora and fauna;
- iv. Details on the locations, monitoring program and use of nest boxes by fauna;
- v. Procedures for the demarcation and protection of retained vegetation, including all vegetation outside and adjacent to the construction footprint;
- vi. Plans for impacted and adjoining areas showing vegetation communities; important flora and fauna habitat areas; locations where threatened species, populations or ecological communities have been recorded;
- vii. Vegetation management plan(s) for sites where native vegetation is proposed to be retained;
- viii. Identification of measures to reduce disturbance to sensitive fauna;
- ix. Rehabilitation details, including identification of flora species and sources, and measures for the management and maintenance of rehabilitated areas (including duration of the implementation of such measures);
- x. Weed management measures focusing on early identification of invasive weeds and effective management controls;
- xi. A procedure for dealing with unexpected EEC threatened species identified during construction, including cessation of work and notification of the Department, determination of appropriate mitigation measures in consultation with the OEH (including relevant relocation measures) and updating of ecological monitoring or off-set requirements;
- xii. Details on the methodology for vegetation mapping and survey;
- xiii. Ecological monitoring requirements; and
- xiv. Compliance record generation and management.

b. Principal Contractors would undertake the following ecological monitoring as a minimum:

- i. A pre-clearing inspection will be undertaken prior to any native vegetation clearing by a suitable qualified ecologist and the Contractor's Environmental Manager (or delegate). The pre-clearing inspection will include, as a minimum:
 - ♦ Identification of hollow bearing trees or other habitat features;
 - ♦ Identification of any threatened flora and fauna;
 - ♦ A check on the physical demarcation of the limit of clearing;
 - ♦ An approved erosion and sediment control plan for the worksite; and
 - ♦ The completion of any other pre-clearing requirements required by any project approvals, permits or licences.

10. Visual Amenity Management

10.1 Visual Amenity Management Objectives

a. The following visual and landscape management objectives will apply to the construction of the project:

- i. Minimise impacts on existing landscape features as far as feasible and reasonable;
- ii. Ensure the successful implementation of the Landscape Design; and
- iii. Reduce visual impact of construction to surrounding community.

10.2 Visual Amenity Management Implementation

a. Principal Contractors will develop and implement a Visual Amenity Management Plan for temporary works which will include as a minimum:

- i. The visual mitigation measures as detailed in the environmental approval documentation for construction and Appendix B of this Construction Environmental Management Framework;
- ii. Input from an experienced Landscape or Urban Designer;
- iii. The maintenance of outward facing elements of site hoarding or noise barriers, including the removal of graffiti and weeds;
- iv. Apply the principles of Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting and relevant safety design requirements and detail mitigation measures to minimise lighting impacts on sensitive receivers for all permanent, temporary and mobile light sources;
- v. Identify the processes and procedures that will be used for the incorporation of the principles of Crime Prevention Through Environmental Design (CPTED) in the design and construction of any temporary site facilities; and
- vi. Compliance record generation and management.

b. Visual and landscape measures will be incorporated into the Principal Contractor's regular inspections including checking the health of retained vegetation around site boundaries, checking the condition of any site hoarding and acoustic sheds, and checking the position and direction of any sight lighting.

c. The Contractor will retain compliance records of any inspections undertaken in relation to visual and landscape measures.

11. Soil and Water Management

Figure 7 Erosion and Sediment Controls at the Cudgegong Road Site



11.1 Soil and Water Management Objectives

- a. The following soil and water management objectives will apply to construction:
 - i. Minimise pollution of surface water through appropriate erosion and sediment control;
 - ii. Minimise leaks and spills from construction activities;
 - iii. Maintain existing water quality of surrounding surface watercourses; and
 - iv. Source construction water from non-potable sources, where feasible and reasonable.

11.2 Soil and Water Implementation

- a. 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:
 - i. The surface water and flooding mitigation measures as detailed in the environmental approval documentation and Appendix B of this Construction Environmental Management Framework;
 - ii. Details of construction activities and their locations, which have the potential to impact on water courses, storage facilities, stormwater flows, and groundwater;
 - iii. Surface water and ground water impact assessment criteria consistent with the principles of the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines;
 - iv. 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 project will be sourced, handled, stockpiled, reused and managed; erosion and sediment control measures; salinity control measures and the consideration of flood events;
 - v. A contingency plan, consistent with the NSW Acid Sulphate Soils Manual (EPA 1998), to deal with the unexpected discovery of actual or potential acid sulphate soils, including procedures for the investigation, handling, treatment and management of such soils and water seepage;
 - vi. 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;
 - vii. 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 non-compliance can be rectified;
 - viii. The requirements of any applicable licence conditions;
 - ix. The responsibilities of key project personnel with respect to the implementation of the plan;
 - x. Procedures for the development and implementation of Progressive Erosion and Sediment Control Plans;
 - xi. Identification of locations where site specific Stormwater and Flooding Management Plans are required; and
 - xii. Compliance record generation and management.
- 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.
- 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).

- 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.
- e. Principal Contractors will undertake the following soil and water monitoring as a minimum:
 - 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); and
 - iii. All water will be tested (and treated if required) prior to discharge from the site in order to determine compliance with relevant approvals and licence requirements. 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.
- f. The following compliance records will be kept by the Principal Contractors:
 - 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; and
 - iv. Records of the release of the hold point to discharge water from the construction site to the receiving environment.
- g. The following water resources management objectives will apply to the construction of the project:
 - 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:
 - ♦ 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; and
 - ♦ Providing designated sealed areas for equipment wash down.

12. Air Quality

Figure 8 Dust Mitigation at Northwest Station Site



12.1 Air Quality Management Objectives

- a. The following air quality management objectives will apply to construction:
 - 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.

12.2 Air Quality Management Implementation

- a. Principal Contractors will develop and implement an Air Quality Management Plan which will include, as a minimum:
 - i. The air quality mitigation measures as detailed in the environmental approval documentation and Appendix B of this Construction Environmental Management Framework;
 - ii. The requirements of any approval and applicable licence conditions;
 - iii. Site plans or maps indicating locations of sensitive receivers and key air quality / dust controls;
 - iv. The responsibilities of key project personnel with respect to the implementation of the plan;
 - v. Air quality and dust monitoring requirements; and
 - vi. Compliance record generation and management.

- b. Air quality and dust monitoring will involve the following as a minimum:
 - i. Meteorological conditions will be monitored and appropriate responses will be organised and undertaken periodically by the Principal Contractor;
 - ii. Regular visual monitoring of dust generation from work zones; and
 - iii. Monitoring emissions from plant and construction vehicles to ensure they have appropriate emission controls and are being maintained correctly.
- c. The following compliance records will be kept by the Principal Contractor:
 - i. Records of any meteorological condition monitoring;
 - ii. Records of any management measures implemented as a result of adverse, windy weather conditions; and
 - iii. Records of air quality and dust inspections undertaken.

13. Waste Management

13.1 Waste Objectives

- a. The following waste objectives will apply to construction:
 - i. Minimise waste throughout the project life-cycle; and
 - ii. Waste management strategies will be implemented in accordance with the *Waste Avoidance and Resource Recovery Act 2001* management hierarchy as follows:
 - ♦ Avoidance of unnecessary resource consumption;
 - ♦ Resource recovery (including reuse, reprocessing, recycling and energy recovery); and
 - ♦ Disposal.
- b. Targets for the recovery, recycling or reuse of construction waste, and beneficial reuse of spoil will be provided by the Principal Contractor.

13.2 Waste Implementation

- a. Principal Contractors will develop and implement a Waste Management Plan which will include as a minimum:
 - i. The waste management mitigation measures as detailed in the environmental approval documentation and Appendix B of this Construction Environmental Management Framework;
 - ii. The responsibilities of key project personnel with respect to the implementation of the plan;
 - iii. Waste management monitoring requirements;
 - iv. A procedure for the assessment, classification, management and disposal of waste in accordance with Waste Classification Guidelines; and
 - v. Compliance record generation and management.
- b. Principal Contractors will undertake the following waste monitoring as a minimum:
 - i. Weekly inspections will include checking on the waste storage facilities on site; and
 - ii. All waste removed from the site will be appropriately tracked from 'cradle to grave' using waste tracking dockets.
- c. Principal Contractors will report all necessary waste and purchasing information to Sydney Metro as required for Sydney Metro to fulfil their WRAPP reporting requirements.
- 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.

14. Acronyms

Acronym	
AA	Acoustic Advisor
CEMP	Construction Environmental Management Plan
CNVS	Construction Noise and Vibration Strategy
DPE	NSW Department of Planning and Environment (Formerly Department of Planning, Industry and Environment)
EIS	Environmental Impact Statement
EMF	Environmental Management Framework
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environment Protection Licence (issued by EPA under the POEO Act)
ER	Environmental Representative
ESCP	Erosion and Sediment Control Plan
NOHSC	National Occupational Health and Safety Commission
DPC	Department of Premier and Cabinet including Heritage NSW
POEO Act	Protection of the Environment Operation Act 1997
SM	Sydney Metro
TBM	Tunnel Boring Machine
TfNSW	Transport for NSW

Appendix A – Environment and Sustainability Statement of Commitment



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.
- Publicly report on sustainability performance.



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 TfNSW 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 B – Standard Environmental Mitigation Measures

Table B-1 Standard Environmental Mitigation Measures

Reference	Impact / issue	Mitigation measure
Groundwater		
CEMF-GW1	Requirements for baseline monitoring of hydrological attributes. Migration of contaminants in groundwater and reduction in beneficial uses of aquifers	<p>Monitoring of groundwater levels and quality at the site area would occur before, during and after substantial construction. This would also include monitoring of potential contaminants of concern. Groundwater level data would be regularly reviewed during and after construction by a qualified hydrogeologist.</p> <p>Groundwater monitoring data would be provided to the NSW Environment Protection Authority and NSW Department of Planning and Environment and the Natural Resources Access Regulator for information.</p>
CEMF-GW2	Ground movement and settlement	<p>A detailed geotechnical model would be developed and progressively updated during design and construction. The detailed geotechnical model would include:</p> <ul style="list-style-type: none"> • Assessment of the potential for damage to structures, services, basements and other subsurface elements through settlement or strain • Predicted changes to groundwater levels, including at nearby water supply works. <p>Where building damage risk is rated as moderate or higher, a structural assessment of the affected buildings/structures would be carried out and specific measures implemented to address the risk of damage.</p> <p>Where a significant exceedance of target changes to groundwater levels are predicted at surrounding land uses and nearby water supply works, an appropriate groundwater monitoring program would be developed and implemented. The program would aim to confirm no adverse impacts on groundwater levels or to appropriately manage any impacts. Monitoring at any specific location would be subject to the status of the water supply work and agreement with the landowner.</p>
Construction Noise and vibration		
CEMF-NV1	Construction hours	Construction hours would be in accordance with the ICNG, planning approvals and the EPL (if required), except where otherwise specified in an approved noise management plan.
CEMF-NV2	Construction hours	Work generating high noise and/or vibration levels would be scheduled during standard construction hours or other less sensitive time periods, where feasible and reasonable. Where this is not feasible and reasonable, the works would be carried out as early as possible in each work shift.
CEMF-NV3	Construction hours	When working adjacent to schools, churches and other noise sensitive facilities, particularly noisy activities would be scheduled outside normal operating hours, where feasible and reasonable.

Reference	Impact / issue	Mitigation measure
CEMF-NV4	Airborne noise; Ground-borne noise and vibration	Noisy plant and equipment would be located and operated to minimise the level and duration of impacts on sensitive receivers.
CEMF-NV5	Heavy vehicle movements	Where feasible and reasonable heavy vehicle movements would be limited to daytime hours.
CEMF-NV6	Noise and vibration induction	All employees, contractors and subcontractors would receive an environmental induction. The site induction would include the following as a minimum: <ul style="list-style-type: none"> • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Identification of activities likely to cause complaint • Appropriate behavioural practices such as avoiding unnecessary shouting or 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 • Environmental incident reporting and management procedures.
CEMF-NV7	Airborne noise	Appropriate mufflers and noise attenuation would be fitted on all plant and equipment utilised.
CEMF-NV8	Airborne noise; Ground-borne noise and vibration	Damped hammers such as the 'City' model Rammer hammers and shears/ pulverisers would be used where feasible and reasonable.
CEMF-NV9	Airborne noise	All plant and machinery would be regularly maintained to assist in minimising noise emissions.
CEMF-NV10	Airborne noise	Where significant noise impacts are predicted and/or long periods of construction works are planned, acoustic sheds can be used as an effective mitigation method. For all sites where acoustic sheds are proposed, the sheds would be designed and constructed to minimise noise emissions. This would likely include the following considerations: <ul style="list-style-type: none"> • All significant noise producing equipment that would be used during the night-time would be inside the shed, where feasible and reasonable • Noise generating ventilation systems such as compressors, scrubbers, etc, would also be inside the shed and external air intake/discharge ports would be appropriately acoustically treated • The door of the acoustic shed would be kept closed during the night-time period, where feasible and reasonable. Where night-time vehicle access is required, the doors would be designed and constructed to minimise noise breakout.

Reference	Impact / issue	Mitigation measure
CEMF-NV11	Airborne noise	Use of engine exhaust brakes should be avoided where possible. Air brake silencers would be used on heavy vehicles that access construction sites multiple times per night or over multiple night.
CEMF-NV12	Airborne noise	Non-tonal movement alarms (or an equivalent mechanism) would be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
CEMF-NV13	Airborne noise	Temporary noise barriers / hoarding would be implemented between noise sources and nearby potentially affected noise sensitive receivers, wherever feasible and reasonable. Noise barriers / hoarding would be designed with consideration of on-site heavy vehicle movements with the aim of minimising sleep disturbance impacts.
CEMF-NV14	Construction vibration	Where there is potential for exceedances of the vibration objectives, attended monitoring would be undertaken at the commencement of vibration generating activities to confirm site laws. If, following confirmation of site laws, there continues to be a potential for exceedances, continuous vibration monitoring including audible and visible alarms would be conducted at the nearest sensitive receivers.
CEMF-NV15	Construction vibration	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.
CEMF-NV16	Airborne noise Ground-borne noise and vibration	The community would be kept informed of upcoming construction work including through: <ul style="list-style-type: none"> • Notification letters (including regular monthly notification letters) • Website • Project information and construction response telephone line • Email distribution list • Place Managers
CEMF-NV17	Community preference for noise mitigation and management	Further engagement and consultation would be carried out with: <ul style="list-style-type: none"> • The affected communities to understand their preferences for mitigation and management measures • 'Other sensitive' receivers such as schools, medical facilities or places of worship to understand periods in which they are more sensitive to impacts. Based on this consultation, appropriate mitigation and management options would be considered and implemented where feasible and reasonable to minimise the impacts.
CEMF-NV18	Airborne noise; Ground-borne noise and vibration	A register of relevant noise and vibration sensitive receivers would be kept on site. The register would include the following details for each receiver: <ul style="list-style-type: none"> • Address of receiver • Category of receiver (e.g. Residential, Commercial etc.) • Contact name and phone number

Reference	Impact / issue	Mitigation measure
CEMF-NV19	Noise monitoring	<p>A noise monitoring program would be carried out for the duration of the works in accordance with the Construction Noise and Vibration Management Plan and any approval and licence conditions.</p> <p>Where a sensitive receiver has refused monitoring at their property, monitoring would be carried out at an alternate location if available and deemed representative by an acoustic consultant.</p>
CEMF-NV20	Airborne noise; Ground-borne noise and vibration	<p>All significant noise generating items of plant will be accompanied by certified sound power levels prior to operating at a Sydney Metro construction site. The sound power levels will be subjected to regular audits to ensure they remain within in-service levels of + 2 dB of the Sound Power Level ranges identified in Table 13 of the CNVS. Failure to meet these levels would result in a re-assessment of predicted noise impacts.</p>
CEMF-NV21	Airborne noise; Ground-borne noise and vibration	<p>Appropriate respite periods would be provided. This would include:</p> <ul style="list-style-type: none"> • Consideration of the need to efficiently undertake construction balanced against the communities' preferred noise and vibration management approach • Coordination with any required ancillary works (utility relocations etc.) to minimise overall noise impacts and to avoid scheduling such activities during planned respite periods. <p>High noise and vibration generating activities may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block unless otherwise agreed with the affected parties.</p>
CEMF-NV22	Airborne noise Ground-borne vibration	<p>Construction site layouts would aim to minimise airborne noise impact including:</p> <ul style="list-style-type: none"> • Loading and unloading of materials/deliveries to occur as far as possible from noise sensitive receivers or be appropriately shielded • Site access and egress points and internal roads as far as possible away from noise sensitive receivers and to minimise the need for reversing movement • The offset distance between noisy plant items and nearby noise sensitive receivers would be as great as possible.
CEMF-NV23	Airborne noise	<p>Delivery vehicles would be fitted with straps rather than chains for unloading, wherever feasible and reasonable</p>
CEMF-NV24	Airborne noise	<p>Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.</p>

Reference	Impact / issue	Mitigation measure
CEMF-NV25	Alternative construction methodologies	<p>Alternative construction methodologies and measures that minimise noise and vibration levels during noise intensive works would be investigated and implemented where feasible and reasonable.</p> <p>This would include consideration of:</p> <ul style="list-style-type: none"> • The use of hydraulic concrete shears in lieu of hammers/rock breakers • Sequencing works to shield noise sensitive receivers by retaining building wall elements • Locating demolition load out areas away from the nearby noise sensitive receivers • Minimising structural-borne noise to adjacent buildings including separating the structural connection prior to demolition through saw-cutting and propping, using handheld splitters and pulverisers or hand demolition • Installing sound barrier screening to scaffolding facing noise sensitive neighbours • Using portable noise barriers around particularly noisy equipment, such as concrete saws • Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods • Use of bored piling in lieu of impact piling.
CEMF-NV26	Noise emissions from equipment	<p>Long term construction site support equipment and machinery would be low noise emitting and suitable for use in residential areas, where feasible and reasonable. Examples include:</p> <ul style="list-style-type: none"> • Low noise water pumps for use in water treatment facilities • Low noise generators and compressors • Low noise air conditioner units for use of amenities buildings.
CEMF-NV27	Construction traffic noise	<p>Further assessment of construction traffic would be completed during detailed design, including consideration of the potential for exceedances of the <i>NSW Road Noise Policy</i> base criteria (where greater than 2 dB increases are predicted). The potential impacts would be managed using the following approaches, where feasible and reasonable:</p> <ul style="list-style-type: none"> • On-site spoil storage capacity would be maximised to reduce the need for truck movements during sensitive times • Vehicle movements would be redirected away from sensitive receiver areas and scheduled during less sensitive times • The speed of vehicles would be limited and the use of engine compression brakes would be avoided • Heavy vehicles would not be permitted to idle near sensitive receivers.
CEMF-NV28	Building condition surveys – construction vibration	<p>Condition surveys of buildings and structures near to the tunnel and excavations would be carried out prior to the commencement of excavation at each site, where appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist.</p>

Reference	Impact / issue	Mitigation measure
CEMF-NV29	Cumulative construction noise impacts	The likelihood of cumulative construction noise impacts would be reviewed during detailed design when detailed construction schedules are available. Co-ordination would occur between potentially interacting projects to minimise concurrent or consecutive works in the same areas, where possible. Specific mitigation strategies would be developed to manage impacts. Depending on the nature of the impact, this could involve adjustments to construction program or activities of Sydney Metro West or of other construction projects.
CEMF-NV30	Ground-borne noise	Feasible and reasonable measures would be implemented to minimise ground-borne noise where exceedances are predicted. This may require implementation of less ground-borne noise and less vibration intensive alternative construction methodologies.
CEMF-NV31	Ground-borne noise – cross passages	The proximity of cross passages to nearby receivers and the corresponding construction ground-borne noise and vibration impacts during the excavation works would be considered when determining locations. Relocation of cross passages to be further away from sensitive receivers to mitigate potential construction impacts would be considered, where feasible and reasonable.
CEMF-NV32	Blasting Management Strategies	Blasting would be planned during hours that would cause the least disruption and disturbance to the nearest receivers. Notification protocols prior to blasting for the nearest sensitive receivers would be established.
CEMF-NV33	Blasting Monitoring	Vibration and overpressure measurements would be completed at the start of any blasting activities to confirm that vibration levels are within the blasting criteria.
Heritage		
CEMF-H1	Heritage induction	Induction courses for site workers would include training in the identification of Aboriginal and non-Aboriginal artefacts/relics and management of Aboriginal and non-Aboriginal heritage values.
CEMF-H2	Heritage	Heritage items not affected by the works would be retained and protected throughout construction
CEMF-H3	Unexpected finds	If suspected human skeletal remains are uncovered at any time during the proposed work, procedures outlined in the Sydney Metro Exhumation Management Plan, the Sydney Metro Unexpected Heritage Finds Procedure and Heritage Management Plan would be implemented.
CEMF-H4	Unexpected finds	If unexpected Aboriginal or non-Aboriginal objects / items are identified during construction work, the Sydney Metro Unexpected Finds Procedure would be implemented.
CEMF-H5	Aboriginal consultation	The Aboriginal community consultation process would continue with Aboriginal heritage knowledge holders (including Registered Aboriginal Parties) as per the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (Department of Environment, Climate Change and Water, 2010).

Reference	Impact / issue	Mitigation measure
CEMF-H6	Aboriginal heritage interpretation	If Aboriginal archaeological site/s are recovered during test excavation (and salvage, if required), results would be incorporated into Aboriginal heritage interpretation in consultation with registered Aboriginal parties.
CEMF-H7	Aboriginal heritage interpretation	If Aboriginal archaeological remains are recovered during construction, results would be incorporated into the project specific Designing with Country strategy in consultation with Aboriginal knowledge holders.
Flora and fauna		
CEMF-FF1	Flora and fauna	Vegetated areas to be retained and/or identified adjacent habitat areas would be fenced off prior to works to prevent damage or accidental over clearing
CEMF-FF2	Flora and fauna	<p>Clearing would follow a two-stage process as follows:</p> <ul style="list-style-type: none"> • Non-habitat trees would be cleared first after sign-off of the pre-clearing inspection; and • Habitat trees would be cleared no sooner than 48 hours after non-habitat trees have been cleared. <p>A suitably qualified ecologist will be present on site during the clearing of habitat trees. Felled habitat trees would be left on the ground for 24 hours or inspected by the ecologist prior to further processing.</p>
CEMF-FF3	Flora and fauna	Weed management would be undertaken in areas affected by construction prior to any clearing works. Weed management would be undertaken in accordance with the <i>NSW Biosecurity Act 2015</i> .
Visual amenity		
CEMF-LV1	Visual impacts	Where feasible and reasonable, the elements within construction sites would be located to minimise visual impacts (for example storing materials and machinery behind fencing).
CEMF-LV2	Visual impacts	The design and maintenance of construction site hoardings would aim to minimise visual amenity and landscape character impact.
CEMF-LV3	Visual impacts	Graffiti would be removed promptly from hoardings and any other aspects of construction sites.
CEMF-LV4	Visual impacts	All structures (including acoustic sheds or other acoustic measures, site offices and workshop sheds) would be finished in a colour which aims to minimise their visual impact, if visible from areas external to the construction site. This finish is to be applied to all visible fixtures and fittings (including exposed downpipes).
CEMF-LV5	Lighting impacts	Lighting of construction sites would be orientated to minimise glare and light spill impacts on adjacent receivers and would be installed and operated in accordance with AS4282:1997 Control of the Obtrusive Effect of Outdoor Lighting.
CEMF-LV6	Public art	Construction site hoardings would be designed in accordance with <i>Sydney Metro Brand Design Guidelines</i> and opportunities for public art on hoardings would be considered in locations of high pedestrian use.

Reference	Impact / issue	Mitigation measure
CEMF-LV7	Trees	Opportunities for the retention and protection of existing street trees and trees on the perimeter or within the site would be identified during detailed construction planning.
CEMF-LV8	Trees	Existing trees to be retained would be protected prior to the commencement of construction in accordance with Australian Standard AS4970 the Australian Standard for Protection of Trees on Development Sites and Adjoining Properties.
CEMF-LV9	Trees	Trees removed would be replaced to provide a net increase in the number of mature trees at a ratio of 2:1.
CEMF-LV10	Trees	Where work is required on council land, opportunities would be investigated with the relevant local council to provide plantings in proximity to the impacted areas during construction where feasible and reasonable.
Soils and surface water quality		
CEMF-SSWQ1	Acid sulfate soils	Prior to ground disturbance in areas of potential acid sulfate soil occurrence, testing would be carried out to determine the presence of actual and/or potential acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the <i>Acid Sulfate Soil Manual</i> (ASSMAC, 1998).
CEMF-SSWQ2	Soil salinity	Prior to ground disturbance in high probability salinity areas, testing would be carried out to determine the presence of saline soils. If salinity is encountered, excavated soils would not be reused or would be managed in accordance with <i>Book 4 Dryland Salinity: Productive Use of Saline Land and Water</i> (NSW DECC, 2008). Erosion controls would be implemented in accordance with the 'Blue Book' (Landcom, 2004).
CEMF-SSWQ3	Erosion and sedimentation	Erosion and sediment measures would be implemented at all construction sites in accordance with the principles and requirements in <i>Managing Urban Stormwater – Soils and Construction, Volume 1</i> (Landcom, 2004) and <i>Volume 2D</i> (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the 'Blue Book'. Additionally, any water collected from construction sites would be appropriately treated and discharged to avoid any potential contamination or local stormwater impacts. Temporary sediment basins would be designed to the 80th percentile 5 day rainfall event as a minimum in accordance with <i>Managing Urban Stormwater: Soils and Construction and Managing Urban Stormwater, Volume 2D: Main Road Construction</i> (DECC, 2008). This would include the development and implementation of Progressive Erosion and Sediment Control Plans (ESCPs) for all active worksites, especially works within waterbodies and / or low lying areas.

Reference	Impact / issue	Mitigation measure
CEMF-SSWQ4	Materials storage	<p>A protocol will be developed and implemented to respond to and manage any leaks or spills during construction. Spill kits will be provided at main work sites and ancillary construction sites and chemicals will be stored and handled in accordance with relevant Australian standards such as:</p> <ul style="list-style-type: none"> • AS 1940-2004 The storage and handling of flammable and combustible liquids • AS/NZS 4452:1997 The storage and handling of toxic substances • AS/NZS 5026:2012 The storage and handling of Class 4 dangerous goods • AS/NZS 1547:2012 On-site domestic wastewater management
CEMF-SSWQ5	Wastewater discharge	<p>Construction water treatment plants would be designed so that wastewater is treated to a level that is compliant with the ANZECC/ARMCANZ (2000), ANZG (2018) and draft ANZG (2020) trigger level default guidelines for 95 per cent species protection and 99 per cent species protection for toxicants that bioaccumulate unless other discharge criteria are agreed with relevant authorities.</p>
CEMF-SSWQ6	Water quality monitoring	<p>A surface water monitoring program would be implemented to observe any changes in surface water quality that may be attributable to construction work and inform appropriate management responses.</p> <p>The program would be developed in consultation with relevant stakeholders.</p> <p>Monitoring would occur during pre-construction and construction at all waterbodies with the potential to be impacted. Monitoring would include sampling for key indicators of concern.</p>
CEMF-SSWQ7	Local stormwater capacity	<p>Further design development would confirm the local stormwater system capacity to receive construction water treatment plant inflows. In the event there is a stormwater infrastructure capacity issue with existing infrastructure, mitigation measures such as storage detention to control water outflow during wet weather events would be implemented.</p>

Reference	Impact / issue	Mitigation measure
Hydrology and flooding		
CEMF-HF1	Flooding behaviour impacts	<p>Detailed construction planning would consider flood risk at construction sites. This would include:</p> <ul style="list-style-type: none"> • Identification of measures to not worsen flood impacts on the community and on other property and infrastructure during construction up to and including the one per cent AEP flood event • Provide flood-proofing to excavations at risk of flooding or coastal inundation during construction, where feasible and reasonable, such as raised entry into shafts and/or pump-out facilities to minimise ingress of floodwaters into shafts and any dive structures • Review of site layout and staging of construction works to avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required. This includes design of site hoardings to minimise disruption to flow paths (if possible). <p>Not worsen is defined as:</p> <ul style="list-style-type: none"> • A maximum increase in flood levels of 50mm in a one per cent AEP flood event • A maximum increase in time of inundation on one hour in a one per cent AEP flood event • No increase in potential soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event.
CEMF-HF2	Flooding behaviour impacts	Drainage at construction sites would be designed, where feasible and reasonable, to mitigate potential alterations to local runoff conditions due to construction sites.
CEMF-HF3	Flooding emergency management	Construction planning regarding flooding matters would be carried out in consultation with the NSW State Emergency Service and the relevant local council.

Reference	Impact / issue	Mitigation measure
Air quality		
CEMF-AQ1	Dust impacts	<p>The following dust management measures would be implemented during construction works:</p> <ul style="list-style-type: none"> • Regularly wet-down exposed and disturbed areas including stockpiles, active earthwork areas, unsurfaced haul roads and loads of soil being transported to reduce wind-blown dust emissions, especially during dry weather • Minimise the number of stockpiles onsite, and: <ul style="list-style-type: none"> ○ avoid stockpiling in exposed areas ○ position stockpiles away from surrounding receivers ○ appropriately cover or seal exposed areas prior to periods of no work (e.g. long weekends, picnic day weekends, holiday periods) ○ progressively rehabilitate exposed areas on completion of different work stages, including providing temporary cover and commencing permanent landscaping as early as possible • Wheel-wash facilities or rumble grids would be provided and used near the site exit points, as appropriate • Ensure vehicles and mobile plant: <ul style="list-style-type: none"> ○ use designated haulage and access routes and that appropriate vehicle speeds are assigned on sealed and unsealed roads ○ are covered when entering or exiting the site when carrying loads ○ are maintained in accordance with manufacturer specifications • Dust extraction and filtration systems would be installed for tunnel excavation works and deep excavation with limited surface exposure • The intensity of activities would be adjusted based on measured and observed dust levels and weather forecasts • Consider all relevant measures listed in the <i>Guidance on Monitoring in the Vicinity of Demolition and Construction Sites (Version 1.1)</i>, (Institute of Air Quality Management, 2018) corresponding to the highest level of risk determined around each construction site
CEMF-AQ2	Exhaust emissions from the combustion of fossil fuels	<p>Maintain plant and equipment in a proper and efficient manner including the following tasks:</p> <ul style="list-style-type: none"> • Conduct visual inspections of emissions from plant as part of pre-acceptance checks • Switch off plant and equipment when not in-use • Avoid diesel or petrol-powered generator use wherever possible with mains electricity or battery powered equipment used wherever practicable
CEMF-AQ3	Odour emissions	<p>The following best-practice odour management measures would be implemented during relevant construction works:</p> <ul style="list-style-type: none"> • The extent of opened and disturbed contaminated soil at any given time would be minimised • Temporary coverings or odour suppressing agents would be applied to excavated areas where appropriate • Regular monitoring would be conducted during excavation to verify that no offensive odours are being detected beyond the site boundary.

Reference	Impact / issue	Mitigation measure
Contamination		
CEMF-C1	Management of low risk contamination	<p>For sites where potential contamination risk is moderate, high or very high, a further review of data would be performed.</p> <p>Where the additional data review provides sufficient information to confirm that contamination is likely to have a very low or low risk, the site would then be managed in accordance with the Soil and Water Management Plan. This would typically occur where there is minor, isolated contamination that can be readily remediated through standard construction practices such as excavation and off-site disposal. In these circumstances, a Detailed Site Investigation or Remediation Action Plan would not be required.</p>
CEMF-C2	Detailed Site Investigation	<p>Where data from the additional data review (mitigation measure C1) is insufficient to understand the risk of contamination, a Detailed Site Investigation would be carried out in accordance with the <i>National Environment Protection Measure (2013)</i> and other guidelines made or endorsed by the NSW EPA.</p> <p>The sites requiring a Detailed Site Investigation would be confirmed following the additional data review (mitigation measure C1).</p>
CEMF-C3	Remediation	<p>Where data from the additional data review (mitigation measure C1) or the Detailed Site Investigation (mitigation measure C2) confirms that contamination would have a moderate, high or very high risk, a Remedial Action Plan would be developed for the area of the construction footprint. Each Remedial Action Plan would detail the remediation works required to mitigate risks from contamination throughout and following completion of construction. The Remediation Action Plan would be prepared in accordance with relevant NSW EPA guidelines and where applicable, detail remediation methodologies in accordance with Australian Standards and other relevant government guidelines and codes of practice.</p> <p>Remediation would be performed as an integrated component of construction and to a standard commensurate with the proposed end use of the land.</p> <p>The sites requiring Remediation Action Plans and remediation would be confirmed following the additional data review (mitigation measure C1) and Detailed Site Investigation (mitigation measure C2).</p>
CEMF-C4	Site Audit Statement	<p>Where contamination is highly complex, such as significant groundwater contamination; contamination associated with vapour; contamination that requires specialised remediation techniques; or contamination that requires ongoing active management during and beyond construction, an accredited Site Auditor would review and approve the Remediation Action Plan, and would develop a Site Audit Statement and Site Audit Report upon completion of remediation.</p> <p>The sites requiring Site Audit Statements would be confirmed following the preparation of Remediation Action Plans (mitigation measure C3).</p>

Reference	Impact / issue	Mitigation measure
CEMF-C5	Migration of contaminated groundwater	<p>Where off-site sources of groundwater contamination have been identified, development and implementation of controls to manage the potential impacts of contamination due to drawdown and resulting migration of contaminated groundwater into the construction footprint would be implemented.</p> <p>A review of available groundwater data would be completed to inform the plan. Where insufficient data is available to understand groundwater conditions and the potential for contamination to migrate as a result of the proposal, further investigation would be carried out if considered necessary and if not already undertaken under mitigation measure C2.</p>
CEMF-C6	Unexpected contamination	An unexpected finds protocol would be established to facilitate the quarantining, isolation and remediation of unexpected contamination identified during construction. Any unexpected asbestos identified on site would be managed in accordance with applicable regulatory requirements.
Local business		
CEMF-BI1	Power and utility interruptions	Planned power and utility interruptions would be scheduled to before or after typical business hours where feasible and reasonable. Prior notice would be provided to all affected business owners of the interruptions.
CEMF-BI2	Business visibility and accessibility	Hoarding and screening impacting the visibility of business would be minimised where feasible and reasonable, without compromising public safety or the effective management of construction airborne noise. Clear pathways and signage would be implemented around construction sites to maximise visibility of retained businesses, including sufficient lighting along pedestrian footpaths during night-time where relevant.
Social		
CEMF-S1	Impacts on social infrastructure	Consultation would be carried out with managers of social infrastructure located near construction sites about the timing and duration of construction works and management of potential impacts, with the aim of minimising potential disruptions to the use of the social infrastructure from construction activity.
CEMF-S2	Social impacts	Consultation would be carried out with stakeholders to identify opportunities for public art at construction sites to reflect community values, culture and identity of the local community.
Sustainability and climate change		
CEMF-SCC1	Sustainability implementation	Sustainability initiatives would be incorporated into the detailed design and construction to support the achievement of the Sydney Metro's sustainability objectives.
CEMF-SCC2	Sustainability implementation	Best practice level of performance would be achieved using market leading sustainability rating tools during detailed design and construction.

Reference	Impact / issue	Mitigation measure
CEMF-SCC3	Climate change risks	Climate change risk treatments would be confirmed and incorporated into the detailed design.
CEMF-SCC4	Greenhouse gas emissions	An iterative process of greenhouse gas assessments and design refinements would be carried out during detailed design and construction to identify opportunities to minimise greenhouse gas emissions. Performance would be measured in terms of a percentage reduction in greenhouse gas emissions from a baseline inventory calculated at the detailed design stage.
CEMF-SCC5	Greenhouse gas emissions	25 per cent of the greenhouse gas emissions associated with consumption of electricity during construction would be offset.
Waste and resources		
CEMF-WR1	Waste management	A central waste area (or areas) would be established, at which waste (including recyclables) would be stored or stockpiled. Stockpiles and bins would be appropriately labelled, managed and monitored till being removed from site.
CEMF-WR2	Compliance with legislative and policy requirements	All waste would be assessed, classified, managed, transported and disposed of in accordance with the <i>Waste Classification Guidelines</i> and the Protection of the Environment Operations (Waste) Regulation 2014.
CEMF-WR3	Disposal of hazardous materials	A hazardous material survey would be completed for those buildings and structures suspected of containing hazardous or special waste materials (particularly asbestos) prior to their demolition. If hazardous waste or special waste (e.g. asbestos) is encountered, it would be handled and managed in accordance with relevant legislation, codes of practice and Australian standards.
CEMF-WR4	Waste minimisation	Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging.
CEMF-WR5	Reuse and recycling	Waste streams would be segregated to avoid cross-contamination of materials and maximise reuse and recycling opportunities.
CEMF-WR6	Reuse on Sydney Metro West sites	A materials tracking system would be implemented for material transferred between sites and to offsite locations such as licensed waste management facilities.
CEMF-WR7	Waste management	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.
Hazards and hazardous materials		
CEMF-HA1	Impacts on underground utilities	Dial before you dig searches and non-destructive digging would be carried out to identify the presence of underground utilities in areas where additional land is required.

Reference	Impact / issue	Mitigation measure
CEMF-HA2	Compliance with legislative and policy requirements	All hazardous substances that may be required for construction would be stored and managed in accordance with the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005), the Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, Industry and Environment, 2011) the Work Health and Safety Act 2011 (Commonwealth and NSW) and the requirements of the Environmentally Hazardous Chemicals Act 1985 (NSW).
CEMF-HA3	Management of hazardous materials	A hazardous materials analysis would be carried out prior to stripping and demolition of structures and buildings associated with rail integration works which are suspected of containing hazardous materials (particularly asbestos). Hazardous materials and special waste (such as asbestos) would be removed and disposed of in accordance with the relevant legislation, codes of practice and Australian Standards (including the Work Health and Safety and Regulation 2011 (NSW)).
Cumulative impacts		
CEMF-CI1	Occurrence of cumulative impacts	<p>Coordination and consultation with the following stakeholders would occur where required to manage the interface of projects under construction at the same time:</p> <ul style="list-style-type: none"> • Other parts of Transport for NSW • NSW Department of Planning and Environment • Port Authority of NSW • Local government • Emergency service providers • Utility providers • Construction contractors. <p>Co-ordination and consultation with these stakeholders would include:</p> <ul style="list-style-type: none"> • Provision of regular updates to the detailed construction program, construction sites and haul routes • Identification of key potential conflict points with other construction projects • Developing mitigation strategies in order to manage conflicts. Depending on the nature of the conflict, this could involve: <ul style="list-style-type: none"> ○ Adjustments to construction program, work activities or haul routes of conflicting projects ○ Co-ordination of traffic management arrangements between projects.